Issue 17

Great Lakes Center Newsletter

Fall 2020

RESEARCHING THE GREAT LAKES AND THEIR TRIBUTARIES SINCE 1966

Group picture from our 2019 Open House, before the COVID-19 pandemic.

IN THIS ISSUE

Congratulations, Sonya! 3

Common terns impacted by POPs 4

Starry happenings on Grand Island 5

Moving forward on mapping historic lake sturgeon habitat 6

Snails, Gobies, and Green Beans 6

Cladophora decomposition 7

Restoring flow regime could negatively affect threatened species 8

GLOS buoy upgrade 9

Spicebush and American witch-hazel 10

Scientists to Students 11

Research photos 11

GLC turns 55: Looking to the future

by Alexander Karatayev

In 2021, the Great Lakes Center is going to celebrate its 55th anniversary. It is a perfect time to think about who we are, where we are now and where we are going to be in the next 5–10 years.

The Great Lakes Center (GLC) mission is to improve the quality of the environment by providing comprehensive and up-to-date science to enhance and sustain the ecological function of the Great Lakes' ecosystems into the future. The GLC supports research at SUNY Buffalo State and has secured millions of dollars in external research funding over its 54 years of history. The GLC employs 18 full-time faculty and staff and brings together more than 25 affiliated faculty from eight academic departments at Buffalo State to conduct research in aquatic ecology, fisheries, environmental toxicology and chemistry, urban ecology, watershed dynamics, environmental education, and art. The GLC's list of collaborators exceeds 100 scientists nationwide and internationally. The GLC provides excellent opportunities for Buffalo State undergraduate and graduate students to participate in various research and educational projects related to the Great Lakes environment. On campus, the Center serves as both a catalyst and a facilitator to link high-quality research with graduate and undergraduate education, largely contributing to the College's role and visibility in the community.

(continued on next page)

(continued from previous page)

Personnel. Over the last 10 years, the number of full-time employees at the GLC has increased by 50%. Currently, there are seven full-time State employees (including two members with split appointments with the Biology Department, and three Field Station personnel) and 11 scientists and technicians supported by research funds through the SUNY Research Foundation (RF), as well as 17 student assistants and 32 seasonal employees. While in the past at least four employees were fully or partially supported by RF funds, currently all eleven staff on research positions are fully supported through external grants obtained by GLC researchers.

Facilities. The GLC comprises facilities on and off campus to support high-quality research in a variety of disciplines, promote rigorous graduate and undergraduate education, and facilitate research dissemination to the public. They include aquatic ecology equipped laboratories in the new Science and Mathematics Complex on the Buffalo State main campus, laboratories at its Field Station on the Niagara River, a fleet of research vessels capable of operating in nearshore and offshore waters of the Great Lakes and their tributaries, and a variety of sampling and analytical equipment to support the research and educational mission of the GLC.

Research. The GLC is recognized as a regional, national, and international center for research excellence in aquatic and watershed studies. Since 2009, GLC externally-secured grant funding has exceeded $14.2 million, with a five-fold increase in the last ten years, and currently exceeds $7.5 million (including multiyear grants). The GLC has become a leader in several large collaborative projects, including the leading role in US EPA Great Lakes National Program Office (GLNPO) Benthic Monitoring Program, which covers all five of the Great Lakes and is the world's largest monitoring program in freshwater. Additionally, the GLC has led, over a number of years, projects that involve whole-lake limnological and biological studies in lakes Erie and Ontario under the GLNPO auspices. The GLC has also been the leader in collaborations with the NYS Department of Environmental Conservation, the U.S. Army Corps of Engineers and other universities for a comprehensive study of the food web of the Niagara River ecosystem, which is a globally significant Important Bird Area that supports the Mississippi migratory flyway. The GLC hosts the Western NY Partnership for Regional Invasive Species Management office (WNY PRISM), coordinating a regional response to aquatic and terrestrial invasive species. The GLC also operates a Great Lakes Observing System (GLOS) buoy in Lake Erie where long-term data is collected as part of NOAA's effort to track changes in the Great Lakes as the planet warms. The research at the GLC also involves funded graduate student research projects that span a variety of local ecosystems and organisms and contribute to the knowledge necessary to support our aquatic environment.

