
COLUMBIA RIVER BASIN 100TH MERIDIAN TEAM MEETING

November 27–28, 2017

Portland, Oregon

Attendees: Eric Anderson (Washington Department of Fish and Wildlife), Leslie Bach (Northwest Power and Conservation Council), Jennifer Bayer (US Geological Survey), Martina Beck (BC Ministry of Environment and Climate), Rick Boatner (Oregon Department of Fish and Wildlife), Steve Bollens (Washington State University), Justin Bush (Washington Recreation & Conservation Office), Jim Capurso (US Forest Service), Marcie Clement (Chelan Public Utility District), Tim Counihan (US Geological Survey), Lori Curtis (Flathead Conservation District), Lisa DeBruyckere (Creative Resource Strategies, LLC), Debra Deshon (Mussel Dogs), Glenn Dolphin (Oregon State Marine Board), Robyn Draheim (Pacific States Marine Fisheries Commission), Tim Dykstra (US Army Corps of Engineers), Kendall Farley (Northwest Power and Conservation Council), Becky Flitcroft (US Forest Service), Bruce Hansen (US Forest Service), Erik Hanson (Confederated Salish & Kootenai Tribes), Keith Hatch (Bureau of Indian Affairs), Gina Hoff (US Bureau of Reclamation), Rian Hooff (Oregon Department of Environmental Quality), Bryan Horsbaugh (US Bureau of Reclamation), Denise Hosler (US Bureau of Reclamation), Rayola Jacobsen (RJ Consulting, LLC), Kristia Lawcynell (US Bureau of Reclamation), Joe Maroney (Kalispel Natural Resources), Madelyn Martinez (US Army Corps of Engineers), Dominic Maze (City of Portland Environmental Services), Molly McCahon (Lakes Commission), Ken Merrill (Kalispel Fishery & Water Resources), Christine Moffitt (USGS – University of Idaho), Alan Monek (US Bureau of Reclamation), Nancy Munn (National Oceanic and Atmospheric Administration), Brooke Penaluna (US Forest Service), Stephen Phillips (Pacific States Marine Fisheries Commission), Allen Pleus (Washington Department of Fish and Wildlife), Anthony Prisciandaro (US Bureau of Reclamation), Stevan Raye (US Bureau of Reclamation), Martyne Reesman (Oregon Department of Fish and Wildlife), Johnna Roy (US Fish and Wildlife Service), Cindy Sawchuk (Alberta Environment & Parks), Jesse Schultz (Washington Department of Fish and Wildlife), Jesse Schultz (Washington Department of Fish and Wildlife), Stacy Schmidt (Montana Fish, Wildlife & Parks), Adam Sepulveda (US Geological Survey), Bethany Steinkraus (Mussel Dogs), Michael Stephenson (Idaho Power Company), Mark Sytsma (Center for Lakes and Reservoirs – Portland State University), Pam Taylor (Washington Department of Fish and Wildlife), Jennifer Vogel (Central Kootenay Invasive Species Society representing FortisBC, Inc.), Damian Walter (US Army Corps of Engineers) Krista Watts (Columbia Power Corporation), Kate Wilson (Montana Department of Natural Resources & Conservation), Nic Zurfluh (Idaho State Department of Agriculture)

Remote attendees: Stephanie Showalter Otts (National Sea Grant Law Center), Erin Rainey (Arizona Game and Fish Department), Karen Vargas (Nevada Department of Wildlife), Steve Wells (Aquaticus), Tom Woolf (Montana Fish, Wildlife & Parks), Ron Zurawell (Alberta Environment & Parks)

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INVASIVE MUSSEL INITIATIVE UPDATE—BUILDING CONSENSUS IN THE WEST (B. HORSBURGH)

The DOI initiative, [*Safeguarding the West from Invasive Species*](#), includes actions to strengthen federal, state, and tribal coordination to address invasive mussels. Six teams, led by representatives from select agencies, were formed to produce actions in the following categories—prevention, early-detection monitoring, rapid response, containment and control, outreach and education, research, and increasing capacity. Hilary Smith is tracking progress in achieving the actions. The Bureau of Reclamation (BOR) has the lead on nine commitments spread across six focus areas.

Reclamation is launching a [prize competition](#) in December 2017, offering funding incentives to identify innovative concepts to eradicate mussels in open waters. It will be open to any entity.

BOR received an additional \$1 million in 2017 to support dreissenid project work in several regions. In the CRB, BOR supported dive surveys in Jackson Lake, an interagency agreement with USGS for collecting samples at high-risk locations within Reclamation projects to conduct eDNA analysis, and purchase of water quality monitoring equipment. BOR is anticipating receiving \$4.5 million in additional allocation in 2018, and that \$1.4 million will be dedicated for the Pacific Northwest – the spend plan includes conducting vulnerability assessments at high-risk BOR facilities in the Pacific Northwest, entering into an interagency agreement with Bureau of Indian Affairs, and conducting enhanced monitoring at a water quality lab.

BOR has conducted work in other regions. In the lower Colorado, BOR engaged in a partner workshop led by the Bureau of Land Management (BLM) to develop an interjurisdictional strategy to address mussels in Lake Havasu. An upcoming workshop (last week of November 2017) will occur focused on reducing risk of spread from Lake Mead.

