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## PRESIDENT'S NOTES



### Balance

**Joe Mentor, Jr., President, AWRA Washington Section**

I am nearing the end of my term as Chapter President, so I'm going to take advantage of one of my last opportunities to pontificate to you, my colleagues, and my friends.

I just returned from my vacation. My son and I went on a Boy Scout canoe trip in the Bowron Lakes Provincial Park in North Central British Columbia. There were 16 of us: seven adults and nine boys. We canoed and portaged almost 80 miles. We worked and played hard, and we slept well. We saw moose, bear, beavers, eagles, and the Aurora Borealis. We heard calling loons, howling wolves and bugling elk. Most importantly, we bonded. I feel stronger, more relaxed, and invigorated. I like how I feel, and I want this feeling to continue.

So does my family. Upon my return I promised them (and myself) that I would try to achieve a more balanced lifestyle.

This morning I got up early and rode my bicycle through Lincoln Park, near my home in West Seattle. Afterward, I resisted the urge to go straight to e-mail, choosing instead to have breakfast with my teenaged daughter, who is in between summer camps and, like many other kids, is at home and therefore available and willing to spend the time with me. I have been thinking a lot lately about balance; in my life and in my work.

I also have spent a lot of time recently thinking about balance in our natural resource policy. Unfortunately, the trend appears to me to be headed in the opposition direction. As is consistent with larger trends in political debate, our public discussions about natural resources policy are becoming more and more polarized. It seems somewhat archaic these days to discuss "win-win" solutions. The polemics tossed around by various interests and individuals at resource conferences to me are a disturbing indication we are headed towards more and probably harsher conflict.

We no longer live in a world of unfettered water use. Water use is highly regulated. Furthermore, the need for instream flow protection has clearly been established. As Colorado Supreme Court Justice Hobbs observed, the recognition of instream flows is one of the more dramatic developments in the history of appropriative water law. Yet in my opinion there are those who, in challenging the state's trust water program, intend to wreck havoc on a system where the settled expectations of property owners can be reconciled with the need to protect instream flows.

Many municipal water rights issues have been resolved by the Legislature. There are, however, two unfortunate aspects to the manner in which they were resolved. First, Legislators were left with the impression that out-of-stream domestic water supply issues have been addressed. This is true, to an extent, but not for smaller public water systems and individual rural water users.

Yet their response has been frustrating as well. They seem to want nothing short of a cessation of all development in rural areas.

I understand their frustration, but to me the position of some tribal advocates ignores the realities of rural life. There are large areas of the state where we are expecting growth to occur, but where public water systems simply are not available to serve additional future needs. It seems clear to me that our water resource policies must come to terms with the ever-increasing suburbanization of Western and parts of Central Washington. Neither the tribes nor state government, however, appear willing to face up to this issue.

In August we tend to think about and lead more balanced lifestyles. We should try harder to do so at other times of the year. We also should try harder to achieve balance in our resource allocation policies. We live in an amazing part of the world, as anyone who spends time this month to explore our region clearly will see and understand. We need to do our best to keep it this way. We also need to work together to recognize and understand each other's needs and try harder to address them. ☺

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# Sustainability Through Participation

**Tom Martin, Secretary of the AWRA Washington Section**

How we participate in sustaining water quality and quantity is a good indication of the quality of our society. We have an excellent opportunity to show the world how Washington makes the best use of our water, liberty and pursuit of happiness. The Board of Directors of the Washington Section of the AWRA is looking for members to paint this picture of Washington for display at the 2005 National AWRA conference, which will be held in Seattle.

The Board will be reaching out across the state find the professionals and volunteers who are playing vital roles in sustaining our water resources. We are on a quest to find members who are working with their community to focus attention on our water and to explain how to tend to it.

When we find them, we will give them some of the recognition that they deserve in return for some insights on how AWRA can help them make their work more meaningful. Initially, we will be looking in the major watershed and educational centers: from Vancouver to Pasco and Spokane, and from Bellingham to Ellensburg and Pullman.

Since the beginning of the Washington Section of the AWRA, our activities have centered on Seattle, Bellevue and Puget Sound. Naturally, our search for dedicated professionals and volunteers begins in Seattle.

