Water Reuse Planning for the State of Washington

Workshop Report

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Water Reuse Planning for the State of Washington

WORKSHOP REPORT

Facilitated by:
National Water Research Institute

In cooperation with:

Washington State Department of Ecology

May 30-June 1, 2003

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FOREWORD

Water utilities are enthusiastic about the option of using water reuse as a viable alternative to increasing water supplies. This enthusiasm has come about because of the many advances in membrane technologies, which have enabled utilities to produce high-quality water from effluent water sources. In particular, membrane performance has been greatly improved due to increased rejection of dissolved solids, lower pressure requirements, reduced fouling, and increased energy recovery. These improvements have all contributed to lowering the cost of production. Water reuse is, therefore, a more widely acceptable option and considered by many today as the "best available technology" for delivering a high-quality, reliable, and sustainable product.

Nevertheless, a host of challenges remain to be addressed if utilities in the State of Washington are to optimize water reuse as a viable option to expanding source waters. High-quality drinking water is one of many demands placed on source waters by population centers, especially those experiencing the uncertainties of climate change and natural population growth. In general, the public does not recognize the connection between water resources and the economy. This lack of understanding is probably due in part to the fact that water utility managers provide high-quality water 24-hours a day, 7 days a week to their customers, who take for granted that the service will never cease and there will always be water coming from their taps.

Washington State has been involved in water reuse activities over the past 10 years. With 16 plants throughout the state, Washington is among the nation's leaders in water reuse activities. This workshop represents the first collaborative effort between NWRI and the Washington State Department of Ecology, wherein NWRI has pledged to assist Ecology in developing and implementing a sustainable statewide water reuse program.

The workshop is based on the Nominal Group Technique (NGT), which was developed by Andre Delbecq, Ph.D., while at the University of Santa Clara. The NGT offers a format that addresses a focused question that no single person can answer but who can, in concert with others, can identify issues and define options to approaching a resolution to the question. The process is rigorous and robust, and its protocol provides a controlled environment that allows every voice to be heard regardless of perspective. The ability of the workshop participants to focus on a single question allows for the maximum use of time and energy during an intensive 2 days. Since 1992, NWRI has utilized the NGT format as a process of identifying, prioritizing, and developing approaches to address critical local, state, and national water issues. The participants attending were invited because of their expertise and credibility in their respective fields.

This report documents the results of the efforts of the 33 workshop participants who provided their expertise to answer the question: *What issues must be addressed to enable the State of Washington to facilitate the development and implementation of a sustainable water reuse program?*

This report comprises two parts: Part 1 (Working Group Reports) presents a more detailed version of the top 10 issues that were prioritized from the 17 consolidated issues generated during the NGT portion of the workshop. Participants were assigned to one of the 10 working

groups and asked to digest and synthesize all of the individual issues consolidated under their particular overarching issue. The power point slides used by the working group during their presentations can be found in Appendix E.

Part 2 (NGT Workshop) reports the results of the issue identification and consolidation elements of the workshop. The participants identified 86 issues that were consolidated into 17 overarching themes. The fact the participants were able to identify 86 issues suggests the significance of the workshop question from their individual perspectives.

The success of any activity is due in great part to the participants and their enthusiasm for engagement in the process. The participants in this workshop are to be commended for just that, great enthusiasm! In particular, Mrs. Kathy Cupps is recognized for providing the "glue" to the planning process that made the workshop possible.

Thanks is extended to the NWRI team that facilitated the workshop: Brian Brady, who so masterfully served as the Workshop Secretary and kept track of the issues to ensure their clarity; Tammy Russo, Workshop Coordinator; Patricia Linsky and Gina Melin, Editors; Barbara Close, Graphic Coordinator; Aura Javellana, Laura Cox, Marci Farmer, Word Processors; Raymon Thomas, Graphics Assistant; and Jo Sullivan, Photographer.

Ronald B. Linsky
Executive Director
National Water Research Institute

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PRIORITY 1

Develop Rational, Scientifically Supportable Water Reuse Standards That Are Protective of Public Health and the Environment

WORKING GROUP MEMBERS:

Crook, Loge, Rosain, and Sakaji

Issue Description:

The State's current water reuse standards are modeled after California's criteria, which may or may not be appropriate for Washington State. Washington's standards are based on research, experience at operating facilities around the country (particularly those in California), scientific literature, so-called "good engineering practice," input from stakeholders, and, ultimately, professional judgment by regulators. The standards rely on indicators or surrogates to characterize the safety of reclaimed water. Currently used indicators do not adequately represent reclaimed water quality from the standpoint of public health and environmental protection. Better indicators of microbial and chemical contaminants are needed to represent constituents of concern, and more advanced analytical techniques are needed to adequately characterize risks to public health and the environment. Thus, while Washington's current standards generally are considered to be conservative, questions remain as to whether the standards are overly conservative or not protective enough.

Current water reuse standards in Washington and elsewhere in the United States are not based on risk-assessment methodology. Risk-assessment techniques need to be incorporated as one of the tools to be used during the development of standards, using current methodologies modified with appropriate assumptions and research to fill key data gaps.

Importance:

Scientifically supportable standards are critical to provide an adequate, but not excessive, level of health protection and to help secure public, political, and user acceptance. Overly conservative, or overly liberal standards, could lead to either excessive costs or unreasonable health risks.

The principal objective of reuse guidelines and standards is to protect public health and the environment by providing minimum-acceptable requirements. The current standards lack an explicit integration of water quality and health, are not defensible from a health standpoint, and

do not reflect the unique geographic attributes of the State. In addition, the current standards are not adaptable to either emerging biological and chemical constituents of concern or emerging and innovative treatment and analytical monitoring technologies. Individual- and multiple-contaminant removal barriers need to be incorporated into reclaimed treatment facilities to ensure adequate health protection from specific contaminants of concern. It is important to understand that underlying health objectives should not be compromised by substituting inappropriate levels of treatment.

The absence of a standardized protocol to evaluate the acceptability of proposed alternatives and their reliability features to accepted treatment processes can result in unknown goals and procedures that may cause unnecessary and costly studies and/or documentation by proponents, lengthy turn-around times to determine equivalency, and inconsistent – and possibly incorrect – decisions by regulators. The revised standards/guidelines must be adaptable to address the issue of equivalency. Refer to Priority 9 for implementation strategies related to treatment process water quality and reliability.

How Do You Propose Meeting or Complying with This Issue?

- Form a multidisciplinary technical working group and scientific advisory board of recognized experts in various areas of expertise (e.g., environmental engineering, microbiology, human health, epidemiology, human and eco-toxicology, risk assessment, regulations) to help develop revised standards.

  Considerations include, but are not limited to:
  - identifying information gaps related to the presence, identification, health risk, and environmental effects of microbial and chemical constituents
  - treatment technology needs and performance
  - microbial and chemical constituents of concern
  - constituent limits
  - analytical monitoring techniques
  - monitoring frequency
  - using a risk-based paradigm similar to the U.S. Environmental Protection Agency's (USEPA) methodologies

- Decide whether water-quality standards should follow the USEPA drinking-water paradigm or should be strictly health-based. Risk managers must make a choice after carefully weighing input from the scientific advisory board.

- Need the State to closely monitor the progress and results of research that is currently underway by several research organizations to identify better microbial and chemical indicators in reclaimed water.

- Review existing regulations from other states and the rationale behind them, as well as current literature and current research.

- Need the State to play an active role in addressing key data gaps that are specific to revised standards and do not solely rely on information in the literature or experience from other regulatory agencies.

- Update standards based on supportable scientifically based information using risk assessment as one of the tools, and provide documentation of the rationale supporting the standards.

- Provide a scientific basis for evaluating new and/or innovative treatment technologies.

- Establish performance and reliability criteria for existing unit operations and processes.

- Evaluate the impact of integrating variants of unit-treatment processes on product water quality.

Who Are The Individuals Best Able to Address, Illuminate, Refine, and Focus This Issue?

- Jim Crook, Water Reuse Consultant, Boston, Massachusetts.

- Frank Loge, Washington State University.

- Bob Rosain, Parametrix, Inc., Kirkland, Washington.

- Rick Sakaji, California Department of Health Services (CDHS).

- Bob Bastian, USEPA.

- Phil Berger, USEPA.

- Mark Borschardt, Marshfield Medical Research Foundation, Wisconsin.

- Dick Bull, MoBull Consulting, Richland, Washington.

- Bob Cooper, BioVir Laboratories, Benicia, California.

- Ric DeLeon, Metropolitan Water District of Southern California (MWD).

- Chuck Gerba, University of Arizona.

- Christine Moe, Emory University.

- Joan Rose, Michigan State University.

- Mark Sobsey, University of North Carolina, Chapel Hill.

- Jeff Soller, EOA, Inc., Oakland, California.
- Dave Spath, CDHS.
- Bill Stubblefield, Parametrix, Inc., Kirkland, Washington.
- George Tchobanoglous, University of California, Davis.
- Rhodes Trussell, Montgomery Watson Harza, Pasadena, California.

Budget:

$1.5 to 2.0 million.

Comments:

"How will the proposed method ensure that the result will be specifically focused on Washington's issues?" – ***Art Benedict***

"Make the criteria establishment a two-step process. First, establish human and environmental 'risk-based' criteria. Then use a policy process to establish regulatory standards that take into account cost, etc." – ***Lynn Coleman***

"Change to public health and the environment to show dual-agency roles. Budget $1- to 2-million scope. Salmonid – instream flows important." – ***Kathy Cupps***

"Demonstrating compliance with standards should not impose an unacceptable burden on the reclamation facility operator. Compliance-testing protocol should be adequate to demonstrate compliance with reliability, but low complexity and cost." – ***Larry Esvelt***

"Need to adjust language so that we do not create public concern that there is great risk" – ***Tom Fox***

"I agree with Tom Fox's comment that the 'headline' of report should not be that current standards are not protective of public health. That headline can be inferred from the topic statement that such protective criteria need to be developed." – ***Adam Gravley***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1 through 10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"Is it necessary (a high priority) for Washington State to support such a committee effort, or could the State rely on the work of other professional organizations and technical guides already developed? – ***Jim Milton***

"Deciding whether water quality standards should follow the USEPA drinking water paradigm or be strictly health-based will be a choice of the risk managers after carefully weighing input from the scientific advisory board. – ***Rick Sakaji***

"Water reuse discussions that set standard methods of treating, testing, and rendering harmful elements (e.g., microbes and pathogens from waste water) may raise public questions related to the reuse of animal by-products entering the food chain, which has resulted in Bovine Spongiform Encephalopathy (BSE). Chronic Wasting Disease (CWD) in the 'wild' (where the epidemiology of the disease is not fully understood), Creutzfeldtf-Jacob's Disease, and other Transmissible Spongiform Encephalopathies all have the common denominator of (virus-like) prions. In Alzheimer's disease, similar plaque develop and are composed of fragments of proteins, (e.g., prion protein [PrP]).[1] As public information is developed, 'hot' topics (e.g., Canada BSE and Wisconsin CWD) may need to be addressed to demonstrate awareness and have techniques in place to allay concerns.
Some relatively small risks become powerful elements of arguments. – ***Harry Yamamoto[1]***

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1 Technical Report: Transmissible Spongiform Encephalopathies: A Review for Pediatricians (T109906), Pediatrics, Volume 106, Number 5 , November 2000, pp 1160-1165.


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PRIORITY 2

Need for the State to Take a Leadership Role

WORKING GROUP MEMBERS:

Coleman, Cupps, Fox, and Sander

Issue Description:

The Washington State Departments of Ecology (Ecology) and Health (DOH) are charged by State law to take the steps necessary to facilitate water reclamation and reuse to meet the future water needs of the state. Over the next 5 to 10 years, the State must take an active leadership role to build the strong foundation needed to accomplish this goal. Clear priorities and decisive action on those priorities will be essential to the success of this endeavor. Both State staff and the regulated community are still learning how to best implement this program. Agencies operate under a number of constraints, including the following:

- Restricted state funding.
- Limited number of trained staff.
- Different workload priorities between agency programs.
- Complex and diverse issues.
- Lack of available "wet water" data.
- Variety of competing interests within the state.
- Need to be responsive to stakeholders (provide public service).

Given these challenges, state agencies must creatively seek and develop innovative solutions to provide responsible program stewardship and implementation.

Leadership will be required at several levels of state government. The Governor and Legislature's understanding and financial support of the long-term (i.e., over the next 50-plus years) importance of water supply are needed. State agency management will need to coordinate state program priorities to address projects that encompass multiple State programs and agencies. The State staff needs to understand and support the appropriate role of water reuse as a tool in water supply.

Importance:

- The importance of water in ensuring the state's economic, environmental, and societal well-being cannot be overstated. The State has an environmental stewardship responsibility. Utilities, consultants, decision makers, and the public look to state agencies for regulatory requirements, direction, assistance, and appropriate enforcement. Intra- and interagency incongruity or inaction may confuse, delay, add costs to projects, or result in incomplete or poor decisions.

- Comprehensive and consistent direction from the State is needed to ensure that water reuse, as envisioned by State law, is fully considered at the early stages of water-and wastewater-planning processes and implemented when it is beneficial to do so.

- Continued unlimited, or essentially unrestricted, access to public water is not in the long-term interest of the public.

- Public health and the environment must be protected.

How Do You Propose Meeting or Complying with This Issue?

- *Act on the NGT Workshop Results*. This NGT workshop provides the necessary first steps to build the framework. The State should use this workshop report to convey the information to all levels of government. Information must also be shared with a wider audience, including those invited who could not participate in the workshop, and other interested parties. The document will, therefore, be available as an Ecology publication. The State must further actively seek ways to focus and act on the priorities established during this workshop. There is a great deal of information to assimilate. Follow-up discussions with the NWRI advisory panel, state-agency management and staff, and stakeholders are needed to reinforce and help set that direction.

- *Continued Funding and Legislative Support.* The State must have the resources to implement the water-reclamation and reuse program. At a minimum, the continued level of funding is essential for a very basic level of service. Increased funding support must be found to pay for desired state services. Priorities should be evaluated each biennium, and timelines and milestones should be established that reflect the availability of state resources to implement the projects.

- *Maximize Use of Agency Resources*. Ecology and DOH both have jurisdiction over different areas of water reuse. It is desirable to have better coordination and to eliminate the duplication of efforts. Implementation and permitting should continue to occur at the regional level, and additional tools must be provided to help the regional staff. Ecology has established an interagency staff-level Water Reuse Workgroup to assist regional staff with implementation issues. The regional staff is encouraged to contact workgroup representatives and agency specialists for project support. The workgroup is currently

developing guidance for the State permit writer's manual. This should help provide more consistent implementation.

- *Partnerships*. Many organizations outside Washington have a wealth of experience that can be used by, and contribute to, water reuse practitioners in Washington. Communication between these organizations would prevent a duplication of efforts, increase the credibility of decisions, and leverage scarce resources.

  The neighboring states of Oregon and Idaho share many common needs and interests. Consolidating information and efforts would result in shared costs in and decreased expenses for all.

  The Water Reuse Committee of the Pacific Northwest Clean Water Association (PNCWA)/Water Environment Federation (WEF) can also serve as a forum for partnering efforts both within Washington and between the three Pacific Northwestern states.

  A standing diverse stakeholder committee should be established to work in partnership with the State to continue to address these issues. The NGT participants and invited parties can form the basis of this committee. Help should also be solicited from various existing state advisory committees.

- *Access and Inform*. Agency specialists must be able to more quickly access this information and, just as importantly, be able to assess the applicability of this information to Washington State.

  State agency water reclamation and reuse specialists must actively participate in state, regional, and national forums, organizations, workshops, and conferences to access and exchange information and maintain skills, as well as to establish contacts and form partnerships.

  Information must be transferred to other agency staff, stakeholders, and the general public. The State should use agency publications, websites, and links to other sources of information, as well as sponsor and participate in technical and educational workshops and conferences at local, state, and regional levels. This could be done in partnership between state agencies, universities, and organizations, such as the PNCWA, to share the workload and reduce costs. Fees could be assessed, as necessary, for cost recovery.

- *Database*. Gather information for needed databases on how water is being used within the State. Resource support is needed.

- *Develop Markets*. Before there can be a water reuse program, there must be a demand for the water. Users must realize the value of the resource. Illegal users will be required to stop using public water. New users and diverters using water from streams and aquifers in "critical" watersheds will be required to convert to reclaimed water when it is available.

- *Set An Example*. The State should also set an example and reuse water in public projects, buildings, and landscape areas, wherever practical.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

- State Legislature.
- Governor.
- State Federal House and Congressional representatives.
- Ecology: Director, executive staff, and program management teams.
- State Water Reuse Coordinator (Kathy Cupps) and interagency Water Reuse Workgroup.
- DOH: Secretary and Division Directors.
- NGT working groups' members.
- A Standing Diverse Stakeholder Committee.
- Appropriate subcommittees.
- NWRI support (Ron Linsky) and a panel of independent experts.
- States of Oregon and Idaho.
- PNCWA Water Reuse Committee.
- WEF, American Water Works Association (AWWA), and WaterReuse Association.

Budget:

- *Minimum:* Continue the existing level of support.
- *Maximum:* The real cost of water.
- The costs for this priority are functions of:
  - current spending
  - implementing other priority elements from the workshop
  - gathering and compiling water resources data

- enhancing the administration (enforcement) of state water resources
- implementing reuse in state-owned facilities

Not all of these costs should be borne by the water reuse program or by state regulatory agencies. The budget for this workgroup priority needs to reflect the key priorities of the workshop.

Comments:

"Consider drawing on existing resources within DOH and Ecology (Drinking Water, Wastewater, Water Resources, and Water Quality Divisions) to provide fell-time equivalents (FTEs). This could require a reorganization and reorganization of resources and take several years to implement." – ***Richard Benson***

"Partnering with reclamation facility owners may be a means of extending or leveraging resources. Partnering with other agencies, including Washington and adjacent states, federal agencies, and profit and non-profit organizations may assist in extending or leveraging resources. A solution of water rights issues is essential." – ***Larry Esvelt***

"Whereas the Watershed Planning 2514 process can contribute to the state in assuming a leadership role in reuse, it is important to keep in mind that 2514 planning units do not exist at present for the Snohomish, Stillaguamish, Cedar, and Green River watersheds, just to name a few." – ***Kevin Fitzpatrick***

"It was suggested that water-rights issues be addressed and resolved as part of the State's leadership role in water reuse. This would be great to achieve, of course. I add a cautionary note. Taking contentious water-rights issues – except wells, for example – as part of the water reuse program would likely bring unneeded divisions into water reuse. Be careful of tackling contentious water-rights issues that are not central to advancing water reuse." – ***Adam Gravley***

"State that the current budget is not sufficient for the State to take a leadership role in a visible manner. Consider linking lack of resources to the workshop question. With the current budget, the State cannot facilitate the development and implementation of a sustainable reuse program." – ***Art Griffith***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1 through 10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"Water rights must be addressed as the first and central issue in creating markets for reclaimed water. The State should confer an outside review panel to assess the current reuse regulatory structure within the state, and to make recommendations for improvement. The panel should be convened by the State Legislature with the intention of acting on the committee's findings and implementing the committee's recommendations." – ***Frank Loge***

"Explain unlimited access to water versus the State setting an example or developing a market. Develop a water market to resolve water rights issue." – ***Craig Riley***

"Is the existing budget sufficient to maintain or expand your program? Do you have the necessary spending authority to build a program? The program may want to consider a 'fee for service' type of program to maintain the state water reuse regulatory program. Fees should cover annual inspections, permit amendments, technology evaluation, etc., and should not be limited solely to a 'one-time permit application fee.' Fee structure should be reviewed every 2 to 3 years and include overhead for continuing education." – ***Rick Sakaji***

PRIORITY 3

Develop Economic, Political, Legal, and Resource Incentives to Encourage Municipalities, Utilities, and Businesses to Build and Use Reclaimed Water Systems

WORKING GROUP MEMBERS:

Fowler, Gravley, and McKinley

Issue Description:

Whether installed by utilities, developers, or other entities, the cost to build a completely separate, second water-distribution system is high and without hope of recouping that investment through rates that must be lower than rates for potable water. An "Economic Analysis of Reclaimed Water Distribution and Use," conducted for the LOTT Wastewater Alliance by R.W. Beck in 2002, indicates reclaimed-water distribution will not be economically viable for the foreseeable future when viewed from a purely rate-revenue perspective.

One of the key impediments to the use of reclaimed water is the expense of creating a system of pumps and pipes to move water from the wastewater treatment plant to the place of use (e.g., golf course, industry, etc.).

Once construction and operating costs are calculated, the cost of acquiring "new" water is often much less than the cost of reusing water, thereby preventing a reuse project from moving forward. As the costs of "new" water increase, this equation will change. More significant and direct financial incentives would change the situation sooner.

The State of Washington is largely rural, with many reuse projects implemented in regions without a diverse economic base. Many projects are implemented under the perceived notion that reuse is "good," with no tangible economic return to offset the elevated capital and operating costs.

The cost of raw water to the consumer/user is typically well below the actual cost of reuse water. Raw-water extraction, treatment, connection, permitting, and use are usually less expensive than water reuse. The economics simply do not often favor reuse.

Will development projects be encouraged to use reclaimed water through command and control regulations or incentives? The use of reclaimed water in place of potable water can result in higher costs for some projects.

Importance:

High capital costs serve as economic disincentives to the beneficial use of reclaimed water. Many beneficial environmental uses, such as stream flow enhancement and wetland augmentation, offer no direct financial return through rates.

If major reuse customers cannot acquire the water, then they cannot reuse it. A successful reuse program requires large users upfront to create the incentives and models for other users to follow.

Growth and sustainability of reuse require a base of appropriate incentives at the scale of implementation.

Cost is often the primary determinant in assessing a project's feasibility, or in raw *versus* reuse water decisions. This is particularly the case with industrial reuse decisions. A case in point: the Simpson Tacoma Kraft pulp and paper mill uses 30-million gallons per day (mgd) of raw water that could be switched to reclaimed water, with sufficient economic incentives.

Business development projects tend to have high water demand, significant financial capability, and complex permitting and regulatory objectives. They can help address issues of demand and infrastructure cost.

How Do You Propose Meeting or Complying with This Issue?

- Give local governments "carrots and sticks" statutory authority to encourage and/or require the use of reclaimed water for nonpotable purposes.

- Develop a State policy approach, guidelines, and mechanisms to use reclaimed water for water rights mitigation, to include:
  - giving higher priority or expedited review of water rights requests that are offset with reclaimed water mitigation credits
  - prioritizing transfers of existing potable water rights from large water users who are willing to convert to reclaimed water (e.g., golf courses)
  - earning mitigation credits by using reclaimed water for stream flow augmentation, wetlands enhancement, habitat enhancement, aquifer recharge, and other environmental purposes

- Establish a mechanism in existing funding programs (e.g., State Revolving Funds, Public Works Trust Fund, and/or others) to offer grants and/or low interest loans to stimulate the installation of infrastructure for reclaimed water distribution and use. Special focus could be

placed on broad-based community distribution, year-round uses, environmental enhancements, or innovative applications. Consider allowing grants and loans from these funds based on two factors: the ability to pay and quality of the project.

- Provide tax incentives for corporations.
- Explore developing of pollution credits.
- Provide permitting or regulatory credits.
- Provide preferential siting (e.g., power plants).
- Provide public utility tax incentives to local governments.
- Establish enabling legislation that would allow local government to provide discount programs for customers who reuse water – similar to the discounts provided to low-income seniors.
- Integrate purple pipe facilities into Department of Transportation, Transportation Improvement Board, and County Roads Administration Board transportation project ranking. Consider allowing purple pipe installation as an eligible project cost for those same programs.
- Provide authority to the Washington Utilities and Transportation Commission (WUTC) to require electric and gas utilities to bear a significant portion of the costs of facility relocation, when necessary, for water reuse projects.
- Research community/utility incentives used in other states to encourage the development of reclaimed water distribution systems. Many of these incentives are likely to involve water right credits.

Most or all of the above items would need standards, eligibility criteria, or other gatekeeping mechanisms to ensure that high value water reuse projects are implemented.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

- State Legislature.
- Departments of Ecology, Community Development, Transportation, and others.
- Local governments.
- Business community.

Budget:

Assume $25 million annually over a 50-year period, to be paid by private businesses, local governments, and state government.

Comments:

"(1) The use of natural water bodies streams, lakes, wetlands, and groundwater for the transmission of reclaimed water from producers to user would reduce the cost of 'purple pipes' in some locations and applications. Enabling legislation or regulation is needed to allow the intermixing and subsequent withdrawal of reclaimed water from 'natural' water, so long as the quality of each is protected. (2) Adjust or revise 'other' regulations that place industrial production at risk without specifically addressing health- or environment- associated factors and that may result in litigation or product distribution restrictions based on perception rather than scientifically-based regulations. Dual objective improvements (e.g., water line and road improvement projects) frequently are impeded by the timing of funding availability." – ***Larry Esvelt***

"Providing authority to local governments to require use of reclaimed water is not sufficient if the watershed includes multiple jurisdiction and cross county lines. The State must have the authority to require use across watersheds and county lines." – ***Thomas Fox***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1 through 10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"Suggest that the grant/loan program be structured such that reuse projects have some advantage over others (i.e., lower interest rate, higher priority in project ranking, etc.)." – ***Jim Nichols***

"With respect to the concept of water-rights 'credits,' suggest providing the ability to 'recalculate' the amount of water withdrawn from the aquifer to only consider the net water used. Do not count the water that has been used for groundwater recharge, stream flow augmentation, or wetland enhancements." – ***Tom Skillings***

"Support incentives completely. Disincentives can play a major motivator. Polluters (users) pay for the service. Waste flow self examinations will be reduced if economic and regulatory requirements create better design and process controls." – ***Harry Yamamoto***

PRIORITY 4

Promote Policy to Provide Cost-Effective Options for Reuse in Small-Scale and Decentralized Settings

Working Group Members:

Benson, Miller, and Milton

Issue Description:

Current policy tends to encourage centralized systems and requires expensive treatment, monitoring, and distribution costs. State reuse policy declares that cost-effective solutions for small communities are a priority. The strategy proposed here builds on this priority by including water reuse on a scale suitable for implementation in small communities, rural communities, anywhere onsite management is desired, and in decentralized systems. There is a potential to reduce costs associated with larger systems by using small or decentralized systems.

Small-scale applications may warrant different standards. Existing standards should be revised to provide more treatment options to encourage decentralized applications. Treatment requirements should be matched to site risks to reduce costs. The application of innovative technologies that provide equivalent and reliable treatment while minimizing maintenance and monitoring requirements should be encouraged. Small-scale applications may be the best place to test innovative ideas before applying them to larger scale projects.

This working group report summarizes and expands upon the issues that were identified in Priority 4 of the NGT Workshop section of this document. We have attempted to incorporate most of those recommendations into this report.

Importance:

The high cost of conveyance, monitoring, and treatment in centralized reuse systems is an impediment to adopting reuse by small communities. The majority of proposed water reuse systems in Washington State is for small communities or for decentralized satellite systems of larger facilities, with the goal of providing water reclamation and reuse near the point of origin. Capital costs must be affordable for facilities to be built. Operation and maintenance (O&M) costs must be affordable for facilities to be maintained. This is necessary to implement reuse in small community settings and to protect public health and the environment.

How Do You Propose Meeting or Complying with This Issue?

The policy of the State is to promote reuse in small communities. Bringing this into being requires work on both technical and promotional strategies.

Technical Strategies:

- Develop strategies that are appropriate for small-scale applications.
- Identify, evaluate, and inventory technologies appropriate for small-scale applications.
- Allow or approve technologies that meet equivalency criteria.
- Provide technical assistance.
- Focus on using options with low O&M and monitoring requirements.
- Develop guidelines for the application of technologies.

Promotional Strategies: As important as the technical steps are, local community support is critical for effective implementation. Toward this end, we need a clear promotional strategy to bring the community into the program.

- Investigate cooperative agreements to share or reduce costs through economies of scale.
- Seek legislative support and dedicated funding for small-system implementation. Successful strategies could become pilot projects for large-scale applications.
- Encourage holistic thinking, which leads to better decision-making and more cost~~t~~ effective utility investment.
- Incorporate the identified strategies and technologies into updates and revisions of existing rules, such as the large onsite disposal regulations.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

Small working groups comprising state and local government and other stakeholders could identify and inventory technologies. Participants could include:

- Legislature.
- Governor.
- Ecology.
- DOH.
- State and Federal Senators and Representatives.
- Public works officials.
- NGT working group members.

- Stakeholders.
- NWRI.
- Adjacent states.
- Other professional organizations (e.g., PNCWA, WEF, AWWA, National Onsite Wastewater Recycling Association, etc.).

Budget:

- Staffing and operations - $200,000.
  - one FTE agency technical support
  - one-half FTE agency support staff.

- Technical evaluation contract - $250,000.

- System implementation incentives.
  - $500,000 per year from state funds.
  - $500,000 per year from federal funds.

Summary:

Ecology and DOH should provide a leadership role in promoting this strategy to support a State policy of implementing water reuse on a cost-effective basis for small communities and anywhere decentralized applications are desired.

