



PRESIDENT'S NOTES



Joe Mentor, Jr., President, AWRA Washington Section

This year's Board is off and running, with plenty of work to do. We have started the year with the AWRA National organization's announcement that our Chapter has been selected to host the 2005 National Conference. This is a great opportunity for our Chapter, and an honor. It also will be a lot of work, and it's not too soon to get started.

The Board already has begun planning for the National Conference. We expect it to be a four-day affair. There will be plenary, technical and poster sessions. Two weeks ago we had a visit from Ken Reid, the AWRA's Executive Director, who was in town to look for suitable venues, and to help us get started with planning. In a nutshell, the national organization will handle logistics, and our Chapter will organize the technical and social aspects of the conference. More on this later.

Hosting a national conference also has implications for other activities. Our chapter's primary activity each year is to host our annual state conference. This happens every year, at the Seattle Art Museum, in November. The only exception was in 1999, when we last hosted the national conference. The Board then decided to hold a half-day spring state conference, leaving the November slot free for the national meeting.

We haven't yet decided how to handle events in 2005. If we do things as we did in 1999, however, we will have the 2005 conference in the spring, and the 2005 national conference in November. All this means that, together with the 2004 state conference (November 2004), our 2004 Board will be planning, not one, not two, but three conferences simultaneously!

The 2004 Board has many experienced conference planners in its ranks. We are good at planning conferences. But this is not all that we on the Board signed up to do. The Washington Chapter of the AWRA is a diverse group of water resources professionals. We represent a wide variety of disciplines, and employers. We have a tremendous opportunity to be more than we are as an organization. Ken Reid's observation was that our Board spends too much time planning our state conference, and not enough time on other things. Many if not all our Board members agree. In fact, our major initiative for 2004 will be to develop a long-term, strategic plan for the organization. Long-range planning is an important endeavor that could lead to changes the organization. We hope to get started on this one as soon as possible, as the year will go by fast. More on this later as well.~

AWRA DINNER MEETING: PUGET SOUND NEARSHORE ECOSYSTEM RESTORATION PROJECT

FEATURING: TIM SMITH, WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE
Thursday, JANUARY 22nd, 2004 - 5:30 PM Social and Dinner, 7:00 PM Program
At Hales Ale Brewery, 4301 Leary Way NW, Seattle

AWRA is excited that Tim Smith, Special Assistant to Director Jeff Koenings, Washington State Department of Fish and Wildlife is our guest speaker for the 1st quarterly dinner of 2004. Tim serves as the State's federal liaison for Salmon Recovery and is a member of the Salmon Recovery Funding Board. Tim is Chair of the Steering Committee for the Puget Sound Nearshore Ecosystem Restoration Project, a "mega-scale" state and federal initiative to protect and restore Puget Sound's health through the restoration of natural processes.

REGISTRATION

To register, please send registration fee (check made payable to AWRA, Washington Section) with your Name, Organization, Phone, Address, and Email to: CH2M HILL, Carolyn Butchart, PO Box 91500, Bellevue, WA 98009. Registration is \$22 for members, \$27 for non-members, or \$10 for student members if received by January 20th. There is a \$12 no dinner option. Late fee is an additional \$5. If using a complementary corporate sponsorship, please enclose the certificate.

Inquiries: Carolyn Butchart, 425/233-3297 or cbutchart@CH2M.com.

Vertical versus Horizontal Floodplains

Andreas Kammereck, P.E., Golder Associates, Inc.

How many times have you heard someone say, "...we're not in flood, we are plenty high"? There is a common misconception that floodplains are only measured in the vertical dimension. Vertical in this case refers to the inundation elevation for the regulatory floodplain, also called the 100-year flood. It's the horizontal dimension that is increasingly becoming the more realistic measure of potential flood hazard related risks. It's rare in most floodplains to find a resource that can delineate the potential for your property to be impacted by horizontal channel changes. Whether it's small incremental movement or sudden avulsions into new alignments, the channel's historical and/or future lateral changes trace a set of meander boundaries that define the horizontal floodplain.

