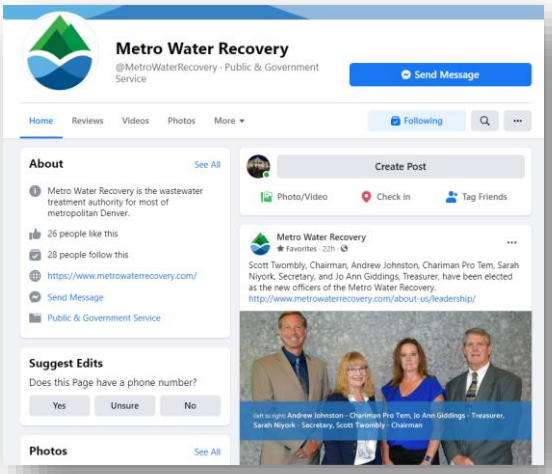
The Connector

Bringing you quarterly updates from Metro Water Recovery

Issue 5 October 1, 2021

What's Inside this Issue?



We hope you and your teams enjoyed the summer and are settling into a nice fall. We are open to feedback and want to make this newsletter the most valuable to you, our Connectors.

- Branding Update: How Connectors Can Help
- Important Dates to Remember
- Emerging Issues: Thermal Pollution and Temperature Standards
- Rules and Regulations Update: Pretreatment Delegation

Branding Update – How Connectors Can Help

New logo, new website, new emails

As of September 1, 2021, Metro Wastewater Reclamation District is Metro Water Recovery. We greatly appreciate your feedback throughout the rebranding process. As we continue to transition, we are again looking to you for assistance. Our email will be changing over the next few weeks to have the extension of @metrowaterrecovery.com. Please update all your Metro contact information. Don't worry if you forget; the old email addresses will still work for a while.

In addition to a new name, we have launched a new website (shown above), metrowaterrecovery.com. The new website has a place just for you! The Connector page was created so you could access all the information you need. This is a work in progress, so please take a few moments to visit the website and let us know what you would like to see either as a Connector or for your customers' benefit.

Beyond the website, we have a new Facebook page and have updated our LinkedIn presence. Please follow us! The purpose of increasing our digital presence is to educate the public on how we serve our community, advocate for environmental issues, celebrate the work of our employees, and provide a channel for emergency communication. As our partners, we also want to help share your messages. Just let us know how we can help!

Please update your references to Metro Water Recovery and let Dawn Ambrosio

(dambrosio@MetroWaterRecovery.com)
know if you need logo files. Thank you for championing our new brand on your platforms!

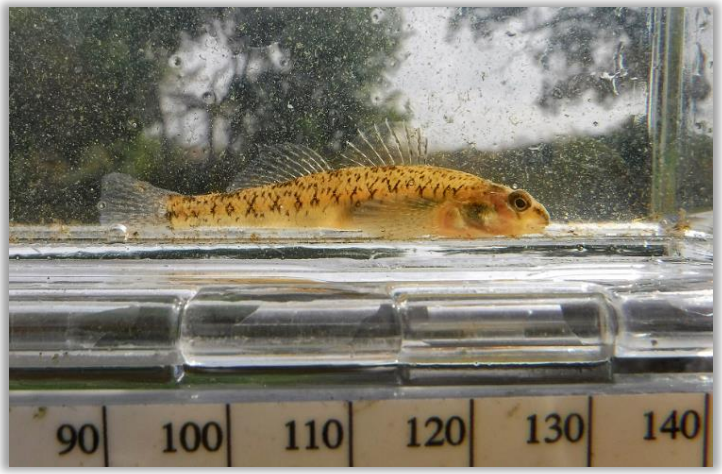
Important Dates to Remember

October 15, 2021	Q3 2021 Sewer Connection Charges due
December 15, 2021	Q4 2021 Annual Charges due
January 17, 2022	Q4 2021 Sewer Connection Charges due

Emerging Issues: Thermal Pollution and Temperature Standards

In 2007, the Colorado Water Quality Control Commission adopted statewide temperature standards for both cold and warm water systems based on the protection of aquatic life (fish and macroinvertebrates). In order to assess attainment of the adopted temperatures standards, Metro staff has maintained hourly temperature loggers in the final effluents of the Robert W. Hite Treatment Facility (RWHTF) and the Northern Treatment Plant (NTP) and at various South Platte River locations upstream and downstream of outfalls, where the effluent discharges to the river.