Education. GLC personnel make significant contributions to the training and education of graduate and undergraduate students. We strive to attract good quality graduate students to our program and provide assistantship and grant support for many of them. Twenty-two students have graduated from the MS and MA Great Lakes Environmental Science (GLES) programs since they began in Fall 2013. Ninety-six percent of these graduates are working in the environmental science field or are enrolled in a Ph.D. program. On average, 15 undergraduate and graduate student assistants are employed by the GLC every year as technicians, to assist in the benthic monitoring program, sampling in the Niagara River food web project, and the Western New York Partnership for Regional Invasive Species Management (PRISM), where they receive training in methods of biological monitoring, taxonomy, aquatic field sampling, and invasive species management. The two GLC members with split appointments with the Biology Department teach aquatic courses at the undergraduate and graduate levels. These courses allow students that wish to specialize in aquatic biology (lakes and streams) or in Great Lakes ecology, access to a complete set of courses from which to become proficient in a variety of areas. In addition, undergraduate and graduate students participate in ongoing GLC research projects.

Outreach. Disseminating the research findings of the GLC and its collaborators is a fundamental step for the advancement of science and its application in ecosystem management. GLC staff disseminate knowledge through press releases, the GLC website, the GLC annual activity report (13 issues available online), a biannual

(continued on next page)

(continued from previous page)

newsletter (16 issues available online), publications in national and international journals (on average 10 peer-reviewed research papers per year), and hosting and contributing to conferences and workshops (on average 36 presentations per year). Additionally, and primarily through our WNY PRISM office, we have a social media presence on Facebook and Instagram and in the last five years have averaged over 40 outreach events, workshops, or presentations at local farmer's markets, festivals, fairs, and outdoors days. The GLC involvement with the community also involves being a member of the Steering Committee for the recent federal and international denomination of the Niagara River Corridor as a Ramsar Site for the protection of its wetlands and wildlife.

Long-term goals (2025–2030)

Research. The GLC will continue to be a regional, national, and international center for research excellence in aquatic and watershed studies. It is our goal to increase and diversify the GLC role in providing research-based perspectives for the protection and sustainability of the Great Lakes' natural resources, including guidance to stakeholders when making resource-related decisions and governance. To address our research goals, maintain, and expand our research capacity we are going to increase external funding to $10 million by 2025 and to $15 million by 2030 as well as increase the number of publications and presentations (20% by 2025 and 50% by 2030).

Education. It is the GLC goal to increase the GLES program enrollment by 50% by 2025 and double that amount by 2030. A larger body of students will result in more participation in our externally-funded research programs and a higher visibility of the GLES program and its comprehensive course work. We aim to educate our students to learn to think as scientists, obtain a broad scope of knowledge in ecology and environmental science, learn to apply that knowledge to practical situations and become environmentally-minded citizens of the Great Lakes.

Outreach. We will continue on our existing path of outreach and explore new methods for community inclusiveness through GLC activities, such as continuing collaborating with the Art Department, Burchfield Penney Art Center, participating in the production of educational videos, and participating in interactive exhibitions. The GLC will develop a social media presence of its own via Facebook and Instagram.

We look forward to celebrating our 55th anniversary next year. •

Congratulations, Sonya!

by Lyubov Burlakova and Susan Daniel

Sonya Bayba

Our long-time employee and student Sonya Bayba graduated this May from the Great Lakes Environmental Science M.A. Program. Sonya has been a wonderful and hardworking laboratory technician at the GLC since 2015. During her time with us, Sonya received several grants, fellowships and scholarships, including a Graduate Assistantship, and an REU summer research grant from the University of Georgia. She graduated from Buffalo State in 2017 with a B.A. in Biology before starting her graduate work. Sonya worked very hard and presented her thesis research at multiple Buffalo State student conferences and at the International Association of Great Lakes Research Conference in 2019. She recently submitted a paper entitled "*Dreissena* in the Great Lakes: evidence of facilitation in benthic communities across a large depth gradient" to the journal *Biological Invasions*. Sonya started a new position in October as a Research Assistant - Invasive Species Survey Data Analyst at WNY PRISM. Great job and congratulations, Sonya! •

