



PRESIDENT'S NOTES

Cleve Steward, WA-AWRA Section President

This being my swan song, I would like to thank you for allowing me to serve as AWRA-WA Section President. It has been a privilege and an honor. We were fortunate to have an active, dedicated group of individuals on the Board of Directors and as WA-AWRA officers over the last year. And our incoming board and newly elected 2008 officers (inside the back cover) are every bit as capable and devoted to AWRA as their predecessors. I am delighted to pass the presidency on to Jacque Klug.

This year, the Board set lofty goals for the organization: to increase public awareness of and discourse on water resource issues; to educate and involve our membership in water-related research, management, and policy development; to encourage excellence and recognize dedicated service and outstanding achievements in the various professions and organizations that comprise our membership; and to strengthen ties between AWRA-WA and organizations with similar purposes and ideals.

A few of the many accomplishments of the AWRA-WA Section in 2007:

Establishing the Rod Sakrison Memorial Endowment Fund. We honored Rod's memory by creating a permanent endowment fund to reward excellence in water resource research among students across Washington State. Support them, mentor them, and involve them, and they will lead us into the future.

Increased AWRA-WA membership. Our numbers had already increased prior to this fall's conference, but the number of new members registered at the conference was unprecedented. We are committed to continuing to grow our organization to better support our mission and core activities, not only by increasing our numbers, but by attracting the best and brightest in our profession.

Stronger ties with national AWRA, other sections, and student chapters. We participated in multi-section informational exchanges and enticed AWRA President Gerry Galloway and Executive Director Ken Reid to attend our annual conference. Our newsletter was disseminated among members of other state sections. We continued to support the UW Student Chapter, recently designated Best Student Chapter by national AWRA. Right on!

Collaboration with our Canadian colleagues. Inviting the British Columbia Chapter of the Canadian Water Resources Association to co-host our annual conference was a great decision! Members of the BC Chapter were instrumental in populating the program for this year's conference. We enjoyed the professional camaraderie and will surely take our Canadian friends up on their offer to host another joint conference in the near future.

AWRA-WA Annual Conference. The first two-day conference held by AWRA-WA was superb. The program comprised a mix of water-related topics, delivered by BC- and Washington-based government and non-government representatives. Highlights included speeches by the Minister of BC's Ministry of the Environment, Barry Penner, Washington Department of Ecology Director Jay Manning, and AWRA President Gerry Galloway. The conference assembled professionals and students from various disciplines to focus on critical water resource issues facing our province and state.

These are but a few of the recent accomplishments of our organization. As past President of AWRA-WA, I plan to stay active, helping to build on our section's noteworthy successes from the last few years. As always, I look forward to the challenge.

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Rainwater Management on Diverging Paths in British Columbia and Washington State?

Seattle Conference provides timely opportunity to compare experience and directions after a decade

By Kim Stephens P.Eng., Program Coordinator, Water Sustainability Action Plan for British Columbia

In October, the American Water Resources Association and the Canadian Water Resources Association co-hosted a conference in Seattle that included a cross-border panel session on Stormwater Management and Low Impact Development. Three questions framed the panel presentations and surrounding discussion:

- What effects have technology improvements and increasingly stringent rainwater/stormwater management requirements over the past 20 years had on the water quality of receiving waters?
- How will those resources be affected by burgeoning population growth and development in the future?
- And what lessons can Washington State and British Columbia learn from each other as they strive to minimize the impacts of rainwater/stormwater runoff?

The panel session created a timely opportunity to compare an American top-down prescriptive approach versus a Canadian bottom-up educational approach.

The Cross-Border Panel

Kim Stephens and Remi Dube provided a British Columbia perspective, while Ed O'Brien and Gary Minton provided a Washington State perspective.

- Kim Stephens is the Program Coordinator for the Water Sustainability Action Plan for British Columbia, and was principal author of Stormwater Planning: A Guidebook for British Columbia.
- Remi Dubé is the City of Surrey's Drainage Planning Manager, and is on the steering committee for the inter-governmental partnership that developed the Water Balance Model for British Columbia.
- Ed O'Brien is an Environmental Engineer with the Washington Department of Ecology, and was a contributing author to the 2001 and 2005 editions of the Stormwater Management Manual for Western Washington
- Dr. Gary Minton has been a leading contributor to the development of design criteria for rainwater/stormwater treatment relevant to the conditions of the Pacific Northwest

The panel session was moderated by Chris Pitre, an associate and senior water resources project manager at Golder Associates. According to Chris, "When the panel members reflected on what each would be talking about, it quickly became clear that the order of presentation should be Ed O'Brien first, Gary Minton second, and the team of Kim Stephens and Remi Dube third."

"As Kim observed during these pre-conference discussions," continued Chris Pitre, "Our choice is to either end on a glass half-empty or glass half-full note. He said let's show our audience that there is hope because Remi and I have a good news story to tell."

Presentation Overviews

The lead-off presentation by Ed O'Brien was titled Aquatic Natural Resource Protection and Rehabilitation in Urban and Urbanizing Areas Requires Significant Societal Change.

Stormwater management in Washington has evolved since the earliest days of settlement. The late 1970's and 80's saw the inception of standards for protecting the aquatic natural resources. According to Ed O'Brien, "While treatment and flow control crept into local standards and have become more stringent, the science tells us end-of-pipe controls are inadequate to protect the resources."

"Low Impact Development...or LID as it is typically called...is heralded as the way to have development and high quality resources too," continued O'Brien, "But without watershed-scale restrictions on the extent of land disturbance, LID approaches will also fail."

O'Brien posed this question: "Is society willing to make the sacrifices – lifestyle changes, property restrictions, tax increases - likely necessary to protect the resource?"

Dr. Gary Minton followed with a presentation titled What about the other 190%?-Application of Stormwater BMPs to Present and Future Development.