Trained to think in the vertical

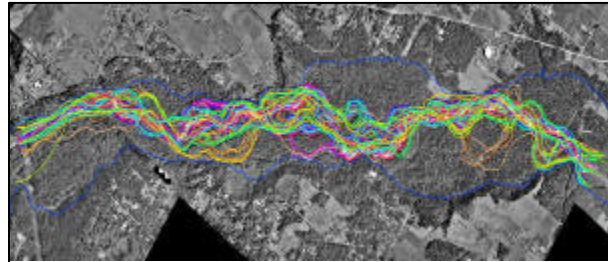
The FEMA National Flood Insurance Program (NFIP) was established in 1964 for use in planning development in floodplains. Although the maps are often used by engineers to find flood information, their purpose is to provide guidelines for establishing flood insurance rates. The FEMA NFIP Flood Insurance Rate Maps (FIRMs) delineate inundation areas and provide water surface elevations to be used to describe flood flow depths for the regulatory flood event.

Floodplain maps, with flood recurrence intervals, have become one of the most readily available public resources for evaluating river systems. The long-term integration of these maps and the regulatory flood water elevations that they provide have trained floodplain managers, engineers and citizens alike to think of floodplains in the vertical orientation. Ironically, as the maps grow older, they further highlight the missing horizontal component to the definition of the floodplain as channels migrate laterally. Although this fact is widely recognized, FEMA has not yet integrated the horizontal floodplain component into the regulatory framework of the NFIP.

Horizontal floodplains

It's important to recognize that the ongoing dynamics of river channels is natural. It's not a perceived problem - at least not until it affects people. Development in floodplain areas is resulting in the growing need to better define and understand how and why channels move. The historical lateral migration of the channel, or anticipated future limits of lateral movement define what is commonly referred to as the channel migration zone (CMZ), or the river's meander belt. The channel migration zone is fast becoming the key issue for floodplain landowners as they manage risk and assess ongoing channel changes. Picture 1 shows an example of the White River's meander belt for a reach between Auburn and Buckley, Washington, for the period between 1936 and 2001. The multiple lines represent historical channel locations, and help define how the channel has moved over time. Mapping such as this is often the corner stone of defining channel migration zones.

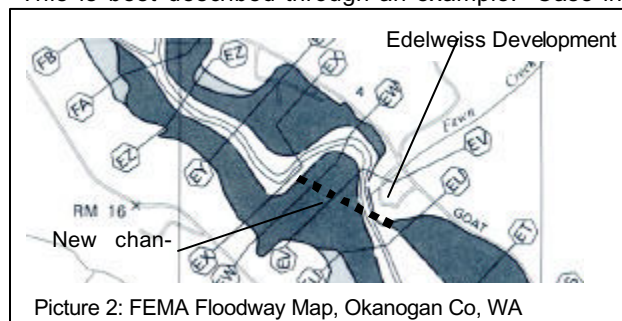
Identifying and evaluating channel migration zones is most often governed by information. Let's face it, not everyone has the budget to complete detailed flood-



Picture 1: Historical meanders of the White River near Auburn, WA

plain inventories, develop maps and perform analysis of channel dynamics. Luckily there is often a wealth of existing aerial photography and other available mapping resources. Many other factors enter into the mix of defining the channel migration zone, including: topography, geology, hydrology, vegetation, in-channel large woody debris (LWD), man-made structures (i.e. houses, roads, bridges, dikes, levees, fill/grading, etc.), in-channel and overbank flows, transport and deposition of sediments, historical geologic and geomorphic characteristics, changes in floodplain connectivity, and the list goes on and on. It is important to find the available existing data, gather site specific information through field investigations, and apply best available science to answer the specific questions of channel change that relate to the project scope.

This is best described through an example. Case in



Picture 2: FEMA Floodway Map, Okanogan Co, WA

point, a property located in the Edelweiss Development, in Okanogan County, Washington. Picture 2 shows the floodway map for the river reach around the Edelweiss Development, located just upstream of the Weeman Bridge on Highway 20 on the Methow River. In the map, the regulatory floodplain is everything between the outside limits of the gray shaded areas. The area within the grey shaded zone, delineated by a long heavy dashed line along either side of the depicted river channel is the 'floodway'. Per the NFIP, no development is allowed in the floodway, but is allowed in the shaded areas, also called the flood fringe. The Edelweiss Development is not in flood due to it's elevated ground surface above the regulatory flood inundation water surface elevation. The Edelweiss Development sits on an ancient alluvial fan where Fawn Creek meets the Methow River. The left bank floodplain through this reach is completely cut-off by this alluvial fan, and the floodway bounds immediately adjacent to a large portion of the development area. Although the NFIP definition of the floodway includes the increased risk of high

water velocities and corresponding potential erosion, it does not account for lateral movement of the channel and it's floodway due to that erosion.

