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OREGON STATE UNIVERSITY • CORVALLIS
DECEMBER 1993 • VOLUME 3 NUMBER 4

1993 Water Quality Conference

Focuses on Problem Solving: Management of Over-Utilized Streams

In addressing environmental degradation, the process of identification, remediation, and restoration can be frustrating. Researchers often see a lack of public will, funding, or legislation. Policy makers may not receive adequate scientific evidence upon which to base decisions. Citizens may feel left out of information loops and become resistant. The Sixth Annual Water Quality Conference, held November 3-4 at OSU and sponsored by the Oregon Water Resources Research Institute (OWRRI) and the OSU Extension Service, provided a case study of the benefits resulting from working together. The conference theme, "Management of Over-Utilized Streams: Lessons from the Tualatin Watershed," covered historical, technical, political, and sociological perspectives involved in a mandated water quality restoration program.

A pre-conference tour of the Tualatin Basin helped participants to see the varied urban, agricultural, and forestry practices within the watershed. A tour through the Rock Creek treatment plant illustrated the investment required to remove wastewater pollutants, especially phosphorus.

The Environmental Picture

The Tualatin River is a blueprint, a glimpse into the future where environmental problems can't be adequately addressed by conventional pollution control technologies. Following the historic river through social, physical, and habitat changes demonstrated how the river's current algal blooms and low dissolved oxygen are the cumulative result of everyone's activities.

Broken connections between the river's headwaters and lower reaches, loss of riparian zones and wetlands, and the introduction of exotic species can be described as the story of "aquatic ecology meets modern development," Stan Gregory (Fisheries & Wildlife, OSU) said.

The regulatory approach chosen to meet the mandated water quality program, set pollution loading allocations based upon what was necessary to maintain the riparian ecosystem. Such an approach means decisions must sometimes be based upon uncertain data.

Intense scientific investigation of the Tualatin rapidly made it "the most studied basin in the world," according to Robert Baumgartner (DEQ).

Some of the new research based on the Tualatin River and presented at the conference included: the methods of phosphorus (P) transport, the movement of colloids in water, the adsorption or release of sediment P, the ability to manage groundwater P, the variability of P in certain soil types, and the mobility of iron phosphate in deep geology. This type of data was used to calibrate and adapt two water quality models (HSPF and CE-Qual2) so that policy makers could evaluate alternative management scenarios.

The luncheon speaker, Angus Duncan (Northwest Power Planning Council) spoke about water issues and salmon recovery programs. He

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A Farewell to Benno

We all wish to offer our best wishes to Benno Warkentin as he returns to his professorship in Crop and Soil Science. Under his seven years of directorship, OWRRI grew, prospered, and increased in stature within the State of Oregon.

One of Benno's greatest achievements was the successful expansion of the Institute's program in the area of technology transfer. Through his efforts and the outstanding work of Patricia Easley, OWRRI is now looked to by a variety of state and federal agencies as an important source of information related to water resources issues within the Pacific Northwest.

We thank Benno for all that he has given to OWRRI and to water resources-related research within the State.

A Vision for the Future

by Kenneth J. Williamson, Director

My vision for the future direction of Oregon's Water Resources Research Institute can be summarized in four words: **scope, central, proactive, and interdisciplinary.** Each of these terms helps to define the future of programs under the direction of the OSU Research Office, the U.S. Geological Survey, and our advisory board.

I want the Institute to have a broad **scope.** Oregon is a diverse state with a wide variety of water resources. OWRRI needs to have enough breadth to address the entire statewide range of water resources issue from large rivers to small creeks, from huge aquifers to local well problems. OWRRI is one of the few state organizations that has a broad enough mandate to be able to respond to all of Oregon's water resources needs.

I want the Institute to be a **central** agency for transfer of water resources related information. My hope is that state and federal agencies and the public of Oregon will look to OWRRI for information, expertise, and research related to water problems. The Institute has contact with information sources and personnel with a range of expertise that spans the entire water resources field. We want OWRRI to develop a history of successfully meeting a wide variety of needs so that persons think of the Institute first when confronted with water resource related problems.

