



**MUDDY RIVER POSTER SESSION
APRIL 13, 2021**

ABSTRACTS
arranged by breakout room

THE WENDELL BERRY ROOM: SUSTAINABILITY

1. Using the Campus as a Living Laboratory for Sustainability

Ayden Samoylov—MassArt, Chrisoula Moraitis—Wentworth, Julia Giangrande—MassArt

Our community partner is the Wentworth Sustainability Committee, and we worked to design signage for the campus that highlights the sustainable features that often go unnoticed but have a huge impact on our community. Led by Debra Shepard, our team was given resources to educate ourselves on the topics and then worked independently to consolidate this information in an accessible and concise way. Wentworth has invested so much into bringing sustainable practices to campus, and signage is an easy way of communicating the university's commitment and actions to students and the greater community. These signs strategically placed in high traffic areas will be seen by faculty, staff, students, high school students that participate in WIT's outreach programs, and neighbors passing through. This will act as an example to our larger community and hopefully help to spread awareness of these initiatives. With proper signage and accessible communication, spreading the word of these sustainable features could allow for more projects like these throughout Boston, bettering our community and environment.

Our team aims to educate students on campus on the efforts and features of sustainability in architecture, facilities operations, community service, and more. These signs will be placed across campus to be both visually appealing and informative, along with links to resources for more information. As students of Boston, we understand the importance of sustainable initiatives from our colleges and the need to bring these ideas to fruition. We hope to effectively communicate this information to the greater community and spur interest in the actions Wentworth has taken to set an example for sustainability on campus.

2. Mycelium in Design: A Climate Café

Emily Quach—Wentworth, Lauren Richelieu—MassArt, Alexandra Lowrie—MassArt

Mass Audubon is a nature conservation nonprofit that protects more than 38,000 acres of land throughout Massachusetts. It was founded in 1896, with the purpose of conserving the natural treasures of Massachusetts so that they can continue to be enjoyed by wildlife and people. Mass Audubon is committed to wildlife research and conservation, ecological management, education, community outreach, and advocacy. Our work with Mass Audubon was focused on community conversations. We organized a Climate Cafe which serves as a tool to create a comfortable environment that can generate conversation about Climate Change among people. Mass Audubon hosts frequent Climate Cafes to further reach those in the community. Conversations generated help educate our community which in turn can create change. The conversation about this Climate Cafe was centered around Mycelium and its versatility as a material. We picked this topic because we come from design-related fields. As the field of design is inherently wasteful, we have to be conscious of this to minimize our impact on the environment. We explore the applications of mycelium in packaging, fashion, and construction. We hope to generate conversation about how people can think and act more sustainably.

3. Sustainable Energy Generation: Benchmarking Microgrids

Griffin Robinson—Wentworth, Samantha Kanach—Emmanuel, Cassidy Purrington—Wentworth

The WIT microgrid group was tasked with researching case studies and best practices to build the business case for a microgrid for the Wentworth campus and its surrounding community. A microgrid at Wentworth would independently generate energy and distribute it throughout its campus and the surrounding community. It would have the capability to function independently from the national grid in times of crisis. In addition to reducing grid dependency, creating a microgrid would have financial benefits; supporting low-income neighbors in addition to the school and emergency services.

For this service-learning project, we focused primarily on researching similar campuses with existing and theoretical microgrids and looking for “best practices.” These best practices, such as large-scale renewable energy generation with energy storage and islanding (the capability to generate energy during grid power outages), help illuminate what Wentworth should be doing to establish a microgrid of its own. Throughout our research, we organized information from independent studies of other microgrids and sent out surveys to the community. We catalogued how these microgrids harnessed power, whether they stored it, the beneficial effects of their microgrid installation, and their campus’s relationship with neighboring communities. This information is not only important for the Wentworth microgrid feasibility study, but for other universities that are attempting to build a similar microgrid system as well. By developing a

catalogue of this information, our group has begun to find common practices that have proven successful in microgrid systems.

