2023 Annual Conference Paper Abstracts

Are Loons on Thin Ice with Climate Change?

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Climate change is impacting Common Loons (*Gavia immer*) throughout New York's Adirondack Park during both the nesting and non-breeding seasons. Direct effects of climate change on breeding loons include increased exposure to avian diseases and reduced reproductive success secondary to extreme weather events, including torrential rain storms and drought. During the non-breeding season, loons are susceptible to unpredictable ice-in events, leaving them vulnerable to missing essential migratory windows, which are defined by their molting patterns. These impacts may contribute to a future decline in the population of loons breeding in New York State. The implementation of management tools, such as artificial nest rafts and loon rescues, are recommended strategies to mitigate the detrimental impacts of climate change on New York's loon population.

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Title: The Initiation of Regime Shifts in Trophic Status on ADK Lakes

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Abstract: As we enter an era of unprecedented anthropogenic disturbance, it is crucial that we characterize the interactions and potential synergies that a variety of human activities (e.g., pollution, land use change, climate change) have had on ecosystem functioning. Present and future climate change, recovery from acid rain, and recovery from historical watershed disturbances make Adirondack (ADK) lakes an important case study to understand other mid-latitude lakes impacted by a mixture of collective human disturbances. We hypothesize that interactions among disturbances and/or disturbance legacies result in impacts and regime shifts that are synergistic rather than summative. Presented here are sediment core records from three lakes in the northeast ADK that cover a gradient of successively increasing human influences. To test our hypothesis, we use the concentrations of trace metals and the concentrations, ratios, and stable isotopic compositions of carbon and nitrogen, as well as historical maps and records of forest disturbance and water chemistry. Prior to European impact, all lakes displayed resilience in response to periods of natural climate variability. However, following sequential intensive land use change, acid rain, and recent climate change, we find evidence for synergistic interactions and consequent regime shifts in trophic states of the lakes. The lakes have potentially reached a tipping point resulting in a novel ecological state that is not repairable as long as the ecosystem is stressed by future warming.

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