Fish living near two wastewater treatment plants have unaltered thermal tolerance but show changes in organ and tissue traits


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Municipal wastewater treatment plants (WWTPs) are a significant source of anthropogenic pollutants to aquatic ecosystems. While WWTPs are designed to remove a large fraction of these pollutants, they may still release wastewater at temperatures and with the presence of pollutants that can stress fish populations. We investigated the thermal tolerance of rainbow trout (Oncorhynchos mykiss) from different locations near two wastewater treatment plants in southern Ontario, Canada. Fish from wastewater outfalls showed unaltered thermal tolerance compared to fish from uncontaminated reference locations, indicating that WWTPs were sufficiently effective at removing temperature and chemical stressors. However, we observed significant changes in organ and tissue traits, including decreased gill mass, kidney mass, and red blood cell counts. These changes suggest that fish near WWTPs may experience sublethal stressors such as pollution and temperature extremes, which could affect their health and fitness. Our findings highlight the importance of monitoring fish populations near wastewater treatment plants to ensure they are not experiencing stress from unexpected pollutants and temperature changes.