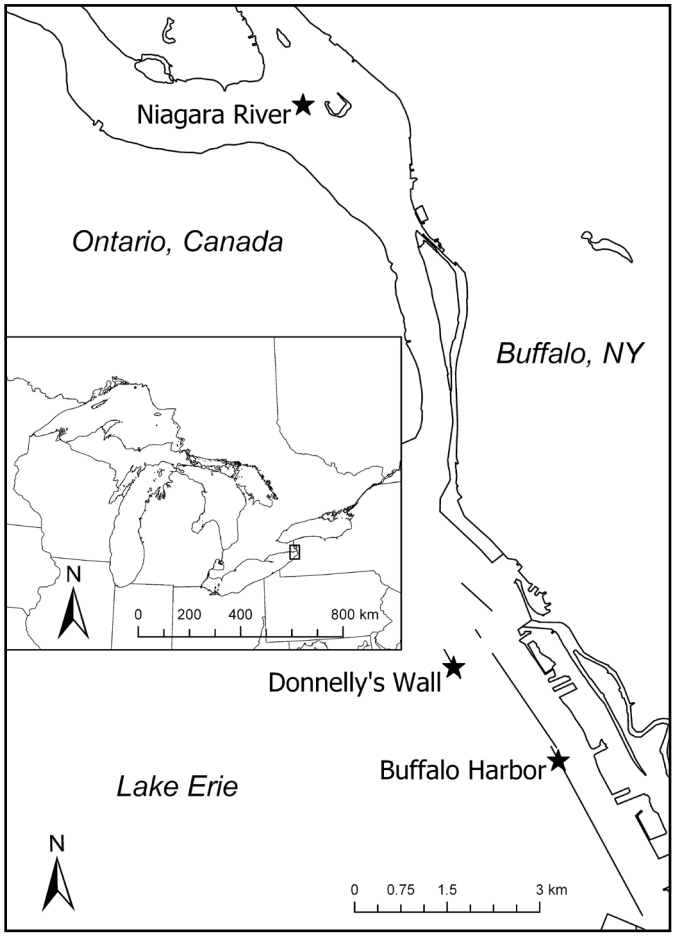
Common terns impacted by persistent organic pollutants

by Katie Hastings

A 1-3 day old tern chick and eggs in a nest. (Photo credit: GLC archives)

Professor and researcher Alicia Pérez-Fuentetaja recently published another paper stemming from the Emerald Shiner Project. The new paper, done with co-authors Steven Travis and Diana Aga from University at Buffalo, features work on the amount of legacy persistent organic pollutants (POPs) in various life stages of the common tern (*Sterna hirundo*) in the Niagara River. Though they are migratory, common terns breed in the Niagara River corridor and a main component of their diet is emerald shiners (*Notropis atherinoides*).

"The common tern is a threatened species in New York State, and their numbers have not increased much despite state efforts to provide nesting sites and surveillance. This study shows how wildlife is affected by human pollution of aquatic systems and how the chemicals we produce can have a multigenerational effect, being passed from mothers to chicks," said Dr. Pérez-Fuentetaja in a UB press release.



Three sampling locations (stars) of the tern breeding grounds that included a set of adjacent islands in the Niagara River, Donnelly's Wall, and two Buffalo Harbor breakwaters. Inset shows the location within the Great Lakes.

This study looked at the concentration of PCBs, PBDEs, and DDE, a metabolite of the insecticide DDT, in common terns at various life stages and in their food source, emerald shiners. PCBs and DDT were banned in the 1970s and PBDEs haven't been sold in the US since 2013, yet they persist in the environment and bioaccumulate up the food web. This study found that newly hatched chicks had the highest concentrations of POPs, and the source of these chemicals was passed to them solely through maternal loading since they hadn't eaten yet. Older chicks had a decrease of chemicals as they grew and began to metabolize some of the chemicals. There was also a match between emerald shiner contaminant profiles and those of tern brains and livers.