Between June 13th and 17th, 2002, flows on the Methow River peaked at approximately 6,500 cfs, a near bank-full flow. The FEMA-defined regulatory flood event is 34,000 cfs. The resulting effect of reduced conveyance through both the left and rightbank floodplain led to an avulsion of the channel upstream of the Edelweiss Development and a re-alignment of the active channel. Something had to give, and it turned out to be the Fitzpatrick's property and house. Picture 3 shows an oblique aerial photo of the erosion along the point of the Edelweiss Development, and where the house used to sit in front of the still standing garage. The slack water seen in the upper left side of the picture is the old abandoned river channel along the leftbank side of the floodplain, which is shown in the FEMA map. The current channel alignment effectively cuts off this channel bend to form a new abandoned ox-bow. The resulting change in channel profile has led to a localized adjustment in gradient that is propagating upstream by lowering the river bottom, and further fixing the channel in it's new location directed at the Edelweiss Development.

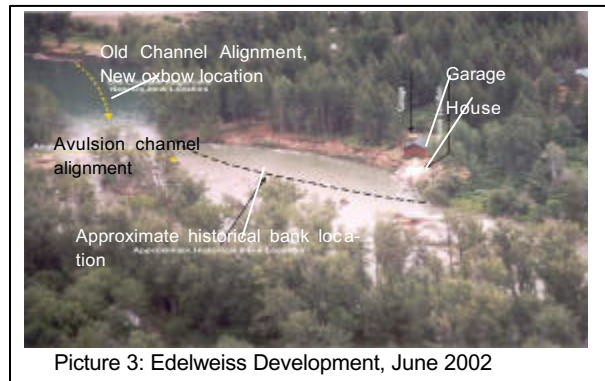
This is a real-world and recent example where the FEMA floodplain maps define the vertical inundation limits of the regulatory floodplain but miss the real issue, namely the location of the horizontal channel migratory limits.

What's Happening in Washington

The Washington State Department of Ecology (Ecology) is at the forefront of addressing horizontal floodplain issues by providing funding programs, developing technical guidelines for assessing channel migration zones and developing regulatory mechanisms for identifying and addressing channel migration in risk prone areas. This constitutes a longer term non-structural approach to managing the risk, versus short-term site specific structural intervention. Local municipalities and floodplain managers are starting to take advantage of these resources as situations like the Fitzpatrick's property occur more often.

King County is in the lead with the most comprehensive in-place regulatory mechanism that provides river specific migration corridors, regulatory guidelines for how to address development in high risk areas, and techniques for further assessing the risk. You can find more details at: <http://dnr.metrokc.gov/wlr/flood/migration.html>. Ecology has recently developed a methodology for assessing channel migration zones called, "A Framework for Delineating Channel Migration Zones". This document was just released in December of 2003 and includes a comprehensive approach specific to Washington's dynamic river systems. Look for it at: <http://www.ecy.wa.gov/biblio/0306027.html>. Also in December of last year, DOE adopted the revised Shore-

line Master Program (SMP) Guidelines that further define channel migration zones as inherently important in assessing and managing shoreline areas. You can find out more at:



Picture 3: Edelweiss Development, June 2002

<http://www.ecy.wa.gov/programs/sea/SMA/guidelines/index.html>.

FEMA is starting to promote integration of revised regulatory language into the NFIP through a document called, "Higher Regulatory Standards in Floodplain Management, 2nd Edition", published in February 2002. This document provides ideas and examples of floodplain management regulations that exceed the NFIP minimum standards, including integration of channel migration issues. DOE is continuing to address channel migration through the ongoing funding, technical support, and implementation of comprehensive flood hazard management plans (CFHMP's) throughout Washington State. This remains as one of the most viable avenues for implementing effective long-term floodplain management, and for identifying and incorporating horizontal floodplain issues into local flood management planning and implementation.

