

Westfield State University Department of Environmental Science

Fall 2022



An Evening of Environmental Science

December 6, 2022
7:00 pm – 8:30 pm

Zoom Link to virtual symposium:

<https://westfield-ma.zoom.us/my/timparshall>

Table of Contents

ZOOM LINK TO VIRTUAL SYMPOSIUM:	1
TABLE OF CONTENTS	2
PROJECTS BY STUDENT NAME	3
WELCOME!	4
RING-NECKED PHEASANT REPORTING SURVEY	5
JACOB SQUIRES,	6
SARAH DEMING,.....	6
DO DAMS SIMULATE DROUGHT CONDITIONS DOWNSTREAM FOR MACROINVERTEBRATE COMMUNITIES?	7
NICHOLAS DOLAK, LIAM MACCURTAIN, AND RYAN ZIEMNICKI DOING FIELD WORK.	8
ANALYZING CAMPUS-WIDE FEEDBACK ON THE WSU GREENHOUSE	9
KURTLEN BURKOTT IN THE GREENHOUSE	10
THE EFFECTS OF REMOVING BURNING BUSH ON NATIVE PLANTS	11
EVAN CARBONEAU, DRYING LEAF LITTER COLLECTED FROM FOREST LITTER TRAPS.	12
LYDIA WALSH, PHOTOGRAPHER	12
COMPARING EASTERN GRAY SQUIRREL FUR COLOR MORPHS BETWEEN RURAL AND URBAN AREA	13
AUSTIN O'BRIEN	14
JESSICA QUENNEVILLE	14
TREE CAMPUS USA	15
BRIAN PALMIERI, COUNTING TREE RINGS IN THE SCIENCE LAB.	16
CLINT LEBER, PHOTOGRAPHER.....	16
HEMLOCK WOOLLY ADELGID AND ELONGATE SCALE IN WESTERN MASSACHUSETTS	17
JACOB TOWSLEY INVESTIGATING HEMLOCK TREES FOR NON-NATIVE INSECTS.....	18
IMPROVING POLLINATOR HABITAT RESTORATION TECHNIQUES IN WESTERN MASSACHUSETTS, USA	19
ALIVIA GJEKAJ	20
“GREEN CAMPUS”: REDUCING ECOLOGICAL FOOTPRINT BY INCREASING GREEN SPACE	21
LILY SMITH.....	22
KRYSTEN WOODS.....	22
CONGRATULATIONS ENVIRONMENTAL SCIENCE MAJORS	23
ENVIRONMENTAL SCIENCE DEPARTMENT WEBSITE:.....	23
ENVIRONMENTAL SCIENCE DEPARTMENT ON FACEBOOK:	23
ENVIRONMENTAL SCIENCE DEPARTMENT ON INSTAGRAM:.....	23

Projects by Student Name

Burkott, Kurtlen	9 - 10
Carboneau, Evan.....	11 - 12
Deming, Sarah	5 - 6
Dolak, Nicholas	7 - 8
Gjekaj, Alivia	19 - 20
Leber, Clint	15 - 16
MacCurtain, Liam	7 - 8
O'Brien, Austin	13 - 14
Palmieri, Brian	15 - 16
Quenneville, Jessica	13 - 14
Smith, Lily	21 - 22
Squires, Jacob	5 - 6
Towsley, Jacob	17 - 18
Walsh, Lydia	11 - 12
Woods, Krysten	21 - 22
Ziemnicki, Ryan	7 - 8



Welcome!

Our Senior Capstone course is designed to give students an opportunity to build on what they have learned while at Westfield State and step up to show off what they can do. Students dive into a semester-long project and direct it from start to finish. These presentations showcase where they have ended up, but the journey they have been on throughout the semester has taken them in many different places.

I am proud to have been able to work with this fantastic group of students before they head off into the wide world. I am looking forward to seeing what they do next!

Thank you for joining us,

Tim Parshall
Environmental Science Department, Chair



Ring-Necked Pheasant Reporting Survey

Sarah Deming & Jacob Squires

Abstract:

In the early 1900s, Ring-necked Pheasants were introduced within the Commonwealth of Massachusetts and the resulting hunting boom nearly eliminated this once-wild species. In more recent times, the Division of Fisheries & Wildlife stocks approximately 40,000 pheasants across the state each year due to the absence of wild birds. This study focused on successful harvests of pheasants reported by hunters in Massachusetts to determine if foliage played a significant role in Ring-necked Pheasant harvest during the hunting season. We also tracked the sex of each bird released to see if there was any significant difference between the harvest of each sex. We worked with the Ashfield Rod & Gun Club to band and release pheasants during the Fall 2022 season. This banding process allowed us to accurately record the sex of each bird and the date when they were released, which consisted of four locations hunted by the public. When a bird was successfully harvested, the hunter would make a phone call to provide the band number, date and location where the harvest occurred. To reach a larger audience, we created an online survey for hunters across Massachusetts to complete with their recorded harvests. We found that more male birds have been harvested when compared to female birds. Furthermore, hunters were active at a similar rate in both October and November. However, when looking at the date released and the date reported, birds released earlier in the season survived longer than those released later. In the future, this study could be repeated with other stocked game bird species to see if similar results are obtained. Additionally, this type of study could be utilized to monitor stocked or introduced upland species, specifically pertaining to reintroduction programs with the goal of rebuilding a wild population.