"These substances interfere with the reproductive system and are endocrine disruptors," Dr. Pérez-Fuentetaja said. "They tax the terns' livers as they have to try and get rid of these pollutants, but the bioaccumulative nature of PCBs, PBDEs and DDEs means that the birds will not be able to fully detoxify themselves, and that they will pass part of their body-load to the next generation. These substances can alter development and neurological processes and could cause deformities, cancers, and impaired behavior."

The paper, Evidence of continued exposure to legacy persistent organic pollutants in threatened migratory common terns nesting in the Great Lakes, was published online in Environment International on September 3 and in the journal's November issue. Read the full UB Press Release. All of the birds in the study died naturally by weather events and were collected by the NYS Department of Environmental Conservation. •

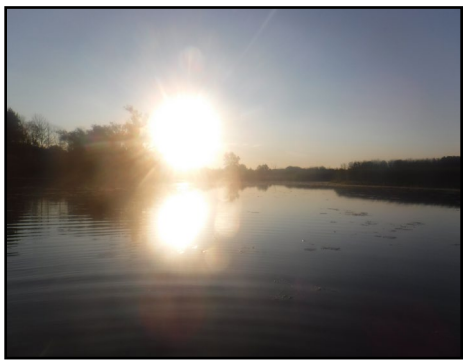
Starry happenings on Grand Island

by Alexander Krest

In late September, Alex Krest, graduate student in Dr. Pennuto's lab, began his starry thesis work in Burnt Ship Creek within Buckhorn Island State Park. No, he wasn't observing the vastness of outer space on a beautiful fall day in Grand Island. Rather, he and some lab members were delving into the expanse of the invasive macro-algae starry stonewort (*Nitellopsis obtusa*) that was lying just beneath the water's surface. This relatively under-researched species was discovered in the St. Lawrence Seaway in 1978 and can now be found throughout the Great Lakes.

An example of the six-pointed star shaped bulbil found on stems of Starry stonewort. (Photo credit: Kylie Wirebach)

Native to Eurasia, starry stonewort forms dense mats along the sediment surface and brings with it a plethora of detrimental impacts, including competitive dominance over native algae and macrophytes, reduction in fish spawning activity and overall diversity loss, and restrictions on recreational activities.This species was discovered in August near the mouth of Burnt Ship Creek by WNY PRISM staff. It is the second known infestation in Western New York and the first in Erie County. Starry stonewort has the potential wreak havoc on the region's ecological, economic, and recreational sectors if left unchecked. Fortunately, only male plants have been observed in the Great Lakes region so far. This means that no sexual reproduction is occurring to aid population expansions, and that bulbils and plant fragment are the only means for expanding distributions. Before initiating any management activity on this population, the lab will seek to understand some basic biology of the species.



The sun rises over Burnt Ship Creek on Grand Island, New York.

After mapping out the existing population, preliminary vegetation and invertebrate samples were collected from three patch types: starry stonewort (invasive macro-algae), muskgrass (*Chara sp.*) (native macro-algae), and american elodea (*Elodea canadensis*) (native macrophyte), to understand how starry stonewort interacts with its environment when compared to native alternatives. Ongoing research will investigate potential consumers of stonewort as well as document changes in habitat functioning associated with this invasion. •

A D-Net filled to the brim with Starry Stonewort.

Moving forward on mapping historic lake sturgeon habitat

by Kylie Wirebach

Kylie studying juvenile sturgeon in her Stream Ecology class during her junior year at Allegheny College (2018), not knowing that she would be working with them as a graduate student two years later!

Kylie Wirebach, a new graduate student in Dr. Pennuto's lab, has completed her first summer of work on the U. S. Fish and Wildlife Service-funded sturgeon project, in collaboration with Dr. Dimitry Gorsky from USFWS. The goals of the project are to map historic habitat use by lake sturgeon in Lake Erie and assess the current suitability of those habitats for lake sturgeon reintroduction efforts.