Carlton Stinson likes to work in the community. His work results in preserving the present and future water quality of Puget Sound. He runs the "Salmon in the Schools," and the "Storm Drain Stenciling" Programs for Seattle Public Utilities.

I have had the pleasure of working with Carlton on Seattle's Creeks, Drainage and Wastewater Citizens' Advisory Committee. Carlton helps organize the monthly committee meetings. I had a chance to see

him at work in his natural habitat one Saturday this spring at The Lake Union Clean Sweep: a volunteer clean up day.

When I arrived at South Lake Union Park I saw a small flotilla of kayakers and other boaters, scientists, booths, a band, activists, organizers (Puget Sound Alliance and Seattle Parks Department) and a legion of hungry volunteers. It was the one week-end this May that was gray, cool and drizzly. Carlton was nowhere to be seen.

After milling in the crowd for awhile, I took some pictures of the pile of junk that the boaters and volunteers had collected. A group of scientists was there to sort and classify the garbage collected that day.



Carlton Stinson

Carlton finally arrived wearing his sterile gloves and carrying buckets with spray paint. He welcomed me with his big easy smile and hearty laugh. Earlier, he attended Mayor Nickels' address to the volunteers and coordinated the stenciling program on Dexter Avenue. Ballard was the next stop after lunch.

This must be more than just a job for him. What satisfaction other than a paycheck do you get from your work, I asked? For a long time he has enjoyed working with the community, but funding is difficult to find for volunteer groups. Just as he invited me to join the post-clean-up picnic, a young woman rushed up and greeted him with a warm embrace. Once again that big easy smile and hearty laugh—job satisfaction.

Carlton is a wealth of information and contacts. He knows of many others like himself around Western Washington. He agreed to be a partner in our quest. Thank you, Carlton!

Carlton Stinson is sustaining our water resources through participation in volunteer efforts and community involvement. The AWRA Board is looking for more people like Carlton who are making a difference to the quality of our waters.

In his President's Notes from our previous newsletter, Joe Mentor announced that the Board of Directors launched into long-range, strategic planning for the



Scientists classifying trash at the 2004 Lake Union Clean Sweep.

Washington Section of the AWRA. Interestingly enough, Joe used the word sustainable in phrasing the second objective for our strategic plans. Our membership base needs to be sustainable.

As long as there is questionable sustainability of water quantity and quality in our state for all beneficial uses, the AWRA membership should be sustained—or will it? It will because we want people with water on their minds and in their bones (and in their wallets) to know that AWRA is the place to be.

AWRA can be the mechanism for gathering with compatriots to be heard and to make a difference to our waters. Our strategy is to change our organization to be member-centric. Sustainability through participation—we hope this works as well for our membership as it does for our water.

The number of members who participate in the AWRA each year depends on the interest in the theme of our section's annual conference. Every year AWRA holds its annual conference and draws a crowd of about 150 people. Some of them return year after year to the conference; some miss a few here and there. Most attend one conference and don't return. The one-timers come because the theme directly relates to them. The Board believes

that if the members participate in selecting the conference theme, they will continue to sustain our membership and our water.

By the time the 2005 National AWRA Conference arrives in Seattle, hopefully the Washington State Section membership will be ready to show the world how Washington makes the best use of our water.

How is this going to happen? The Board intends work with members who are already participating in sustaining our water resources, like Carlton Stinson, to form member groups around the state.

Our goal is facilitate this process. The Board will help members engage in dialog about common ground and differences of opinion. We will coordinate with all groups to select annual conference themes, and to chronicle and publicize group actions taken to sustain our water resources.

What's the water like in your neck of the woods, shrub-steppe, etc.? Participants in sustainability please contact us via our web-site at [www.wa-awra.org](http://www.wa-awra.org), and we can put you in contact with other members in your watershed. ☺

## June Dinner Meeting Review

Paul Wetherbee, Puget Sound Energy

The June Dinner meeting was held on June 23<sup>rd</sup> at the Hale's Ales Brewery in Fremont and featured an engaged crowd eager to dig into awesome lasagna and Low Impact Development (LID). Len Zickler, principal at AHBL, Inc., and guest speaker for the dinner meeting, delivered a lively and information-packed presentation featuring his experience with LID in the Seattle/Tacoma area.