Comments:

"Would you see the scope of your issue covering stand-alone technologies for individual communities or also providing for umbrella O&M organizations that could provide O&M assistance to several communities within a geographic area similar to the small-community drinking-water effort?" – ***Art Benedict***

"In pursuing our goal, it is important to note that health and the environment is protected only to the extent that standards are applied by regulators, operators, and lab personnel, etc. This concept underscores the need to evaluate technologies for consistent (equivalent) performance and reliability, which in turn should lead to reduced maintenance and monitoring requirements that are affordable to small communities." – ***Richard Benson***

"Must ensure equal protection of health and water quality. This would be an environmental justice issue. Need for more data." – ***Kathy Cupps***

"Implementation of water reuse facilities, regardless of scale, must be planned and designed by competent and qualified persons to ensure workability, reliability, economy, and longevity of the system. The impact of application on other infrastructures, utilities, and governmental functions needs careful analysis. The separation of 'small' from 'large' systems should avoid fractionation of programs where multiple small systems have regulatory or economic advantages over a more comprehensive (large-scale?) approach." – ***Larry Esvelt***

"What is meant by 'technologies determine the standards'? This could be a slippery slope that would come at odds with standards that are already developed to protect public health and the environment." – ***Kevin Fitzpatrcik***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1 through 10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"Low monitoring requirements need to be traded off against increased reliability requirements coupled with an understanding of process failures (frequency and magnitude). This will also depend on the health or environmental protection supplied by treatment technology. Is the concern of acute or chronic? Technologies and treatment facilities need to be commissioned to ensure they have been installed properly." – ***Rick Sakaji***

"I would suggest that a control management entity be used to operate and manage reclamation facilities in relative close proximity. This has been used for water and wastewater in Washington and the nation for at least the past 30 years. This allows some economics of scale and better trained and paid operators." – ***Dan Sander***

"Is your focus limited to only 50,000 gpd facilities? If so, it may be too low of a threshold." – ***Tom Skillings***

"Small? Range? The infrastructure costs over the long-term must be factored in the total plan for each project. The nitrate issue is a major area that is being resolved, and reuse should be a part of the solution." – ***Harry Yamamoto***

PRIORITY 5

Develop a Water Reuse Research Program in Washington

Working Group Members:

Benedict, Buehrer, Esvelt, and Price

Issue Description:

The State should facilitate the creation and continuing existence of a partnered research program that addresses the specific water reuse needs in Washington.

Importance:

Water reuse is a rapidly evolving water-management tool for supplementing our limited water resources; therefore, research is important to foster the development of criteria and standards to provide economical and sustainable solutions that will help protect public health and the environment.

How Do You Propose Meeting or Complying with This Issue?

A workshop/task force will be developed to bring together experts in water reuse needs unique to Washington. The workshop will identify issues, priorities, estimated budgets, and those who might best carry out the work. The suggested areas where research projects may be developed include:

- *Reuse and Sustainability Definitions*. This would include a needs assessment that looks at reuse costs and societal and environmental benefits, as well as a life-cycle cost analysis over the short-, medium-, and long-term (100 years).

- *Scientific and Technical Research Needs.* This would include surrogates for organic contaminants in reclaimed water used for potable reuse; better indicators for microbial and chemical constituents; and the fate, transport, and effect of xenobiotic organic chemicals in the environment.

- *Decentralized, Onsite Treatment, and Reuse Systems.* This would be a paradigm shift from conventional municipal reclaimed-water reuse. Different types of onsite water, such as roofwater, greywater (e.g., sinks, bath), and blackwater (e.g., toilet water), would be viewed

as water sources and used based upon their quality and treatment needs for onsite reuses, such as toilet flush and irrigation water. Research tasks will include the review of existing, new, and emerging treatment and reuse technologies that are applicable to small, decentralized onsite systems. Recommendations for treatment requirements for onsite systems will also be developed. These types of onsite reuses are currently becoming common practice in the growing sustainable "green" building industry, and research in this area will help complement water reuse applications in a broader context.

- *Emerging Technologies*. Research into new and emerging treatment and reuse technologies, such as membrane bioreactors, would be studied.

- *Stormwater*. Urban drainage and runoff from development activities may be less contaminated than wastewater and, therefore, more easily treated for reuse. The issue needs further study from the quality/quantity, institutional, legislative, and implementation perspectives.

- *Political, Legal, and Economic Incentives for Water Reuse That Reflect the Unique Geography of Washington*. Much of Washington is rural, with many reuse projects in regions without a diverse economic base. Further research needs to be done on the socioeconomic impacts of reuse projects, with no tangible economic return to offset the elevated capital and operating costs.

- *Streamflow Augmentation*. Reuse water may be an important resource in protecting sensitive fisheries. If streamflow augmentation were found acceptable with a reasonable treatment cost, it could cause utilities to pursue decentralized treatment higher in the watershed.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

Ecology, working with DOH and the Washington Water Research Center, will identify workshop/task force participants to represent the research categories. A peer review group will also be established to review and guide the research activities to ensure the quality of research and its application to water reuse.

Budget:

- Workshop/task force: $100,000.

- Estimated annual research budget: $1 to 2 million.

Comments:

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1 through 10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"Washington should consider partnering with AWWARF, Water Environment Research Foundation (WERF), NWRI, and others to leverage research funds and to share research results." – ***Rick Sakaji***

"Define methods to establish and update research priorities. Collaborate with the activities of other states, WERF, NWRI, etc." – ***Bruce Willey***

"Pilot projects can be and are working models. A research intern will be invited by Royal City, Washington, to study a reuse pilot at our active laboratory." – ***Harry Yamamoto***


WORKSHOP QUESTION:
WHAT ISSUES MUST BE ADDRESSED TO ENABLE THE STATE OF WASHINGTON TO FACILITATE THE DEVELOPMENT AND IMPLEMENTATION OF A SUSTAINABLE WATER REUSE PROGRAM ?
Priority 5
Priority 6
Priority 7
Priority 8
Priority 9
23A
DEVELOP CONSISTANT REGULATIONS THAT BALANCE WATER QUALITY WITH CURRENT & FUTURE QUANTITY WHILE AVOIDING UNDUE BURDENS TO DISCHARGES
63A
REVENUE SOURCES TO PAY FOR RECLAIMED WATER PROJECTS, REGULATORY OVERSIGHT, AND SYSTEM OPERATION MUST BE IDENTIFIED
29A
PUBLIC PERCEPTION IS THE KEY TO SUCCESS.
33, 54, 49, 77
94
MAINTAIN STATE STANDARD
DESIGN CRITERIA, GUIDAN
AND REGULATIONS
72, 35, 34, 66
#5
PRICE
#6
NICHOLS
BADGER
HALLER
BAY
SKILLINGS
THOMAS
#8
SCHULER
YAMAMOT
RILEY
#9
HAGSTROM
ANDERSON
WILLEY
Working Group 6
DOUBLETREE HOTEL
SEATTLE AIRPORT

PRIORITY 6

Develop Consistent Regulations and Policies That Balance Water Quality with Water Resource Values While Avoiding Undue Burden to Reuse Proponents

Working Group Members:

Badger, Haller, and Nichols

Issue Description:

Current regulations place conflicting values on water quality and water resources for reclaimed water projects. Impairment criteria and water rights uncertainty are barriers to implementing reuse projects.

RCW 90.46.130[1] includes an impairment prohibition for municipal reclaimed-water facilities that places veto power solely in the hands of downstream water right holders. Treatment facilities that propose reuse are in a difficult position regarding the water rights associated with their project. Facilities that include reuse as their preferred means of discharge may be required to mitigate any potential impairment to water-rights holders. Further, some municipalities may be required to remove their discharge from a water body and yet still be required to provide mitigation. In addition, the owner of a reclaimed-water facility has limited means of benefiting from the reclaimed water returned to the watershed via streamflow augmentation, groundwater recharge, and wetland enhancement, to name a few. The legislature provides that the owner of a reclaimed-water facility has the exclusive right to the reclaimed water; however, this right is not considered as part of the total water rights available to the proponent.

On the one hand, facilities are penalized with the assumption that they are impairing existing rights, while on the other they are not credited for the enhancement to the water resource. A better integration of water reuse into Growth Management Act (GMA) planning, watershed planning, and water-rights permitting needs to occur.

[1] RCW 90.46.130 states: " . . . Facilities that reclaim water under this chapter shall not impair any existing water right downstream from any freshwater discharge points of such facilities unless compensation or mitigation for such impairment is agreed to by the holder of the affected water right," and " . . . Agricultural water use of agricultural industrial process water and use of industrial reuse water under this chapter shall not impair existing water rights within the water source that is the source of supply for the agricultural processing plant for the industrial processing, and if the water source is surface water, the existing water rights are downstream from the agricultural processing plant's discharge points existing on July 22, 2001, or from the industrial processing's discharge points existing on the effective date of this section."

Importance:

Impairment and water-rights uncertainty are important for the following reasons:

- Uncertainty regarding the impairment prohibition is a deterrent for facilities contemplating water reuse. In addition, if a reuse facility is penalized for utilizing a reuse option through the need to mitigate downstream water-rights holders, it faces exorbitant financial burdens, extended project timelines, and possible missed funding opportunities.

- The potential for third-party lawsuits over assumed water-rights impairment is a risk that some facilities are unwilling to accept.

- Project proponents need to have reasonable certainty or confidence as to the quantity available for beneficial use, which can be used as credit or mitigation for water rights.

- The GMA requires cities to provide for the sufficient infrastructure to accommodate their population allocations. With this in mind, communities have been making improvements to park, transportation, water, and sewer systems to "be ready" for their numbers; however, the assurance of necessary water rights for the future is not there. A reclaimed-water program can help to provide these assurances.

How Do You Propose Meeting or Complying with This Issue?

Ecology needs to take a leadership role in complying with the Legislature's mandate to encourage reclaimed-water projects. Where conflicting statutory values exist for water quality and water resources, Ecology, as the steward of the environment, should lead the charge in shaping and bringing consistency to the needs, regulations, and laws of Washington State. One important aspect of this would include changes to RCW 90.46.130 to remove current conflicts between water quality and water-resource values. These aspects can include removing the impairment prohibition, using Ecology's trust water program to purchase assumed impaired rights, or other means.

Ecology needs to develop a streamlined water reuse permitting and water-rights credit system that will enable water reuse project proponents to receive appropriate water-right benefits for their large investment in improving water quality and conserving the potable-water resource.

Watershed-planning efforts should incorporate the value and benefit of water reuse and recommend mitigation strategies for water-rights processing associated with reclaimed-water facilities. In addition, the planning unit should consider the local value of water within a watershed with consideration for both the quality and quantity of the water. The planning unit should contemplate the potential for the relative value of water quality and water resources to change over time in response to local changes in land use, demographics, instream flows, and other factors.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

- Ecology's water quality, water resources, and water reuse programs.
- DOH.
- Watershed planning units.
- Reclaimed-water project proponents.

Budget:

- Legislation and rule changes: $200,000 (staff time).
- Increases to trust water-acquisition program: Multi-millions (appropriations for water rights purchase).

Comments:

"The water-quality side must be further addressed regarding instream uses and existing uses in effluent-dominated and dependent waters. Western states and a USEPA task force are discussing this issue and the requirements to protect existing uses under the CWA. Use attainability studies under the proposed Ecology surface water-quality standards. Stream flow augmentation as water reuse should be further explored under this context." – ***Kathy Cupps***

"Why is water-rights permitting necessary? Ensure coordination of water quantity and water-quality permit process" – ***Frank Loge and Craig Riley***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1-10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***


James Bay
Working Group
7
Art Benedict
NWRI

PRIORITY 7

Establish a Permanent, Dedicated Revenue Source for an Environmentally Viable Ecology Water Reuse/Reclamation Program

Working Group Members:

Bay, Skillings, and Thomas

Issue Description:

Revenue sources must be identified to pay for reclaimed-water projects and regulatory oversight and to help support system operations to ensure the continued development of an alternative sustainable source of water for the State. This funding must be established at the federal, state, and local government levels. The utilities are also responsible for establishing self-sustaining funds to support this effort.

Importance:

Advances in water reclamation are needed to preserve critical and limited surface water and groundwater resources. This sustainable goal requires identifying and expending dedicated funds.

The most significant impediment to implementing reuse is neither technology nor public acceptance, but funding. While many recognize that reclamation is "the right thing to do," paying for the expensive facilities creates barriers to implementation. Reclamation facilities have to compete with other agencies for the same limited resources just to meet basic needs.

A cost-benefit analysis of the benefits of a reclamation project should be conducted to establish a value that would be recognized by all parties. The advantages and benefits of reclaimed-water projects must be promulgated and recognized by all approving bodies (e.g., Ecology, DOH, and State Legislature), as well as by potential beneficiaries.

Additional water resources must be obtained to help meet Federal laws and State regulations, such as the CWA; Endangered Species Act (ESA); Western Water Law; Safe Drinking Water Act (SDWA), etc.

How Do You Propose Meeting or Complying with This Issue?

- Obtain support for and establish separate and dedicated levels of funding for:
  - a reclaimed water oversight organization
  - projects (grants/loans from the State; funds internally generated by the utility through rate structure)
  - reclaimed water system O&M (funds internally generated by the utility through rate structure)

- Establish funding criteria that recognize the value of the direct benefits of water reclamation. Also, establish funding criteria that recognize the value of reclaimed water beyond that which is consumed. These criteria should include evaluation factors that consider the value of groundwater recharge, stream-flow augmentation, wetland enhancement, and other demonstrated net benefits to the environment.

- Assign values to the tangible (i.e., identifiable and measurable) as well as intangible (i.e., identifiable, but not measurable) benefits of reuse.

- Prioritize entities and purveyors for access to and/or approval of additional surface water, groundwater resources, rights, and permits. Those with the highest potential or ability (e.g., financial, large or increasing customer base, etc.) to enact a water-reclamation program should be listed in second place.

- Growth pays for growth as well as the new technology associated with that growth. Traditional surface and groundwater sources do not adequately supply ever-increasing demands for water. As stated earlier, access to traditional water sources is simpler and less expensive than enacting a reclamation program. Reuse programs need to be developed and funded by utilities with the greatest ability to do so. Reuse is an integral part of water-resource management, wastewater management, and ecosystem management.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

- Legislators – The State needs to take a leadership role (see Priority 2) and recognize the environmental and political benefits of this program.

- Governor – Needs to lead by exemplifying top-level support within the State.

- Regulatory Agencies – Ecology, DOH, and other agencies (e.g., Washington Department of Fish and Wildlife, Department of Natural Resources, Corps of Engineers, etc.).

- A formal Reuse Program will be created within Ecology to oversee all aspect of reclaimed water. Combine resources in Ecology and DOH to form a single clearinghouse with a program organization similar to other areas within Ecology.

- Independent research and professional and support organizations (NWRI, American Public Works Association [APWA], etc.).

- Local utilities.

- Environmental organizations.

- Potential, current, and past beneficiaries of reclaimed-water projects. They provide support and help build consensus when they are successful in obtaining project funding and in constructing a viable water-reclamation project.

Budget:

Ecology's estimated annual budget is $50 million, which funds indirect (overhead) and direct (project) costs.

Over the next 4 biennial cycles (8 years), establish an annual water-reclamation budget of 25 percent of the total DOE and DOH budgets. Start at 10 percent and increase 5 percent each additional biennium until the goal is met. Available funding that is dedicated to reuse projects will promote more reuse projects, advance the industry, and improve the environment.

The budgeting process includes:

- Providing and direct and indirect funding from funding sources.

- Establishing direct and indirect costs and values:
  - nexus to water rights
  - value to water rights
  - costs to treat and make available as reclaimed water

- Separating funding from other water-resources funding.

- Having water reuse projects compete with water reuse projects only.

- Establishing a steady income source to sustain the program:
  - fund indirect
  - fund projects (how do you evaluate the projects for funding?)

- Make decisions with long-term financial, societal, and environmental viability in mind.

Comments:

"How would funding priorities be determined? What are utilities willing to pay in fees to fund regulatory oversight (permit)?" – ***Kathy Cupps***

"Funding of projects is not the most critical need. If there is a demand for reclaimed water, then there will be money for the project. If users can take water for free, why should they pay for reclaimed water? Why should the federal and state governments pay if locals will not pay?" – ***Tom Fox***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1-10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

PRIORITY 8

Recognize That Public Perception Is the Foundation of a Successful Project

WORKING GROUP MEMBERS:

Riley, Schuler, and Yamamoto,

Issue Description:

The old paradigm that "perception is reality" holds true. Most people, including decision makers, think that water scarcity and competition are concentrated in densely populated desert regions. Engineers can develop a perfect technical program, but success will be determined by public perception. For a long time, the mentality of the wastewater industry was to "dispose of a waste," rather than to "produce a resource" that has beneficial uses. It is no wonder that public perception is based on waste disposal – nothing good can come from wastewater!

Wastewater and water-resources professionals, as well as the public, lack a basic understanding of wastewater. We still believe that "sewage is sewage until you lose track of it."

The public has an inherent level of distrust and disgust when there is a perception of waste. A lack of understanding, a lack of trust of public officials, and the science of production can result in the public stopping a project.

Communication must be centered on honesty, fairness, and respect.

Importance:

"Commode to commodity" is possible, if we are not stuck in a silo. The key to developing and sustaining the market for reclaimed water is public acceptance. The project could fail if public perception is not addressed upfront. Positive public perception will develop political and financial support for the project, and then create a demand for reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

Good will spends money! The key to developing good will lies in social validation of the project, which can be developed by allowing the public the ability to participate and generate individual ownership in the project.

The key is a four-legged stool based on marketing, media, public relations, and public involvement.

The message needs to be simple and translated to the sixth-grade level for the general public's consumption. It must develop, identify, and explain the need for and value of the resource in a way that communicates with the public, but does not lecture. The product and project need to be "marketed."

Allow participation; the project proponents should be proactive, not reactive. This is based on understanding the real underlying issues of the project's opponents. Project communication cannot respond to and be based on media sound bites, but should instead address the underlying issues causing concern.

Disseminating the message begins with identifying community advocates and leaders. Messages and information based on "follow the leader" concepts are effective by publishing success stories based on local and national examples. Particularly effective are resource materials that educators and teachers provide grade school students.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

There are numerous state and national resources available, such as:

- State agency resources: Water reclamation program leads.
- Communication specialists: Jo Sullivan, King County Department of Natural Resources; and Sarah Hubbard-Gray, Hubbard-Gray Consulting.
- Reclaimed water marketing professionals: John Reuten, Resource Trends.
- Local success stories: Shelly Badger, City of Yelm; Tom Skillings, Skillings & Connolly, Inc; and Jim Bay, City of Yelm.
- Academia: Brent Haddad, University of California, Santa Cruz.
- Nationally and internationally known and recognized professionals: Dr. Takashi Asano of the University of California, Davis, as well as the rest of the NGT workshop participants!
- Private foundations: Bullitt Foundation (Seattle) and NWRI.
- Professional organizations: WEF, AWWA, WateReuse Association, PNCWA, Pacific Northwest Section-AWWA, and representatives of treatment-equipment manufacturers.

Budget

One million-dollars – We can always spend too little, but never spend too much.

Comments:

"Would production of or sponsoring of a broad-based video or TV program to sell reclaimed water as a 'product' be within the scope of this topic?" – ***Art Benedict***

"When considering the importance and potential cost of a sustainable reuse program, it is certainly worthwhile to include in any funding request an official advocate, with a good combination of technical and interpersonal skills, trained in risk management and, above all, a good listener." – ***Richard Benson***

"Resources for successful projects, including public acceptance, should include the City of Medical Lake, who successfully implemented a reuse program that is accepted by local citizens; Department of Fish and Wildlife (DFW); Department of Social and Health Services (DSHS), operator of Eastern State Hospital; and thousands of fisherman and recreational users of West Medical Lake." – ***Larry Esvelt***

"Add to end of title: '…and Appropriate for the State of Washington.' Depending on how this is approached, it has the potential to facilitate or hinder/prevent distribution and use of reclaimed water." – ***Karla Fowler***

"Consider the following title: 'Develop Better Water Reuse Criteria That Are Rational, Scientifically Supportable, Protective of Public Health and the Environment.' Without the 'word' better, the implication is that there are no existing criteria and/or that existing criteria are irrational and not scientifically supportable." – ***Art Griffith***

"Look to develop tools/materials that may be used by utilities for the specific reuse programs. Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1-10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"Financial responsibility can be shared over the life of the project by users and beneficiaries. Each can be assessed a portion of the cost. The values of the product waters can be established as either monitized or non-monitized for each party" – ***Ron Linsky***

"I would suggest that public perception changes should take place on a global perspective (statewide or northwest-wide) and not just focused on a project-by project basis." – ***Tom Skillings***

"Have public-service announcements or broadcasts combining USEPA/U.S. Department of the Interior, Bureau of Reclamation (USBR)/NWRI video and State of Washington projects. Could

be used during fall Water Week and at service clubs, city councils, professional engineering societies (e.g., American Society of Civil Engineers [ASCE]) meetings, and operator meetings highlight non-traditional reuse applications (e.g., washing Yelm's school buses.)" – ***Dan Sanders***

PRIORITY 9

Define Processes and Resources to Continually Update Standards and Criteria and to Review Alternative Technologies

Working Group Members:

Anderson, Hagstrom, and Willey

Issue Description:

The State's standards are out-of-date, incomplete, and inconsistent with the rules and guidelines of other states. A major update is needed to protect public health and the environment and to promote sound reclaimed-water practices. This update should reflect new science and health data, technology developments, the experience of Washington's reclaimed program to date, and an improved understanding of reclaimed-water opportunities and constraints. Moreover, the State must implement a process to continually update the standards to keep current with new developments in reclaimed water and to be responsive to the needs of practitioners and the public.

The State must develop a regulatory framework based on prescriptive and performance requirements that will facilitate the use of alternative technologies that are equivalent to those specified in the standards. Such a program will ensure that Washington utilities can use reliable, cost-effective solutions in meeting the program objectives.

Importance:

Current, clear, and scientifically based standards are necessary to ensure reclaimed-water practices are technically sound, cost-effective, and protective of public health and the environment.

Reuse treatment technologies are evolving rapidly. These technologies may present significant advantages, including reduced cost and superior water quality. Absence of a standardized protocol to evaluate the acceptability of proposed alternatives and their reliability features can result in lengthy turn-around times to determine equivalency and inconsistent – and possibly incorrect – decisions by regulators. Also, the absence of clear protocols may create unnecessary burdens on proponents of new technologies, which in turn may limit the availability of cost-effective technologies to Washington utilities.

How Do You Propose Meeting or Complying with This Issue?

To update and maintain the State's standards, the following actions are recommended:

- *Conduct Needs Assessment Workshops*: Hold regional workshops throughout the state to gain feedback on the strengths and deficiencies of the current standards; encourage participation from diverse interests, including wastewater utilities, end users, consultants, regulators, water-resource agencies, vendors, the environmental community, water purveyors, the legal community, special-interest groups, and the general public.

- *Coordinate Overlapping State Rules and Guidelines*: Conduct a thorough review of current and pending rules and guidelines that overlap or impact the objectives and requirements of the reclaimed-water program. Identify conflicts and inconsistencies and define policies and actions to rectify these issues.

- *Conduct Peer Reviews of Current Standards*: Convene a team of regulators and practitioners from Washington and other states to perform a critical review of the current standards and to define priorities for updating the standards.

- *Conduct Public Policy Peer Reviews*: Convene a team of State regulators, representing all stakeholders involved in the permit process, to perform a critical review of the permitting and implementation process; define needs for developing the framework for coordinated permitting focused on removing the barriers to implementing of the reuse program.

- *Update the Standards*: Convene and fund a working group to update the standards.

- *Conduct Peer Review of Updated Standards.*

- *Establish and Implement a Biennial Update Process*: Identify and prioritize issues. Convene and fund a working group to update the standards.

To develop a regulatory framework for technology evaluation, the following actions are recommended:

- Identify existing, new, and innovative technology likely to be appropriate or proposed by project proponents (e.g., ultraviolet [UV] disinfection, membranes, membrane bioreactors, onsite systems, and natural methods of treatment).

- Prepare a policy statement or similar document listing treatment processes already determined to be equivalent to those specified in existing criteria

- Detail a specific protocol(s) to obtain or provide information needed by the State regulators to determine the equivalency of treatment processes not currently approved. Demonstration studies or other research may be needed.

- Define the level of effort and expertise required to perform the assessments.

- Identify opportunities to use results from prior work in other states (i.e., define the potential for reciprocity mechanisms or similar methods to minimize the duplication of effort).

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

Use the Water Reuse Work Group to select the Peer Review Team and a working group to update the standards as well as to establish the technology-evaluation protocol. At a minimum, the Peer Review Team should include regulators from other states with major reuse programs, academics, reuse practitioners, and end users.

Budget:

- Initial update of standards and establishment of technology evaluation protocol: $0.5 to $1.0 million.

- Biennial update of standards: $100,000 every 2 years.

- Ongoing technology assessment: 1 FTE ($100,000 per year).

Comments:

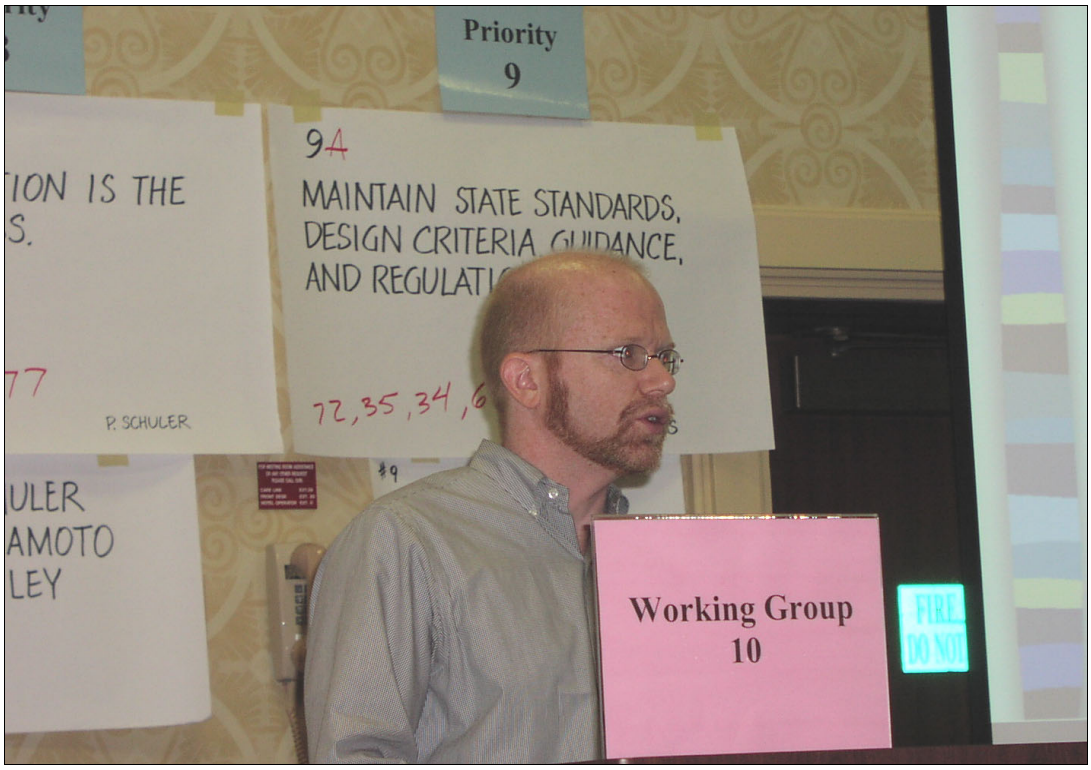
"To facilitate the development of standards applicable to decentralized applications, standards should emphasize reliable treatment performance and sound maintenance and monitoring protocols and rely less on high-frequency sampling and reporting requirements. Standards should require good record keeping and provisions for audits from regulators." – ***Richard Benson***

"To protect the public investment and ensure effective and economical reuse of wastewater, it is essential that qualified persons plan and design the implementation with full consideration of the need for the coordinated applications of technologies and an appreciation of the impacts on other systems." – ***Larry Esvelt***

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1-10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

"It is important to maintain institutional 'memory' or history when giving a biennial review. The State regulatory program must retain staff for biennial reviews." – ***Rick Sakaji***


Art Griffith
Working Group
10


Priority
9
94
MAINTAIN STATE STANDARDS,
DESIGN CRITERIA
AND REGULATI
72,35,34,6
P. SCHULER
Working Group
10
FIRE
DO NOT

PRIORITY 10

Build the Foundation for a Sustainable Reuse Program in Washington through an Effective Communication, Education, and Information Program

Working Group Members:

Fitzpatrick, Gillaspie, and Griffith

Issue Description:

The State and its partners need to take a more active role in promoting and communicating the benefits of water reuse, as well as its technical and regulatory aspects, to schoolchildren, the public, professional community, and State Legislature. Information should be readily accessible and easy to understand.

This issue is closely linked with the efforts of Priority 8.

Importance:

A poorly understood program requiring concurrent actions by many stakeholders is not a viable program.

How Do You Propose Meeting or Complying with This Issue?

All of the priority issues are complex and involve large numbers of stakeholders; therefore, communication is critical to success. Communication from the stakeholders to the public at large is important. Decision makers need to consider all these different areas in crafting a reuse program so general education and outreach are needed. Information must be focused. There is a danger in presenting too much information that is not easily understood.

Communication

- The media and outreach communication staff associated with most Public Works Departments should be informed about reuse issues. These same media and outreach staff would be useful in developing the reuse message and in packaging the information.

- Materials should be easy to read and graphically pleasing.

- The communication strategy for reuse in Washington State should draw upon experts in each of the previously listed priority areas. In addition, market-research polling and focus-group research are needed to craft the key message for reuse. This would likely be accomplished on a regional basis.

- A method of measuring the effectiveness of the reuse communication strategy is needed.

- A detailed legislative communication strategy is needed.

Education

- Reuse professional education is a necessary additional tier for a sustainable reuse program. That would be accomplished through an expanded short-school education and operator certification requirements. This could be developed in cooperation with Green River Community College.

- Reuse education should be incorporated in the basic environmental education requirements of the Washington K-12 education curriculum standards.

Information

- Conducting peer reviews and leveraging existing organizations are ways of ensuring that the exchange of credible, technical information is provided.

- Each group needs to develop its technical expertise and be able to share it with the other groups.

- For information clearinghouse needs, something analogous to the Association of Washington Cities or Association of California Water Agencies (ACWA) websites would be helpful. The members of the Reuse Council could organize this effort.

- Consider the use of an electronic list to provide easy-to-access and quickly available information on reuse issues to the interested technical community.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus on This Issue?

All members of the professional community have a responsibility to facilitate effective communications. We need to be able to share in our respective areas of expertise, and we need to learn about areas of expertise other than our own.

Targeted individuals include:

- The interagency staff-level work group (being developed under the "State Leadership" priority area).
- The Standing Stakeholder Committee (being developed under the "State Leadership" priority area).
- Local governments, including Public Works Directors, City Managers, County executives, and Council and Commission members.
- PNCWA and the Pacific Northwest Section, APWA, for short school outreach and education.
- NWRI, Association of State and International Water Pollution Control Authorities (ASIWPCA), WERF, and other national reuse leaders.
- Directors, DOH and Ecology.
- Washington Department of Trade and Community Development, especially its role in providing technical assistance in meeting the GMA.
- Regional affiliations (of water purveyors), including Evergreen Rural Water.
- Groups that are conducting and implementing the Water Resource Inventory Area (WRIA) planning efforts.
- Washington Office of Education (under the State Superintendent).