Today, Lake Erie sturgeon are only known to spawn in the Detroit and Niagara Rivers, though juveniles have been released in recent years into the Maumee River. However, Kylie's preliminary research has found that lake sturgeon may have previously spawned in up to 22 tributaries of Lake Erie. Of these, 13 are in Ohio, 3 in Michigan, 3 in Pennsylvania, and 3 in New York.

The next steps for this project include gathering habitat data for these tributaries, including substrate, stream velocity, stream depth, and water temperature. Kylie is planning to use remotely-sensed (satellite and aerial imagery) data to derive some of this information. Once complete, these stream characteristics will be ranked and compared in a GIS environment to identify suitable and unsuitable habitats. •

Snails, Gobies, and Green Beans

by Kira Yerofeev

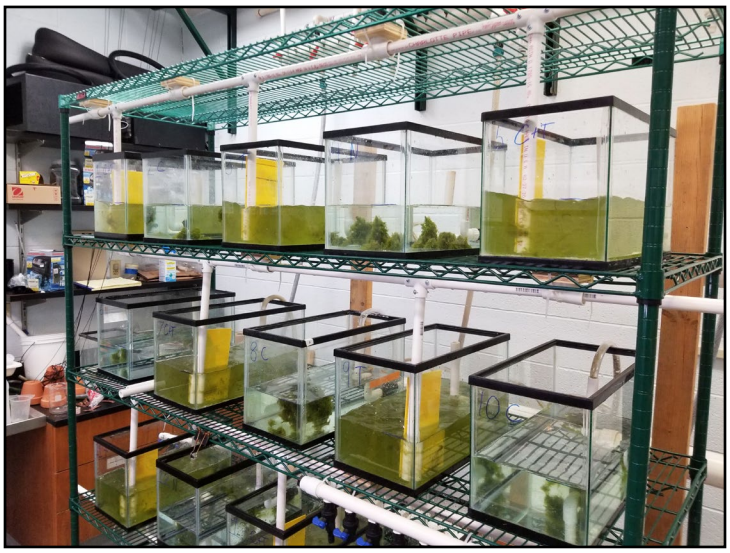
Ramshorn snails (Planorbidae) heading towards their green bean meal.

New Master's student Kira Yerofeev is in the early stages of her thesis project set-up. The general question she hopes to answer with her project is "How does round goby (*Neogobius melanostomus*) predation affect snail behavior?" Snails have some remarkable predator avoidance behaviors documented in the literature. For example, several species adjust their locations differently when faced with different predators, crawling up plant stems (and even leaving the water) when crayfish are about, but crawling down into the substrate detritus when water-column fish are present. Part of her research will determine if these behavioral responses are hard-wired to taxonomic units (i.e., avoid crayfish with one method and avoid fish with another), or if the responses are more flexible. She hopes to further expand that question and determine whether round goby predation affects leaf-litter breakdown as a consequence of snail behavior changes. While she refines her project's questions and her experimental set-up, Kira is rearing 4 snail species in the wet lab at the Field Station. She hopes to collect round gobies for her project in the near future, too. For now, her work mainly consists of searching through literature, cleaning snail tanks, and feeding snails lots of green beans (a tried-and-true favorite). •

Cladophora decomposition: biotic and abiotic factors contribute to the break-down of a nuisance algal species in the Great Lakes

by Jay Wagner

Cladophora glomerata has long been viewed as a nuisance algal species throughout the Great Lakes. With increasing water clarity and altered benthic phosphorus availability, attributed to decades of ecosystem engineering by Ponto-Caspian dreissenid mussels, *Cladophora* is experiencing a resurgence. *Cladophora* attaches to hard substrates while growing but will eventually break from its holdfast as it ages (called sloughing). It can then be carried by waves and currents in the water-column, eventually settling in the benthos, washing up on shore or possibly being pulled into water-intakes and clogging infrastructure. Although significant work has gone into understanding its growth dynamics, a knowledge gap exists on what happens to *Cladophora* after it settles and begins to break down.



The tank set-up at the Field Station with three treatments including: aquaria with a single crayfish dispersing *Cladophora* around the tank; algae suspended and dispersed by mild turbulence induced by a fin attached to a motor; and the control with no turbulence or crayfish, leaving a single mass of algae in one location in the tank.

