American Water Resources Association
Washington Section
www.waawra.org
NOVEMBER-DECEMBER

President's Notes

By Tyler Jantzen, P.E., CH2M, AWRA-WA President

As I look back on 2015 in this last newsletter of the year, I can't help feeling proud of AWRA-WA for what I consider to be a very successful year, thanks to our dedicated and hard-working volunteer board, numerous volunteers, our host of sponsors, and our membership.

Some highlights of the year include:

- **Events:** we hosted 11 events, with over 400 total attendees. This includes the annual conference with 145 attendees – one of our highest attended conferences to date. About 35% of the total event attendees were students, whose attendance is subsidized by our generous sponsors. Thank you to our dinner committee, chaired by Megan Kogut and Tyson Carlson, and to our conference planning committee, chaired by Scott Kindred and Steve Nelson for making all these events a huge success.
- **Newsletter:** we published 5 newsletters in 2015, highlighting important water resources issues in Washington State. Thank you to our editor Eric Buer, and his host of volunteer authors for all of your contributions.
- **Awards:** we will award two $2,000 student fellowships. Applications are being accepted through November 25. Please see our website for more information. While we typically only award a single award for Outstanding Contribution to Washington's Water Resources, this year we awarded two – to Bob Barwin and Urban Eberhardt – for their respective contributions to assuring stream flows to support fish.

- **Student Chapters:** we worked closely with student chapters at Central Washington University and the University of Washington to support their programs through networking and educational events. Congratulations to the CWU chapter for their formal recognition by AWRA early this year.

Through these elements, we achieve our mission:

- To provide a forum for advancing water resources management in Washington and the Pacific Northwest region.
- To serve the public interest by supporting education and informational exchanges, thereby resulting in better policy development regarding important water resources issues.
- To involve professionals and students from all disciplines and interested members of the public in activities that promote broad discussion and understanding of water resources issues.
- To recognize excellence in water resource education, management, and research.

Looking towards 2016, I want to highlight the 2016 Board of Directors Candidate Election Slate, and the election at the December 8 dinner meeting (details at www.waawra.org). It's been my pleasure to serve as president in 2015, and I look forward to continuing to support these programs and this mission in 2016 as past-president.

In this Issue:

Wait, 2015 isn't Over Yet! Don't Miss The 5th Annual Water Law & The Public Trust Continuing Law Education Conference:

This Year's Topic:

Living Within Our Water Means

Thursday, December 3, 2015

AWRA National Roundup

By Wayne Wright, GeoEngineers Inc.

2015 has been a busy year for the AWRA National organization. With the incoming President, Dr. John Tracy, we began a process to renew and redefine the importance of AWRA in setting guidance, input, and awareness to managing our precious water resources across the nation. As part of that overall objective, President Tracy established 6 focus areas and assigned various board members to lead and advance each initiative as well as support all initiates as much as possible. The President's Focus Areas are:

1. Relationships/Leveraging of State Sections: Jointly led by M. Narvaez, M. Dunning and D. Watt. Goal is to generate ideas/actions/activities that better link/leverage AWRA National and AWRA State section activities. This includes Board members becoming more connected with the Sections in their home states.
2. IMPACT Review, L. Beutler will lead: Goal will be to complete review of the IMPACT magazine a present a plan for changes to IMPACT to improve content, style and communication.
3. Leadership Development, B. Bateman will lead: Initial focus will be on developing pilot scale state water leadership academy. This far the program has been set and sponsorships gained to start this innovative program in late 2015. We will hold the first event with State employees and water managers then make necessary changes to adjust the program for other areas of practice for water resources professionals.
4. Marketing AWRA, W. Wright will lead; Goal for the coming year is to generate ideas and discussion on innovative ideas to increase AWRA's profile and market AWRA's brand and reach out to members more often. Thus far several ideas have been implemented involving changes under development to the AWRA web page, adding a mid-level professional career development program to the National conference in Denver.
5. Value Proposition-Membership Structure, N. Gollehon will lead: Expand on ideas and information obtained in the member survey conducted in late 2014.
6. Technical Committee, R. Frias will lead: Continue to implement activities started last year that bring focus to technical committees, set Board Member participation and support technical committee activities more fully.

In addition to these focus areas, severalk other items of note are underway at AWRA National:

- The 2017 Spring Specialty Conference topic and leadership has been set and the initial planning has begun. In spring of 2017, I (Wayne Wright) will be the Conference Chair developing a program targeting on the theme "Inseparable Water Resources and Forests". The conference will bring forestry and water resource professionals into one setting to discuss whole watershed management programs, and how forest management plays an important role in overall water recourse conditions – especially in the face of climate change.
- As noted above, we are undertaking a substantial upgrade and overhaul of the national AWRA website. Our effort thus far have been information gathering and researching options for content management and viewer enjoyment as well as ease of navigation.
- We are taking a good look at our dues pricing and structure with some emphasis on the paperless membership since more and more professionals are moving away from hardcopy files.
- The AWRA journal continues to be a crown jewel of the national organization with very high technical scores and high quality content.

My first year serving on the national AWRA Board of Directors has been extremely rewarding and most interesting. This organization is an active place for water resource professionals to meet, discuss, learn, innovate and create the formulas for a sustained future and it starts at the local level with AWRA-WA!

The blend of academics, government (federal, state, local), private industry, agriculture/forestry and other elements of water resource management makes AWRA a uniquely positioned organization to truly make a difference. Thank you for your membership in our association and your commitment to wise water resource management. If you have questions or would like more information about involvement at the national level, I can be reached at +1 (360) 265-1340.

