LCRA WATER QUALITY ADVISORY COMMITTEE MEETING

May 26, 2022

Online - Microsoft Teams Meeting and LCRA Redbud Center, Austin TX

Welcome and Introductions

The Middle and Lower Basin meeting of the Clean Rivers Program (CRP) Colorado River Basin Water Quality Advisory Committee (WQAC) was held May 26, 2022, at 9:00 a.m. via Microsoft Teams and in-person at the Lower Colorado River Authority (LCRA) Redbud Center. Lisa Benton (LCRA CRP Project Manager), Aaron Richter (LCRA CRP Data Manager and Quality Assurance Officer) and Susan Meckel (LCRA Colorado River Watch Network coordinator), welcomed the 14 in-person attendees and the 19 online attendees.

Clean Rivers Program Updates for Colorado River Basin – *Lisa Benton, LCRA*

Benton provided historical background information on the Clean Rivers Program and the roles of the various stakeholders, including the Upper Colorado River Authority (UCRA) and the City of Austin (CoA). She stressed the importance of data collection, quality assurance, and data management, and how the Water Quality Advisory Committee helps guide resources to gather and assess water quality information to identify and address water quality issues throughout the basin.

The Colorado River basin CRP program has $887,594 allotted for the fiscal year (FY) 2022-2023 budget cycle (this includes a recent amendment to add $124,000 for additional monitoring). Approximately 62% of the funds in the contract with Texas Commission on Environmental Quality (TCEQ) are used for monitoring water quality and associated costs. 27% of the funds are contracted to UCRA for administering the Clean Rivers Program in the upper basin, 11% towards personnel/labor, and approximately 1% for supplies and travel.

Benton then turned the floor over to Robin Cypher, the data assessor for the Colorado River basin at TCEQ.

Cypher provided an update on the Texas Integrated Report and 303(d) List ("Integrated Report"), which is a statewide assessment of the status of water quality that uses data collected from the Clean Rivers Program.

For the draft 2022 Integrated Report in the Colorado River Basin, there were 138 water bodies evaluated. 89 of these had enough data to assess, and 19 of them were considered impaired for not meeting the Water Quality Standards for their designated use. For a complete list of the impaired waterways, please see the presentation posted here. Cypher explained that the next steps are that the draft report will be presented to the TCEQ Commission in June and then would be sent to the U.S. Environmental Protection Agency (EPA) for review and approval. (Update since meeting: the draft 2022 Integrated Report was adopted by the TCEQ Commissioners on June 1, 2022 and has been sent to EPA

for approval). In September 2022, TCEQ will begin the call for data for the 2024 Integrated Report to continue the process.

Benton then continued the presentation. She gave a recap of the LCRA CRP Coordinated Monitoring Meeting, which is a meeting held each year to make sure all entities conducting water quality monitoring in the Colorado River basin are communicating and making efficient use of resources. For the coming fiscal year 202e, there will be 3 water bodies with additional monitoring efforts:

- Colorado River below Lady Bird Lake – new site created at Austin Colony neighborhood
- Clear Creek (tributary to Inks Lake) – adding 2 monitoring events to gather additional chloride, sulfate, and dissolved metals data
- Llano River at FM 1871 in between Junction and Castell – site added at the request of the U.S. Fish and Wildlife Service to keep track of native mussel species near this crossing

Summer Weather Outlook – *Bob Rose, LCRA Chief Meteorologist*

Bob Rose then began his presentation focused on summer weather projections. The recent rainfall was helpful, but we are indeed remaining in a drought weather pattern. The vast majority of the Hill Country and portions of the lower basin are seeing 6-16 inches of rainfall departure from normal since October 1, 2021. We are not at the same level of drought as was seen in May 2011; however, many parts of the Hill Country are seeing exceptional drought and the lower basin near Matagorda Bay is in the extreme drought category. The National Oceanic and Atmospheric Administration (NOAA) supports the National Integrated Information System (https://www.drought.gov/) with up-to-date information on drought conditions across the United States. LCRA provides a link to this data by incorporating the drought conditions for the Colorado River basin into the Hydromet website (https://hydromet.lcra.org/) via the Drought Monitor layer. Currently there is a moderate La Niña in place as indicated by sea surface temperature anomalies in the central Pacific Ocean. La Niña conditions tend to bring drier weather patterns to our region. Rose explained that the odds are in favor of La Niña persisting through the summer and fall of this year.