Budget:

Item	***Budget***	***Type of Costs***
Communication		
Polling/Focus-Group Research	$100,000	One-Time
Communication Strategy Development	$ 60,000	One-Time
Education		
Short-School Component	$300,000	Annual
K-12 Reuse Education Component Add	$ 40,000	One-Time
Information		
Website Development and Maintenance	$ 10,000	Annual
List Serve Development and Maintenance	$ 10,000	Annual
TOTAL	***$520,000.00***	

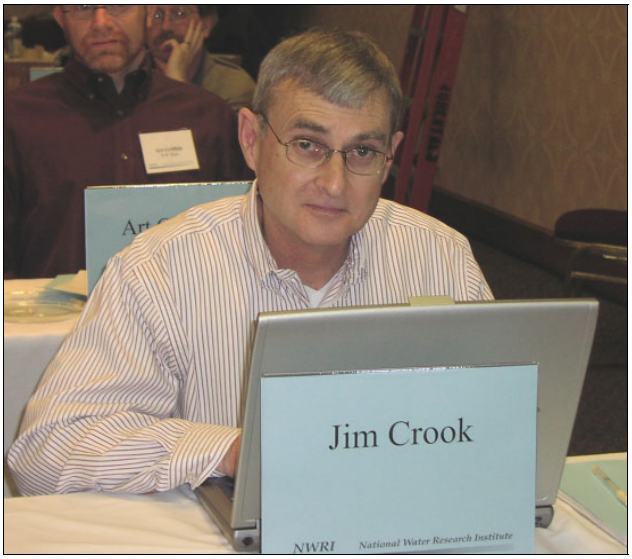
This is a rough budget; it does not address revenue sources or in-kind resources that could be secured. It also does not include project-specific communication and outreach costs.

Comments:

"Need to review budgets for each of the priorities to determine if consolidation would be possible. The total budget necessary to implement Priorities 1-10 would be less than the sum of the individual budgets. Consolidation after review would provide a more accurate cost estimate." – ***Jim Hagstrom***

PART 2

NGT WORKSHOP


Jim Crook
NWRI National Water Research Institute


Bob Rosain
Rick Sakaji
Frank Loge
NWRI National Water Research Institute
Dick McKinley


Gerald
Anderson


Harry
Yamamoto
Kevin Price
Kevin Price


Rick Sakaji
NWRI National Water Research Institute

PRIORITY 1

Develop Rational, Scientifically Supportable Water Reuse Criteria That Are Protective of Public Health

Originators:

Crook on behalf of himself, Anderson, Benedict, Coleman, Gillaspie, Hagstrom, Loge, Price, Sakaji, and Willey

The following issues were consolidated under the above title:

Title: **Develop Rational, Scientifically Supportable Water Reuse Criteria That Are Protective of Public Health**

Originator: Crook

Issue Description:

The State's current water reuse standards are based, to a large degree, on California's criteria, which may or may not be appropriate for Washington State. The Washington standards are based on research, experience at operating facilities around the country (particularly those in California), scientific literature, so-called "good engineering practice," input from potential users of the water and, ultimately, professional judgment by regulators. Questions remain as to whether the standards are overly conservative or not protective enough.

Importance:

Scientifically supportable criteria are critical to provide an adequate, but not excessive, level of health protection and to help secure public, political, and user acceptance. Overly conservative or overly liberal criteria could lead to either excessive costs or unreasonable health risks.

How Do You Propose Meeting or Complying with This Issue?

- Form a multidisciplinary technical advisory committee of recognized experts in various areas of expertise (e.g., environmental engineering, microbiology, epidemiology, toxicology, risk assessment, regulations) to identify information gaps and provide recommendations on treatment needs, constituents to be monitored, constituent limits, and monitoring frequency.

- Review existing regulations from other states and the rationale behind them, current literature, and current research.

- Update criteria based on supportable scientifically based information and provide documentation of the rationale supporting the criteria.

Title: **Procedures to Allow Alternatives to Treatment Processes Specified in the Water Reuse Standards**

Originator: Crook

Issue Description:

The water reuse criteria allow alternatives to treatment processes specified in the criteria, if such alternatives are acceptable to the regulatory agencies. However, protocols have not been developed to evaluate equivalency of alternative processes. Thus, it can be difficult for proponents and regulators to identify what constitutes treatment equivalency and treatment reliability.

Importance:

Absence of a standardized protocol to evaluate the acceptability of proposed alternatives and their reliability features to accepted treatment processes can result in unknown goals and procedures that may cause unnecessary and costly studies and/or documentation by proponents, lengthy turn-around times to determine equivalency, and inconsistent– and possibly incorrect – decisions by regulators.

How Do You Propose Meeting or Complying with This Issue?

Washington State should develop a standardized protocol or set of protocols that can be used to determine equivalency of alternative treatment-unit processes, or alternative treatment trains, for both water-quality and treatment reliability. This can be accomplished by first identifying existing, new, and innovative technology likely to be appropriate or proposed by project proponents (such as UV for disinfection, membranes, membrane bioreactors, onsite systems, and natural methods of treatment). The State can then prepare a policy statement or similar document listing treatment processes already determined to be equivalent to those specified in existing criteria and detailing a specific protocol(s) to follow to obtain or provide information needed by the State regulators to determine equivalency of treatment processes not currently approved. Demonstration studies or other research may be needed.

Title: **Better Indicators for Microbial and Chemical Constituents**

Originator: Crook

Issue Description:

Water reuse criteria rely on indicators or surrogates to characterize the safety of reclaimed water. Currently used indicators do not adequately represent reclaimed water quality from the standpoint of public health and environmental protection. Better indicators are needed to represent constituents of concern.

Importance:

By themselves, current indicators/surrogates are not reflective of microbial pathogens and chemical contaminants. More representative indicators are needed so that water reuse criteria for both potable and nonpotable applications can be developed that are more representative of the presence or absence of microbial and chemical contaminants and, thus, protect public health and the environment without being unnecessarily restrictive. Public acceptance of the use of reclaimed water would be enhanced.

How Do You Propose Meeting or Complying with This Issue?

Research is currently underway by the WERF and others to identify better microbial and chemical indicators in reclaimed water. Washington State should closely monitor the progress and results of these research efforts, examine literature to review current and proposed microbial indicators and surrogates for health-significant chemical contaminants, and document the state-of-the-art of monitoring methodology, such as rapid and/or online sampling and analytical techniques. A workshop with appropriate experts/researchers may be useful to identify what course of action should be taken.

Title: **Surrogates for Organic Contaminants in Reclaimed Water Used for Potable Reuse**

Originator: Crook

Issue Description:

Total organic carbon (TOC) currently is used as a surrogate for organic chemical contaminants in reclaimed water used for potable reuse. Unfortunately, it provides little information on the presence and significance of low levels of toxic organic contaminants that may be present in the water. Thus, a high TOC does not necessarily indicate that the water contains health-significant

levels of organic constituents, and a low TOC does not necessarily indicate that the water does not contain health-significant levels of organic contaminants. A more appropriate surrogate or suite of surrogates is needed to more definitively indicate the presence or absence of constituents of concern, including disinfection by-products (DBPs), pharmaceuticals, and endocrine disruptors.

Importance:

Using TOC as a surrogate for organic contaminant removal is useful as a measure of overall organics removal but is not adequate as a measure of health-significant organic constituents. More appropriate surrogates for health-significant organics are needed. Imposing restrictive TOC limits can result in expensive advanced -treatment technology to achieve the limits that may or may not be needed.

How Do You Propose Meeting or Complying with This Issue?

Will need to rely on some current and proposed research addressing this issue being done at the national level.

Title: **Equivalency Determinations**

Originator: Anderson

Issue Description:

A method is needed to determine treatment and disinfection equivalency to the requirements in the Water Reclamation and Reuse Standards.

Importance:

New treatment and disinfection technologies do not always fit the requirements and procedures in our current standards and guidance. Discharge permits requirements for O&M are particularly a hardship for small communities that have installed reclaimed water facilities.

How Do You Propose Meeting or Complying with This Issue?

One approach is to allow the use of technologies specifically approved by the California Title 22 regulations for the treatment of reclaimed water.

More innovative approaches are being practiced by customers with special water reuse quality needs. Customized treatment either at a central wastewater treatment plant or at customer sites is one possibility to add flexibility and to add more customers at an acceptable cost. For example, a customer could be served by their own pipeline from the treatment plant, and the recycled-water producer provides two or more qualities of recycled water. For a customer with special

needs, the standard quality of recycled water is delivered to site, and a customized treatment facility at the site provides added treatment to meet customers' standards.

Another approach may be to establish review procedures for demonstrating equivalency. This review could be held under the guidance of a state university, that is:

- Establish an NWRI National Center in the State of Washington.
- Identify a site and the necessary attributes of the site.
- Use the National Center to address key questions that are of immediate interest to reuse stakeholders in the State and, possibly, the Pacific Northwest.
- Perform sound science to develop a foundation for guidelines and standards.
- Help shape the program vision through the technical advisory committee.

Title: **Are Membrane Bioreactors Ready for Reuse Applications in Washington State?**

Originator: Benedict

Issue Description:

Membrane bioreactors are an emerging treatment technology that can produce better than secondary effluent: biochemical oxygen demand is less than 5 milligrams per liter (mg/L), turbidity is less than 1 nephelometric turbidity units (ntu), total nitrogen is less than 10 mg/L, and there are low fecal coliform levels. Thus, this technology offers opportunities for many reuse applications. Current standards and guidance do not directly reflect the reuse potential or capability of this technology.

Importance:

Without standards or guidance that directly reflect the capability and limitations of the technology, the pace of implementation will likely be slowed. In particular, the costs and benefits for small-community reuse applications need to be determined.

How Do You Propose Meeting or Complying with This Issue?

- Compile available national and state experiences, WEF publications, and California and in-state experience.
- Convene a committee to review, synthesize, and focus on the issue in Washington.
- Ultimately, update the standards and guidance.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.

- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Should Water Quality Standards Be Based on Target Pathogens to Define/Ensure a Safe Water Supply?**

Originator: Hagstrom

Issue Description:

Many of the current regulatory requirements are based on the Pomona virus study; the conclusions were based on the removal/inactivation of the polio virus. Research has demonstrated that several pathogens exhibit a greater resistance to removal/inactivation than the polio virus (Adenoviruses, MS-2 bacteriophage, *Cryptospordium*, etc.). The water industry has adopted a risk-based regulatory philosophy focused on target pathogens. These regulations are used to define "safe" water to the public. Thus, the definition of "safe" is valid only as long as the industry has not identified a pathogen that presents greater risk to public safety. This approach may result in an endless loop, confusing the public on what defines "safe."

This approach has been questioned given the inherent transient nature of the regulations, difficulty in isolating a target pathogen, and the accuracy of determining inactivation. It has been suggested that a shift in philosophy in defining a safe water in terms of general microbial risk in lieu of target organisms should be considered.

Importance:

Obtaining public acceptance of reclaimed water is an absolute in the development of sustainable water reuse programs for the state. Defining "safe" in clear, static terms should be our goal and would greatly assist in gaining both public confidence and ultimate acceptance of reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

- Review the philosophies and approaches used in the development of drinking water regulations. Establish an approach and framework that builds from the application of this approach.

- Researches who may be of assistance include Chuck Haas of Drexel University and Joan Rose of Michigan State University.

Title: **Develop a Regulatory Framework Based on Prescriptive and Performance Requirements That Will Facilitate Introduction of New Treatment Technologies**

Originator: Hagstrom

Issue Description:

A current regulatory practice is to apply prescriptive requirements meeting minimal performance standards. These performance standards are based on the presence of surrogate constituents used as an indication of "safe" water. New technologies without prescriptive recognition are required to meet more stringent performance requirements, typically based on specific pathogens/contaminants, leading to a costly and lengthy testing procedure.

Importance:

Reuse treatment technologies are evolving rapidly. These technologies may present significant advantages, including reduced cost and superior water quality. The current process for gaining acceptance of new technologies is unclear, costly, and slow. Developing a flexible regulatory framework using a combination of prescriptive and performance-based criteria would facilitate entry of these technologies in the industry.

How Do You Propose Meeting or Complying with This Issue?

Establish uniform water-quality requirements consistent with the intended use and associated risk and develop compliance strategies to ensure delivery of the required performance.

Title: **Reuse Guidelines and Standards Must Be Predicated on a Strong Scientific Framework That Integrates Water Quality and Health**

Originator: Loge

Issue Description:

Historical perspective:

- The Pomona Virus Study in California played an integral role in the development of initial reuse criteria and in the interpretation of guidelines for implementation of innovative technologies.
- The USEPA uses a risk-based paradigm in the development of all drinking water and ambient water quality criteria.

Importance:

The principal objective of reuse guidelines and standards is to protect public and environmental health. The current criteria lack an explicit integration of water quality and health; are not defensible from a health standpoint; and do not reflect the unique geographic attributes of the State. In addition, criteria are not adaptable to emerging chemical and biological constituents, public concerns, or emerging and innovative treatment technologies.

How Do You Propose Meeting or Complying with This Issue?

- Develop guidelines and standards based on a risk paradigm.
- Provide a scientific basis for evaluating new and/or innovative treatment technologies and establishing performance and reliability criteria for existing unit operations and processes.

Title: **Develop a Water Reuse Research Program in Washington**

Originator: Price

Issue Description:

Water reuse is a dynamic part of water management, ranging from public perception, to major advances in treatment technologies, to emerging contaminants.

Importance:

While many parts of the country and the world are contributing to the advancement of the field, there are needs that arise that are specific to the region.

How Do You Propose Meeting or Complying with This Issue?

The State should facilitate the creation and continuing existence of a partnered research program that addresses the specific needs in Washington. This should be done with the university system, private sector, local agencies, and various national organizations. The first step would be to identify issues, priorities, resource needs, and who might best carry out the work.

Title: **Develop a Risk-Management Framework for Evaluating Containment Barriers Used to Produce Recycled Water**

Originator: Sakaji

Issue Description:

Generally, recycled water-quality standards are used to ensure performance by a treatment process that achieves a minimum level of contaminant removal. Many assume that alternative treatment processes meeting these performance-based standards provide an equivalent degree of public health protection; however, performance-based standards are usually surrogates with weak correlations to the actual contaminants of concern. Evaluating alternatives should focus on establishing a performance-based standard that can ensure the process removes specific contaminants.

Importance:

Ensure that contaminant removal barriers will provide adequate public health protection from specific contaminants of concern. It is important to understand that the underlying health objectives are not compromised by substituting inappropriate levels of treatment.

How Do You Propose Meeting or Complying with This Issue?

- Develop a white paper that clearly outlines the public health objectives of performance-based water quality standards.
- Use people that have a historical perspective on why the water quality performance standards are the way they are.
- The estimated cost is $150,000.

Title: **Need to Understand How Contaminant-Removal Processes Could Be Integrated to Avoid Compromising Contaminant Barriers**

Originator: Sakaji

Issue Description:

Wastewater treatment is no longer a simple single- or two-unit process train. There are now variants on contaminant-removal unit processes that produce different qualities that can produce different impacts on downstream processes and may ultimately affect product water quality.

Importance:

- The State should not want to compromise the overall contaminant barrier by unknowingly or unwittingly impacting the downstream unit processes, thereby reducing their effectiveness.

- The State should establish scientifically sound water-quality standards and-public health protection objectives that result in equivalent levels of contaminant removal regardless of the combination(s) of unit processes integrated into a process train.

How Do You Propose Meeting or Complying with This Issue?

Convene technical advisory committees to examine specific processes and integrate those units into process trains.

Title: **Increase Flexibility of Wetlands Water-Quality Requirements and Consolidate Rules Governing Wetlands**

Originator: Willey

Issue Description:

The current guidelines for use of reclaimed water in wetlands stipulate low concentrations for phosphorus and total kjeldahl nitrogen (TKN) and include toxicity requirements identical to that for surface-water discharge. For many constructed wetlands, or even restored wetlands, this "one-size-fits-all" set of requirements appears to be overkill. Formulating a more flexible set of requirements, such as those for irrigation with reclaimed water, would allow the water-quality limits to match the intended use.

Rules for developing wetlands projects tend to be confusing, sometimes contradictory, and are addressed in several regulations and guidelines. Consolidating and coordinating these

requirements would make the requirements more understandable and may facilitate more high-quality projects.

Importance:

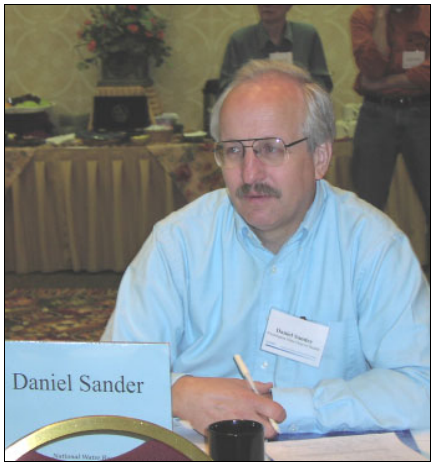
- Need to match water-quality requirements with the intended use of the wetlands. Meeting the TKN and phosphorus requirements increases the cost of treatment compared to other common water-reclamation opportunities.

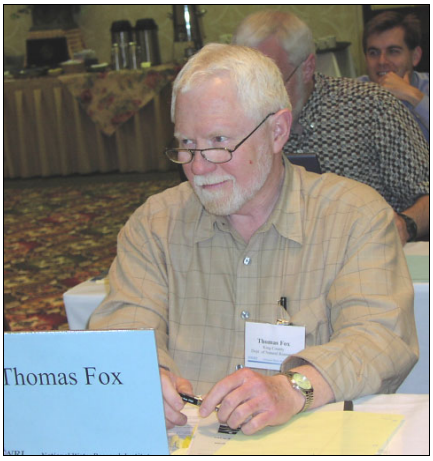
- Need to facilitate development of wetlands projects using reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

- Assemble a panel of experts on wetlands systems – define appropriate water-quality limits for various types of wetlands. Take into consideration fate of water downstream of wetlands, public access, habitat creation, etc.

- Assemble all state guidelines pertaining to wetlands and assemble agencies currently having jurisdiction. Develop uniform, coordinated policies and guidelines for wetlands systems.





PRIORITY 2

Need for the State to Take a Leadership Role

Originators:

Cupps on behalf of herself, Bay, Benson, Coleman, Fox, Gillaspie, Nichols, Price, and Sander

The following issues were consolidated under the above title:

Title: **State Needs to Take a Leadership Role**

Originator: Cupps

Issue Description:

Ecology and DOH are charged by state law to take the steps necessary to facilitate water reclamation and reuse within the state of Washington. State government needs to take a leadership role in obtaining and disseminating current and emerging information regarding reclaimed water, in streamlining procedures, and in developing and maintaining consistent regulations and implementation policies throughout the various regions, programs, and agencies. In doing this, we must be sure that all points of view are heard and considered.

Importance:

Agency leadership is necessary to provide guidance to utilities, consultants, decision makers, and the public and to ensure that water reuse is fully considered in planning and implementing water/wastewater projects.

How Do You Propose Meeting or Complying with This Issue?

The State Legislature has recognized the need for state leadership in implementing a water reuse program. Continued (increased) funding support is necessary for implementing this program.

The complexity of the field requires input from a diversity of knowledgeable professionals and disciplines. Ecology and DOH need to quickly become aware of, access, and assess the available technical information. Much of the information is out-of-state. Go to it and bring it home.

State agency water-reclamation and reuse specialists must actively participate in state, regional, and national forums, organizations, workshops, and conferences to exchange information and maintain skills, as well as to establish contacts and form partnerships for successful implementation.

The State should also set an example and use reclaimed water in public projects, building and landscape areas wherever practical.

Title: **Form a Water Reuse Department for the State of Washington**

Originator: Bay

Issue Description:

Ecology and DOH need to be combined into one department, allowing for better control and understanding of all combined water reuse issues.

Importance:

This will provide a single department contact and personnel that will be well versed on all issues of reuse.

How Do You Propose Meeting or Complying With This Issue?

Instead of cutting employees, combine the expertise of half a dozen Ecology and DOH officials to oversee all water reuse issues and projects.

Title: **Need for Better Communication and Coordination between State Reuse and Onsite-Sewage Programs**

Originator: Benson

Issue Description:

Currently, there is little communication or coordination between state programs. Better coordination could help both programs, resulting in expanded training opportunities and increased treatment options.

Importance:

- Significant amounts of water go into groundwater from onsite sewage systems (i.e., 40 percent of homes in Washington are served by them).

- Onsite systems can either augment or be counter productive to identified beneficial uses, such as groundwater recharge.

- An overlap of jurisdictions and complex regulations/standards creates problems.
- Onsite systems are often the only avenues for new developments.

How Do You Propose Meeting or Complying with This Issue?

- Need better coordination and communication between programs.
- Consider consolidating state programs (e.g., jurisdictional split).
- Use soil based treatment systems (e.g., sand filtration) to provide cost-effective and reliable solutions for reuse programs.
- Develop public education and outreach programs to explain options to regulators and the public.

Title: **Limited Ecology Resources to Implement a Reuse Program**

Originator: Coleman

Issue Description:

Ecology has limited resources to implement a reuse program, specifically:

- A limited number of staff (the ratio of staff to the complexity of laws to administer).
- Different workload priorities between agency programs.
- A need to train staff coming up to speed on a "new" program.
- A lack of available "wet water" data.

Importance:

These limitations can slow the permitting process, increase costs, and may result in incomplete or poor decisions.

How Do You Propose Meeting or Complying with This Issue?

- Increase the number of staff.
- Provide training for agency staff.

- Maintain cross-agency workgroups at staff and mid-manager levels.
- Implement and maintain water rights and metering databases.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **A Sustainable Water Reclamation Program Requires a Demand for Sustainable Reclaimed Water**

Originator: Fox

Issue Description:

In Washington, it is too easy to access public water for purposes that should be using reclaimed water. Irrigation and industrial water users have access to public water through the water-rights process, either by applying for new rights, acquiring existing rights, or by purchasing water from public water supplies. And, frequently, users simply assume a *right* to water and begin using public water without review or approval.

Importance:

Before there can be a water-reclamation program, there must be a demand for reclaimed water. Unlimited and essentially unrestricted access to public water is neither in the public's interest nor conducive to a water-reclamation program, since users will take the lowest cost alternative. There are many nonpotable diversions that are either questionable or simply illegal. There are many users that could, and should, use lower-quality sources of reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

- Provide sufficient resources to enforce the current water code.
- Require users who are illegally using public water to instead use reclaimed water, if they want to continue their activities.
- Require new users to use reclaimed water, if available.
- Require diverters using water from streams and aquifers in "critical" watersheds to convert to reclaimed water, when it is available.
- Ecology and the State Legislature are the entities that must deal with this issue.

Title: **Ecology Needs Water Use Data**

Originator: Fox

Issue Description:

The major potential reclaimed-water users are direct diverters of waters of the State. The State does not know *who* is using *how much* water. Much of our state water is not metered, and metered water is not reported.

Importance:

The State must be able to evaluate the total water use in watersheds.

How Do You Propose Meeting or Complying with This Issue?

Provide money to Ecology to monitor water use in the state

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Stop the Insanity**

Originator: Nichols

Issue Description:

Currently at Ecology, there is no consensus on how to address or coordinate the issue of water reuse as it relates to downstream water-rights holders. The State's staff is in a difficult position because there are a number of rules and regulations that need to be considered. There is also a variety of opinions throughout the department regarding this issue. Ecology's regulators find their hands somewhat tied. They are unable to provide a clear message to dischargers because the regulators just do not know what to say.

Importance:

This issue is important because it creates hardships and difficulties for the regulated community. There are a number of unanswered questions and no direction because Ecology is not sure of its own position. These delays lead to increased project costs, extended project timelines, possible missed funding opportunities, and frustrating, contentious relations between all parties.

How Do You Propose Meeting or Complying with This Issue?

Despite the need for and importance of consensus in decisions of this nature, a point is eventually reached when an issue can be discussed to death. In this case, it is time for the leaders in Ecology to take the recommendations of their staffs and the regulated community and finally make a decision. Understandably, there will be some who will not be happy, but that is unavoidable.

After a decision is made, Ecology management will need to express the expectation of support from their entire staff. Finally having an answer, though it may create some hard feelings within the agency, will also be a huge relief for many because they will finally have definitive answers and the ability to send a consistent message to those they regulate.

Title: **Work with National and State Water Reuse Organizations**

Originator: Price

Issue Description:

Many organizations outside Washington have a wealth of experience that can be used by, and contributed to, water reuse practitioners in Washington.

Importance:

Communication between these organizations would prevent a duplication of effort, increase the credibility of decisions, and leverage scarce resources.

How Do You Propose Meeting or Complying with This Issue?

A water reuse organization/committee should be created that is a part of a national organization. This could be through the WateReuse Association or committees at the WEF and the AWWA, or others.

Title: **State Staff Lacks an Understanding of the Importance/Benefits of Wastewater Reclamation and May Not Support Such Projects**

Originator: Sander

Issue Description:

Many DOH and Ecology staff do not fully understand the legislation and guidance for reuse. The key to this understanding is the concept of reclaimed water being available for a multitude of uses and the value (e.g., financial, social, and environmental) of this product. Few staff disagree that reclaimed water belongs to the utility and is not a "water of the state."

Importance:

- A consistent message is needed for consultants, public works, and elected officials.
- Intra- and inter-agency disagreements confuse, delay, and add costs to projects.
- If all state staff understood and were committed to the concept, more thorough analyses of potential projects would show that more projects are viable.

How Do You Propose Meeting or Complying with This Issue?

- Conduct another round of training for DOH and Ecology staff.
- Need clear directions from agency heads that the departments/programs will seek every opportunity to encourage and facilitate wastewater reclamation projects.
- Implement continuous, high-level review/concurrence or a process to quickly resolve issues.

PRIORITY 3

Develop Economic, Political, Legal, and Resource Incentives to Encourage Municipalities, Utilities, and Businesses to Build and Use Reclaimed Water Systems

Originators:

Gravley on behalf of himself, Coleman, Fowler, Gillaspie, Loge, McKinley, and Rosain

The following issues were consolidated under the above title:

Title: **What Incentives Exist or Should Be Created for Business Development Projects to Buy and Use Reclaimed Water?**

Originator: Gravley

Issue Description:

Will development projects be encouraged to use reclaimed water through command and control regulations or incentives? The use of reclaimed water in place of potable water can result in higher costs for some projects.

Importance:

Business-development projects tend to have high water demand, significant financial capability, and complex permitting and regulatory objectives. They can help address issues of demand and infrastructure cost.

How Do You Propose Meeting or Complying with This Issue?

- Provide business and occupation tax incentives.
- Provide permitting or regulatory credits.
- Provide preferential sites (e.g., power plants).

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Need for Purple Pipe Infrastructure Funding and Incentives**

Originator: Fowler

Issue Description:

Whether installed by utilities, developers, or other entities, the cost to build a completely separate, second water-distribution system is high and without hope of recouping that investment through rates that must be lower than rates for potable water. An "Economic Analysis of Reclaimed Water Distribution and Use," conducted for the LOTT Wastewater Alliance by R.W. Beck in 2002, indicates reclaimed water distribution will not be economically viable for the foreseeable future when viewed from a purely rate-revenue perspective.

Importance:

High capital costs serve as economic disincentives to the beneficial use of reclaimed water. Many beneficial environmental uses, such as streamflow enhancement and wetland augmentation, offer no direct financial return through rates.

How Do You Propose Meeting or Complying with This Issue?

- Establish a fund offering grants and/or low-interest loans to stimulate the installation of infrastructure for reclaimed-water distribution and use. A special focus could be placed on broad-based community distribution, year-round uses, environmental enhancements, or innovative applications.

- Have the state government serve as a model; provide designated state funding to support infrastructure and the initial use of Class A reclaimed water, where available, for irrigation and other uses at state government facilities.

- Encourage the development of reclaimed-water distribution systems to include research community/utility incentives used in other states to. Many of these incentives are likely to involve water right credits; see related issues involving the use of reclaimed water for water rights mitigation.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.

- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Develop Political, Legal, and Economic Incentives for Water Reuse That Reflect the Unique Geography of Washington State**

Originator: Loge

Issue Description:

The State of Washington is largely rural, with many reuse projects implemented in regions without a diverse economic base (e.g., outside of King County). Many projects are implemented under the perceived notion that reuse is "good," with no tangible economic return to offset the elevated capital and operating costs.

Importance:

Growth and sustainability of reuse requires a base of appropriate incentives at the scale of implementation.

How Do You Propose Meeting or Complying with This Issue?

- Provide tax incentive for corporations.
- Provide pollution credits.
- Integrate environmental economics into the political and regulatory structure.

Title: **Financial Incentives to Pay for the Construction of Pumps and Pipes**

Originator: McKinley

Issue Description:

One of the key impediments to the use of reclaimed water is the expense of creating a system of pumps and pipes to move water from the wastewater treatment plant to the place of use (e.g., golf course, industry, etc.).

Once the construction and operating costs are calculated, the cost of acquiring "new" water is often much less than the reuse water, thereby preventing a reuse project from moving forward. As "new" water costs increase, this equation will change. More significant and direct financial incentives would change the situation sooner.

Importance:

If major reuse customers cannot acquire the water, then they cannot reuse it. A successful reuse program requires large users upfront to create the incentives and models for other users to follow.

How Do You Propose Meeting or Complying with This Issue?

Some type of financial or regulatory incentive needs to be created.