AWRA Speed Networking: Worth It

By Andrea Watson, Washington Department of Health

So you've graduated – maybe even with an advanced degree – and the job hunt has begun in earnest. But applying to jobs you find online is starting to seem like throwing time and energy down a virtual black hole. Frustration is setting in, money is tight, and you're wondering how you're credentials will ever make it past an HR gatekeeper.

We've all been there. This situation is painfully close to where I found myself after graduate school. Knowing I wasn't getting anywhere with the online search and apply approach, I challenged myself to attend at least one environmental professional networking event per month in the hopes of making some real world connections and getting my materials directly to hiring managers. I figured the worst case scenario was that I would improve my small talk skills.

I was on the AWRA email list and was notified of an upcoming AWRA UW Student Chapter speed networking event. Despite my non-student status I decided to attend, and, long story cut dramatically short, I met my current manager.

I realize I've been lucky, but I encourage students, job seekers, and future job seekers (so yeah, pretty much everyone) to attend AWRA's networking events. The atmosphere is great, the opportunities are there, and you can always brush up on your small talk!

Water Banking in the Little Spokane Watershed, Washington

By Carl Einberger, Aspect Consulting and Mike Hermanson, Spokane County Utilities

There are significant uncertainties regarding current and future water availability in many areas of Washington State, including the Little Spokane Watershed (WRIA 55). To be proactive in addressing these uncertainties, Spokane County (the County) is planning to develop a regional water bank to address existing and potential future regulatory constraints on water use in WRIA 55. Ecology is not issuing new water rights in WRIA 55 under current regulatory conditions.

A water bank is a mechanism that facilitates transfer of water rights between sellers and buyers, or that reallocates water made available through infrastructure projects (e.g. conservation, storage). The source water right that is "banked" is typically held in the State's Trust Water Right Program and protected from relinquishment, until its diversion/withdrawal authority is formally conveyed to the buyer. Currently, approximately 30 public, quasi-public, and private water banks are in operation or being studied in Washington.

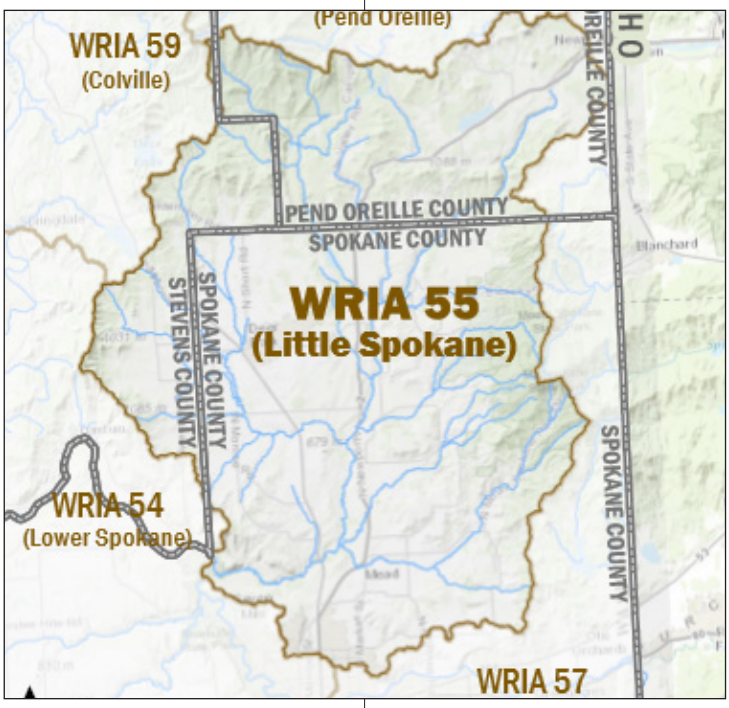


Figure 1: WRIA 55 and surrounding environs

As part of this process, the County convened a Policy Advisory Group (PAG) with members from the counties, water purveyors, the Kalispel Tribe, and Ecology to support interagency and stakeholder coordination and evaluation of water banking in the watershed. Aspect Consulting, along with Jonathan Yoder of Washington State University, Cascadia Law Group, and Carlstad Consulting, were engaged by the County to conduct a feasibility study on water banking and to facilitate PAG meetings. The recently completed feasibility study has yielded a number of themes critical to evaluating the path forward for water banking in WRIA 55. These themes include understanding the legal, regulatory, and policy framework; evaluating potential demand; understanding the economic environment; developing bank seeding approaches; and constructing an implementation plan.

Understanding the Legal, Regulatory, and Policy Framework

There are numerous legal, regulatory, and policy framework issues that provide incentives to the Counties to be proactive in developing water banking in the Little Spokane Watershed. For example the Little Spokane River instream flow rule (WAC 173-555; the "Rule") does not address groundwater and contains ambiguous exemptions for domestic use. This means that water is frequently unavailable to meet adopted instream flows in WRIA 55 and existing surface water users with water rights junior to the Rule are routinely curtailed by Ecology.

Groundwater right holders and exempt well users have not historically been curtailed, but could be in the future based on Ecology's and the Court's evolving interpretation of the law, the Rule, and standards for protection of existing water rights. Case law on groundwater exempt use, impairment of instream flows, conjunctive management of surface and groundwater, county building permit and Growth Management Act (GMA) responsibilities, and over-riding considerations of the public interest (OCPI) standards continue to be clarified by the court system. There is a corresponding trend towards increasing County and Ecology co-management of future curtailment risks and the associated impacts on property values, on the ability to develop property, and on property transactions when instream flows are not met.