WATERCRAFT INSPECTION PROGRAM UPDATE AND REVIEW

Montana (*S. Schmidt, T. Woolf*)—Montana had a successful 2017, creating a funding mechanism and tripling their program (e.g., laws, outreach and education). New in 2017—mandatory inspections for watercraft leaving Tiber and Canyon Ferry reservoirs as well as for watercraft entering the state and crossing the Continental Divide. Montana has \$13 million in funding available over 2 years, and codified the Montana Invasive Species Advisory Council in 2017. 2017 activities included 35 FWP stations (an increase from 22 in 2017), 160 seasonal staff, and five new supervisors. Montana hired 212 watercraft inspectors; about 139 remain with the program today. They conducted 84,000 inspections, an increase from 37,530 in 2016. Inspectors intercepted 17 mussel-fouled boats, an increase from seven intercepted in 2016. In addition, there have been increases in partner inspection stations. There has been an increase in enforcement efforts, including four new FTEs; 80 citations

were issued in 2017, primarily for failure to stop at inspection stations. Looking forward, Montana seeks to expand stakeholder managed inspection stations, adopt the Colorado Watercraft Inspection app, and increase outreach. In 2018, hours will be reduced for some inspection stations, there will be minor changes to locations (Fort Peck information booth moving to Flowing Wells, Canyon Ferry Silos moving to nearby location, overlook station at Tiber removed and decontamination stations added, Culbertson station moving closer to Nashua (further west on highway 2)). There will be major changes to hiring, training, and logistics—supervisors will be conducting their own hiring and training locally, and there will be additional permanent structures at each station. Lessons learned—managing people remotely is a huge challenge; supervisors will be taking effective management classes; and increases in stations east to west are causing people to be checked numerous times.

Oregon (*R. Boatner*)—The Oregon Department of Fish and Wildlife (ODFW) conducts inspections and manages inspection stations, and the Oregon State Marine Board conducts outreach and education and administers the financial aspects of the program. In 2017, the inspection program was funded by the Aquatic Invasive Species Prevention Permit, and the budget was \$0.5 million/year (12 seasonals, two permanent staff). The Ontario and Central Point stations were opened in February. Central Point intercepted four mussel-fouled boats; Ontario intercepted eight with mussels. The other stations open in May. In 2017, WRRDA funds became available; these funds were used beginning in August to open a station in Umatilla, where they intercepted two boats with dreissenids. A station was opened in Burns for three weeks. In 2017, ODFW conducted 2,100 inspections, and intercepted 14 vessels with dreissenids. In 2018, Central Point and Ontario will remain open all year. Others will open in April and stay open through Labor Day. If federal funds are not available, the Gold Beach station will move to Umatilla, Klamath Falls and Lakeview will open in April, and Central Point and Ontario will remain open all year.

Washington (*E. Anderson*)—From 2010 through 2015, there was little direction or vision for developing an enforcement program, little funding, and competing priorities. During 2016–2017, a lieutenant was dedicated to coordinate statewide activities, and AIS program management began working with enforcement again. A new AIS legislative bill passed, which will bring additional funds into the program, and WRRDA funds became available to Washington. The paradigm shift included centralized scheduling, dedicated AIS technicians, and a focus on more interstate traffic. Staff implemented an improved model for check stations, developing two anchor points (Spokane and Plymouth point of entry). In addition, a permanent AIS Sergeant was hired to coordinate the stations. Funding was shifted to fish management for technicians to be hired to operate the check stations. Stations operated four days per week at each location April–September. In 2015, there were 933 inspections were conducted; in 2016, there were 86 station days and 2,180 inspections; and in 2017, there were 216 station days and 9,054 inspections; **And 686 stops**.

In 2017, Washington changed the boating safety form that all officers complete when they conduct boating safety checks – an AIS block was inserted, and officers were given training on effective

completion of the form. In 2018, there will be additional funds to expand the program (state legislation as well as WRRDA funds) – check station effort will be doubled (no increase in stations, but increase in effort at each station). Washington is working on a long-term agreement/MOU to establish a check station at the previous State Line rest area. Washington has an MOU with the National Park Service to give the NPS at Lake Roosevelt state authorities to conduct inspections, decontaminate, issue seizures and tickets, etc.

Idaho (N. Zurflub)—2017 was the 9th year of the inspection program; Idaho administered 18 inspection stations (13 cooperation stations and five ISDA stations). There was law enforcement support from local county and Idaho State Police. Idaho entered into an agreement with the Bear Lake Regional Commission to support two Utah stations. There were three roving crews (roving crews are great for outreach and education purposes). Cooperators include soil and water conservation districts, tribes, cities, counties, and commissions. In 2017, Idaho conducted more than 90,000 inspections; 31 vessels were intercepted with mussels (two with viable mussels). Mussel-fouled vessels were destined for: 7-Idaho, 11-Washington, 4-Oregon, 4-Montana, 2-Alberta, and 3-British Columbia. A total of 502 vessels were intercepted with weeds, and 5,204 hot washes were performed. Highway 20 and 27 stations are doing a lot of hot washes (local ordinance is mandating hot washing). 24-hour nighttime operations were conducted in Cotterell (I-84W) in 2017—Cassia Soil and Water Conservation District is the cooperator, and there is Idaho State Police support; increased lighting at the site accompanied by an electronic message board. 2018 activities will include expanded hours at a few sites, expanded night operations (24 hours at Cotterell, and 18 hours at Malad, Cedar, and Jackpot). A series of site improvements will occur, including expanded internet and cellular service, infrastructure, messaging boards, etc. Education/outreach campaigns include *Clean, Drain, Dry*, *Don't Let it Loose*, *Knock it Off*, *Know What you Grow*, and *Buy it Where you Burn It*.