Identification of the horizontal floodplain is only one component or the overall floodplain management package. Through the identification of horizontal floodplain issues, we would expect more effective and targeted allocation of resources towards addressing issues encountered in the active floodplain. The long-term approach being the non-structural implementation of reformed flood hazard area regulations and better planning of structural development in the floodplain. In the shorter term, we hope that an improved understanding of both the vertical and horizontal floodplain will better guide the implementation of projects at the ground level. For all the folks who live in the floodplain, we hope that an increased understanding of horizontal floodplain issues would change the often heard statement to say, "...we're not in flood, we are plenty high, and plenty far away". ☺

Andreas Kammereck, P.E. is a Senior Engineer with Golder Associates in Redmond, WA specializing in riverine and surface water engineering. If you have questions, feel free to call 425-883-0777 or email akammereck@golder.com.

Death by a Thousand Cuts-

Puget Sound Nearshore Ecosystem Restoration Project Prevails

Maria Or, Army Corps of Engineers

"Death by a thousand cuts" resonates an eerie tone, yet it is not far from the truth when used to describe the health of the Puget Sound. Like lashes to the earth, deep scars and infections developed through centuries of settlement and use. As an individual, incremental acts of neglect to the environment may seem insignificant, but as viewed from a more comprehensive perspective, every little cut adds to more loss. In 2000, the Army Corps of Engineers (Corps) conducted a reconnaissance study, which prompted concern and further research into the health of the Puget Sound.

Findings showed significant degradation in the nearshore environment. Some of these problems were noteworthy enough to prompt a large-scale feasibility study, which would take a deeper look at potential problems in the nearshore, including 2,500 miles of bluffs, beaches, mudflats, kelp and eelgrass beds, salt marshes, gravel spits and estuaries.

A large task at hand, the Corps, along with its co-sponsor the Washington Department of Fish and Wildlife, as well as many supportive and partnering agencies and groups, has been developing a broad systematic approach to answer the questions: What's wrong with the Puget Sound? What do we need to do to fix it? And how can we preserve what we have?

The feasibility study, called the Puget Sound Nearshore Ecosystem Restoration project, started in the fall of 2001. Washington State Department of Fish and Wildlife (WDFW) is the local sponsor. An Executive Committee, Steering Committee and Science Team were also formed at that time. Since then these groups, which consist of many supportive and consid-

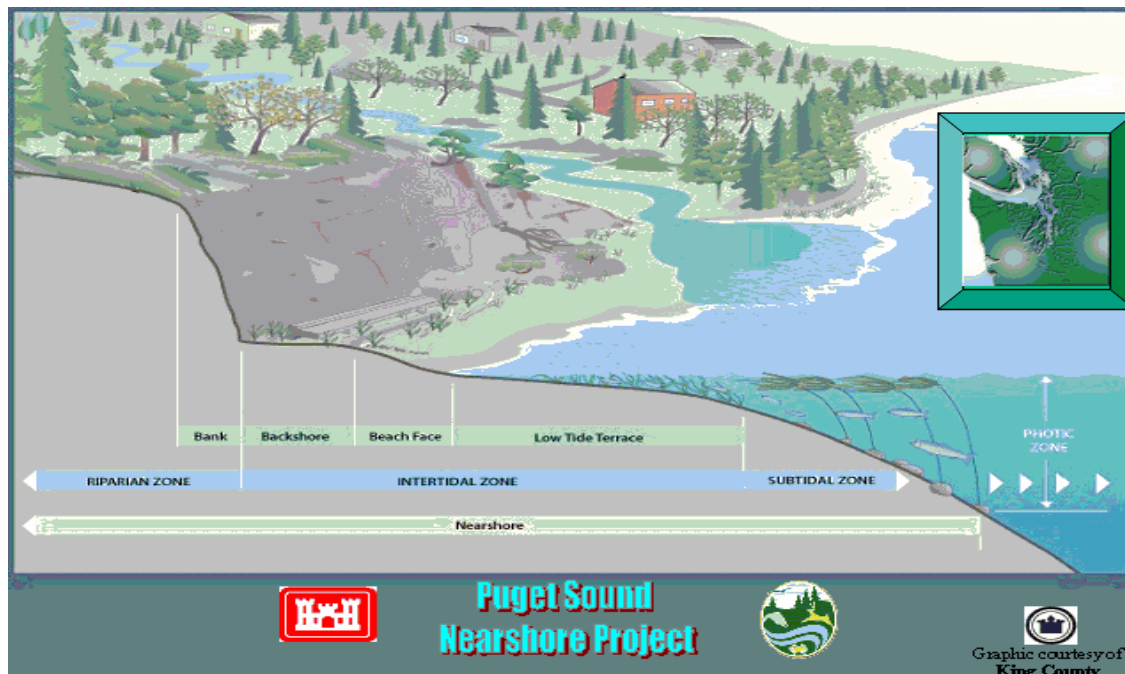
erably influential and representative organizations in Washington, have worked feverishly to investigate, educate and inform the public of the importance of this project.

