

# ALUMNI NEWSLETTER

DEPARTMENT OF ENVIRONMENTAL SCIENCES

SUMMER 2022

 Mark J. Camp, editor  
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## Greetings to the friends and alumni of the Department of Environmental Sciences!

The Department of Environmental Sciences at The University of Toledo continues to grow and change even through the trials of the past two years. Our faculty and students are conducting research that helps solve local environmental issues in Northwest Ohio and beyond, such as: harmful algal blooms, the impacts of microcystins on humans and turtles, the impact of road salts on aquatic communities (search for Dr. Bill Hintz in the NY Times!), the reestablishment of lake sturgeon in the Maumee River, the conservation of imperiled-flagship species of the Oak Openings region, understanding the historic lake levels of Lake Erie, the influence of climate change on plant function and many more. While much of our research is conducted locally, the results have global implications.

Our faculty are currently involved in several large collaborative projects that highlight the interdisciplinary nature of solving environmental problems. Dr. Chris Mayer is leading a group of faculty in a partnership with the Ohio DNR, USGS and USFWS to combat the presence of invasive carp in the Sandusky, Maumee and Cuyahoga Rivers. This project involves multiple crews scouring the rivers to find and remove these fish. Dr. Kennedy Doro is leading our partnership with the H2Ohio project; an initiative aimed at creating, restoring and enhancing wetlands within the state with the aim of reducing nutrients (phosphorus) loading into Lake Erie. And Dr. Mike Weintraub is leading the UToledo portion of a project with the Department of Energy entitled Coastal Observations, Mechanisms, and Predications Across Systems and Scales (COMPASS). COMPASS is a multi-institutional effort designed to understand

the biogeochemical, ecological, microbial, and plant interactions in coastal regions, including the coast of Lake Erie.

Our faculty and student's efforts in the field and classroom are being recognized not only by the University, but societies, agencies and the popular press. Two of our students have been awarded NOAA's prestigious Knauss Fellowship: Michaela Margida, Ph.D., has spent the last year working in the office of Senator Cory Booker and M.S. student Kaitlyn Lang will be working with NOAA's chief scientist to lead the United States' involvement in the United Nation's Decade of Ocean Science project. Several of our students have received awards for their research and presentations or small grants, including undergrad Amar Kolapkar (Society of Exploration Geophysicists Scholarship) and M.S. student Touhue Yang (Cashner Award from The American Society of Ichthyologists and Herpetologists). Silas Fisher has been recognized for their art, science and leadership in diversity inclusion. They were featured on the cover of *The Wildlife Professional* journal and their art was featured in an article in *Audubon*. On the faculty side, Dr. Henry Streby was elected as a Fellow of the American Ornithological Society. The university recognized Drs. Chris Mayer and Henry Streby for their grantsmanship and scholarly activity, respectively. Drs. Mike Weintraub and Jon Bossenbroek were recognized by the College for their research and teaching, respectively.

We have also had a few changes in our staff and departmental roles. First, Dr. Tim Fisher stepped down as Department Chair after serving for 10 years. Many thanks to him

for all his service! In July 2020, Dr. Jon Bossenbroek took over as Chair and is hoping to one day have a semester where COVID-19 doesn't



dominate many of our decisions. Dr. Alison Spongberg retired in the summer of 2020 after 25 years of service to the university. We wish Alison all the best in her retirement! Several of our faculty have been promoted in the past 2 years: Drs. Refsnider and Streby were promoted to Associate Professor, Drs. Becker and Qian to full Professor and Dr. Crail to Distinguished University Lecturer. This past fall we welcomed back one of our alumni, Wendy Jacquillard, as our new Lab Coordinator. Dianne Mauter retired in June 2019. Her replacement is Sandy Stewart, who we hope sticks around for a long time!

Finally, I cannot end without mentioning my highlight of COVID-binge-TV watching. This year during Shark Week there was a new show, Shark Academy. Recent alum and Spring 2022 UToledo Commencement Speaker, Randy Thomas, became the star of the show when he won the competition. If you love sharks, take a couple evenings to watch eight novices learn how to swim and conduct research on sharks. You won't be disappointed!