4. Stepping into the Future: Kinetic Energy Tiles

Olivia Proctor, Lacey Douglass, Michael Cooper—all Wentworth

The city of Boston, Massachusetts has been working towards creating a more sustainable environment. The city's Environment department's mission "is to enhance the quality of life in Boston by protecting our air, water and land resources and addressing climate change. "Kinetic Energy Tiles are tiles that generate energy through the act of applying pressure to the tiles such as footsteps. By placing Kinetic Energy Tiles on the walkways around the muddy river, just the act of walking on the tiles will produce energy for many different things in the surrounding area. The amount of foot traffic and bicyclists that populate the multi-use path that surrounds the muddy river have been constantly rising from year to year and with the cleaning of the river and surrounding areas, we can assume the rise will continue. Studies have shown that, "each pedestrian generates up to 7 watts at 12 volts DC, enough to run a LED streetlamp for 30 seconds." With the amount of pedestrian traffic these paths withstand, the Kinetic Energy Tiles would be able to provide energy for not only streetlights, but blue light systems, water features, and even a water pump in the Fenway Garden Society. These tiles provide a clean form of energy as well as reducing energy costs for the given area. A project in Cambridge has estimated a cost, "of \$50,000 includes \$35,000 to purchase approximately 280 square feet of tiles (about 17 tiles) and \$15,000 for installation."

THE VARSHINI PRAKASH ROOM: SUSTAINABILITY

1. The Benefits of Electric Cars: Mothers Out Front Jamaica Plain

Clara Lagor—MassArt, Simran Padgett—Emmanuel, Alexa Bellezza—Wentworth

We are working with Mothers Out Front Jamaica Plain. Mothers Out Front is an organization of mothers committed to combating issues involving climate change, race, and social justice. Mothers Out Front also engages in marches and rallies on climate change and aims to fight for climate justice to create a better future for their children and their children to come.

We are conducting research about electric cars and doing interviews in order to get information that can be distributed out to the public during the green living tour. The green living tour allows neighbors to experience and learn first hand about what their community is doing to live a green lifestyle by informative videos and other mediums. In our video, we address where electric cars get their energy from, and some of the concerns of electric vehicles, like charging or mileage. That being said, we mostly focus on the benefits of owning an electric vehicle which is reducing the amount of carbon we release into the atmosphere, as well as other perks that come from

driving the car, like how quiet it is, and how smooth the driving is. This 2-5 minute video will be easy to understand for the general public and will better inform them about electric cars. Given all the environmental benefits of alternatively powered vehicles, we hope that this video will encourage people to seek out options other than gas-powered cars, and hopefully consider going electric.

2. Small Businesses Making Big Changes: Mothers Out Front West Roxbury

Josephine Wermuth—MassArt, Oscar Rodriguez—MassArt, Benjamin Clough—Wentworth

Mothers Out Front is an organization with the focus on creating environmental change in communities big and small via grassroots movement. They instill value in environmental protection in the community through supporting small businesses in their efforts to be more sustainable. We worked with Maxine Hunter from the West Roxbury Mothers out Front Branch and Jacob Robinson from Roxbury Main Streets to connect with local businesses who have already made big environmental changes.

We interviewed two businesses that are working sustainably to find out how they made that switch and what benefits it may have had. With this information we made two videos for each business, one quick video just briefly explaining the business and how they are environmentally friendly and another, longer video that goes more in depth for other interested business owners. The result will allow members of the community to see how others are already taking steps and will hopefully inspire the members to act in a similar fashion to shrink the environmental footprint of the community.

