



PRESIDENT'S NOTES:

Jason McCormick, McCormick Water Strategies AWRA-WA Section President

Since the last newsletter, your local AWRA-WA Chapter has been very busy on both sides of the Cascades. We hosted the annual conference in Seattle, WA and supported the AWRA-CWU Student Chapter by hosting a water resources project tour in Kittitas County. Additionally, we hosted a networking event for students and young professionals at the University of Washington, nominated two new board members to be considered for the election slate, and held a dinner meeting in Seattle.

On October 16th, the 2018 AWRA-WA Annual Conference "Hirst, Foster, Boldt, and Beyond: A New Era of Water Management?" was held at The Mountaineers in Seattle, WA (pages 2-8). It was a tremendous success thanks to all of you! 172 attendees listened to 18 engaging speakers, whose thought-provoking presentations generated insightful discussions amongst the audience. In addition, we proudly granted the 2018 Outstanding Professional Service Award to Guy Gregory. We are very grateful to Guy for his years of dedication to hydrogeology and the water resources profession.

On November 10th, AWRA-WA Board Member Tom Ring and AWRA-CWU Student Chapter President, Brandon Kautzman led a tour of water resources projects in the Kittitas County area (page 14). Attendees included students, professionals, and a CWU Geology professor. In total, we viewed three projects, those being a Taneum Creek diversion dam removal project, the Lake Cle Elum Fish Passage project, and a floodplain restoration project in the Teanaway River basin.

November is the time of year for Board Elections. We have nominated Jessica Kuchan of Mentor Law Group and Jenna Mandell-Rice of Van Ness Feldman to our 2019 Board election slate. Please review the election slate on pages 9-12 and remember to vote.

As a reminder, AWRA-WA's Student Fellowship award amount has been raised to \$2,500, so encourage students you know to apply (see box to the right)! AWRA-WA grants two fellowship awards annually, which are cash grant awards to supplement student research. A report from the 2018 recipient is on page 13.

Lastly, we are looking forward to our Annual Meeting and Board Election results, coming up shortly on December 19th in Seattle, WA. Hope to see you there!

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STUDENTS - BE AN AWRA-WA FELLOW!

AWRA-WA Fellowship applications are now being accepted for the 2018-19 academic year. If you are, or know of, a graduate student studying water resources, **applications are due February 15, 2019.**

Apply at:

<https://www.waawra.org/People&Awards/Fellowships>

ANNUAL AWRA-WA MEETING DEC 19th!

Join us at **Naked City Brewery (8564 Greenwood Avenue, Seattle) December 19th**, where Paul M. Craig, President of Dynamic Solutions International, will be discussing Aquatic Species Habitat Modeling at 7 pm. There will be a social hour starting at 5:30 and dinner at 6:30. Cost is \$30 for members and \$35 for non-members. Register at WAAWRA.ORG

WRITE A NEWSLETTER ARTICLE!

AWRA-WA's newsletter brings you stories from Washington's world of talented water professionals. We're always looking for news, stories and articles from our members and board, so contact greg@washingtonwatertrust.org to submit or discuss a story. The next newsletter deadline is March 31, 2019

2018 CONFERENCE PROCEEDINGS

HIRST, FOSTER, BOLDT AND BEYOND: A NEW ERA IN WATER MANAGEMENT?

Session 1 “Hirst, Foster, Boldt, and Beyond: A New Era of Water Management?”

Scribe: Jason McCormick (Editors Note: Pages 2-8 include edits and additions to the scribes’ notes.)

AWRA-WA’s 2018 Annual Conference featured an introductory session, **moderated by Adam Gravley of Van Ness Feldman LLP**, that set the day’s tone and grounded attendees in relevant and recent Washington State Water Law. Speakers in Session 1 focused on the court cases listed in the conference title, stepped through other recent water law cases, and vetted the so-called “Hirst Fix” legislation under Senate Bill (SB) 6091, now known as the Streamflow Restoration Act under Chapter 90.94 RCW.

First, **Alan Reichman, Senior Counsel, Ecology Division of the Washington State’s Attorney General’s Office**, offered many insights into recent legal cases and legislative changes. Mr. Reichman discussed the Hirst decision from the perspective of its status as a “signature case” on legal and physical water availability and protection of instream flows. In response to the Hirst decision, the Legislature passed SB 6091, creating Ecology’s Office of Streamflow Restoration, amending the State’s building and subdivision codes, and creating a new section of water code - Chapter 90.94 RCW. Mr. Reichman left attendees with the point that water law is at an interesting crossroads, “[there is] a lot of potential before us”, and that we’re at the “beginning of the adventure”.

Next, **Patrick Williams, Law Offices of M. Patrick Williams**, discussed the Hirst case and SB 6091 from experience as counsel for Sara Foster in the Foster v. Yelm, et. al. case focusing on Ecology’s application of Overriding Consideration of Public Interest (OCPI). In the Yelm case, Mr. Williams’ client prevailed and reversed the City of Yelm water right permit on the inappropriate use of OCPI. Mr. Williams points to SB 6091 to note that the term “reasonably attainable” looks a lot like the standards used for OCPI determinations. Noting that SB 6091 is a “buy now, pay later approach”, he asked attendees to consider whether tribes and the environment would foot the bill if costs and benefits are unscientific or poorly quantified.

Lastly, **Lauren King, Foster Pepper, PLLC**, explored federally reserved *Winters* and *Walton* Tribal Rights, as confirmed in their namesake court cases, and how those early cases established the foundation of tribal rights as they are today. From there, the Boldt case provided the Columbia Basin treaty tribes the ability to harvest 50% of passing fish at usual and accustomed places, as well as granted them the right to fifty percent of the salmonid harvest. Ms. King also noted that the Stevens Treaties obligated the State to provide for “food and drink...forever”. In closing, Ms. King reminded conference attendees that it is well defined that “tribal rights run deep”, and that out of stream water use shall not degrade tribal rights.

Following the session, a series of questions arose regarding SB 6091, most notably whether it allows new uses to “jump priority” (i.e., to be super senior and not interruptible). The consensus was that SB 6091 *does* allow new uses to “jump priority”, and that tribal rights are generally not quantified and factored into the legislation. We’ll see what the future holds from here.

THANK YOU 2018 WAAWRA SPONSORS!