Title: **Money Makes the World Go Around– Economics Do Not Favor Water Reuse**

Originator: Rosain

Issue Description:

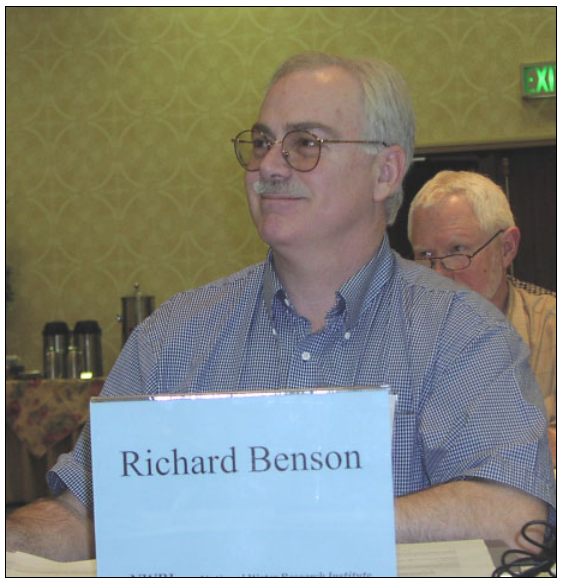
The cost of raw water to the consumer/user is typically well below the cost of reuse water. Raw-water extraction, treatment, connection, *permitting*, and use are usually less expensive than water reuse. The economics simply do not often favor reuse.

Importance:

Cost is often the primary determinant in assessing a project's feasibility, or in raw *versus* reuse water decisions. This is particularly the case with industrial-reuse decisions. A case in point: Simpson Tacoma Kraft pulp and paper mill uses 30-million mgd of raw water that could be switched to reclaimed water, with sufficient economic incentives.

How Do You Propose Meeting or Complying with This Issue?

Provide economic incentives, community- or state-based, to move economic decisions in favor of reuse.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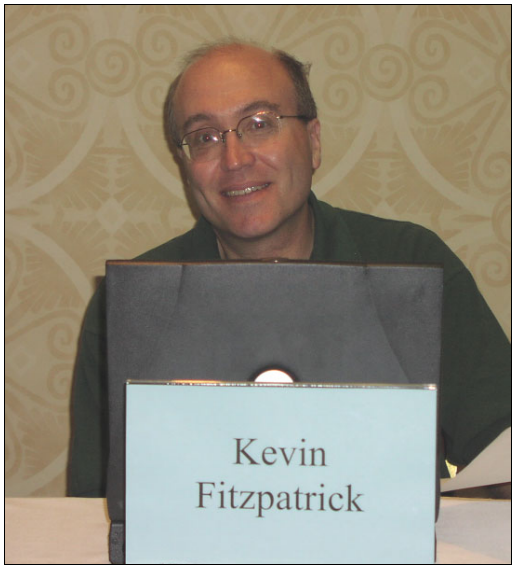
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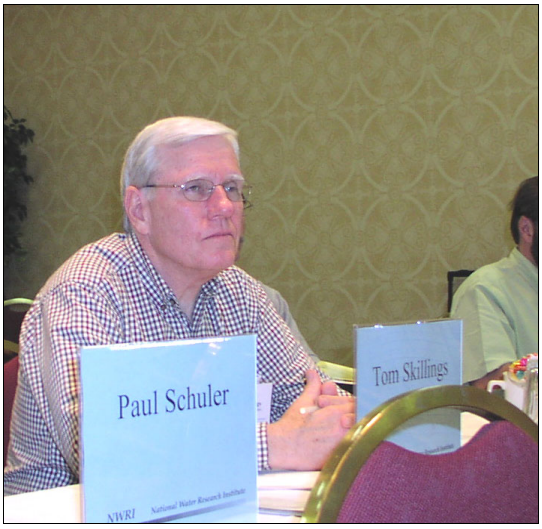
Fitzpatrick


Paul Schuler
Tom Skillings


Mark Buehrer

PRIORITY 4

Revise Reuse Policy to Provide More Treatment Options to Encourage More Decentralized Applications, e.g., Subsurface Landscape Irrigation

Originators:

Benson on behalf of himself, Buehrer, Coleman, Crook, Gillaspie, Fitzpatrick, Miller, Milton, Sander, and Skillings

The following issues were consolidated under the above title:

Title: **Revise Reuse Policy to Provide More Treatment Options to Encourage More Decentralized Applications, e.g., Subsurface Landscape Irrigation**

Originator: **Benson**

Issue Description:

Current policy tends to encourage centralized systems and requires expensive treatment, monitoring, and distribution costs. Onsite technology has advanced in recent years, providing better treatment and distribution alternatives, such as subsurface drip irrigation. Properly sited, designed, constructed, and managed onsite systems, such as subsurface drip systems, can provide safe, reliable service and can help conserve water by reducing potable-water use for landscape irrigation. Treatment requirements should be matched to site risk to reduce costs.

Importance:

Landscape irrigation is a significant use of potable water and represents a significant opportunity for water savings. Soil-based treatment systems can provide safe and reliable service.

How Do You Propose Meeting or Complying with This Issue?

Revise statutes and standards to expand treatment options and encourage more decentralized systems. Revise large onsite rules to encourage the use of treated effluent for subsurface landscape irrigation, with pretreatment requirements matched to site risk.

Title: **Guidelines and Standards for Onsite/Decentralized Water Reuse Systems**

Originator: Buehrer

Issue Description:

The development of guidelines and standards for onsite/decentralized water reuse systems is needed so that permits can be easily obtained to allow for small, efficient onsite systems that would provide water reuse applications on house sites, buildings, industries, and small communities.

Importance:

Onsite/decentralized water reuse systems are cost-effective and can help protect the environment by reducing impacts to natural water sources.

Onsite systems can be very cost-effective because they can be designed for a specific waste stream (e.g., predictable quantities and qualities) and, depending on location, can also reduce costs for municipal-water and wastewater treatment and conveyance by reducing demands on these various municipal systems.

Onsite systems also help the users become more aware of their water-use activities and to develop a greater appreciation of the value of water.

How Do You Propose Meeting or Complying with This Issue?

The development of onsite/decentralized water reuse standards would require legislative backing and the writing of regulatory documents. The completion of this task would be aided by the existing availability of numerous types of technology that are already being used for small-scale onsite systems.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.

- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.

- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."

- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Procedures to Allow Alternatives to Treatment Processes Specified in the Water Reuse Standards**

Originator: Crook

Issue Description:

The water reuse criteria allow alternatives to treatment processes specified in the criteria, if such alternatives are acceptable to the regulatory agencies. However, protocols have not been developed to evaluate equivalency of alternative processes. Thus, it can be difficult for proponents and regulators to identify what constitutes treatment equivalency and treatment reliability.

Importance:

Absence of a standardized protocol to evaluate the acceptability of proposed alternatives and their reliability features to accepted treatment processes can result in unknown goals and procedures that may cause unnecessary and costly studies and/or documentation by proponents, lengthy turn-around times to determine equivalency, and inconsistent – and possibly incorrect – decisions by regulators.

How Do You Propose Meeting or Complying with This Issue?

Washington State should develop a standardized protocol or set of protocols that can be used to determine equivalency of alternative treatment-unit processes, or alternative treatment trains, for

both water-quality and treatment reliability. This can be accomplished by first identifying existing, new, and innovative technology likely to be appropriate or proposed by project proponents (such as UV for disinfection, membranes, membrane bioreactors, onsite systems, and natural methods of treatment). The State can then prepare a policy statement or similar document listing treatment processes already determined to be equivalent to those specified in existing criteria and detailing a specific protocol(s) to follow to obtain or provide information needed by the State regulators to determine equivalency of treatment processes not currently approved. Demonstration studies or other research may be needed.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Cost-Effective Solutions, Particularly for Small Communities**

Originator: Fitzpatrick

Issue Description:

The Reclaimed Water Use Act declares that cost-effective solutions for small communities are a state priority. There is a need to reduce the costs, while still protecting public health and the environment.

Importance:

The majority of proposed water reuse systems in Washington State are for small communities or decentralized satellite systems of larger facilities with the goal of providing water reclamation and reuse near the point of origin. Capital costs must be affordable for facilities to be built. O&M costs must be affordable for facilities to be maintained. This is necessary to protect public health and the environment.

How Do You Propose Meeting or Complying with This Issue?

Although the benefits of water reuse may be in the overall economic interest of the state, benefits do not always coincide with "who pays." More education on economics would be helpful, especially a workshop focused on economic factors for reuse projects.

Small communities should more fully evaluate whether Class A reclaimed water is needed or if a lower cost reclaimed water (e.g., Class B, C, or D) would be suitable to meet these needs. This should be done as early in the planning process as possible.

Facilities must be designed with attention given to the details necessary to ease O&M costs, even if it increases capital costs. Operators should be included throughout the design process.

Daily or other frequent monitoring is a high-cost item to small communities. Online surrogates and faster, but still accurate, tests should be encouraged wherever possible to reduce operator time. The State should consider the feasibility of reducing the monitoring frequencies for facilities with demonstrated continuous compliance and effective operating protocols.

Local recycled-water ordinances can facilitate use if they specify the conditions under which reclaimed water is available or its use may be mandatory, the procedures for obtaining it, and the requirements for the proper use of it to protect public health and prevent nuisance. Charges for reclaimed-water use can offset expenses.

Utilities should seek out partnerships with neighboring utilities and reclaimed water users (including public-private partnerships) that result in reducing the costs of planning, design, construction, and O&M of facilities.

Expertise, equipment, and cooperative extension services, such as Washington State University, could possibly facilitate and reduce the costs of pilot testing and disinfection-system verification.

A database on the available sizes and costs of treatment units for reclaimed water facilities that communities can readily access would be of value. This would take a cooperative effort between state, utilities, and consultants. Could PNCWA facilitate this project?

Title: **Facilitate Water Reuse by Adopting Requirements That Assume Reuse Is the Best Option for Wastewater Disposal**

Originator: Miller

Issue Description:

Water reuse guidelines should be predicated on the idea that we are enabling reuse.

Importance:

Historically, the burden of proof on the suitability of water for reuse has been on the "discharger." This often leads to the abandonment of reuse in favor of other, more certain disposal methods.

How Do You Propose Meeting or Complying with This Issue?

This issue is primarily one of perception. Subtle changes in the language of the regulations are the key to changing the perception of the intent of the requirements. In addition, establishing clear quality standards, for all reuse categories, can reduce the uncertainty. These standards should be "end of pipe," not in the receiving water to avoid costly modeling evaluations prior to permitting.

Title: **Cost-Effective Reuse in a Rural/Small Community Setting**

Originator: Milton

Issue Description:

A strategy to support water reuse was proposed and evaluated as a part of a comprehensive water-resources planning effort for the Yakima River Basin in Washington. The practical application of this strategy appears to be limited due to the nature of the dispersed small communities, lack of resources, and economy of scale needed to implement reuse projects.

Importance:

The Yakima River Basin is an area of growing population with over-appropriated surface waters and a Ecology-imposed moratorium on groundwater withdrawals. Ecology has declared the three Water Resource Inventory Areas of the Yakima River Basin to be critical basins. Critical basins are defined as having over-appropriated surface waters and listed species (e.g., trout and steelhead are "threatened") under the ESA. The exceptions to this moratorium are for single domestic wells or special consideration for critical existing domestic systems. This restricts economic development in the basin, which needs diversification from its heavily agricultural and drought cyclical economy.

How Do You Propose Meeting or Complying with This Issue?

Ecology has promoted reuse through a pilot reuse program. Future reuse may depend upon additional promotional pilot projects. Technology is ever improving, and its application needs to be encouraged. Equipment suppliers may be able to provide for cost saving with area-wide installation of particular systems or equipment. Special grants may be provided for critical watershed areas or moratoriums.

Title: **Ability of Smaller Utilities to Adequately Staff, Operate, and Maintain Reclamation Facilities**

Originator: Sander

Issue Description:

Meeting the costs of operating (including adequately staffing) a reclamation treatment facility is difficult (particularly in smaller communities), especially when the beneficial uses may not have hard economic value (i.e., generating cash to pay the bills).

Importance:

- Systems may be operated without an adequate number of qualified staff.
- Increased risk to public health.
- If serious problems were to occur, it would be a giant setback to the reclamation/reuse movement.
- Discourages many state staff, consultants, and utilities from pursuing this option.

How Do You Propose Meeting or Complying with This Issue?

- Work with utilities and the State Auditor to ensure that there is revenue received for the delivered product. This may be an internal transfer from another city's budget item, or from the State, but at least it is "revenue received."

- Work to establish better "values" of reclaimed water.
- Investigate opportunities in facility monitoring and reporting to become more efficient and lower costs.
- Investigate intergovernmental agreements to share or reduce costs through economies of scale.

Title: **Constructed Wetlands Should Play a Role in Water Reclamation to Promote the Implementation of Lower Classes of Reclaimed Water**

Originator: Skillings

Issue Description:

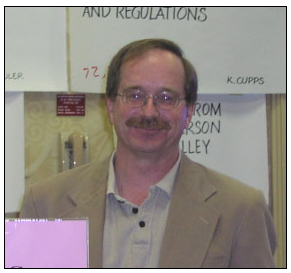
The cost to develop and operate a water-reclamation facility is, in many cases, cost prohibitive for smaller communities. The use of lower-cost, natural systems to produce a product meeting reclaimed-water standards that can be used for streamflow augmentation or wetland enhancement could provide financial encouragement for proponents. The measurement of water-quality standards, when applied to the discharge from constructed wetlands, make continuous compliance difficult or impossible.

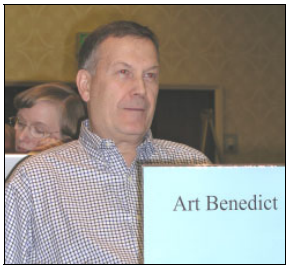
Importance:

If the discharge from constructed treatment wetlands could be considered for non-consumptive beneficial purposes, such as wetland enhancement or streamflow augmentation, more communities could pursue water reuse. This form of treatment and reuse would provide an environmental value to the water cycle. Constructed treatment wetlands could result in implementing expanded reuse and could provide a mitigation strategy for water resource issues in the watersheds.

How Do You Propose Meeting or Complying with This Issue?

The regulations need to be changed that will allow a natural form of treatment. For this to take place, there needs to be an acceptance of the fact that constructed wetlands will not consistently produce a quality of water that will meet daily numerical criteria; however, the average water quality from the wetlands can, over an extended time period, meet water-quality standards in a natural manner. Re-address this issue.





PRIORITY 5

Develop a Water Reuse Research Program in Washington

Originators:

Price on behalf of himself, Benedict, Buehrer, Coleman, Crook, Gillaspie, Hagstrom, Loge, and Willey

The following issues were consolidated under the above title:

Title: **Develop a Water Reuse Research Program in Washington**

Originator: Price

Issue Description:

Water reuse is a dynamic part of water management, ranging from public perception, to major advances in treatment technologies, to emerging contaminants.

Importance:

While many parts of the country and the world are contributing to the advancement of the field, there are needs that arise that are specific to the region.

How Do You Propose Meeting or Complying with This Issue?

The State should facilitate the creation and continuing existence of a partnered research program that addresses the specific needs in Washington State. This should be done with the university system, private sector, local agencies, and various national organizations. The first step would be to identify issues, priorities, resource needs, and who might best carry out the work.

Title: **Stormwater - A Resource for Reuse?**

Originator: Benedict

Issue Description:

Currently, legislation, programs, and funding for stormwater-management are separate from water and wastewater, except for the reuse focus of the latter. This separation is similar to that of

water supply and wastewater management in the past. Perhaps it is time to bring stormwater under the reuse umbrella.

Importance:

Stormwater – urban drainage and runoff from development activities – is an integral part of the water resource. It may be less contaminated than wastewater and, therefore, more easily treated for reuse. Although existing best management practices provide some treatment, higher reuse levels could be achieved.

How Do You Propose Meeting or Complying With This Issue?

- Scope the issue from a quality/quantity, institutional, and legislative perspective.
- Look for existing linkages between water/wastewater reuse and stormwater management activities.
- Focus on implementation issues.

Title: **What Is Water Reuse? A Definition Is Needed**

Originator: Buehrer

Issue Description:

Water resources are found in nature, and some of these resources are impacted by human activities, which results in different qualities of water sources. A definition of "water reuse" is needed to clearly describe the different types of water reuse applications that are possible.

Importance:

The past practices of the twentieth century in the United States have labeled many of the water resources that are impacted by human activities as "wastewater." To help guide the development of a sustainable water-management approach, the term "wastewater" should be eliminated from the regulatory vocabulary, and all types of human-impacted water sources should be described by their quality (i.e., potable water, bottled water, greywater, blackwater, combined water, complex/industrial water, stormwater, roofwater, and reclaimed water). Currently named "wastewater treatment plants" should be renamed as "water reclamation facilities." All types of water sources should be considered a resource. There is no such thing as "waste."

How Do You Propose Meeting or Complying with This Issue?

The definition of "water reuse" can be defined and agreed upon by those involved with water resource management and should be approved by the legislative process.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Better Indicators for Microbial and Chemical Constituents**

Originator: Crook

Issue Description:

Water reuse criteria rely on indicators or surrogates to characterize the safety of reclaimed water. Currently used indicators do not adequately represent reclaimed water quality from the standpoint of public health and environmental protection. Better indicators are needed to represent constituents of concern.

Importance:

By themselves, current indicators/surrogates are not reflective of microbial pathogens and chemical contaminants. More representative indicators are needed so that water reuse criteria for both potable and nonpotable applications can be developed that are more representative of the

presence or absence of microbial and chemical contaminants and, thus, protect public health and the environment without being unnecessarily restrictive. Public acceptance of the use of reclaimed water would be enhanced.

How Do You Propose Meeting or Complying with This Issue?

Research is currently underway by WERF and others to identify better microbial and chemical indicators in reclaimed water. Washington State should closely monitor the progress and results of these research efforts, examine literature to review current and proposed microbial indicators and surrogates for health-significant chemical contaminants, and document the state-of-the-art of monitoring methodology, such as rapid and/or online sampling and analytical techniques. A workshop with appropriate experts/researchers may be useful to identify what course of action should be taken.

Title: **Surrogates for Organic Contaminants in Reclaimed Water Used for Potable Reuse**

Originator: Crook

Issue Description:

TOC currently is used as a surrogate for organic chemical contaminants in reclaimed water used for potable reuse. Unfortunately, it provides little information on the presence and significance of low levels of toxic organic contaminants that may be present in the water. Thus, a high TOC does not necessarily indicate that the water contains health-significant levels of organic constituents, and a low TOC does not necessarily indicate that the water does not contain health-significant levels of organic contaminants. A more appropriate surrogate or suite of surrogates is needed to more definitively indicate the presence or absence of constituents of concern, including DBPs, pharmaceuticals, and endocrine disruptors.

Importance:

Using TOC as a surrogate for organic contaminant removal is useful as a measure of overall organics removal but is not adequate as a measure of health-significant organic constituents. More appropriate surrogates for health-significant organics are needed. Imposing restrictive TOC limits can result in expensive advanced treatment technology to achieve the limits that may or may not be needed.

How Do You Propose Meeting or Complying with This Issue?

Will need to rely on some current and proposed research addressing this issue being done at the national level.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Characterize the Fate, Transport, and Effect of Xenobiotic Organic Chemicals in the Environment**

Originator: Hagstrom

Issue Description:

A recent challenge to the industry is the need to remove individual organic compounds, rather than simply focusing on organic matter in general. Of particular concern is the documented presence of xenobiotic organic compounds in reclaimed water; however, the effects of these compounds on human health and the environment are uncertain.

Importance:

Our industry has the responsibility of protecting human health and the environment. As such, we are obligated to develop an understanding of pathways through which these compounds enter the

environment, the risks these compounds pose, and the methods to ensure that these compounds do not enter the environment in excessive quantities through reclaimed water. Resolving this issue is necessary to gain public acceptance.

How Do You Propose Meeting or Complying with This Issue?

The industry can meet this challenge through continued research on the fate, transport, effect, and treatment of xenobiotic organic compounds.

Title: **Develop Political, Legal, and Economic Incentives for Water Reuse That Reflect the Unique Geography of Washington State**

Originator: Loge

Issue Description:

The State of Washington is largely rural, with many reuse projects implemented in regions without a diverse economic base (e.g., outside of King County). Many projects are implemented under the perceived notion that reuse is "good," with no tangible economic return to offset the elevated capital and operating costs.

Importance:

Growth and sustainability of reuse requires a base of appropriate incentives at the scale of implementation.

How Do You Propose Meeting or Complying with This Issue?

- Provide tax incentive for corporations.
- Provide pollution credits.
- Integrate environmental economics into the political and regulatory structure.

Title: **Streamflow Augmentation – Good or Bad?**

Originator: Willey

Issue Description:

Seemingly, many Washington streams could benefit from dry-season augmentation with well-treated reclaimed water. This would help maintain minimum stream flows needed for fisheries.

Water-quality concerns related to temperature, total dissolved solids, endocrine disrupters, and micropollutants limit this practice. Research is needed to weigh the pros and cons of streamflow augmentation and to better define the water quality needed to adequately protect aquatic life.

Importance:

- Reclaimed water may be an important resource in protecting sensitive fisheries.

- If streamflow augmentation is found acceptable with a reasonable treatment cost, it may cause utilities to pursue decentralized treatment higher in the watershed.

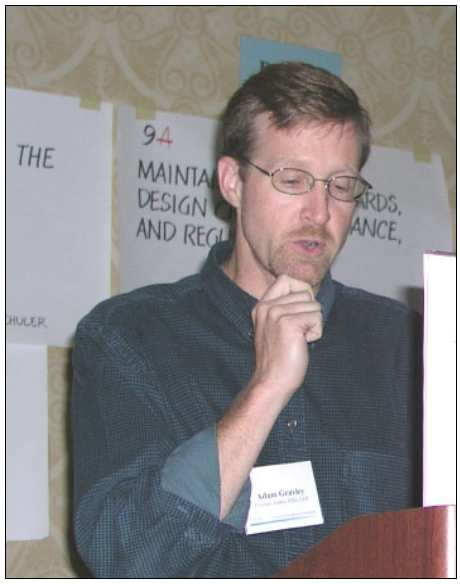
How Do You Propose Meeting or Complying with This Issue?

- Review research conducted to date.

- Convene a panel of experts to assess the current knowledge and identify information gaps.

- Consider conducting "before and after" field studies to assess the impacts of streamflow augmentation with reclaimed water on localized fisheries and aquatic species.


Shelly Badger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PRIORITY 6

Develop Consistent Regulations That Balance Water Quality with Current and Future Quantity While Avoiding Undue Burdens to Discharges

Originators:

Nichols on behalf of himself, Badger, Coleman, Gillaspie, Gravley, Griffith, Haller, and Milton

The following issues were consolidated under the above title:

Title: **Balance Quality Versus Quantity without Creating an Undue Burden to Dischargers**

Originator: Nichols

Issue Description:

Through the TMDL process, a treatment facility can be made to increase its level of treatment and, in some cases, remove its discharge from a water body that is deemed too impaired to accept the effluent; however, if a treatment facility complies with this mandate through a reuse option, the operator can then be held responsible for any impairment to downstream water rights holders. These requirements are completely in conflict with each other.

On the one hand, the discharger is told that its effluent is not clean enough for discharge to a surface water; however, if the discharger removes it, the discharger is further told it is robbing a downstream user of a valuable resource. In the first case, the quality is inadequate, but in the second case, it is a matter of water quantity, regardless of how clean it is.

Quality and quantity cannot be looked upon as stand-alone criteria that do not impact each other. They are interrelated and have a dramatic effect on each other. It is important that they be examined and considered collectively rather than separately. If effluent is considered too laden with contaminants for discharge into a water body, how can it have been beneficial to a downstream user?

Importance:

The balance between quality and quantity is important because when these criteria are looked at individually, a discharger may become responsible for one regulation purely as a result of complying with another. A treatment-facility operator should not be "punished" for attempting to improve effluent quality, especially when such efforts are mandated by a regulatory agency.

This places an additional financial burden on the discharger after the initial investment is made to meet the regulations.

How Do You Propose Meeting or Complying with This Issue?

The regulations should be tailored so that quality and quantity are not mutually exclusive. Instead, they need to be considered together so that if a discharger is required to remove effluent from an impaired water body, that effluent cannot be looked upon as having had a beneficial use to downstream water rights holders. If it is not clean enough for the fish, it certainly should not be looked upon as having been acceptable for human consumption.

Title: **Include a Reclaimed Water Program as an Integral Component of a Community's Ability to Provide Water for the Future**

Originator: Badger

Issue Description:

The Watershed Management Act (WMA) was adopted by the state to encourage better use of water resources statewide. The objective of Watershed Plans is to develop a comprehensive strategy for balancing competing demands for water, while at the same time preserving and enhancing the future integrity of the watershed.

Communities with reclaimed-water programs have a unique opportunity to incorporate their program into such planning efforts as a strategy for increasing water supplies to meet future needs. They can use reclaimed water to reduce the amount of potable water used by high water users to further their water supply and they can recharge the aquifer or augment a nearby stream to benefit instream flows.

The "value" of this water must be taken into account by Ecology in considering the communities' water-rights situations.

Importance:

Communities have and will invest in reusing their water because it is "the right thing to do"; however, while the implementation of a reclaimed-water program is responsible and visionary, it is more expensive. Additionally, the GMA required cities to provide for the sufficient infrastructure to accommodate their population allocations. With this in mind, communities have been making improvements to park, transportation, water, and sewer systems to "be ready" for their numbers; however, the assurance of necessary water rights for the future is not there. A reclaimed-water program can help to provide these assurances; however, to do so, it must be recognized not only for its increased level of treatment and associated environmental benefits, but also for the benefits to the watershed in the form of conservation and enhancement of potable water supplies.

How Do You Propose Meeting or Complying with This Issue?

A policy should be developed in conjunction with DOH and Ecology that would provide for the recalculation of water use considering the return of reclaimed water from aquifer recharge, wetland enhancement, and stream-flow augmentation. The total quantity of water that is reclaimed should be deducted from the total quantity of water withdrawn from the aquifer to determine the actual impact to the watershed.

Ecology should adopt a regulation or policy to grant additional water rights that are equal to the amount of water used for non-consumptive beneficial uses. With appropriate "credits" given to those that "reclaim their water," an added incentive will be provided that with a substantial investment comes the assurance that water need for the future can be provided.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Regulatory Compliance Liability Safe Harbor**

Originator: Gravley

Issue Description:

Cities, counties, and other municipal-water and wastewater utilities have concerns about the risk of liability arising from the provision and/or the use of reclaimed water. To many, reuse is new, different, and has unknown effects. This perception of risk (even if there are no scary lawsuits) retards water reuse.

Importance:

- Ease the decisions made by local government officials.
- Remove financial risks by budget-strapped local governments.

- Ease contracting for the supply of reclaimed water.

- Ease the allocation of risk among parties.

How Do You Propose Meeting or Complying with This Issue?

Adopt legislation providing that political subdivisions of the State are not liable for damages so long as they are in compliance with reuse laws and regulations, as well as applicable permits. This is a strong incentive for compliance.

Title: **Is Water Rights Impairment a Project Cost, Public Cost, or Shared Cost?**

Originator: Gravley

Issue Description:

In freshwater-discharge context, downstream water rights effectively have veto power (see Revised Code of Washington [RCW] 90.46.130 [1]). In augmentation or recharge projects, who is entitled to the water? How much can a utility recover? Current law allocates the cost of impairment to the public.

Importance:

Project proponents need to have reasonable certainty or confidence as to the quantity available for beneficial use. They need to have a water supply incentive.

How Do You Propose Meeting or Complying with This Issue?

- Legal rules should follow policy judgment as to the allocation of the costs of water rights impairment.

- Legislation is needed to create a rebuttable presumption that reclamation does not impair downstream water rights.

- Water rights "credit" should be provided to municipal utilities that devote reclaimed water to stream or groundwater recharge.

- Some water-rights acquisition funds should be allocated to address the public costs of impairment.

Title: **Expedite Water Rights Decisions**

Originator: Griffith

Issue Description:

- Reclaimed water infrastructure is expensive.
- Funds are limited.
- Installing reclaimed water infrastructure is less likely, if cheaper alternatives exist.
- The development of new water sources using new/transferred water rights may be cheaper.
- Purveyors may wait for water rights decisions before proceeding.

Importance:

- Not knowing alternatives makes evaluating alternatives difficult.
- Acting before knowing alternatives increases the risk.

How Do You Propose Meeting or Complying with This Issue?

- Provide adequate resources to process applications.
- Work with applicants to ensure applications are viable.
- Reprioritize "the stack" of pending applications.

Title: **Water Rights: Impairment Is a Barrier to Water Reuse Project Implementation**

Originator: Haller

Issue Description:

RCW 90.46.130 includes an impairment prohibition for facilities contemplating water reuse projects. The statute does not define impairment, sets up different impairment standards for different types of reclaimed water, and (for some reclaimed water proponents) places the decision regarding the adequacy of proposed mitigation or compensation solely within the hands of owners of potentially impaired rights.

Importance:

- Uncertainty regarding impairment prohibition is a deterrent for facilities contemplating water reuse.
- The potential for third-party lawsuits over potentially impaired rights is a risk that some facilities are unwilling to take.
- Statutory differences in impairment terminology make the implementation of regulatory guidance difficult.
- The advantages of removing impairment as a barrier to reclaimed-water projects must be tempered with the "wet water" impacts to water users and instream flows associated with turning formerly nonconsumptive uses into consumptive uses.

How Do You Propose Meeting or Complying with This Issue?

Ecology is developing policy, rulemaking, and legislative proposals to address impairment issues. In some cases (e.g., third-party acceptability of projects, statutory differences in impairment metrics), only legislative solutions are available. Legislative changes to Chapter 90.46 can be time-consuming, have uncertain outcomes, and cause delays for existing projects. Support from other stakeholders is needed.

Title: **Water Quality Versus Water Quantity: Developing a Credit System**

Originator: Haller

Issue Description:

Chapter 90.46 RCW and the Legislature directed Ecology to encourage water reuse projects. Some municipalities are proposing to meet a portion of its GMA obligations through credits for reuse projects. While the word "credit" makes intuitive sense to reclaimed-water project proponents, there is currently no basis in either statute or rule for this system. Further, neither the Legislature nor Ecology has determined whether such credits should be on a straight one-for-one basis. Some states allow the withdrawal of state waters mitigated by a larger donation of reclaimed water (e.g., Arizona requires an extra 5-percent donation).