3. The Role of Sustainability in Green Business Strategy: Mothers Out Front West Roxbury

Natasha Newcomb—MassArt, Samantha Margolin—Simmons, Rayan Peters—Wentworth

Mothers Out Front is an organization of mothers to fight for climate, racial and social justice in order to protect the future of their children. We partnered with the Mothers Out Front in West Roxbury and focused on sustainability through the lens of local businesses. Throughout this project, we interviewed businesses in West Roxbury to see how they engage with sustainability. This information was summarized and aims to provide other businesses with the information we gathered to help educate them on small changes they can make to their own business to become more sustainable. Many small businesses tend to struggle with a lack of knowledge and resources, of how to create more sustainable practices within their businesses. We found through a series of three interviews that business owners strive to incorporate sustainability in ways that come at no additional cost to them, such as saving cardboard boxes or switching to energy-efficient lighting. Businesses want to incorporate sustainability to greater degrees, yet given the change in consumption as a result of the pandemic, the funding for these alternatives

is not available. However, the owners did express explicit plans to continue their push towards sustainability post-pandemic and are taking basic steps towards this goal now given their available resources. Future work will be aimed at creating educational resources for owners looking to engage with sustainable practices in their business, regardless of financial constraints.

THE DOUG TALLAMY ROOM: ENVIRONMENT

1. Autonomous Ground Vehicle for Seeding to Restore Vegetation

Jared Alexander, Ethan Farland, Trey Pierce, Elijah Fernandes—all Wentworth Institute of Technology

Vegetation may be destroyed by natural disasters or human activity such as mining, construction or war. Without vegetation, the area may be at a high risk for erosion, mudslides or loss of topsoil. The land conditions or topology may be too dangerous for humans or normal agricultural equipment to enter for reseeding or planting to restore the vegetation. A swarm of autonomous or remotely controlled ground vehicles capable of planting seeds may be an effective way to plant seed over the area. While seeding the area the system monitoring and controlling the vehicles should record their locations, paths or areas seeded, and gather other information, such as taking photographs. The purpose of our project is to develop and test the location tracking system for a land vehicle involved in seeding an area. The concept involves taking in information from an aerial drone, mapping out paths to avoid obstacles, and planting as many seeds as possible for vegetative growth. We are designing prototypes for several subsystems. The vehicle would have a microcontroller for location and sensor input, and control of actuators for a rake and hopper for seeding. Wireless communication would exchange signals with the central hub for the swarm of vehicles. Such a system may contribute toward improved restoration of vegetation.

2. T is for Tree: A celebration of our trees along the MBTA

Bridget Foner—MassArt, Trevor Esmel—Wentworth, Amanda Rodriguez-Tabares—MassArt, Hope Antonellis—MassArt

What is Speak for the Trees? What are they doing for us? Speak For The Trees is a nonprofit organization focused on creating an equitable urban tree canopy in Boston. They do this through tree giveaways, plantings, community education, outreach, and public advocacy.

What is T is for Trees? What are we doing for them? “T is for Tree: A celebration of our trees along the MBTA”. This is an art outreach project that combines mapping, photography, and community engagement to highlight and share the trees near to T stations throughout the city.

We created a campaign that is visually appealing and accessible for members of Boston's community. We walked along the MBTA Green E Line photographing trees juxtaposed to the train. We created an interactive website and forum with information on tree identification as well as a gallery of images. The forum asks participants to reflect and share on their experiences, perceptions, and connection to trees. We expect this project to breathe as an organism after our initial launch of the site; that future teams can nurture and watch as the stories grow and connect to a wider web of community.

3. Reforestation Web-Based Geographic Information System

Stavros Ioakimidis, Eric Spooner, Yasser Alghamdi—all Wentworth

The progressive expansion of deforestation is impairing the quality and viability of life on Earth. Deforestation is caused directly by agricultural expansion, logging, strip mining and urbanization, and indirectly by pollution and climate change. With population and urbanization increasing, deforestation is getting worse. Methods for reforestation have been evolving toward countering this problem. One way is to have planters manually walk around and plant the seedlings or seeds, with associated cost and risk of an injury. Agricultural machinery has been developed for large scale, efficient planting. However, the land must be prepared prior to planting, otherwise the machinery may be damaged or the seeds will not grow properly. Reforestation often needs to occur in rough terrain with many natural obstacles, preventing the use of conventional machinery. Swarms of drones have been reported to be used in reforestation efforts, overcoming issues with rough terrain and difficult access, but controlling the drones efficiently is difficult. A Geographic Information System (GIS) for monitoring and control of aerial vehicles like drones could be useful. Using drones for reforestation has advantages of being potentially cost effective, efficient, and adaptable. The purpose of this project is to develop a GIS for real-time tracking of unmanned aerial vehicles. GPS would be used to determine location of drones on a display with a GIS and track the paths taken. Operators could manage and monitor the dropping of seeds from a handheld controller. Using this system, they could more accurately drop these seeds where they are needed to adequately cover an area for new plant growth. Such a system would improve reforestation efforts.