"Considerable progress has been made in the acceptance of Low Impact Development concepts, which is heartening," emphasized Gary Minton, "However, we must not forget that LID whether of new developments or as retrofit will affect a relatively small percentage of development over the next few decades, perhaps on the order of 10%."

"We therefore must not lose sight of the reality that the vast majority of new development will be tradi-

tional and that retrofitting will have a modest impact in the near future," warned Minton.

He concluded by stating that: "We must not forget the other "190%." The 90% of new development that will be traditional and the currently built environment, i.e. 100%, that is the cause of our existing problems stemming from excessive stormwater."

Kim Stephens and Remi Dubé concluded with *Beyond the Guidebook: Designing with Nature to Create Livable Communities and Protect Stream Health*.

According to Kim Stephens, "In 2002, when *Stormwater Planning: A Guidebook for British Columbia* was published, its underlying premise that land development and watershed protection can be compatible represented a radical shift in thinking."

"The Guidebook recognized that water volume is something over which local government has control through its infrastructure policies, practices and standards," explained Kim Stephens, "The Guidebook focus on volume control was the catalyst for a change in thinking that has resulted in innovation at the site scale."

"Beyond the Guidebook is an inter-governmental initiative that builds on this foundation by advancing a runoff-based approach and decision support tool," added Remi Dube, "We are incorporating all the lessons learned to date to correlate runoff volume management with urban stream health at a watershed scale."

British Columbia Perspective

In the second half of the 1990s, Kim Stephens of British Columbia and Bill Derry of Washington State collaborated to conduct some 20 workshops sponsored by local governments throughout British Columbia. These events had a major impact in stimulating and influencing discussion regarding a 'science-based' ecosystem approach to integration of stormwater management and land use planning.

Bill Derry was one of the first stormwater utility managers in Washington State. He believed so strongly in the need for scientifically-defensible research that he convinced his fellow utility managers to organize and fund a research centre at the University of Washington. Bill was a Founding Director of the Center for Urban Water Resources Management (which is now part of the Center for Water and Watershed Studies).

Translating the Science:

In British Columbia, Bill Derry's reputation for providing leadership was based on having access to the latest scientific findings. His knowledge was a key ingredient in creating what became known as the 'fish picture' graphics. These illustrated the consequences of urbanization on aquatic abundance and diversity.

Stephens and Derry used the graphics to 'translate the science' and develop a common understanding among broad and diverse audiences in a workshop setting. Starting with the **City of Kelowna** in July 1998, the graphic above helped a number of municipalities in British Columbia pass *Council Resolutions* that represented the first steps down a pathway that will ultimately lead to implementation of 20-year and 50-year visions for greener, more livable communities.

These province-wide workshops led to the SmartStorm Forum Series of four transformational events during the period 1999 through 2001. The Guidebook was an outcome.

Overcoming Fear and Doubt

According to Kim Stephens, "A decade ago, British Columbia and Washington State had the same science and a common understanding of what it meant. We had the same point of departure. A decade later, we are on diverging paths. In British Columbia, we are changing the way we develop land. Washington State is not."

"Circa 2000, our mantra in British Columbia was *Overcoming Fear and Doubt*," continued Stephens, "We were literally hanging on by our fingernails. We knew that if we failed to change land development practices, it would be another generation before anyone would try again. So we said...we must not fail; and we did not fail."

Stephens also commented on how the research work he and Bill Derry undertook for King County on the Role of Adaptive Management in the Tri-County Puget Sound Response to the Endangered Species Act is being applied in British Columbia. "Adaptive management is a core element of the Fergus Creek plan," added Remi Dubé.

What the Science is Telling Us

Ed O'Brien, in his presentation, stated that "Locally, our knowledge was and still is way ahead of the federal game because of Puget Sound Plan initiatives and a few forward-thinking local governments. The federal rules impede our progress in implementing strategies and requirements that we know are necessary."

Stephens agreed. "Rainwater management practice in Washington State is apparently being driven by a water quality regulation when a decade ago the science...and in particular the work of Rich Horner and Chris May...told us that changes in hydrology, not water quality, must be the focus of our efforts. If you get the hydrology right, water quality typically takes care of itself."

Stephens, Minton and O'Brien agreed on the need to tackle land use because that is where changes in hydrology are created. "We have a number of manuals in Washington State, but the design criteria don't reflect what we have learned," observed Gary Minton.

Minton and O'Brien both commented on the limited effectiveness of end-of-pipe solutions. "Yet that is where all your effort is going...into ponds at the end of piped conveyance systems," commented Kim Stephens. "Yes, and the ponds are oversized," added Gary Minton.

The integration of rainwater management and land use is the differentiator between British Columbia and Washington State. "In Washington State, we cannot achieve environmental protection using current methods of development," bemoaned Ed O'Brien, "Not many new developments are applying low impact development techniques. There isn't a land use dictator who can demand change. It will take public education to instill a culture change for us to have any hope that we can protect aquatic resources in the urban environment."

Fergus Creek in the City of Surrey:

The City of Surrey's Fergus Creek watershed plan is a pilot for the current Beyond the Guidebook initiative in British Columbia. Plan development is the result of a building block process over the past decade. This process started with the East Clayton Sustainable Community and continued with the Campbell Heights Industrial Area.

According to Kim Stephens, "The City of Surrey is 'walking the sustainability talk' and is demonstrating regional leadership in Metro Vancouver by proactively implementing a design with nature approach to green infrastructure practices."

Remi Dubé reported that no large-scale storage ponds will be built in the Fergus watershed: "We will be implementing 'green solutions' as an alternative to conventional engineered 'blue solutions'. Rainwater runoff volume will be managed through constructed facilities and the creation of contiguous large-scale greenways that have been integrated into the area's land use plan."

"The science-based analytical methodology that we have validated through the Fergus Creek process now enables the City of Surrey and other local governments to explore the fundamental requirements both explicit and implicit in Federal Fisheries Guidelines for stream health

and environmental protection," concluded Remi Dubé.