USACE UPDATE (D. WALTER)

A total of \$4 million in WRRDA funds were available in FY16; \$5 million in FY17; estimated \$5 million in FY18. USACE would like to work with USFWS/NMFS/PSMFC to front load a Section 7 consultation(NEPA); the cost to complete the Environmental Assessment is \$350K. An estimated \$4.25 million is available in 2018 for watercraft inspection work; waiting on the amount available for monitoring. When NEPA is completed, rapid response funding could potentially be available to the states (for response actions).

CANADA UPDATE

ALBERTA (C. SAWCHUK)

The program was doubled in 2017 to fortify borders, especially after the Montana mussel detections. In 2017, Alberta conducted 30,957 inspections, and intercepted 19 mussel-fouled boats (18

originated from eastern Canada). Every boat is considered high risk, unless it comes from Alberta or British Columbia, in which case each boat is considered low risk. Alberta detected a kayak with mussels. People that bypass stations remain a problem; considering electronic flashing signs. Nighttime operations – Coutts and Dunmore are operating 20 hours – two mussel fouled boats after dark. A QA/QC Secret Boater program was implemented. Alberta worked with British Columbia on a local passport program (see next section); 438 passports issued (82% positive response; 17% neutral). Alberta continued their mussel sniffing dog program (Working Dogs for Conservation). The amount of media attention received because of the existence of the dogs equated to more than \$800,000 in advertising/media attention. Alberta began a new search application – shorelines – using dogs. Port of Entry (POE) notifications – 1,000 forms received in 2017 – 639 forms from Alberta POEs and 300 from British Columbia POEs.

BRITISH COLUMBIA (M. BECK)

2017 British Columbia Watercraft Inspection Station programs doubled in size – from 32 to 65 inspectors; 10 inspection stations; nine operated dawn to dusk; Golden station operated 24 hours per day; 5 stations along eastern border with Alberta. British Columbia conducted 35,000 inspections, 2,070 high risk inspections, and 639 decontaminations, and intercepted 25 mussel-fouled boats (12 were commercially hauled) – British Columbia received notifications on 20 of the 25 boats. A total of 24 of the boats were destined for British Columbia; and 1 was destined for Alaska. Nighttime operations- Golden station operating 24/7 – 5 high risk jurisdictions, but no mussel interdictions. A QA/QC Secret Boater program was implemented. British Columbia and Alberta co-launched a BC/AB Pilot Passport Program – passports issued to boaters frequently traveling between or within BC and AB. Boaters must sign a commitment form to practice *Clean, Drain, Dry* and stop at inspection stations; 1,390 passports issued (76% positive response, 24% neutral). British Columbia launched a detection dog program – partner dog with an officer (multi-purpose dog) – Kilo checked a boat from Quebec that blew past an Alberta station, and he detected mussels on the boat.

The western provinces have been working on POE notifications (via Canadian Border Services Agency); 304 notifications were received from BC POEs in 2017. A key challenge is that American boaters keep their cell phones off in Canada.

Lessons Learned from both provinces:

- Don't get complacent – a kayak that was mussel infested was intercepted.
- Nighttime inspections are necessary
- Passport systems are difficult to operationalize
- Skippers (people that blow past check stations) are a big gap
- QA/QC checks are important

- Before moving to a border notification system, ensure adequate response mechanisms
- Improve staff understanding of other jurisdictions protocols

Both provinces are interested in developing a watercraft manufacturer form – to work with manufacturers and dealers on protocols for testing new boats. The goal is to create a streamlined process that reduces the risk of new boats transporting AIS while maintaining efficiencies for businesses. Both Canadian provinces are interested in if this is being done in other jurisdictions, and if there is any interest from the group to expand this work.

ESA MANUAL (L. DEBRUYCKERE, J. ROY, N. MUNN, D. WALTER, S. PHILLIPS)

The USFWS has funded an initiative through the Pacific States Marine Fisheries Commission to develop a manual to front-end load a Section 7 consultation to address potential actions to control a dreissenid introduction in the four Columbia River Basin states. The US Army Corps of Engineers will be creating an Environmental Assessment from the information developed in the manual to initiate a consultation. The states will begin compiling information, beginning with Washington, Oregon, Montana, and then Idaho. The manual is estimated to be completed by December 31, 2018.

FORT PECK VULNERABILITY ANALYSIS AND RECOMMENDATIONS AND VULNERABILITY ASSESSMENTS IN THE COLUMBIA RIVER BASIN (L. DEBRUYCKERE, POWER AGENCIES)

A vulnerability analysis was conducted to assess the vulnerability of other authorized purposes of the Fort Peck Project (Montana), including irrigation, fish and wildlife, and recreation. The outcome of the report included 14 recommendations to implement infrastructure, outreach and education, monitoring, and prevention efforts. USACE staff requested that a checklist be made that incorporates other authorized purposes for hydropower facilities – it could be amended to the existing checklist used for hydropower infrastructure. In addition, there was discussion about how often vulnerability assessments should be reviewed, as information can become outdated over time.

NORTHERN PIKE (J. MARONEY)

Pike are not native to the Columbia River Basin—they are a problem, not an opportunity. The management goals are to minimize impacts to native species and reduce their spread. From 2012–2017, managers implemented mechanical suppression. They removed 4,552 in 2012, 5,953 in 2013, 3,967 in 2014, 751 in 2015, 181 in 2016, and 34 in 2017. Capturing all age classes requires gillnetting to occur for at least four years in a row. CPUE went from 5.6 in 2012 to 0.15 in 2017.