Importance:

- Municipalities must prepare comprehensive water-planning documents that examine the potential for reuse.
- Communities with limited water rights are looking at innovative ways to meet growth.
- Washington State has many watersheds with ESA-listed species where both quality and quantity of water are critical.

How Do You Propose Meeting or Complying with This Issue?

- A survey or digest of how other states have set up credit systems should be prepared.
- A stakeholder group should review other credit systems and provide recommendations on the value of reclaimed water relative to other state resources.
- Legislation or rulemaking should be used to establish the regulatory framework for a credit system.
- Trust-water banking and ASR programs can be used as models for such a program.

Title: **Do Water Rights Impairments or "New Water" Rules Prevail?**

Originator: Milton

Issue Description:

Facility planning, in the mid-1970s, required the City of Yakima in Washington to evaluate the land application of effluent. A response to this alternative by USBR was that the reduction in discharge to the river, even though immeasurable, would diminish the supply of water to downstream users and the ability of the USBR to deliver contracted water supplies. In other cases of reuse, mitigation was required. The Washington State Legislature has since adopted regulations declaring that water treated for reuse is "new" water; however, the contradictory requirement remains to address impairment of other water users.

Importance:

Projects to reuse water have been restricted because of the question of water rights. Current projects to reuse water are being asked to address impairment. A coherent policy does not exist to address this issue. Millions of dollars are being spent to implement reuse without providing assurance that impairment may restrict the future use of facilities that are being built.

How Do You Propose Meeting or Complying with This Issue?

The courts may ultimately need to resolve this issue. Preferably, guidance should be developed and provided to the communities at the time of facilities planning. If the plans are approved and the facilities are built, communities need assurance that claims will not be made to prevent use of the treatment/reuse facilities or operations. The State Environmental Policy Act (SEPA)/National Environmental Policy Act (NEPA) review may provide some assurance, and the Attorney General's opinion may be of value. A legal test of the Reuse Law may be required for clarification.

PRIORITY 7

Identify Revenue Sources to Pay for Reclaimed-Water Projects, Regulatory Oversight, and System Operations

Originators:

Bay on behalf of himself, Coleman, Gillapie, Griffith, Skillings, and Thomas

The following issues were consolidated under the above title:

Title: **Water Reuse Funding**

Originator: Bay

Issue Description:

Funding for reuse projects is unavailable, unlike projects for salmon restoration, trails, stormwater management, watershed management, and transportation.

Importance:

Water reuse needs to be prioritized, brought to the top of the pile, and recognized as a true resource.

Water reuse is an opportunity to provide the environment a shot in the arm and to assist in sustaining our water resources.

How Do You Propose Meeting or Complying with This Issue?

The Puget Sound Stormwater Management team provides direction, training, and funding sources.

A Reuse Department, similar to the Puget Sound Stormwater Management team, could provide this same service while providing the same direction, training, funding sources, and permitting efficiency.

I do not believe that any of the issues presented, or the development of reuse projects, can be accomplished without the reuse reorganization and new funding sources.

The importance of water reuse needs to go before our state officials for acceptance, understanding, importance, and assistance.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Encourage Appropriate Pricing for Potable Water**

Originator: Griffith

Issue Description:

- Potable water systems are sized for peak demands.
- The unit cost to meet peak demands is greater than the unit cost to meet average demands.
- Potable- and reclaimed-water systems may be in competition for customers.
- Sometimes, potable water sold during peak periods is not sold at prices that reflect its cost.
- This has implications for reclaimed-water pricing because reclaimed-water rates are often tied to potable-water rates.

Importance:

Appropriate pricing of potable water may improve the cost recovery of a reclaimed-water system.

How Do You Propose Meeting or Complying with This Issue?

- Many utilities already do this (e.g., seasonal/inverted block rates).
- Marginal cost pricing.

Title: **Show Me the Money!**

Originator: Skillings

Issue Description:

The most significant impediment to implementation of reuse is not technology; it is not public acceptance; it is funding. While many recognize the benefits for reclamation as "the right thing to do," paying for these expensive facilities places a barrier to implementation. Reclamation facilities have to compete for the same limited resources that other agencies need just to meet their basic needs.

Importance:

Available funding that is dedicated to reuse projects will promote more reuse projects, advance the industry, and improve the environment.

How Do You Propose Meeting or Complying with This Issue?

The Legislature should provide this funding mechanism as an additional funding program or the current funding should have a portion dedicated for reuse projects with a priority.

Title: **Growth Should Pay for Growth**

Originator: Thomas

Issue Description:

Prioritize the potential to develop reclaimed-water programs over obtaining additional surface/groundwater resources when considering expanding water rights.

Those entities and purveyors with the highest potential or ability (i.e., financial, large or increasing customer base, etc.) to enact a water-reclamation program should be listed in second place for access to/approval of additional surface/groundwater resources/rights/permits.

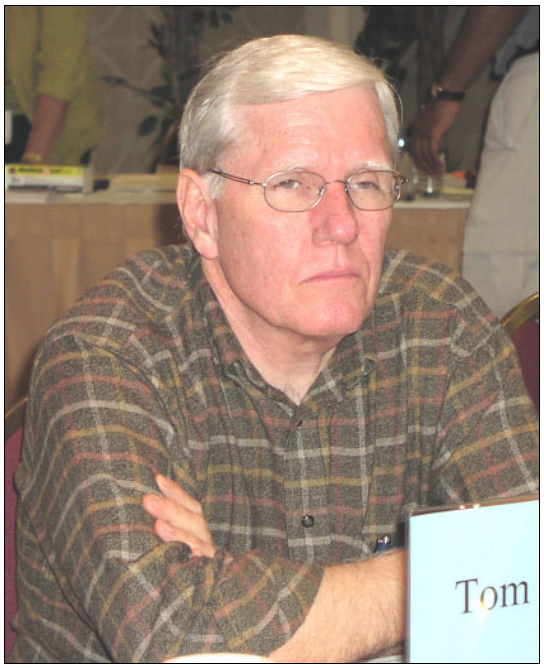
Importance:

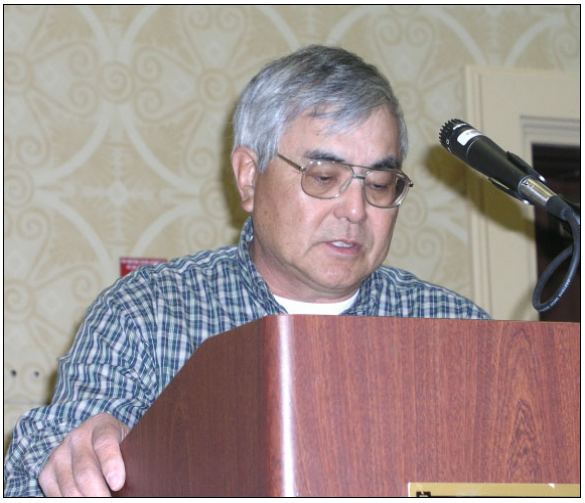
Growth pays for growth and the new technology associated with that growth. Traditional surface-water and groundwater sources are not adequate to supply ever-increasing demands for water. As stated earlier, access to traditional water sources is simpler and less expensive than enacting a reclamation program. Reuse programs need to be developed and funded by utilities

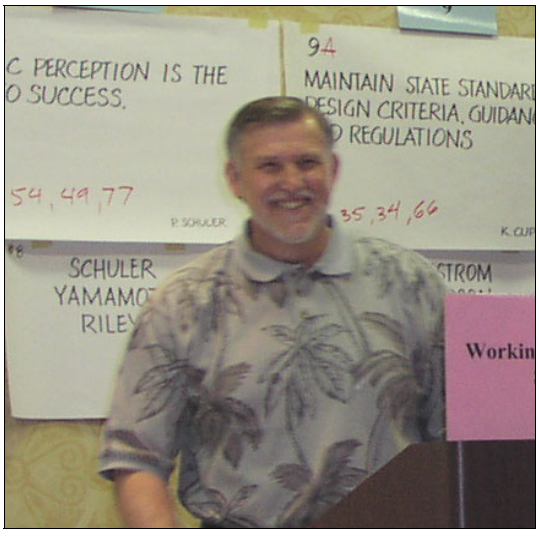
with the greatest ability to do so. Reuse is an integral part of water resource management, wastewater management, and ecosystem management.

How Do You Propose Meeting or Complying with This Issue?

Develop cooperative partnering efforts between large utilities and regulatory agencies.



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PRIORITY 8

Recognize That Public Perception Is the Key to Success

Originators:

Schuler on behalf of himself, Coleman, Gillaspie, McKinley, Riley, and Yamamoto

The following issues were consolidated under the above title:

Title: **Public Perception Is the Key to Success**

Originator: Schuler

Issue Description:

A successful program will be one that is technically viable, financially viable, and believable by the public. Engineers can develop the perfect technical program, but success will be determined by public perception. There are a number of models that have shown the way not to do it.

Importance:

Because water reuse in Washington is driven by fish issues rather than water scarcity, the public must feel that this issue is important to spend significant quantities of tax revenue. Perception must drive the program. Positive public perception will cause the politicians to financially support the program. Political pressure can create the "demand" for reused water and funding.

How Do You Propose Meeting or Complying with This Issue?

As part of the program's development, Ecology must dedicate significant resources to selling the program using public relations experts to develop a marketing program.

Title: **Change Perception from "Disposal" to Product Creation**

Originator: Schuler

Issue Description:

In the wastewater-treatment business, "treatment" is considered the "disposal of waste." The industry mentality needs to be changed to one of a producer of a good product.

Importance:

Designer water has more "value" than wastewater. Adding "value" may change the economics of reused water.

How Do You Propose Meeting or Complying with This Issue?

Train industry workers on public perception through PNCWA, WEF, NWRI, and other professional associations.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Perceived Health Concerns May Negatively Impact the Market for Reclaimed Water**

Originator: McKinley

Issue Description:

The "alar scare" showed us the devastating market impacts of perceived health issues. If people are not willing to golf at a course using reclaimed water or buy products produced with reclaimed water, then industries will not be willing to invest in reuse water. A preemptive education campaign would have to compete for the attention of busy people. The City of Phoenix, Arizona, has better acceptance of reuse because the general public has a solid understanding of the problem.

Importance:

This is critical. If people are not willing to use the reclaimed water or to do business with companies who use reclaimed water, then the programs will fail. There must be a market for reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

A carefully crafted education campaign is essential. This program must specifically help the public to understand the water-supply problems in the State, how the reuse program fits in with the issue, and how reclaimed water is safe in a given particular use.

Title: **Public Perception: Sewage Is Sewage Until You Lose Track of It**

Originator: Riley

Issue Description:

The public has an inherent level of distrust and disgust when there is a perception of waste. A lack of understanding, a lack of trust of public officials, and the science of production can result in the public stopping a project.

Importance:

Generally, this perception is the last hurdle to overcome when developing and implementing reclamation projects.

How Do You Propose Meeting or Complying with This Issue?

Develop a state program to "brand" reclaimed water as a "valuable" resource through public outreach programs – not through specific public "education" – to change the "yuck factor" to a "yumm" factor.

Title: **Commode to Commodity Water Reuse: Perception Is Reality**

Originator: Yamamoto

Issue Description:

People, including decision-makers, think that water scarcity (competition) is concentrated only in the densely populated and industrialized zones of the state. The true condition is more acute than most people realize, or want to believe, in all areas, regardless of population density.

Watershed management encompasses private ownership and multi- jurisdictional authorities that can have limited scopes, which block meaningful progress of resource management. They want the gain, but not the pain. Private-sector perception is that the Ecology wields despotic powers.

Environmental quality reflects the status of the total interrelationship of both economic and biological conditions, which determines sustainability.

Importance:

Health and safety funding are top priorities of equal importance. Resource management must be dedicated to long term goals in keeping with completing the environmental loop. Communities (that lack a taxing base) must make hard decisions and have difficulty developing and managing infrastructure.

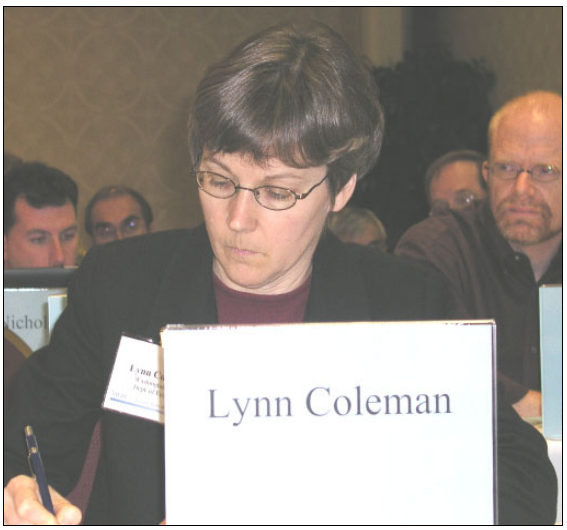
Miscalculations cause vast amounts of resources to be used up, misappropriated, or fouled up, which can be difficult or impossible to replace, repair, or supplement.

How Do You Propose Meeting or Complying with This Issue?

- Use case studies to illuminate both positive and negative outcomes and work directly with users and potential users (special tactful methods need to be taken to avoid litigation).
- Encourage stakeholder participation.
- Network using established and proven methods and include appropriate "generalists."
- The City of Royal City, Washington, Class A Reuse Water Reclamation Facility's challenges and history are being shared by relating technical and other lessons learned by facing the real day-to-day management problems of a Class A reuse facility with very little tax base and a very low per capita income population. Royal City has started an internship program and is directing funding to improve process control. Finding helpful ears is proof that the system can work.
- The program needs to develop tools that assist agencies in preserving watersheds.
- USEPA Region 10 and Public Works Trust Board are having the Environmental Finance Center at Boise State University present some interesting tools; included is a CD-ROM containing 619 fund sources, database system to track grants or loans, and other tools.
- The DOH Financial Viability Manual and Software for fractional budgeting and rate-setting workshop with laptops was an excellent tool.
- Economics drives the issue and gives the basic motivation for most people to properly manage resources.


Kathy Cupps


Jim


Lynn Coleman


Janet Gillaspie

PRIORITY 9

Maintain State Standards, Design Criteria, Guidance, and Regulations

Originators:

Cupps on behalf of herself, Anderson, Benedict, Coleman, Crook, Gillaspie, and Hagstrom

The following issues were consolidated under the above title:

Title: **Maintain State Standards, Design Criteria, Guidance, and Regulations**

Originator: Cupps

Issue Description:

Standards and guidance established in the mid-1990s no longer fully address today's challenges. The reuse of industrial process wastewaters has also recently been added to the law. There are rapid advances in both technology and the knowledge of the transport and fate of pollutants. The State needs a better way to keep regulatory requirements up-to-date.

Importance:

Up-to-date and clear standards and guidance documents are necessary for good decision making and timely implementation. The decisions we make today will have long-term impacts on the quantity and quality of our water resources, environmental quality, public health, and our state's economic well-being.

How Do You Propose Meeting or Complying with This Issue?

The state should consider a biennial review, prioritization, and update of the highest-priority items. Close coordination and agreement between Ecology and DOH programs on those priorities is essential to ensure that the resources are available to do this. Once priorities are identified, the state should create a table with milestones and timeframes to complete the priority work within the biennium.

A three-pronged approach, (i.e., internal interagency workgroups, stakeholder input, and an independent panel of national experts) would provide the needed balance in preparing and reviewing the documents.

Partnering with other states facing the same priority issues may result in more timely and cost-effective ways to do this.

Title: **Equivalency Determinations**

Originator: Anderson

Issue Description:

A method is needed to determine treatment and disinfection equivalency to the requirements in the Water Reclamation and Reuse Standards.

Importance:

New treatment and disinfection technologies do not always fit the requirements and procedures in our current standards and guidance. Discharge-permit requirements for O&M are particularly a hardship for small communities that have installed reclaimed-water facilities.

How Do You Propose Meeting or Complying with This Issue?

One approach is to allow the use of technologies specifically approved by the California Title 22 regulations for the treatment of reclaimed water.

More innovative approaches are being practiced by customers with special water reuse quality needs. Customized treatment either at a central wastewater treatment plant or at customer sites is one possibility to add flexibility and to add more customers at an acceptable cost. For example, a customer could be served by their own pipeline from the treatment plant, and the recycled water producer provides two or more qualities of recycled water. For a customer with special needs, the standard quality of recycled water is delivered to site, and a customized treatment facility at the site provides added treatment to meet customers' standards.

Another approach may be to establish review procedures for demonstrating equivalency. This review could be held under the guidance of a state university, that is:

- Establish an NWRI National Center in the State of Washington.
- Identify a site and the necessary attributes of the site.
- Use the National Center to address key questions that are of immediate interest to reuse stakeholders in the State and, possibly, the Pacific Northwest.
- Perform sound science to develop a foundation for guidelines and standards.
- The technical advisory committee could help shape the program vision.

Title: **Are Membrane Bioreactors Ready for Reuse Applications in Washington State?**

Originator: Benedict

Issue Description:

Membrane bioreactors are an emerging treatment technology that can produce better than secondary effluent: biochemical oxygen demand is less than 5 milligrams per liter (mg/L), turbidity is less than 1 ntu, total nitrogen is less than 10 mg/L, and there are low fecal-coliform levels. Thus, this technology offers opportunities for many reuse applications. Current standards and guidance do not directly reflect the reuse potential or capability of this technology.

Importance:

Without standards or guidance that directly reflect the capability and limitations of the technology, the pace of implementation will likely be slowed. In particular, the costs and benefits for small community reuse application need to be determined.

How Do You Propose Meeting or Complying with This Issue?

- Compile available national and state experiences, WEF publications, and California and in-state experience.
- Convene a committee to review, synthesize, and focus on the issue in Washington.
- Ultimately, update the standards and guidance.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.

- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."

- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Procedures to Allow Alternatives to Treatment Processes Specified in the Water Reuse Standards**

Originator: Crook

Issue Description:

The water reuse criteria allow alternatives to treatment processes specified in the criteria, if such alternatives are acceptable to the regulatory agencies. However, protocols have not been developed to evaluate equivalency of alternative processes. Thus, it can be difficult for proponents and regulators to identify what constitutes treatment equivalency and treatment reliability.

Importance:

Absence of a standardized protocol to evaluate the acceptability of proposed alternatives and their reliability features to accepted treatment processes can result in unknown goals and procedures that may cause unnecessary and costly studies and/or documentation by proponents, lengthy turn-around times to determine equivalency, and inconsistent – and possibly incorrect – decisions by regulators.

How Do You Propose Meeting or Complying with This Issue?

Washington State should develop a standardized protocol or set of protocols that can be used to determine equivalency of alternative treatment unit processes, or alternative treatment trains, for both water quality and treatment reliability. This can be accomplished by first identifying existing, new, and innovative technology likely to be appropriate or proposed by project proponents (such as UV for disinfection, membranes, membrane bioreactors, onsite systems, and natural methods of treatment). The State can then prepare a policy statement or similar document listing treatment processes already determined to be equivalent to those specified in existing criteria and detailing a specific protocol(s) to follow to obtain or provide information

needed by the State regulators to determine equivalency of treatment processes not currently approved. Demonstration studies or other research may be needed.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Develop a Regulatory Framework Based on Prescriptive and Performance Requirements That Will Facilitate Introduction of New Treatment Technologies**

Originator: Hagstrom

Issue Description:

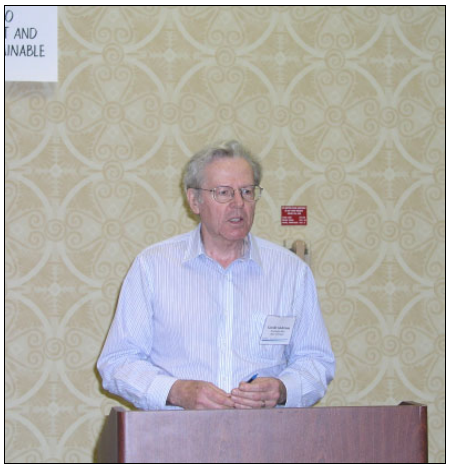
A current regulatory practice is to apply prescriptive requirements meeting minimal performance standards. These performance standards are based on the presence of surrogate constituents used as an indication of "safe" water. New technologies without prescriptive recognition are required to meet more stringent performance requirements, typically based on specific pathogens/contaminants, leading to a costly and lengthy testing procedure.

Importance:

Reuse-treatment technologies are evolving rapidly. These technologies may present significant advantages, including reduced cost and superior water quality. The current process for gaining acceptance of new technologies is unclear, costly, and slow. Developing a flexible regulatory framework using a combination of prescriptive and performance-based criteria would facilitate entry of these technologies in the industry.

How Do You Propose Meeting or Complying with This Issue?

Establish uniform water-quality requirements consistent with the intended use and associated risk and develop compliance strategies to ensure delivery of the required performance.



PRIORITY 10

Need for More Effective Communication, Education, and Information

Originators:

Fitzpatrick on behalf of himself, Anderson, Coleman, Fox, Gillaspie, and Yamamoto

The following issues were consolidated under the above title:

Title: **Need for More Effective Communication, Education, and Information**

Originator: Fitzpatrick

Issue Description:

The State needs to take a more active role in communicating the benefits of water reuse and the basis for the standards, criteria, and permit requirements both within and outside of our state and local agencies. Information should be readily accessible and easy to understand. The State has limited resources to accomplish this important task.

Importance:

An understanding of the reasons (i.e., drivers and constraints) behind a water reuse project, such as local water issues and alternatives, is needed for sound decision making. Those who are impacted by a decision should actively participate in the process. Public acceptance and support is essential to the success of water reuse.

How Do You Propose Meeting or Complying with This Issue?

SEPA and the NEPA, as well as the reclaimed-water permitting process, contain minimum public notification requirements. These actions are not generally sufficient to fully inform and educate the public at large.

A great deal of basic information on water reuse is available on Ecology's website at http://www.ecy.wa.gov/programs/wq/reclaim/index.html. Encouraging others to provide links to the Ecology site would be helpful in disseminating the information. An agency email-newsletter and website posting would also be valuable in disseminating information quickly.

Examples from the projects operating in Washington State are beneficial. Ecology has ordered a digital camera to take more pictures of water reuse facilities and sites to supplement presentations. Photos could also be placed on the website. The demonstration projects and other utilities and industries with (or planning) water reuse projects could also provide websites

highlighting their programs. These examples are of greatest value when they include the reasons behind and successes of the project. These websites could link to the Ecology site, and Ecology could also link to these sites. This does not have to be limited to Washington State. Projects in Oregon and other states would also be of value.

Ecology needs to provide additional in-house training and materials so that more agencies, public information officers, and other staff can carry the message to local governments, watershed planning groups, TMDL groups, businesses, the news media, organizations, and other interested parties. The communication format needs to encourage two-way dialog. The NWRI *Water from Water Recycling Video* is one useful tool.

Ecology (and DOH) must take an active leadership role in presenting papers at conferences and workshops.

Given the cost and the time involved in developing a water reuse project, there should be more opportunities for the public to participate, particularly early in the process. Watershed planning, GMA, and TMDL efforts provide opportunities for participation. The development of stakeholder process groups with diverse representation is desirable.

Early public involvement develops community support, while providing opportunity to identify and address public concerns. This, in turn, assists the agency to design a program that meets the needs of the community; therefore, a more concerted public-outreach process is considered necessary. Effective public participation can be encouraged and implemented at both the state and local levels.

- State funding agencies should require public information and outreach during project planning for recycled-water projects as a condition for receiving loans and grants.

- The State needs to provide the stakeholders with technical information (e.g., scientific, economic, environmental, and social impacts).

- The State should promote the incorporation of water reclamation and reuse into the educational curricula of public schools and institutions of higher education.

Title: **Clearing House for the Operation and Maintenance of Facilities, Distribution Systems, and Use Areas**

Originator: Anderson

Issue Description:

Water-reclamation facility operators need assistance to operate their facilities efficiently. There is limited training available for Group III and IV operators for the complexity of the facilities.

Importance:

Water-reclamation facility operators need to understand the basis for standards, facility design, and permit requirements to operate the facilities well. Properly operated and maintained facilities are necessary to maximize water-resource benefits while simultaneously protecting public health and the environment.

How Do You Propose Meeting or Complying with This Issue?

Ecology recently held a reclaimed-water facility operator's workshop recently that generated a number of priority issues and suggestions for implementation, such as to:

- Encourage more interactive dialog between operators and state agencies.
- Conduct annual or semi-annual workshops or meetings to facilitate communication.
- Provide a list of operator contacts and the types of treatment units and plants.
- Establish an operator forum on the web.
- Establish a "reclaimed-water facility" operator section within the PNCWA.
- Form partnerships with state agencies, PNCWA, Evergreen Rural Water Association, and Washington Environmental Training Resource Center to provide more comprehensive, advanced-operator training.
- Request that state agencies provide an implementation manual to help operators understand responsibilities under the standards.

Facilities must be designed with attention to details to ease O&M costs, even if it increases capital costs. Operators should be included throughout the design process.

Frequent monitoring is costly to small communities. Online surrogates, or automated accurate tests, should be encouraged, where possible, to reduce operator time. The State should consider reducing monitoring frequencies for facilities with demonstrated continuous compliance and effective operating protocols.

Utilities should form partnerships with neighboring utilities and reclaimed-water users (including public private partnerships) that result in reducing the costs of planning, design, construction, and O&M of the facilities.

Expertise, equipment, and extension services at Washington State University would facilitate and reduce the costs of pilot testing and disinfection systems verification.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Reclaimed Water Is Not Disposal**

Originator: Fox

Issue Description:

Too frequently, community members equate treating wastewater to the level required for discharge to our environment with reclaimed water when the *only* beneficial use is discharge even when the stream does not need it. As long as *we* continue this confusion, the public will remain confused and, thus, so will the legislature.

Importance:

- The public views sewage treatment as reclamation and views reclaimed water as sewage.
- Operators see treatment as disposal and *not* as producing a valuable product.
- Elected officials will *not* give it the priority that is deserved.

How Do You Propose Meeting or Complying with This Issue?

- Raise level of understanding that *we* are obligated to return water to the environment at a quality that will not degrade the stream.
- For every wastewater treatment facility, establish the cost (value) to treat wastewater to meet stream standards. Then credit any beneficial reuse project with any savings.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Water Reuse and the Land Ethic Legacy**

Originator: Yamamoto

Issue Description:

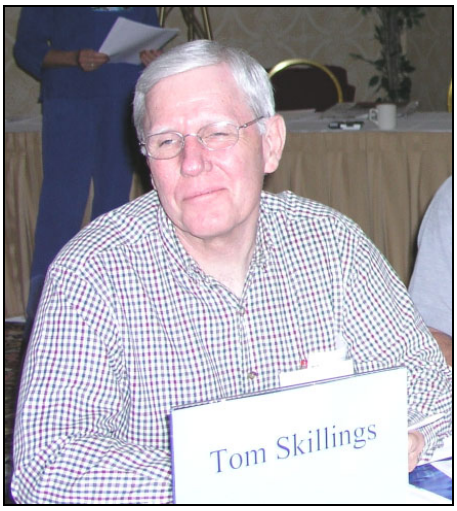
Water reuse challenges must be mitigated by basic historical and natural biotic system solutions. Soils are the primary, natural recycled-water media.

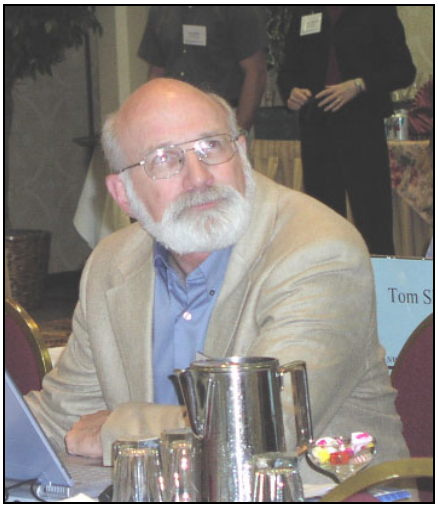
Importance:

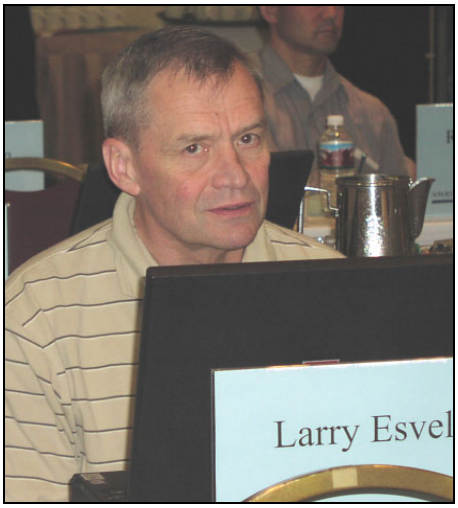
In general, best management practices, Dr. Fulgem's *Everything I Learned in Kindergarten*, and J. Baird Callicott's works on *The Land Ethic Legacy* best address the water reuse issue.

How Do You Propose Meeting or Complying with This Issue?

Partnering with folks with vision is a pleasure that will leave a proper legacy for our kids.







PRIORITY 11

Establish Monetary Values by Using Reclaimed Water for Environmental Enhancements and Water Resource Management Strategies

Originators:

Skillings on behalf of himself, Bay, Buehrer, Coleman, Esvelt, Fitzpatrick, Gillaspie, Griffith, Loge, Miller, Milton, Sander, Thomas, and Yamamoto

The following issues were consolidated under the above title:

Title: **Encourage Sustainable Year-Round Options for the Use of Reclaimed Water That Add Value**

Originator: Skillings

Issue Description:

The development of a reclaimed-water system is very costly. Irrigation uses are obvious, and the benefits are easily acceptable. Using reclaimed water for non-consumptive beneficial uses, such as aquifer recharge and recovery, stream-flow augmentation, or wetland enhancement is not as easily understood or accepted as having value. Regulatory and permitting agencies often perceive such uses as an alternate form of wastewater discharge and not as a beneficial non-consumptive use of reclaimed water.

Importance:

This issue is important because water-reclamation facilities are expensive to implement. Often, an agency will initially develop a reclamation facility to correct an immediate problem. It is quickly discovered that the available options are limited, and the cost to implement the year-round facilities are financially and politically challenging. The recognition of the value of the environmental benefits of non-consumptive use of reclaimed water will help facilitate the implementation of water reclamation. It is not just about meeting a standard of discharge – it is about improving the environment.