Rose explained that the forecasts predict with high confidence that temperatures will be above normal this summer in our region. There is also a strong prediction that we will likely have a very active hurricane season on the horizon for this late summer and fall because the waters of the Gulf of Mexico are much warmer than normal. In addition, La Niña weather patterns also create a bigger chance of hurricanes forming in the Atlantic Ocean and Gulf of Mexico. According to the National Hurricane Center and Central Pacific Hurricane Center (part of the National Oceanic and Atmospheric Administration), there is a 65% probability that we will have an above-normal hurricane season in the U.S.

In conclusion, Rose stated the following:

- Temperatures are forecast to average between 1 and 3 degrees above normal May through August
- Below-normal rainfall is forecast June through August
- Drought conditions are forecast to worsen through the summer months
- An active hurricane season could potentially provide some relief from drought and heat
- Not a rerun of 2011, but an extreme summer is expected

Microplastics and Plants – *Lexi Woods, Upper Colorado River Authority*

Lexi Woods then presented on microplastics. This presentation and research was a part of her thesis work at Nicholls State University. Woods began by providing an overview of microplastics, which are tiny pieces of plastics that are unfortunately very prolific in the environment.

In 2005, some of the most notable evidence of the persistence of plastic and its effects on the aquatic environment were demonstrated, when multiple pieces of white plastic were found inside the digestive tract of a Laysan Albatross chick carcass. Researchers thought it was likely that the chick had died due to starvation from consistently consuming plastics, which 'tricked' the stomach into feeling full while providing no nutritional value and possibly causing digestive blockages. Remarkably, one of these pieces of had a serial number still imprinted on its surface. Cross-checking and verification of the serial number revealed that this plastic had originated from an U.S. Navy seaplane that was shot down thousands of miles away near Japan in 1944 during WWII. After this discovery, simulations and other computational modeling that cross-referenced weather patterns and water movement revealed that this plastic had gone on a 60-year journey in the North Pacific Ocean. Specifically, within the North Pacific oceanic gyre.

Within this oceanic gyre are two distinct swirling vortices of plastic garbage. One off the coast of Japan called the Western Garbage Patch and the Eastern, off the coast of America. Together, they form the Great Pacific Garbage patch. Amazingly, it was calculated that the piece of plastic from the seaplane had spent approximately 10 years travelling around the Western garbage patch and was eventually carried thousands of miles across the gyre to the Eastern garbage patch. For the next 50 years, it remained off the coast of California swirling along until it was eventually eaten by a Laysan Albatross chick in 2005. This so notable because, not only did this plastic persist long enough to travel such a distance, it retained a legible serial number even after being exposed to the elements and digestive juices.

Woods explained that although plastics could appropriately be one of our greatest achievements in technological innovation, they are now also recognized as one of the greatest environmental challenges that our species has ever known. Plastics by invention are meant to persist, meant to handle high and low temperatures, be flexible or rigid. They were designed to be used in virtually any application. We use plastic for everything! The extensive integration of plastic into our daily lives and the existing waste management strategies historically in place, have created this crucial need for more research on how plastics are affecting our environment and how we can fix those effects. Now that we have more plastic than we know what to do with, we are finding that plastic pollution causes another distressing phenomenon. That is when plastic becomes microplastic.

Once plastic waste enters a waterbody, various factors begin to degrade the material. There are several methods of plastic degradation- all of which can be slow processes with varying degrees of effectiveness. Abiotic degradation occurs via environmental factors. While Insects, microorganisms and fungi have also been observed aiding the degradation. For example, in 2014 waxworms were observed consuming a plastic film with the help of some zealous bacteria in their gut.

The breakdown of larger plastic products into smaller particles is what makes a microplastic. Specifically, these smaller particles have come to be known as secondary microplastics. They are 5mm to 1um in

size but for a size reference, think of a grain of rice all the way down to an 8th of a grain of sand. Plastics that are intentionally manufactured at this size are called primary microplastics. These include nurdles used to produce larger plastic objects such as plastic jars, bags, films, etc. and microbeads which are commonly used in personal care products like toothpastes, shower gels, and face washes as exfoliants. Microfibers that are washed out from polyester clothing as well as personal care microbeads are washed down our drains, which eventually make it to our waterways.

Woods pointed out some promising news that TCEQ has included proposed changes to the Texas Water Quality Standards that helps address microplastics pollution by providing a specific definition of "pre-production plastic" to include further clarity on regulatory oversite regarding microplastics within Texas waterways.

On top of being very prolific in the environment and resistant to weathering, they can also become tiny cocktails of chemical contaminants. Because plastic polymers are made of long carbon chains, they are hydrophobic. This means it is possible for microplastics to both leach out and attract potentially toxic compounds. Plasticizers such as phthalates and plastic forming compounds like BPA and styrene leach out of plastic polymers. Industrial chemicals that are banned but remain in the environment, like DDT, PCB, and lead can be attracted by this hydrophobic, polymeric structure and can become sorbed to the plastic's surface. This can lead to adverse effects on fauna when microplastics are unwittingly ingested. If enough microplastics are eaten, the contaminants can build up in the tissues of the organism, also known as bioaccumulation.