Basin Sponsors



Watershed Sponsors



Guy Gregory Receives The 2018 “Outstanding Contribution to Washington Water Resources” Award. Photo: Tom Ring

Session 2 – Implementing ESSB 6091 in the Chehalis, Nooksack, and Little Spokane Watersheds***Scribe: Dave Christensen***

Session 2, **moderated by Carl Einberger of Aspect Consulting**, was focused on the progress in implementing the new Streamflow Restoration Act” stemming out of Senate Bill 6091, now codified as Chapter 90.94 RCW. This session included three speakers from three different WRIA processes: Kirsten Harma from the Chehalis Basin Partnership, Gary Stoyka from Whatcom County, and Mike Hermanson from Spokane County.

Kirsten Harma, Watershed Coordinator for the Chehalis Basin Partnership, presented the progress to date in the Chehalis River basin, which includes both WRIAs 22 and 23. She started with background about the watershed planning history and talked about how key this history of working collaboratively has helped build and maintain trust among members, citing a “foundation of trust among stakeholders” and efforts at “providing synergies” for a holistic plan. The watershed plan focused on water resource issues during the summer low flow period when water supplies were insufficient to meet in stream and out of stream demands, according to Ms. Harma, with the low end of the hydrograph the primary challenge facing the Chehalis going forward. In addition to the low flow issues, the Chehalis Basin experiences severe flooding as seen in the well-publicized 2007 and 2009 Chehalis floods, as well as water quality issues. Kirsten concluded by summarizing the desired outcomes, which include developing a plan that builds on past work, and represents multiple needs based on local decision-making about current and future challenges.

Gary Stoyka, Natural Resources Program Manager for Whatcom County, finished the session by providing an update for WRIA 1- The Nooksack Basin near Bellingham, WA. Gary talked about the requirements of the streamflow restoration law, and how they applied to the WRIA 1 Watershed Management Board formed for watershed planning purposes in 2016. Like the Chehalis, WRIA 1 is a “Section 202 Basin” (subject to RCW 90.94.020), which, among other things, means that they must update their watershed plan formed under 90.82 RCW to mitigate for future exempt wells through streamflow enhancement activities. Gary explained how the process works, including the relationship to other planning activities and the committees and subcommittees involved. WRIA 1 watershed management board has a complex plan approval process with many entities involved at different stages, including impacts determination, identified actions, adaptive management feedback, and connection to the “bigger water picture”. Gary talked about the challenge of meeting the statutory deadline of February 1, 2019 to adopt a watershed plan meeting the requirements for offsetting future permit-exempt uses. WRIA 1’s WMB has approached this task by breaking 20-year projected well impacts into sub-basins in a region with an anticipated growth rate of 1.6%. Gary also talked about the process for developing and evaluating 89 projects that have been identified offset the impacts from new well uses and how those projects address specific needs in each sub-basin. He finished up by talking through their detailed timeline for both early action items and planning future project tiers amidst the backdrop of needing to allocate between tribal, environmental, and agricultural uses.

Mike Hermanson, Water Resource Program Manager for Spokane County, talked about the approach being taken in WRIA 55, the Little Spokane watershed. The Little Spokane was one of the first instream flow rules adopted by Ecology in 1976, built around maintaining 80% exceedance flows in that system. The flows have fallen below this standard in 27 out of 42 years since being adopted, leading to a “hole in the hydrograph” and consequent curtailment of junior water users. The current work is updating the watershed plan with information obtained from technical studies that have been conducted over the past several years, including a water demand forecast, an integrated surface and groundwater model, and water bank feasibility study. Mike presented data on estimating consumptive and non-consumptive water use for each home using a permit exempt well, and explained how these values were used to develop the 20 year demand projection to meet the requirements under the law. They use demographic data and an econometric model to provide demand quantities targeted to specific conditions of each sub-watershed. Mike contrasted those numbers to projected impacts from climate change and also showed the current projects being developed to improve streamflow to offset the impacts from permit exempt wells on instream resources, which included both water acquisition and managed aquifer recharge projects. The project has been well received locally, and data from the model has helped water resource managers seed aquifers to target suitable areas for water use. While finding the right projects is challenging and several questions regarding permitting, land easements, and water sourcing comes into play, there is a great deal of optimism, Mike says, about aquifer recharge projects because they can replicate a natural system with a relatively low footprint.

Session 2 questions focused on how exempt well daily limits (in gallons/day) were established, how new 6091 requirements have necessitated changes to original watershed plans, and requests for more detail on how watersheds are prioritizing restoration projects. Each presenter acknowledging that new requirements and improved information would impact how projects are managed locally, and that resources for getting more detailed technical information would improve local decision-making processes.

Session 3: Net Ecological Benefits

Scribe: Elisa Dawson, Student and AWRA Volunteer from Oregon State University



Kiza Gates, Science Team Habitat Manager at Washington Department of Fish and Wildlife (WDFW), described how projects that restore flows in Washington State have served to benefit aquatic systems and species, as well as offset or mitigate impacts for new out of stream uses. With the development of the Net Ecological Benefit concept, the State is exploring new non-traditional ways to benefit aquatic systems and mitigate for impairment to in-stream flows. Traditional flow restoration and mitigation projects provide benefits to fish, wildlife, and aquatic resources that can be quantified and monitored. Non-traditional projects, which seeks benefits by creating aquatic system enhancements that may or may not put water in-stream, are more difficult to quantify and may require closer monitoring of the baseline ecological conditions. Ms. Gates discussed how WDFW has approached flow restoration and mitigation projects historically as well as the technical challenges of developing an assessment framework that can quantify non-traditional aquatic resource benefits. In the ever-changing landscape of instream flows, WDFW continues to analyze the relationship between in-stream flow and ecosystem function, including physical habitat, water quality, energy flows, salmonoid metrics, and community structure. WDFW's water science team works in places such as Manastash Creek and the Teanaway River in Kittitas County to establish how water rights acquisitions could benefit aquatic species. There is a modeling need for each unique watershed in order to assess historic information, establish metrics for change over time, and set up long term reference sites. WDFW will play an important role in assessing Net Environmental Benefits under the Streamflow Restoration Act going forward. WDFW will use their tools to evaluate ecological responses to various flow thresholds, using such metrics as physical habitat quantification, water quality and temperatures, energy flow, salmonid population dynamics, and community structure (species and functional diversity). Regional modeling effort are critical to establish baseline relationships between flow, habitat, and fish population responses.