Designing with Nature in British Columbia

"In British Columbia, we have made a conscious decision to go the educational route," reported Kim Stephens, "It is all about establishing expectations and creating an environment that encourages innovation and gets practitioners excited about what they are doing. The culture is changing."

"We call our approach designing with nature," continued Remi Dubé, "We have borrowed from the teachings of Ian McHarg because we believe this is the way we will create livable communities and protect stream health."

According to Kim Stephens: "We are creating change through on-the-ground partnerships – for example, the Green Infrastructure Partnership, a consortium of government and no-government organizations. Finding the right solution is an outcome of sharing a vision about what we want our communities to look like, not because a government agency prescribed a regulation. For us, designing with nature has become a rallying cry."

Stephens added this soft approach is bearing fruit: "We are celebrating on-the-ground successes through programs such as the Showcasing Green Infrastructure Innovation Series. We are learning how to create a self-fulfilling prophecy. Increasingly we hear people say that the tide has turned. Major land developers want to be seen as innovative. As a result, practitioners are investing a lot of time, energy and resources in making rainwater capture systems effective. Green infrastructure is becoming part of our ethic. "

"Green infrastructure is a work-in-progress in British Columbia. We have by no means achieved Nirvana, but we are on the right path. We are steadily but surely making the shift from single-function stormwater management to the integrated and comprehensive perspective that is captured by the term rainwater management," concluded Remi Dubé.☺

Web story posted on the Green Infrastructure Community-of-Interest on the Water Bucket Website:

<http://www.waterbucket.ca/qi/index.asp?sid=6&id=275&type=single>. ☺

The Board of AWRA WA seeks to provide through this newsletter a full range of views on water resource issues. Opinions expressed in this newsletter do not necessarily reflect the views of individual Board members, the section membership, or their employers.

International Watersheds Initiative: An Integrated Ecosystem Approach to TransBoundary Watersheds

By Irene Brooks, Acting Chair, U.S. Section, International Joint Commission

Overview: It has become broadly recognized that effective management of water resources and aquatic ecosystems requires an integrated, participatory approach that considers the ecosystemic interconnections among water, air, and land, and that involves all relevant public and private stakeholders. The rationale for such an approach may be evident, but the difficulty of applying it increases with the number of political jurisdictions sharing the watershed, the size of the basin, and complexity of the issues. This is further compounded when it comes to waters that straddle national boundaries. To meet this challenge along the US-Canada border, the International Joint Commission (IJC), with support from both countries, has launched an International Watersheds Initiative (IWI). Here I describe the key features of the Initiative and highlight the potential contributions of such an approach to more effective management of transboundary waters shared between Washington State and British Columbia.

IJC: The International Joint Commission (www.ijc.org) is an independent binational organization established by the Boundary Waters Treaty of 1909. Its purpose is to help prevent and resolve disputes relating to the use and quality of boundary waters and to advise Canada and the United States on related questions. The IJC consists of six Commissioners, half appointed by the US President and half by the Canada's Governor General upon the advice of the Prime Minister, who are supported by a staff of about 50, with offices in Ottawa, Ontario, Washington, DC, and a Great Lakes Regional Office in Windsor, Ontario.

Boards: Much of the IJC's work is accomplished through 18 boards with various responsibilities within specific transboundary water basins. Originally, these boards had mandates focused primarily on water quantity and quality, with separate boards for each aspect. In the past decade, the Commission has proposed – and has received instructions from the two national governments to further develop – a more inclusive and integrated approach, based on what we have termed the International Watersheds Initiative.

Challenges: The IWI approach was designed to respond to emerging challenges such as intensified population growth and urbanization, global climate change, changing uses of water, pollution from air and land, and introductions of exotic species. These factors, which present a growing threat to water supply, water quality, aquatic and shoreline habitats and biodiversity, call for a holistic and better integrated response.

Local Engagement: The IWI is based on the premise that local people, given appropriate assistance,

are those best positioned to resolve local transboundary issues. Effective trust-building and problem-solving capabilities at the local watershed level can go a long way in preventing or reducing transboundary problems and potential disputes. This can reduce the need for involving either the two national governments or the IJC in a formal manner to resolve specific watershed issues.

Building Capacities: The Commission therefore is working to strengthen the capabilities of existing IJC boards through:

- Employing a broader, ecosystemic perspective of the watershed;
- Expanding outreach and cooperation among organizations with local water-related interests and responsibilities;
- Promoting the development of a common vision for the watershed;
- Developing a better hydrologic understanding of the water-related resources; and,
- Creating the conditions for the resolution of specific watershed-related issues.

Pilot Watershed Boards: In 2005, the Commission identified boards in three watersheds as pilots for the IWI concept: the St. Croix River (New Brunswick, Maine), the Red River (principally North Dakota, Minnesota, Manitoba), and the Rainy River (Minnesota, Ontario). Earlier this year, the Souris River (Saskatchewan, North Dakota, Manitoba) was added to the list of pilot boards.

IJC commissioners and staff have been working to strengthen the capacity of these boards, providing catalytic funding (about \$2 million over the past three years) for selected projects involving activities such as developing harmonized transboundary watershed maps and geographic information systems information layers, modeling river and reservoir hydraulics, and expanding outreach to the public. The St. Croix River board has made the greatest progress thus far, and in April 2007 was designated the first full-fledged International Watershed Board.

Expanding the IWI: The IJC is now exploring ways to strengthen the watershed approach in the pilot basins and to expand it progressively, where suitable, along the entire length of the border. We believe that more can be done with the boards to strengthen local participation, foster a more strategic approach, improve sharing of information and lessons learned, and pick up the pace of implementation.

A role for the IWI approach along the Washington-British Columbia border? The attached schematic map shows the principal watersheds in the region. The IJC currently oversees the International Osoyoos Lake Board of Control, the International Kootenay Lake Board of Control, and the International Columbia River Board of Control. Since the 1930s and 1940s, these boards have overseen regulatory Orders for operations of the Zosel and Corra Linn dams, and monitored Grand Coulee dam water levels at the border.