In 2019 when Woods first began her thesis research, there were very few efforts focused on effects of microplastics for vegetation health and growth. Since then, several research studies have been published that focus on the topic. An overarching trend that can be seen in the emerging research, is that if microplastics impact plant health and growth it is likely a result of the plant tissues taking in the microplastics or the particles getting stuck to the outer surface of the plants.

What could make microplastics stick to the surface of plants? Woods decided to look into biofilms. Aqueous bacteria excrete a filmy matrix composed of extrapolymeric substances (EPS) which is a fancy way of saying "sticky blob made of proteins, sugars, and nucleic acids". This sticky blob allows biosorption of metals like lead and copper through ionic interactions with surrounding waters. It is interactions like these that could allow microplastics to hitch a ride on plant tissues. Woods chose the wetland ecosystem as the ideal environment to replicate for her thesis research project.

Numerous wastewater treatment plants (WWTPs), like the one in Thibodaux, Louisiana, employ assimilation wetlands to provide a cost-effective method of improving effluent water quality. And where there's a city, there's microplastics. Plumbing and drainage deliver microplastics directly to WWTPs and if proper protocols are not in place to filter microplastics out, the contaminated effluent is likely reaching the waterways. Typically, plants are the first hurdle that microplastics come across upon discharge into wetland systems.

Woods explained that she developed a mesocosm study to determine if aquatic vegetation could remove microplastics from wetland surface waters so that they would not be as readily available to aquatic fauna. For details on her research design, methods, and results please refer to the presentation posted here.

Woods stated the following main conclusions from her research:

- Microplastics stick to plant tissues, but plants help them aggregate in surface waters much more abundantly.
- Smaller microplastic particles stick around more than larger particles.
- Microplastics of 43-500 um by themselves are not necessarily toxic to the plants and don't seem to block gas exchange processes or inhibit growth of common wetland species.
- The Thibodaux, Louisiana WWTP emergent vegetation exposed to effluent had low abundance of microplastics.
- Although emergent vegetation does not remove microplastics from surface waters, Woods advocated for management practices that can implement microplastics abatement strategies using vegetation in wetlands to help consolidate the particles for removal.

Using wetland vegetation to reduce microplastics would allow the particles to weather and sink, becoming sequestered into the top layer of sediment which in turn is constantly being covered by accretion. Research is showing that the more wetland plants there are, the less microplastics are present in the surrounding water. Emerging research is also showing ecotoxicological effects of nanoplastics as the smaller and more dangerous size of particles in the environment. Woods stated that evidence is mounting that the more quickly these plastics are removed from the surface waters, the less time they are available for interactions with potentially toxic compounds and accidental ingestion by filter feeders. Consequently, less trophic transfer of sorbed contaminants.

With recently emerging research, it is being observed that sediment deposition is one of the most common fates of microplastics in the environment. Woods stated that she believes this research is very promising because it opens the door to so many other research avenues that are currently understudied.

Lexi can be reached at lexiw@ucratx.org.

Basin Summary Report Planning – *Aaron Richter, LCRA*

Aaron Richter then presented information regarding the upcoming 2023 Basin Summary Report (BSR), which is a report produced every 5-6 years by the Clean Rivers Program within each basin in Texas. The BSR is a decision-making aid for water quality issues across the state. It helps CRP partners, TCEQ, and others working in water quality protection to understand water quality conditions, trends and changes. The report includes a very thorough data analysis of water quality data collected through CRP, as well as verbal information to help update and inform the public on efforts made to address impairments and concerns in the basin.

Goals of the BSR include 1) the development of data driven monitoring plans with a selection of prioritized water bodies for action, special study, or continued routine monitoring; 2) the enhancement of knowledge and understanding of water quality issues present in the basin including *why* these conditions might exist; 3) the verification and *explanation* of findings in the Texas Water Quality Integrated Report; 4) and the assessment of water quality improvement

projects within the basin. The last BSR for the Colorado River basin was done in 2017 and included a trend analysis of major water quality parameters from 2006-2015.

The next BSR will be finalized in 2023. LCRA presented ideas for analysis within the upcoming BSR including:

- Trend analysis for data collected within the timeframe of the 2022 Integrated Report;
- Long-term trend analysis for datasets which stretch back 40 years;
- Trend analysis which accounts for the cyclic process of water quality parameters within different months of the year;
- Simple spatial analysis along the basin using box-plots;
- More involved spatial analysis along the basin using Spatial Tools for the Analysis of River Systems (ArcGIS) and Spatial Stream Network (R package);
- Evaluation of Water Quality Protection Programs;
- Colorado River Watch Network analysis; and
- Historical biological data analysis.