Developments served by permit-exempt wells are constrained by the Department of Ecology v. Campbell & Gwinn Decision, which limits a development project to one permit exemption, which could affect existing and future subdivisions in WRIA 55.

In other Washington basins (e.g., Kittitas, Skagit, Yakima), regulatory uncertainty over legal water availability has created economic conditions that are politically challenging for counties. WRIA 55 may face these same challenges in the future. Specific examples include the following:

- In 2001, junior surface water users in the Yakima Basin, including 1,000 cabin owners and the City of Roslyn, were ordered by Superior court to curtail water use.
- In 2006, new groundwater use was restricted in the Upper Kittitas basin.
- In 2013, a Washington State Supreme Court Decision (Swinomish Indian Tribal Community v. Ecology) invalidated a portion of an instream flow rule that allowed exempt well development in Skagit and Snohomish Counties.

As a result of all these actions property values dropped, refinancing loans were deferred, cabin sales slowed, and properties were devalued.

Continued on Page 4: Spokane

Conference Review: Hydrologic Impacts of Climate Change

By Terry Smith, AWRA-WA Board Member

The first session of the AWRA-WA State confered featured Julie Vano of the Oregon Climate Change Research Institution, Oregon State University, and Matt Bachmann, Hydrologist, United States Geological Survey Washington Water Science Center.

Ms. Vano, a former student-recipient of AWRA-WA fellowship and postdoctoral fellow at the college of Earth, Ocean and Atmospheric Sciences at Oregon State University, gave a presentation on "A User's Guide to Climate Change Information for Water Resources Planning." She presented ways in which global climate models can by used to address local-scale climate impacts, including projections of future streamflow. These models use a combination climate and land structure information.

Ms. Vano emphasized the importance of using historical data as well as future simulations, and not relying on one model. As an example, ehe used the Yakima River Basin as an example of how to use specific information for streamflow estimates in 2050. Ms. Vano advocated a need to better quantify uncertainty, and the need to develop new ways to connect scientists, water managers, and decision makers.

She also emphasized the need to work on including climate change alongside other influential changes, and to improve the ability to monitor current changes, citing the UW Drought Monitoring System for the Pacific Northwest as one example of important monitoring reports.

Matt Bachmann gave the presentation "A Look at the Future: Climate Change and Anticipated Impacts on the Hydrologic Cycle in the Pacific Northwest". Based on anticipated climate impacts rising temperatures will increase evapotranspiration and thus significantly reduce the amount of water recharging our shallow aquifers.

The USGS groundwater models suggest that this effect will cause groundwater depletions under future climate scenarios, even in cases where we get the the same amount of total rainfall. Groundwater impacts from drought are somewhat delayed compared to surface water impacts but they are just as real.

Water users who try to use groundwater pumping as a mitigation strategy for water scarcity during drought years are only postponing the impacts of those withdrawals. That might work out well if the drought turns out to be short-lived and the impacts of that missing water don't show up until a wet year when that water won't be missed, but under projections for future Pacific Northwest climate scenarios these kinds of droughts might not be so short-lived.

Groundwater and glaciers would only be capable of supplying sufficient water for two to three years in drought time. More of Mr. Bachmann's presentation, with some informative graphics and reference to specific projects, will be available on the AWRA-WA website.

Page 3: Spokane *Evaluating Potential Water Demand*

A major component of assessing the feasibility of establishing a water bank in WRIA 55 is understanding the magnitude and characteristics of the potential existing and future demand for water. Demands include:

- Future rural residential development in WRIA 55, which is forecasted to increase by approximately 3,000 acre-feet per year by 2040.
- Surface water rights, issued after the Rule was adopted, which contain instream flow provisions totaling approximately 800 acre-feet per year of water.
- Pending water right applications that have been on hold since 1987, with an annual quantity of about 4,000 to 5,000 acre-feet per year.
- Groundwater rights and current exempt uses that are junior to the Rule if Ecology or Court determinations create a new regulatory framework.

Understanding Economic Considerations

The WRIA 55 water bank feasibility study evaluated a range of benchmarks for price and market activity outcomes, based on whether water banks are nonprofit (public) or for-profit, and whether a regulatory imperative (e.g., Ecology enforcement or future changes in county land use decisions based on legal interpretations of water availability) is implemented for mitigation requirements.

Data on water pricing from Spokane, Pend Oreille, and Stevens Counties and from statewide transactions were considered. The analysis focused on residential costs assuming a single family home with 500 square feet of lawn irrigation. The analysis suggested that water bank transaction costs could range from less than 1% of the improved value of a home for a publically run water bank without a regulatory imperative, to 10% or more for a privately run water bank under a regulatory imperative.

Developing Water Bank Seeding Options

The establishment of a water bank requires the input of some form of credit (seeding) for water use resulting from an action that adds to the overall stream flow of the basin. Potential seeding sources in WRIA 55 include:

- **Pre-Rule Irrigation Water Rights.** As part of the feasibility study, a screening-level analysis of selected water rights and claims predating the Rule for potential bank seeding was conducted, as these water rights are not subject to the instream flow requirements of the Rule. As such they are not interruptible. Some of these water rights could ultimately provide bank seeding.
- **Surface Storage.** Storage projects could contribute to water bank seeding and instream flow mitigation through passive surface aquifer recharge (SAR) or more active aquifer storage and recovery (ASR). The WRIA 55 Watershed Plan evaluated the construction of new infiltration galleries and restoration of existing natural wetland sites for the purposes of augmenting groundwater and increasing storage.
- **Pend**

Continued on Page 11: Storage

Conference Review: Climate Change Economic Considerations

By Terry Smith, AWRA-WA Board Member

The third session of the AWRA-WA 2015 State Conference featured Terese Richmond a partner at Van Ness Feldman, LLP, and Dr. Gretchen Geene, an Environmental Economist at Ramboll Environ.