There seems to be substantial local interest at present in expanding work in the Osoyoos Lake / Okanagan River basin, as evidenced by the Osoyoos Lake Water Science Forum, held in September 2007. Although initially conceived by the IJC, this well-attended forum was a success largely thanks to the active preparation and participation of board members and other Canadian/U.S. federal scientists and officials, state/provincial officials, and

Native American and other local presenters and participants. Among the themes emerging from the forum were the need for binational watershed planning, the importance of harmonized basin mapping and data-sharing, and a general interest in maintaining binational momentum and dialogue.

As has been the case with the other IWI pilot boards, proposals for further action within the Okanagan and other Washington/B.C. transboundary basins rightly should originate from stakeholders and basin residents. The IJC is prepared to facilitate these efforts in an inclusive way with all levels of governments, aboriginal groups, and concerned citizens and organizations for the health of these watersheds. ❧

Questions or comments may be directed to IJC staff members Willem Brakel (brakelw@washington.ijc.org) or Ted Yuzyk (yuzykt@ottawa.ijc.org)

2007 Transboundary Water Resource Issues Conference of the WA Section of the AWRA, Co-Hosted by the BC Branch of the CWRA

This year's annual conference offered the first two day conference of our section, focused on transboundary water resource issues and co-hosted with the B.C. Branch of the Canadian Water Resources Association. The conference opened on Thursday with Cleve Steward the 2007 WA-AWRA president welcoming our key note speakers Barry Penner, Minister of Environment in British Columbia, and Jay Manning Director of the Washington Department of Ecology, and Gerald Galloway, President of the AWRA. Our keynote speakers engaged attendees on the range and breadth of the issues facing the region in the coming years and the need for effective communication, and collaboration, on technical and policy issues affecting transboundary water resources.

Conference speakers on day one presented a look at ongoing work to address stormwater management, liquid waste management, and climate change issues. The speakers provided insights and differences on how U.S. and Canadian cities, agencies and universities are working to address stormwater and waste treatment issues within current policy frameworks and a changing climate. The last session of the day brought these topics further into focus with speakers presenting case studies showing application of information to managing Fraser River flooding, developing adaptation plans to address climate change, updating the Seattle Public Utilities urban drainage framework to address climate change and permitting of a new waste discharge in eastern Washington.

Another first for this year's conference was a social hour and dinner on Thursday night at the Odyssey Maritime Discovery Center on the Seattle waterfront. Attendees from the U.S. and Canada were able to re-

lax and renew old friendships and make new ones. The dinner was highlighted with a keynote address by David Dicks, Executive Director of the Puget Sound Partnership who spoke on the broad range of issues facing the region to restore the health of the Puget Sound.

Peter Morgan President of the B.C. Branch of the Canadian Water Resources Association started day two of the conference by introducing Jay Manning, who, in his keynote address, framed the water resource issues Washington State is facing in the coming years. The speakers then provided attendees a look at transboundary water resource issues and the Columbia River System. The morning session speakers brought into focus the diverse interests and issues of water storage, power generation irrigation needs, and salmon recovery on the Columbia system. The afternoon session was dedicated to speakers presenting case studies highlighting natural and anthropogenic effects on the Sumas watershed, climate change effects on water storage and runoff, developing a management framework of the multi-state Rathdrum Prairie Aquifer, and operation and future vision of the U.S Section of the International Joint Commission.

We hope this year's conference gave attendees valuable and compelling information on what our region is facing in the management and preservation of our shared water resources. We enjoyed the interaction with the Canadian section, the many Canadian speakers who contributed, and hope to continue our work on this conference with future co-sponsored events. ❧

(Presentations are posted at www.wa-awra.org)

Permitting a New Waste Discharge to the Spokane River: Implications for Interstate River Management

By Stan Miller, former Program Manager for Spokane County's Water Resources Section, County Utilities Division, Public Works Department

During the last decade considerable effort has been expended on identifying and mitigating water quality problems on the Spokane River. Among those problems low hypolimnetic dissolved oxygen in Lake Spokane (Long Lake Reservoir), is of greatest concern for wastewater dischargers. Modeling studies using the CE QUAL W2 water quality model indicate that under "natural" conditions the hypolimnion contains only four mg dissolved oxygen per liter. This is significantly less than the eight mg per liter needed for healthy rainbow trout populations. The modeling further identified phosphorus discharges as the most important factor in dissolved oxygen depression in the reservoir. Phosphorus stimulates algal growth in the lake; the algal biomass sinks to the bottom of the lake where it is aerobically decomposed by bacteria. This results in oxygen depletion during the summer when stratification prevents mixing with oxygen rich surface water.

To address the water quality limitations of the Spokane River the Washington Department of Ecology has established a number of water clean up plans (TMDL's) for the River. The TMDL for controlling dissolved oxygen in Lake Spokane places strict limits on both oxygen demanding substances and phosphorus in waste discharges in both Washington and Idaho. Municipal dischargers in Idaho include the City of Coeur d'Alene at 4 million gallons per day (mgd), the City of Post Falls at 2 mgd and the Hayden Area Regional Sewer and Water Board at less than 1 mgd (Hayden seasonally disposes of waste water via land application). There are currently two municipal dischargers in Washington; the City of Spokane discharges about 39 mgd and the Liberty Lake Sewer and Water District discharges just under 1 mgd.

The current daily total phosphorus load from the municipal dischargers is about 250 pounds.

Controlling Phosphorus Discharges to the Spokane River

The CE QUAL W2 model included phosphorus loads Lake Spokane from a range of sources: municipal and industrial point source discharges, surface non-point discharges, ground water seepage and internal cycling of sediment phosphorus.