Jacob Squires, Tagging a Pheasant

Sarah Deming, Photographer

Do Dams Simulate Drought Conditions Downstream for Macroinvertebrate Communities?

Nick Dolak, Liam MacCurtain, & Ryan Ziemnicki

Abstract:

Climate change is an increasing problem around the globe, causing shifts in ecosystems. In Western Massachusetts precipitation is becoming more intense and erratic. We are studying the changes in precipitation and droughts on streams. We hypothesize that these changes are causing similar negative impacts as experienced by organisms below dams. In this study we collected benthic macroinvertebrates (BMI) as an index of climate change impacts on natural streams. We are using below-dam samples as a control and basing the health of the natural stream (above dam sample) on the difference between them. According to our data, there seems to be no difference in the population diversity, richness, and evenness above and below the dams. We concluded that either the dams are causing insignificant negative impacts to the BMI populations, or the drought has negatively impacted the populations of natural streams in the same way that dams do.



Nicholas Dolak, Liam MacCurtain, and Ryan Ziemnicki doing field work.

Analyzing Campus-wide Feedback on the WSU Greenhouse

Kurtlen Burkott

Abstract:

Greenhouses are a beneficial addition to any area, through the way they could be used to control the growth of plants. The goal of this project was to get feedback on some of the uses and improvements for the current greenhouse on the Westfield State University campus. Some of the purposes for the greenhouse could include using it for a therapeutic space, growing plants to be planted around campus, growing food for the dining commons, use by existing classes, and use by students (e.g. student clubs). To investigate potential uses and improvements needed for the current greenhouse, I created a campus-wide questionnaire that surveyed faculty, staff and students on their opinions. In addition to the questionnaire, temperature loggers were put in the current greenhouse to track the variability of temperature in each of the three bays, which is one of the main issues that we are currently facing in our greenhouse. After surveying 82 Westfield State University faculty/staff and students the most selected purpose for students was growing plants to be planted around campus. For faculty and staff, the most popular option was for use by existing classes. The temperature loggers that were placed in the greenhouse demonstrated that temperatures fluctuated widely, oftentimes surpassing 110 degrees F on sunny days, which needs to be addressed by doing some renovations. This project shows that there is an interest in what the potential of the campus greenhouse could be.



Kurtlen Burkott in the Greenhouse

The Effects of Removing Burning Bush on Native Plants

Evan Carboneau & Lydia Walsh

Abstract:

Invasive species are a growing threat to native biodiversity. One invasive species that is common throughout forests in New England is burning bush (*Euonymus alatus*). In 2021, Westfield State University students removed burning bush from the island in the research area near campus. In this project, we studied the effects of burning bush on native trees by measuring the leaf litter and tree diameter growth in areas where burning bush had been removed and where it had not been removed. We found that the trees in the area where the burning bush had been removed produced more leaf litter, but grew less than trees in the area where the burning bush had not been removed. These results suggest the effects of removing burning bush are not as straightforward as we thought and more research should be done.



Evan Carboneau, drying leaf litter collected from forest litter traps.

Lydia Walsh, Photographer

Comparing Eastern Gray Squirrel Fur Color Morphs between Rural and Urban Area

Austin O'Brien & Jessica Quenneville

Abstract:

The eastern gray squirrel (*Sciurus carolinensis*) can be commonly found with two fur color morphs, gray and black. Our goal was to compare the frequency of the black color morph and the frequency of the gray color morph between rural and urban areas near Westfield, MA. The question is derived from the idea that squirrels with the black morph are easier to see, which may have an effect on their survival and abundance in certain areas. We used multiple sampling methods including trapping, roadkill collection, and road surveys. The sampling areas were separated into either rural or urban locations. Results from both the roadkill and road survey collected data determined that the gray color morph was more frequent than the black color morph in both rural and urban locations. The trapping method was unsuccessful and gave us no data. Some suggestions for continuing the project would include trapping in areas with more squirrel activity, getting more people involved in collecting roadkill to provide more data, and continuing the road surveys.



Austin O'Brien



Jessica Quenneville

Tree Campus USA

Clint Leber & Brian Palmieri

Abstract:

Trees are an important natural resource for us all. Some scientifically proven benefits of being a tree campus include but are not limited to, significant stress relief after five minutes of being visually exposed to trees, reduced energy use of buildings, and absorption of carbon dioxide. Green space provides important mental health benefits to students, faculty, and staff. The purpose of this project was to help Westfield State University prepare and submit an application to become established as a Tree Campus USA through the Arbor Day Foundation. We did this by going through a checklist of standards WSU needed to meet and then started doing them. We have created and met with a Campus Tree Advisory Committee and talked about the best way to manage trees on campus. The most time-consuming standard we had to do was to create a Campus Tree Care Plan, which Westfield will use for years to come as a guide on when, where, who, and how to plant/maintain trees on our campus. We also went around campus taking a survey of dead trees and taking core samples of them to later read and help determine if their causes of death were similar.