Len described LID, first of all, as an environmentally sensitive approach to land development and stormwater management. LID strives to minimize changes to the land's natural hydrologic conditions and is a step toward more sustainable development. Len's presentation provided numerous examples of LID technologies that strive mimic pre-development hydrologic conditions by minimizing impervious surfaces, infiltrating stormwater through biofiltration and bioretention facilities, and retaining forested areas. Len used several examples from current and recent projects to illustrate his points, a technique the audience obviously appreciated.

Len drew upon his years of practical experience to illustrate some of the unanticipated difficulties associated with LID. Because LID is a relatively new or uncommon approach, the regulatory framework may not recognize all of the benefits associated LID. For example, Len described how the existing stormwater modeling techniques may not provide a reasonable representation of the observed hydrologic benefits associated with LID, yet there appears to be limited flexibility in the modeling tools to provide a more realistic assessment of the likely post-development conditions.

Probable the highlight of the evening occurred following Len's formal presentation when the question and answer period developed into a lively discussion of the evenings topics. Representatives from state, municipal, county, and private sector interests exchanged issues, concerns, and ideas to the benefit of all the participants. ☺

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# The Water Quality Element in Watershed Planning:

## The many Dimensions of this Optional Element

**Diane Crawford, Senior Environmental Scientist, Golder Associates**

The Watershed Planning Act defines one required element (Water Quantity) and three optional elements (Habitat, Instream Flow, and Water Quality) that may receive grant funding as part of Phase 1 watershed planning. Of these, the least defined element is the Water Quality Element.

Ecology stipulates several requirements to be met if the Water Quality element option is selected. The required components include: determining the degree to which water quality standards are being met, identifying the causes of water quality violations, consideration of total maximum daily loads, and providing recommendations for monitoring. However, there are several complementary items that may be developed as part of the Water Quality Element. These may be determined based on the objectives, needs and requirements of the watershed.

There is a lot of latitude in scoping the Water Quality Element. Some of the Technical Assessments for Water Quality conducted around the state are described below.

### **WRIA 17**

In the Quilcene Watershed (WRIA 17), several ongoing monitoring programs were being implemented by local and State agencies, Tribes, and private entities with little or no coordination or interaction. This resulted in inefficient use of limited resources throughout the watershed for data collection, interpretation, and also resulted in limited data availability across agencies and interest groups. The Quilcene Watershed saw the opportunity to resolve this situation by developing a coordinated centralized database of water quality monitoring programs with a GIS (geographic information system) layer for mapping and planning purposes under the Water Quality Element.

Metadata was compiled for the Quilcene Watershed that detailed the data collection activities, and provided a comprehensive picture of existing water quality data collection programs in the watershed. The goals, objectives, and recommendations for a coordinated water quality management plan were developed, along with a GIS product that became the framework for viewing data collection activities.

Using the metadata database, a Water Quality Monitoring Plan was developed for the Quilcene Watershed to provide the basis for coordinated data collection efforts throughout the watershed. This monitoring plan assists planning efforts by determining whether data of the appropriate quality and quantity are collected, optimizing the sampling locations, improving consistency in the data collected, improving coordination of sampling efforts, and ensuring cost-effectiveness in future studies. The plan includes a summary of water quality recommendations in the watershed, as well as guidelines for continuation of the monitoring effort and a framework for the

adoption of a spatial WRIA-wide water quality database. A GIS product developed as part of the Water Quality Element allows easy viewing of the data collection activities to assist in these planning processes.

### **WRIA 11**

The Nisqually Watershed (WRIA 11) conducted a similar type of Water Quality Assessment to WRIA 17, however this watershed used additional funding to take their coordinated data system several steps further. The Nisqually Water Quality Assessment began with compilation of metadata from various agencies, similar to the Quilcene Watershed, to create a comprehensive picture of existing water quality data collection programs in the watershed and to develop a coordinated Water Quality Management Plan with a GIS product to view the results. In addition, the Nisqually Watershed obtained further funding to allow development of a dynamic web-based spatial database.

The Nisqually database system includes a centralized database for storage and distribution of water quality data, a data management plan describing the use and maintenance of the database, and a web-based application providing geographic and query-based access to the database. This site can be accessed at <http://clientzone.golder.com/nisqually/>.