THE NELSON MERCED ROOM: BOSTON

1. Empowering Local Homeowners Through Education

Catriel Kurz Ribetto—Wentworth, Cassidy Silva—MassArt, Audrey Pappadia—Simmons

Boston Building Resources works to educate & empower homeowners within their local community to assist in a pursuit of becoming self-sufficient. Boston Building Resources provides an accessible way for homeowners to perform their own repairs and remodels by offering

workshops, extensive information and instruction both online and in person, and offering consulting services with design and building professionals. Additionally, through the repurposing of donated materials and appliances at their reuse center, BBR actively reduces the amount of waste that would end up in landfills, while providing low-cost home improvement products to local residents.

Our goal as a team is to communicate BBR's mission by creating material that highlights topics aligning with the organization's goal of providing homeowners with the opportunity to become informed and actively involved in the maintenance of their home, in a sustainable means.

This is being achieved through a series of blog and social media posts. Individually, we have each been assigned a topic by BBR to produce content about. In order to highlight BBR's capacity to empower local residents attempting home repair, we created a blog post and infographics about a plaster repair product and a customer's story with its use. A separate blog post about vinyl garden windows speaks on the window type to inform homeowners of its features, advantages and disadvantages; introducing the energy-efficient garden window that BBR offers for purchase and installation. And a final post was completed about the causes of condensation on windows in the winter and ways to help treat and fix the problems on your own at home.

2. MJE STEM Students as Catalysts for Change

Fatimata Sow—Simmons, Brian Cook—Wentworth, Lily Saki—Wentworth, Maggie Miller—MassArt

We worked with Mothers for Justice and Equality (MJE) non-profit organization, supporting their STEM program. The mission of MJE is to “end neighborhood violence by empowering mothers and youth to challenge the normalization of violence and become effective catalysts for change in their homes, schools, and communities”. MJE implements different programs to engage in educating individuals to be change makers, one of which is the youth program. MJE partners with K-8 schools in Boston providing educational programs focused on STEM. During the 2021 STEM workshop, students began to research solutions to the topic they had chosen for their environmental justice SL project. They were given the opportunity to research online and watch videos to determine what information they will use.

Our goal is to educate students about sustainability issues by cultivating workshops and lesson plans depending on what they are interested in. As a group we worked closely with the advisor by researching specific topics. Our task was to help our advisor run the lesson and engage with the students to learn more about what they are interested in and what we can teach/show them. The focus will be getting at least two feasible solutions to attract pollinators. When meeting with the students, we were asked to lead a group discussion after the students watch three videos about pollinators. The students are meant to compare/contrast the videos and review what they learned. At this point, we were asked to take notes and drive the conversation. Through

engaging with the students, we were able to experience how Jun relates with them and sparks the conversation. It was interesting to see the ways Jun was able to keep the topic focused on a broader subject while also making it relatable.

3. Community Engagement: The Environmental Forum

Arielle Gordon Wilson—MassArt, Jessica Cobb—Simmons

During the semester, we have worked as teaching assistants for the Environmental Forum course taught at Wentworth. We were paired with service learning groups, and spent time communicating with them, providing resources and assistance with their projects. Skills we practiced and utilized during this time were active listening, leadership, and support which came in a variety of ways for different groups. As the semester progressed, groups progressed at different rates, but were able to come together to complete their work and meet their deadlines. Service learning is important because it gives students the opportunity to engage with their community, have hands-on experience in sustainability related fields, and to apply their skills and knowledge learned in their classes. Every student comes with a different perspective and skillset, and groups harmoniously create a service learning project that aids their community partners initiatives. It is important to give back to the community in times of need, as well as assist nonprofit organizations especially during the pandemic.