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Phil Roni, Vice President and Principal Scientist and Kramer Fish Sciences, pointed out that \$500 million is spent each year on the west coast to restore watershed processes, habitat conditions, and recover listed salmonids, with very little actually spent on effectiveness monitoring. Restoration techniques include fish passage, in-stream structures, off-channel/floodplain habitat, riparian improvement, sediment reduction, flow augmentation, nutrient enrichment, and acquisition and protection. Most evaluations of the success of these actions have focused on changes in habitat and fish numbers, though recent efforts have attempted to quantify their effects on flow and other watershed processes. Mr. Roni discussed the physical and biological effectiveness of various restoration techniques according to their ability to mitigate for different types of habitat degradation. This includes impacts to both flow and temperature due to water withdrawal or climate change. In addition, Mr. Roni discussed different approaches for quantifying the cumulative benefits of various restoration and mitigation actions at both a reach and watershed scale. Most current knowledge on instream flow enhancement comes from studies on impacts of dams and culverts via flow alteration, and additional studies have shown promise from floodplain restoration and road removal, which reduces sediment and improves overall habitat. Other restorations actions such as riparian planting and grazing reduction have complex relationships with restoration metrics that are often only seen at larger scales and over longer periods of time. There have been very few studies on flow enhancement, which requires stream specific models, though available literature documents fish responses in some detail. There is working remaining to more clearly define the connection between existing science and quantification of "Net Environmental Benefits".



George Walter, Environmental Program Manager for the Nisqually Tribe, provided a progress report on how they are approaching streamflow restoration planning process in the Nisqually Watershed. Their challenge is providing "real" (measurable) net ecological benefit while providing water for some level of rural development and exempt single-family wells. Their effort has been to establish planning processes at the community scale that give a "sense of ownership of each other's future", with the Nisqually Tribe being the lead agency. As they seek to project future demand and certify water availability, they have taken both a "micro approach" and a "macro approach" At the micro approach, they evaluate water need on a well by well basis, which has led to demand estimates of only 350 -500 gallons/day (gpd) versus the 3,000 – 5,000 gpd thresholds suggested elsewhere. On the "macro" scale, they are focusing on larger efforts such as a water banking or mitigation banking, using larger thresholds and salmon recovery planning guidelines to inform project lists that can provide larger NEB benefits and provide wholesale improvements in instream flow. They are using a "Velma Model" to characterize how forest cover relates to streamflow. While mitigating new water uses on a case-by-case basis, they are also taking a long-term view on flow restoration. Longer-term projects including moving from shallow to deep aquifers, allowing water drawn from deeper aquifers percolate down into a shallow aquifer and enhance stream flows. They are also looking at water rights acquisitions for instream flow.

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Session 4 - Water Resources Data And Modeling: Predicting Trends & Effects Of Climate Change

Scribe: Steve Nelson

This Session, **moderated by Amanda Cronin of AMP Insights**, explored current scientific and technical understandings of potential impacts to water resources and shifting water demands because of shifting climatic baselines. Panelists came together to discuss climate modelling, predict groundwater response, and identify climate changes already affecting Washington's surface water systems.

Richard S. Dinicola, Hydrologist and Associate Director of the USGS Washington Water Science Center, focused on the potential effects of climate change and population growth on groundwater and stream low flow conditions in Washington. The USGS is producing an informed conceptual model evaluating potential impacts of both climate change and population growth on groundwater resources and stream low flows throughout the Puget Sound Regional Aquifer System. Rick compared several evaluations by USGS and other investigators, described recurrent or common themes in the predictions of change in Puget Sound stream base flow and summarized uncertainties and gaps in understanding with ideas for future investigations.

Rick noted that the groundwater systems that would be directly impacted by predicted changes in groundwater recharge and storage are those systems that receive mountain-front recharge (for example, the Sequim-Dungeness peninsula) and semi-arid basins, particularly alluvial groundwater systems that also develop on the slopes of the Cascades and within tributaries of the Columbia River. These basins are more affected by short-term and seasonal recharge-discharge relationships where limited volumes of groundwater rapidly refill groundwater storage that tends to also rapidly discharge groundwater to streams. Groundwater systems that rely on long-term recharge, such as deeper alluvial, glacial, and bedrock aquifers will not be as impacted by climate change effects. These deeper systems will experience greater change, primarily due to overdrafts, to meet growth in population and irrigation demand. Wetter winters will not necessarily lead to increased base flow, as the precipitation from more frequent or intense storm systems likely will result in a higher percentage of the precipitation running off into streams rather than infiltrate as recharge.

The USGS is compiling recent data to estimate water budgets for many Puget Sound basin streams and will use predictions of climate change precipitation scenarios and population growth estimates for the year 2040 to estimate the potential changes in stream flow. Results are expected in late 2019.

Nick Bond, Principal Research Scientist with the Joint Institute for the Study of the Atmosphere and Ocean (JISAO) of the University of Washington (UW), delivered a presentation titled, “Climate Change and its Impacts on Water Resources and Extreme Events in Washington State”. This presentation reviewed the latest information on the regional manifestations of climate change in the Pacific Northwest, particularly precipitation, snowpack and stream flows patterns. The presentation also addressed frequency and intensity of extreme events (e.g. floods and drought). Nick summarized a key conclusion of the climate change predictions that result from atmospheric warming trends and shift in precipitation patterns: the annual hydrograph of precipitation frequency and intensity likely will shift and compress, so that winters will be wetter, precipitation events greater in intensity, and summers will be drier. Basins that tend to catch and store part of their seasonal precipitation as snowfall will likely receive more rain, increasing earlier-season runoff out of the basin. Basins that catch and store much of their precipitation as snowfall will store less snow and instead release more runoff in the fall and less in the summer. The change in the character in the hydrograph will significantly affect the watershed conditions, notably, the timing, temperature and



Session 4 Panelists discuss interrelationship between stream flows and climate change. Photo: Tom Ring

quality of fall and spring runoff that affect habitat and salmonid migration, the availability and temperature of late summer base flow, and the potential for invasive species development in destabilized habitats.

Jennifer Johnson, Hydrologic Engineer with the Bureau of Reclamation in the Pacific Northwest Region's River and Reservoir Operations group (“Potential Climate Impacts on Columbia River Basin Hydrology - Results from RMJOC [River Management Joint Operating Committee]-II Study”) summarized the recent completion of the second phase of a basin-wide climate change assessment. The five-year study evaluated the most recent output from the Global Climate Models (CMIP [Coupled Model Inter-comparison Project]-5) and looked to address a wide range of questions related to the computational methodologies that arose in the previous study.