I want the Institute to be **proactive.** OWRRI has the luxury of being able to look into the future and to start now on the solutions to tomorrow's problems. A proactive stance will hopefully decrease both the adverse impacts of various activities upon Oregon's water resources and minimize the costs of remediation for Oregon's taxpayers. Along this line, we hope to begin a series of "white papers" that will be proactive in describing what faculty within Oregon's higher education system see as critical future issues for Oregon.

Lastly, I want the Institute to be **interdisciplinary.** All water resources problems are extremely complex and true solutions can only be accomplished within the framework of interdisciplinary teams. Just a few of the disciplines associated with OWRRI include: hydrology, fisheries and wildlife, environmental science and engineering, agriculture, forestry, bioresources, economics, political science, and soil science. OWRRI has the ability to bring together diverse state and federal agencies and faculty to participate in such team efforts.

I invite all our readers to become a part of this vision of OWRRI as we face Oregon's water issues.



OWRRI

New Faces at OWRRI

On November 15, Kelly Bartron joined the OWRRI staff to replace Janet Preble. Janet recently resigned to allow herself to enjoy more family time and has taken a part time job in the Department of English. We wish Janet well in her new position.

Kelly comes to OWRRI from the Agricultural Experiment Station Director's Office and will serve as office coordinator. Kelly attended Boise State University as a Court Administration major before transferring to OSU and graduating with a Liberal Studies Degree. Kelly's strong background in computers and writing will be a great assistance to the office and our technology transfer efforts.

Penny Cass has replaced Heidi Van Zee as the new editor of H₂O News. Heidi is now teaching technical writing to college freshman and sophomores. Like Heidi, Penny received her Master's at OSU in Scientific and Technical Communication with a minor in Environmental Science.



H₂O Newsletter

OWRRI's goal for H₂O News is to make the newsletter one of the state's foremost vehicles for interagency, interdepartment communication. New restoration techniques, scientific findings, and methods for encouraging public participation are never fully realized if each agency operates in an information vacuum.

The newsletter will be used to create a web of communication between all the various state and federal, regional and local water agencies. By regularly publishing the projects, the findings, and the uncertainties of the researchers and policy makers, a resource bank will be developed that may soon be accessible by computer. OWRRI is currently exploring computer systems to coordinate insights from people concerned about Oregon's water.

If you have suggestions for making this searchable database most useful to your organization, please contact Penny Cass or Patricia Easley, (503) 737-4022. We hope that the next issue of H₂O News will provide details for uploading, downloading, and reading Oregon water resource reports.

Publications from the Water Quality Conference

Report #1 — Land use and nonpoint phosphorus pollution in the Tualatin Basin

Report #2 — An analysis of water quality data in Tualatin River tributaries with three different land uses

Report #3 — Modeling the Tualatin River system including Scoggins Creek and Hagg Lake: model description, geometry, and forcing data

Report #4 — Late winter 1992 sampling for water quality in three stream segments of the Tualatin River Basin, Oregon

Report #6 — Landscape change in the Tualatin Basin following Euro-American settlement

Report #7 — The historical Tualatin River Basin

Report #8 — Issues surrounding the biota of the Tualatin River Basin

Final Report — A project to collect data and provide evaluation and recommendations for alternative pollution control strategies for the Tualatin River Basin

Thesis — Land use and nonpoint source phosphorus pollution in the Dairy-McKay hydrologic unit area of the Tualatin River Basin, Oregon

Available from OWRRI, Oregon State University, Strand Agriculture 210, Corvallis, OR 97331 for \$5.00 each (Thesis \$7.00).



