Vox clamantis in Deserto

December 16, 2020

Public Comments on Utah Division of Water Quality Integrated Report 2018/2020 Chapters 2 and 3

Note: The following comments are my own as a private citizen and are not intended to reflect opinions of other organizations.

Northern Utah was gifted with rivers, lakes and streams born from 'the greatest snow' on Earth, precipitated by the Wasatch Front, Middle Rocky Mountains, the backbone of North America, a mile-high wall of uplifted ancient seas that snatch any remaining moisture from clouds originating hundreds of miles west in the Pacific Ocean after travelling across the mostly barren, dry, and vast Great Basin Desert. These rivers, lakes, and streams are home to native cutthroat trout, among others, and home to one of the most diverse aquatic mollusk assemblages this side of the Mississippi. These waters flow from the peaks of the Front and the High Uinta's, feeding the dying remnants of Ancient Lake Bonneville, Utah Lake and Great Salt Lake. To the south and to the east, the Green and Colorado Rivers and all their tributaries within the Colorado Plateau form a maze of canyons (some with springs and streams) unlike anywhere else on Earth, providing a home to unique and strange species adapted to Utah's largest rivers, silt and sand laden, that were portrayed as 'too thick to drink, too thin to plow". All this in the second driest state in the USA. It is indeed an honor and privilege to be a citizen and student of these watersheds. To call this home.

I have been studying rivers, streams, and lakes for nearly sixty years after given my first fly rod at the age of five. I have spent most of my adult life conducting scientific research on freshwater ecosystems, ecology, and the pseudo-science of bioassessment. Earned my bachelor's degree in Fish and Wildlife Management, Masters in Entomology (aquatic) and Ph.D. in aquatic ecology focusing on these phenomena. Throughout my professional career, I collaborated with many state water quality agencies including MT, ID, AZ, WY, CA, and even UT. This vast experience has given me many insights and perhaps some wisdom, and for better or worse, I now consider myself an 'elder' as practiced in Native American tradition.

Utah Division of Water Quality (DWQ) has been tasked by its citizens to protect all waters of Utah, a prodigious responsibility. It is also up to Utah citizens to remain involved and to monitor DWQ's actions, as best they can.

The following are comments on Utah Division of Water Quality's Integrated Report 2018/2020 Chapters 2 and 3, primarily Chapter 3.

To begin with, I tallied the impaired rivers and streams vs. total AUs reported in Chapter 3 and found that 39% of rivers and streams in UT were listed as 'impaired', which was even more than rivers and streams with 'insufficient data', 'partially supporting', and by far greater than 'fully supporting'. In all, I tallied 88% of the rivers and streams in UT as combined impaired, partially supporting, and insufficient data. Only 9% of our rivers and streams (AUs) were designated 'fully supporting', although I have no reason to believe that these few rivers and streams are truly fully supporting DWQ designated beneficial uses or ecological integrity as outlined in the Clean Water Act. There are just too many discrepancies and inconsistencies in Chapters 2 and 3 in the latest Integrated Report.

DWQ is the sole UT state agency responsible for maintaining and improving water quality in Utah's rivers and streams and Utah citizens naively expect DWQ to protect our rivers and streams. This is obviously not the case. I reviewed past DWQ Integrated Reports and found that not much has changed for the better over the past decade; the majority of rivers and streams (AUs) continue to be in poor health or have not been fully evaluated. Very few rivers and streams in UT are fully supporting their so called "beneficial uses" (e.g., fisheries and the aquatic life they depend on, not *food chain*, which is an antiquated idea, and as I stated on numerous occasions, it should be called *food web*. It is embarrassing that in the state that I reside, our water quality experts still uses the term food chain).

I will focus much of the remainder of my comments using DWQ's assessments of the Jordan River AUs as case studies and in particular the impairment parameter, *Macroinvertebrates*. However, I am assuming that any river or stream in UT listed by DWQ as impaired for macroinvertebrates does so for similar reasons.