The first phase of the study was the first large-scale evaluation of future hydrology of the Columbia Basin (<https://www.usbr.gov/pn/climate/planning/reports/>). The second phase of the study further refined technical processes used to develop future stream flows. The objectives for the second phase included improved accounting for the range of climate change outcomes, as global climate models agree on overall temperature trends, but indicate different precipitation and weather pattern changes, and previous study used a reasonable range of annual temperature and precipitation projections, which was too narrow on future winter spreads. The second phase also improved the accounting and incorporation of uncertainty.

The Phase 2 study reviewed 182 traces of future projected climate adjusted hydrology at 396 sites throughout the Columbia River Basin to help understand potential future impacts on the system. Improved stream flow models indicated more pronounced warming than previous predictions, particularly in the interior (Snake River Basin) and some improved consistency between models. Similar predictions of wetter fall and winter, with increased percentage falling as rain, earlier spring runoff and reduced summer base flow.

John Chandler, Technical Lead of Water Resources at Puget Sound Energy WA-AWRA Board Member, presented “Hydrologic Changes over Time at the Baker Project”. John has been the water manager of the Baker Project for nearly five years and has been responsible for managing the storage and release of 620 billion gallons of water annually. The Baker Project in the Baker River watershed is a hydroelectric two-reservoir system capable of generating 200 megawatts northwestern Washington constructed in 1925 (lower dam) and 1959 (upper dam). The dams operate primarily for license compliance (recreation and environmental benefits), hydropower, and ancillary benefits such as flood control, with an overarching commitment to public safety. John presented multiple data analyses and discussed the changes in the Baker basin precipitation and discharge seasonality, frequency of storms, and timing and length of dry periods. John discussed how these changes important to multipurpose water management.

John described the statistical characteristics of stream flow data set for the period of record and concluded that the data indicated a lack of constancy of the mean and variance over time (non-stationarity). The use of data without accounting for non-stationarity could inappropriately predict the frequency and intensity of rainfall events. For example, data before 1989 exhibit two 15,000+ cfs flow days and data after 1989 exhibit nineteen 15,000+ cfs flow days. These data have shown that flood frequency, and therefore flood risks, are greater using the more recent data set than if the entire data set is used. Consequently, more spilling is necessary in the late winter/early spring to avoid spilling in May and June, and it is has become more difficult to provide minimum instream flows discharging from lower Baker reservoir while keeping upper Baker reservoir sufficiently full for recreation.

In summary, hydrologic changes are already occurring in the Baker basin (and likely elsewhere): Wet periods are getting wetter and more variable, and dry periods are getting drier and less variable. These changes make water management more challenging. As John described it, more water comes when you don't want it, less water comes when you do want it. Consequently, the higher variability makes planning difficult and some water management adaptation methods being used. John indicated that the time of filling and the time of drawdown are the critical reservoir water management events, which rely on interpretation of data. Using old hydrologic records for design and management periods may misrepresent the actual risk, and there is a greater need to appreciate the trends and changes within a data set to determine the current relevance of older data for prediction.

Final Panel Session – Looking Forward To Policy Issues

Scribes: Greg McLaughlin and Patrick Vandenberg

In the final session, **moderated by Jamie Morin of Mentor Law Group**, panelists discussed future considerations and policy issues related to water resource management. **This panel included keynote speaker Leon Szeptycki (LS)**, as well **Mary Verner (MV)**, **Water Resources Director for The Department of Ecology**, **Daryl Williams (DW)** **Natural Resources Liaison (ret.) of the Tulalip Tribes**, and **Mike Schwisow (MS)**, **Former Washington State Agricultural Director and representative of Washington State growers and water users**. Ms. Morin presented the panel with questions focused on water resource management trends and what each thought the future held in light of the Streamflow Restoration Act coming out of Senate Bill 6091 and other recent water trends and decision. The following is in a “Question and Answer Format”. Answers provided are general quotes and paraphrases of comments as written down by the scribes, and are therefore subject to potential and unintentional transcription errors.



Final Panel, clearly enjoying a good old fashioned water debate. From Left: Jamie Morin, Mike Schwisow, Leon Szeptycki, Daryl Williams, Mary Verner Photo: Tom Ring

Q: From your perspective, what is the context of recent water resource management trends, and what will happen in the future?

Mike Schwisow described the irrigation districts, most of whom he represents in Eastern Washington, as “local special purpose governments” of which there are about 100 in WA State, enabled by the first WA legislature in 1890. Prior appropriation is an important component – his clients have old water rights they protect dearly. He noted positive steps recently in irrigation district participation in seeking solutions to water management problems, such as the Yakima Basin Integrated Plan and the Odessa Groundwater Replacement Plan, both addressing very difficult problems in the spirit of collaboration. He emphasized the value of watershed scale solutions that recognize the value of on the ground solutions vs courtrooms solutions.

Leon Szeptycki noted the big California shift in water management, which has moved to source diversification and risk management. 50 years ago, the City of Los Angeles only relied on Colorado River water, added to by water from the State Water Project operated by the California Department of Water Resources. Now they have diversified supply through recycled water, groundwater recharge, and managed aquifer recharge – with even some desalinization. However, the most important source of new water has been conservation policies during droughts. This risk management, defined as reducing demand, drives decisions all the way up to the San Francisco Bay area.

Daryl Williams explained how tribes have senior water rights allocated both for direct needs of reservations and for wildlife. The Washington State Water Code requirements to protect flows have not been well implemented, he said, in a way that protects these rights, with the best example being overallocation of surface waters. “We need to look at how to get stream flows back to where they were before overallocation,” he said, pointing out that this will also address future uses and stay ahead of climate change. In addition, Daryl discussed is a wider and wider gap in summer months where recharge is not happening. Things that help restore flows to river, whether canceling water rights or creating more storage for dry summer months, are needed more and more each year.

