**Juliella Hankinson**

Hankinson Home Academy-Bethany Hankinson, Parent/Teacher

**Salt in the Water? A Study of Variables Effecting Chloride Levels in Tributaries from Excessive use of Road Salt**

After road salt is applied, excess is washed off roads into soil and nearby waterways. The objective of this study is to determine the effect of road salt on Wolf Run, a tributary of Kokosing River in Knox County, Ohio. An initial water quality analysis was completed. From 9/30/2021-2/28/2022, water samples testing chloride levels using Quantab Chloride test strips were drawn. Variables measured were width, depth, precipitation amounts, water and air temperature. Observable macroinvertebrates, flora, wildlife, and changes in the stream and the riparian zone were documented. Results indicate a correspondence to lower levels of chloride with higher water levels and vice versa. When precipitation levels went from 0.86 to 3.5 inches the chloride went from 1.8 to 1.6 quantab units. Without further road salting, chloride levels decrease. When snow accumulation went from 1.5 to no accumulation for three days, salt levels continued at roughly 1.6 quantab units. Without snow accumulation, chloride levels dropped to 1.2 quantab units. Wolf Run had higher chloride levels than the Kokosing River. This study indicates waterways; such as tributaries, with lower levels of water may be the first to exhibit signs that the overall water system is in danger of becoming overloaded with salt.

**Isabella Bair, Cassidy Loos, Sophia Riker**

New Philadelphia High School, Kip Brady, Teacher

**Reclamation of "Ohio's Hidden Mine" and its impact on aquatic ecosystems**

The Dessecker Mine Complex, known as "Ohio's Hidden Mine", is a small watershed in Tuscarawas County, Ohio that was mined for coal from 1947-1995. Extensive, unregulated mining activity resulted in severely degraded water quality downstream of the complex. We examined changes to the ecology of a headwater stream that drains from the mine complex following completion of a reclamation project in August 2018. Between 2018 and 2021, macroinvertebrate similarity to a nearby unmined reference stream improved by a factor of 4, the abundance of Northern Dusky Salamanders increased by a factor of 6, and the ratio of the decay rate of White Oak leaf litter between the unmined reference and reclaimed streams decreased from 10 to 5. Although measures of stream water quality improved over the course of the study, leaf decay rate, salamander diversity, and macroinvertebrate diversity remained significantly different from the unmined reference stream. Taken together, these results suggest that, although the reclamation project has mitigated some effects of historic mining activities, key aspects of ecological structure and function remain in an impaired state relative to streams without mining influence.

**Nykaih Gay**

Paul Laurence Dunbar High School, John Huston, Teacher

**Potential ecological benefit of Amur Honeysuckle (Lonicera maackii)**

Amur Honeysuckle is a noxious woody shrub, introduced in southern Ohio in the late 1950’s but is now rampant across the state. This vigorous, invasive shrub has displaced many native shrubs with its aggressive growth. Cecropia moth caterpillars (Hyalophora cecropia linnaeus) are often raised on lilac (Syringa vulgaris), a non-native of the same taxonomic class as bush honeysuckle (Diervilla spp., Taxonomic class Magnoliatae). Can cecropia moth caterpillars (Hyalophora cecropia linnaeus) complete a life cycle stage with bush honeysuckle as a host plant? A captive cecropia female that mated with a wild male produced larvae that were placed on bush honeysuckle locations under protection from predators to see if pupation would occur. Locations were selected daily as larvae emerged over a three day period (day 1 = 50 larvae, day 2 = 20 larvae, day 3 = 15 larvae). Pupation rate by location was 30%, 50%, and 27% respectively. Cecropia moth larvae can complete a life cycle stage 1 utilizing the

invasive species bush honeysuckle as a host plant while protected from predators by a mosquito net. This identifies the opportunity for the invasive species Amur Honeysuckle to become a contributing part of the ecosystem.

**Hannah Daniel, Elizabeth Dorsey, Adeline Kendle, Cambri Mushrush**

New Philadelphia High School, Kip Brady, Teacher

**The New Philadelphia City Schools Tick Project**

The Blacklegged (Deer) Tick (Ixodes scapularis) has experienced a dramatic geographic range expansion

across eastern North America over the past decade. The first Ohio population of I. scapularis was

identified in Coshocton County in 2010, and today the species occurs in all of Ohio's 88 counties. In

eastern North America, I. scapularis is the only known vector for Borrelia burgdorferi, the etiologic agent

of Lyme Disease, so understanding the ecological factors contributing to I. scapularis abundance and

Borrelia burgdorferi prevalence have important implications for human and ecosystem health. The New

Philadelphia City Schools has recently developed a project to map Borrelia burgdorferi prevalence within

I. scapularis populations in Tuscarawas County, Ohio. Our preliminary data include the results from 153

adult I. scapularis individuals obtained from 13 different locations. Overall, 73 of the 153 ticks (48%)

have tested positive for Borrelia burgdorferi sensu lato. Prevalence across the 13 sampling locations

ranged from 9% to 73%, suggesting that prevalence may be affected by habitat variation across sites.

These data indicate that populations of I. scapularis in Tuscarawas County have Borrelia burgdorferi

prevalence rates similar to those in regions where Lyme Disease is considered endemic.

**Jacob Widanski**

West Clermont High School, Jon Souders, Teacher

**Characteristics of seasonal Eastern box turtle (Terrapene carolina carolina) migration into prairie habitat**

Eastern box turtles (Terrapene carolina carolina) are a relatively common subspecies of box turtles found across much of the eastern United States, including southwestern Ohio. For over 17 years, high school students from West Clermont LSD have utilized radio telemetry to track the weekly movement of turtles at Rowe Woods in western Clermont County and collect data on their surrounding environment. Combining these 2,215 observations with meteorological data from Lunken Airport’s ASOS weather station, I analyzed the habitat selection of Eastern box turtles using R and QGIS. Movement of turtles into prairie habitat was observed from late spring into summer between May and September when weekly mean external air temperatures exceeded 10 C (50 F), with an average of 21.54 C (70.78 F) from 215 observations. Meanwhile, in all other vegetation types, turtles were observed with a mean weekly air temperature of 18.57 C (65.42 F). Turtles were found in the prairie even when ambient temperatures at the time of observation exceeded 32 C (90 F). 9.7% of all observations were in the prairie, including 22% in May, despite accounting for only 4.2% of total turtle home range size using a 90% kernel density estimate. It would be expected that turtles occupy shaded habitats such as dense forests, which regulate external temperatures from extremes relative to open habitats, during warmer summer temperatures since Eastern box turtles are ectotherms and thermoconformers. This finding provides insights into the seasonal shift in habitat utilization of Eastern box turtles and lays ground for future work investigating the factors influencing habitat selection.