Jordan River

Macroinvertebrate impairment occurred for all Jordan River (JR) AUs, except AU-8. Macroinvertebrates in the Jordan River weren't assessed since 2008 or 2010 - ten to twelve years ago. Impairment could have and has likely gotten worse. In Chapter 3, there is no description of which macroinvertebrate taxa were absent (i.e., observed minus expected). Based on my more than ten years conducting macroinvertebrate research on the Jordan River and more than 40 years throughout the western U.S., I conclude that the measure of macroinvertebrate impairment that DWQ uses, the single metric RIVPACs, provides very little useful information. This deficiency is my major concern, that DWQ does not adequately evaluate macroinvertebrate assemblage health or impairment and that listing of rivers and streams in UT as impaired, fully supporting, or other classifications in Chapter 3 for macroinvertebrates, using only one metric, is suspect.

DWQ lists specific chemistry impairments such as easily quantified chemistry variables including zinc, copper, cadmium, E. coli, TDS, DO, etc. in the Jordan River but only one metric for macroinvertebrates even though there are likely more than forty easily identified common taxa whose ecologies and sensitivities are fairly well understood. Without more information, concerned citizens cannot hope to evaluate DWQ's listings of macroinvertebrate impairments,

especially as they poorly correlate with other concurrent types of impairments listed in Chapter 3. There appears to be no additional information available on macroinvertebrate impairment and no link to the data in Chapter 3 to verify DWQ assumptions and conclusions.

Salt Lake County Watershed Planning and Restoration does an exemplary job of macroinvertebrate assessments for flowing waters within Salt Lake County using a multi-metric approach. I suggest DWQ personnel open a dialogue with this agency and follow their lead. Also, USU/USGS 'bug lab' automatically provides at least two dozen macroinvertebrate metrics for every macroinvertebrate sample they process, including those they analyze for DWQ. I strongly suggest that DWQ review these metrics and incorporate into their 303(d) assessments. The more metrics we have at our disposal the better we will be able to understand and evaluate macroinvertebrate impairment. We cannot rely on one metric to feel confident that the rivers and streams listed as impaired, fully supporting, etc. in Chapter 3 are valid assessments.

Physical Integrity
None of the streams and rivers in Chapter 3 were listed as impaired for physical impairments, one of the three 'legs' in CWA definition of ecological integrity. Can we assume that DWQ does not measure and report any physical metrics for Utah's flowing waters? If so, why not? These measures are not difficult to obtain or evaluate. Or should we assume, that none of Utah's waters are physically impaired. I know this not to be the case. Obviously, macroinvertebrate impairment is related to physical impairment. To ignore physical measures, particularly in the Jordan River, is a gross oversight by DWQ and needs to be remedied as soon as possible. We all understand the transition from severe embeddedness, to severe bedload instability, to severe deposition are critical impairments to the River and the great majority of the River suffers from one or more of these conditions – causing macroinvertebrate impairment.

Native Mollusks
Mill Creek3-SL City, *American Fork*, *Current -Goshen* AUs as just a few examples were classified as 'no evidence of impairment' or 'fully supporting', however native mussels that once thrived are apparently extinct in these units. Mussels and other mollusks are extremely important keystone species in the Wasatch Front drainages and their loss has major ecosystem function impacts. Again, the reason DWQ misdiagnosed these AUs and likely others was because of reliance on RIVPAC models that only use > 50% probability of capture. This is a sad state of affairs in my opinion. Utah Division of Wildlife Resources has begun an excellent effort to monitor aquatic mollusks in UT and may have been hindered in their efforts by their sibling organization that for the last few decades failed to manage or even monitor this important taxonomic group. Thankfully UDWR has now taken the lead monitoring Utah's native mollusks. DWQ should follow their lead.