Mary Verner said noted that, increasingly, our (Ecology and Washington State as a whole) decisions are being made for us by the legal availability of water rather than hydrogeologists forecasting what is there. She referenced the growing case law and legislative responses that are “closing in on us”, with 90.94 RCW as only the latest example. The Legislature responded to the *Postema-Hirst* continuum, and the task now is to establish both legal availability and physical availability of water resources. In the future, the Growth Management Act (GMA) and the Water Code are conjoined, therefore requiring increased collaboration with municipalities, tribes, irrigators, and counties in charge of GMA as they deal with climate change impacts, population increases in the form of water use, and impervious surfaces.

Q: What should be the next focus of legislators, and how would this advance water resource management?

MV – “From early on, it appeared we needed a combination of certainty and flexibility. These two prongs go together as certainty provides the legal basis for flexibility. Ecology is approaching the legislature to identify priorities for where to complete the next adjudication. Decisions on (water) quantity must be based on certainty.” Ms. Verner went on to say that much of this certainty can be defined and enhanced by water rights adjudications.

DW – “There are not a lot of immediate clear and good answers. The legislature tries to fix court decisions, but somehow just creates more conflicts within the code itself and more opportunities for organizations to sue each other over water rights. There is no one size fits all water code and every basin is different. We’ve had big conflicts between user groups, but as time has gone on we have gotten better at working together on water in WA state. Maybe we can put away politics, and talk together about our needs to find a livable middle ground. This may put us ahead of a lot of states, which is good because we need to allocate this limited resource in a way that’s fair to everybody.”

LS – “Successes can be achieved through collaboration. For example, the Colorado River basin collaboration really advanced water management. But the question remains: What policies actually work that promote or support collaboration and disincentivize antagonism and litigation? Get the legislature to pass that legislation. Also, the implications of climate change are severe, and pain is coming.”

MS – “Daryl is right in that each WRIA has a unique situation. The State legislature is not the place to find these solutions. It has to happen in each WRIA with collaboration among the user groups. Let’s make sure the streams are in the best shape possible both for municipal growth and food production. With a future marked by climate change, we can’t sit back and wait for someone else to solve the problem. As someone involved in agriculture and irrigation, an early default is storage – not in every WRIA, but this is still worth looking at.”

Q: An AWRA strength is interdisciplinary participation: How can AWRA-WA advance the discussion?

MS – Acknowledged that the YBIP and Odessa involvement by AWRA members such as Tom Ring, Steven Malloch, Bob Montgomery, and Paul Jewell are very important to this work.

LS – There would be a lot of value in expanding the AWRA discussion to farmers, legislators, and more – the Water Summit in Montana would be a good model for Washington State.

DW – We need to work with the general public to give them more information about the programs and get the people of the State of Washington involved in these issues. We need their attention because, if they understand it, they can support the political process needed to get it done.

MV – (Agreeing with Daryl) Past practices has led to over-appropriation, which in turn has led to demand and supply problems. On the supply side there may be value in releasing a preconceived notion that “storage is bad”. There is also great potential in managed aquifer and recharge infrastructure to re time the availability of water. The climate panel really brought home both that more water in the winter and less in the summer is absolutely inverted from what we need, and also that there is a lot of uncertainty going forward.

Selection of additional Panelist Comments:

DW – On the work to create the Streamflow Restoration Act, he recalled that he had never seen people so angry on both sides of an issue, and this maybe left people worn out. He said the confirms the need to get the different parties together and work out equitable solutions.

MV – She said that it feels like we’re entering a new era, and a new lexicon is forming: Integrative water management is moving to conjunctive water management. There is a shift to groundwater storage and instream flow impacts from those types of projects.

LS – In the last comment of the conference, our keynote pointed out, tongue in cheek, that perhaps one of the most severe impacts of the problem is that water scarcity could make barley significantly harder to produce, likely “doubling the price of beer.” Amidst chuckles in the crowd, the attendees concluded the formal part of the conference and went to the social hour, which include networking, food, and (fortunately) complimentary beverages.

Special thanks to Felix Kristanovich and the rest of the AWRA-WA conference planning team for another amazing conference!!!

See you all next year!

AWRA – WASHINGTON SECTION ANNUAL MEETING

The AWRA Washington Section will convene its annual meeting and conduct elections for the 2019 Board of Directors. Our elections process will be electronically administered. Each AWRA-WA member in good standing will be sent a link to a secure ballot and can vote for up to 15 individuals for the 2019 Board, with the option to add write-in candidate(s). Biographies of those nominated for the 2019 board candidate slate are presented on the following pages for review. Election results will be announced at the December 19th, 2018 Chapter meeting to be held at the Naked City Brewery in Seattle.

The Board of Directors consists up to 15 directors, plus the past president. All members may attend the annual meeting and to nominate other candidates. Board members 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, and other activities.

The 2018 Board of Directors presents the below candidates for the 2019 Board:

Rabia Ahmed	Amanda Cronin	Jenna Mandell-Rice	Tom Ring
Tyson Carlson	Tom FitzHugh	Greg McLaughlin	Jennifer Saltonstall
John Chandler	Felix Kristanovich	Jason McCormick	Stephen Thomas
Dave Christensen	Jessica Kuchan	Stan Miller	Patrick Vandenberg

CANDIDATE BIO'S



Rabia Ahmed - Rabia is Principal Economist and Managing Partner at Green Economics LLC. She has over 15 years of experience in water and natural resource economics, policy and regulatory economics, litigation support, and international development, with previous work at Maul Foster & Alongi, Ramboll Environ and Cardno ENTRIX. Rabia's expertise 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 and feasibility analyses of water projects. She has carried out a number of water management projects in more than twenty-five US States and internationally. She also has many years of experience in the international development sector, and worked directly with communities in some of the remotest areas of Pakistan and Bangladesh. Rabia has an MS degree in Economics from Portland State University. 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.



Tyson Carlson - Tyson is an Associate Hydrogeologist with Aspect Consulting, with over 17 years of experience specializing in water resource development and water rights. Serving private and public sector clients, Tyson's water rights experience includes both new appropriations – municipal, agriculture, fish propagation, and commercial/industrial purposes – 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's background in analytical and numerical groundwater modeling is often used in the development of site-specific conceptual models describing groundwater-surface water interaction, saline intrusion, well hydraulics, and aquifer sustainability. These skills are also used in Tyson's work in large-scale hydrogeologic characterization – such as regional tunnel alignments, contaminant fate and transport modeling, and construction dewatering design. Tyson has a BS in Soil, Water, and Environmental Science and a MS in Hydrology from The University of Arizona. Outside of the office, he can be found skiing the deepest of Cascade powder, on his bike, or fly fishing his favorite waters.



