Thanks in part to the generosity of the North Cascades Audubon scholarship, my team and I are researching how noise and light pollution affect cognition in birds. Road noise and artificial light at night are rapidly increasing in urban and suburban areas, yet their impacts on avian behavior and cognition remain poorly understood. Our group is filling this gap by studying how these “sensory pollutants” affect learning, memory, and problem-solving in birds. Understanding how the human-built environment alters these cognitive processes is critical as cognition influences many aspects of survival, such as foraging, navigation, and predator avoidance. If sensory pollution impairs these processes, it could have far-reaching consequences for many species that live in urban areas.

This summer, we conducted an experiment using captive-bred zebra finches and exposed each of them to a random sequence of road noise, artificial light at night, a combination of both, and a control. After 4 days of each treatment, we tested their cognitive capabilities. Using a spatial memory task and detour reaching task, we examined the birds’ memory, learning abilities, and problem-solving. The spatial memory task involves hiding food under one of five locations on a foraging grid. We measure how long it takes the bird to learn the location of the food and if they can remember that location after their treatment. The detour reaching task measures inhibitory control, an aspect of problem-solving, to see if birds can resist the impulse to peck at visible food behind a transparent barrier and instead find a different route to reach it.

Our research is ongoing and our results may change as we continue to test birds. Preliminary data suggest that spatial memory is greatly affected by light pollution, as well as road noise to some degree, but reversal learning and inhibitory control are not as impacted by sensory pollutants. This may indicate that these cognitive processes are being affected through mechanisms that are differentially influenced by a birds’ environment. For example, light pollution may disrupt sleep quality, which is linked to memory formation, while road noise may interfere more with attention during learning tasks. Teasing apart the mechanisms underlying these relationships between cognitive function and environmental stressors would help us better understand how urban environments influence birds.

This winter, we plan to expand on these results by replicating this experiment in a group of wild-caught black-capped chickadees. Previous work has found that wild birds are potentially more affected by sensory pollutants than captive-bred birds, so our next experiment will allow us to better replicate the real-world impacts of noise and light pollution. Ultimately, we aim to improve understanding of how urbanization affects avian

cognition and inform conservation efforts that mitigate the impact of human-induced environmental change.