How Do You Propose Meeting or Complying with This Issue?

These forms of reuse should be encouraged for the environmental benefits they provide. These uses of reclaimed water should be encouraged because they add value. The State Legislature should provide a funding mechanism to encourage environmental enhancement and recharge. Ecology should encourage applications of reclaimed water for these purposes as a form of mitigation strategies. Mitigation could be in the form of additional water-rights considerations or

project-development approvals. This recognition would encourage agencies or developers to spend the necessary resources to implement and embrace the reuse concepts.

Title: **Water Reuse Funding**

Originator: Bay

Issue Description:

Funding for reuse projects is unavailable, unlike projects for salmon restoration, trails, stormwater management, watershed management, and transportation.

Importance:

Water reuse needs to be prioritized, brought to the top of the pile, and recognized as a true resource.

Water reuse is an opportunity to provide the environment a shot in the arm and to assist in sustaining our water resources.

How Do You Propose Meeting or Complying with This Issue?

The Puget Sound Stormwater Management team provides direction, training, and funding sources.

A Reuse Department, similar to the Puget Sound Stormwater Management team, could provide this same service while providing the same direction, training, funding sources, and permitting efficiency.

I do not believe that any of the issues presented, or the development of reuse projects, can be accomplished without the reuse reorganization and new funding sources.

The importance of water reuse needs to go before our state officials for acceptance, understanding, importance, and assistance.

Title: **Address "Root-Cause Problems" to Water Resource Management**

Originator: Buehrer

Issue Description:

As problems come along, often only the symptoms of the problems are dealt with and the real issue, or "root-cause," of the problem is not addressed.

Examples of a few root-cause problems related to water and wastewater management include:

- Using water to convey wastes.
- Restrictive water reuse and permit requirements that prohibit or require great costs to build and operate water reuse systems.
- Landscape and farming practices that use poor and outdated irrigation practices (or, you could say that landscapes that require any water at all should be native type).
- Water laws.

Importance:

Without addressing the root-cause problems, the problems that are being addressed simply continue, and a great amount of cost and resources are spent dealing with the issue. This is not a sustainable approach. The elimination of root-cause problems can be one of the simplest and most cost-effective approaches to dealing with current problems.

How Do You Propose Meeting or Complying with This Issue?

Dealing with root-cause problems can often mean becoming involved in many heated debates due to politics, special interests, and community concerns. Unfortunately, crisis situations are typically needed to force people to seriously consider the issues at hand. A proactive approach to solving real root-cause problems takes dedicated leadership to lead the way.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Validate the Use of Existing Water Resources for Transmission of Reclaimed Water**

Originator: Esvelt

Issue Description:

The current interpretation of regulation and policy restricts the use of existing water resources for transmission of reclaimed effluent from a producer (discharger) location to the location of a potential user. Current policy apparently mandates that the effluent become a portion of the "waters of the State," if discharged to a water of the State (e.g., stream, lake, wetland system or groundwater system). The use of existing water resources could be benefited by the transport of reclaimed effluent in existing water resources for short or extended distances to the point of withdrawal of a user of the resource, in addition to reducing the cost of transmission facilities from point of production to the point of use to an extent to make the reuse application more economically feasible.

Importance:

The potential user of reclaimed water may be located distant from the producer. When existing resources, such as a stream, lake, or wetland system, can be used to transport the resource from the producer to the user, the resource may be benefited due to the added-water availability, even if available for only a portion of the water resource. This relates to the ownership of the reclaimed water after and when it is mixed with waters of the State. This issue has been partially addressed for groundwater storage, but injection and withdrawal in a different geographic location or vicinity may not be considered acceptable either, even if within the same groundwater regime.

How Do You Propose Meeting or Complying with This Issue?

Clarify laws and regulations regarding water "ownership" or rights of the producer to assign use, and specifically allow the retention of those rights when intermixed with other waters during transport for use at another location, so long as water quality for reuse and for quality of the water resource being used for transport is protected.

Title: **Integrate Water Reuse into TMDL Modeling**

Originator: Fitzpatrick

Issue Description:

Many of the current watershed models employed for TMDL analyses do not examine either the positive or negative impacts that result from existing reclaimed-water projects or what could result from future projects. There is a need to integrate reuse opportunities, along with intelligent stormwater management, to restore beneficial uses in many of our impaired watersheds.

Importance:

As TMDL/Water Cleanup Plans move ahead in Washington State, there appears to be a growing disconnect or a lack of clear understanding of the ways that reuse may advance or retard the restoration of beneficial uses in a water body; therefore, there is a risk that the benefits of reuse in implementing TMDL objectives could be lost.

How Do You Propose Meeting or Complying with This Issue?

Ensure that any watershed model used for developing a TMDL incorporates a module of necessary assumptions that address any and all reuse projects in the watershed. Incorporating this assumption is especially important for TMDLs dealing with temperature, dissolved oxygen, and flow.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Provide Assistance to Document Environmental and Community Benefits**

Originator: Griffith

Issue Description:

- Reclaimed-water infrastructure is expensive.
- Reclaimed-water systems can have environmental and community benefits (in-stream flows/habitat, groundwater recharge, new community facilities).
- When considering costs versus benefits, environmental and community benefits need to be addressed.

Importance:

Environmental and community benefits may:

- Help jurisdictions make the best decision.
- Help communicate benefits to the public.
- Increase willingness-to-pay for reclaimed-water facilities.

How Do You Propose Meeting or Complying with This Issue?

- Leverage ESA/salmon-related work.
- Use the expertise of natural resource economists.
- Determine if efforts in other locations are transferable.
- Learn from past successes in Washington.

Title: **Develop Political, Legal, and Economic Incentives for Water Reuse That Reflect the Unique Geography of Washington State**

Originator: Loge

Issue Description:

The State of Washington is largely rural, with many reuse projects implemented in regions without a diverse economic base (e.g., outside of King County). Many projects are implemented under the perceived notion that reuse is "good," with no tangible economic return to offset the elevated capital and operating costs.

Importance:

Growth and sustainability of reuse requires a base of appropriate incentives at the scale of implementation.

How Do You Propose Meeting or Complying with This Issue?

- Provide tax incentive for corporations.
- Provide pollution credits.
- Integrate environmental economics into the political and regulatory structure.

Title: **Avoid Reliance on Low-Quality Uses As a Key for Reuse Strategies**

Originator: Miller

Issue Description:

Most discussions of water reuse seem to consider water to be a commodity degraded in quality each time it is "used." We focus on finding uses requiring lower-quality water for a source once meeting drinking-water standards. Unless these uses are essential, we run the risk of creating water demands simply for showing reuse; we will not actually reduce the demand for water. We can create a reuse program that does not foster sustainability.

Importance:

A key justification for water reuse is that it extends a scarce resource. In this regard, reuse should be part of a strategy including the elimination of unjustifiable uses of water and improving the efficiency of use for other uses (e.g., conservation). Only to the extent that reuse is compatible with these goals is it truly fostering sustainability.

How Do You Propose Meeting or Complying with This Issue?

Restrict water reuse to projects that meet defined criteria for sustainable use. A technical/public interest task force would be required to develop these criteria. The criteria would be multi-layered. For example, use of reclaimed water to support a silviculture operation may be appropriate in a region that has the ability to process trees into useful products; it may not be appropriate for a region where long travel distances would make processing trees uneconomic.

Title: **Need New Methods for the Cost-Effective Evaluation of Reuse**

Originator: Milton

Issue Description:

I attended an Instream Flow workshop in Seattle earlier in the week! There was much discussion of an ecosystem approach to the setting of instream flows. This gets to the sustainable issue. Today, I have heard much frustration about implementing reuse projects and additional other discussions on evaluating cost. This has caused me to think about an ecosystem approach to the evaluation or value of water for reuse projects.

Importance:

As we manage increasingly limited water supplies with increased multiple demands, we need a new mechanism to evaluate reuse water projects versus traditional alternative cost evaluations. We need to include the future value of water, including values of instream flows, ESA, tribal fishing rights, etc.

How Do You Propose Meeting or Complying with This Issue?

It is too soon to have recommendations! I would appreciate your ideas!

Title: **Timing of Reports and Required Approvals Often Result in Less Than Thorough Evaluations of Alternatives and Reviews**

Originator: Sander

Issue Description:

Starting with the timing of water-system plans, including wellhead protection programs, wastewater general sewer/facility plans, and other local plans (many multi-jurisdictional), the reports may be out of sync by several years. With the facilities resulting from these plans lasting 20-plus years, it is vital to take a comprehensive approach to analysis of water resource management.

More specifically, the actual reports may be received a few days before funding deadlines, causing hurried reviews and compromised comments (if any) so as not to lose grant/loan dollars by not approving them by a specific date.

Importance:

- Various reports/plans often result in investments of millions of dollars and construction of facilities that last dozens of years – missed opportunities.
- Alternatives may be limited or cost-prohibitive because evaluation comes a few years late.
- Plans/reports are often not accurate, correct, or comprehensive enough.
- State staff either feel pressured, or desire to approve documents to be eligible for funding and/or address existing problems.

How Do You Propose Meeting or Complying with This Issue?

- Pre-plan conferences prior to beginning general sewer/facility plans to clearly discuss and determine expectations (at least define the terminology and expected level of detail).

- DOH could be more flexible on the water system plan due dates to correspond with wastewater reports.
- Coordinate these plans better with watershed and growth management-related plans.
- Allow "interim" (band-aid) fixes (up to five years) to existing wastewater facilities to allow additional time for more thorough planning (may include funding mechanism).

Title: **Ensure Local Coordination and Management of Reuse Endpoints at Watershed Planning Level Based Upon Most Beneficial Outcome**

Originator: Thomas

Issue Description:

As cities grow and expand into agricultural areas, existing agricultural land transforms to residential. Reuse and irrigation water use shifts from agriculture to residential lawns/gardens. Small groups benefit as opposed to the greater population.

Importance:

Reuse for residential irrigation does *not* promote overall conservation (i.e., there are no economic incentives [e.g., rates]) and does not restore water into other uses (streams/aquifer/etc.).

An irrigation district's agricultural water use/right should not convey over when property is subdivided and developed.

How Do You Propose Meeting or Complying with This Issue?

Water right/reuse management becomes part of county/city development review process coordinated with watershed management.

Title: **Water Reuse, a Dichotomy**

Originator: Yamamoto

Issue Description:

Waste not, want not – or pay dearly later.

Importance:

Reclaimed water is economically non-competitive but, if not properly reclaimed, can be economically and environmentally devastating.

How Do You Propose Meeting or Complying with This Issue?

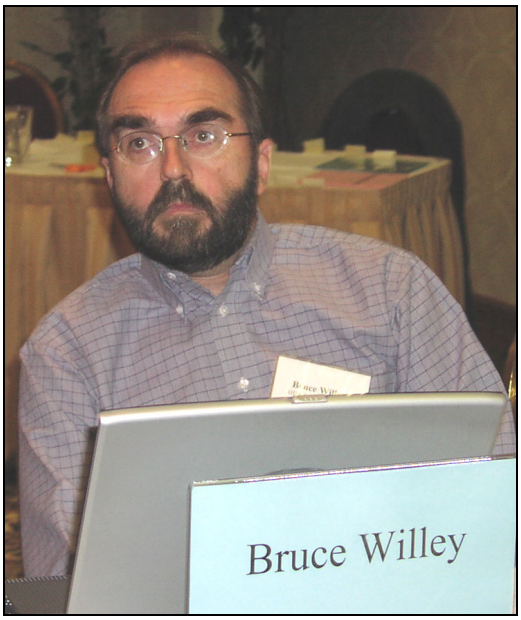
- EPA Region 10 and Public Works Trust Board are having the Environmental Finance Center, Boise State University, present some interesting tools: this includes a CD-ROM containing 619 found sources, a database system to track grants or loans, and other tools.

- The DOH Financial Viability Manual and Software for fractional budgeting and rate setting workshop with laptops were tops.

- Economics drives the issue and provides the basic motivation for most people to properly manage resources.

- Our municipality needs to form partnerships.

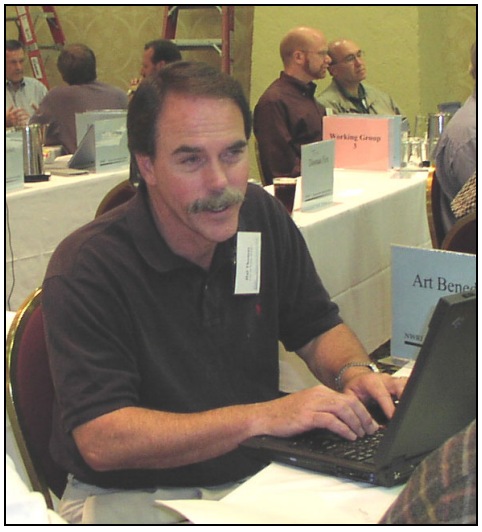
- I plan to implement a Geographical Information Systems to deal with "silos."

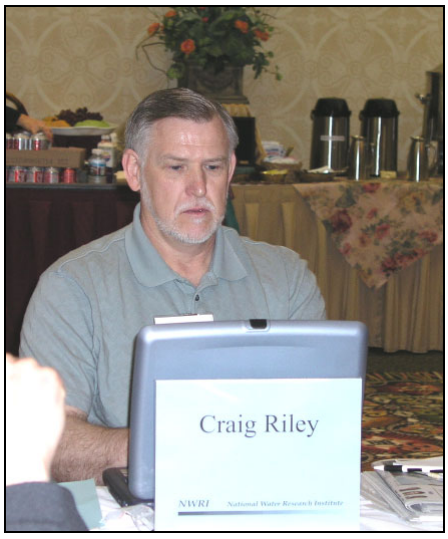

Bruce Willey


Lynn Coleman


Karla Fowler


Stan Miller




Craig Riley
NWRI

PRIORITY 12

Improve Feasibility of Groundwater Recharge by Ameliorating Diverse Water-Quality Requirements and Developing Guidance for Reclaimed-Water Aquifer Storage and Recovery (ASR)

Originators:

Willey on behalf of himself, Coleman, Fowler, Gillaspie, Miller, Riley, and Thomas

The following issues were consolidated under the above title:

Title: **Review and Clarify Groundwater Recharge Requirements (with Special Focus on Aquifers with High Hydraulic Conductivity)**

Originator: Willey

Issue Description:

Some communities interested in groundwater recharge are located over aquifers with high hydraulic conductivity. The reuse guidelines limit the feasibility of these applications by establishing unattainable criteria or by being sufficiently ambiguous that requirements for a recharge program cannot be readily determined.

- Direct injection. The guidelines stipulate that the reclaimed water shall be retained underground for a minimum of 12 months prior to being withdrawn as a source of drinking-water supply. In some Washington aquifers, the high hydraulic conductivity of the aquifer renders this infeasible.

- Surface Percolation. The guidelines allow groundwater recharge by surface percolation; however, the language for this practice is silent on the issue of residence time before withdrawal. Will the State require the 12-month retainment period? Also, the language on the required quality of reclaimed water seems ambiguous. In highly porous aquifers, the percolated water would receive limited treatment before reaching the groundwater table. In this case, would the water-quality requirements for direct injection apply?

Importance:

As water resources become increasing limited, groundwater recharge may become more economically viable and publicly acceptable. The State's guidelines should not limit this

practice unless there is clearly a scientifically based public health or environmental reason for doing so. Also, the State's guidelines on alternative methods of groundwater recharge should be better aligned and based on the same public health and environmental principles.

How Do You Propose Meeting or Complying with This Issue?

- Conduct a review to determine an appropriate minimum residence time and to determine if this requirement is specific to the characteristics of the aquifer. Determine if the driving factor for the minimum residence time can be offset by higher levels of treatment.

- Concurrently review (and revise) the guidelines for direct injection and surface percolation to provide a consistent, unambiguous set of rules.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.

- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.

- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."

- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Guidelines for Underground Storage and Retrieval of Reclaimed Water**

Originator: Fowler

Issue Description:

Since groundwater recharge with reclaimed water is a beneficial use, it follows logically that subsequent recovery and alternative use of the reclaimed water should be possible. Although an ASR statute (RCW 90.03.370) and rule (WAC 173-157) for potable water have been developed, reclaimed water is specifically excluded.

Some guidance for storage of reclaimed water exists in statute and standards, but none for recovery. As specified in the Reclaimed Water Act (90.46 RCW), reclaimed water that is discharged to ground via surface percolation or direct injection must be incorporated into sewer/water comprehensive plans approved by Ecology and DOH. In order to reserve its right to the water, the generator must specifically identify its intention to store and recover the water for beneficial uses. Hydrogeological studies would likely be needed to demonstrate the availability of reclaimed water for subsequent recovery or other beneficial use. Many questions remain.

Importance:

There is a strong desire among some utilities (including the LOTT Wastewater Alliance's four government partners) to retain control of any water discharged to ground so that it can be retrieved for future use. A lack of mechanisms and approaches for accomplishing this hinders planning and project development.

How Do You Propose Meeting or Complying with This Issue?

The ASR statute (RCW 90.03.370) would seem to provide relevant guidance that could be used to frame an approach for reclaimed water. In addition, many technical requirement sections of WAC 173-157 seem appropriate for ASR of either water right water or reclaimed water. Development of specific reclaimed water guidelines is needed.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.

- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Requirements for Reclaimed Water As a Source for Aquifer Recharge Should Be Consistent with Other State Regulations**

Originator: Miller

Issue Description:

Current and proposed regulations administrated by Ecology and DOH allow the discharge of onsite wastewater-treatment-system effluent and stormwater runoff only a few feet from underground sources of drinking water. The justification for these requirements is based on the perception that the cost of alternative technologies and the collection and treatment of sanitary waste and stormwater are not justified by the water-quality benefits gained. While this assumption is problematic, it does create a double standard for reclaimed water as a source of aquifer recharge.

Importance:

Consistency in regulations is needed both to convince the public that health is being protected and that the costs of water quality protection are appropriately distributed.

How Do You Propose Meeting or Complying with This Issue?

- Use wellhead protection as a tool to increase the treatment level required for onsite and stormwater disposal to levels acceptable for drinking-water protection. This will allow for the judicious use of onsite technology without jeopardizing drinking-water supplies.

- Examine current regulations for onsite and stormwater disposal for suitability as recharge water.

- Consider the ability of the vadose zone as a treatment system when developing standards for reclaimed water as a source for aquifer recharge.

Title: **Focus on Developing Indirect Potable Reuse to Supplement Public Water System Supplies**

Originator: Riley

Issue Description:

The fundamental basis for the passage of the Reclaimed Water Use Act was to provide additional water supplies throughout the state, especially public water-system supplies. Currently, it is difficult to implement indirect potable reuse projects due to water resources and public concerns regarding quality, cost, and availability. There is a need to develop an understanding of the public, elected officials, consultants, and rank and file regulators to define and promote the quality, reliability, and "safety" of the resource, when properly produced.

Importance:

Public water systems are facing either physical or legal restrictions on the quantity of water available for water supplies, which in turn controls economic and community growth, and well as public-health protection. This is the fundamental need of public utilities as the generators of reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

- Implement a state task force using public, private, utility, and educational resources available to develop guidance and public information programs.

- Support the necessary health research through the USEPA, Centers for Disease Control, and available private institutions.

Title: **Rectify the Groundwater Nondegradation Policy with Reclaimed Water Potential for ASR**

Originator: Thomas

Issue Description:

There are perception and policy concepts that Class A-treated reuse-water may be "less clean" than surface-water supplies (treated) and should not be used for ASR.

Importance:

Irrigation and spray farms serve as shallow aquifer-recharge systems for reclaimed water. During high surface-flow periods, reuse water provides an additional ASR source to help maintain those high flows for creek scouring and habitat improvement, while increasing groundwater reserves.

How Do You Propose Meeting or Complying with This Issue?

- Regulatory agencies, universities, consultants, reuse agencies, and ASR agencies need to work together to provide a plan.

- Educate, develop technology, and equate the issue of water degradation and reuse for ASR.

PRIORITY 13

Regulations and Permitting Often Present an Absolute Real Impediment to Water Use

Originators:

Rosain on behalf of himself, Buehrer, Coleman, Cupps, Esvelt, Fowler, Gillaspie, Miller, Schuler, and Willey

The following issues were consolidated under the above title:

Title: **Regulations and Permitting Often Present an Absolute Real Impediment to Water Reuse**

Originator: Rosain

Issue Description:

Conflicts in current water use (e.g., water rights), discharge and reuse regulations (e.g., stream flow augmentation), inter- and intra-agency jurisdictional conflicts, and the simple regulatory morass of project permitting tend to stifle many reuse projects and/or creative reuse opportunities.

Importance:

Without a reasonable and *predictable* permitting process in place (i.e., one that will even favor reuse), project proponents will take the easiest route to permitting their project, which may not be reuse.

How Do You Propose Meeting or Complying with This Issue?

- Streamline the permit process drastically.
- Provide performance incentives for Ecology and other agencies to issue permits *on a defined* schedule.
- Make the process predictable.
- Seriously consider a "Risk-Based Decision-Making Process" to project permitting.

Title: **Coordinate Water Reuse Programs with Building Codes, Plumbing Codes, and Other Related Local and State Regulations**

Originator: Buehrer

Issue Description:

The application of water reuse systems can conflict with local and state building and plumbing codes and regulations; therefore, the related building and plumbing codes and regulations need to be revised and updated to accommodate the installation of water reuse plumbing and fixtures.

Importance:

To implement a reuse system within a building site, it is very important to be able to receive a permit in a timely manner. This will help to control costs, keep projects on schedule, and promote the use of water reuse systems in other projects.

How Do You Propose Meeting or Complying with This Issue?

Patience and persistence will be needed to accomplish this need.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Integrate Standards to Protect and Maintain Environmental Water Quality**

Originator: Cupps

Issue Description:

The 1997 Water Reclamation and Reuse Standards need to be more clearly integrated with environmental water-quality regulations for the protection of all beneficial uses. Differences in existing requirements for planned versus unplanned projects make implementation more difficult and confusing.

Importance:

A fundamental premise of water reuse is to provide a water supply of appropriate quality for the use. Water-quality protection is necessary to sustain the variety of beneficial uses of our resources and to maintain our quality of life.

Beyond the treatments required for health protection, certain uses have specific water-quality needs. For example, high sodium or boron in water can be harmful to crops, and hardness and nutrients can cause problems in industrial applications. Our standards include wetlands, streamflow augmentation, and groundwater recharge. Any differences in regulatory requirements should be based on sound science that ensures an equal degree of water quality protection. We need to level the playing field.

How Do You Propose Meeting or Complying with This Issue?

Water-quality parameters and treatment techniques for protecting the environment, as well as beneficial uses, should be included in updates to the standards and in the permit writer's manual guidance. Appropriate permit and monitoring requirements should be developed.

As the various Ecology and Environmental Health program regulations and guidance documents are updated, they should be reviewed for consistency with water reuse requirements.

Title: **Accommodate Other Regulations Toward the Reuse of Reclaimed Water**

Originator: Esvelt

Issue Description:

Other agencies and authorities have language in their regulations that make the use of reclaimed water a potential liability. The regulatory authority for agricultural products has non-quantitative regulations for materials used in the production or processing of the products, which could be used by special interest groups to jeopardize the distribution or sale of the products or to raise the potential for lawsuits that could result in devastating penalties for the distribution or sale of the products. For example, food-processing regulations include wording such as the "use of water that contains filth in the process is not allowed." Since "filth" is in the eye of the beholder, as evident to those that have traveled to some developing nations, this type of restriction needs to be addressed and quantified to protect public health and should not be subject to the whim of a complainant.

Importance:

Industries and potential water users will not use reclaimed water if there is a potential or risk that a full production year of a commodity will be put at risk unjustifiably or outside of the realm of controls that they can employ in the production process. If generic regulations are used to determine compliance with practices that protect product quality and that regulate public health risk, instead of specific scientific-based regulation, then perception or the modification of interpretation may cause restrictions that were not intended during the development of the regulations.

How Do You Propose Meeting or Complying with This Issue?

- Identify other regulatory authorities and agencies that could impact the use of reclaimed water and coordinate revisions in standards and guidelines that may adversely affect the use of reclaimed water.

- Seek legislative directives for all regulatory agencies and authorities to review regulations that may impede water reuse.

- Modify those that do or may impede the potential for water reuse without scientifically based reason.

- Modify requirements and regulations in all areas that reflect scientifically based criteria.

Title: **Unrealistic Pipeline Separation Requirements**

Originator: Fowler

Issue Description:

The "Criteria for Sewerage Works Design" (aka, the "Orange Book"), published by Ecology in December 1998, requires a minimum 10-foot horizontal separation from any potable water lines or sanitary sewer lines and a minimum 18 inches of vertical separation below potable water lines and 1 foot above sanitary sewer lines. When such separation cannot be maintained, the guidelines state that "special construction requirements should be provided, such as providing a sleeve, using ductile iron pipe, encasing in concrete, or other method approved by DOH and Ecology."

Ecology and DOH have demonstrated a willingness to approve less separation distances in restrictive situations, but special justification and approvals are required in each circumstance.

Importance:

Strict adherence to the guidelines, as currently written, could severely limit the potential of reclaimed-water distribution. The guidelines are inconsistent with the addition of purple pipe infrastructure in already-built urban environments, where existing sanitary sewers and potable water lines are already in the ground, and in low-impact developments that feature narrow streets and increased landscaping. Wider-than-necessary separations escalate already high construction costs. The need for case-by-case approvals delays a community's ability to plan reclaimed-water infrastructure or to commit to providing service to potential users.

How Do You Propose Meeting or Complying With This Issue?

Revise the criteria to provide more realistic separation requirements, especially within urban areas and in situations where the water being distributed is Class A.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.

- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Requirements for Reclaimed Water As a Source for Aquifer Recharge Should Be Consistent with Other State Regulations**

Originator: Miller

Issue Description:

Current and proposed regulations administrated by Ecology and DOH allow the discharge of onsite wastewater-treatment-system effluent and stormwater runoff only a few feet from underground sources of drinking water. The justification for these requirements is based on the perception that the cost of alternative technologies and the collection and treatment of sanitary waste and stormwater are not justified by the water-quality benefits gained. While this assumption is problematic, it does create a double standard for reclaimed water as a source of aquifer recharge.

Importance:

Consistency in regulations is needed both to convince the public that health is being protected and that the costs of water quality protection are appropriately distributed.

How Do You Propose Meeting or Complying with This Issue?

- Use wellhead protection as a tool to increase the treatment level required for onsite and stormwater disposal to levels acceptable for drinking-water protection. This will allow for the judicious use of onsite technology without jeopardizing drinking-water supplies.

- Examine current regulations for onsite and stormwater disposal for suitability as recharge water.

- Consider the ability of the vadose zone as a treatment system when developing standards for reclaimed water as a source for aquifer recharge.

Title: **Follow the Leaders to Take Advantage of Their Progress and Avoid Barriers to Implementation**

Originator: Schuler

Issue Description:

Rather than develop unique or pioneering water reuse standards, the State of Washington should allow the water-scarce states to take the lead on the technical issues for resource reasons, but use their progress to develop an appropriate standard for the regional situation.

Importance:

From a market standpoint, the "close follower" is in a more economically viable position than a market leader. With the advances in research in states such as California, Arizona, and Florida, the science is moving forward rapidly. Washington can use these advances to ensure a successful program.

How Do You Propose Meeting or Complying with This Issue?

Develop a focus group or technical advisory committee to collect, evaluate, and summarize the programs of other states and countries, then choose a successful program upon which to base the Washington program. Washington can use market forces outside of the state to support the program.

Title: **Increase Flexibility of Wetlands Water-Quality Requirements and Consolidate Rules Governing Wetlands**

Originator: Willey

Issue Description:

The current guidelines for use of reclaimed water in wetlands stipulate low concentrations for phosphorus and TKN and include toxicity requirements identical to that for surface-water discharge. For many constructed wetlands, or even restored wetlands, this "one-size-fits-all" set of requirements appears to be overkill. Formulating a more flexible set of requirements, such as those for irrigation with reclaimed water, would allow the water-quality limits to match the intended use.

Rules for developing wetlands projects tend to be confusing, sometimes contradictory, and are addressed in several regulations and guidelines. Consolidating and coordinating these requirements would make the requirements more understandable and may facilitate more high-quality projects.

Importance:

- Need to match water quality requirements with the intended use of the wetlands. Meeting the TKN and phosphorus requirements increases the cost of treatment compared to other common water reclamation opportunities.

- Need to facilitate development of wetlands projects using reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

- Assemble a panel of experts on wetlands systems – define appropriate water quality limits for various types of wetlands. Take into consideration fate of water downstream of wetlands, public access, habitat creation, etc.

- Assemble all state guidelines pertaining to wetlands and assemble agencies currently having jurisdiction. Develop uniform, coordinated policies and guidelines for wetlands systems.

PRIORITY 14

Develop Indirect Potable Reuse to Supplement Public Water-System Supplies

Originators:

Riley on behalf of himself, Coleman, Gillaspie, and Thomas

The following issues were consolidated under the above title:

Title: **Develop Indirect Potable Reuse to Supplement Public Water-System Supplies**

Originator: Riley

Issue Description:

The fundamental basis for the passage of the Reclaimed Water Use Act was to provide additional water supplies throughout the state, especially public water-system supplies. Currently, it is difficult to implement indirect potable-reuse projects due to water resources and public concerns regarding quality, cost, and availability. There is a need to develop an understanding of the public, elected officials, consultants, and rank and file regulators to define and promote the quality, reliability, and "safety" of the resource, when properly produced.

Importance:

Public water systems are facing either physical or legal restrictions on the quantity of water available for water supplies, which in turn controls economic and community growth, and well as public health protection. This is the fundamental need of public utilities as the generators of reclaimed water.

How Do You Propose Meeting or Complying with This Issue?

- Implement a state task force using public, private, utility, and educational resources available to develop guidance and public information programs.