John Chandler - John is a licensed professional engineer who currently serves as the water resources technical lead at Puget Sound Energy. He is the water manager of the Baker Project, a two reservoir system with three powerhouses, and combined capacity of 200 MW. John also supports operational compliance, dam safety, FERC license implantation, and marketing. He received an M.S. focused in water resources and environmental engineering from the University of Maine at Orono in 2008. When he's not working John enjoys multiple types of partner dances, ultimate frisbee, and playing card games.



Dave Christensen - Dave Christensen has over 20 years of experience working in water resource management, environmental health and environmental protection. He has worked as a consultant, for local and state governmental agencies, and non-profit organizations. Dave is the Program Development Section Manager for the Washington State Department of Ecology Water Resources Program. His team develops State rules and policies, evaluates legislative proposals, and collaborates with water resources interests to address current conflicts and challenges. Dave holds a B.S. degree from the University of Washington in Fisheries Biology and an M.S. in Limnology and Oceanography from the University of Wisconsin. When not working, he tries to spend most of his time outdoors, mostly chasing salmon and halibut out in the ocean or on the Salish Sea, but also enjoys wandering through the woods with his wife and two teenage girls.



Amanda Cronin, is a Manager at AMP Insights. She is a Washington State native with over thirteen years of professional experience in water rights, water transactions, stream restoration and conservation program design and implementation. At AMP Insights, Amanda specializes in water resource policy and planning, water transactions and water banking and works in WA, CA, AZ and WY. Before joining AMP Insights, Amanda was a Project Manager at the Washington Water Trust for 11 years and a Watershed Program Coordinator at the Idaho-based Palouse-Clearwater Environmental Institute for 2 years. At the Washington Water Trust, Amanda worked across Washington State to develop and implement water right acquisitions for environmental flow restoration and groundwater mitigation and she also led the development of the Walla Walla and the Dungeness Water Exchanges for the Water Trust. Amanda holds a B.A. from Whitman College and an M.S. in Environmental Science and Policy from Northern Arizona University. Amanda lives in Seattle, WA with her husband and two children. Amanda enjoys spending time outside; backpacking, mountaineering, cross country skiing, gardening and playing ultimate frisbee.



Tom FitzHugh - Tom FitzHugh is a Water Resources Scientist with Stantec Consulting, in Bellevue, Washington. He specializes in hydrologic modeling of surface water systems, including reservoir and water supply system operations, riverine and reservoir temperatures, and rainfall-runoff processes. His current work is analyzing water supply operations for water agencies and other clients in California's Central Valley. Prior to joining Stantec in 2015, he worked for the Bureau of Reclamation in Sacramento, California for 5 years, where he conducted modeling for long-term planning studies such as the Shasta Lake Enlargement study and analysis of new environmental flow standards in the San Joaquin River Basin. From 1999-2009 he worked for The Nature Conservancy in Chicago and Olympia, where his responsibilities were regional conservation planning, analysis of environmental flows, scientific software development and training, and GIS. He has an M.S. in GIS and Remote Sensing from the University of Wisconsin-Madison, and a B.A. in Political Science from Lawrence University. In his spare time he enjoys hiking, learning and practicing his Spanish, and following the Seattle Sounders and the Reign.



Felix Kristanovich - Felix is a managing consultant with Ramboll in Seattle, Washington. He has 25 years of professional experience in the United States and abroad where he has worked on numerous watershed analysis and 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 been actively involved in several professional societies, including AWRA, where he has served on the Board for the last five years as Secretary, Treasurer, and 2010 Board President. Felix organized technical field trips during the 2005 and 2009 AWRA National Conference in Seattle, and was the co-organizer of several National AWRA conferences. Felix volunteers his time on Whidbey Island where he spearheaded numerous watershed restoration projects. Felix and his wife June enjoy backpacking, hiking, and telemark skiing with their two fantastic dogs Storm and Bear here in the Washington Mountains, and sea kayaking around Puget Sound and in Alaska. Felix and June also enjoy landscape photography and are season ticket holders to the Seattle Opera.



Jessica Kuchan – Jessica Kuchan is a partner with Mentor Law Group, PLLC where she helps clients with issues relating to water resources, land use and natural resources. Jessica works with local governments, non profits, and private water users to find innovative solutions to complex water resource issues. Prior to law school, Jessica was an environmental scientist with the King County Department of Natural Resources researching the impact of water quality changes on fresh water mussels, macroinvertebrates and salmon. Jessica received a bachelor of science in biology from Gonzaga University and juris doctor from Lewis and Clark Law School with a certificate in Environmental and Natural Resource Law.



Jenna Mandell-Rice – Jenna is a senior associate in the Seattle office of Van Ness Feldman LLP. She practices in the areas of water, natural resources, and environmental law, with a focus on water resources development, civil litigation, and public policy. Jenna has worked with municipal water utilities and suppliers to address water rights, water supply and water quality challenges, and has assisted clients in finding solutions for municipal and agricultural water supply. She also helps clients navigate complex regulatory, permitting, enforcement and litigation matters under a range of environmental statutes, including the Federal Power Act, Clean Water Act, Safe Drinking Water Act, Washington State Environmental Policy Act, National Environmental Policy Act, and Endangered Species Act. Prior to joining private practice, Jenna served as a law clerk for the Council on Environmental Quality (CEQ), an office within the Executive Office of the President that coordinates Federal environmental efforts and works closely with agencies and other White House offices to develop environmental policies. She also served as an intern for the Honorable Christine M. Arguello in the U.S. District Court for the District of Colorado.



Greg McLaughlin - Greg is a project manager with Washington Water Trust, where he has worked since 2006, opening the Ellensburg Field Office in 2008. His instream flow and water resource management projects have culminated in 65 cfs and 9,000 acre-feet of annual flow to fish-critical tributaries throughout Washington State. His work includes water right reviews, connecting project benefits to salmon recovery plan, and shepherding those projects through the Ecology review process. He is a frequent presenter statewide on water rights valuation and transactions, trust water, and water law. Greg has worked since 1997 on collaborative resource management projects from his hometown in rural Missouri to the Mekong River in Thailand. He has academic degrees in Environmental Science (BA - Colorado College 1995) and Social Ecology and Community Development (MA - Yale University 2002). Greg currently lives in Lynnwood, WA, and spends his free time as a youth pastor, traveling and doing community service with his wife and four sons.