Home*A*Syst helps rural residents protect groundwater

A new method is available to help prevent pollution in rural Oregon. The Oregon Homestead Assessment System (Home*A*Syst) is a voluntary program enabling residents to become knowledgeable about water pollution risks and to develop an action plan for reducing identified problems.

Home*A*Syst is modeled on the federal program, Farm*A*Syst, but has been adapted to meet important Oregon concerns and regulations. The Home*A*Syst package consists of eleven worksheets and nine fact sheets. By following worksheet steps, a farmer, feedlot owner, or rural resident arrives at a risk ranking for their property on such topics as: drinking well condition, pesticide storage, fertilizer handling, and wastewater treatment. If a property owner finds activities leading to a moderate or high level of potential groundwater pollution, the fact sheets suggest steps for changing and improving the risk-producing practices. The voluntary and confidential Homestead Assessment System is available for \$12.00 from local extension offices or from:


Agricultural Communications
Oregon State University
Administration Services, A422
Corvallis, OR 97331-2119
(503) 737-2513.

Request the package EM8546.

OREGON'S 1994 WATERSHED
ENHANCEMENT CONFERENCE

**"Who Will Catch
the Rain?"**

Ashland Hills Hotel, Ashland
JANUARY 27 and 28, 1994



Come to a conference exploring new patterns
of management and new streams of thought
about Oregon's watersheds.

Learn about the Watershed Health Program,
local watershed councils, shifts in manage-
ment focus and new watershed curriculum.

Call 1-800-624-3199 for more information

Call for Proposals from EPA and OWRRI

EPA solicits research grant proposals

The EPA is seeking grant applications for conducting exploratory environmental research which focuses on any aspect of pollution identification, characterization, abatement or control, or which addresses the effects of pollutants on the environment.

EPA Research Grants Application/Information kits are available from: US Environmental Protection Agency, Grant Operation Branch (3903F), 401 M St. SW Washington, DC 20460, (202) 260-9266.

The identifier for this grant solicitation is OER-94 and the announcement appeared in the October 14, 1993 Federal Register (Vol 58, No. 197) as number 53199. The deadline for submitting grant applications is June 1, 1994.

OWRRI offers 104 grants

Under the Water Resources Research Act, Section 104, the Oregon Water Resources Research Institute is requesting research proposals that address the State's water resources-related problems and seek to expand understanding of water and water-related phenomena in areas of critical need. All disciplines in physical and biological sciences, social sciences, agriculture, forestry, and engineering may apply. Proposals that foster entry of new scientists and engineers into water resources are encouraged.

Project Research Period: July 1, 1994 through June 30, 1995.

Eligibility: Faculty members at Institutions of Higher Education in Oregon.

Constraints: Proposals for \$10,000 - \$15,000. 2:1 cost-sharing required.

For information and application forms, contact OWRRI, 210 Strand Agriculture Hall, Oregon State University, Corvallis, OR 97331-2208, (503) 737-4022.

Upcoming Conferences, Seminars, and Classes

January 10-12, 1994

Pacific Salmon and their Ecosystems
University of Washington conference covering the status and trends of salmonids, contributing factors, politics, and technological and institutional solutions.
 Held in Seattle. Cost \$225.00 before December 15. For more information: (206) 543-0867 or (email) gonyea@u.washington.edu.

January 14, 1994

Research and Development Opportunities
Workshop with Technology Transfer Managers from Battelle Laboratories, U.S. Dept. of Energy, Westinghouse Hanford Company, and the Oregon Economic Development Dept.
 Held at OSU, LaSells Stewart Center, 1:00 PM.
 For more information call:
 Patricia Easley (503) 737-4023.

January 27-28, 1994

Who will catch the rain?
Covers partnership, education, management, and monitoring. Speakers will include Gov. Barbara Roberts, Ted Strong, Martha Pagel, J.D. Hoye, and Sen. Bill Bradbury.
 Held in Ashland. Cost \$35.00 before January 14. For more info: 800-624-3199.