The Nisqually web-based application is a platform for public viewing of the data via geographic display of sampling stations, for conducting specific queries from the database, for viewing data from queries on time history charts, and for downloading data using several query structures. In addition, the web-based application provides GIS coverage of the Nisqually Watershed and a library for data, reports, and other files related to water quality issues in the watershed.

### **WRIA 15**

The Kitsap Watershed (WRIA 15) chose to conduct their Water Quality Element studies in two parts. The first phase essentially fulfilled the required elements of a Water Quality Assessment, per RCW 090.82, but also provided an overall assessment of water quality distribution and trends throughout the watershed. This assessment primarily used the water quality database from the Washington Department of Health to assess groundwater quality in the watershed.

The Kitsap Watershed is virtually surrounded by marine waters, and is relatively dependent on groundwater for water supply due to lack of sufficient surface water sources. Due to this, the Kitsap Watershed was particularly interested in evaluating key water quality issues that may jeopardize groundwater quality in the watershed. Therefore, the second phase of the Kitsap Water Quality Assessment focused on analyzing WRIA-wide trends over time for all available parameters. In addition, the assessment

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identified several specific issues that could potentially affect groundwater quality for detailed evaluation and assessment. In particular, this assessment evaluated the potential issues related to saline intrusion and nitrate susceptibility.

Chloride concentrations were used to evaluate the susceptibility of aquifers to saline intrusion. A spatial analysis of chloride concentrations in wells with distance from the coast showed a three-fold increase in groundwater chloride concentrations from inland toward the coast, with the sharpest increase in chloride concentrations occurring in wells located within  $\frac{1}{4}$  mile to  $\frac{1}{2}$  mile of the coast. Elevated concentrations in coastal wells were most common in the sea level aquifer, but were far less common in the shallow aquifer because it is generally not in direct hydraulic continuity with marine water in much of the watershed.

The primary source of nitrate in groundwater in the Kitsap Watershed is from on-site septic systems. Elevated nitrate concentrations (greater than 2.5 mg/L indicates non-background influences in nitrate) correlated very well with completion depths of wells, with the highest concentrations found between 60 feet and 120 feet below ground surface and decreasing markedly with depth.

The majority of wells with elevated groundwater nitrate concentrations were completed in the shallow aquifer rather than the deeper, sea level aquifer. It was calculated that nitrate concentrations in septic system effluent is on the order of 50 mg/L, with a daily per capita wastewater production of 65 gallons per day. Assuming an average groundwater recharge rate of 20 inches a year, a population density of 800 people per square mile (or 2.1 acres per housing unit using an average of 2.6 people per housing unit) is expected to result in a maximum groundwater nitrate concentration of 2.5 mg/L. Actual concentrations may be lower due to attenuation of nitrate. Analysis of data from the Kitsap Watershed indicates that a population density of 500 people per square mile (3.3 acres per housing units) may result in elevated groundwater nitrate concentrations. The highest population densities are generally associated with centralized sewer systems, which provide a self-limiting effect on nitrate impacts to groundwater from septic systems.

#### **WRIA 59**

In the Colville Watershed (WRIA 59), the first phase of their Water Quality Assessment included an overview of water quality, including compilation of data collected throughout the watershed to provide an overview of data collection efforts and overall water quality.

The second phase of the Water Quality Assessment in the Colville Watershed was developed based on

specific needs identified in the data compilation process and an understanding of water quality issues that are important in the watershed. A series of problem statements were developed based on review of the water quality data compiled in the first phase of the assessment, and these problem statements were prioritized to determine which issues required further detailed assessment as part of the Water Quality Assessment, which issues could be handled better or more appropriately in another venue, and which issues could be put on hold pending further funding or interest.

The top three priority issues identified in the Colville Watershed were the focus of the second phase of their Water Quality Assessment. These were:

**Fecal Source Tracking Methods** – A fecal coliform TMDL is currently underway in the Colville Watershed to address fecal coliform 303(d) exceedances in the Colville River. The Planning Team determined that they need to better understand the potential sources of fecal coliform in the watershed in order to develop the TMDL. They therefore determined that it was necessary to identify and evaluate the sometimes complex analyses required for fecal source tracking (including several types of rDNA genotyping and various chemical analyses).

