CAWS Annual Meeting 2023

Environmental Conservation Department

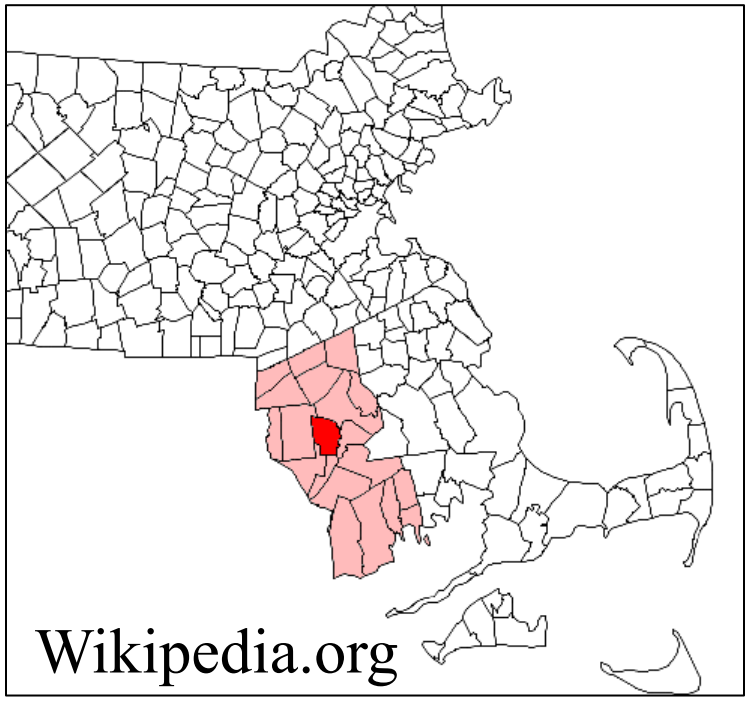
Brian Bastarache

Bristol Aggie 101

Signed into Existence in 1912.

Located in Dighton, MA

Was Truly Ag. Ed.