As teaching assistance, we are able to see all the connections and similarities between each of our 19 group projects. Of these 18 projects, 15 are with different organizations. Compared to last year's 11 projects and 9 organizations. The class size itself has almost doubled, showing an increasing interest in the COF student body with sustainability and community service. Our four major themes this semester that our projects have been working on are Boston (community), environment, water and sustainability. These topics have led our work and our guest speakers throughout the semester. We learned about air quality issues in Roxbury, systematic racism and ways we can combat that, and ways that communities can come together to create something beneficial to a whole community and strengthen connections. With these various different projects and speakers, one common theme has continued to surface in all our conversations: Together as a community, we can bring change.

THE GINA MCCARTHY ROOM: BOSTON

1. East Boston: Environmental Justice in Our City

Joselyn Rybdzyk—MassArt, Jona Sulaj—Wentworth, Lucy Glover—MassArt, Emma Donald—Simmons

Unlike many other types of pollution that are clearly visible, Air pollution is often overlooked and disregarded. Although it is easy to ignore, air-related pollution is the leader in fossil fuel

emissions, and causes an abundance of illnesses, as well as often being a tool in environmental racism. East Boston is severely impacted by air pollution - due to their proximity to Logan Airport, and many other methods of transportation such as an increased number of cars and busses. A 2014 Logan Airport study showed a 400% increase in childhood asthma in highly impacted areas of east Boston, as well as a 200% increase in adult COPD (chronic obstructive pulmonary disease).

Mothers Out Front of East Boston aims to address this issue through public knowledge campaigns, as well as technological methods, such as the Air Partners air quality app, where residents of east Boston can check how safe the air is outside to limit their exposure to harmful pollutants. They're also encouraging an increase in air filters, as well as tree canopies which can greatly reduce the amount of air pollution. Very few people are actually aware of the severity of these environmental issues and may not even realize that their long term health is being affected, or that their environmental pollution actively harms others. In reality, air pollution is something that impacts each and every one of us, but not necessarily equally. Mother's Out Front East Boston is bringing this matter to everybody's attention and emphasizing the fact that not all areas are fairly affected. While the Latino community on average are breathing in 63% more pollution than they are responsible for, caucasians are creating about 17% *more* pollution than they are forced to breathe in. These staggering statistics are by no means a coincidence, and make this an incredibly relevant conversation ,regardless of who you are.

Our team worked with Mothers Out Front of East Boston to create signage filled with this information that will be placed in public spaces around East Boston, that will lead people to consider the pollution that they have to deal with on a daily basis, and how they can keep themselves safe. The signage will also be placed around a public sculpture, to further bring attention to this issue.

2. You Reap What You Renew: Urban Farming in East Boston

Steve Matin—Wentworth, Cora Wright—Simmons, Anne Marie Deffe—Emmanuel, Simon Chin Lee—Wentworth

Eastie Farm is a grassroots organization that aims to improve neighborhood food access, community involvement and promote small-scale urban farming. The Farm's seeds were planted in 2015 when a group of East Boston neighbors worked with city officials to turn over two empty, overgrown lots on Sumner Street to Eastie Farm, which is now a 501c3 nonprofit. Eastie Farm does not have locks, and everyone is to eat the produce or sit and socialize around the firepits; today, residents from various cultural, ethnic, and economic backgrounds come together to help grow and nurture vegetables and fruits and learn to garden and the farms offer numerous programs including summer camp for children, composting and composting classes, weekend work parties, food rescue programs, and rainwater collection. Eastie Farm collaborates with neighborhood organizations including East Boston Health Center, the YMCA, Harbor Arts, East Boston Community Soup Kitchen, Crossroads Family Shelter and Boston

Food Forest Coalition. Our contributions to this project differed from person to person - Simon gave an interview for upcoming summit and helped organize group meeting times, Cora participated in food distribution, tree trimming, and gave a video interview upcoming summit, Steve visited six farm sites, recorded and edited video, and gave an interview for upcoming summit, and Anne Marie designed, personalized, and emailed individualized receipts for Eastie's annual seedling sale fundraiser.