During the winter months (December–February), the RWHTF's final effluent is about 4°C warmer than the chronic stream standard, resulting in regular exceedances of the instream temperature standard as far as seven miles downstream at 104th Avenue. Many of these exceedances occur during the abrupt transition to the wintertime temperature standards in early December. Currently, there are no exceedances of the instream temperature standards downstream of the NTP outfall.



Johnny darter (Etheostoma nigrum) collected during a Metro fish survey along the South Platte River in Brighton

Outfall area at RWHTF, where treated wastewater (effluent) is returned to the South Platte River

The Warm Stream Tier I winter temperature standards assigned to this portion of the South Platte River are based on the presence of the Johnny darter, a small native fish found in shallow water throughout North America east of the Rocky Mountains. The South Platte River basin is on the far western edge of their native range. Metro fish surveys have demonstrated Johnny darters are not abundant in the South Platte River mainstem and are more likely to be present in shallow, sandy-bottom tributaries.

The Johnny darter is considered the most thermally sensitive fish in this river segment, and the winter stream standards have been developed to protect this species. Past studies supported by Metro have shown that elevated winter water temperatures common in effluent-dominated streams can promote out-of-season spawning in Johnny darter populations and contribute to reduced reproductive success in the spring. Future research will focus on assessing what is the most appropriate chronic winter season temperature standard needed to protect these thermally sensitive fish populations.

Temperature Standards and the Johnny Darter

Metro has an extensive history of working with temperature standards. Prior to the adoption of statewide temperature standards in 2007, a stakeholder process resulted in tiered criteria based on the most sensitive fish species in warm and cold waters in Colorado.

Due to the presence of the Johnny darter, Warm Water Tier I standards were placed on Segment 15 of the South Platte River during the initial Regulation 38 hearing after the adoption of the standards. During the hearing process, Metro requested a site-specific standard be placed on Segment 15. However, after many discussions with the regulatory agencies, the proposal was not deemed appropriate, and it was agreed a temporary modification would provide time for Metro to perform additional studies to determine an appropriate temperature standard for the segment.

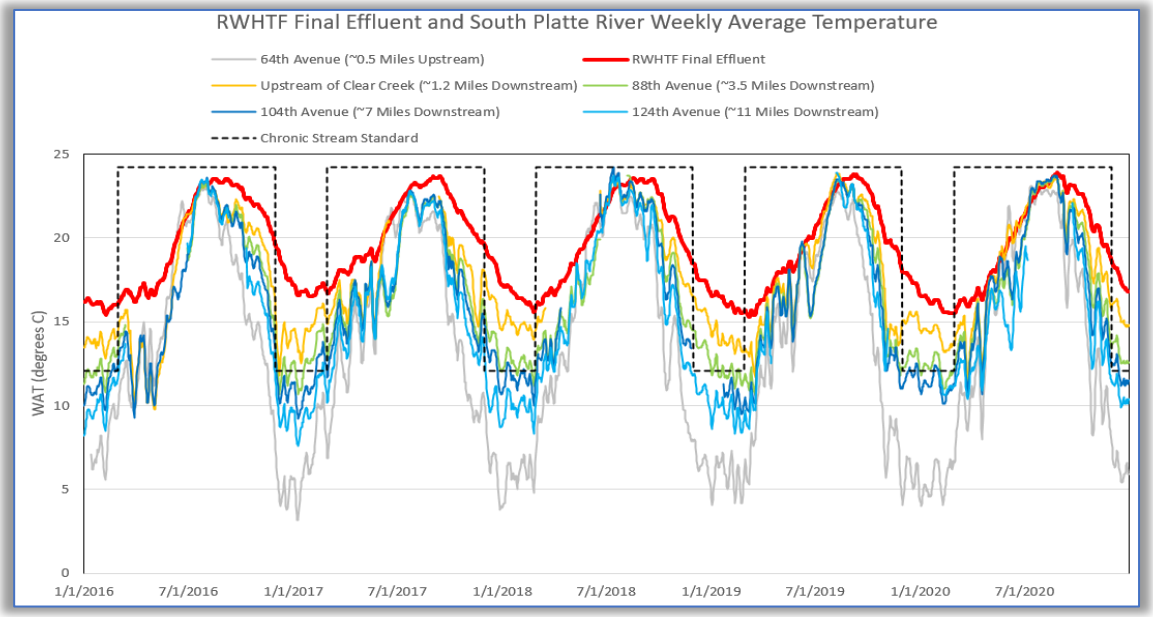
After collecting continuous temperature data, modeling temperature, and evaluating what factors influence the river temperatures in the segment in 2009, Metro staff made a second attempt to institute a site-specific standard for Segment 15. Again, the regulatory agencies still felt there was more work needed to be done and the temporary modification was extended. Based on feedback from the regulatory agencies, Metro determined a better understanding of the Johnny darter's thermal tolerance was needed.