UPPER COLUMBIA CONSERVATION COMMISSION (*K. WILSON*)

Fish, Wildlife & Parks manages the AIS program in Montana. DNRC administers the Montana Invasive Species Council, the Upper Columbia Conservation Commission (UC3), and an AIS grant program. HB622 established the UC3 to protect aquatic environments in tributaries to the Columbia River from the threat of invasive species (focusing on the Montana portion of the CRB). The bill also directed the FWP to develop a Containment and Quarantine Plan for the Missouri River, establish invasive species management areas, and codify the Montana Invasive Species Council. Tiber Reservoir is positive for dreissenids; Canyon Ferry is suspect for dreissenids.

UC3 is to monitor the condition of aquatic resources, develop an annual monitoring plan, encourage cooperation and coordination with AIS partners, develop and implement an education and outreach strategy, and produce an annual report for the Governor's Office and Legislature. There are nine UC3 appointed/voting members that serve staggered four-year terms. The chair is currently Lori Curtis, Flathead Conservation District. There are also 10 non-voting/ex-officio members comprised of federal partners and the Province of British Columbia.

Moving forward, there will be a workshop on watercraft inspections and monitoring, co-hosted by CSKT/UC3 (December 11-12), quarterly meetings, task-focused committees, and outcomes, such as deliverables as specified in HB 622 and AIS recommendations to the Governor and Legislature.

MEMBER ISSUE UPDATES

NATIONAL AIS LEGISLATIVE UPDATE

FY2018 appropriations (Energy and Water) - \$4.388 for quagga and zebra mussels.

FY 2018 Interior and Environment -\$21 million for AIS (\$16.6 in FY2017) - \$3 million to Lake Tahoe and \$10.4 million for Asian carp (\$2 million will be spend on carp control and prevention – contract fishing). The four states that receive AIS task force state plan monies, it will be flat funded (states will receive what they received in 2017).

FY2018 Federal Budget – funding is flat, however, page 6 has EDRR language (within 180 days of the act passing agencies will report on efforts to prioritize EDRR – how agencies plan to protect specific native species and natural resource values on public lands across the nation).

Other Bills:

HR1330 – Healthy Habitats Bill – includes NEPA categorical exclusion, and now reads to achieve a substantive annual net reduction of invasive species populations. Attached this bill to the Wild Act.

S 826 – Wild Act – removed the NEPA categorical exclusion and contains HR1330. The Wild Act also includes the Theodore Roosevelt Genius Prize for the management of invasive species (\$100,000).

HR2560 – Reef Assassin Act – no movement likely.

HR2603 – Saving America’s Endangered Species Act – no movement yet.

HR1357 – Stamp out Invasive Species Act – no movement.

USARK vs. Zinke – The government lacks authority under the shipment clause to prohibit shipments of injurious species between the continental United States.

Stop Asian Carp Act (HR2983/S1398) – compels the current administration to release the Brandon Road Study within 7 days of the bill’s enactment. The draft report was released on August 7, 2017.

HR953/S340 – Passed in the House, but no movement in the Senate. This bill amends the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Water Pollution Control Act (commonly known as the Clean Water Act) to prohibit the Environmental Protection Agency or a state from requiring a permit under the National Pollutant Discharge Elimination System for a discharge of a pesticide from a point source into navigable waters if the discharge is approved under FIFRA. The bill establishes exemptions from this prohibition.

S1528 – Genetically Engineered Salmon Labeling Act – will likely pass.

S756 – Amends Marine Debris Act to reduce marine debris – will likely pass. The language of the bill includes invasive species.

H Res 170 – expresses commitment of House of Rep to work on combatting invasive species.

Other Bills – S168/HR1154: Commercial Vessel Incidental Discharge Act – It is now attached to S1129 Coast Guard Authorization Act – passed out of committee, but is now stuck, with likely action in 2018. Bill would exclude commercial vessels less than 79 feet in length and all recreational fishing vessels from any state and federal regulations pertaining to incidental discharge. The bill eliminates vital Clean Water Act protections and relegates EPA to an advisory role.

GREEN CRAB/CLAWED FROGS (*A. PLEUS*)

Green crab—In 2015, WDFW worked with Washington Sea Grant to develop a science-based program to monitor for green crabs in recognition of the existence of an established population on Vancouver Island. They were monitoring 30 sites in 2016, and captured a green crab in Puget Sound – conducted a rapid response and did not catch any additional crabs after putting out 100 traps. Several weeks later, in Padilla Bay, they discovered three more green crabs—biologists attributed it to larval distribution of green crabs. In 2017, on Dungeness Spit, they captured four green crabs with six traps. They have trapped 100 green crabs in 2017 to date, and continue to trap. WDFW is

also working with British Columbia to manage the Sooke green crab population, which is established.

African Clawed frog—In 2015, Washington detected African clawed frogs, which tested positive for Rana virus, in three stormwater ponds in Lacey. The situation is contained because the ponds have mechanical barriers. WDFW received a permit to increase the salinity of the pond with a de-icing salt mix to raise the salinity above 16 parts per thousand. WDFW removed 400 frogs across 2 treatments. Trapping will continue to determine if efforts were 100% successful. A total of 6,000 African clawed frogs have been removed from the 3 ponds.

MUSSEL DOGS (*D. DESHON*)

The program began in 2008 (it initially took two years to get a permit to train for mussels). Most of the dogs are donated to Mussel Dogs – the best dogs are enthusiastic for toys, which creates the game of “hide and seek.” Once the dogs learn the game, odor imprinting is used to align the presence of the ball with the odor of the mussels – when they find a mussel, they are awarded with a ball. The dogs undergo continual training thereafter.