Terese Richmond presented "Factoring the Costs of Climate Change into Decision-Making". She presented a risk management pathway that an entity, such as a water district, could use to manage risk and uncertainty while staying within its budget and ability to explore opportunities. She began by noting that the Third National Climate assessment found that the pace and extent of adaptation activities are not proportional to the risks to people, property, infrastructure and ecosystems from climate change and that important opportunities available during the normal course of planning and management of resources are being overlooked.

The pathway is a step-by-step approach to systematically address risk. The pathway has 5 steps: 1) risk identification, using assessments, audits and a risk assessment matrix; 2) risk elimination, including mitigation, which in a larger setting includes carbon emission reduction, and can be addressed by alternative energy use; 3) risk reduction, which adaptive actions such as elevating structures, bridges and buildings, utilizing green roofs, and water recycling; 4) insurance protection; and 5) investment opportunities in green bonds.

Dr. Gretchen Greene presented "Climate Change and Water Management: Fear of Uncertainty". There are known pressures on the resource base – population and economic growth, and increased demand for water and agricultural products. The challenge to water management is the combination of climate uncertainty with the anticipated demand for water resources, while also balancing economic and environmental stresses. Reliability will reduce the stress and well managed adaptive approaches will increase reliability.

Uncertainty in demand and uncertainty in supply call for strategies to increase reliability, such as addressing technical feasibility, cost and social acceptance. Steps for handling uncertainty include

1. Developing multiple scenarios with different assumptions for underlying factors;
2. Comparing past projections to actual data and to reduce uncertainty based matching previous patterns and
3. Assess historic variability for particular factor as a means of quantifying uncertainty.

However, non-stationarity complicates the use of old uncertainty tools (Stationarity is the idea that natural systems fluctuate within an unchanging envelope of variability). Incorporating economics into climate change adaptation management will allow decisions to be made in light of uncertainty of potential outcomes.

Thanks to Our Basin Sponsors!

Conference Review: Streams, Fish, and Climate Change

By Erin Thatcher, AWRA-WA Board Member

In Sesison 5 of the AWRA-WA State Conference Tim Beechie from NOAA Fisheries reviewed the current understanding of salmon vulnerability and resilience to climate change. Dr. Beechie is the author of recent and in-progress research exploring how to tailor salmon habitat restoration projects to climate change projections. Climate vulnerability varies by species and by location. Current research has demonstrated how vulnerability is higher for species with longer freshwater residency and where temperature and flow changes are large. Dr. Beechie shared results of recent research that shows steelhead vulnerability to flow changes from climate change to be highest in mid-range elevations. This conclusion is based on the expected exposure to flow changes due to their life cycle, and their sensitivity to current stressors. Existing stressors like habitat loss and flow regime changes from development can reduce a salmon population's ability to adapt to the new stressors from climate change.

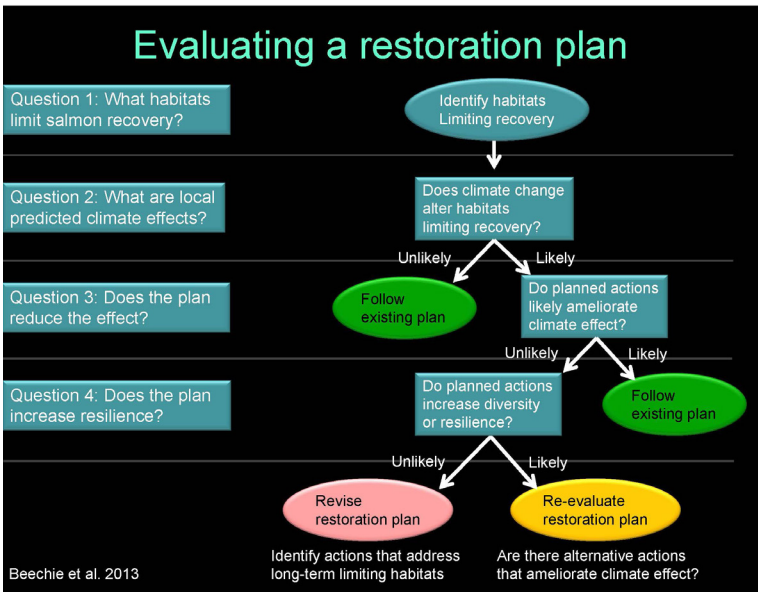


Figure 1: Evaluating proposed restoration plans

This begs the question: what implications does this have for salmon habitat restoration plans? Finding the answer involves evaluating each plan against its capacity to ameliorate climate change effects or enhance salmon's resilience to the anticipated climate change stressors, and establishing design criteria that align with future projected conditions.

Aja K. DeCoteau from the Columbia River Inter-Tribal Fish Commission gave an update on the CRITFC's restoration plan for Columbia River salmon, known as Wy-Kan-Ush-Mi Wa-Kish-Wit, or Spirit of the Salmon. The plan has goals to address climate change as well as protecting and restoring fish runs, the latter having received most of the attention to-date. The CRITFC recognizes that climate change threatens the First Nation food resources, culture, and treaty rights for four tribal populations that depend on salmon: the Nez Perce, Umatilla, Yakama, and Warm Springs tribes. Ms. DeCoteau described CRITFC's collaboration with numerous climate groups, including the National Fish, Wildlife and Plants Climate Adaptation Strategy, and the Climate Change Journal.