Dr. Jonathan Bossenbroek  
 Chair







## Dr. Christine Mayer, Aquatic Ecology Lab

Grass carp are an invasive fish now present in the Great Lakes. They are herbivorous and consume mainly submerged aquatic vegetation. Grass carp were imported to the U.S. decades ago to remove excess vegetation from ponds. In the 1980s, a process to produce triploid (infertile) grass carp was developed. Adult grass carp have been found in all the Great Lakes, except Lake Superior, and it was long assumed that these occasional individuals were stray triploid fish. However, grass carp spawning has been confirmed in Lake Erie. If the Lake Erie grass carp population becomes large, they may reduce submerged vegetation in the nearshore areas and wetlands. Such vegetated areas provide native fish nurseries, invertebrate habitat, improve water quality and decrease erosion. Consequently, natural resource agencies want to minimize the number of grass carp, especially those capable of reproducing.



*UToledo grass carp strike team attempting to remove fish from the Sandusky River.*



*Mayer Lab members standing near electrofishing boats used for adult grass carp removal.*

The University of Toledo has been involved in grass carp research since 2015 when DES M.S. student Holly Embke (biology '17, advisors Qian and Mayer) found fertilized grass carp eggs during high flow events in the Sandusky River. The search for other spawning locations has been continued by research technicians Nicole King and Keith Shane at the UToledo Lake Erie Center (LEC) with support from the USGS. Grass carp eggs and larvae have since been found in the Maumee River. We continue to investigate other Ohio rivers. DES Ph.D. student Sabrina Jaffe (M.S. biology '21, advisor Qian) has constructed a model predicting the conditions most likely to result in spawning. Sabrina's model was incorporated into a forecasting tool built by hydrologists at the USGS to predict spawning days in advance of the event, so that crews can more efficiently target rivers with gear to remove spawning grass carp.

By 2018 it was clear that grass carp were spawning in at least two Lake Erie rivers, and multiple state and federal agencies formed crews dedicated to removing adult grass carp. The crews are affectionately known as 'strike teams'. In 2018 the Fish & Wildlife Service and Michigan DNR each

deployed a crew. In 2019 UToledo, funded by Ohio Department of Natural Resources, also deployed one crew. UToledo has now increased to five strike teams (funded by OH DNR and the Great Lakes Fishery Commissions) led by crew chief and DES alumnus Robert Mapes. Each boat is led by a full-time research technician or graduate student with



*Boat and nets used to sample rivers for grass carp eggs and larvae.*

two seasonal technicians assisting.

Both the grass carp strike teams and egg and larvae crew work out of the UToledo Lake Erie Center. We've added seven boats to the LEC fleet for these projects and construction of a new boat storage barn was recently completed. LEC Boat Captain Alex Lytten and DES's Steve Murphy have fabricated specialized sampling equipment needed for the specific task of each boat type. In addition to the grass carp work, graduate students and technicians studying other fish in both the Mayer and Hintz labs have brought a new, high level of fish researcher activity to the LEC.

The information produced by adult removal is helping to answer ongoing research questions. DES postdoctoral researcher Dr. Ana Gouvias estimated the resident population of grass carp in the Sandusky River at approximately 165-185 fish over the past three years. While three years is a short time to infer a population trend, it is encouraging that numbers have not substantially increased. DES M.S. student Kaitlen Lang (ecology '22, advisor Mayer) is determining if mortality has increased since removal began using age estimates of the captured fish. Ph.D. student Robert Hunter (advisor Mayer) is trying to determine the spatial scale of habitat data needed to predict successful capture locations. Together these research efforts are geared at maximizing removal efforts and determining if control is reducing the numbers of this invasive species in Lake Erie.

Laboratories and Centers, continued from page 5

**Dr. Daryl Moorhead Lab**

The biggest thing from my lab is that Michaela Margida successfully defended her Ph.D. (ecology, '21). Michaela recently completed her work as a NOAA Sea Grant Knauss Fellow in Washington, DC, where she had received a placement in New Jersey Senator Cory Booker's office, working with constituents, developing policy on climate, environmental justice and other environmental topics, and supporting work in the Environment and Public Works Committee and the Environmental Justice Caucus.



Michaela Margida with Senator Cory Booker.