Winter Term (January - March)

Water Resources Science.
 CSS 335X, CRN 27536
A course designed to provide students from diverse disciplines a background in water resource use issues.
 Held at OSU. Benno Warkentin, Instructor.
 Tuesdays 10:30-11:20, Thursdays 10:30-12:20.
 107 Strand Ag. Hall

Winter Term (January - March)

Economics and the Endangered Species Act,
 AREC 407A/507A, CRN 26383/26384
Explores the changing use of economic concepts in achieving the purposes of the ESA.
 Held at OSU. Bruce Rettig, Instructor.
 Tuesdays 12:30-1:30. Cordley Hall 2113.

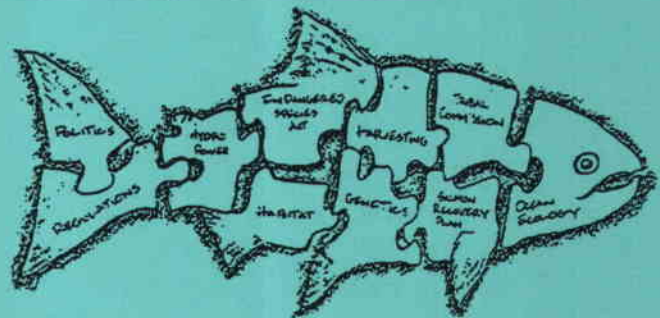
February 28 and March 1, 1994

Environmental Investment Opportunities for the 21st Century: Technologies, Financing and Strategies
Northwest regional conference showcasing new business and investment opportunities being created by environmental regulations, market trends and technologies.
 Held at the Oregon Convention Center, Portland.
 For more information contact the Advanced Science and Technology Institute in Eugene at (503) 346-3189 or FAX (503) 346-1352.

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Salmon seminar series: a resounding success

Sponsored by OWRRI, the series **Salmon & the Columbia River: The Recovery Puzzle** included talks by fish biologists and managers, the Northwest Power Planning Council, a geneticist, and Ted Strong, Director of the Columbia River Inter-Tribal Fish Commission. The series explored the historical antecedents of the current salmon run declines, the regulatory difficulties, the ocean effects and those of hatcheries and harvesting, as well as the impacts of hydropower.



Each talk in the series was videotaped and can be borrowed from OWRRI. Summaries of each speaker's insights will be published in a booklet by the end of January. The Salmon Seminar publication will be available from OWRRI for \$2.50. Last terms Watershed Seminar publication is also available for \$2.50. To order either booklet or to borrow a video, contact Patricia Easley at (503) 737-4023.

Water Quality Conference...

Continued from page 1
called for "an evolutionary step in our thinking about the relationship between the works of nature and the works of man." Duncan said such a transition involves changing current ideas about "balance." "[Balance] relies on the notion of natural resources as a pie that can be sliced into ever thinner pieces to accommodate new people and their always growing demands... Natural systems don't survive on smaller and smaller shares."

The Remediation Picture

After reviewing how the current problems arose, their effects on wildlife, the regulatory mandates, and the scientific descriptions of the basin, the Conference focused on processes for improving the Tualatin River water quality. The economic impact of various agriculture remediation techniques were of great concern to the more than 1700 Tualatin Valley farmers and livestock owners who represent a farm gate value of approximately \$160,000,000. Non-point source farm pollution comes from nutrient applications, runoffs, and sediment. Techniques for controlling these sources include reducing, incorporating, or banding applied fertilizer, creating grass filler strips, using riparian and fencing, switching to conservation tillage and to annual or perennial cover crops. Cross estimates these practices would cost Tualatin farmers about \$6,000,000, though best case scenarios could actually increase farm profits, while worst case experiences might double the projected cost.

The effects of timber harvest on phosphorus (P) contribution can result from surface erosion, burning, and fertilizers. Yet, Dave Degenhardt (Oregon Department of Forestry) explained that there was no explicit pattern between harvesting and P loading in the Tualatin River. Degenhardt said current thinking suggests that harvesting on sedimentary soils may contribute more P than logging on volcanic soils, and that the groundwater system is involved in summer P loading.