**Development of a temperature monitoring plan** – There are several temperature 303(d) listings in the Colville River that may potentially require TMDL analysis. The Colville Watershed determined that they needed to develop a temperature monitoring plan to provide them with the appropriate methodology to characterize elevated temperatures in the watershed, identify potential causes of elevated temperatures, and develop measures for mitigating elevated temperatures. A monitoring plan was developed for the Colville Watershed that identified Forward Looking Infrared (FLIR) analysis as a tool for identifying temperature variations throughout the river, and potential sources of the elevated temperatures. In addition, a “snapshot” longitudinal survey was developed to collect temperature data along the entire river system in a single one-day sampling event in order to evaluate temperatures within a single timeframe.

These various methods for evaluating and assessing water quality were all developed based on the specific needs identified in each of the watersheds described. The optional component of the Water Quality Element allows the flexibility to adapt the individual assessments to each watershed in order to provide a meaningful, practical, and useful product that can be used to their full effectiveness in each watershed.☺

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# River-Aquifer Exchanges in the Methow River Basin, Part II

Chris Konrad, U.S. Geological Survey, Tacoma, WA

*This article is based on a recently completed USGS report on water resources in the Methow River basin. The complete report is available on-line at: <http://water.usgs.gov/pubs/wri/wri034244/>.*

The first part of this article described river-aquifer exchanges in the Methow River Basin for water years 2001 and 2002. An explicit objective of the investigation was to quantify seepage from irrigation canal seepage and to assess its effect on aquifer recharge and baseflow in rivers. A detailed investigation of the lower Twisp River was undertaken to address this objective.

Ground-water levels and river stage were monitored at three sites on the north side of the Twisp River, beginning in May 2001, to evaluate the ground-water response to irrigation-canal seepage and to assess the relation between river-aquifer exchanges and ground-water levels. Each site has two ground-water monitoring wells and one river stage station. The monitoring wells were installed and instrumented as ground-water levels increased during the spring of 2001. Ground-water levels in the lower Twisp River valley generally declined from late spring and summer 2001 to late autumn 2001 and winter 2002, when they were at minimum annual levels. Ground-water levels rose in spring 2002 and attained maximum levels in summer 2002. This pattern is consistent with the smaller gains in streamflow (lower rate of aquifer discharge) observed during winter and larger gains in streamflow (higher rate of aquifer discharge) observed during summer. The specific timing of changes and minimums and maximums, however, varied from well to well and likely reflected differences in geology and sources of recharge.

Water levels at the upstream site rose rapidly during spring, reaching maximum levels in late May and June, and then gradually receded. Water levels declined at a more rapid rate briefly in October. The timing of the fluctuations in May and October coincides with the seasonal recharge from irrigation canals. The hydraulic gradient between the river and aquifer at this site indicates that ground-water generally flows toward the river, though its rate may fluctuate.

Ground-water levels at the middle site increased during the spring, were relatively high during summer and receded in the autumn, but they were likely influenced by fluvial recharge by the Twisp River, hill-slope recharge from snowmelt and application of water for irrigation, and irrigation canal seepage the middle site recharge from melting snow that infiltrated into the ground. These hydraulic gradient between the river and aquifer was seasonally variable, but generally consistent with the seasonal increase in ground-water inflow to the river during late summer and autumn compared with winter and spring.

Ground-water levels in wells at the downstream site had the most complex spatial and temporal patterns of all of the sites. Water levels in the alluvial aquifer north of the river, fluctuated synchronously with river stage but were consistently lower, on average 3.6 ft, than the water-surface elevation of the river. Water levels in the north well, located in the large glacial terrace above the river, initially were lower than the water-surface elevation of the river in May 2001, but rose above river stage by early July and reached a maximum altitude on September 5, 2001. Water levels declined during the autumn, winter, and early spring to a minimum altitude on April 30, 2002. Water levels rose quickly and steadily in the spring and summer of 2002 to a maximum on September 29, 2002. The hydraulic gradient between the bedrock aquifer and the river was positive during the summer and early autumn (indicating flow toward the river), but negative the rest of the year.