Based on Washington water quality criteria, since the "natural" background level of dissolved oxygen does not meet the standard, human caused degradation is limited to decreasing the natural dissolved oxygen by only 0.2 mg/L. According to the U.S. EPA, Idaho dischargers must meet Washington water quality standards at the state line. This is interpreted to mean that the phosphorus load from

point sources in Idaho can result in no more than a 0.2 mg/L drop in dissolved oxygen in Lake Spokane. Similarly, the phosphorus from Washington dischargers can result in no more than a 0.2 mg/L drop in dissolved oxygen in Lake Spokane.

This leads to significantly different treatment levels being established for the two states. In Idaho, where the total discharge is about six million gallons per day, a total phosphorus concentration of 50 micrograms per liter is required. While this is a 95% reduction over current levels in Idaho discharges it is still 5 times higher than the 10 microgram per liter target for Washington dischargers. The major difficulty with these treatment levels is the cost of achieving them. There are physical / chemical treatment processes that will achieve the 50 microgram per liter concentration fairly reliably. They are costly, but available none-the-less. Of the treatment processes available only reverse osmosis reliably reaches 10 micrograms per liter total phosphorus. Reverse osmosis is not only expensive but also energy intensive.



To address both capital costs and operation and maintenance costs, the Foundational Concepts, a guidance document laying out the path to achieving treatment and contaminant reduction goals for the Spokane River cleanup, calls for a stepwise process to achieve final clean up levels. The phased process outlined in the Foundational Concepts calls for Washington dischargers to achieve a 50 microgram per liter phosphorus concentration within ten years. The plan also calls for the Washington dischargers to make up the "delta," the difference between the phosphorus load at ten micrograms per liter and 50 micrograms per liter, by reducing non-point phosphorus discharges.

The Proposed Spokane County Facility

To achieve the provisions of the Foundational Concepts Spokane County intends to build and

operate a plant based on membrane bio-reactor technology with effluent filtration. This will produce Class A reclaimed water. This discharge stream will be suitable for all reclaimed water uses except direct human consumption. The effluent will contain no more than 50 micrograms per liter of phosphorus at the time the plant goes on line; currently plant completion is targeted for 2012 or 2013. This is four or five years ahead of completing scheduled upgrades for the City of Spokane facility.

Concurrent with the design and construction of the facility Spokane County will explore several water reuse options. These include water use for irrigation of parks, sports complexes and golf courses. Possible use by area industries and Aquifer recharge via restored wetlands will be examined.

Benefits of the Spokane County Facility

Permitting a new discharge for a Spokane County water reclamation facility will have several immediate benefits to river quality. Key among these is the continuation of the regions septic tank elimination program. In 1980 there were over 40,000 on-site disposal systems over the Spokane Valley Aquifer in east central Spokane County. In order to handle the waste from the recommended septic tank elimination program, Spokane County purchased 10 million gallons per day of treatment capacity from the City of Spokane in 1983. Since 1985, the county has eliminated nearly 30,000 on-site waste disposal systems. Some ten thousand still remain within the Urban Growth Boundary and another ten thousand outside the boundary yet still over the aquifer. At present the county sends nearly seven million gallons of its ten million gallons of purchased capacity at wastewater to the city facility. At current rates of growth, the county

will exceed its available capacity within 10 years. A new plant permitted by Spokane County can be on line by 2012.

A new plant and discharge, will allow continued connection of existing on-site wastewater systems as well as facilitating new development. Elimination of existing on-sites will reduce phosphorus loading to ground water and consequently loading to the Spokane River. Ground water phosphorus loading from on-site wastewater disposal is estimated to be six pounds per day for each ten thousand systems. Of this one-half is expected to reach the river. Continuing the septic tank elimination program to completion will remove 30 pounds per day phosphorus loading to the river.

The new plant will also result in the "immediate" diversion of about seven million gallons of discharge from the city of Spokane's plant. This means that in five years seven million gallons of wastewater will see a reduction of phosphorus concentration from about 500 micrograms per liter to 50 micrograms per liter. Left in the city plant it will be ten years before this level of treatment is achieved. This is equivalent to an additional reduction of 30 pounds of phosphorus per day during that five-year period.

It is obvious that permitting a new waste discharge to the Spokane River for the plant proposed by Spokane County will result in both a near term and a long – term reduction in phosphorus load to the river. In that the "delta" elimination plan central the Foundational Concepts includes participation in non-point source reductions in both Washington and Idaho, permitting the plant may also garner interstate benefits as well. ☺

Upcoming Events

November 6-9, 2007. Pacific Salmonid Recovery Conference 2007, Seattle. http://www.nwetc.org/bio-500_11-07_seattle.htm

November 12-15, 2007. National AWRA Conference. Albuquerque, New Mexico. <http://Awra.org>.

From the Washington Department of Fish & Wildlife Weekender Report:

<http://wdfw.wa.gov/do/weekendr/weekendr.htm>

Cooling water has slowed the sturgeon catch below Bonneville Dam, where 305 bank anglers checked 35 legal-size fish during the last full week of October. That's about one fish for every 8.7 rods, roughly the same odds as for boat anglers. In mid-October, bank anglers averaged about one legal-size fish for every three rods.

Sport crabbing will not reopen this year in Marine Area 7 (San Juan Islands), where the summer catch slightly exceeded the annual quota. The daily catch limit in Puget Sound is five Dungeness crab, males only, in hard-shell condition with a minimum carapace width of 6¼ inches. In addition, fishers may catch six red rock crab of either sex per day, provided those crab measure at least 5 inches across.

The kokanee salmon run, easily viewable from the bridge over Harvey Creek on the south end of Sullivan Lake in Pend Oreille County, is spectacular right now. The bright red fish are moving into Harvey Creek to spawn. The run usually extends into the middle of December, but the best time to see most of the fish is during the month of November from the Sullivan Lake Road Bridge. There is a pull out for parking near the bridge. You can walk along the stream to view the kokanee, but please stay out of the stream to avoid disturbing their redds – or egg nests. Bald eagles are often near Harvey Creek, taking advantage of making an easy meal out of some of the spawning kokanee.