3.Solar Sleuthing

Maggie Clancy—Simmons, Matthew Wage—MassArt, Sophie Olsson—MassArt

Greening Rozzie is a volunteer run non-profit that supports both the Roslindale neighborhood and the greater city of Boston. The organization's objective is to involve the local community in environmental activism, education, and integration of sustainable initiatives. One goal of the organization is to gather data on current solar panel use in the Roslindale neighborhood to estimate how and where alternative energy sources can be promoted. Our contribution to this project is twofold. First, we surveyed the residential streets in Roslindale to collect data on how many houses use solar energy and how many solar panels they have. This information was then compiled in a spreadsheet to allow for comparative surveying in the future. Second, we created a blog post to outline the surveying process and illustrate the importance of volunteer work surrounding community environmental organizations. As a result, we were able to contribute new data that will aid in Greening Rozzie's goal to cut the neighborhood's carbon emissions by 25% in 30 years. The same survey will be completed in future years to see how this progress continues. This work emphasizes the importance of community involvement and the role of data in the adoption of sustainable energy sources.

THE WILLIAM GOLDEN ROOM: WATER

1. Researching the D- Rating in the Emerald Necklace

Lily D'Anna—Simmons, Erin Morton—Wentworth, Samantha Jones—Emmanuel, Jeffrey Lynch—Wentworth

The Muddy River recently received an extremely poor rating when scientists measured the health of the river. The Emerald Necklace Conservancy is a local organization that works to restore the parks and rivers in Boston for community health and enjoyment. Together, we researched the reasons why the Muddy River received such a low rating and what that means for the environment and people around it. The D- rating of the Muddy River affects humans, animals, and the entire ecosystem. We identified the major causes for the low rating to be E. Coli and cyanobacteria blooms due to lack of sunlight, sewage overflows, and industrial activity runoff containing high levels of nitrogen and phosphorus. After researching the causes for the D- rating, we started to identify possible solutions with the help of researching other case

studies with similar issues. Some approaches that other cities have taken to clean their waters include increased focus to educate people on the situations, digging out sediment and burying elsewhere, creating more sunlight, prohibiting the use of plastic bags, creating man made channels, and providing financial assistance to waterfront homes that were willing to help control polluted water flowing through their properties. Furthermore, our team has concluded that it is important to educate the general public on how the rating of the Muddy River can affect public health. The research our team conducted will be distributed at future Emerald Necklace events to educate the community about these issues and introduce ways that everyone can help clean up the river.

2. Drawing Boston's Attention to the Muddy River

Zeynep Gunalp—MassArt, Sen Luc Miglin—MassArt, Justin Gabiosa—Wentworth, Ramona Dias-Gaylor—Wentworth

Keeping the water quality clean in our rivers is important to our health, well being, and environment. Trash and other pollutants such as phosphorus can have a negative impact on the acidity of the water, which can also affect the ecosystem. Fish and other living creatures can hold these negative substances which we might consume.

The Muddy Water Initiative is an organization that aims to restore the Muddy River in Boston, MA to a non polluted state. Two main projects that this group is working on are a Watergoat and a water filtration system. A Watergoat is a trash collection method that uses buoys tied together to catch all of the debris floating on the river. Every week this trash is emptied by volunteers working in conjunction with the DCR. The other project the Muddy Water Initiative is working on is a river biochar boom water filtration system. This project aims to filter out negative substances such as phosphorus, E.coli, nitrogen, and hydrocarbons using charcoal. Each device is placed along the river using a float, and underneath it are multiple bags of biochar.

Our aim for this project is to find a way to draw attention to the Muddy River and to give viewers a way to contact the Muddy Water Initiative if they wanted more information about their goals. We first worked on finding out which areas we can put signs in and who has jurisdiction over different areas; this was important to the project because depending on where we wanted to put our work, we would have to get permission from whoever's jurisdiction it was. The locations we decided on were a small bridge owned by DCR, two non-load bearing walls that are already due to be taken down in the near future, and anywhere we can legally stick a sticker to.