**Dr. Jeanine Refsnider Lab**

Several Refsnider Lab graduate students finished their research projects this year. M.S. student Sarah Carter (ecology/biology, '21) studied effects of landscape connectivity on productivity in two declining turtle species with funding from the Competitive State Wildlife Grants program (US Fish and Wildlife Service) and Austin Hulbert completed his M.S. in Fall 2020 studying hatchling turtle survival and ecology on the same funding source. Ph.D. student Ian Clifton completed his work on the thermal ecology of high-elevation desert lizards and their potential capacity to compensate for the effects of climate change and successfully defended his dissertation in Fall 2021. Ph.D. student Josh Otten completed his study of the long-term effects of the 2010 Kalamazoo River oil spill on river turtles with a grant from the US Fish and Wildlife Service and successfully defended his dissertation in Spring 2022.

The lab also recently finished a study on how Lake Erie's harmful algal blooms affect the health of wetland-associated

songbirds, amphibians, and reptiles, a project which included several summer visiting undergraduate students through our NSF-funded Research Experience for Undergraduates program.

Finally, DES alum Paige Madden, pictured right, has joined the lab as a new graduate student – she has extensive experience radio-tracking hatchling turtles with Sarah Carter and Austin Hulbert, and for her thesis research Paige will be studying paternity patterns in several species of freshwater turtles, leveraging the many DNA samples that were collected in several of our previous field projects.



**Dr. Henry Streby Lab**

The three Ph.D. students in the Streby Lab ([www.henrystreby.com](http://www.henrystreby.com)) are each in different stages of their graduate careers as the 2021-2022 academic year comes to a close. Silas Fischer conducted an exciting field season of experimental manipulation of nestling songbird hydration in extreme drought conditions in New Mexico. Silas will be taking on preliminary examinations and defending their dissertation proposal soon. Silas was recently featured on the cover of *The Wildlife Professional* magazine for an article on expanding diversity and

inclusion in the sciences. Annie Lindsay worked with collaborators this year on laboratory analysis of isotopic ratios in

fat samples she surgically collected from songbirds during migration. Annie is done with field data collection and continuing with a lot of analysis and writing for her dissertation. Annie is also the current banding director at the Powdermill Avian Research

Center where she recently recorded that organization's 800,000<sup>th</sup> bird capture in their unparalleled long-term bird-banding dataset.



Gunnar Kramer with his publication award from *The Wildlife Society*.

Gunnar Kramer successfully defended his dissertation in November 2021 and accepted a position at Harvard on a National Science Foundation

Postdoctoral Research Fellowship. Gunnar

also won an award from The Wildlife Society for the best wildlife related paper published in any journal in the past three years.

We're looking forward to a highly productive 2022!



Silas Fischer conducting an avian ecology experiment in New Mexico.



Annie Lindsay (Ph.D candidate) banding birds at the Powdermill Avian Research Center.

News From Our Students, continued from page 3

### Michaela Margida

(PH.D. — ECOLOGY, 2021)

Michaela was a science policy fellow on New Jersey Senator Cory Booker's staff after being awarded the John A. Knauss Marine Policy Fellowship in 2020 where she worked directly with a small team to help advance and shape U.S. environmental policy.

***"On a personal level, it has been incredible, amazing and humbling," Margida said.***

### Matt McCormick

(M.S. — GEOLOGY, 2021)

Matt accepted a position with the Federal EPA working with remediation of Superfund sites in Arizona, California, Hawaii and Nevada.

***"It's literally my dream job!"***

### Akinwale Ogunkoya

(GEOLOGY, DORO LAB)

Akinwale, a current graduate student, received the Geological Society of

America 2021 Allan V. Cox Research Award Grant for an outstanding research proposal in the field of geophysics.

### Tom Walsh

(M.S. — GEOLOGY, 1990)

Tom now heads a hydrogeological consulting firm in Pittsburgh. He stopped by the department in September 2020 and mentioned he has fond memories of the Fall Field Trips led by Dr. Camp.

## REST IN PEACE

### Stephen L. Goldman (1941-2021)



Dr. Stephen Goldman passed away on October 17, 2021. He served The University of Toledo from 1971

until retiring in 2007, remained a Professor Emeritus of the Department of Environmental Sciences (DES) and was one of its founding members. Steve's research focused on plant gene transformation and cell culture, and he held several patents in that technology. In fact, he was one of the first to successfully transform corn (maize).