Throughout July, a 20-day decomposition experiment was performed at the Field Station using 25 aquaria to tease out the role of wave action and crayfish consumption on the breakdown process. To simulate the wave action, a machine moved a fin at a consistent, standard period within each aquarium receiving the abiotic treatment. Northern clearwater crayfish (*Faxonius propinquus*), a known consumer of *Cladophora*, was the biotic treatment. Controls were established as well as a combined treatment utilizing both biotic and abiotic contributors. Water samples were drawn from each aquarium at days 0, 10 and 20. These were sent to the National Center for Water Quality Research at Heidelberg University where a suite of tests was performed including measurement of soluble reactive phosphorus (SRP) and nitrogen. Initial and final *Cladophora* tissue was also collected, weighed, and tested for C:N:P as well as chlorphyll *a* pigment concentration in Dr. Pennuto's aquatic ecology laboratory on campus.

While statistical analyses are ongoing, observational data through the experimental process has suggested interesting treatment effects. While crayfish have been reported to consume *Cladophora* in streams, this behavior has not been apparent in lakes. Throughout this experiment, the crayfish did not exhibit a significant change in mass with the presence or absence of *Cladophora*. However, distribution of the *Cladophora* within the enclosures containing crayfish appeared substantially different than enclosures containing only *Cladophora*. This may suggest that, although crayfish may not be actively consuming the detached algae, they may be contributing to its degradation through bioturbation of the detached mats of algae. Much as the way mechanical turbulence by waves serves to break apart algae masses, exposing surface area accessible to decomposers, the crayfish also break up and spread out the conglomerate of material. With this additional insight, combined with future statistical findings, we soon hope to better describe the contribution of natural processes to the reduction of nearshore nuisance algal biomass. •

Restoring flow regime could negatively affect threatened species

by Alexander Karatayev, Lyubov Burlakova, and Vadim Karatayev

For over 15 years, we studied Texas hornshell (*Popenaias popeii*), a rare unionid bivalve found in only a few Texas and New Mexico rivers. After surveying over 250 sites in the entire historical range of *P. popeii* in Texas, we found that this species has been extirpated from a large portion of its geographic range. The remaining population in the Rio Grande is very fragmented, with only one 190 km stretch above Laredo still supporting high densities (Karatayev, A.Y., L.E. Burlakova, T.D. Miller,and M.F. Perrelli (2018) (1MB)). As a result, the Texas hornshell recently became the only federally-listed critically threatened unionid mussel in Texas.

Texas hornshell (*P. popeii*).

In the Rio Grande, Texas hornshell live in patches (mussel beds) in narrow gaps beneath large sandstone rocks resting atop bedrock. These habitats provide "flow refuges" for mussels during peak currents. Over four years, we tracked one of the largest mussel habitat patches at La Bota above Laredo, Texas, using an intensive mark-and-recapture study that has been recently published (Karatayev, V.A., L.E. Burlakova, A.Y. Karatayev, L. Yang, and T.D. Miller (2020)). To our surprise, the mark-recapture models estimated high levels of annual downstream emigration of adult Texas hornshell (16–51%) as well as high immigration rate from upstream habitats (32–48%). This means that during high river flows, the La Bota mussels are washed out into an unsuitable polluted area since the bed is located upstream from the Laredo sewage plant, below which no live Texas hornshell were found due to heavy pollution.

Scientists participating in the mark-recapture study. (L-R) Susie Daniel, Lyuba Burlakova, Josh Fisher, students from Laredo Community College and Texas International A&M University in Laredo, T. Vaughan, and T. Miller

Furthermore, in many dammed rivers there are active efforts to restore peak river flow rates. Peak river flows are a critical function in pristine rivers, but they also move many organisms downstream from habitat patch to habitat patch. Therefore, in rivers with high habitat loss, restoring natural flow regimes without restoring habitat patches could accelerate local extirpation if the restored peak flows end up moving animals out of the remaining, good habitats into poor-quality habitats downstream.