The seasonal patterns in recharge are distinctly different for the bedrock and alluvial aquifers: the alluvial aquifer responds primarily to increases in river stage; in contrast, the water level in the bedrock aquifer shows little relation to river stage. Irrigation-canal seepage and infiltration of water applied to crops are likely the primary source of seasonal variation in recharge of the bedrock aquifer because (1) the timing of water-level changes coincides with the irrigation season; and (2) aquifer recharge from other sources (snow melt, streamflow, or ground-water flow from tributary basins) is unlikely to sustain ground-water levels at a steady high level during summer only to decrease in autumn.

Aquifer recharge from irrigation canal seepage helped to support ground-water discharge of about 13 ft<sup>3</sup>/s to the lower Twisp River during late summer. Ground-water inflow, however, was less than surface-water diversion from the lower Twisp River, which ranged from a monthly high rate of 33 ft<sup>3</sup>/s in July, (21 percent of monthly streamflow in the Twisp River) to a monthly low rate of 21 ft<sup>3</sup>/s in September (79 percent of streamflow in the Twisp River). The seasonal effect of canal recharge on ground-water discharge to both the lower Twisp River appears to dissipate by January at which point the lower Twisp has a steady gain of about 3 ft<sup>3</sup>/s throughout the winter.

The increase in streamflow gains along the lower Twisp River during late summer and autumn may be due in part to the hydraulic effect of irrigation-canal seepage, where ground water mounds underneath canals in response to recharge rather than rising uniformly across the aquifer. Ground-water flow would increase in response to the higher hydraulic gradient between the mound and the aquifer and the increased saturated thickness of the aquifer at the

mound. As a result, ground-water flow from irrigation-canal seepage would not return to the river steadily throughout the year, but instead would be greatest in late summer and decline as diversions decrease in the autumn. The transient increase in ground-water discharge to the river agrees with the observations of groundwater-levels.

The results of this investigation are open to various interpretations about the benefits of lining irrigation canals. Any interpretation depends on other factors including how diversions are modified in response to canal lining and the location in a river where the effects are assessed. Regardless, management of water resources can move forward based on a sound understanding of how ground water and surface water interact in the Methow Valley. ॐ

## ANNOUNCING THE ANNUAL AWARD FOR OUTSTANDING CONTRIBUTION TO WASHINGTON'S WATER RESOURCES

The AWRA, Washington Section plans to honor an individual at our annual conference on October 28, 2004 for outstanding contribution to the water resources profession in the State of Washington. The winner will be awarded a handsome plaque commemorating the honor. In addition, the AWRA Board will make a donation to a water-related, nonprofit organization of the individual's choosing.

The following criteria will apply:

- Outstanding contribution or achievement in the water resources field (broadly defined) in the State of Washington.
- Leadership, so that others are enabled, inspired or organized to advance the understanding, management or wise use of water resources.
- Degree of innovation.
- Interdisciplinary or bridge-building qualities.
- Acknowledgement of the outstanding contribution from a diversity of perspectives.

Current State Chapter members are encouraged to send in a nominating letter for themselves or another candidate. In addition to identifying a nominee, the letter must contain an explanation of how the candidate specifically meets the criteria listed above. An individual need not satisfy all of the criteria to win the award, and other appropriate factors brought up in the nomination letter may be considered. Any person may be nominated for this award, but only current State Chapter members may submit a nomination. The nomination letter must be post-marked by October 1, 2003.

Submit all letters of nomination to:

Peter Sturtevant,  
Nominations Subcommittee,  
c/o CH2M HILL,  
PO Box 91500,  
Bellevue, WA 98009-2050

*There are lots of people out there working hard to protect and enhance Washington's water resources.  
This a chance to bring some much-deserved recognition.*



<http://www.wa-awra.org>

**September Dinner Meeting:**

**Washington State's Water Quality Certifications for Hydropower**

**Featuring: Chris Maynard  
Washington State Department of Ecology**

**Thursday, September 30, 2004**

5:30 Social and Dinner, followed by the Program at 7:00 p.m.

At Hales Ales Brewery and Pub, 4301 Leary Way NW  
(in the Fremont neighborhood of Seattle)

Online directions can be found at [www.halesales.com](http://www.halesales.com)

The State of Washington (Ecology) works with the Federal Energy Regulatory Commission (FERC) licensing process for hydropower dams. Seventeen dams will begin relicensing in the next ten years. When an applicant requests a license, either to re-license an existing dam or for new construction, Ecology works with the utility, reviews studies, analyses and plans. If Ecology determines that water quality standards are attainable, a 401 certification is issued with conditions to ensure that the standards will be met. These conditions become part of the new FERC license.