Columbia River Treaty: Past & Possible Futures

By Rachael Paschal Osborn, Center for Environmental Law & Policy

We tend to think of our current water resource problems as the most pressing ever – no issue could be more intractable or controversial than the ones we must solve today. Or, perhaps not. The accomplishments and follies of water managers of the past offer much to students of history. In the Columbia River basin, controversies of the 1950s over international management have important implications for future management of the river.

The Columbia River Treaty between the United States and Canada governs operations at multiple dams and reservoirs on the Upper Columbia River and its tributaries in Washington and British Columbia. The treaty is also a business arrangement between the two nations that committed the U.S. to paying, at least partially, for construction of three British Columbia dams and sharing the benefits of power generation and sales accruing to the U.S. as a result of increased water storage in B.C.

The treaty has no expiration date, but may be cancelled by either party starting in 2024, subject to 10 years notice. The year 2014 will trigger a key decade in which many parties will assess treaty benefits and the merits of opting out of or negotiating new terms of the treaty.

Columbia River Hydrology & Hydro Development

The Columbia River Treaty is best understood in the context of the hydrology of the Columbia River. Originating in the Columbia Ice Fields, the river drops 2500 feet (762 meters) over the course of its 1,240-mile (1,995 kilometer) length. Annual runoff averages 134 million acre-feet (165 billion cubic meters) with a substantial range of unpredictability. Although not the largest river in the United States, the Columbia is the most “powerful” in terms of head (water velocity and drop).

The Columbia River is also one of the most powerful rivers in the world in terms of hydroelectric development. The watershed is one of the most heavily dammed, with 14 dams on the mainstem, 219 major dams on tributaries, and more than 1,000 small dams scattered throughout the basin.

Treaty History

The Columbia’s flashy hydrology along with the human propensity to build in floodplains combined to create disaster in 1948, when heavy winter snows in the Canadian Rockies led to record spring runoff. Many communities in both the Columbia and Fraser River basins were flooded, but it was Vanport – near Portland – that suffered the worst of it, losing 20,000 homes to floodwaters as a dike failed on May 30 (a disaster strikingly similar to the Katrina floods of 2005). As floodwaters receded, it became apparent that Grand Coulee Dam

was incapable of controlling the Columbia during high-runoff years.

However, the specific trigger for a river management treaty arose from a proposal to build a hydroelectric dam on the Kootenay River at Libby, Montana. (The river’s name is spelled “Kootenay” in Canada and “Kootenai” in the U.S.) The Kootenay arises in Canada, loops south through northwestern Montana and northern Idaho, then flows north to Castlegar, B.C., where it discharges into the Columbia. Libby Dam would flood 42 miles (68 kilometers) into Canada. The U.S. naturally offered to pay for flooded B.C. lands, but the Canadians sought more – a share of the downstream power benefits created by storing spring flood waters for later release. Initial reaction by U.S. dam builders to this novel benefit-sharing concept was puzzlement and rejection.

British Columbia countered with a proposal to divert the Kootenay into Columbia Lake, headwaters of the Columbia River at Canal Flats, an extraordinary divide where the two water bodies pass within a kilometer. This action, which could have deprived the U.S. of much of the flow of the Kootenay, was not well taken. Soon the B.C. plan blossomed into a proposal to divert the Columbia at its northern apex (near present-day Mica Dam) into tunnels that would discharge to the Fraser River. International tensions developed. Meanwhile, British Columbia was entertaining offers from various U.S. interests (including Kaiser Aluminum and a consortium of Puget Sound utilities) to pay for development of hydro dams at Arrow Lakes and Mica.

Although the Columbia-to-Fraser diversion was not viewed as a serious proposal, the U.S. did take notice when B.C. Premier W.A.C. Bennett began to promote new hydroelectric facilities in the Peace River basin, a central B.C. watershed that flows northeasterly toward the Arctic Ocean. While this project would not impact U.S. waters, it would compete for construction funding. British Columbia could afford to invest in either the Peace River or Columbia River project, but not both.

The B.C. Premier’s role in the water politics of the era illustrates an important difference in the federalist structure of the two countries. Canadian provinces exercise greater control over natural resources than do the U.S. states. This control included, at the time of treaty negotiations, provincial power to license hydroelectric facilities (in contrast to Federal Power Commission control over licensing in the United States). Premier Bennett, a charismatic politician who fought with Ottawa over authority to develop B.C. rivers, promoted dams as good for the provincial economy. Ottawa countered by enacting the International River Improvements Act in 1955, transferring control over dams

on the Columbia and other international rivers to the federal government. But the internal Canadian battle was not over.

Once the U.S. agreed to entertain Canadian demands to share in downstream benefits, progress on the terms of the Columbia River Treaty sped to conclusion. In 1959, the International Joint Commission issued two key reports, one proposing three options for engineering multiple dams, and one proposing a 50-50 basis for apportioning the U.S. benefits of flood control and power production. Treaty negotiators accepted this principle, agreed on an engineering plan, and reported the treaty text to the parties in January 1961.

The United States Senate immediately ratified the Columbia River Treaty, but the conclusion of international negotiations merely shifted the stage to a provincial-federal turf battle in Canada. A major concern was how to fund construction of the B.C. dams. Premier Bennett favored the sale of surplus power to the United States. The federal government opposed power exports, fearing that commitments to sell energy would, as a practical matter, forever commit Canada to sending the power south.

The Canadian federal negotiators secured a "no sale" provision in the treaty. Bennett countered by creating the B.C. Power Corporation and taking over two Peace River power suppliers. This put the province in the position of both owning the power supply and providing service to major markets in Vancouver and Victoria. It also put the federal government in the position of having no Canadian market for new Columbia River hydroelectric supply.