Our study suggests several important implications for species protection and restoration. Protection of subpopulations isolated in small river stretches by itself may not prevent local extirpation if elevated peak flows will carry most individuals to downstream degraded habitats. To avoid the adverse effects on threatened aquatic species, we may need to restore both habitats and the flow regime simultaneously. One of the best ways would be to restore and maintain long, contiguous stretches of high-quality habitats. •

Popular GLOS buoy receives an upgrade

by Mark Clapsadl

We have been operating a Great Lakes Observing System (GLOS) buoy in the open waters of the eastern basin of Lake Erie for a decade now. For the last ten years, each spring to late fall, this buoy has been collecting weather and lake condition data and making these data available (both archived and in real time) to anglers, boaters and researchers alike. Anglers and other boaters tend to be interested in wind and wave information so that they can make decisions about the safety or comfort of heading out onto the lake; researchers have used these data for climate modelling work; and fishery managers conducting field work use pretty much the whole suite of data to help guide fisheries sampling decisions or to perhaps explain events such as a sudden fish kill.

Our ten-year-old buoy is quite weather-worn.

Going into the 2020 season, it looked like the GLC buoy would be in its last season. Funding was uncertain and the ten-year-old system for relaying cellular data back to our computers was no longer going to be supported by the cellular service provider. The only technical fix available required components too large to fit in the hull of the buoy and there was no inexpensive remedy for the problem. In addition to the connectivity problem, the buoy was really starting to show the effects of a decade of exposure to storms, heat, cold and sunshine.

Conditions on Lake Erie can be very rough at times. The buoy survived multiple storms where the average wave height was 17 feet or more, and although dramatic events such as storms can take their toll, it was often the act of deploying and retrieving the buoy that most put it at risk. Covered with sensors and solar panels and measuring in at around 800 pounds and 16 feet in length, the buoy is heavy, awkward, and quite fragile, and contact with any hard object can do real damage. After ten years of service, the buoy is in rough shape.

All of these factors seemed to indicate that we would not likely be able to continue operations of the buoy in 2021. Fortunately, the situation has recently changed. The GLOS administration reviewed the user statistics of the various buoys for which they have provided support and it turns out that the Dunkirk buoy is extremely popular. There were over 19,000 visits to the Dunkirk location of the GLOS website in 2019, and when we were forced to delay deployment of the buoy by about two months this spring, there was a surge of comments to the site asking for the buoy to be deployed. In 2020, the site received almost 16,000 visits from over 1,750 viewers despite the truncated season.

The GLOS organization, like so many others these days, has limited resources. However, the interest shown by the community helped to make continuation of the Dunkirk buoy a priority. We are currently working with GLOS to acquire a new buoy and expect to have the buoy operational for spring 2021. This buoy would have current technology for communications as well as improved sensors. In addition, it is considerably smaller: 9 feet long as opposed to 16 feet and weighs over 500 pounds less than the original. We currently expect to have the operational costs of the buoy covered for next year and after that time we will, with the help of GLOS, be looking to find alternate sources of funding to cover repairs, maintenance, and deployment of the new buoy. •

The new buoy. (Image copyright: Nexsens Technology 2020)

Habitat planting feature: Spicebush and American Witch-hazel

by Katie Hastings

There are many varieties of native plants in the gardens at the Field Station, and as the seasons shift to autumn, I'd like to focus on two species that stand out at this time of year.

Everything right now is pumpkin spice, so it's appropriate to talk about spicebush (*Lindera benzoin*) or wild allspice. The foliage and twigs are very aromatic, and the bright red berries can be dried and powdered as a spice. Native Americans had a variety of medicinal and culinary uses for spicebush, and it was useful to American colonizers as well, being used as a replacement for allspice during the Revolutionary War and replacing tea in the Civil War (Tucker et al. 1994). Spicebush is also very beneficial to wildlife, the drupes being favored by many species of gamebirds and songbirds. Spicebush is the larval host for the spicebush swallowtail (*Papilio troilus*) and the promethea silkmoth (*Callosamia promethea*). Consider planting spicebush as a replacement for the non-native forsythia, since spicebush also has early yellow flowers but provides greater habitat benefits.