With these locations in mind, we have decided that creating posters, signs, and stickers would be the best way for our group to spread awareness of the Muddy Water Initiative as well as bringing attention to the polluted state of the river. For creating the public art/graphic art, each member of the team is working with a different medium.

3. Lobby for the Rivers Day

Matt Grochowalski—Wentworth, Samantha Woodman—Emmanuel, Meredith Di Sessa—MassArt

The Mass Rivers Alliance is a non-profit organization dedicated to protecting and restoring the rivers and streams of Massachusetts. In order to ensure climate resiliency to our waterways, the organization is dedicated to equity, diversity, and inclusion. Staying true to these ideals, the Mass Rivers Alliance believes clean and healthy rivers are a right and that every citizen should have access to the state's waterways. The Mass Rivers Alliance advocates for the rivers by lobbying for legislation at the state level to ensure that their mission is achieved. We had several zoom meetings with a representative from our community partner to learn more about the Mass Rivers Alliance and what they needed from us for their Lobby for The Rivers Day event. They were expecting a large turnout and wanted everyone to have easy access to information regarding their state reps and senators. To help, we created legislator sheets for members of the House of Representatives and Senators for Mass Rivers's lobby day on March 18th. We researched the representatives' district, committees, and if they supported the bills Mass Rivers was lobbying for. We also created an infographic fact sheet on House Bill H.1635 dedicated to protecting our rivers from droughts. This ended up being the Mass Rivers Alliance's third and largest Lobby Day and all regions of Massachusetts were represented. Ultimately, the event was a success, and our work benefited the citizens attending lobby day and can be used as templates for future lobby days regarding similar bills.

THE MONA HANNA-ATTISHA ROOM: WATER

1. Muddy River Trash Mitigation

Bilal Breezy, Abbie Sera, Summer Davis, Adam Najih, Zack Smith, and Jaden Thomas—all Wentworth

Debris plays a significant influence when creating a project. Various experiments have been conducted to mitigate the impact of debris on old structures, such as hydropower dams and bridge piers. In trying to resolve the debris problem, hydrokinetic utilization is the most hypothetical method being used. However, a measurable assessment of the success of the research has not been fully documented. Mitigation plans are mainly used for few hydropower installations, usually in secluded areas. Understanding the type of debris the equipment is expected to collide with, how the debris flows along the river, and the current strategy for developing a larger hydrodynamic equipment approach is critical. There have been many techniques to decrease the effects of debris on engineered structures. A major company tackling this problem is "4Ocean", a global company aiming to end the ocean plastic crisis. As stated in the 4Ocean article, "Every 4Ocean product purchased comes with our one-pound promise to pull one pound of trash from the ocean, river, coastlines". 4Ocean takes accountability in making the Earth much cleaner, and they also educate others about the

importance of the effects of global plastic pollution. So far, 4Ocean has reached its first goal of 13 million pounds of plastic being pulled from the ocean. With global support, their goal was met, and their approaches proved effective. This project aims to replicate some of the 4Ocean approaches to tackle River Trash Mitigation on the Muddy River Project and other waterbodies in the Greater Boston area.

2. Smart Equipment on the Muddy River

Jordan Ortiz, Paul Ferrigno, Jerry Arevalo, Keegan Choate, and Charlotte Hobby—all Wentworth

Technology has advanced at an accelerated rate and improved industries like communication, transportation, and manufacturing. Technology has revolutionized the construction industry and tasks that can be accomplished on the job site in recent years. Smart heavy equipment is at the forefront of the revolution, evolving and improving the construction industry. Machines such as excavators, bulldozers, and tractors have seen the most significant advancements and will be the focal point of this research. Machine autonomy has progressed quickly throughout the last several years, with control units, sensors, and actuators all “smarter” than ever. These improvements have shown a 20% increase in contractor productivity and are expected to continue advancing across the board. Implementing these machines has shown improvements in safety, production rate, reduced costs, and product lifecycle management (PLM). Access to real-time information instantly while in the field is all possible due to the Internet of Things (IoT). Artificial intelligence is incorporated in these machines to help get the work done right the first time, minimizing wear and tear on equipment, reducing fuel consumption, and optimizing equipment combinations. The purpose of this project is to highlight ways smart heavy equipment has begun to emerge as an industry frontrunner in improving the efficiency and productivity of site development and identify how they can be utilized on the Muddy River Project and similar projects. By increasing the use of smart heavy equipment on construction sites, the industry is bound to see vast improvements across all areas, from scheduling to man-hours, productivity, and profitability.