CRITFC has also addressed climate impacts on other species such as Pacific lamprey, which have received far less attention than salmon thus far. Ms. DeCoteau also pointed to fish passage as a critical climate change factor: the coolest habitat with the most protection from climate change stressors is often blocked by barriers like dams and culverts. The Tribes have done, and continue to do, essential work to protect the salmon ecosystem from climate change.

Scott Nicolai of the Yakama Nation shared a great collection of photos that tell the story of his recent wood replenishment projects, and described several successful ones putting generous amounts of wood harvested from adjacent uplands into stream and river channels. Mr. Nicolai encouraged woody debris restoration projects to "Load it up! Don't be shy!" to reconnect the floodplain, which spreads the water out, slows it down, and thus helps protect downstream infrastructure from floods. Before and after photos showed dense native riparian plant growth where before restoration there had been dry grass – achieved by the river, without any human planting labor.

Unlike engineered log jams and woody debris structures, these wood pieces are expected to move during high flows, creating channel complexity that benefits fish. He shared several specific guidelines for wood replenishment projects, and gave an example showing how to target the best locations for wood placement. He made the case that this is an important tool in our toolbox as humans, fish, and wildlife that depend on healthy river ecosystems, adapt

Continued on Page 11: Fish

Thanks to Our Media Sponsor

October Dinner Meeting Review: Icicle Creek Work Group

By Shobuz Ikbal, Optima Project Management

At AWRA-WA's monthly dinner meeting on October 7, 2015, Mike Kaputa, Director of Chelan County Dept. of Natural Resources, presented the action plan of the Icicle Creek Work Group and the management plan for the water basin.

Background

Icicle Creek is a major tributary to the Wenatchee River in Chelan County, WA (Figure 1). The Icicle Creek watershed encompasses an area of approximately 212 square miles most of which is undeveloped and resides in the Alpine Lakes Wilderness and the Wenatchee National Forest. Flows from Icicle Creek support a range of demands including both instream and out of stream uses that affect a diverse set of stakeholders.

Icicle Creek Work Group (IWG) was convened in December 2012 by the initiatives from Washington Dept. of Ecology and Chelan County with the stated vision of "find collaborative solutions for water management within the Icicle Creek drainage to provide a suite of balanced benefits for existing and new domestic and agricultural uses, non-consumptive uses, fish, wildlife, and habitat while protecting treaty and non-treaty fishing interests." The IWG is made up of a diverse set of stakeholders representing local, state, and federal agencies; Tribes; irrigation and agricultural interests; and environmental organizations.

The nine Guiding Principles related to implementation of water resource projects within the Icicle Basin adopted by the IWG include: 1) broad benefits to streamflow; 2) promotion of sustainable hatchery system; 3) fulfillment of Tribal treaties; 4) improvement to municipal and domestic supplies; 5) improvement to agricultural reliability; 6) protection of aquatic and terrestrial habitat; 7) legal compliance; 8) protection of non-treaty harvest; and 9) compliance with wilderness acts and management plans.

The IWG is developing a comprehensive list of projects that address Icicle Creek issues and concerns identified in their Guiding Principles. Some of the significant projects and initiatives were discussed at the presentation including:

Conservation

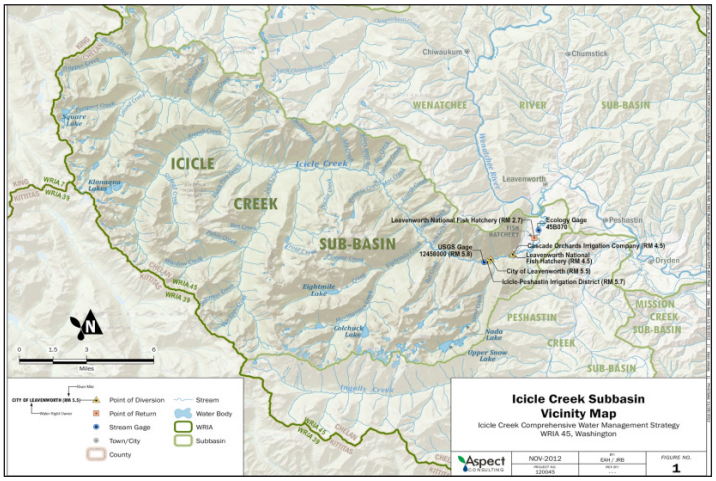


Figure 1: Icicle Creek Sub-Basin

Conservation efforts are being undertaken by three major diverters of Icicle Creek water: Icicle-Peshastin Irrigation District (IPID), Cascade Orchards Irrigation Company (COIC), and City of Leavenworth. These conservation projects will have a direct instream flow benefit on Icicle Creek. A significant portion of the water diverted from Icicle Creek is exported from the sub-basin, so any conservation from out-of-basin infrastructure would materially improve Icicle Creek's instream flows. Of these three, COIC provides one of the best opportunities with pipeline upgrades. On the other hand while use in Leavenworth has declined and conservation efforts will revolve around upgrading channels into pipe conveyance systems, which have only limited opportunities.

Reuse

This project will ***Continued on Page 11: Icicle***

AWRA-WA Section Annual Meeting

The AWRA Washington Section will convene its annual meeting and conduct elections for the 2016 Board of Directors at the **December 8, 2015 Chapter Meeting** in to be held at Naked City Brewery and Taphouse in Seattle.