The process to develop certification can take years and a final 401 certification for hydropower licenses may involve analysis and review of a wide variety of technical data. Ecology worked with public utility districts to identify how the agency will do this work, and this approach was included in the recent state-adopted water quality standards.

In order to build a more predictable pathway toward certification, Ecology is developing guidance to be used in the certification process. The guidance spells out expectations of dam operators who want to obtain certification.

Chris Maynard is the Hydropower Coordinator for Ecology and the principal contact for Ecology's 401 certification guidance. Chris will provide an update on the guidance development, address frequently asked questions, and provide insight into the interface of 401 certification and water quality standards (WQS).

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**AMERICAN WATER RESOURCES ASSOCIATION, Washington Section, Inc.  
DINNER MEETING REGISTRATION FORM**

Registration is (please circle those that apply): \$22.00 (members), \$27.00 (non-members), \$10.00 (student members) If using a complimentary corporate sponsorship, please enclose certificate.

Name: \_\_\_\_\_

Total \$ \_\_\_\_\_

Organization: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

E-mail: \_\_\_\_\_

Detach and mail with payment (**checks payable to AWRA, Washington Section**) to HDR Engineering Inc., Steve Foster, 500 108<sup>th</sup> Avenue NE, Suite 1200, Bellevue, WA 98004. Inquiries: Paul Wetherbee, (425) 462-3746 or [paul.wetherbee@pse.com](mailto:paul.wetherbee@pse.com)

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THE IMPACT OF CLIMATE CHANGE ON  
PACIFIC NORTHWEST WATER RESOURCES

American Water Resources Association,  
Washington Section

**2004 ANNUAL CONFERENCE**

**October 28, 2004  
Seattle Art Museum**

Conference Statement

Warmer winters, more flooding, shorter ski seasons, higher frequency of droughts, and chronic water shortages. These are a few of the consequences of climate change that scientists predict will occur in the Pacific Northwest (PNW). With shorter mountains and relatively warm winter temperatures in comparison to other regions -, the PNW is particularly vulnerable to warming temperatures. The 2004 Annual Conference of the American Water Resources Association (AWRA) Washington Section will explore the causes of climate change and its impact to the Pacific Northwest's water resources.

AWRA is hosting world-renowned scientists and policy makers to address the drivers of climate change, the tools used to explore the effects of climate change, and strategies for planning and adapting to changing conditions. Conference participants will learn about the challenges climate change will present for water management, what others are doing to prepare for changing conditions in our region, and what potential new management and regulatory strategies will be needed to manage water for humans and the environment.

*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/>.*

**About the Newsletter.** *This newsletter is a publication of the Washington Section of the American Water Resources Association. It is published bi-monthly or quarterly. This is a forum for members to share ideas and opinions. Opinions expressed in the AWRA Newsletter are those of the authors and do not necessarily represent the official position of the AWRA – Washington Section. Comments on articles are welcome.*

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**Submissions are welcome for the Oct-Nov-Dec, 2004 newsletter.** *The submittal due date is October 1, 2004. The editor reserves the right to make changes for reasons of length, grammar, or clarity. Contact Sandra Slayton at 425/883-0777, or send submittals directly to: [sslayton@golder.com](mailto:sslayton@golder.com). Recent newsletters available online at: [www.wa-awra.org](http://www.wa-awra.org).*

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2004 Membership Application / Change of Address Form  
( ☞ please circle, as appropriate ☜ )

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Annual membership in the state chapter costs \$25.

(If you attend the 2003 November Conference, your conference registration includes 2004 membership.)

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Please indicate if you prefer to receive your newsletter electronically.

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2004 Membership Dues: \$25.00. **Checks only.** Please make check payable to **AWRA Washington Section.**

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The American Water Resources Association is a scientific and educational non-profit organization established to encourage and foster interdisciplinary communication among persons of diverse backgrounds working on any aspect of water resources disciplines. Individuals interested in water resources are encouraged to participate in the activities of the Washington Section.

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