Nutrient Impairment
None of the rivers and streams in Chapter 3 are listed for nutrient impairment. Most likely because DWQ is in the process of developing nutrient criteria. However, DWQ has developed nutrient criteria for headwater streams primarily based on TITAN models for

macroinvertebrates. RIVPACs models rely on fifteen environmental variables for their development, none of which were nutrient specific. I am not sure whether the TITAN models or RIVPAC models are correct in their assessment of macroinvertebrate impairments due to nutrients, most likely neither. Again, RIVPAC models shed zero light on nutrient impairment and DWQ apparently does not make the effort to examine their exhaustive macroinvertebrate database to determine causes of impairment, including nutrients. Hence, the impaired for macroinvertebrates parameter listings in Chapter 3 hold very little meaning.

Fisheries Assessments
In Chapter 3 there were no specific fish metrics and in Chapter 2 the Lakes and Reservoirs chapter there were no biological metrics, fish or macroinvertebrates, even though DWQ designated beneficial uses are fisheries centric. I recommend DWQ consult with UDWR fisheries biologists on a regular basis to determine if a lake or reservoir is providing a sustainable fishery and subsequently fully supporting DWQ's mandate.

Upper Green River
DWQ listed Green River-1 AU as 'Fully Supporting' and Green River-2 AU as 'Not Supporting' but only for selenium. Neither AU's were listed for temperature, DO, or macroinvertebrates. These units are completely impacted by the Flaming Gorge dam-reservoir. The natural ecological condition (integrity) of these units was far from what conditions are now due to the dam. These units were much warmer, had lower DO, and a macroinvertebrate assemblage unique to large, silt and sand laden SW desert river ecosystems that are some of the most endangered in the U.S and once supported now threatened and endangered endemic fish species.

The beneficial use designation is misappropriation for upper Green River and is a clear case of modern humanistic, socially desirable, anthropomorphic, magisterial, fantasy-based bias that all rivers should be clear, clean, and cold and filled with trout (i.e., cold water fisheries beneficial use). This designation flies in the face of all river ecologists attempts at preserving native river ecosystems and seriously violates the ecological integrity clause of the Clean Water Act, i.e., "maintain and improve the physical, chemical, and biological integrity" of its waters. DWQ obviously is not interested in protecting natural conditions but caters to current societal recreational and economic desires. I understand, I enjoy fly fishing the upper Green River myself but as a river ecologist I understand the need to protect the integrity of what few remaining free flowing large desert river ecosystems we have.

This also reflects on DWQ's evaluation of the Jordan River, the belletristic designation as a cold-water fishery, free of sediment even though most of the river flow comes from shallow eutrophic Utah Lake-Reservoir and as such can never attain 'fully supporting' under current standards.

"Keeping up with the Joneses"
Surrounding states in the western USA (e.g., ID, MT, CA, CO etc.) include a suite of metrics in their biological assessments with the knowledge that a single RIVPAC metric is insufficient to

adequately evaluate water quality. It is very disappointing that Utah's biological assessment program lags so far behind.

I have commented at great length on DWQ's past Integrated Reports apparently to little or no avail and have grown weary of this exercise. Hopefully, the last remaining bits of integrity and health of Utah's rivers, streams, and lakes will survive, even as Utah's human population propagates and its economy prospers.

Conclusion

Citizens cannot rely on DWQ's evaluation of macroinvertebrate impaired parameters provided in Chapter 3 or for lakes and reservoirs in Chapter 2 because of the lack of DWQ's biological knowledge. As a citizen of Utah, this is of great concern, as our neighboring states do a much better job evaluating the biological health and integrity of their rivers and streams. I recommend that EPA critically evaluate the lack of progress that DWQ has made towards improvement of Utah's waters and the examine the validity of the macroinvertebrate parameter for all waters listed in Chapter 2 based on a single, impossible- to- interpret, user-unfriendly metric and the lack of lake and reservoir biological assessments in Chapter 3.