Metro entered into a contract with the University of Wyoming to study the thermal tolerances of Johnny darters collected from the South Platte River near Denver. Completed in 2016, results indicated it was possible the current standard was potentially not low enough. Based on the results of this study, Metro started evaluating other regulatory alternatives to address the temperature issue and this is when the Discharger Specific Variance (DSV) effort began.

Season	Maximum Weekly Average Temperature (Chronic)	Daily Maximum Temperature (Acute)
March–November	24.2°C	29.0°C
December–February	12.1°C	24.6°C

Top right: South Platte River Segment 15 Temperature Standards

Bottom Right: Rolling weekly average temperatures at the RWHTF final effluent and various monitoring locations along the South Platte River



What Are We Doing?

RWHTF and NTP have compliance schedules for temperature which expire at the beginning of 2030 and 2026, respectively. Ahead of these deadlines, Metro is taking many steps to lessen the extent and impact of thermal pollution, initially focusing on RWHTF since the South Platte River currently exceeds the chronic standard in the winter months downstream of the outfall.

Instream improvements. One step is to improve aquatic habitat and promote mixing of the river and tributaries. In 2019, Metro completed construction of these South Platte River instream temperature habitat improvements:

- Two riffles (rocky or shallow part of stream or river with rough water)
- Six spur dikes (elongated structure with one end anchored to the shore and the other jutting into the current)
- One hardened channel bar (spit of land in middle of stream or river)
- One backwater pool (water held back by a dam or other obstruction)
- Bank stabilization
- Grade control structure repair

These improvements were designed to more rapidly mix the relatively warm South Platte River water with cooler Clear Creek water in order to create a more consistent thermal environment for aquatic life, increase heat dissipation, and lower overall instream temperatures

Repaired grade control structure

Jordan Parman (Water Quality Scientist) deploying temperature loggers in the South Platte River at Fort Lupton

downstream of the confluence. Preliminary monitoring results from before and after construction demonstrate these habitat improvements are achieving the goal of more efficient instream thermal mixing while also providing important and diverse microhabitats preferred by the native fish of the South Platte River.

Climate change presents an additional challenge to reducing overall stream temperatures in Segment 15. Most climate change projections for the South Platte basin predict reductions in the annual average streamflow and increases in stream temperature.[1,2] Given these projections, the potential warming and declines of upstream and tributary stream flows could serve to counteract temperature reduction efforts undertaken by Metro.

Sewer heat recovery. Metro is taking another step to promote additional, environmentally sustainable efforts specifically targeted at reducing thermal pollution of the effluent. Sewer heat recovery systems can reduce the thermal load of wastewater discharge and reduce energy use in residential areas by providing a sustainable means of heating water and cooling in buildings. The National Western Center (NWC) currently is undergoing major redevelopment and incorporating sewer heat recovery as a sustainable approach to heating and cooling of the development, assisting with the development goal of achieving a net-zero energy landscape.

1. Woodbury, M., M. Baldo, D. Yates and L. Kaatz (2012). Joint Front Range Climate Change Vulnerability Study.
2. Colorado Climate Change Vulnerability Study: A Report by the University of Colorado Boulder and Colorado State University to the Colorado Energy Office (2015).

New Delgany Interceptor segment being placed beneath the NWC

The basis of the NWC campus energy design was to install a sewer heat recovery system that uses the water in the Delgany Interceptor as a thermal source and sink. The system will use a heat pump to transfer heat from the interceptor to a hot water loop, which will supply heat to the NWC to meet building demands in the winter and will provide cooling by transferring heat from the buildings to the interceptor as a sink in the summer. The initial phase of the system is designed to recover 4 megawatts (MW) of thermal energy. Future expansions may meet heating demands of up to 12 MW. The initial phase is expected to cool the RWHTF effluent temperature by 0.11°C, while the expansion would cool the influent by as much as 0.23°C.

