Modeling impacts of PFAS contamination of Great Lakes fish

Per- and polyfluoroalkyl substances (PFAS) are a group of anthropogenic chemicals that are known for their water-resistant properties created by their strong carbon-fluorine bonds. These bonds are extremely hard to break and cause these chemicals to bioaccumulate over time in the environment. They have been found in the blood of both humans and wildlife and have known effects on hepatotoxicity, immunotoxicity, hormones and development. Due to the complex nature of these chemicals, there are many gaps in our knowledge about how they impact the health of key species in nature. In attempt to better understand how these chemicals impact wildlife, I will be creating a model to simulate how PFAS contamination will alter population levels of lake trout, lake whitefish and steelhead trout when there is disease present in their population.

The model will simulate how the total population of fish in Lake Michigan changes with a disease present in their population. To see how PFAS impacts the disease susceptibility of these populations, it allows for a proportion of the fish to be exposed to PFOS each year. It will use corresponding mortality, recovery and infection data from laboratory experiments for calculations and will also keep track of the yearly death rates from both the PFAS exposed and non-exposed fish. This model will be a useful tool for making informed management decisions and may be updated as more research is done about how PFAS affects fish from the Great Lakes.