Dr. Goldman led the effort to establish the Plant Science Research Center (PSRC) and later served as its first Director. He supported the formation of the Department of Environmental Sciences and simultaneously directed the PSRC, Stranahan Arboretum and UToledo Lake Erie Center (LEC) during the ensuing period of administrative reorganization.

During that time, Steve was a tireless advocate for the new department and the three centers.

Although it may seem odd that a plant genetic engineer would join an environmental program, he had hoped to turn his skills to transforming a biofuel grass (*Miscanthus*) to hyper-extract metal contamination from brownfields, of which Toledo has an abundance. His plan was to grow biofuels on sites that could not be safely used for other purposes, generate energy from the biomass, extract the sequestered metals from the ashes, and eventually reduce soil contamination to a level where other uses for these sites were possible. Steve was a systems thinker.

Unfortunately, fiscal limitations slowed the planned development of the three centers and department. Steve's health declined and he retired before he could pursue his brownfield remediation plan.

It's hard to know where to start or end with Steve, even now that he's gone. However, few people know that he had considerable input to the initial proposal to establish DES, as well as development strategy, etc. He was adamant about an

integrated curriculum. He led the PSRC proposal to USDA over the objections of OSU and even wrested about \$300k out of the Ohio Plant Biotechnology Consortium (again, away from OSU). These are herculean feats never performed since by UToledo.

Perhaps you remember the proposal he led to establish an endowed chair of bioremediation technology at UToledo? It came so close that we leveraged it into faculty positions. If I recall, they ended up being Dwyer, Mayer and Heckathorn. No? This only skims the surface. DES owes as much to Steve as it does anyone for our existence, today.

For those of you who knew Steve, he made an impression. As Henry would say, he spoke truth to power, and it cost him. However, I can think of no single person who made as much of a contribution to the formation and survival of DES, LEC, PSRC and Stranahan Arboretum in the early days than Steve. May he rest in peace. He had too little in life.

Cheers!

Daryl Moorhead

### Lorna Lynn (Miller) Snyder (1953-2021)

Lorna (B.S. '75, M.S. '03) passed away peacefully in her Swanton, Ohio, home on April 20, 2021. Lorna started out her career at the University of Toledo teaching in the

Geology Department. She went on and started working for Bowser-Morner, Inc. as a secretary, and quickly moved herself up working in the Geotechnical field. At the age of 50, Lorna obtained her Masters Degree in

Geology. She was a member of the Toledo Rock Hounds and no matter where she was, she was always collecting rocks.

## SELECTED GRANTS (FISCAL YEARS: 2020 &amp; 2021)

TITLE	SPONSOR	FACULTY	TOTAL AWARD
Building resilient shorelines - shoreline alterations and nearshore habitat (FY21)	NOAA/ODNR	Becker	\$30,000
Assessment of Sandusky River habitat for walleye spawning (FY20)	USFWS/OSU	Bossenbroek	\$69,118
Portable toxin detection technology to support Great Lakes derision support tools (FY20)	NOAA/BGSU	Bridgeman	\$112,319
Great Lakes Bay Watershed Education and Training (B-WET) program (FY21)	NOAA	Bridgeman	\$79,883
Wetlands' soil properties, hydrology and nutrients retention capacity (FY20)	OLEC	Doro	\$49,732
H2Ohio wetlands monitoring program - phase 3 (FY21)	ODNR/OSU	Doro	\$317,680
Surficial geology mapping of Glacial Lake Agassiz Strandlines, Polk County, Minnesota, dated 11/18/2019 (FY20)	USGS	Fisher	\$17,499
Investigating leaf angle response to temperature and carbon dioxide (FY20)	USDA	Heckathorn	\$193,798
Lake Sturgeon survival, habitat use and movements in Lake Erie (FY21)	USGS	Hintz	\$75,749
Forecasting the risk of high microcystin exposure in Western Lake Erie using routine monitoring data (FY20)	USGS	Mayer	\$225,000
Removal of invasive grass carp from Lake Erie and tributaries: targeted collection and modeling to improve catch (FY21)	USFWS/ODNR	Mayer	\$396,240
COMPASS GLM (FY21)	USDOE	Qian	\$159,969
Grass carp reproduction in Lake Erie (FY21)	USGS	Qian	\$134,863
The role of foreshore sands in human exposure to microcystin (FY20)	ODHE/OSU	Sigler	\$100,274
Assessing the impact of shore management on the resilience of coastal environmental microbiomes (FY20)	NOAA/OSG	Spanbauer	\$60,000
COMPASS FME (FY21) - A partnership with the Department of Energy (USDOE) on a project focused on Coastal Observations, Mechanisms and Predictions Across Systems and Scales (COMPASS). This multi-million dollar project is designed to understand the interactions of the ecology and biochemistry of microbes, waters, soils and plants within a coastal system. Drs. Bridgeman, Doro and Spanbauer are also contributing to this project.	USDOE	Weintraub	\$1,580,000