3. Mystic River Watershed: Educational Outreach on the Health of Watersheds

Joanna Jones—Simmons, Lucas Arruda—MassArt, Liberty Seifert—Emmanuel

The Mystic River Watershed Association is a non-profit organization that strives for a vibrant, healthy and resilient Mystic River watershed for the benefit of all our community members. The Mystic River Watershed Association uses science, advocacy and education to ensure a vibrant, healthy and resilient environment for all plants, animals and people that call the watershed home. It achieves this by creating materials used for public knowledge in the Mystic River Watershed with the goal of informing all residents how they can contribute to a healthier watershed for everyone. This includes social media posts, physical flyers, mail in brochures, etc.

Currently the main problems the Mystic Watershed is dealing with are pollution from stormwater, climate change, and numerous disconnected pathways. The Mystic Watershed Association has made progress by creating a Mystic Greenway which connects 25 miles of linked paths from Mystic lakes to Boston Harbor. Our team was brought together with the goal of updating existing outreach material and creating new and engaging social media posts to help inform the community.

4. Beyond the Wall: Edgewater Neighborhood Association

Haley Johnson—MassArt, Ryan Kalayjian—Wentworth, Angela Szarek—Simmons, Maura Raymo—Simmons

The “Beyond the Wall” project is an ongoing effort spearheaded by the Edgewater Neighborhood Association. Chairperson Vivien Morris and block captain LaRay Brison have been advocating for access to the Neponset River, which is hidden behind a large, pointed, stone wall. This wall was erected in the 1930’s, a time of inequality in the area. Not only does this wall stop the residents of Boston’s Mattapan neighborhood from accessing the wonderful river in their own backyard, but it also poses a danger to residents and visitors. The wall blocks sight to the river behind it, leaving it a prime, secluded location for illegal activity.

Over the last two and a half months, we Colleges of the Fenway students have been working with the Neponset River Watershed Association in an effort to create tools to progress the ENA’s plea to open up the wall, providing equal access to all residents.

In a collaborative effort we have successfully created a logo that encapsulates the EWA and NRWA’s mission statements and efforts. We’ve also had the chance to visit the site of the wall and meet Vivian and LaRay to hear their first-hand accounts of exactly how the wall is affecting the neighborhood along with their dream outcomes for the project.



Taylor Adams

RECIPIENT OF 2019-2020 MINI GRANT

The Use of eDNA in the Muddy River

Early detection and removal is the most effective way to control invasive species. However, at the earliest stages of invasion, invasive species can be difficult to document and prevent because they are able to propagate rapidly from a small population that can be difficult

to see through observation. One proposed method to more easily identify the presence of a species is by using environmental DNA to survey for the presence of invasive species. We used eDNA to search for two aqueous species, *Xenopus laevis* and *Cabomba caroliniana* in the Muddy River. To extract DNA from the aqueous samples we used ethanol precipitation followed by DNA extraction using the DNeasy Blood and Tissue kit (Qiagen) for *Xenopus laevis* and *C. caroliniana*. After extraction PCR was used to amplify all samples. Our methods successfully amplified *Xenopus laevis* DNA in lab and field water samples primer. Additionally, the matK primer specific to *Cabomba caroliniana* amplified leaf samples in the lab. However, no water samples were amplified using the same methods. *Xenopus laevis* has not been documented in the natural environment of Massachusetts since the early 1990's. Since it is currently present in the Charles River Watershed, more research is needed to document its spread across the state's waterways and to examine how this invasive amphibian was able to travel to the Muddy River.