The pros of using canines:

- Reduced boat inspection times (a dog can scent an entire boat in less than a minute)
- Efficiency
- Effectiveness
- Boater friendly
- Education

Dogs can detect veligers. D. Deshon and three co-authors published a paper in 2016—The ability of scent detection canines to detect the presence of quagga mussel veligers, *Management of Biological Invasions*.

The 2017 boating season – more than 7,000 vessels were inspected.

Considerations when starting your own program:

- Access to mussels
- Purchase of a canine
- Handler training
- Care, feeding, and housing of canine
- Safe area for inspections
- Ongoing training
- Yearly certifications by an independent agency

Or, you can hire a private contractor. Note: It is possible to train canines for other odors.

MODEL QUAGGA/ZEBRA MUSSEL RECIPROCAL VESSEL CERTIFICATION PROGRAM FOR CLEAR LAKE AND NEIGHBORING LAKES IN NORTHERN CALIFORNIA (L. DEBRUYCKERE, R. DRAHEIM, S. SHOWALTER OTTS)

The National Sea Grant Law Center, Creative Resource Strategies, LLC, and Robyn Draheim have been working with several federal, state, and local jurisdictions in Northern California to advance elements of reciprocity to prevent the introduction and spread of dreissenids. The four water bodies involved include Clear Lake, and lakes Berryessa, Sonoma, and Mendocino, and the entities include the US Army Corps of Engineers, Bureau of Reclamation, Lake County, Solano Water District and Sonoma Water District. Contractors conducted analysis of each watercraft inspection program, existing and potential elements of reciprocity, and existing and potential local ordinance to advance as well as other elements, such a local boater program. An action plan was created that addresses existing gaps in each of the programs, and recommendations were made to address the gaps. The contractors are convening with all of the entities in January 2018 to advance elements of reciprocity and assist with implementation.

FLOWERING RUSH (D. WALTER, J. BUSH)

COLUMBIA BASIN STATES COOPERATIVE WEED MANAGEMENT AREA

A Columbia Basin States Cooperative Weed Management Area was created to addressing flowering rush in the CRB. A total of \$65,000 was awarded from the National Fish and Wildlife Foundation to create the CWMA. A regional summit will be held, and then a regional management plan will be developed and then implemented. The outcomes include sustainable leadership, information sharing, and regional coordination. The summit will be held February 27-28, 2018 at the Northern Quest Resort at Airway Heights, Washington. For more information, <https://www.eventbrite.com/e/flowering-rush-summit-registration-38243668843>.

The regional management plan will address prevention, planning and prioritizing, tactics and implementation as well as monitoring, evaluation, adaptive management and data sharing. Ideally, landscape-scale harmonized planning will occur: Regional plans are intended to tier to state plans, which tier to county plans, which tier to watershed plans.

US ARMY CORPS OF ENGINEERS

Flowering rush exists in McNary Dam and reservoir. The US Army Corps of Engineers and US Fish and Wildlife Service are using mats to control existing populations. Flowering rush is capable of competing with native bulrush. Since the original siting in 2013 in one localized area, sites have spread in size and scope (likely a result of both spread and increased surveillance). Chemical treatments (diquat) may be possible to knock back larger patches. The variety they are working with is very aggressive.

MULTI-SPECIES MONITORING OF AQUATIC INVASIVE SPECIES: PILOT PROJECT (J. CAPURSO, B. FLITCROFT, B. PENALUNA, B. HANSEN)

Within Region 6, AREMP and PIBO sites cover most of the region, but gaps exist in non-wadeable waters and high-use aquatic locations/waters with high probability of AIS invasion. The gap could potentially be filled by developing a multi-species eDNA program. Types of big water locations include Crane Prairie Reservoir (reservoir), Tahkenitch Lake (lake) and Rogue River-Gold Nugget Site (non-wadeable river).

Accomplishments and next steps:

- Developed primers for focal AIS
- Poised to understand more about AIS detections in big water
- Secure funding to complete pipeline and analysis of 2017 field samples
- Secure funding for 2018 field season

MONITORING WORKSHOP FOR THE COLUMBIA RIVER BASIN

BUILDING CONSENSUS (WRP)—FIELD AND LAB STANDARDS WORKGROUPS

- **Field standards—Plankton tow** (*K. Vargas*)—The committee (16 members) chose to develop minimum protocols, and is working on a second draft of recommendations to the committee. The major issues include a) what type of lab analysis will be performed on the samples that we collect? e.g., cross polarized light microscopy, camFlow, eDNA, etc.; b) do different lab analysis methods require different field preservation methods, QA/QC and equipment decontamination/disinfection?; and c) different experts have different opinions on preservation (20%, 25%, or 75% EtOH?) and equipment decontamination (vinegar, bleach, etc.).

Nevada’s AIS Program Update: Microscopy and eDNA samples were negative in Nevada in 2017 except for the Colorado River, Wildhorse and South Fork Reservoirs (weak positive for zebra mussels in Wildhorse and South Fork Reservoirs on three occasions), but eDNA results were back to negative in October; microscopy samples for the entire state was negative. If mussels are present, they should show up in late May and in the Fall. In 2017, Nevada watercraft inspection and decontamination stations conducted WID 26,000 inspections and 942 decontaminations; Lake Mead: 12,000 inspections and >700 decontaminations.