The Board of Directors consists of up to fifteen directors, plus the past president. All members are welcome to attend the annual meeting and to nominate other candidates via a write-in form available at the meeting.

Board members are expected to actively participate and support the following activities:

- Attending monthly board meetings
- Refining section policies
- Running dinner meetings
- Organizing the annual conference
- Securing articles for newsletters
- Supporting the student chapter and establishing new student chapters

The 2015 Board of Directors Presents The Following Candidates for the 2016 Board

- Rabia Ahmed
- Eric Buer
- Tyson D. Carlson
- Shobuz Ikbal
- Scott Kindred
- Felix Kristanovich
- Allison MacEwan
- Jason D. McCormick
- Stan Miller
- Steve Nelson
- Tom Ring
- Jennifer Saltonstall
- Terry Smith
- Erin Thatcher
- Stephen D. Thomas

Board candidate biographies are presented on pages 8 through 10 for review by the membership.

Board of Directors 2015 Candidates

Rabia Ahmed

Rabia Ahmed is an economist currently working with Ramboll Environ U.S. Corporation in Seattle, and is a Board Member of the AWRA-Washington Section. She has over 13 years of experience in water and natural resource economics, policy and regulatory economics, litigation support, and international development. Prior to joining Ramboll Environ in 2011, she worked with Cardno ENTRIX in Portland, Oregon for about five years. Rabia's primary expertise in the water sector includes studying water laws and water markets, assessing and valuing surface and groundwater rights in that context, conducting assessment of water rights, carrying out water supply security analyses, supporting the water rights applications process, and conducting cost-benefit analyses of water projects. She lives in Lynnwood, Washington, with her husband, two children, and a beautiful cockatoo. In her spare time, she likes hiking and sailing with her family.

Eric Buer

Eric is a geologist at Farallon Consulting and a licensed geologist and hydrogeologist in Washington State. He has been working in private consulting since 2006. After graduating with a M.S. in Geology from the University of Washington Eric began his professional career in underground construction before moving over to environmental consulting in 2008. He has worked on a wide variety of projects performing groundwater characterization work, fluvial geomorphologic assessments, environmental monitoring, and contaminated site assessments and remediation. When he's not crunching groundwater data or performing sediment bedload transport analysis he enjoys skiing in the Cascades and following the winter snowpack into the many excellent rivers of Washington State in his whitewater kayak.

Tyson Carlson

Tyson is an Associate Hydrogeologist with Aspect Consulting with 16 years of experience specializing in water resource development and water rights. Serving private and public sector clients, Tyson has a BS in Soil, Water, and Environmental Science and a MS in Hydrology from The University of Arizona. Tyson's water rights experience includes both new appropriations and transfer/change of existing rights, including use of the State's Trust Water Right Program for purposes of instream flow, habitat, and mitigation through water banking. Tyson has a strong background in analytical and numerical groundwater modeling and larger scale hydrogeologic characterization. These skills are also used in Tyson's work on well hydraulics, aquifer sustainability, saline intrusion, determining regional tunnel alignments, and other work. Outside of the office, he can be found skiing the deepest of Cascade powder, on his bike, or fly fishing his favorite waters.

Shobuz Ikbal

Shobuz Ikbal has over 25 years of experience as a civil engineer and public works manager in the US and overseas. Before founding Optima Project Management, a engineering consulting firm, he was the City Engineer for Redwood City in California. His international work experiences include managing large civil infrastructure projects in Asia, such as reconstruction of Kabul, Afghanistan and Banda Aceh, Indonesia. He has also worked with City of Los Angeles and City of Seattle for more than 18 years where he managed their stormwater, wastewater and transportation programs. Shobuz received his BSc in Civil Engineering from UC Irvine and a Masters in Civil Engineering from Cal State University, Los Angeles. He is a registered PE in Washington and California and a certified PMP.

Scott Kindred

Scott is the founder of Kindred Hydro Inc. and a hydrogeologist with 20 plus years of consulting experience. His practice is focused on stormwater infiltration, basin-wide infiltration feasibility assessment, and evaluating the groundwater impacts associated with stormwater management practices. Scott has worked in environmental site assessment and remediation, landfill design and monitoring, water supply and water rights, groundwater modeling, and provided expert witness services. His clients have included numerous cities and counties, industrial and mining facilities, private and public developers, nuclear facilities, PRP groups, and military installations. Scott has a Bachelor's degree in geology from Brown Univ. and a Master's degree in civil engineering from MIT. He is a registered P.E. in Washington State. Scott is currently working on climbing the 100 highest peaks in Washington State and making good progress on the list.

Board of Directors 2015 Candidates

Felix Kristanovich
Felix is a senior water resources engineer with Ramboll-Environ in Seattle, Washington. He currently serves as the Ramboll North America Water Network Representative for Climate Adaptation and Flood Risk Management. He has 26 years of professional experience in the United States and overseas working on watershed analysis, streamflow restoration projects, water quality monitoring programs, environmental impact studies, hydrologic field investigations, floodplain analysis, and design and modeling of storm water systems. Felix has conducted evaluations for industrial clients, banks, international development agencies, and federal agencies. Felix has been actively involved in AWRA, organizing the National AWRA Conferences in 2005, 2009, and 2013. Felix enjoys backpacking, hiking, telemark skiing and outdoor photography, and sea kayaking with his wife around Puget Sound and in Alaska.