Without a local market, Canada was forced to concede the point and enter into federal-provincial agreements detailing construction funding and power sales. Rather than re-visit the terms of the treaty, Canada and the U.S. signed a protocol authorizing downstream power sales in the United States. The House of Commons approved the treaty in 1964.

Treaty Provisions

The Columbia River Treaty required Canada to construct 15.5 million acre feet (MAF) of reservoir storage on the Columbia and Duncan Rivers for optimum downstream power generation and flood control. The U.S. must return to Canada one-half of the benefits that Canadian storage produces in the U.S. The Treaty also authorized the U.S. to construct and operate Libby Dam on the Kootenay River. The United States made cash payments of \$245 million to Canada upon ratification, and another \$64 million upon completion of the three Ca-

nadian dams: Duncan (1967), Keenleyside (1968) and Mica (1973).

Day-to-day implementation of the Columbia River Treaty is complex, requiring coordinated operation of reservoirs throughout the basin to ensure flood control and maximize power benefits. Treaty terms have been augmented by agreements to address flows for Columbia basin salmon, sturgeon, whitefish and rainbow trout. Other agreements have addressed non-treaty storage, coordination of the Libby project, and other non-power issues.

Treaty Impacts

The drowning of major reaches of the Columbia River and its tributaries caused massive impacts in Canada and the United States. Dissatisfaction over the terms of the treaty is being expressed in parts of British Columbia, where it was not well understood that the Canadian dams would be operated like bathtubs. Dams and reservoirs blocked and destroyed fisheries (including extirpating salmon from the Upper Columbia in Washington and B.C.), drowned riverside communities, created intractable water quality problems, and took a terrible toll on native and First Nation cultures and economies in both countries.

The treaty also created an enormous amount of electrical power, much of which is shipped southbound to California markets in exchange for substantial cash payments making their way north to B.C.

Treaty Futures

Lessons may be learned from the story of this 43-year old treaty. First, as in the 1950s, U.S. citizens and government tend not to understand Canadian attitudes and motivations about resource management. There are rumblings that British Columbians want changes in the management of the Canadian dams. That fact must be part of the equation for downstream water management. Second, the dams did a huge amount of damage to habitat, wildlife and people. Consideration of the all of the impacts did not occur during treaty negotiations. Let's not make that mistake again. Third, the treaty did not contemplate the damage it would do, nor that optimizing power production may not be desirable (or even possible) if all interests are considered. In 2014, new voices will be heard and it will be up to governments to listen.

Rachael Paschal Osborn is director of the Center for Environmental Law & Policy, a public interest organization devoted to protection and restoration of the waters of western Washington and the Columbia Basin (www.celp.org). Rachael lives and works in Spokane. ❧

Salmon Restoration of the Upper Columbia River

What is the history? What are the obstacles?

By Mark Thomas, Restoration Technician, Canadian Columbia River Intertribal Fisheries Commission

Sockeye, Coho, and Chinook salmon have for thousands of years strived to access spawning habitat in the upper Columbia River and its tributaries. Hundreds of thousands of salmon annually represented a staple food source for many of the inhabitants of the upper Columbia. First Nations would benefit from the huge runs and capture their winter food supply whilst teaching the younger generations about fishing methods and the spiritual importance of the salmon. To the First Nations salmon was more than food; it represented a connection to a greater being.

In the early 1940's habitat for migration, spawning and early life stage rearing was lost due to the construction of the Grand Coulee Dam. The ecological importance of salmon to watersheds is now better understood due to studies on the biological relationships between salmon and riparian zones. Unfortunately it is then obvious the impact of the lack of upper-Columbia River salmon stocks has on the biodiversity in the upper-Columbia River. 1100 kilometres of main stem river and lakes habitat are inaccessible to anadromous stocks not to mention the additional thousands of kilometres of tributary habitat which is typically most vital for spawning and rearing habitat. Also forgone is the nutrient load that would flush through the system during spring freshets that would feed the phytoplankton and zoo-planktons that are the basis of the food web.

Upper Columbia River First Nations never ceded the rights to fish the Columbia River salmon runs and have never been reconciled with for the loss of an important food source. Concerned First Nation members voiced concern over the loss of salmon in the years following, but were unheard. Only recently have First nations been getting attention to the possibility of salmon restoration. In the early 1990's First Nations formed the Canadian Columbia River Inter-Tribal Fisheries Commission (CCRIFC). CCRIFC's prime mandate at that time and continues to be the "Restoration of salmon stocks in the Canadian portion of the Columbia River". Since this time CCRIFC has been actively pursuing options to address this issue. CCRIFC applied to the Inter-National Joint Commission (IJC) to seek an issuance of orders that would provide for mitigation to the blockage of salmon in the upper Columbia which occurred due to the formation of Lake Roosevelt by the Grand Coulee Dam.

In 2006 CCRIFC undertook to develop a comprehensive analysis of the obstacles facing salmon restoration. In early 2007 a draft report titled 'Scoping Document to Assess the Feasibility, Impacts, and Benefits of Restoring Anadromous Salmon to the Canadian Reaches of the Upper Columbia Riv-

er' was produced by ESSA Technologies Ltd. This report was the first technical review of the feasibility, impact and benefit issues related to salmon restoration in the upper Columbia. Also early in 2007 we convened a workshop in Spokane Washington where United States and Canadian First Nations were represented as well as provincial, state and federal agencies. The purposes of the workshop were to 1. Review and refine the draft scoping document, 2. Clarify critical uncertainties or outstanding issues related to decision making about restoring salmon passage, 3. Discuss studies necessary to resolve critical uncertainties required to make decisions, 4. Propose a framework for gathering information and making decisions about salmon restoration. The workshop was broken into 4 focus groups; Biological/Ecological, Engineering-flow management, Socio-economic, Legal-policy-regulatory. Key water management issues were identified and discussed. The workshop was considered a large step forward to address the possibility of salmon re-introduction.