- **Field standards—Substrates and Shoreline Monitoring** (*E. Raney*)—The field standards committee, which contains 13 members, is using the plankton tow field standard group as a guide. They will be taking next steps to describe field standards for substrates and shoreline monitoring.
- **Lab standards** (*S. Wells*)—14 committee members worked through sample preservation and handling; the final tables will list the parameters and the methods used to preserve and handle. The methodology used dictates how the sample is handled. The table will be completed and available for sharing in January 2018.

CURRENT STATUS OF ACTIVITIES

- **Oregon Department of Fish and Wildlife/Portland State University**—PSU generally conducts sampling for the Oregon Department of Fish and Wildlife (ODFW). ODFW sampled eight water bodies outside of the Columbia River Basin – plankton tows, shoreline surveys, and substrate surveys – results will be back in about two weeks. The 2017 PSU sampling program:

- **BPA-USACE:** 11 water bodies, 110 veliger samples (The Corps determines where they will be conducting sampling on their legacy sites);
- **WRRDA funding:** 32 water bodies, 76 veligers, 86 shoreline adult, and 96 eDNA samplings (sampling occurred based on risk assessment); and
- **Seattle City Light:** 1 water body, 56 veliger, 14 shoreline adult, 18 substrate checks.

In 2018, with similar funding, the sampling frequency and regime will be the same. PSU is opening an eDNA lab in 2018. Strengths of the program include skilled field and lab assistance. Weaknesses include only funded for surveys in the CRB, and annual funding limits ability to be strategic. Challenges include keeping skilled staff. Decontamination requirements limit field sampling – it takes a lot of time and water to decontaminate – every net that is used in the field for sampling goes into an acid batch.

- **Washington Department of Fish and Wildlife**—2017 sampling included 227 sampling sites at 95 water bodies (eDNA, calcium, artificial substrates, vertical and horizontal plankton tows, and visual shoreline sampling). Water bodies sampled are selected based on the potential for introduction through human activities or environmental compatibility:
 - **Boatyards** capable working on large commercially hauled watercraft.
 - **Transporters** - private/public entities transporting equipment (docks, heavy equipment, etc.) that is not watercraft for hydro power facilities and agriculture.
 - The “**usual suspects**” – all watercraft usage including water sports, wakeboarding tournaments, commercial, government, pleasure, recreational fishermen, and walleye and bass tournament anglers.

Laboratory analysis includes microscopy through a private consultant (Cameron Lange), artificial substrates and visual shoreline survey (field staff), water quality (Hanna handheld multiparameter), water quality (E Washington University Professor), eDNA (WDFW molecular genetics lab). Changes anticipated for 2018 include an increased number of sites and frequency of sampling, measuring calcium on all water bodies in Washington, using calcium more in risk assessment, contracting additional microscopy services, and seeking a second consultant to analyze eDNA samples. The strengths of the program include copartners, experience of primary surveyors, use of five sample methods, and confidence in the labs used for analyzing samples. Weaknesses include lack of staff, funding, and the need for more samples.

- **Washington State University and US Geological Survey**—Sampling occurred in open water (ship-board sampling) throughout and downstream lower portions of Bonneville, The Dalles, John Day, McNary, and Priest Rapids reservoirs on the Columbia and Ice Harbor Reservoir on the Snake River (n=120 samples for microscopy and 120 samples for eDNA) and shallow water, dock-based sampling. A total of 270 samples were analyzed for

microscopy, 120 samples for eDNA, and a subset of those samples using the FlowCam. WSU biologists decide when and where to monitor based on risk of introduction, risk of establishment, and legacy sites. All samples were analyzed with microscopy using cross-polarized light, 1/3 were sampled for eDNA, and a subset of the samples are being processed using FlowCAM. In 2018, they need to sample throughout the full 6-month reproductive season (May–October) rather than merely the last two months (September–October). The strengths of the program include broad spatial coverage, consistent, state-of-the-art technologies, QA/QC, strong interagency collaboration, and robust connections to education and outreach. Weaknesses include limited temporal coverage (late season only). Challenges include contracting as early in 2018 as possible (February/March). A recent peer-reviewed article in an international science journal recommends that collective monitoring efforts in the CRB should be increased at least several fold. Regional coordination and collaboration has been good, but can be strengthened – some sort of standing committee should be formed to help guide future actions.

- **Idaho Department of Agriculture**—In 2017, 905 plankton samples were collected from 76 waterbodies – multiple sample events, bi-weekly, per waterbody; two-week turnaround for microscopy lab analysis. Sampling included reservoir drawdown, substrate, and benthic ponar grab sampling. Monitoring priority and frequency are based on a water body scoring designation. Idaho receives assistance from counties, tribes, Idaho Power, Idaho DEQ, and several other entities. There have been no suspicious detections in Idaho. Surveys include invasive plants, snails, clams, mussels, and crayfish.

<http://idaho.maps.arcgis.com/apps/MapSeries/index.html?appid=30b457e794af4cc287b88dc65deeccea>

In 2018, there will be about 900 samples for microscopy analysis, reservoir drawdown, substrate and benthic grab sampling, eDNA monitoring coordination. If anyone knows anyone else conducting water body monitoring in Idaho, please have them contact Nic.