- Support the necessary health research through the USEPA, Centers for Disease Control, and available private institutions.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

Title: **Rectify the Groundwater Nondegradation Policy with Reclaimed Water Potential for ASR**

Originator: Thomas

Issue Description:

There are perception and policy concepts that Class A-treated reuse-water may be "less clean" than surface-water supplies (treated) and should not be used for ASR.

Importance:

Irrigation and spray farms serve as shallow aquifer-recharge systems for reclaimed water. During high surface-flow periods, reuse water provides an additional ASR source to help maintain those high flows for creek scouring and habitat improvement, while increasing groundwater reserves.

How Do You Propose Meeting or Complying with This Issue?

- Regulatory agencies, universities, consultants, reuse agencies, and ASR agencies need to work together to provide a plan.
- Educate, develop technology, and equate the issue of water degradation and reuse for ASR.


Lynn Coleman
Washington State
Dept. of Ecology


Larry Ewell


Kathy Cupps

PRIORITY 15

Ensure Comprehensive and Coordinated Planning and Design of Facilities for Reclamation and Reuse

Originators:

Esvelt on behalf of himself, Coleman, and Gillaspie

The following issues were consolidated under the above title:

Title: **Comprehensive and Coordinated Planning and Design of Facilities for Reclamation and Reuse**

Originator: Esvelt

Issue Description:

Entire wastewater-treatment facilities must be designed and constructed to accommodate water reuse. The addition of components to accomplish a specific criterion, such as meeting turbidity or bacteriological standards, will not be effective unless the overall facility is designed and constructed to be coordinated and to accomplish meeting the overall goal.

Importance:

A complete preliminary-treatment and biological-treatment system design needs to be developed to provide effluents that will accommodate the effective and efficient operation of added facilities to meet specific criteria for reclaimed effluents.

The addition of filtration to reduce turbidity will not work as effectively unless the preliminary and biological treatments have been designed to produce an effluent that is consistently low in total suspended solids.

The effectiveness of disinfection processes is dependent on producing an effluent to be disinfected that is low in reducing substances and suspended material. Chlorine disinfection effectiveness is dependent on the effluent being fully oxidized and not having transients of ammonia or nitrites. UV light disinfection depends on the effluent being high in transmissivity. Reclamation components and reclaimed effluent quality are dependent on relatively steady flows unless the entire system is specifically designed to accommodate highly variable flows.

How Do You Propose Meeting or Complying with This Issue?

Increase the qualifications of engineers performing the design of facilities, including emphasizing the consultant selection process for qualifications and experience in implementing reclamation and reuse projects and facilities. Qualifications, such as specialty certification (i.e., diplomate status in the American Academy of Environmental Engineers), as well as mandatory licensing, should be considered.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

- A water reuse program and a reclaimed water program are two very different things. Reclaimed water is *much* narrower and more limiting.
- If the timeframe is too short, large amounts of resources and money will be used, only to have to redo it.

How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

- Federal law – CWA; ESA; Western Water Law; and SDWA.
- State law – Growth management; land-use planning; state regulations; health; Ecology; water rights; onsite; National Pollutant Discharge Elimination System (NPDES) permits; drinking-water standards.

Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.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WORK WITH NATIONAL AND STATE WATER REUSE ORGANIZATIONS.
K. PRICE
FOLLOW THE LEADERS TO TAKE ADVANTAGE OF THEIR PROGRESS AND AVOID BARRIERS TO IMPLEMENTATION
P. SCHULER
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PUBLIC PERCEPTION: SEWAGE IS SEWAGE UNTIL YOU LOSE TRACK OF IT
C. RILEY
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PRIORITY 16

Plan for Unintended Consequences

Originators:

McKinley on behalf of himself, Coleman, and Gillaspie

The following issues were consolidated under the above title:

Title: **Plan for Unintended Consequences**

Originator: McKinley

Issue Description:

Example: Large reclaimed-water uses could reduce the amount of potable water sold, resulting in the need to raise rates.

To be financially sustainable, water reuse should operate like a sewer or water utility, with regular and predictable revenues. If revenues for water reuse end up hurting revenues for water or sewer services, it will be much more difficult to sustain. Using reclaimed water for a new industry, or in association with new growth, would minimize this issue.

Another example would be higher-strength influents at wastewater treatment plants if greywater is removed.

Importance:

This is part of preparing for the unintended consequences that can and will occur with reuse. It is not critical but should not be ignored.

How Do You Propose Meeting or Complying with This Issue?

We will have to be careful and sensitive to this issue when using reclaimed to replace potable water for a large water user.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.
- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

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How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."
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Issue Description:

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Local governments are unable to overcome “silo” thinking when making utility infrastructure investments to promote water reuse.

Importance:

A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.

PRIORITY 17

Accommodate Normal Customer Relationships between Utilities and End Users to the Extent Possible

Originators:

Fowler on behalf of herself, Coleman, and Gillaspie

The following issues were consolidated under the above title:

Title: **Accommodate Normal Customer Relationships between Utilities and End Users to the Extent Possible**

Originator: Fowler

Issue Description:

Unlike the process for receiving potable-water service, reclaimed water end users must sign binding End Use Agreements, install color-coded facilities and signage, abide by the generator's permit requirements, and meet State standards. Specific uses and use areas must be defined and documented. In some cases, special training in use requirements may be involved.

Importance:

While health and environmental protection goals are important, all of this has the potential to result in paperwork, monitoring, and record-keeping requirements that are so excessive they serve as a disincentive for using reclaimed water. It is important to realize that most potential users of reclaimed water are small- and medium-sized users, not large ones. Also, in many cases, the potential uses of reclaimed water are *already* expressly "nonpotable" – such as irrigations systems, which are expressly nonpotable beyond the backflow prevention device. Complex use agreements seem anomalous for these nonpotable applications.

How Do You Propose Meeting or Complying with This Issue?

- Ensure the State Reclaimed Water Permit includes the provisions that must meet core State interests but does not make reclaimed water so complicated, paper-intensive, laborious, or intimidating to apply for and use that it will discourage customer participation.

- Give public utilities the flexibility to do their job by allowing them to structure customer relationships and agreements that meet local service needs, within necessary permit and standards requirements.

- Simplify rules of service as much as possible, especially with regard to Class A reclaimed water.

- Help ensure successful implementation with End User Agreements (aka, Service Agreements) that are concise, simple, and as user-friendly as possible, while still meeting necessary requirements.

Title: **Need (Quantitative) Definitions of "Water Reuse" and "Sustainable"**

Originator: Coleman

Issue Description:

- Water reuse is not "reclaimed water" in Washington State's legal definitions.

- Regarding "sustainable," most agency and utility decisions, as well as cost estimating, are done for 6 months to 20 years. Different decisions might be made for a timeframe of 50 to 250 years.

Importance:

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How Do You Propose Meeting or Complying with This Issue?

- Clearly define "water reuse" as broader than "reclaimed water."

- Make decisions with long-term financial, societal, and environmental viability in mind.

Title: **Get Out of the Silo**

Originator: Gillaspie

Issue Description:

Integrated natural resource and environmental planning should be improved by breaking down "silo" thinking. Federal laws and regulations, as well as state laws and regulations, set up barriers for implementing successful reuse programs. Conflicts are included in:

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Local governments are unable to overcome "silo" thinking when making utility infrastructure investments to promote water reuse.

Importance:

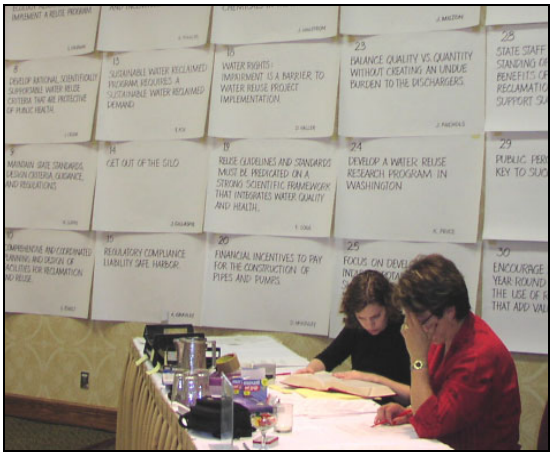
A lack of holistic thinking leads to poor decision making and poor utility investments.

How Do You Propose Meeting or Complying with This Issue?

Meet the difficult challenge of breaking down historic legal program frameworks.


WORKSHOP QUESTION:
WHAT ISSUES MUST BE ADDRESSED TO ENABLE THE STATE OF WASHINGTON TO FACILITATE THE DEVELOPMENT AND IMPLEMENTATION OF A SUSTAINABLE WATER REUSE PROGRAM ?
Ron Linsky
Brian Brady
DOUBLETREE HOTEL


Barbara Close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MICROBIAL AND CHEMICAL CONSTITUENTS
INTEGRATE STANDARDS TO PROTECT AND MAINTAIN ENVIRONMENTAL WATER QUALITY

STRENGTH OF FEELING ANALYSIS

The idea behind the Strength of Feeling Analysis is that priority ranking alone does not show unanimity, or lack of unanimity, by the workshop participants. Strength of Feeling Analysis, however, provides a transparent quantitative measure of agreement or disagreement among all participants. Table 1 shows how the 33 participants ranked all 17 major issue areas.

The following table lists the research issues, in descending order of importance, the issue title, the times it was voted for (picked), the total number of points received from the balloting, and finally, the strength of the group's feeling, expressed as a percentage.

TABLE 1

Issues (17) Ranked by All Participants (33)

Rank	Title	Times Picked/Pts	Strength of Feeling
1.	Develop Rational, Scientifically Supportable Water Reuse Standards That Are Protective of Public Health and the Environment	33/240	72.7%
2.	Need for the State to Take a Leadership Role	25/201	60.9%
3.	Develop Economic, Political, Legal, and Resource Incentives to Encourage Municipalities, Utilities, and Businesses to Build and Use Reclaimed Water Systems	31/178	53.9%
4.	Revise Reuse Policy to Provide More Treatment Options to Encourage More Decentralized Applications, e.g., Subsurface Landscape Irrigation	28/137	41.5%
5.	Develop a Water Reuse Research Program in Washington	28/135	40.9%
6.	Develop Consistent Regulations That Balance Water Quality with Current and Future Quantity while Avoiding Undue Burdens to Discharges	23/127	38.5%
7.	Identify Revenue Sources to Pay for Reclaimed-Water Projects, Regulatory Oversight, and System Operations	21/123	37.3%
8.	Recognize That Public Perception Is the Key to Success	21/120	36.4%
9.	Main State Standards, Design Criteria, Guidance, and Regulations	23/111	33.6%
10.	Need for More Effective Communication, Education, and Information	21/111	33.6%
11.	Establish Monetary Values by Using Reclaimed Water for Environmental Enhancements and Water Resource Management Strategies	19/94	28.5%
12.	Improve Feasibility of Groundwater Recharge by Ameliorating Diverse Water-Quality Requirements and Developing Guidance for Reclaimed-Water Aquifer Storage and Recovery (ASR)	14/72	21.8%

Rank	Title	Times Picked/Pts	Strength of Feeling
13.	Regulations and Permitting Often Present an Absolute Real Impediment to Water Use	16/70	21.2%
14.	Develop Indirect Potable Reuse to Supplement Public Water-System Supplies	9/46	13.9%
15.	Ensure Comprehensive and Coordinated Planning and Design of Facilities for Reclamation and Reuse	9/22	6.7%
16.	Plan for Unintended Consequences	3/10	3.0%
17.	Accommodate Normal Customer Relationships between Utilities and End Users to the Extent Possible	3/8	2.4%

APPENDICES

APPENDIX A

ACRONYMS

ACWA	Association of California Water Agencies
ASCE	American Society of Civil Engineers
APWA	American Public Works Association
ASIWPCA	Association of State and International Water Pollution Control Authorities
ASR	aquifer storage and recovery
AWWA	American Water Works Association
BSE	Bovine Spongiform Encephalopathy
CDHS	California Department of Health Services
CWA	Clean Water Act
CWD	Chronic Wasting Disease
DBP	disinfection by-product
DOH	Department of Health State of Washington
ESA	Endangered Species Act
FTE	full-time equivalent
GMA	Growth Management Act
mg/L	milligrams per liter
MGD	million gallons per day
MWD	Metropolitan Water District of Southern California
NEPA	National Environmental Policy Act
NGT	Nominal Group Technique Workshop
NPDES	National Pollutant Discharge Elimination System permit
NOWRA	National Onsite Wastewater Recycling Association
NTU	nephelometric turbidity unit
NWRI	National Water Research Institute
O&M	operation and maintenance
PNCWA	Pacific Northwest Clean Water Association
PrP	prion protein
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
TKN	Kjeldahl nitrogen
TMDL	total maximum daily load
TOC	total organic carbon

USBR	U.S. Department of the Interior, Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
UV	ultraviolet
WEF	Water Environment Federation
WERF	Water Environment Reasearch Foundation
WMA	Watershed Management Act
WRIA	Water Resource Inventory Area
WUTC	Washington Utilities and Transportation Commission

APPENDIX B

PREVIOUS NGT WORKSHOPS CONDUCTED BY NWRI

Seawater Desalination: Opportunities and Challenges. Report of a workshop sponsored by NWRI in cooperation with Metropolitan Water District of Southern California and Member Agencies. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, March 28-30, 2003. 213p.

Decision Support System. Report of a workshop sponsored by NWRI in cooperation with Tellus Institute. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, February 4-6, 2003. 161 p.

Water Quality and Resource Management Issues. Report of a workshop sponsored by NWRI in cooperation with Lawrence Livermore National Laboratory and University of California. Wente Vineyards, Livermore, California, January 28-30, 2003. 252 p.

Life Cycle Environmental Impacts Associated with Different Fuel Options. Report of a workshop sponsored by NWRI in cooperation with Clarkson University, Lawrence Livermore National Laboratory, and USEPA – Office of Research and Development. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, February 15-17, 2002. 202 p.

Issues in Methanol Research. Report of a workshop sponsored by NWRI in cooperation with the American Methanol Institute. Hilton Hotel, Costa Mesa, CA, October 5-7, 2001. 173 p.

Chino Basin Organics Management. Report of a workshop sponsored by NWRI in cooperation with the Inland Empire Utilities Agency, and the Southern California Alliance of Publicly Owned Treatment Plants. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, April 18-20, 2001. NWRI Report No. NWRI-01-03, 205 p.

Desalination Research & Development. Report of a workshop sponsored by NWRI in cooperation with the United States Bureau of Reclamation. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, January 19-21, 2001. 185p.

Knowledge Management. Report of a workshop sponsored by NWRI. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA January 5-7, 2001. 169 p.

Oxygenate Contamination. Report of a workshop sponsored by NWRI in cooperation with the United States Bureau of Reclamation. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, September 15-17, 2001: 258p.

Utility Leadership. Report of a workshop sponsored by NWRI in cooperation with Malcolm Pirnie, Inc., the University of Southern California, and the University of South Florida. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, October 24-26, 1999: 154p.

Non-potable Water Recycling. Report of a workshop sponsored by NWRI in cooperation with Irvine Ranch Water District and the Orange County Water District. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, May 23-25, 1999: 174p.

Conjunctive Use Water Management Program. Report of a workshop jointly sponsored by NWRI, Association of Ground Water Agencies, and the Metropolitan Water District of Southern California. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, May 27-29, 1998: 157p

Barriers to Providing Safe Drinking Water Through Small Systems. Report of a workshop jointly sponsored by NWRI, Pan American Health Organization, and NSF International/WHO Collaborative Center. Pan American Health Organization Headquarters, Washington, D.C., May 13-15, 1998: English report: 175p., Spanish report: 188p. (Bound in a single volume.)

Barriers to Harvesting Stormwater. Report of a workshop jointly sponsored by NWRI, Los Angeles County Department of Public Works, County of Orange Public Facilities & Resources Department, Southern California Coastal Water Project, and the American Oceans Campaign. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, September 22-24, 1997: 159p.

Groundwater Disinfection Regulations Benefits Conference. Report of a conference sponsored by NWRI. Arnold and Mabel Beckman Center, National Academies of Sciences and Engineering, Irvine, CA, March 17, 1997: 75p.

Groundwater Disinfection Regulation. Report of a workshop jointly sponsored by NWRI and the USEPA. Arnold and Mabel Beckman Center, National Academies of Sciences and Engineering, Irvine, CA, January 6-8, 1997: 209p.

Membrane Biofouling. Report of a workshop jointly sponsored by NWRI, UNESCO Centre for Membrane Science and Technology, and CRC for Waste Management and Pollution Control, LTD. UNSW Institute of Administration, Sydney, Australia, November 15-17, 1996: 176p.

The Santa Ana River Watershed. Report of a workshop jointly sponsored NWRI and the Santa Ana Watershed Project Authority. Co-sponsors included: City of San Bernardino Water Department, City of Riverside, Western Municipal Water District, and Orange County Water District. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, August 23-25, 1995: 182p.

The New River. Report of a workshop jointly sponsored by NWRI and the County of Imperial, California. Barbara Worth Country Club, Holtville, CA, May 19-21, 1995: English report: 134p., Spanish report: 134p. (Bound in a single volume)

Establishment of The Middle-East Water and Energy Research and Technology Centre. Report of a workshop jointly sponsored by NWRI and the Sultanate of Oman through the Worldwide Desalination Research and Technology Survey. Muscat, Oman: September 21, 1994: 29p.

Risk Reduction in Drinking Water Distribution Systems. Report of a workshop jointly sponsored by NWRI and the Environmental Criteria and Assessment Office of the USEPA. Arnold and Mabel Beckman Center, National Academies of Sciences and Engineering, Irvine, CA, February 27-28, 1994: 142p.

Fouling and Module Design. Report of a workshop jointly sponsored by NWRI and the National Science Foundation (NSF). Virden Conference Center of the University of Delaware, Lewes, DE, October 30 – November 1, 1993: 115p.

Groundwater Disinfection Rule. Report of a workshop jointly sponsored by NWRI and the USEPA in collaboration with the Weston Institute. Virden Conference Center of the University of Delaware, Lewes, DE. June 7-8, 1992: 103p

APPENDIX C

PARTICIPANTS' BIOGRAPHICAL SKETCHES

Gerald Anderson, P.E.
Reclaimed Water Engineer, Water Quality Program
Washington State Department of Ecology

Jerry Anderson has worked for the Washington State Department of Ecology since 1979. He has been a Reclaimed Water Engineer with the Department's Water Quality Program since 1999, where he is responsible for developing and issuing NPDES and State waste discharge permits and for reviewing and approving the planning, design, and construction documents for reclaimed water facilities. He has also served as a member of the Department's Water Reclamation and Reuse Workgroup to develop and update reclaimed water standards and guidance documents. Anderson received a B.S. in Hydraulics and Wastewater from the South Dakota School of Mines & Technology. He is a registered professional civil and hydraulic engineer in the state of Washington.

Shelly Badger
Administrator
City of Yelm, Washington

Shelly Badger has worked for the City of Yelm for 17 years. For the last 10 years, she has served as City Administrator, which provides support and facilitates efforts of the Mayor and City Council to respond proactively to challenges facing the City, which has a population of 3,485. Badger oversees City departments, including the police, public works, finance, and community development, and she oversees projects such as economic development and watershed planning. From 1994 to 1999, she was also Project Manager for the $10 million reclaimed water project, which was one of the state's pilot reclaimed water demonstration projects to produce quality Class A reclaimed water for 100-percent reuse.

James E. Bay
Director of Public Works
City of Sequim, Washington

James Bay has worked for the City of Sequim, Washington, since 1988, serving as the Director of Public Works for the past 6 years. As Director of Public Works, he is responsible for managing the water, sewers, streets, parks, and buildings in the City, as well as acts as Building Official and Fire Marshall. He is also involved with the City's Reuse Demonstration site, which is a project supported by the Washington Department of Ecology that will use reclamation effluent in place of potable water for irrigation, landscape, and fish habitat enhancement, among others. Prior to joining the City, Bay spent 2 years in the Army, served as a Police Officer and Deputy Medical Examiner for Oregon, and was a hazardous waste facilities manager in Middletown, California. He also worked in construction and engineering in the states of Washington, Oregon, and California.

Arthur H. Benedict, Ph.D., P.E.
Associate
Economic & Engineering Services, Inc.

Art Benedict is an Associate of Economic & Engineering Services, Inc. (EES) and has extensive environmental engineering experience with municipalities, government agencies, and industry. He has authored or co-authored over 30 publications and has served on the United States Environmental Protection Agency's Environmental Engineering Peer Review Panel. His areas of expertise include stormwater, wastewater, and water supply. Among his wastewater projects, he was involved in upgrading treatment facilities using the sequencing batch reactor process, as well as providing new pretreament and ultraviolet disinfection facilities. Benedict received a B.S. and M.S. in Civil Engineering from Tufts University and a Ph.D. in Civil Engineering from the University of Washington. He is a registered professional engineer in the states of Washington and California.

Richard M. Benson, P.E.
Environmental Engineer and Lead, Large On-Site Sewage Systems Program
Washington State Department of Health

Richard Benson is an Environmental Engineer and Lead for the Washington State Department of Health, Large OnSite Sewage Systems (LOSS) Program, which reviews and approves LOSS project applications statewide. He has worked in the Wastewater Management (LOSS) Program since 1994. He is also a member of the National Onsite Wastewater Recycling Association and currently serves on the Department of Licensing OnSite Designer Program Advisory Committee. In addition, he is the primary author of two Department standards publications, *Water Conserving (Greywater) Systems* and *Subsurface Drip (Wastewater Distribution) Systems,* and acts as Department technical lead for those technologies. Benson received an A.A. from Spokane Community College and a B.S. in Mechanical Engineering from Gonzaga University. He is a registered professional engineer in the state of Washington.

Mark Buehrer, P.E.
Director
2020 Engineering

Mark Buehrer is the founder and director of 2020 Engineering, a consulting firm in Washington that develops and implements sustainable civil engineering designs that uses conventional engineering practices with new and alternative technologies. Civil engineering work includes tasks such as site and roadway designs, stormwater management, ecologically based wastewater treatment, and water reuse systems. Prior to founding 2020 Engineering in 1995, Buehrer worked for five private consulting engineering firms in the states of Alaska and Washington, was a City and General Contractor in Alaska, and worked for a state agency in Ohio. Buehrer received a B.S. in Civil Engineering from Ohio Northern University. He is a registered professional engineer in the states of Washington, Oregon, Missouri, and Michigan.

Lynn Coleman, P.E.
Environmental Engineer, Water Resources Program
Washington State Department of Ecology

Lynn Coleman has 18 years experience in developing technical and engineering policy for state and federal agencies. Her areas of expertise include drinking water, site remediation, water quality permitting, and water resources. Coleman has worked with the Washington State Department of Ecology for the past 15 years. Currently, she is working on industrial, municipal, and agricultural water conservation programs, including the technical aspects of implementing Washington's source metering program and conducting engineering audits of industrial facilities. Coleman received a B.S. in Wildlife Biology at Colorado State University and a B.S. in environmental Engineering from Oregon State University. She is a registered professional engineer in the states of Washington and Oregon.

James Crook, Ph.D., P.E.
Water Reuse Consultant

Jim Crook is an environmental engineer with more than 30 years experience in state government and consulting engineering arenas, serving public and private sectors in the United States and abroad. He has authored more than 100 publications and is an internationally recognized expert in water reclamation and reuse. Previously, he spent 15 years directing the California Department of Health Services' water reuse program and developed California's first comprehensive water reuse criteria. He also spent 15 years with consulting firms overseeing water reuse activities and is now an independent consultant specializing in water reuse. In addition, he was selected as the American Academy of Environmental Engineers' 2002 Kappe Lecturer. Crook received a B.S. in Civil Engineering from the University of Massachusetts and both a M.S. and Ph.D. in Environmental Engineering from the University of Cincinnati.

Katharine C. Cupps, P.E., M.A.
Water Reclamation and Reuse Lead
Washington State Department of Ecology

For almost 4 years, Kathy Cupps has served as the state policy and engineering lead for water reclamation and reuse at the Washington State Department of Ecology. She is responsible for agency policy and guidance to regional staff as well as the overall coordination of the state water reuse program. Prior to joining the Department in 1988, Cupps was employed as a consultant with a private engineering firm and in private industry. Currently, she serves as Co-Chair of the Water Reuse Committee for the Pacific Northwest Clean Water Association. Cupps received a B.S.C.E. in Environmental Engineering from the University of Houston, a B.S. in Psychology from the University of New Mexico, and a M.A. in Organizational, Cognitive, and Educational Psychology from New Mexico State University. She is a licensed professional engineer in Washington State.

Larry A. Esvelt, Ph.D., P.E., DEE
Principal
Esvelt Environmental Engineering

Since 1976, Larry Esvelt has been Principal of Esvelt Environmental Engineering, a consulting firm that specializes in water quality, water and wastewater treatment, industrial waste management, biosolids management, and wastewater reclamation and reuse. Esvelt is a Diplomate of the American Academy of Environmental Engineers and the author of numerous papers. Some topics include wastewater treatment effectiveness for removing toxicity from wastewaters; the treatment of food processing wastewaters; biological wastewater treatment; and reuse of treated effluents, among others. Esvelt received a B.S. in Civil Engineering from Washington State University and both a M.S. and Ph.D. in Civil Engineering from the University of California, Berkeley. He is a registered professional engineer in the states of Alaska, California, Idaho, Montana, New Mexico, Oregon, and Washington.

Kevin C. Fitzpatrick
Section Manager, NWRO Water Quality Program
Washington State Department of Ecology

Kevin Fitzpatrick has been the Section Manager of the NWRO Water Quality Program, Northwestern Regional Office for the Washington State Department of Ecology since 2001. As Section Manager, he oversees four operational units – Municipal Permit Unit, Industrial and Stormwater Unit, Watershed Unit, and Compliance and Technical Assistance Unit – to carry out the program's mission to protect and preserve the waters of Washington State for the benefit of current and future generations. Prior to joining the Department in 2001, he served as Lieutenant Commander for the U.S. Coast Guard Reserve and was a Criminal Investigator. Fitzpatrick received a B.S. in Biology from Loyola University of Chicago and a M.A. in Zoology from Southern Illinois University.

Karla F. Fowler
Program Manager
LOTT Wastewater Alliance

Since 1996, Karla Fowler has been Program Manager of the LOTT Wastewater Alliance, a partnership that helps preserve and protect public health, the environment, and water resources by providing wastewater management services for the urbanized area of north Thurston County in Washington. Prior to joining the LOTT Wastewater Alliance, Fowler was Co-Owner and Managing Principal and Consultant for CM3 Associates, a public communications consulting firm specializing in service to local and state agencies, professional service businesses, and non-profit organizations. Among her projects with CM3 Associates, she oversaw the LOTT Wastewater Management Partnership Projects and developed programs like Washington WaterWeeks with the Washington State Department of Ecology. Fowler received both a B.A. in Radio TV-Film and a M.A. in Library Science from the University of Wisconsin-Madison.

Thomas P. Fox, P.E.
Water Reuse Coordinator
King County Department of Natural Resources

Thomas Fox has more than 25 years experience as a water resources and environmental professional in the private consulting engineering and public resource management sectors. Since 1998, he has been the Water Reuse Coordinator at the King County Department of Natural Resources in Washington, where he is responsible for policy recommendations and for implementing King County's Reclaimed Water Program, ensuring compliance with state reclaimed water regulations and NPDES permit conditions. He is also theProject Manager of a multimillion -dollar satellite reclaimed water facility. Fox received a B.S. in Civil Engineering and M.S. in Environmental Engineering from Texas A&M University. He is a registered professional engineer in the states of Washington and Texas.

Janet Gillaspie
Executive Director
Oregon Association of Clean Water Agencies

For 8 years, Janet Gillaspie has been Executive Director of the Oregon Association of Clean Water Agencies (ORACWA), an organization of local government agencies working to maintain and enhance the quality of lakes, rivers, and streams in Oregon by managing the treatment of human and industrial wastes and the runoff of polluting waters. In addition, for the last 15 years, Gillaspie has run her own environmental consulting firm, Environmental Strategies, LLC, which specializes in strategic environmental management, policy development, and training and education. She also spent 9 years with the Oregon Department of Environmental Quality, where she was the Public Information Officer and the manager of field operations for the Northwest Region. Gillaspie studied Biology at the University of Oregon.

Adam W. Gravley, J.D.
Partner
Preston Gates Ellis LLP

For 12 years, Adam Gravley has practiced environmental, local government and public utility law, with a focus on water law, at Preston Gates Ellis LLP. Gravley represents business, local government, and individual clients in a broad range of water quantity and quality areas, with work centering around infrastructure projects, including electric power facilities, wastewater treatment plants, transit systems, and hydroelectric facilities. He has extensive experience in water rights and resources includes permitting, transfers and transactions involving existing water rights, appeals and litigation of agency actions, water supply agreements, and public water system regulation. Gravely received a B.A. in History from Kalamazoo College, a M.A. in History from Brown University, and a J.D. from Georgetown University.

Art Griffith, P.E.
Senior Utility Analyst
R.W. Beck

For the past 10 years, Art Griffith has completed a wide range of utility financing projects for water, wastewater, stormwater, and electric facilities. His specific areas of expertise include utility ratemaking, financial planning, impact fee determination, interlocal agreement preparation, fiscal policy and level-of-service definitions, and assisting municipal utilities in defining capital funding alternatives. Recent projects have compared the economics of reclaimed water distribution with the economics of other water supply alternatives. Griffith received a B.S. in Chemical Engineering from the University of Washington and a M.S. in Civil and Environmental Engineering from the University of Wisconsin. He is a registered professional engineer in the state of Washington.

James P. Hagstrom, P.E.
Partner
Carollo Engineers

Jim Hagstrom, a partner with Carollo Engineers, has 11 years experience in the planning, design, and construction of water treatment facilities. His background includes the development, evaluation, and application of membrane treatment technologies, as well as bench-scale and pilot-scale studies to evaluate the treatability of ground and surface waters. In the area of wastewater, he was Project Manager for both the Sammamish Valley Reclaimed Water Production Facility and the Carnation Wastewater Treatment Facility in King County, Washington. Hagstrom received both a B.S. in Civil Engineering and a M.S. in Environmental Engineering from the University of Illinois at Urbana-Champaign. He is a registered professional engineer in the states of California, Idaho, Illinois, and Washington.