Construction of a new Operations Services and Controls Building (OSCB) at RWHTF was completed in February 2021. The design of the OSCB includes the incorporation of a heat recovery system, which uses a water-to-water heat pump to transfer heat from a portion of the secondary effluent to the OSCB's hot water supply loop. The heat pump will meet building heat demands for an estimated 70 percent of the time and will be capable of providing cooling service during summer months by using the wastewater as a heat sink.

The portion of the secondary effluent used for heat recovery at the OSCB is very small compared to the total secondary effluent flow, and it is not anticipated Metro will measure an impact to the effluent temperature.

Metro Water Recovery is implementing the small-scale heat recovery system in the OSCB to assess the potential to apply this technology to current on-site heating needs and additional support buildings planned for construction and to offer an on-site demonstration for education.

Metro is also investigating more traditional cooling technologies at the RWHTF; however, these potential solutions present several challenges due to space constraints, water quality, and a need to align infrastructure with future tertiary treatment. Cooling towers and chillers are potentially feasible but are expensive, energy intensive, and have significantly larger carbon footprints when compared to solutions like sewer heat recovery. A pilot test of cooling tower technologies is anticipated at the RWHTF for winter 2021. The technical and environmental feasibility analysis at RWHTF is anticipated to be complete in the second quarter of 2022.

At NTP – which has available land, tertiary treatment, and less significant thermal loading – cooling towers may be a viable option, but Metro is also investigating low-tech and cost spray ponds. The technical investigation of cooling alternatives at NTP is anticipated to be complete by the fourth quarter of 2021.

Future Efforts

Metro anticipates initiating a project in 2022 to ensure compliance by the deadlines. Due to the proximity to new developments of interceptors which feed RWHTF and the technical and environmental challenges of installing cooling technologies at that facility, Metro will continue to work on the development of on- and off-site heat recovery projects that offer a sustainable solution to thermal pollution while providing environmental benefit. A modest estimate of potential heat recovery projects would result in a 1.13°C reduction in temperature of the effluent while offering a nearly 400,000 metric tons of CO_2-equivalent emissions reduction over a 25-year timespan. This effort will include outreach to developers, regulators, partner utilities, and local officials in order to spread awareness and interest.

Rules & Regulations Update

The Metro Water Recovery Rules and Regulations Governing the Operation, Use, and Services of the System (Rules) govern the operation, use, and services of Metro's system and were first issued in March 1971.

The establishment and enforcement of the Rules are requirements in Metro's Service Contracts with Connectors as well as a requirement of the U.S. Environmental Protection Agency (EPA). Throughout the years, several amendments and revisions to the Rules have been approved by Metro's Board of Directors.

Metro is considering amending the Rules this fall to remove certain provisions in Section 6 which cover our Pretreatment Program. As the regional facility that provides wastewater treatment services for your community, Metro implements a federally approved pretreatment program, which is required by the federal framework. Through implementation of the pretreatment program, Metro acts as the control authority to ensure nondomestic facilities that send wastewater to our treatment plants do not discharge wastewater that would adversely affect the plant or receiving waterbody.

What provisions may be included in this action?

Metro proposes removing sections 6.3 through 6.11 of the Rules and marking these sections as "RESERVED." These provisions are obsolete because Metro is the control authority and implements the pretreatment program for your community. These revisions would be in addition to other amendments related to Metro's local limits effort that will be included for consideration by the Metro Board of Directors this fall.

What does this mean for you?

Nothing would change for Connectors. No new obligations or duties would arise because of the proposed amendments. Additionally, these amendments would not prevent Connectors from taking independent voluntary action consistent with Metro's pretreatment program to control nondomestic facilities in their service areas.

With whom can I talk about the proposed amendments?

If you would like to discuss the proposed amendments, please reach out to Ridge Dorsey, Senior Pretreatment and Sampling Manager, at rdorsey@mrwd.dst.co.us (303-286-3159).

Should Metro choose to move forward with these amendments later this fall, the process will follow federal public notice procedures, including a public notice and comment period as well as presenting the item for consideration to the Metro Board of Directors during public meetings. If Metro moves forward, details will be available on our new website.