Spicebush (*Lindera benzoin*)

Our other featured plant is American witch-hazel (*Hamamelis virginiana*), which is starting to bloom right now! Witch-hazel has fragrant yellow flowers with long stringy petals that make an attractive food source for pollinators when most other flowers have faded. The seed capsules mature for a year before the seeds are explosively ejected the following fall. Birds and small mammals eat the seeds, while deer and beavers browse the plant. Witch-hazel is notably used as an astringent liniment and has also been used medicinally by Native Americans. Although it sounds spooky, witch-hazel doesn't get its name from witches, although that is a popular story. The "witch" in witch-hazel derives from the Middle English *wyche* meaning "pliant," and not related to those who practiced magic. The crooked branches of witch-hazel were traditionally used for dowsing rods.

American Witch-hazel (*Hamamelis virginiana*) in bloom.

In our habitat gardens, spicebush is one of the first shrubs to flower, and witch-hazel is one of the latest to bloom, like seasonal bookends. If you're out for a hike this autumn, look for the bright yellow flowers of American witch-hazel or the fragrant yellow leaves of Spicebush. Happy fall! •

Scientists to Students

by Katie Hastings

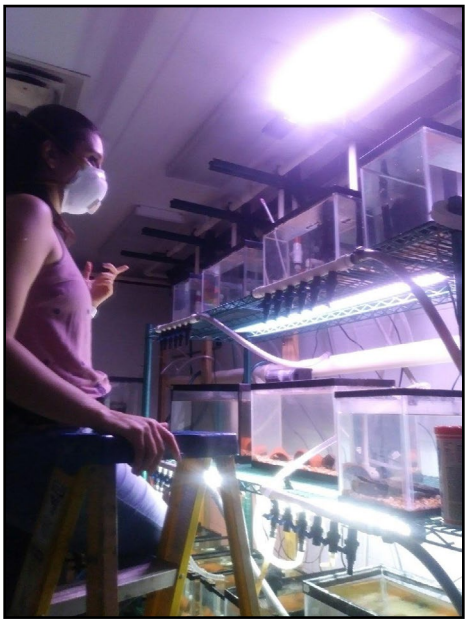
Susan Daniel, research scientist, was one of several scientists who met virtually with students from three classrooms this spring as a part of Illinois-Indiana Sea Grant's Scientists to Students (S2S) program. Normally, this program connects students to scientists aboard the EPA research vessel *Lake Guardian*, but due to COVID-19, changes had to be made. Some of the interactions were prerecorded messages, while others were live events connecting students and scientists directly in their own homes. Students had the opportunity to ask questions and receive answers. The teachers involved were all a part of IISG's Shipboard Science program at some point in the past, where they went for a workshop aboard the *Lake Guardian*, and now teach Great Lakes issues as part of their curricula.

"I was 19 years old. I never even knew any of this stuff existed. I didn't know I could be a scientist. I thought that was something way beyond what I could be," said Susan Daniel. "When these students come and ask good questions and really remind you what you're doing is important, it lights that fire in your belly for a couple more months—to really have that drive to do research, and do it well."

Full article and video at Illinois-Indiana Sea Grant •

Research photos

Mark Clapsadl doing field work on Lake Erie in October 2020.



Above: M.A. Biology student Amy Cavanaugh works on a fish larva culture at the field station.

Lower left: Alexander Krest returning with an invertebrate sample. (Credit: Kylie Wirebach)

Great Lakes Center
Buffalo State College
1300 Elmwood Avenue
SAMC 319
Buffalo, NY 14222

Phone: (716) 878-4329
Fax: (716) 878-6644
greatlakes@buffalostate.edu

GLC Personnel

Director

Alexander Karatayev

Research Scientists

Lyubov Burlakova

Mark Clapsadl

Susie Daniel

Allison Hrychik

Christopher Pennuto

Alicia Pérez-Fuentetaja

Research Technicians

Brian Haas

Erik Hartnett

Katie Hastings (Newsletter editor)

Brianne Tulumello

WNY PRISM

Sonya Bayba

Brittany Hernon

Andrea Locke (Coordinator)

Lucy Nuessle

Emily Thiel

Administrative Assistant

Susan Dickinson