Jason McCormick – Jason 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 newly formed Washington State Department of Ecology, Office of Columbia River (OCR) where he worked in water rights permitting, project planning, geospatial water resource mapping, program outreach, and coordinated initial grant solicitations. 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. In addition, he draws a strong appreciation for the communities and unique local values of Eastern Washington from his local roots. Jason is the outgoing president of WA-AWRA, and will be an automatic board member in that position in 2019.



Stan Miller - Stan is semi-retired, and currently doing water resources 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 Utilities Division of the Public Works Department for over 20 years. The prime focus of Water Resources is the regional aquifer protection program. In that capacity he worked toward integrating the groundwater protection efforts of all municipalities and water purveyors using the Spokane Valley-Rathdrum Prairie Aquifer. In addition to working on this program at the administrative level, Stan has developed technical information and conducted local studies on the potential impacts of storm water infiltration on ground water quality and the interaction of the Spokane River and the Spokane Valley Aquifer. 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 working on the restoration of a turn-of-the-century home.



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 University and Northern Arizona University respectively. He has taught geology and hydrogeology classes at Central Washington University 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.



Jennifer Saltonstall - Jenny is a licensed Hydrogeologist in Washington State, a Principal at Associated Earth Sciences, Inc., and consults on Puget Sound area hydrogeology, geology, and geologic hazards assessments for both private and public sector clients. She is a leader in storm-water infiltration feasibility and practical stormwater infiltration site investigation and design, both for shallow conventional systems and deep stormwater recharge Class V UIC wells. Jenny is an expert in complex Puget Sound stratigraphy and has a fundamental understanding of subsurface “plumbing” system in our area from managing hundreds of infiltration projects from design through construction. Jenny provides senior review for geologic and hydrogeologic studies, is a regular contributor at technical conferences, and has been an invited speaker on infiltration components for “green” storm water management seminars. Outside of work, Jenny and family love backpacking, board games and backyard projects.



Stephen Thomas - Stephen is lead hydrogeologist in the Seattle office of Shannon & Wilson, Inc. He has 23 years of experience as a consultant 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, 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 University of Cardiff (Wales) and a MSc in Hydrogeology from the University of Birmingham (England), and is a licensed hydrogeologist in the states of Washington and California. Stephen has been on the Board since 2009, and has held positions of vice president and treasurer, and has chaired the dinner and sponsorship committees. Stephen enjoys many outdoors activities, particularly rugby football, cycling and open-water swimming, and annoying his neighbors with his guitar playing.



Patrick Vandenberg - Patrick, a native of Southern California, has called Seattle home for about three years now. He is the Senior Civil Engineer at Seattle Public Utilities District, where he specializes in hydrology and hydraulic modeling. He received his Bachelors of Science from UCLA and his Masters of Science at UW, both in Civil Engineering. He was formerly the University of Washington Student Chapter Representative to the AWRA-WA Board. Patrick previously worked for King County as a hydraulic modeling engineer in the Wastewater Treatment Division. Before moving to Seattle, he worked as an environmental engineer for AECOM in Long Beach, CA. He enjoys playing ultimate Frisbee and volleyball. He is also the WA-AWRA Webmaster.

THE EFFECTS OF WARMING ON WETLAND CARBON AND MICROBIAL DYNAMICS

A REPORT BY WA-AWRA'S 2017 GRADUATE FELLOWSHIP RECIPIENT

By Marissa Medina, Eastern Washington University, WA-AWRA Graduate Fellow



Picture Credit: Amanda Frye

RESEARCH SCOPE

My research examines how climate change is likely to impact wetland ecosystem functioning. I am measuring the effects of experimental warming on wetland microbial communities and carbon dynamics across a range of wetland hydro-periods. My field assistants and I are comparing soil organic carbon, methane and carbon dioxide fluxes, and soil community structure between permanent, semi-permanent, and ephemeral wetlands. Through spring 2019, we will study stability and function of different wetland types under future warming scenarios, including the responses of microbial communities at Turnbull National Wildlife Refuge, representing a range of different wetland types within the same area, geology, and climate regime.

IMPORTANCE OF WETLANDS ECOSYSTEM RESEARCH

Wetlands support crucial ecosystem services, by filtering pollutants, improving water quality, and maintaining the biodiversity of both terrestrial and aquatic species. Loss of these services would cause both biological and economic problems, as well as the loss of cultural services such as recreational birding, fishing, and hunting. Wetlands also are important for carbon storage. Decomposition in anaerobic environments is dramatically slowed by the lack of oxygen, allowing for the accumulation of organic material. Wetlands with organic rich soils are potentially important regulators of atmospheric gases such as carbon dioxide and methane. Anthropogenic increases of these greenhouse gases have caused increased global temperatures of 0.85° C, causing increased precipitation during wet periods followed by longer periods of drought. This will decrease the number of functional wetlands and affect the remaining wetlands by altering their hydrology and biogeochemical cycles [Altor et al. 2008].

Hydrology is the most critical factor contributing to how wetland soils develop and function. Permanent wetlands are inundated with water year-round, while semi-permanent wetlands hold water until the end of the fall season. Ephemeral wetlands seasonally hold water in the spring and early summer but dry out by late summer. Different types of wetlands react differently to warming and drought. Surface water and groundwater provide important connections between land and riverine ecosystems. Wetland types also differ in their inputs and outputs of carbon dioxide and methane. Human alteration of wetlands and climate change has shifted the balance of carbon dioxide and methane movement between wetlands and the atmosphere. Wetland drought and degradation have already eliminated carbon sinks, converting some wetlands into net carbon sources. Similarly, methane fluxes have increased with temperature due to accelerated microbial metabolism under warmer conditions [Kayranli et al. 2010].

Soil microbes regulate biogeochemical cycles in wetlands that influence overall ecosystem services. Changes in hydro-period and temperature that impact microbial community structure and biodiversity are likely to impact these ecosystem processes. Thus, we predict an overall decrease in soil biodiversity as wetlands warm, reducing soil carbon storage. Methane cycling in wetland soils is also controlled by microbes such as methanogens and methanotrophs. Methanogens emit methane as the metabolic byproduct in anaerobic environments, while methanotrophs that consume methane as a source of carbon and energy in aerobic environments. Both groups occur in wetlands and their balance determines methane emissions. Therefore, as temperatures and drought increase, microbial communities might change between methane emitting and degrading processes.