Although the feasibility study is not slated to be completed until late 2007, it has already shown progress. The Science Team is planning to provide a Draft Guiding Ecological Principle later this year. In brief, it will be framework of tasks and scope that will include information on the immense Puget Sound and guides to this restoration effort.

Expected to cost \$12 million, cost share agreements for feasibility studies are 50/50 and are technically shared between the Corps and a local sponsor. However, most of the local costs are being shared by a coalition of tribes, state and local government organizations, environmental groups and industries through WDFW. The U.S. Environmental Protection Agency, U.S. Geologic Survey, National Oceanic Atmospheric Administration Fisheries, and the U.S. Fish and Wildlife Service are also providing support and scientific expertise to the project.

Federal funding for this project comes from annual continuation of federal appropriations acts which began in 1999. ~~~

For more information on the Puget Sound Nearshore Ecosystem Restoration project, contact the Corps' project manager Bernie Hargrave at (206) 764-6839. For inquiries about preparing for a project of this magnitude or federal appropriation acts, call Linda Smith at (206) 764-4371 or Mona Thomason at (206) 764-3600.



Ken Slattery Receives Award for Outstanding Contribution

Each year the Washington AWRA Section honors an individual to recognize his/her outstanding contribution to the water resources profession in the State of Washington. For 2001, this award was presented to Ken Slattery, Department of Ecology, at our annual conference which was held on November 13 at the Seattle Art Museum.

Ken Slattery has been at the forefront of changing the manner in which Washington State has managed its waters for almost a quarter of a century. Ken received his Bachelors Degree from Western Washington University. After starting with the Department of Ecology in 1975, Ken became one of the principal proponents of setting instream flows for the rivers in the state. Ken also was a strong advocate for using federal authorities under Section 401 of the Clean Water Act to preserve instream flows. This approach ultimately led to the *Elkhorn* decision by the United States Supreme Court (*PUD No. 1 of Jefferson County et al. v. Washington Department of Ecology et al.*), where that authority was explicitly recognized by the highest court of the land.

More recently, Ken has worked with the U.S. Bureau of Reclamation and others for several years to develop a comprehensive program for enhancing water supplies and improving stream flows in the Yakima River basin.

This process led to a number of significant improvements in water management for the basin. As an offshoot of his participation in the negotiations, Ken authored legislation in 1989-91 that created the first trust water rights program in the state, a program that was eventually expanded to cover the entire state. This program proved to be extremely valuable in protecting critical fish streams during the drought of 2001. Ken has been directly involved in successful efforts to restore flows to the Skokomish, Naches and Green rivers.

In the last several years, Ken has been Ecology's primary legislative contact for water policy, writing much of the water legislation that Ecology and the State have proposed. As a result, Ken has been influential in many of the revisions to state water code. Ken feels that his proudest achievement is his mentoring of numerous Ecology staff, helping them to further their careers.

In light of these numerous achievements, we congratulate Ken on receiving the 2003 Award for Outstanding Contribution to Washington's Water Resources. Along with the award, the State Section makes a \$500 donation to a nonprofit, water-related organization of the awardee's choice. Appropriately enough, Ken choose to donate the funds to the Washington Water Trust. ❧

2003-3004 Student Fellowships Awarded

University of Washington graduate students Carol Volk and Julia Fields were awarded the Washington State Section's annual student fellowships for the 2003 – 2004 academic year. Ms. Fields received the open competition award for her study on Private Sector Strategies For Marine Conservation. Ms. Volk, a member of the University of Washington Student Section of the American Water Resources Association, received the student section member award for her study of Nutrient Dynamics and Aquatic Communities of Headwater Streams in Red Alder and Coniferous Forests. The 2003–2004 Washington Section Fellowship Awards were presented Thursday November 13, 2003 during the Washington State Section Annual Conference held at the Seattle Art Museum.

