



Streamside Runoff

CENTER FOR STREAMSIDE STUDIES

Methods of Measuring Light Availability

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Ashley Steel is currently investigating the role of in-stream factors (e.g., light, temperature, and flow) on migratory behavior and survival on juvenile chinook salmon in the Snake and Columbia River systems. Research on environmental controls of migratory behavior in other species or in other areas provides evidence that these factors may be important. Available data for the project are from spring 1997 when the National Marine Fisheries Service conducted a radio-tagging experiment on hatchery chinook salmon in the Grande Ronde River. During the period of out-migration, Ashley collected additional data on in-stream conditions at nine monitoring stations.

One component of the study involved investigating the best way to measure light availability. Light was measured in three ways. First, a pair of recording light meters was placed at each site. One meter was attached to a steel plate on the river bottom and the other was fixed in a sunny location on land. It was hoped that the difference between these measurements could be used as an index of available light or a meaningful exponential decay coefficient could be calculated from the in-stream meter and the water depth. Second, suspended sediment samples were collected over the course of the study. Third, a horizontal Secchi disc was used to measure visibility. The disc is made up of a PVC periscope and a Secchi disc on a pole. To use the apparatus, the researcher fixes the disc in the water and lines up the periscope so that the disc is in view. The periscope is then gradually pulled away from the disc and the distance at which the disc disappears and reappears is recorded.

So far, the horizontal Secchi disc seems to be the best method. Results are similar to those of the

suspended sediment method but require much less time and equipment. The apparatus is simple, inexpensive to build, and can be used in shallow streams or deep rivers (with boat access). The horizontal Secchi disc measures a parameter with a biological meaning that might be relevant for both locating prey and avoiding predators. It also measures the distance at which a standard object can be identified against the background of the river environment. The light meters have been much less successful because the readings appear to be strongly influenced by light scattering.



Ashley uses the horizontal Secchi disc to measure light availability.

Ashley is currently using the horizontal Secchi disc to measure visibility in a Washington Department of Fish and Wildlife study of wild chinook salmon migration in the Skagit River. This study has been designed not only to understand fish migration but also to compare visibility measurements using the horizontal Secchi disc, a horizontal black disc¹, a regular Secchi disc, and an electronic turbidimeter. Results should be available by December of this year. If the horizontal Secchi disc continues to

perform well, the Center will be producing a fact sheet with building plans and instructions for the apparatus early next year.

E. Ashley Steel is a Doctoral Student in Quantitative Ecology and Resource Management working with Jim Anderson and Peter Guttorp. She can be contacted at ashley@cqs.washington.edu or at (206) 616-9440.

¹This method is described in Davies-Colley, R. J. 1988: Measuring water clarity with a black disc. *Limnology and Oceanography* 33: 616-623.

The mission of the Center for Streamside Studies is to provide the necessary information for the resolution of management issues related to the production and protection of forest, fish, wildlife, and water resources associated with the streams and rivers in the Pacific Northwest.

The Social Construction of a Watershed:

Changing Rights and Changing Land

Penny Eckert recently completed a case study in the lower watershed of the Dungeness River on the Northern Olympic Peninsula of Washington State, where irrigation systems controlled, and continue to control, the kinds of land uses and therefore, the landscape appearance. This study explored the relationship between land cover and property over 150 years by examining in detail the land and property history of a particular area, and tracing changes in land cover to the major factors influencing landowners who caused or permitted these changes to occur.

Methods used to study the pattern of land cover change and property boundary change over time were aerial photo interpretation and geographic system analysis (GIS). Processes driving land cover change through the agency of landowners and tenants were studied using population and agricultural censuses for the area, content analysis of telephone directories and local newspapers, interviews, and property title searches. The study drew on the legal and regulatory context for development of property rights in land and water, and on the history of irrigation and of planning in the area.

Results are presented in a series of maps of land and property change. Land cover changed from forest to farm to scattered rural residential, and property holdings shifted from large to very small parcels. The study shows that property in land is both a pattern on the landscape and a set of dynamic human relationships, constantly negotiated, disputed, resolved, and renegotiated. Tenure other than fee simple ownership is shown to be important in land cover change. Multiple factors, some with lag times of decades, are shown to work together to cause land cover change. The study concludes that the constant negotiations about property rights in water and land, both formal and informal, make a major contribution to how people think about land and what kinds of land uses they make of it. The study suggests that thinking about planning as a property process and recognizing it as part of a larger negotiation process about property rights, will improve the success of planning implementation.