The various alternatives for reducing non-point source (NPS) pollution from urban areas included source control through public information, planning, illegal connection and dumping control, recycling, and use of alternative products. Increased storage to capture small, frequent storms was recommended to allow infiltration, settling, and removal of solids. Innovative ideas such as the use of constructed wetlands, porous pavement, compost filters, and treatment trains were also highlighted. Wayne Huber (Civil Engineering, OSU) stated, however, that while there are lots of good ideas, there is little information regarding their effectiveness. He suggested that, "We need post mortem data on BMPs (Best Management Practices)."

Increasing the flow of water in the Tualatin River through additional storage, displacing water diversion, conservation, purchase of water rights, and groundwater use were discussed. Pete Klingeman (Civil Engineering, OSU) suggested that most alternatives shift the time of

flows by shifting the place flows come from. He indicated that we are currently reaping the harvest of past time/place decisions and suggested that the easiest choices may not always be the best choices.

Judy Li (Fisheries & Wildlife, OSU) suggested river restoration should include shading, water exchange with both backwater areas and subsurface flows, soil retention, nutrient filtration, instream habitat structures, and animal corridors.

The People Picture

Thursday morning's conference focused on the variety of perspectives within the Tualatin Basin — the restoration

The cumulative effect of use piled upon use makes responsible parties of us all...

role played by the county, the sewerage agency, the rural land owner, development groups, the cities, and the citizens. The tough questions and decisions involved in managing responsible growth can be accomplished when diverse people and interests work together on specific goals.

The efforts of the Unified Sewerage Agency (USA) of Washington County and its 12 member cities have resulted in a higher level of treatment than 98 percent of the nation's facilities and the highest level of treatment in Oregon. USA has more farmer demand for its sludge than it has supply. The public company has been actively involved in promoting citizen awareness through television, publications, press releases, videos, billboards, tours, and education programs. John Jackson (USA) concluded that water quality restoration means water that is "more usable by more people more of the time."

On-going agriculture programs to control pollutants are focused on confined animal feedlots, container nurseries, and hobby farms. The programs for highly erodible land have reduced soil loss by 8 tons/acre or 72,000 tons per year. Dick Kover (Washington County Soil & Water Conservation District) believes that the coordination developed between various agencies in the McKay Creek HUA tributary should be required reading for others attempting to address environmental problems.

Dick Porn (Western Realty Advisors) suggested that initial water quality plans could have become the largest public works project in Oregon, costing more than the combined property taxes in the area. Porn described what actually occurred as the "Oregon Solution," which he said was "reasonable people working together for a reasonable solution," and "engineers talking to engineers rather than lawyers talking to lawyers."

Vergie Ries (Policy Manager, City of Beaverton) offered a cost savings formula to other localities facing mandated environmental programs. Ries suggested that

public opposition be addressed by having staff become knowledgeable, creating a team of experts, and offering quick, responsive customer service. The difficulty of meeting fast-track mandates with small revenues and heavy work loads can be met by planning to live within a budget, avoiding department polarization, including volunteer groups in the process, meeting deadlines, and staffing up when needed. Changing customer behavior is best addressed by getting the word out early, keeping messages consistent and before the public, involving children in the process, and remaining patient. Coping with the moving target of the future is anticipated by monitoring effectiveness and polishing or refining plans, and by continually remaining flexible. Ries concluded, "A wise person learns from experience but a wiser person learns from the experience of others."

The perspective of volunteer citizen groups was presented by Kathy Clair (Tualatin Riverkeepers) who suggested that public information and participation gives citizens a sense of ownership in the water quality process. Riverkeepers helps connect citizens with the Tualatin River by providing unusual river access and boat rides on the Tualatin River. The Tualatin River mainstem normally has only eight public access points and no rental boat outlets. Clair concluded that no matter how many scientists or legislative bills cover the river, "Nothing will get done without everyone working together."