Carol Volk is pursuing a PhD from the University of Washington College of Forest Resources. She expects to complete her work in the fall of 2004. Julia Fields' is pursuing a dual degree combining study at the University of Washington School of Marine Affairs (Masters of Marine Affairs) with work at the School of Law (J.D.). She plans to complete her dual degree program in 2006.

The fellowship program provides the Section with the opportunity to encourage students attending graduate school in Washington to become the future leaders in water resources management by supporting promising individuals with a financial incentive to pursue their studies. Because AWRA recognizes the interdisciplinary

nary nature of water resources management, the Section focuses on students who are applying a range of disciplines to their research problems for recognition through the fellowship program. Three criteria, the interdisciplinary nature of the course of study and research; the potential application of the work to current needs in water resources management; and the effectiveness of the response in communicating research objectives, form the basis for the review of fellowship applicants.

The Section provides two awards. One fellowship is awarded through "open" competition to any student enrolled in an appropriate graduate program offered by a Washington State college or university. Competition for the second award is limited to members of AWRA Student Chapter Members; currently only the University of Washington has a student chapter.

In addition to the \$1500 cash stipend, the award recipients receive one-year membership in both the State Section and National AWRA, a one-year subscription to the Journal of the American Water Resources Association, and admission to the Washington State Section Annual Conference. Award winners are expected to report on their work to the Section membership either through an article in the newsletter or by a presentation at a Washington State Section sponsored meeting. ❧
Notice for the 2004–05 fellowship award will be posted in a future Section Newsletter. Applications will be due in the fall of 2004.

AWRA-Washington Section 2003 Annual Conference

Water's Woven Web: Water Resource Management in Land Use Planning in Washington State

Water plays a vital role in the economic and social development of Washington State. The 2003 Washington Section American Water Resources Association annual conference explored the intertwined web of water resource management and land use planning in Washington. The conference featured multidisciplinary speakers addressing water resource management and how it is implemented under the Growth Management Act, the Shoreline Management Act, Public Water System Planning, the Safe Drinking Water Act, and the Endangered Species Act. Drawing on speakers from public, private, and non-governmental sectors, the conference developed current water resource management and land use issues in the context of the complex regulatory framework currently facing water managers and land developers.

As is the custom in recent years, the meeting was held in the auditorium of the Seattle Art Museum on Thursday, November 13, 2003, and drew 131 registered recipients. The conference was organized into four sessions featuring two speakers in each session, plus introductory and keynotes speakers. Tim Troh-

movich (1000 Friends of Washington) provided an excellent overview in his introductory talk regarding the interconnections between land and water resource management. Mark Trahan (The Seattle Post-Intelligencer) delivered a thought-provoking keynote address regarding the role of water in the public debate of western development issues. One highlight of the conference proved to be the extended question and answer period in each session, which allowed for thoughtful discussion following each presentation. The Board thanks the conference speakers for their invaluable contribution to the success of the meeting.

Funding support for the 2003 conference was provided by 18 corporate sponsors. The Board acknowledges and thanks the conference sponsors for their generous support. For more information about the Washington State Section of AWRA and the conference, see the State Section's web site at: <http://earth.golder.com/waawra/>. ☞

AWRA Washington Section extends a sincere thank you to our conference sponsors, listed on the following page.

Attention AWRA Members!

Want to get involved? Here's your opportunity! Join an AWRA Committee Today!

The AWRA Board invites you to join one or more committees and volunteer your time and talents to the Washington AWRA Chapter. There are several committees to choose from so you're sure to find one that meets your interests. Joining is easy, just contact the chairperson listed below.