However, LCRA is looking for analysis ideas from the WQAC to be performed as a part of the 2023 BSR for the Colorado River basin. If you have ideas about analyses that you would like to see, email Aaron Richter (Aaron.Richter@lcra.org) from now until the end June 2022 with ideas that you might like to see evaluated.

Stakeholder Updates

Austin Youth River Watch (AYRW) – Beth Bennett and Emma Walsh, Program Coordinators

The mission of Austin Youth River Watch is to transform and inspire youth through environmental education, community engagement, and adventure. Beth Bennett and Emma Walsh presented an updated on program impacts from January 2022 – May 2022. During this time, they have collected 29 water quality data sets, collected 812 lbs of trash from six locations, planted 99 trees, and 236 native grasses! Restoration projects have included the MLK Day of Service, Barton Creek cleanup, and a project at Circle Acres Preserve. They have also facilitated an intern service-learning project where bi-weekly water quality data has been collected at the FM 973 bridge on the Colorado River downstream of Austin, and hosted a community event with the Colorado River Conservancy in the Knollwood Community of Austin. This summer, their programming will include water quality testing and E. coli sampling. They are also planning an event in the Austin Colony neighborhood with the Colorado River Conservancy (date to be determined). For more information visit riverwatchers.org.

Colorado River Alliance (CRA) – Adrienne Longenecker, Executive Director

The mission of CRA is to serve as an active voice for a healthy river. They do this by "championing the long-term vitality of the Texas Colorado River through education and engagement for all generations" through the follow avenues:

- *Educate*: 709 students received hands-on STEM education during field trips to the Wilkerson Center for Colorado River Education at the LCRA Redbud Center this school year.
- *Collaborate*: Working with business leaders, elected officials, and community stewards they celebrate and highlight community members making a difference in water resource protection in the Highland Lakes region through their Annual River Heroes of the Highland Lakes program.
- *Innovate*: In the past year, 3,846 people experienced the Mobile River, which is a water-science-center-on-wheels featuring interactive models and fun, educational video games.
- *Engage*: The annual Lake Travis Clean-Up took place on April 24th. 360 shoreline, park and dive volunteers removed 423 bags of trash totaling 10,080 pounds.

CRA is recruiting fall interns this year and is hiring a Communications and Outreach position. Spread the word and contact adrienne@coloradoriver.org with any questions regarding these opportunities. Also on the horizon is the CRA strategic planning process, River Heroes of the Highland Lakes event on June 9, Lake Travis Underwater Cleanup on September 11, and Cocktails for the Colorado on October 13.

Roundtable Discussion

- Colorado River Watch Network (CRWN) – Susan Meckel is the new coordinator for the CRWN program. She introduced herself to the meeting attendees and noted her excitement about getting to know the volunteers and growing the program in new ways.
- Texas Surface Water Quality Standards (TSWQS) proposed changes – Benton listed a few key proposed changes to the TSWQS. The TCEQ public comment period has ended and TCEQ is reviewing and addressing comments at this time. Specific proposed changes to the rules include revisions/additions to:
    - Statewide toxic criteria
    - Site-specific toxic criteria
    - Uses, criteria, and descriptions of individual water bodies
    - Site-specific recreational uses for select water bodies
    - Revisions to clarify the prohibition of discharges of visible pre-production plastic into surface water in the state.
    - Addition of explicit prohibition of discharge of visible pre-production plastic in all wastewater and stormwater discharges subject to 30 TAC 307.4(b)(8)
- Aquatic vegetation and algae in the Highland Lakes – Benton provided a brief update, stating that due to the drought conditions, warm water temperatures and lack of flow through the reservoirs, there is quite a bit of vegetation and algae growing in several of the lakes right now; notably Lake LBJ and Inks Lake.
- Native mussel conservation – Benton informed the audience that LCRA/LCRA Transmission Services Corporation has submitted a draft Candidate Conservation Agreement with Assurances (CCAA) to the U.S. Fish and Wildlife Service (USFWS). This is a voluntary agreement that commits LCRA to conservation measures and avoidance and minimization standards that provide a net conservation benefit to four native mussel

species that are proposed for listing under the Endangered Species Act. The CCAA is currently being reviewed by the USFWS regional office. The CCAA must be finalized by August 2022, in order to take effect before the USFWS final listing decision is made.

The meeting adjourned at 12:00.