*We need an evolutionary step in our thinking
about the relationship between the
works of nature and the works of man...*

Groundwater conferees share research results

Following the 1993 Water Quality Conference, researchers from around the state shared the current results and status of their groundwater work. Organized by OWRRI and the DEQ, participants gave brief reports on research related to North Malheur County, the Lower Umatilla Basin, The Willamette Valley, the state of the State's drinking water, and the infiltration of pesticides.

Participants also identified constraints in research and education, and discussed funding priorities for the next four years. A summary of workshop conclusions will be forwarded to DEQ.

Rick Kepler, DEQ, provided participants with a booklet entitled "Summary of Groundwater Protection Grant Projects in Oregon and Potential Funders." This publication, financed by Oregon's Strategic Water Management Group is available from the Department of Environmental Quality, Water Quality Division, Groundwater Section, 811 SW 6th Ave., Portland, OR 97204.

Holistic approach addressed by hydrologists

The American Institute of Hydrology, Oregon Section, and OWRRI sponsored a mid-October symposium on **Assessing Watershed Conditions: A Holistic Approach**.

The opening session focussed on assessing aquatic conditions and discussed the role of erosion in the transport of DDT, developing biological criteria models to assess biological integrity, stream restoration, and an ecosystem perspective of riparian areas. Models for salmon recovery and the use of texture in streambed surface to evaluate chemical responses to sediment inputs were also discussed.

The afternoon session switched focus to terrestrial conditions. Cumulative effects, runoff from logging operations, roads, and agricultural land, and the use of digital topography to assess debris-flow potential were explored.

The third session dealt with assessing surface and groundwater conditions. New research described the effects on nitrogen concentration from lining irrigation canals and from groundwater systems. Models were used to analyze the effects of pumping on stream flow.

The fourth session provided the integration of different disciplines in watershed assessments. Speakers from universities, state departments, and federal agencies described new holistic ecosystem approaches.

The hydrology conference was attended by a record crowd who were quite enthusiastic about the speakers and topics. For further information on the conference, contact Jim Ruff (503) 222-5161.



Students Receive Awards for Water Resources Posters

Four students from the Bioresource Engineering Department of OSU were awarded for their outstanding posters displayed at the Water Quality Conference. Florian

Brandi-Dohrn received first prize for his presentation of the "Effect of a Cereal Rye Winter Catch Crop on Nitrate-N Leaching Monitored with Passive Capillary Samplers." Derek Godwin (Implementing Best Management Practices in Small Farm Operations), John Knutson (Monitoring Chemical Contaminants for Groundwater Protection), and Lynda Whitcomb (Livestock Along Suburban Streams) were also recognized. Awards were supported thanks to the generous donation of Unified Sewerage Agency.

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Upcoming Conferences, Seminars, and Classes

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March 21-13, 1994

1994 Pacific Northwest/Oceania Conference:
Assessment of Models for Groundwater Resources
Analysis and Management

Conference will bring together water, land, and environment managers; and model developers and users to assess groundwater modeling issues. Focus will be placed on the state-of-the-art in both theory and application. Papers are being solicited.

Held in Honolulu. For further information contact Dr. Aly I. El-Kadi, Water Resources Research Center, University of Hawaii at Manoa: (808) 956-6331 or (email) aly@water.soest.hawaii.edu.

March 22-24 and June 14-17

International River Quality Symposia
Sponsored by Poland and the US. Focuses on Willamette River in Oregon and the Vistula River on the Baltic Sea. Will promote international partnerships, cooperation in research, information transfer, education. Papers being solicited.

First session held in Portland. Second session held in Gdansk. For information contact Dr. David Dunnette, 218 Science Building II, PSU, Portland, OR 97207. Phone (503) 725-3473. Fax (503) 725-4882/4883.