THE FUTURE OF RESEARCH OF WETLANDS AND CLIMATE CHANGE

As wetlands continue to decline with climate change, the ecosystem services provided by wetlands will also change. Wetlands mitigate climate change by trapping pollutants in the water, which are then held and stored in the sediments. Wetland systems, including plants and microbes, also filter out pollutants in the water, improving water quality in the watershed. By working toward restoration or conservation of these systems, we can preserve important resources and ecosystem services. This study in particular could provide a wider understanding of how the microbial community, wetland hydroperiod, and carbon dynamic of wetlands function and interact. Therefore, giving a larger perspective on potential elements to include in restoration or conservation practices.

ACKNOWLEDGEMENTS

I wanted to give a special thanks to my Advisor Dr. Justin Bastow for the guidance and support during my graduate work at Eastern Washington University. Secondly, to my committee member Dr. Jeniffer Walke who has helped me with the molecular part of this study. Next, to my assistants Amanda Frye, Craig Wells, and Connor Potucek for their continued help in the field and in the lab. And finally, to the AWRA Graduate Fellowship Award, the Washington Conservation Corps Education Award, the EWU mini grant, and Isotech Labs who have help fund this research.

CENTRAL WASHINGTON UNIVERSITY AWRA NOVEMBER FIELD TOUR*GEOLOGICAL AND GLACIAL INFLUENCES ON YAKIMA BASIN GROUNDWATER, WITH TOM RING*

By Brandon Kautzman, Central Washington University, WA-AWRA Chapter President



Picture Credit: Jason McCormick

On November 10th the AWRA CWU Student Chapter had the pleasure of a tour of Yakima Basin water resources with Central Washington water resource veteran, Tom Ring. We started with an overview of how surface and ground water of the Yakima Basin is influenced by its geologic and glacial history. We witnessed glacial moraines and terraces formed by tens of thousands of years of glacial advance and retreat. Tom discussed the role that the 20 million year old Columbia River Basalt Flows, which comprise the bones of the ridges forming Yakima Basin, have on the regions aquifers and groundwater availability. With this background in mind, Tom outlined a history of water resource management issues spanning more than 100 years.

The story of Central Washington water in the twentieth century was largely building dams and barriers resulting in excellent water storage for irrigation, but decimating the native fish populations. Tom took us to the Taneum Creek where salmon had returned after the removal of a barrier and acquisition of addition winter flow following years of opposition. We then visited the Cle Elum Dam Fish Passage currently under construction where Tom regaled us with the history of legal struggles between the Bureau of Reclamation and the Tribes over Native ancestral fishing rights. The \$100 million fish passage construction underway before us was a testament to the result of this dispute.

Our final stop was the Teanaway River wetland restoration project implementing large woody debris placement. Tom emphasized throughout the tour that water storage and irrigation has dramatically altered the seasonal flows throughout the basin. To restore native fish habitats we must restore some of the natural balance of seasonal river flows. Wetland restoration projects, such as this one, were highlighted as ways of potentially restoring some of that balance.

DUNGENESS OFF-CHANNEL RESERVOIR

Flow Restoration Strategies in the Post-Hirst World

By Emily Dick, Washington Water Trust

In 2015, the worst drought on record occurred in the Dungeness. The river's flow dropped to 58 cfs in August, far below minimum target flow (105 cfs) and insufficient to support returning Chinook and pink salmon. Snowpack is currently the only form of water storage, but climate change forecasts indicate that less precipitation will fall as snow, making it much less reliable for water storage.

Partners in the Dungeness Basin are in the planning stages of an Off-Channel Reservoir that will deliver Flow Restoration and Aquifer Recharge and other benefits to this watershed. The Reservoir will significantly restore stream flows, increasing Dungeness River late-season flows by 20-50%, while improving water quality, providing flood control storage, improving recreation opportunities, and shoring up agricultural water supplies.

The Dungeness River will provide water for reservoir storage via the Highland irrigation system during the spring runoff period, when river flows are high. From August to September of each year, irrigators on the east side of the Dungeness River Basin will use the stored water instead of diverting 20-30 cubic feet per second (cfs), roughly half the normal irrigation water diversions, from the river in critical low flow period. This will lead to increases in streamflow of 30-50% during drought years.

The Dungeness River provides critical habitat for ESA-listed Puget Sound Chinook and other salmonids. A primary limiting factor to habitat in the Dungeness River is late summer low flows. Spring high flows from snowmelt decline over the summer often reaching critically low levels in late summer. The Dungeness is also a major source of irrigation water supply, compounding late summer low flow issues in the lower 11 miles of the river, downstream of irrigation diversions.

Excess storm runoff captured in Highland irrigation canals, which causes flooding issues in the City of Sequim, will also be stored in the reservoir. Capturing additional high flows and runoff in the reservoir also expands the aquifer recharge capacity to restore aquifers and independent streams. The reservoir would also store existing mitigation water for aquifer recharge east of river where two-thirds of existing mitigation obligations are held.

The land surrounding the reservoir will become a new County Park. Clallam County has made the Off-Channel Reservoir as its top water resources priority because of benefits to community development, water resources, and salmon recovery. As the project will restore up to 30 cfs of Dungeness flows indefinitely, this project reflects a quantity of flow restoration unavailable through traditional water acquisition with the additional benefit of mitigation and small stream aquifer recharge.

MENTORSHIP PROGRAM UPDATE

By Tom Fitzhugh, Water Resources Scientist – Stantec Consulting

AWRA-WA launched a mentorship program in early 2018, whose goal is to connect young professionals and students in the field of water resources with experienced professionals who share a similar specialty and are interested in building a mentoring relationship. Earlier in the year, the program connected 7 students and young professionals with potential mentors.

The program also had its first networking event on November 14, 2018, which was conducted in conjunction with the AWRA-WA University of Washington student chapter. The event consisted of a career panel with three experienced professionals in the water resources field, and an hour of speed networking where students were able to connect with young and experienced professionals in a variety of water resources fields. Information on the mentorship program can be found on our website, and anyone who is interested in being involved (either as a mentor or mentee) can apply/register there. For any questions about the mentorship program, please contact Tom Fitzhugh (thomas.fitzhugh@stantec.com)



2018 AWRA Conference – Photos by Tom Ring

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