- **Montana Fish, Wildlife & Parks**—In 2017, waters were sampled throughout the state. Social pressure and habitat suitability for dreissenid introduction and establishment drives sampling locations. Changes to the program in 2018 include increased staffing (in field and laboratory); increased equipment, supplies and materials; and a new electronic data collection system. In 2017, 223 different waters were sampled—there were no adult or larval detections of adults or veligers, no new detections, and new training on bryozoas. Tiber Reservoir was sampled 16 days—128 plankton samples, 66 eDNA samples, 194 total samples, mussel sniffing dogs, Fish and Wildlife Service dive team, snorkel surveys, and 24 artificial substrates. There is not a lot of suitable habitat for dreissenids in Tiber Reservoir, but there is good habitat at the dam. Canyon Ferry Reservoir was sampled 10 days—147 plankton samples, snorkel surveys, Fish Wildlife & Parks dive team, 10 artificial substrate samples, and use of mussel sniffing dogs. Lab analysis consisted of in-house polarized microscopy.

Changes anticipated for 2018 include sampling low-risk waters less frequently, increasing sampling crews and hiring them earlier, and using a new field collection system. Strengths included accomplishing goals by Incident Command. Challenges included hiring staffing too late in the season. Weaknesses included an increased emphasis on sampling for mussels, which lessened effort on other aquatic invasive species. Staff hope to continue to improve on partner collaboration.

- **Bureau of Reclamation**—In 2018, more plankton tows will be added. Dive surveys occurred in 2017 in Jackson Lake – they’ll be adding settling plates at six high-risk reservoirs. **eDNA**—From 2007–2017, 544 water bodies were sampled—18,934 samples were collected and tested. A total of 15 states collaborated in this program in 2011; in 2011, they began performing all tests on any sample where a body had been found. Positives have been found once in 46 water bodies, twice in 17 waterbodies, and more than three times in 20 water bodies. The 52 positive water bodies (excluding known positive waters) were samples from a marina/boat launch–31 (60%), mid-lake–12 (23%), dam–8 (15%), and hatchery–1 (2%). Samples can be PCR positive with veligers that do not birefringe. BOR has developed a protocol for eDNA and monitoring for invasive species – it’s specific for dreissenid mussels, and is posted on their website (www.usbr.gov/mussels, www.usbr.gov/research). Since 2009, the Pacific Northwest Region has conducted more than 400 reservoir monitoring events and conducted analysis for AIS, nutrients, minerals, trace elements, bacteria, chlorophyll and physical profile data. Since 2009, they have collected and analyzed more than 1,200 plankton tows.
- **British Columbia**—In 2017, 383 samples were collected from 101 lakes – all have been negative for dreissenids. Sampling occurred from June–October; 75% of samples were collected by external contractors. The sampling season was challenging because of wildfires. Where samples are collected is based on lake chemistry, high use lakes, lakes in close proximity to population centers and easy access, and opportunistic locations. Lab analysis includes microscopy, and there was a new lab used for 2017. In 2018, the program will receive \$450,000 over three years to enhance the lake monitoring program, develop a new funding application process for external contractors to conduct sample collection, update the provincial lake monitoring protocol, ensuring it aligns with best available science and work implemented across the western jurisdictions. Strengths include increased funding to increase effort, strong interest from partners, and research work ongoing with universities. Weaknesses include developing a robust decision tool for where and when to sample, and increased use of citizen science engagement. Challenges include interest from external groups on use of eDNA for early detection, and working to ensure public efforts for ED align with provincial/western standards. There is a need for a clear and consistent message. British Columbia is working with a PhD student at the University of Alberta on a model to optimize lake monitoring efforts and maximize detection rate. Alberta is also working with

federal partners on a project exploring the use of eDNA as a potential tool (invasive fish species). And BC is currently updating and expanding its lake monitoring program and is interested in collaboration.

- **Alberta Environment and Parks**—2017 sampling was conducted across most of the province, with an emphasis on southern Alberta’s irrigation districts. Sampling was conducted monthly from July–September for lakes and June–August for southern reservoirs, and consisted of collecting a 3-site composite (lakes) or five individual sites (reservoirs). Sites selected through collaboration involving Alberta Environment and parks (Lake Monitoring Network), Alberta Lake Management Society, Alberta Irrigation Projects Association, and Alberta Agriculture and Forestry. A total of 84 lakes/reservoirs (150 sampling sites, 23 outlet canals, two rivers – six sites). Passive samplers were deployed in major recreational lakes. Laboratory analysis includes cross-polarized light microscopy; QA/QC sample blanks and duplicates are submitted; and analysis for veligers include spiny water flea presence/absence. Changes anticipated for 2018 include potential changes/refinements to partner monitoring with irrigation districts, driven by funding availability and support; a change from site composting water samples to individual site-specific sampling for lakes to improve/refine rapid response by identifying/pinpointing potentially colonized areas; implementing pilot bench-top qPCR for rapid analysis of dreissenids; improving EDRR in impacted waters and to support WID; and refining the QA/QC program for more rigorous efforts that includes positive samples. Strengths include existing lake water quality monitoring program, which allowed for rapid implementation of veliger monitoring, and collaboration with partners. A weakness is lack of dedicated monitoring resources, which limits the number of water bodies, sampling sites, and species being monitored. Challenges include ongoing funding and support of partners, ongoing technological/program development, and recognition as a key part of an overall AIS program. Central oversight/coordination/communication with an AIS Coordinator has been critical to development and implementation of monitoring program.
- **Confederated Salish and Kootenai Tribes**—The tribes first started monitoring in 2017, partnering with the Flathead Biological Station and US Geological Survey (USGS). The tribes closed all lakes except Flathead Lake to motorized boating. Locations for sampling for eDNA on Flathead Lake was based on access points, high use, and circulation patterns. Changes anticipated for 2018 including sampling on lakes throughout Flathead Basin, volunteer sample collection on Flathead Lake, and increasing the number of sampling sites to more than 100. The strengths include the partnership with the Flathead Biological Station and USGS, and inclusion of research components. Weaknesses include messaging of early detection. Challenges include difficulty in obtaining funding for monitoring, achieving decontamination necessary for eDNA, and assessing the efficacy of eDNA versus microscopy. We need a better framework on the probability of detection.