Penelope Jennings Eckert recently finished her dissertation in the College of Forest Resources. Her chairperson of the Supervisory Committee was Professor Robert G. Lee.



The lower watershed in the early 1900s as clearing was reducing forest cover. Picture from the Bert Kellogg Collection, Port Angeles Public Library.

Message from the Center's New Director

I was appointed director of CSS in January 1998. The ensuing months have been very exciting. The faculty, staff and students have all been very supportive of the Center and have played a major role in its revitalization. CSS has been able to provide financial support to a number of graduate students, helping them to finish their research and travel to meetings to present their results. I am excited about the conferences that CSS has sponsored and the new watershed management course that CSS and the Center for Urban Water Resources Management will be putting on in September thanks to a grant from the EPA. The US Forest Service PNW Research Station is once again providing financial support to CSS. We continue to receive support from the Weyerhaeuser Foundation. The outlook for CSS is bright. The newly constituted advisory board met in June to get to know

each other and discuss areas in need of study. The board is an enthusiastic group and I look forward to working with them in the years to come. I want to thank everyone who participated in the assessment of CSS and who has provided suggestions, guidance, and financial support for CSS. With your continued support, I expect the Center for Streamside Studies to flourish. Thank you all.

-Dr. Susan Bolton

CSS Research Projects

This year the Center funded four graduate students to work on three projects.

CSS Theses Synthesis

Marit Larson and Jeff Bash are working on a project for CSS that will assess the policy and management implications of theses and dissertations produced in affiliation with the Center since its inception in 1987. The project will also focus on possible future management applications of CSS research projects. The project is expected to be completed by the end summer quarter 1998.

Riparian Research Bibliography

Working with the Center for Streamside Studies and the Olympic Natural Resources Center, Jamie

Glasgow is in the process of compiling an annotated bibliography of riparian research in the Northwest. The bibliography will include published, peer-reviewed works as well as ongoing works in progress. Ultimately, the bibliography will be made available on the internet as a resource which will prevent unnecessary redundancy in future studies, as well as expose areas which warrant further investigation. This annotated bibliography will be an effective forum where researchers can monitor what has been, is being, and needs to be done in the field of riparian ecology.

Ecosystem Restoration Symposia

CSS, in conjunction with the Northwest Chapter of the Society for Ecological Restoration, WSU's Center for Environmental Education, and Cascadia Quest, are organizing a conference entitled "Ecosystem Restoration: Turning the Tide". The conference will be held from October 28 - 30, 1998 at the Tacoma Sheraton Hotel in Tacoma, WA, and will include a variety of General Sessions, workshops, field trips, and two regional symposia. Liz Ritzenhaler has been working for CSS to help organize the conference abstracts and the Riparian Symposium. With over 100 presenters confirmed, the conference is shaping into an exciting and informative opportunity. Please call WSU Conferences and Institutes (800-942-4978) to request registration materials.

Calendar of Events

CSS Tuesday Morning Seminar Series - Every Tuesday 8:30 - 9:30 AM from September 29 - December 1 in Anderson Hall room 22. If you would like a schedule mailed to you, contact Leslie Wall at cssuw@u.washington.edu or (206) 543-6920.

Watershed Management Workshop - September 21-25, 1998. Contact Engineering Professional Programs at (206) 543-5539 for more information.

Ecosystem Restoration: Turning the Tide - October 28 - 30, 1998 at the Tacoma Sheraton Hotel in Tacoma, WA.

9th Annual Review- Wednesday, January 27, 1999 in the HUB West Ballroom. More information will be available this autumn. Mark your calendars now.

ASCE Water Resources Engineering Conference Aug 8-11, 1999 in Seattle. Abstracts are wanted on topics such as river restoration, watershed management and limnology. Deadline for submission of abstracts is Oct 15, 1998. For more information view www.asce.org or call 1-800-548-2723.