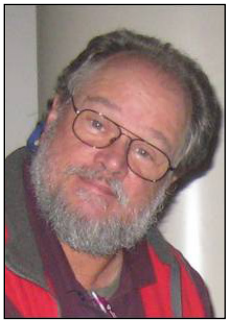
Allison MacEwan
Allison has 30 years of professional experience in water resources, working throughout the Pacific Northwest and across the United States on watershed planning and management, ecosystem restoration design, flood risk management, infrastructure design, water rights, and water supply. She is a registered Professional Engineer in Washington, and a Certified Floodplain Manager. Allison holds a BA in Engineering Science from Dartmouth College and a MSE in Civil and Environmental Engineering from the University of Washington. Allison can be heard playing percussion with the Rumble Strips, a world rhythm dance band based on Vashon Island. She also enjoys hiking, river rafting, and exploring the Pacific Northwest.

Jason D. McCormick
Jason D. McCormick is the founder of McCormick Water Strategies (MWS) with ten years of water resources experience. Jason is recognized regionally as a water rights and water transactional expert. In 2015, Jason formed MWS after working in the private, public, and non-profit water resources sectors. His experience includes six years at Washington Water Trust (WWT) in Central Washington; specializing in water transactions, trust water, mitigation banking, representing conservation buyers, geospatial water rights evaluation, permitting, and water rights instruction. Prior to WWT, Jason worked as a permit writer for the Washington State Department of Ecology, Office of Columbia River. From his experience in the private sector, WWT, and OCR, he excels at water rights permitting, water transactions, water rights evaluations, water resources problem solving, and water rights instruction.

Stan Miller
Stan is semi-retired, and currently consulting as Inland Northwest Water Resources. Prior to venturing into retirement, Stan held the position of Program Manager for Spokane County's Water Resources Section in the County Public Works Department for over 20 years. The prime focus of Water Resources is the regional aquifer protection program. As Program Manager he worked toward integrating the groundwater protection efforts of all municipalities and water purveyors using the Spokane Valley-Rathdrum Prairie Aquifer. Stan has developed technical information and conducted local studies on the potential impacts of storm water infiltration on ground water quality, and the hyporheic interactions between surface and groundwater. Stan is a long-time member of the AWRA Board and a past-president of the Chapter. Away from work, Stan enjoys canoeing, backpacking, running, and restoring a turn-of-the-century home.

Steve Nelson
Steve is a hydrogeologist and engineering geologist at RH2 Engineering, Inc., and holds licenses in Washington and Oregon. Steve has 26 years of experience involving water resource assessment, development, management, remediation, and protection. His project experience includes characterization of groundwater systems for groundwater supply; water reuse; water rights evaluation; aquifer testing; and modeling of groundwater flow, contaminant fate and transport. Steve evaluates geologic, groundwater and geohazard conditions for siting, design, and construction of water resource infrastructure; and supports design and operation of stormwater infiltration and construction dewatering systems. Steve earned Bachelors and Masters of Science degrees in Geology at Cal State Long Beach and Univ. of Arizona. Depending on the season, find Steve trail running, skiing, climbing in the Cascades or Sierra, and/or fly fishing.

Board of Directors 2015 Candidates

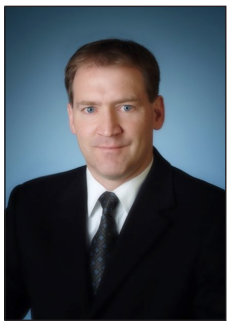


Tom Ring
Tom is a hydrogeologist with the Water Resources Program of the Yakama Nation. He has held this position since 1990 and, in that role, has worked on a variety of projects involving groundwater and surface water quantity and quality, water rights, irrigation and fisheries issues and planning for future water needs. Previously he worked for the Water Resources Program at the Washington Department of Ecology. Tom has Bachelors and Masters of Science degrees in geology from Central Washington Univ. and Northern Arizona Univ. respectively. He has taught geology and hydrogeology classes at Central Washington Univ. and is a licensed geologist and hydrogeologist in Washington State. When not working, he enjoys hiking, climbing, and skiing in the mountains of the west.

Jenny Saltonstall
Jenny is hydrogeologist at Associated Earth Sciences, Inc. with 17 years experience in hydrogeology, geology, and geologic hazards assessments for both private and public sector clients. She has expertise in geologic mapping of complex stratigraphy; sustainability through storm water infiltration; developing conceptual ground water flow models; surface water – ground water studies; aquifer recharge; and ground water monitoring programs. She is a regular contributor at technical conferences and has been an invited speaker on infiltration components for green storm water management seminars. She received her bachelor's degree at Pacific Lutheran Univ. in Geosciences and is a licensed Geologist and Hydrogeologist in Washington State. Jenny enjoys spending time with family doing all things outdoors, keeping up with her kids and growing vegetables the kids will eat.

Terry Smith
Terry Smith is a licensed and retired attorney with a background in environmental law. she has worked for King County's Wastewater Treatment Division for twelve years, where she was responsible for permit applications and negotiations with federal and state regulatory agencies. She is also well versed in in water quality regulations and legislation. Prior to working with the County, Terry worked in private practice representing clients as both plaintiffs and defendants on environmental issues. Working in both the private and public sectors has given her insight into the needs and issues of regulators, businesses, and the public. She recently became interested in water rights laws and issues as well as the importance of water use, along with water quality, to the future of the state and the country.