Historic known spawning areas of salmon and steelhead prior to dam construction on the Columbia River.

One of the key questions arising from the workshop is who has the authority to make decisions on restoring salmon to the upper Columbia? Some Possibilities include:

Joint 'endangered species' action. Agreements have been made between Canada and the USA on

management of several endangered species. Some salmon species are on the US federal endangered species list (ESA). Can this lead to a salmon recovery plan?

Future of the Columbia River Treaty. The review and renegotiation of the Columbia River Treaty is fast approaching (2014-first notice and 2024-earliest termination). The CRT deals fundamentally with transboundary water management and may not provide a suitable venue for discussions about fish passage, genetics, disease risks, etc.

International Watershed Board. The IJC has recommended that governments consider establishing "International Watershed Boards". This may lead to an organization with a broader mandate that could then make recommendations to agencies responsible for specific issues.

Obstacles are still there and salmon continue to bump their heads on the dams in the lower Columbia River. There is hope! In another system that

has similar issues, (on a smaller river) sockeye salmon can now migrate downstream past a hydroelectric dam through a penstock pipe that has blocked off their ability to migrate downstream. This river is the Alouette River located in south western British Columbia; it is boasting the return of Alouette River sockeye above the dam in more than 80 years! Sockeye have been landlocked for decades due to the dam and were thought to have lost their genetic and physiological capability that would enable migration downstream. One of the land locked sockeye or 'Sockanee' have been tracked to the Juan De Fuca Strait proving their innate ability to survive generations of habitat alteration. This evidence is promise that if the proper engineering, hydrology and biology efforts are concerted salmon have the chance to navigate the great Columbia River above the 49th parallel. This achievement would most definitely add relief in the way of increased salmon runs to an already pressured fishery, and to the overall biodiversity of the Columbia River. ☺

Gary Minton Receives Award for Outstanding Contributions

Each year the AWRA Board selects one person in the State to recognize for their Outstanding Contribution to Washington's Water Resources. This year Gary Minton was selected to receive this honor. Dr. Minton has been at the forefront of research into innovative and effective methods of stormwater treatment. He emerged as an early Northwest leader in stormwater management, publishing a number of papers on the subject. He has been influential in the development and acceptance of runoff treatment best management practices (BMPs).

Dr. Minton publishes the quarterly Stormwater Treatment Northwest newsletter. He has also published the authoritative text, Stormwater Treatment which is now into its second edition. He is active in educating practitioners in the Field, presenting courses on stormwater technologies in cities across America and Canada.

Dr. Minton's activities are not confined to the technical area. He has worked to move stormwater treatment into the practical realm of guidelines and manuals for state and local agencies. He has served on state and national panels establishing standard protocols for testing stormwater BMPs. He has also prepared and/or reviewed stormwater manuals for a number of states including Washington and California. Dr. Minton has long been recognized as a National Leader in the Field of Stormwater Quality Treatment. As a measure of his influence and stature in the profession, he recently published an article in Stormwater (a national bi-monthly magazine for the stormwater professional community) proposing common terms to be used for stormwater management. (Might this be an attempt to bring order to an emerging Field not unlike the Genus/Species classification system proposed by the great Linnaeus more than 200 years ago?)

Dr. Minton has had a long and distinguished career in water resources and stormwater management. He truly stands as a major contributor to the advancement of water resources in both Washington State and nationally. Dr. Gary Minton received his PhD in Civil Engineering from the University of Washington. He has run his own Firm, Resource Planning Associates, for more than 20 years.

In addition to the award, the Chapter awarded a \$500 check to a water-related organization of Gary's choosing. This contribution was sent to the Water and Salmon Committee of the Sierra Club, on which Gary actively participates. ☺

1st Annual AWRA-WA Section Photo Contest a Success

By Carl Einberger, Senior Hydrologist and Water Resources Manager, GeoMatrix Consultants

This year our section held its first ever photo contest in conjunction with the annual meeting. Participants were asked to submit photos in the following categories: Water in the West; Water and Wildlife, and Humans and Water. Winning photos were displayed at the annual conference last October.

The contest was judged by two section board members, and two members of the student chapter. Prizes were awarded for overall 1st, 2nd, and 3rd Places, as well as best of category. Although the selection was difficult, given the volume of beautiful photos (70+) we received, the judges settled on the following winners:

Overall Winners

First Place (\$100)

Wood Duck at McLane Nature Preserve
Brian Walsh, Dept. of Ecology

Second Place (\$50)

Ethereal Dawn
Forest Payne

Third Place (Section Membership or Dinner Meeting)

We Are Now Arriving
Maria Llobet

Category Winners (Section Membership or Dinner Meeting)

Water in the West

Blue Glacier, Mt. Olympus
Tom Ring, Yakima Nation and WA AWRA Board Member

Water and Wildlife

Starfish at Low Tide at Canon Beach
Courtney O'Neill, University of Washington

Humans and Water

Water Under the Bridge
Forest Payne

Honorable mentions included photos by: John Strunk, Aspect Consulting; Michael Klisch, Golder Associates; Lindsay Brunetto; and Xiaogang Shi, University of Washington

Winning photos will be posted on the state section website (www.wa-awra.org). As a special bonus for one of the winners (Tom Ring), I have been told that his photo of the Blue Glacier on Mt. Olympus will be used on a future cover of the Journal of the American Water Resources Association (JAWRA). More photos from this and future contests may be selected for JAWRA covers in the future.

I should also note that the judging was completed with no knowledge of the photographers beforehand, thus we had one person win two places. Next year we will limit photographers to one win, to ensure diversity in the number of people who are acknowledged for their work. All involved considered the contest to be a smashing success, and we look forward to making it an annual event. Thank you to all who submitted photos. Watch for the announcement of next year's contest and save your nice water resource related photos for us! ☺

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Special Thanks!
To Golder Associates for word processing and graphics support on this newsletter.

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