2024 Fish & Wildlife Diversity Forum

Moving fish and wildlife conservation forward in the next decade!

POSTER SESSION ABSTRACTS

INTEGRATING WILDLIFE HEALTH PRIORITIES IN THE 2025-2035 PENNSYLVANIA WILDLIFE ACTION PLAN

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Wildlife health threats include disease-causing organisms, toxins, and pollutants that may negatively impact species or entire taxonomic orders, potentially leading to ecosystem-wide disruptions. This developing project will identify and prioritize existing and emerging health threats that may lead to population-level impacts for Pennsylvania Species of Greatest Conservation Need (SGCN). It will describe knowledge gaps, identify priorities for surveillance and research, and evaluate management strategies that could mitigate population-level impacts and geographic spread of priority wildlife health threats. The approach to this project includes assembling working and advisory groups, synthesizing literature on known wildlife health threats, and surveying wildlife health professionals and wildlife agencies in the Northeast. Information from literature searches and survey results will be summarized to generate a succinct wildlife health section for the 2025-2035 Pennsylvania Wildlife Action Plan, with a focus on actionable content.

ENVIRONMENTAL DNA (eDNA) ANALYSIS REVEALS PRESENCE OF CHYTRID FUNGUS AND RANAVIRUS DETECTED IN THE SOUTHERN END OF MICHAUX STATE FOREST, PENNSYLVANIA

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Amphibians can experience population decline due to infectious diseases such as chytrid fungus - *Batrachochytrium dendrobatidis* - (Bd) and ranavirus -*Iridoviridae* - (Rv). Environmental DNA (eDNA) techniques, in conjunction with qPCR, quantify pathogen DNA in aquatic environments. Our objective was to detect and quantify Bd and Rv eDNA, via a multiplex qPCR, from vernal pools in the southern end of Michaux State Forest, Pennsylvania. We collected 33 water samples (~500 mL) from 16 pools in April, May, and August (2022) and March 2023. In the lab, we filtered water (409.5 ± 16.5 mL) through a cellulose nitrate membrane (0.2 µm) within 3.5 h of collection. We stored membranes at -80 °C until DNA extraction. We extracted DNA from membranes using the DNeasy PowerSoil® Pro Kit (Qiagen) according to manufacturer, except for

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extended vortexing step (2.5-hour). We used a pre-stablished multiplex qPCR for Bd and Rv DNA quantification. Our results indicate Bd positivity rates of 18.75% in April and 0% for May August and March, whereas Rv displayed 0% in March and April, 8.3% in May, and 20% in August. We observed 301.9 ± 105.7 Bd copies/dL and 9.1 ± 8.6 RV copies/µL. Concentrations of Bd were slightly higher compared to previous results in western Pennsylvania, whereas Rv concentrations were similar to previous findings in other areas of the United States. This study is a step forward to refine and broaden biomonitoring approaches, at a landscape scale, in Michaux State Forest and potentially other regions in Pennsylvania. Future efforts should additionally use metabarcoding for amphibian species detection to gain deeper understanding of pathogen/host/disease dynamics.

A CONCEPTUAL FRAMEWORK TO PREDICT ACIDIFICATION IN PENNSYLVANIA HEADWATER STREAMS

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Surface water acidification is a process characterized by increasing concentrations of hydrogen ions (H^+), which lowers the pH of waterbodies. Acidification is a major stressor in Pennsylvania, with abandoned mine drainage and atmospheric deposition most often to blame. Numerous aquatic species of greatest conservation need (SGCN) are negatively impacted by acidification. Underlying geology, roads, land cover, abandoned mine lands, and wetlands are the major landscape variables that determine a watershed's susceptibility to acidification. This conceptual framework can be used to prioritize restoration of SGCN and increase the availability of cold water refugia across Pennsylvania.

HARE TODAY, GONE TOMORROW: RECENT SNOWSHOE HARE RANGE CONTRACTION IN PENNSYLVANIA

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The range of the snowshoe hare (*Lepus americanus*) has been contracting northward along its southern boundary over the last century. In Pennsylvania, winter temperatures and snowfall have been identified as key drivers of this range shift; changes in the distribution of hunter harvests in the late twentieth century show a northward contraction to the coldest regions of the state, and spatial variation in snowfall has been found to explain snowshoe hare site occupancy in these areas. In 2023, we used occupancy modeling based on presence-absence data from tracks and fecal DNA to model current snowshoe hare occupancy across northern Pennsylvania, with a goal of assessing whether range contraction had continued as predicted based on occupancy data collected in 2004. The best model indicated that winter snowfall remained an important factor explaining snowshoe hare occupancy, along with the amount of surrounding forest cover and the proportion of that forest cover in the early-successional stage. Using this model to estimate snowshoe hare occupancy probabilities across the study area in 2004 and 2023 showed an overall decline in occupancy, with the total area with a ≥60% predicted probability of occupancy declining by 86%. This contraction is occurring faster than was previously predicted and was not mitigated by increases in the amount of early-successional forest cover in the study area over the last two decades. These findings have negative implications for the persistence of snowshoe hares in Pennsylvania as the decreasing trend in winter snowfall is expected to continue.

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