Erin Thacher
Erin is a water resources engineer with 9 years of experience working with CH2M HILL. She has a B.S. in Environmental Science from Seattle Univ. and M.S. in Environmental Engineering from the Univ. of Washington. Erin started her career as a staff biologist and transitioned into civil engineering over the last few years at CH2M HILL while earning her M.S. as a part-time grad student. She works on a wide variety of projects, including stormwater planning, drainage design, water quality studies, NPDES and other permit compliance, wetland delineations, and habitat restoration. Her key skills include low-impact development feasibility assessments, ArcGIS spatial analysis, outfall dilution modeling, and wetland assessments. She also enjoys technical writing. In her spare time Erin enjoys hiking or snowshoeing with her dog, attempting to garden, playing the piano and guitar, watching the Seattle Seahawks game, and country line dancing.



Stephen D. Thomas
Stephen is a hydrogeologist in the Seattle office of Shannon & Wilson, Inc., where he manages the firm's groundwater group. He has 23 years experience in the areas of geologic and water resources. He manages and performs technical aspects of hydrogeological investigations for groundwater resources development, wellhead protection and groundwater management, groundwater contamination and waste disposal, dewatering, mining and environmental projects. A native of the United Kingdom, Stephen moved to Seattle in 2001, having previously lived in Los Angeles since 1992. He holds a BSc in Geology from the Univ. of Cardiff and a MSc in Hydrogeology from the Univ. of Birmingham, and is a licensed hydrogeologist in the states of Washington and California. Stephen enjoys many outdoors activities, particularly rugby, football, cyclingm and open-water swimming, and annoying his neighbors with his guitar playing.

Page 4: Storage

Oreille River Interbasin Transfer. Water from the Pend Oreille River could be diverted into the upper headwaters of the Little Spokane River, near the town of Newport. A review of water rights decisions and Ecology regulation of the mainstem of the Pend Oreille River indicates that water is potentially available during much of the year.

- **Habitat Restoration.** Restoration of instream and near channel habitat, and fish migration barriers consistent with scientific and resource agency guidance on the sustainability of critical fish species in the Little Spokane Basin could provide out-of-kind mitigation credits for bank seeding; however, statewide uncertainty and pending litigation regarding use of out-of-kind mitigation may constrain bank seeding.

Figure 2: Snow Lake after the parching summer of 2015.

Construct an Implementation Plan

A general consensus was reached among the PAG to develop a publically run bank management model, as opposed to private, state, or NGO-led management structure. Management of the bank could occur through the use of Watershed Management Partnerships, a board of joint control, and other cooperative means to coordinate water bank management. It is envisioned that a centralized water bank accounting system would be incorporated, while water bank applicants would work through the individual county planning and building departments to obtain mitigation certificates as part of other associated building permits.

An Implementation Plan has been developed for continued water bank development. Tasks incorporated into the Implementation Plan include Stakeholder Collaboration, Public Outreach, Water Bank Operational Structure Design, Water Right Acquisition Outreach, Pend Oreille Watershed Source Investigations, and Water Right Procurement. As part of setting up the water bank, plans also call for improvement of instream flows and habitat in the watershed in addition to bank seeding needs.

Conclusion: Water Banking is a Viable Regional Water Management Tool

The feasibility study concluded that water banking is a viable option for WRIA 55. Spokane County would like to continue with water bank development for WRIA 55, pending securing ongoing funding mechanisms to initiate the water bank. The proactive approach the County and other stakeholders are taking is intended to prepare for and mitigate sudden changes in the regulatory environment that may occur, as illustrated by the exempt well moratorium in portions of the Skagit River Basin.

Page 7: Icicle

include a pilot evaluation of reuse at Leavenworth National Fish Hatchery (LNFH) that may utilize up to 20 cfs. This will enable the operator of the hatchery to capture and pump "run-through" water from an effluent pipe at the LNFH back into the Hatchery Channel to improve water supply. Such reuse has been successful at other area hatcheries.

Groundwater Augmentation

The LNFH groundwater augmentation project will expand groundwater supplies at LNFH by over 7 cfs. Geophysical testing was completed in 2014 to confirm availability of the groundwater. A test well has been proposed for installation in early 2016 with production wells to follow. The estimated cost of this project is $2- $5 million.

Storage

An appraisal study was completed earlier this year to determine whether optimizing and automating water storage at the seven Alpine Lakes, managed by IPID and the U.S. Fish and Wildlife Service (USFWS), can meet the Guiding Principles. IPID manages Square Lake, Upper and Lower Klonaqua Lakes, Colchuck Lake, and Eightmile Lake. USFWS manages Upper and Lower Snow Lakes, and Nada Lake. Flows released from Snow Lakes and Nada Lake supply water to LNFH and allow the USFWS to meet instream flow obligations.

These seven lakes, collectively referred to as the Alpine Lakes, each have a small dam and low-level outlet that can be regulated to meet IPID and LNFH diversion needs on Icicle Creek. The Alpine Lakes have a combined estimated usable storage capacity of 20,015 acre-feet. That total usable storage volume is not typically released during a given year due to the difficulty of accessing the more remote lakes and due to the reliability of recharge in the Upper and Lower Snow Lakes Basin. Presently, these lakes are managed in a way that provides the highest level of certainty for drought protection for IPID and LNFH interests. A governing premise of this project is that there is a high degree of certainty that IPID's needs for release from the lakes will be met in drought years.

Next Steps

Future IWG work will include scoping for SEPA and NEPA, initiating feasibility studies, and seeking public consensus on the proposed project list.

Page 6: Fish

to climate change. Even better, these types of wood replenishment projects have been accomplished using simple tools (such as a griphoist), the invaluable Washington Conservation Corps, and wood found within walking distance of the stream.

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