2004 State Conference This Committee plans for the Chapter's November conference. Assist with selecting topics, speakers, and other planning requirements. Generally meets monthly, with additional planning sessions beginning in September. Contact: Cindy Baker at baker.lexington@attbi.com

2005 National Conference The Washington Chapter is pleased to host the AWRA 2005 National Conference. This is an exciting opportunity to work in the national spotlight. Contact: Joe Mentor at mentor@mentorlaw.com or Pete Sturtevant psturtev@ch2m.com

2005 State Conference Here's a second opportunity to work on an upcoming conference. With two conferences in 2005, we're planning ahead for the 2005 State Conference. Contact: Steve Foster at sfoster@hdrinc.com

Membership Committee Work to grow our state chapter through planning social events and communicating with members. Contact: Tom Martin at martint@battelle.org

Dinner Meetings This Committee plans 5-6 dinner meetings every year. The meetings feature a speaker who presents a timely and interesting water resource or quality topic. Contact: Steve Foster at sfoster@hdrinc.com

Finance Committee Got a financial flair? This Committee oversees the Chapter's funds as we build our way toward purchasing an annuity to fund our scholarship awards. Contact: Scott Bender at scott@benderllc.com

Awards Like to read current research? Then this Committee may be for you. Help obtain and judge entries for the Chapter's two \$1,500 scholarships. Contact: Stan Miller at smiller@spokanecounty.org

Newsletter Committee Release the writer within! Assist with obtaining and writing articles for the Chapter's six issues. Contact: Sandra Maunz at smaunz@golder.com

Nominating Committee A new Committee aimed at nominating Board Members. Contact: Paul Wetherbee at paul.wetherbee@pse.com

Long-Range Planning Help direct the long-term vision for the Washington Chapter. Contact: Joe Mentor at mentor@mentorlaw.com

2003 Fall Conference Sponsors

The Washington Section of the AWRA extends our sincere appreciation to our conference sponsors. Thank you for helping make the 2003 conference a success!

Watershed



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Water Resources on a Continental Scale: One Man's View from a Bicycle

Pete Sturtevant, CH2MHill

During the summer of 2002, I took some time off to fulfill a long-time ambition to bicycle across North America. My trip started on the Pacific Coast near Westport and culminated on the Atlantic Coast in southern Maine a little more than 5 weeks later. My background is in water resources; streams have always fascinated me. In this article I'll present a casual review of the surface water resources I encountered while crossing the Continent, from the perspective of a confirmed Northwesterner.

The start of my journey from Twin Harbors State Park near Westport is certainly familiar enough; the Pacific Ocean dominates here. I soon start inland, heading up the scenic Willapa River Valley. Actually the river is only a modest stream, crossed occasionally by the road I am following. It's a classic western Washington scene whose appeal to me has not diminished at all over the years. I follow this relatively short river all the way to its source, up and over the first of many passes, large and small, that I'll be encountering over the coming weeks. That night I camp next to the Cowlitz River. This is a big, swift river, but it pales in comparison to the Columbia River, whose scenic Gorge Area is all too swiftly passed and left behind. Now the emerald green of the countryside fades to shades of tan and brown. Streams issuing from the surrounding hills become uncommon and then disappear completely. I have entered into a semi-arid environment, which makes the Columbia that much more striking. It seems a paradox to view tugs and barges in the middle of a desert.

Leaving the Columbia River, I am soon in the Palouse Country and streams once more make an appearance. Some greenery (maturing wheat) appears on the plateaus that I cross. The last few dozen miles in Washington lie within the narrow canyon of the Snake, another mighty river in an arid setting. The next several days, I follow the Clearwater and then the Lochsa rivers deep into the Rocky Mountains. The forest, initially confined to the mountaintops, soon fills the valley. As the valley narrows, the river becomes my constant companion and streams become abundant again. Only in the last 15 or so miles does the easy valley ride finally yield to the steep, mile-high Lolo Pass that takes me over the Bitterroot Range. This is the same range which nearly defeated the Lewis and Clark Expedition 200 years ago.

The long ride down into Missoula is thrilling. I briefly follow first the Bitterroot River and then Clarks Fork (the latter oddly named since its one of the bigger rivers I've seen). Clark's Fork finds its way north, flowing past the Bitterroot Mountains and eventually to the Pacific Ocean. This geographic fact embarrassed an early survey expedition which was tracing Idaho's eastern border. They had thought that the Bitterroots formed the Continental Divide. They were forced to reassess that assumption when they observed the Clarks Fork

flowing west, past the foot of the range and on to Lake Pend Oreille (and the Columbia River). The story goes that they gave up at that point. They simply drew a line on their map, extending Idaho's border due north to Canada (hence, the Idaho Panhandle).