## SELECTED PUBLICATIONS

- Doro KO, Kolapkar AM, Bank CG, Wescott DJ, Mickleburgh HL 2022.** Geophysical imaging of buried human remains in simulated mass and single graves: Experiment design and results from pre-burial to six months after burial. [Forensic Science International 335:111289.](#)
- Hintz WD, Fay L, Relyea R 2022.** Road salts, human safety, and the rising salinity of our fresh waters. [Frontiers in Ecology and the Environment 20\(1\): 22-30.](#)
- Jin Y, Liu C, Qian SS, Luo y, Zhou R, Tang J, Bao W 2022.** Large-scale patterns of understory biomass and its allocation across China's forests. [Science of the Total Environment 804:150169.](#)
- Barnard MA, Chaffin JD, Plaas HE, Boyer GL, Wei B, Wilhelm SW, Rossignol KL, Braddy JS, Bullerjahn GS, Bridgeman TB, et al. 2021.** Roles of Nutrient Limitation on Western Lake Erie CyanoHAB Toxin Production. [Toxins 13\(1\):47.](#)
- Lowell TV, Kelly MA, Howley JA, Fisher TG, Barnett PJ, et al. 2021.** Near-constant retreat rate of a terrestrial margin of the Laurentide Ice Sheet during the last deglaciation. [Geology 49 \(12\):1511-1515.](#)
- Anderson EJ, Stow CA, Mason LA, McCormick MJ, Qian SS, et al. 2021.** Seasonal overturn and stratification changes drive deep-water warming in one of Earth's largest lakes. [Nature Communications 12:1688.](#)
- \*Soderman AD, Fisher TG, \*Wolfe ER, Becker RH, Martin-Hayden JM, Loope HM 2021.** Parallel tunnel channels of the Huron-Erie Lobe of the Laurentide Ice Sheet: A variation of tunnel channels with implications on lobe history and subglacial meltwater dynamics. [Geomorphology 385:107726.](#)
- Shane KD, Oubre MJ, Crail TD, Miner JG, Mayer CM, \*Sasak TE, DeBruyne RL, Miller JJ, Roseman EF, Hintz WD 2021.** Towards improving an Area of Concern: Main-channel habitat rehabilitation priorities for the Maumee River. [Journal of Great Lakes Research 47\(5\):1429-1436.](#)
- Refsnider JM, \*Garcia JA, \*Holliker B, \*Hulbert AC, Nunez A, Streby HM 2021.** Effects of harmful algal blooms on stress levels and immune functioning in wetland-associated songbirds and reptiles. [Science of the Total Environment 788:147790.](#)
- \*Amidon Z J, DeBruyne R L, Roseman, EF, Mayer, CM 2021.** Contemporary and historic dynamics of lake whitefish (*Coregonus clupeaformis*) eggs, larvae, and juveniles suggest recruitment bottleneck during first growing season. [Annales Zoologici Fennici 58:161-175.](#)
- Anderson EJ, Stow CA, Gronewold AD, Qian SS, et al. 2021.** Seasonal overturn and stratification changes drive deep-water warming in one of Earth's largest lakes. [Nature Communications 12:1688.](#)
- Sullivan PF, Stokes MC, \*McMillan CK, Weintraub MN 2020.** Labile carbon limits late winter microbial activity near Arctic treeline. [Nature Communications 11, 4024.](#)
- \*Keller M, Turco RF, Gray MB, Sigler WV 2020.** [The Fate of Methicillin-Resistant Staphylococcus aureus in a Synthetic Turf System. Sports Health-A Multidisciplinary Approach 12:263-270.](#)
- Su RC, Meyers CM, Warner EA, Garcia JA, Refsnider JM, Lad A, Breidenbach JD, Modyanov N, Malhotra D, Haller ST, Kennedy DJ 2020.** Harmful Algal Bloom Toxicity in *Lithobates catesbeiana* Tadpoles. [Toxins. 12\(6\):378.](#)
- \*Bista DR, Heckathorn SA, \*Jayawardena DM, Boldt JK 2020.** Effect of drought and carbon dioxide on nutrient uptake and levels of nutrient-uptake proteins in roots of barley. [American Journal of Botany. 107\(10\):1401-1409.](#)
- Doro KO, Ehosioko S, Aizebeokhai AP 2020.** Sustainable Soil and Water Resources Management in Nigeria: The Need for a Data-Driven Policy Approach. [Sustainability. 12\(10\): 4204.](#)
- Baiz MD, \*Kramer GR, Streby HM, Taylor SA, Lovette IJ, Toews DPL 2020.** Genomic and plumage variation in *Vermivora* hybrids. [The Auk. 137\(3\).](#)
- Refsnider JM, \*Vazquez TK, \*Clifton IT, \*Jayawardena DM, Heckathorn SA 2020.** Cellular and whole-organism effects of prolonged versus acute heat stress in a montane, desert lizard. [Journal of Experimental Zoology Part A-Ecological and Integrative Physiology. 335\(1\):126-135.](#)
- \*Coleman KK, Sigler WV 2020.** Airborne Influenza A Virus Exposure in an Elementary School. [Scientific Reports. 10:1859.](#)