RISK ASSESSMENT NEEDS – WID AND WATER BODY MONITORING (T. COUNIHAN, S. BOLLENS, M. SYTSMAN, S. WELLS)

The objective of the project, which was initiated in 2008, was to provide a data-driven prioritized list of water bodies for dreissenid monitoring in the CRB and surrounding states. Risk of introduction was established from boater use data—there’s no real way to characterize risk of introduction to the region; it can best be done by jurisdiction and at a more local level. Risk of establishment was determined using water quality data (e.g., calcium). The end result was a 2011 prioritized list of water bodies to monitor for QZ (Wells et al. 2011). From 2012–2015, Washington State University received a BPA technology contract to continue the focus on monitoring.

- Data was collected on where people were monitoring and where they proposed to monitor – this promoted coordination through an understanding of the spatial distribution and intensity of monitoring efforts. This placed ED monitoring in the context of what we do and don’t know about risk of introduction and establishment.
- We observed, during that time period, a shift toward monitoring water bodies in higher risk categories. We also realized there were many water bodies for which we had no data.
- We also assessed whether monitoring effort is sufficient, and determined that plankton efforts were insufficient to inform early detection.

In 2015, a workshop was conducted to define research priorities, which included identifying key gaps in understanding risk of introduction and establishment, and assessing whether or not modeling can be used to inform introduction and establishment.

In 2017, we believe we need to establish an ED monitoring program that: establishes regional risk-based criteria . . . (capture these)

Attendees discussed whether or not allocating effort to high-risk waterbodies is a regional issue (or a local jurisdiction issue):

- We need a filter to identify priority locations where entities need to monitor, acknowledging resources are limited, and those resources should be focused on high-risk water bodies.
- There is also the issue of frequency of sampling within one water body as well as sampling more water bodies with less frequency.
- We need to determine the actual outcomes of monitoring—is it detection before we get overland transport, and then how does that change effort?
- Maybe we need to consider reduction in exposure for each water body, e.g., closing a water body at certain times.
- Does a system that transcends jurisdictions (e.g., Columbia River) become a higher priority?

- Probability of containment should also be considered as part of the consideration for where monitoring should occur.
- Think about a coordinated pot of money for rapid response—for those water bodies that have “regional” risk, such as the Columbia River.
- Risk of dispersal should also be considered.
- Consider achieving consensus on criteria that would be used to prioritize monitoring locations. There is power in developing this consensus criteria (for each individual jurisdiction).
- A memorandum of agreement is critical to any effective long-term strategy.

NEW DRAFT TEMPLATE FOR WATER BODY MONITORING (L. DEBRUYCKERE)

There were no additional suggestions for changes to the water body monitoring spreadsheet, but there was discussion about how the data is being used. If states and provinces have their own databases, PSMFC can pull those databases into the regional system (without having to fill out the spreadsheet).

EDNA DISCUSSION (A. SEPULVEDA)

When there is no body, how should eDNA be used?

Assumptions:

- Mussel bodies are required for assigning positive or infested status.
- There is a chance that eDNA positive is from absent DNA source.
- Most CRB groups are using eDNA monitoring – there is a positive coming.

Do we use eDNA to trigger additional non-molecular survey efforts (e.g., tows, dogs, divers)?

Do we use strength of evidence to list eDNA positive water bodies as suspect or to authorize containment measures? Establish thresholds?, e.g., more than 2 sampling locations where the number of positives samples increase.

- Think about samples collected through time versus samples being collected at one time.

Given uncertainty of DNA sources, are only eDNA negatives useful?

Snapshot DNA samples are not informative; they need to be multiple replicates per site or samples through time (to get at production versus decay). If production is greater than decay, more eDNA is available. If decay is greater than production, less eDNA is available.

Discussion:

- eDNA markers are very species-specific; there shouldn't be any confusion with algae or other species, or groups of species. There should be no ability for co-amplification.
- Do multiple eDNA hits in the same water body over multiple points in time trigger the question about whether the source is external or not, especially if bodies are not being found? This is more about messaging versus a scientific question.
- We could do a better job with our veliger sampling (zebra veligers are negative phototaxic, located 5 m below the surface of the water) – we could be more efficient with all types of sampling.

ESTABLISH A COMMITTEE TO OVERSEE AND GUIDE REGIONAL MONITORING EFFORTS AND SEEK COORDINATION WITH NATIONAL EFFORTS

A monitoring committee will be developed, chaired by Tim Counihan (USGS), and we'll see if, and how, the DOI initiative, has a nexus.

MEMBER, ISSUE UPDATES, UMPS/2017 WENATCHEE RR EXERCISE

UMPS/Wenatchee RR Exercise (*L. Ehwell*)

The Western Regional Panel on AIS met for a summit in San Diego on September 2017, and is planning on meeting in Seattle in 2018. The ANS Task Force, a federal advisory committee, has been under review by the Department of Interior, and the review is not yet completed.

A supplement to the Uniform Minimum Protocols and Standards (UMPS) will be completed in early 2018. The supplement will focus on chemicals and their relationship to watercraft decontamination.

There was a rapid response exercise October 5–6, 2018 in Wenatchee, WA. The scenario focused on Columbia River veliger discovery. The exercise incorporated ICS training and included an exercise.