Brian Palmieri, counting tree rings in the science lab.

Clint Leber, Photographer

Hemlock Woolly Adelgid and Elongate Scale in Western Massachusetts

Jacob Towsley

Abstract:

Eastern hemlock (*Tsuga canadensis*) is a foundation species distributed throughout New England forests. It is commonly found in the understory and provides a unique habitat for a wide variety of vertebrate and arthropod species that rely on the tree for food, shelter, and reproduction. Eastern hemlocks are in decline due to two non-native pests, the hemlock woolly adelgid (HWA, *Adelges tsugae*), and the elongate hemlock scale (EHS, *Firoinia externa*). Both HWA and EHS cause defoliation of the hemlock's needles, leading to lower productivity. These two pests are currently limited by minimum cold temperatures and are unable to sustain a population in the northern part of eastern hemlock's range. The last 100 years having been the warmest in recorded history and temperatures are expected to continue to rise. This creates a general northward shift in species preferred habitat and has caused the spread of species that are limited by cold temperatures. To see the impacts of climate change on the spread of HWA and EHS, plots previously surveyed in 2008 were revisited and assessed. The HWA and EHS have spread into higher elevations than previously found. In 2008, HWA was not found over 450 feet in elevation, with the highest infestation level of 60%. The 2022 data saw infestations of HWA at 100% up to 1740 feet in elevation. HWA and EHS infestation rates have a significant negative correlation with elevation. The 2022 data suggests that HWA and EHS infestations decline above 1750 feet in elevation at a latitude of 42 degrees.



Jacob Towsley investigating hemlock trees for non-native insects.

Improving Pollinator Habitat Restoration Techniques in Western Massachusetts, USA

Alivia Gjekaj

Abstract:

Pollinators are an essential factor to environmental and human health, responsible for the ecosystem service: pollination. Despite their high ecological value, pollinator species are rapidly declining worldwide due to factors such as disease, exposure to pesticides, habitat loss, fragmentation, etc. The primary goal of this project is to expand restoration methods regarding pollinators in Western Massachusetts by restoring degraded pollinator habitats and observing pollinator activity in three separate locations at Westfield State University.

This semester I collected data on pollinator plant availability, pollinator species richness, and pollinator abundance using two main methods: visual observations and blue vane trap observations. I compared the data collected this semester to data collected during the Spring 2022 semester to determine the effectiveness of the Spring 2022 pollinator garden restoration project. This data was also used to determine the relationship between pollinator flower bloom abundance and pollinator species richness and abundance. Using visual observations, pollinator species richness and abundance was determined higher in habitats with a higher abundance of pollinator flower blooms and lower in habitats with few pollinators flower blooms. However, according to the blue vane trap data there is little relationship between abundance of pollinator flower blooms and pollinator species richness and abundance. The blue vane trap data did prove that the pollinator species richness and abundance has increased in the Pollinator Garden since the Spring 2022 Pollinator Garden Restoration Project, deeming that project successful. Increasing pollinator bloom abundance is an essential factor to pollinator habitat restoration.



Alivia Gjekaj

“Green Campus”: Reducing Ecological Footprint by Increasing Green Space

Lily Smith & Krysten Woods

Abstract:

With growing concerns around the impacts of climate change, communities around the world have been searching for ways to reduce their contributions to this growing problem. Over the last four years, we have noticed growing effort from professors, students and administration in becoming a more environmentally-friendly campus. Our research investigates the ways in which we can increase sustainability, become a “Green Campus” and link all of the minor efforts to make a major impact on reducing the ecological footprint of the Westfield State University community. The “Green Campus” project also aims to analyze and apply the use of our natural resources in a more efficient way that benefits social, economic, and natural environments. During this semester we evaluated four areas of campus to assess their ecological efficiency and improve it where necessary; this includes Tim & Jeanne’s Dining Commons Garden Beds, the Wilson Greenhouse, Horace Mann’s Garden, and the area around the Catherine Dower Center. To encourage a knowledge and understanding of the interactions between humans and the environment we are utilizing interactive QR codes to view a story map placed at our main four sites that educate people around the project purpose, as well as the efforts made by the campus that may have been unknown before. After investigating our locations, we learned that the Dining Services for WSU has a great motivation to become as eco-friendly and sustainable as possible. The Greenhouse on campus could be a viable option for campus to grow and maintain vegetation for many purposes in the school, as well as Horace Mann Gardens. The empty field as well as wall space available at the Catherine Dower Center provides ample space to fill with pollinator plants, as well as plants that can help the building decrease energy costs. We have seen that the campus has a great opportunity to expand its sustainability and become an example for future global efforts.



Lily Smith



Krysten Woods

**Congratulations Environmental Science Majors
on completing your Senior Projects!**



**Westfield State University
Environmental Science Department**

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