\*student authors

## FIELD EXPERIENCE: TRIP TO TRINIDAD AND TOBAGO - MAY 2022

For the fourth time, Dr. Jon Bossenbroek accompanied a group of students to Trinidad and Tobago. This year's group consisted of Dr. Bossenbroek and his son Ryan, 12 DES students (Paige Anspach, Vanessa Baumgartner, Sydney Berg, Abby Chapman, Melissa Clawson, Lauren Dalton, Sabrina Diaz, Loren Hire, Raven Patrick, Arika Reed, Devon Smith and Anthony Tomalewski) and group leader Richard Smith of Iere Outdoors. Eight years ago Dr. Bossenbroek was a Fulbright Scholar in Trinidad and studied the spread of the Asian Green Mussel. Through the connections he made during his time Trinidad, he has developed a Field Experience Course that introduces students to a wide variety of ecosystems on this relatively small island. The experiences during this trip span the wide range of subjects covered in the environmental science and studies curriculum.

*"On the biological side of things, we learned how to tag leatherback sea turtles and helped release hatchlings into the ocean; we learned about the highly diverse bat fauna of Trinidad through an evening of mist netting and a strenuous hike to watch thousands emerge from Tamana Cave; we saw many species of birds, including the scarlet ibis, which is the national bird of Trinidad, and the endemic and critically endangered Trinidad piping guan or pawi.*

*Our visit to the southern village of La Brae was our day for geology as we visited the world's largest asphalt lake. This lake contains very high quality asphalt, which is mined and shipped all over the world. And every day we met new people trying to make Trinidad and our world a better place.*

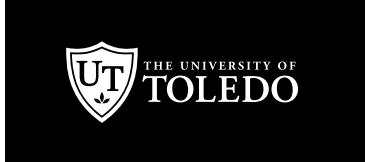
*In the mountain village of Brasso Seco we spent a morning with members of the Alliance of Rural Communities of Trinidad and Tobago, an organization that promotes*

*and develops community owned and independent chocolate producers. In the St. Ann's Valley just outside of Port of Spain, we spent most of a day at the Fondes Amandes Community Reforestation Project. The founder Akilah and technical director Kemba, taught us about forest restoration, fighting fires in the bush and the development of a community that works to preserve biodiversity while serving the needs of the people.*

*At least a dozen others, including guides, naturalists, drivers, caterers and care takers, made our trip incredibly informative and enjoyable throughout."*

- Dr. Jon Bossenbroek





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Please join other alumni in supporting education and excellence in The University of Toledo  
Department of Environmental Sciences!

I would like to make a GIFT/PLEDGE in the amount of:  \$250  \$100  \$50  \$25  Surprise Us! \$ \_\_\_\_\_

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DEPARTMENT OF ENVIRONMENTAL SCIENCES

SUMMER 2022