Daniel R. Haller, P.E.
Water Resources Engineer
Washington State Department of Ecology

Dan Haller has been an Environmental Engineer with the Washington State Department of Ecology since 2001. He is the technical lead for seven central Washington county water conservancy boards, where he is responsible for the primary review of decisions and for developing approval recommendations. He is also the Department's Central regional office's representative on several water resource and cross-programmatic committees that are developing policies, procedures, and guidelines, including Ecology's Internal Policy Team, Water Reuse Workgroup, Metering Database Business Team, and Environmental Engineers Group. Haller received a B.S in civil Engineering and a M.S. in Environmental Engineering from Washington State University. He is a registered professional engineer in the state of Washington.

Frank J. Loge, Ph.D., P.E.
Assistant Professor, Department of Civil and Environmental Engineering
Washington State University

Frank Loge has been an Assistant Professor in the Department of Civil and Environmental Engineering at Washington State University since 1999. His current research interests include the penetration of chemical disinfectants into particles developed in water treatment, the detection and implication of pathogens in stormwater runoff, distributed physical molecular separations for selective harvest of higher wheat straw components, and the association of pathogens with wastewater particles-impact on the biological quality of post-disinfected wastewater effluents. In addition to teaching, Loge is also the Program Director of Water-Wastewater Treatment and Reuse for the State of Washington Water Research Center. Loge received a B.S., M.S., and Ph.D. in Civil Engineering from the University of California, Davis. He is a registered professional engineer in the state of California.

Richard McKinley
Public Works Director
City of Bellingham, Washington

Dick McKinley has worked for the City of Bellingham, Washington, since 2001, serving as Public Works Director. Among his responsibilities, he oversees all water, sewer, stormwater, environmental, transportation, facilities, fleet, purchasing, engineering, solid waste, and real property for the City, which has a population of about 70,000. At Bellingham, he helped set-up a land acquisition program to protect the Lake Whatcom watershed and is a key member of the Bellingham Bay pilot project for sediment remediation and cleanup. Prior to joining Bellingham, McKinley served as the Public Works Director for the City of Walla Walla in Washington for 6 years as well as worked in Public Works for the Cities of Springfield, Oregon, and Medford, Oregon. McKinley received a B.A. in Economics/Political Science and History from Michigan State University and a MPA from Portland State University.

Stanley A. Miller
Water Resources Program Manager
Spokane County Utilities Division

For the past 20 years, Stan Miller as been Program Manager for Spokane County's Water Resources Program of the Spokane County Public Works Department, Utilities Division, in Washington. His responsibilities include managing the regional aquifer protection program, conducting regional water quality monitoring, and providing support for Spokane County projects needing water resources information. Over the last 3 years, he has also served as Project Manager for Spokane County's watershed planning program for the Little Spokane and Middle Spokane Rivers. His interests include stormwater runoff management, non-point pollution impacts of urbanization, and public perception of groundwater protection practices. Miller received a B. A. in Chemistry from Central Washington University and M.S. degrees in Environmental Science and Engineering Management from Washington State University.

S. James Milton, P.E.
Coordinator
Tri-County Water Resources Agency

Jim Milton has been an environmental engineer for 32 years. Currently, he is a contract Coordinator for the Tri-County Water Resources Agency in Yakima, Washington. Prior, he was Executive Director of the Tri-County Water Resources Agency, in which he coordinated and managed the development of the Yakima River Basin Watershed Plan, which included addressing water supply, water quality, and habitat/instream flows. He had also spent 26 years working for the Washington Department of Ecology as an Environmental Engineer in the Water Quality Division and as a District Supervisor for the Environmental Quality Section. Milton received a B.S. in Civil Engineering and Naval Science and an M.S. in Civil Engineering from the University of Washington, Seattle, as well a MBA from City University in Yakima, Washington. He is a registered professional engineer in the state of Washington.

James R. Nichols, P.E.
Public Works Director/City Engineer
City of Chehalis, Washington

Jim Nichols has been Public Works Director/City Engineer for the City of Chehalis, Washington, since 1999. He oversees the City's water, wastewater, and stormwater utilities, as well as the street and engineering divisions. The planning and design efforts for a new $34-million regional wastewater reuse facility are also under his responsibility. Prior to joining the City of Chehalis, Nichols was Quality Control Manager for Triton Marine Construction Corporation, Project Engineer for the Public Works Department of the City of Olympia, Washington, and an engineer for a consulting firm in Connecticut. Nichols received a B.S. in Civil Engineering from Northeastern University and an M.S. in Environmental Engineering from the University of Connecticut. He is a registered professional engineer in the state of Washington.

M. Kevin Price
Manager, Water Treatment Engineering and Research Group
U.S. Department of the Interior, Bureau of Reclamation

Kevin Price is the Manager of the Water Treatment and Engineering Group at the U.S. Department of the Interior, Bureau of Reclamation (USBR). He also oversees the Desalination and Water Purification Research and Development Program, Advanced Water Treatment Research Program, and the Water Reuse Research Program. Price is a member of the WateReuse Foundation's Research Advisory Council and is the U.S. Technical Representative (through the U.S. Department of State) to the Middle East Desalination Research Center in Muscat, Oman. He represents USBR on the Joint Water Reuse, Reclamation, and Recycling Task Force with NWRI, WERF, WRF, and AwwaRF. Price received a B.S. in Zoology from Albertson College of Idaho, an M.S. in Chemical Engineering from Columbia University, and MBA in Finance from the University of Denver.

Craig Riley, P.E.
Water Reclamation Engineer, Water Reclamation Program, Division of Drinking Water
Washington State Department of Health

Craig Riley has worked for the Washington State Department of Health since 1989. For the past 5 years, he has served as the Program Lead for the Water Reclamation Program, which is part of the Division of Drinking Water at the Department of Health. Among his responsibilities, Riley reviews reclamation efforts, promotes water reclamation, provides regulatory review and approval for planning and construction documents, and provides basic management. Prior to joining the Department of Health, he was in consulting for 16 years. Riley received both a B.S. and M.S. in Civil Engineering from Montana State University. He is a registered professional engineer in the state of Washington.

Bob Rosain, P.E., PMP
Senior Consultant
Parametrix, Inc.

Bob Rosain is Senior Consultant for Parametrix, Inc., a firm in the Pacific Northwest that provides engineering, environmental sciences, and architecture consulting services. With over 25 years of experience, Bob Rosain has overseen a wide variety of water management/reuse projects, including water management strategy studies and designs for water treatment/reuse facilities using a variety of conventional and advanced technology processes. Rosain has worked extensively in the power, microelectronics, chemicals, and pulp and paper industries, and he recently completed the Preliminary Engineering phase of a 2-MGD water reuse project planned for Washington State University and the City of Pullman. Rosain received a B.S. in Chemistry from Western Illinois University, an M.S. in Chemistry from the University of Idaho, and a M.S. in Environmental Science/Applied water Chemistry from Washington State University. He is a registered professional chemical engineer in Washington and Oregon.

Richard H. Sakaji, Ph.D., P.E.
Senior Sanitary Engineer, Drinking Water Program, Technical Programs Branch
California Department of Health Services

For the past 8 years, Rick Sakaji has been Senior Sanitary Engineer in the Drinking Water Program of the California Department of Health Services, which has regulatory oversight of California public-water systems and is responsible for the enforcement of the Federal and State Safe Drinking Water Acts. Sakaji's unique background in research and regulatory affairs has allowed him to bring a public-health perspective to advisory committees and workshops on public health, water quality, and water-treatment issues surrounding drinking water and wastewater reclamation. Currently, he has served on several project advisory committees for the American Water Works Association Research Foundation and the Water Environment Research Foundation. Sakaji received a B.A. in Marine Biological Studies and both a M.S. and Ph.D. in Environmental Engineering from the University of California, Berkeley.

Daniel K. Sander
Regional Manager, Eastern Regional Office, Division of Drinking Water
Washington State Department of Health

Dan Sander has worked with the Washington State Drinking Water Program for over 27 years. He has been Regional Manager for 17 years, in which he is responsible for supervising and implementing the State's Drinking Water Program in the eastern two-thirds of the state and for supervising and implementing the Wastewater Reclamation Program statewide. Sander has made numerous presentations throughout Washington and North America on a wide range of water topics, including emergency planning, water system planning and coordination, utility operation and management, and various aspects of Washington State's drinking water program, such as inspections, source water protection, and water quality surveillance. Sander received both a B.S. and M.S. in Civil Engineering from Marquette University.

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Western Region Business Manager
Ondeo Degremont, Inc.

Paul Schuler has spent 12 years as a consultant in the planning, design, and construction of wastewater treatment plants, including reuse plants. As Western Regional Business Manager, Schuler currently runs the western U.S. region for Ondeo Degremont, Inc., a water/wastewater company that sells equipment and performs the design/build phases of water and wastewater treatment plants. Currently, he is President-Elect of the Pacific Northwest Clean Water Association, a member association of the Water Environment Federation overseeing Oregon, Washington, and Idaho. Schuler received a both a B.S. in Civil Engineering and a M.S. in Environmental Engineering from Virginia Tech and a MBA in Management from the University of Oregon. He is a registered professional engineer in the states of Oregon and Washington.

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Tom Skillings is the Founding Principal and Principal Civil Engineer of Skillings-Connolly, Inc., a civil, transportation, and environmental engineering firm that has provided engineering services in the Puget Sound (Washington) region and beyond for over 20 years. Skillings has over 36 years experience in water and wastewater treatment, water supply, and distribution system design. He also was co-author of the Reuse Chapter of the Department of Ecology's *Criteria for Sewage Works Design*. In addition, he has authored several papers and given presentations on the topic of water reuse in the State of Washington and the City of Yelm's reuse facility, in which he was project manager for the planning, design, and construction of the City's reuse project. Skillings received a B.S. in Civil Engineering from Saint Martin's College. He is a registered professional engineer in the states of Alaska, Washington, Idaho, and Montana.

Hal Thomas, P.E.
Public Works Director
City of Walla Walla, Washington

Hal Thomas has over 28 years public works and utilities experience. For the past 2 years, he has been the Public Works Director of the City of Walla Walla in Washington (population 30,000), which treats and discharges all effluent from its wastewater treatment plant to two irrigation districts for agricultural uses. As Public Works Director, he is responsible for the design, construction, operation, and maintenance of all facilities, infrastructure, utilities, streets, and roads within the City. Thomas received a B.S. in Mechanical Engineering from the University of Washington, a M.S. in Mechanical Engineering from the University of Colorado, and a Masters in International Studies from the Naval War College. He is a registered professional engineer in the states of Washington and Virginia.

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Bruce Willey is a civil and environmental engineer who has provided consulting services to private and public sector clients for more than 25 years. He has worked for HDR Engineering, Inc., an architecture and engineering consulting firm, for the past 23 years. Willey's expertise lies in utility planning, process engineering, advanced wastewater treatment, drinking water treatment, water reuse, natural treatment systems, and regulatory negotiations. He has authored or co-authored numerous technical papers and six textbooks on water and wastewater topics. For the past 15 years, he has been actively involved in reuse programs for Northwest communities, leading major projects for King County and Spokane County in Washington, and Silverton, Oregon, to name a few. Willey received a B.S. in Civil Engineering from the University of Maine and a M.S. in Environmental Engineering from Stanford University.

Harry M. Yamamoto
Public Works Director
City of Royal City, Washington

Harry Yamamoto has been Public Works Director of Royal City, Washington, for 9 months. As Public Works Director, he is responsible for overseeing the street, water, and wastewater infrastructure and personnel for the City (population 1,820), which is one of the State of Washington's Centennial pilot projects for Class A Reuse. In addition to his work with the City, Yamamoto is Chairman of the Board of YKY Corporation, a Subchapter S storage corporation that managed the processing and marketing of onions and raised 17 other crops. He also served for 16 years as a Big Bend College Trustee, 3 years on the Farmer's Home Administration, and 12 years on the Washington Sugar Beet Growers Association, among other civic activities. Yamamoto received a B.S. in Agricultural Entomology from Washington State University.

APPENDIX D

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APPENDIX E

WORKING GROUPS' VISUAL PRESENTATION

Working Group 2
Power Point Presentation

The State Needs To Take A Leadership Role

Kathy Cupps
Tom Fox
Lynn Coleman
Dan Sander

Issue

- State law – take necessary steps
- Need to build a foundation
- Clear priorities
- Decisive action
- Still learning
- Constraints
- Leadership at several levels of government

Importance

- Of water cannot be overstated
- Stewardship Responsibility
- Regulatory requirements
- Comprehensive and Consistent Direction
- Assistance
- Enforcement

Implementation

- Act on the Workshop Results
- Continued Funding and Legislative Support
- Maximize Use of Agency Resources
- Partnerships
- Inform
- Data Base
- Develop Markets
- Set An Example

Key Players

- State Legislature
- Governor
- State Federal House and Congressional Representatives
- Department of Ecology, Director, Executive Staff and Program Management Teams
- State Water Reuse Coordinator (Kathy Cupps) and Inter-agency Staff Water Reuse Workgroup
- Department of Health, Secretary and Division Directors
- NGT Workgroup Members
- A Standing Diverse Stakeholder Committee
- Appropriate Subcommittees
- NWRI Support, Ron Linsky and panel of independent experts
- The States of Oregon and Idaho
- PNCWA and Water Reuse Committee
- WEF, AWWA, WateReuse Association, AWRA

Budget

- Minimum: Continue existing level of support
- Maximum: The real cost of water

Working Group 3
Power Point Presentation

Work Group Report

"Incentives"

Adam Gravley
Karla Fowler
Dick McKinley

Work Group Report

Title: Develop economic, political, legal and resource incentives to encourage municipalities, utilities and businesses to build and use reclaimed water systems

Issue Description

- The cost to build a completely separate second water distribution system is high and without hope of recouping that investment through rates
- Once the construction and operating costs are calculated, the cost of acquiring "new" water is often much less than the reuse water, thereby preventing a reuse project from moving forward
- Will development projects be encouraged to use reclaimed water through command and control regulations or incentives?

Importance

- High capital costs serve as economic disincentives to the beneficial use of reclaimed water. If major reuse customers cannot acquire the water, then they cannot reuse it.
- Growth and sustainability of reuse requires a base of appropriate incentives at the scale of implementation.
- Cost is often the primary determinant in assessing a project's feasibility, or in raw *versus* reuse water decisions, so providing a package of financial and regulatory incentives is critical to the success of the reuse program.

How Do You propose Meeting or Complying With This Issue?

1. Give local governments "carrots and sticks" statutory authority.
2. Establish a mechanism in existing funding programs (e.g. State Revolving Funds, Public Works Trust Fund and/or others) to offer grants and/or low interest loans to stimulate the installation of infrastructure for reclaimed water distribution and use. Special focus could be placed on broad-based community distribution, year-round uses, environmental enhancements, or innovative applications. Consider allowing grants and loans from these funds based on two factors: ability to pay and quality of the project.

How Do You propose Meeting or Complying With This Issue?

3. Develop state policy, guidelines & mechanisms to use reclaimed water for water rights mitigation: a) higher priority or expedited review for water rights offset by reclaimed water credits; b) prioritizing transfers from large users willing to convert to reclaimed; c) earning credits for environmentally beneficial uses of reclaimed water.
4. Provide tax incentives for corporations.
5. Explore development of pollution credits.
6. Provide permitting or regulatory credits.
7. Provide preferential siting (e.g., power plants).

How Do You propose Meeting or Complying With This Issue?

8. Provide public utility tax incentive to local governments.
9. Establish enabling legislation that would allow local government to provide discount programs for customers who reuse water, similar to the discounts provided to low income seniors.
10. Integrate purple pipe facilities into Department of Transportation (WSDOT), Transportation Improvement Board (TIB), and County Roads Administration Board (CRAB) transportation project ranking. Consider allowing purple pipe installation as an eligible project cost for those same programs.

How Do You propose Meeting or Complying With This Issue?

11. Provide authority to the Washington Utilities and Transportation Commission (WUTC) to require electric and gas utilities to bear a significant portion of the costs of facility relocation when necessary for water reuse projects.
12. Research community/utility incentives used in other states to encourage the development of reclaimed water distribution systems. Many of these incentives are likely to involve water right credits.
13. Most or all of the above items would need standards, eligibility criteria, or other gate-keeping mechanisms to ensure that high value water reuse projects are implemented.

Who Are the Individuals Best Able to ...?

1. State Legislature
2. Departments of Ecology, Community Development (CTED), Transportation and others as needed
3. Local Governments
4. Business Community

Budget

Assume $25 million annually over a 50-year period, to be paid by private businesses, local governments and state government.

Working Group 4
Power Point Presentation

Priority Group 4

Issue 5A:

Promote policy to provide cost effective options for reuse in small scale and decentralized settings

Team Members

- Rich Benson
- Jim Milton
- Stan Miller
- The Authors of Issues 5, 11, 21, 51, 59, 65, 66 & 76

Description

- Technologies that apply in small scale
- Technologies have application in larger communities for decentralized applications
- Technologies have low maintenance and monitoring
- Technologies may warrant different standards
- Technologies are innovative

Importance

- Small / rural communities are a state priority
- Small scale projects reduce conveyance and potentially maintenance and monitoring costs
- Provide an opportunity for pilot testing of technologies for larger applications

Implementation - Technical

- Establish small work groups to identify and inventory technologies
- Evaluate technologies for effectiveness and scale
- Publish document containing inventory and evaluation data

Implementation - Promotional

- Public outreach to develop support
  - Statewide program
  - Local, project specific programs
- Workshops to disseminate information
- Establish partnerships between communities and industries
- Seek dedicated funding for small systems / economically depressed areas

Key Players

- State and federal agencies
- Work groups – local agencies, professional organizations, education, industry
- Community organizations

Budget

- Staffing and operations - $200,000
  - 1 FTE agency technical support
  - ½ FTE agency support staff
- Technical evaluation contract - $250,000
- System implementation incentives
  - $500,000 per year from state funds
  - $500,000 per year from federal funds

Summary

Ecology and Health should provide a leadership role in this strategy to promote a state policy of implementing cost effective water reuse for small communities and decentralized applications

Working Group 5
Power Point Presentation

Priority 5 - Develop a Water Reuse Research Program in Washington

Mark Buehrer, Larry Esvelt,
Art Benedict, Kevin Price

Washington State Water Reuse
Nominal Group Technique Workshop
June 1, 2003

Issue

The State should facilitate the creation and continuing existence of a partnered research program that addresses the specific water reuse needs in Washington.

Importance

Research is important to foster the development of criteria and standards to provide economical and sustainable solutions that will help to protect public health and the environment.

Proposal for Meeting This Issue

- A workshop/taskforce will be developed to bring together experts in water reuse needs unique to Washington.
- The workshop will identify:
  - issues
  - priorities
  - estimated budgets
  - who might best carry out the work

Suggested Areas For Water Reuse Research

- Definition of reuse and sustainability
- Scientific and technical research needs
- Decentralized, on-site treatment and reuse systems
- Emerging technologies
- Stormwater
- Develop political, legal and economic incentives for water reuse that reflect the unique geography of Washington
- Streamflow augmentation

Who are best able to focus on this issue?

- Workshop/taskforce leads
  - Department of Ecology
  - Department of Health
  - Washington Water Research Center
- Peer review group

Budget

- Workshop/taskforce $100,000
- Estimated annual budget with partnered funds $1 to 2 million

Working Group 7
Power Point Presentation

Reclamation Program Funding

Jim Bay
Tom Skillings
Hal Thomas

Report Title

- Establishment of a permanent, dedicated revenue source for an environmentally viable Ecology Water Reuse/Reclamation Program.

Issue Description

- Revenue sources to pay for reclaimed water projects, regulatory oversight, and help support system operation must be identified in order to ensure the continued development of an alternative sustainable source of water for the state. This funding must be established at the federal, state and local government level. The utility also has a responsibility to establish a self sustaining fund to support this effort

Importance

- The advancement of water reclamation efforts is needed to preserve critical and limited surface and ground water resources. This sustainable goal requires the identification and expenditure of dedicated funds.

Importance (con't)

- The most significant impediment to implementation of reuse is not technology; it is not public acceptance; it is funding. While many recognize the benefits for reclamation as "the right thing to do," paying for these expensive facilities places a barrier to implementation. Reclamation facilities have to compete for the same limited resources that other agencies need just to meet their basic needs.

Importance (con't)

- Cost benefit analysis – it is essential to establish a value recognized by all parties of the benefits of a reclamation efforts.

Importance (con't)

- Advantages and benefits of reclaimed water projects must be promulgated and recognized by approving body (DOE, DOH, Legislators) as well as potential beneficiaries

Importance (con't)

- Obtain additional water resources to help meet Federal laws and state regulations – Clean Water Act (CWA); Endangered Species Act (ESA); Western water law; Safe Drinking Water Act (SDWA).

How do we meet/comply?

- Obtain support for and establish separate and dedicated levels of funding
- Reclaimed water oversight organization
- Funds for projects
- Grants/loans from state.
- Internally generated funds by utility through rate structure.
- Funds for reclaimed water system operations and maintenance.
- Internally generated funds by utility through rate structure.

How do we comply? (con't)

- Establish funding criteria that recognizes the value of the direct benefits of water reclamation. Also establish funding criteria that recognizes reclaimed water has a value beyond that which is consumed. These criteria should include evaluation factors that take into consideration the value of groundwater recharge, stream flow augmentation, wetland enhancement and other demonstrated net benefits to the environment.

How do we comply? (con't)

- Beneficial reuse should have values assigned to tangible (identifiable and measurable) as well as Intangible benefits (identifiable but not measurable).

How do we comply? (con't)

- Those entities and purveyors with the highest potential or ability (financial, large or increasing customer base, etc.) to enact a water reclamation program should be listed in second place for access to/approval of additional surface/groundwater resources/rights/permits.

How do we comply? (con't)

- Growth pays for growth and the new technology associated with that growth. Traditional surface and groundwater sources are not adequate to supply ever-increasing demands for water. As stated earlier, access to traditional water sources is simpler and less expensive than enacting a reclamation program. Reuse programs need to be developed and funded by utilities with the greatest ability to do so. Reuse is an integral part of water resource management, wastewater management, and ecosystem management.

Who are the individuals?

- Legislators.
- Governor
- Regulatory Agencies – Ecology, DOH and other agencies (WDFW, DNR, COE, etc.)
  - Formal Reuse Program to be created within Ecology to oversee all aspect of reclaimed water. Combine resources in Ecology and DOH to form single clearinghouse with program organization similar to other areas within Ecology.
  - Independent research, professional and support organizations (NWRI, APWA, etc.)
  - Local utilities
  - Environmental organizations
  - Potential, current and past beneficiaries of reclaimed water projects. They provide support and help build consensus when they are successful in obtaining project funding and constructing a viable water reclamation project.

Budget

- DOE estimated annual budget is $50 million which funds indirect (overhead) and direct (project) costs.
- Establish, over the next 4 biennial cycles (eight years), an annual water reclamation budget of 25% of the total DOE budget and the DOH budget. Start at 10% and ramp up 5% each additional biennium until the goal is met. Available funding that is dedicated to reuse projects will promote more reuse projects, advance the industry, and improve the environment

Budget

- Direct and indirect funding to be provided from these fund sources
- Direct and indirect costs and values need to be established:
  - Nexus to water rights – what value to water rights
  - Cost to treat and make available as reclaimed water
- Separate and distinct funding from other water resource funding
- Water reuse projects compete with water reuse projects only
- Steady income source to sustain program
  - Fund indirect
  - Fund projects
    - How do you evaluate the projects for funding?
  - Make decisions with long-term financial, societal, and environmental viability in mind

Working Group 8
Power Point Presentation

Public Perception - the Foundation of a Successful Project

Working Group Members:
Paul Schuler,
Harry Yamamoto
Craig Riley
Jo Sullivan, Special Consultant

Issue Description

- old paradigm holds true, perception is reality
- General public including decision makers perception of needs:
  - water scarcity and competition for the resource concentrated in only densely populated, desert regions.
- engineers can develop a perfect technical program, but success will determined by public perception.
- wastewater industry mentality of "disposal of a waste" in stead of "production of a resource" for beneficial use – leads to public perception

Public perception based on waste disposal & nothing good can come from wastewater

- basic lack of understanding in by wastewater and water resources professionals as well as the public.
  - still believe in "sewage is sewage until you lose track of it".
- public has an inherent level of distrust and disgust with perception of waste
  - lack of understanding,
  - lack of trust of public officials, and the science of production
  - result in the public stopping a project.
- Communications must be centered on honesty, fairness, and respect

Importance

- "Commode to commodity" is possible
  - -if we are not stuck in a silo.
- key to developing and sustaining the market for reclaimed water is public acceptance.
- If left to the end to be addressed, the project could be derailed.

Positive public perception will develop political and financial support for the project, and then create a demand for reclaimed water.

Addressing the Issue

- Good will spends money!
- The key to developing the good will lies in the social validation of the project
- Allow the public the ability to participate and generate individual ownership in the project.
- Four legged stool based on
  - marketing
  - Media
  - public relations &
  - public involvement.

Addressing the Issue

- The message needs to be simplified and translate to 6th grade level for general public consumption
- The message has to develop, identify and explain
  - the need for and the value of the resource
  - in a way that communicates with the public,
  - but doesn't lecture
- The product and project need to be "marketed".

Addressing the Issue

- Allow participation
- Project proponents be proactive, and not reactive.
- Understanding the real, underlying issues of project opponents
- Project communication cannot respond to and be based on media sound bites, but address the underlying issues causing concern.

Disseminating the message

- identifying the community advocates and leaders.
- messages based on "follow the leader" concepts
- effective by publishing success stories based on local and national examples.
- public information must be effective for multiple levels of communication skills
- resource materials for educators and teachers to provide through grade schools particularly effective

Who Can Help?

- Link of state and national resources available:
  - State Agency resources
  - Communication specialists - Jo Sullivan & Sarah Hubbard Gray
  - Reclaimed water marketing professionals - John Reuten
  - Local success stories – Shelly Badger and Tom Skillings & Jim Bay
  - Academia - Brent Haddad, UC Santa Cruz
  - National & internationally known & recognized professionals – Private foundations - Bullitt Foundation of Seattle, NWRI
  - Professional organizations – WEF, AWWA, WateReuse Association, PNCWA, PNWS-AWWA, Treatment equipment manufacturer's representatives

Budget

$millions plus –

For marketing & public involvement, you

- can always spend too little,
- but never spend too much.

Working Group 9
Power Point Presentation

Define Processes and Resources to Continually Update Standards and to Review Alternative Technologies

Group Members

- Gerald Anderson
- James Hagstrom
- Bruce Willey

Ideas 9, 34, 35, 66, 72

Issue Description - Standards

- Standards are out of date, incomplete and inconsistent
- Major update is needed to:
  - Protect public health and the environment
  - Promote sound reclaimed water practices

Issue Description - Standards

- Update should reflect:
  - new science and health effect data
  - technology developments
  - experience of Washington's reclaimed program to date
  - improved understanding of reclaimed water opportunities and constraints

Issue Description - Standards

- Moreover, the State must implement a process to continually update the standards:
  - maintain currency with new developments in reclaimed water
  - be responsive to the needs of practitioners and the public

Issue Description – Technology Evaluation

- State must develop a regulatory framework
- Program will ensure that Washington utilities can use reliable, cost-effective solutions in meeting the program objectives

Importance - Standards

- Current, clear and scientifically-based standards are needed to ensure reclaimed water practices
  - technically sound and cost effective
  - protective of public health and the environment

Importance – Technology Evaluation

- Reuse treatment technologies are evolving rapidly
- May present significant advantages
- Absence of a protocol may result in:
  - Lengthy review periods
  - Inconsistent, or incorrect decisions
  - Unnecessary burdens on vendors
  - Potential limitation of cost-effective technologies to Washington utilities

Implementation - Standards

- Conduct Needs Assessment Workshops
- Coordinate Overlapping Rules and Guidelines
- Conduct Peer Review of Current Standards
- Conduct Public Policy Peer Review
- Update the Standards
- Conduct Peer Review of Updated Standards

Implementation - Standards

- Implement Biennial Update Process
  - Identify and prioritize issues
  - Convene and fund working group

Implementation – Technology Evaluation

- Identify candidate technologies and processes
- Define "equivalent" processes that have been approved to date
- Detail a specific review protocol
- Define level of effort and expertise required to perform assessments
- Identify opportunity to use results from prior work in other states

Individuals - Standards

- Peer Review Team
  - To be selected by Water Reuse Work Group
  - Include regulators from other states, academics, practitioners and end users
- Standards Development Team
  - Potentially selected by Water Reuse Work Group

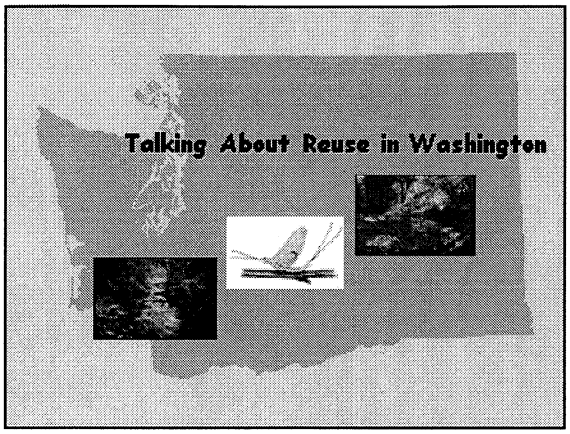
Individuals - Technology

- State must identify and retain appropriate expertise

Budget

- Standards
  - Initial update - $0.5 to $1.0 million
  - Biennial update: - $0.1 million every two years
- Technology Evaluation
  - 1 FTE
  - $100,000 per year

Working Group 10
Power Point Presentation



Education and Communication

Most important issue!

2

Active communication and education strategy

- Foundation for moving projects forward

3page

Tiers of Communication/Outreach

- Professional staff
- Decision makers
- General public
- School children

4page

Communication

- Build on Public Works & other outreach and education staff
- Market Research/Polling/Focus group
- Key message and strategy
- Effectiveness feedback
- Legislature

5page

Education

- Short School
- K-12

6page

Information

- Web site
- List serve

7page

Budget

- Rough numbers
- About $520,000
  - One time = $200,000
  - On-going = $320,000 per year

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