East of Missoula I head up the Blackfoot River, another broad, clear river. Here the topography opens up into a series of broad valleys bordered by modest mountain ranges. This is the Big Sky Country and water is evident everywhere. Numerous streams, large and small, converge on the Blackfoot. Large, isolated ranches dot the valleys. The next day I follow the Blackfoot river to its source at Rogers Pass. This 5,600-foot pass is on the Continental Divide and represents a truly significant hydrologic boundary. I enter the gigantic Missouri River Basin and for next 900 miles, I'll be crossing the Great Plains.

After five joyous miles whizzing down the east side of the Rockies, I leave the forest behind. I cross the Sum River west of Great Falls. On the outskirts of Great Falls, I cross the Missouri River. This single, mighty river drains the north and central Great Plains and its basin pretty much defines the limits of the north-central United States.

Heading east of Great Falls, I enter the prairie, proper: rolling landscape and wheat fields as far as the eye can see. Much of this territory looks almost untouched since the days of Lewis and Clark. The land I pass through, while not quite desert in character, has no flowing streams and few water features of any kind.

Early one morning, I come to edge of a large valley filled with farms. I descend into the Yellowstone River Valley. This is the first large river I've seen in a week. It was quite shallow and very turbid, not at all in character with its source in Yellowstone National Park. Crossing over into North Dakota the character of the land becomes more domestic. I cycle through the natural splendor of Roosevelt National Park, a rare remnant of the once vast grasslands that covered this portion of the Continent. It is here that I cross the Little Missouri River. I cross the broad, muddy Missouri river for a second time in central North Dakota. The eastern portion of this state supports a surprisingly vast system of wetlands, teeming with birds. There had been a very severe storm a day ahead of me and for several days I cycle through flooded towns and inundated fields as part of the aftermath. This is one of those rare times in my career that I actually experience a major flood event.

The eastern portion of North Dakota is as flat as a table top. I have left the Missouri Basin and I cross the Red River (of the North) which forms the border with Minnesota. Ahead of me rise the forest hills of western Minnesota and the end of the Great Plains. I have reached the halfway point of my journey. ~~~

(To be continued)

In Memoriam: Willy O'Neil



We are sad to announce the passing of Willy O'Neil, Environmental Affairs Manager for the Associated General Contractors of Washington and friend of many members of our organization. Willy died from exposure on January 4, 2004, after falling into the Columbia River during a duck hunting trip. Willy truly was a larger-than-life personality. He was a gifted musician, and passionate advocate for restoration of salmon habitat. He was a worthy adversary for some, and an invaluable ally for many others. Willy loved life, and his native state. He died doing what he loved to do. He enriched all of our lives in countless ways. We will miss him.

Looking for a new position?

Need a new prospect? Check out the jobs and opportunities listed on the AWRA Washington Section Website.

Employers can list available positions, and job seekers can post resumes or peruse the openings.

<http://earth.golder.com/waawra/ASP/jobs.asp>

Upcoming Events

The Washington Section AWRA holds regular dinner meetings, including a social hour, dinner, and a speaker. Other meetings and conferences are listed on our website, <http://earth.golder.com/waawra>.

AWRA – Washington Section January Dinner Meeting. Thursday, 1/22/04. Please see meeting announcement on the front page of this newsletter.

AWRA national, regional, and state conference meeting schedule. <http://www.awra.org/meetings/>.

Washington Hydrologic Society. Monthly meetings. Brian Drost at (253) 428-3600 ext. 2642 (bwdrost@usgs.gov) or Llyn Doremus (360) 592-2632 (ladoremus@aol.com).

Brown Bag Meeting. On Wednesday, January 21st at 12:00 noon, Mr. George Pess from NOAA Fisheries will discuss "Predicting Ecosystem Response to Removal of Elwha River Dams" in a brown bag presentation at Herrera Environmental Consultants, 2200 Sixth Ave, Suite 1100, Seattle, in the 12th Floor Conference Room. The reception desk is on the 11th floor.

Members: please submit events you would like included in future newsletters to: smaunz@golder.com

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