A New Face



Clare Ryan is the newest faculty member to become affiliated with CSS. She is an Assistant Professor of Natural Resource Policy and Conflict Management in the Management and Engineering Division of the Col-

lege of Forest Resources. Clare worked for the Washington State Department of Ecology and the EPA for seven years as an environmental scientist and policy analyst, dealing with water quality, air quality, and solid and hazardous waste issues. Ryan left the EPA to pursue graduate work at the University of Michigan School of Natural Resources and Environment. While working on her doctorate, she again worked for the U.S. Environmental Protection Agency in the Office of Air and Radiation, analyzing and implementing provisions of the 1990 Clean Air Act. Her research interests include development and implementation of natural resource policy, specifically the roles agencies play in the policy development and implementation process.

CSS Advisory Board

CSS has a new advisory board which met for the first time in June. The board acts as advisory to the director and help set annual goals and objectives for the Center. The board will also assist in developing strategies to create sustainable funding for CSS. The current members are:

Kurt Beardslee, Washington Trout
Dean Berg, Silvicultural Engineering
Brian Bogaczyk, US FWS
Jeff Cederholm, WA State DNR
Julie Dieu, Rayonier Timberlands
Steve Landino, NMFS
Jeff Light, Plum Creek Timber Co.
Gino Lucchetti, King County
John Mankowski, WA State DFW
Tim Northern, Adopt-A-Stream Foundation
George Pess, Tulalip Tribe
Cassie Phillips, Weyerhaeuser Co. and WFPA
Steve Ralph, EPA Region 10
Martin Raphael, USFS PNW Lab
Jim Walton, Peninsula College
Maurice Williamson

Salmon in the City II

CSS was one of many sponsors of the Salmon in the City conference held in Mt. Vernon, WA May 20-21. The conference had a number of prominent speakers that described in detail the problems that urbanization creates for salmon. Attendance at the conference was over 300 and included participants from Oregon, Washington, and British Columbia. Impervious area (paved surfaces) create or aggravate many of the processes that have led to degraded salmon habitat in urban areas. There was discussion about how to minimize impervious area and its effects. Abstracts from the conference will be available later this year.

Announcements.....

CONGRATULATIONS

CSS would like to congratulate **Tim Beechie** for receiving his doctorate for *Disturbance and Recovery Pathways for Sediment Supply and Woody Debris Recruitment in Northwestern Washington State, and Implications for Salmonid Habitat Restoration*, and **Penny Eckert**, also receiving a doctorate, for *The Social Construction of a Watershed: Changing Rights and Changing Land*. Congratulations also go to the following people getting Master of Science degrees: **Karen Fevold** for *Sub-surface Controls on the Distribution of Benthic Algae in Floodplain Back Channel Habitats of the Queets River*, **Tim Hyatt** for *Residence Time of Large Woody Debris in the Queets River, Washington*, **Jenna Leavitt** for *The Functions of Riparian Buffers in Urban Watersheds*, **Greg Mazer** for *Environmental Limitations to Vegetation Establishment and Growth in Vegetated Stormwater Biofilters*, **Kurt Nelson** for *The Influence of Sediment Supply and Large Woody Debris on Pool Characteristics and Habitat Diversity*, and **Liz Ritzenthaler** for *Bio-*

geochemistry and Hydrology of a Forested Floodplain Backchannel: Riparian and Hyporheic Interactions.

Congratulations also go to several people who have new little additions: Acacia Lina Poulson-Edwards is new to Research Professor **Rick Edwards's** family, **Karen Fevold** had Hannah Margrete Van Dusen, and **Marit Larson** had a healthy baby boy, Eli Charney Sobel.

Professor **Loveday Conquest** is moving on to a new job. She will be trading in her associate deanship in the College of Ocean and Fishery Sciences to be the director of the Teaching Academy at the UW. The mission of the Academy is to promote excellence in teaching.

WELCOME

CSS would like to welcome **Dr. Susan Bolton** as the new director of the Center. Also, the Center would like to welcome **Dr. Clare Ryan**, a professor of social policy in the College of Forest Resources.

The Center for Streamside Studies is a joint effort of the College of Forest Resources and the College of Ocean and Fishery Sciences

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