Bristol Aggie Stats

Public Vocation/Technical High School

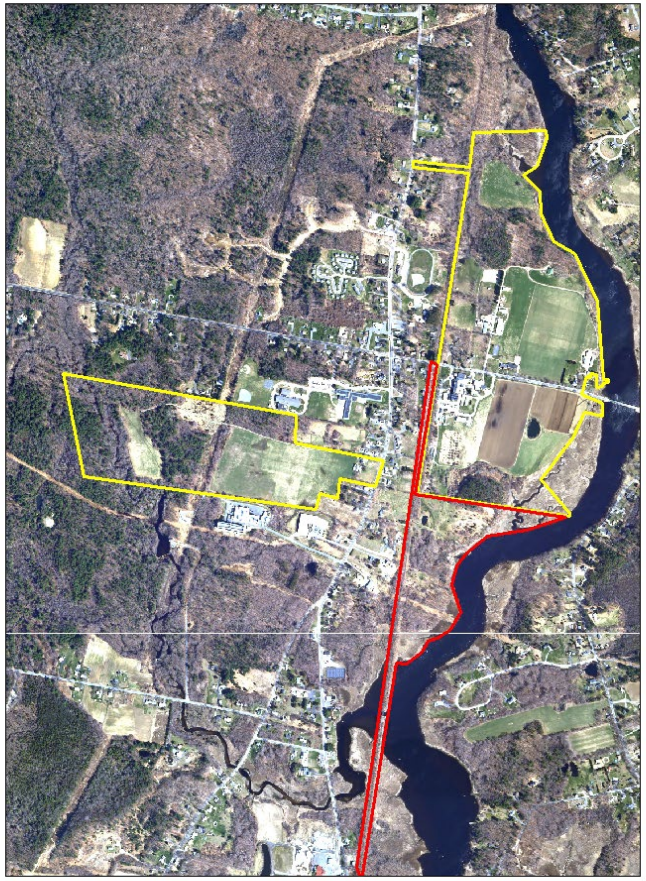
542 Students

450 Applications for Freshman
170 Seats

208 Acres Campus

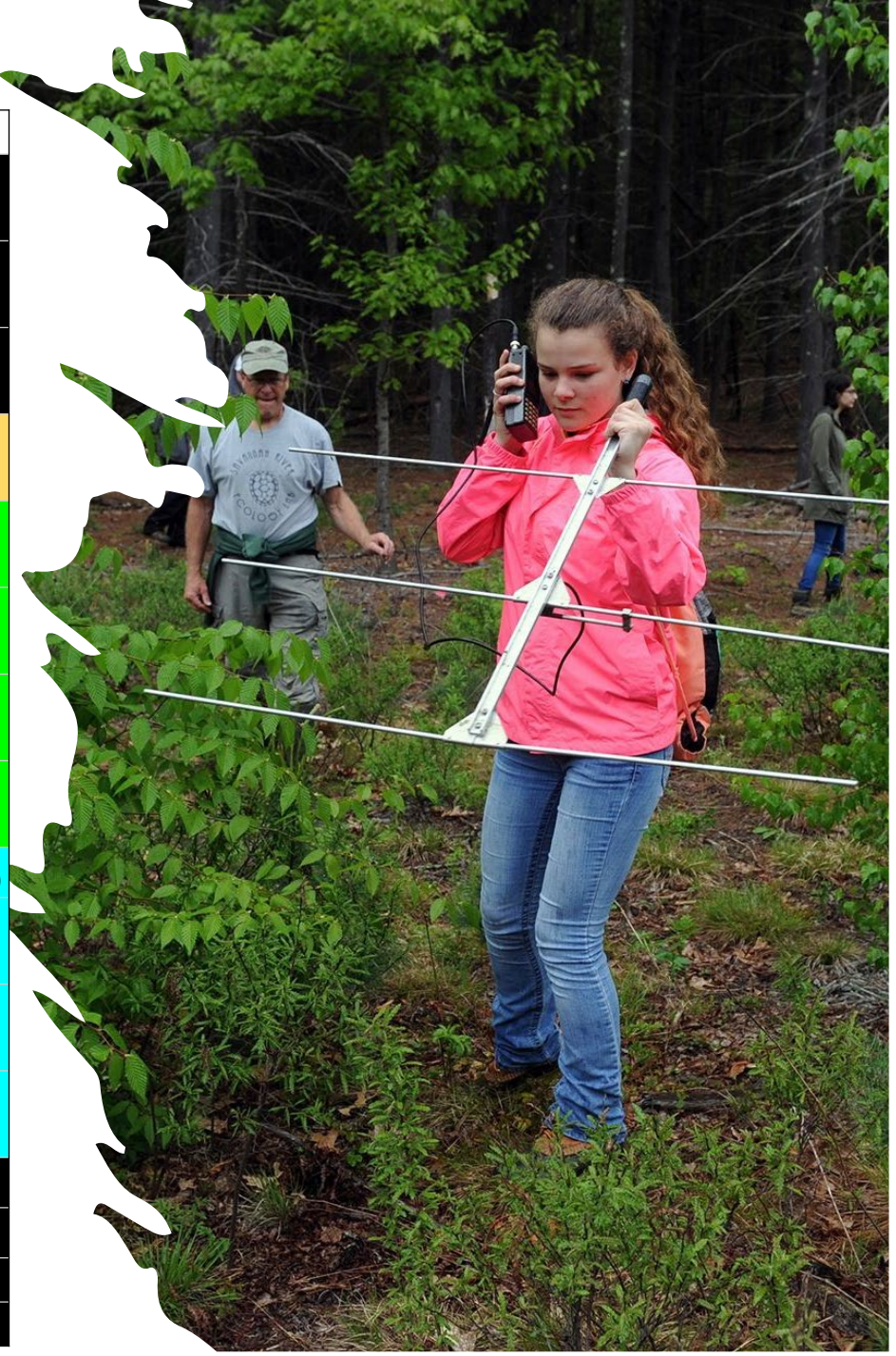
Unique Facility, Faculty,
and Attitude

Bristol Aggie Campus & Sweets Knoll SP



Curriculum

Term	Major Course	Related Course
Freshman 1	Exploratory 1: Limnology (KB)	
Freshman 2	Exploratory 2: Forestry & Habitat (KB)	
Freshman 3	Exploratory 3: Wildlife Mgt. (KB)	
Freshman 4	OSHA & Outdoor Safety (KB)	*(Freshmen placed in majors.)*
Sophomore 1	Intro to Wildlife (BB)	Oceanography (NEW)
Sophomore 2	Limnology (SC)	Marine Biology (NEW)
Sophomore 3	Ornithology (BB)	Envi. Professionalism (KB)
Sophomore 4	Ichthyology/Freshwater Fisheries (BB)	Ecology & Wildlife Mgt.(KB)
Junior 1	Forestry (KB)	Scientific Methods (BB)
Junior 2	Habitat Mgt. (KB)	Sci. Communication (BB)
Junior 3	Marine Fisheries & Aquaculture (NEW)	Env. Legislation & Justice (SC)
Junior 4	Herpetology & Mammalogy (KB)	Sustainability & Public Health (SC)
Senior 1	Envi. Interpretation (BB)	
Senior 2	Drone Operations (BB)	
Senior 3	Climate Sciecne (SC)	
Senior 4	Senior Capstone (BB)	




NRM
NRM

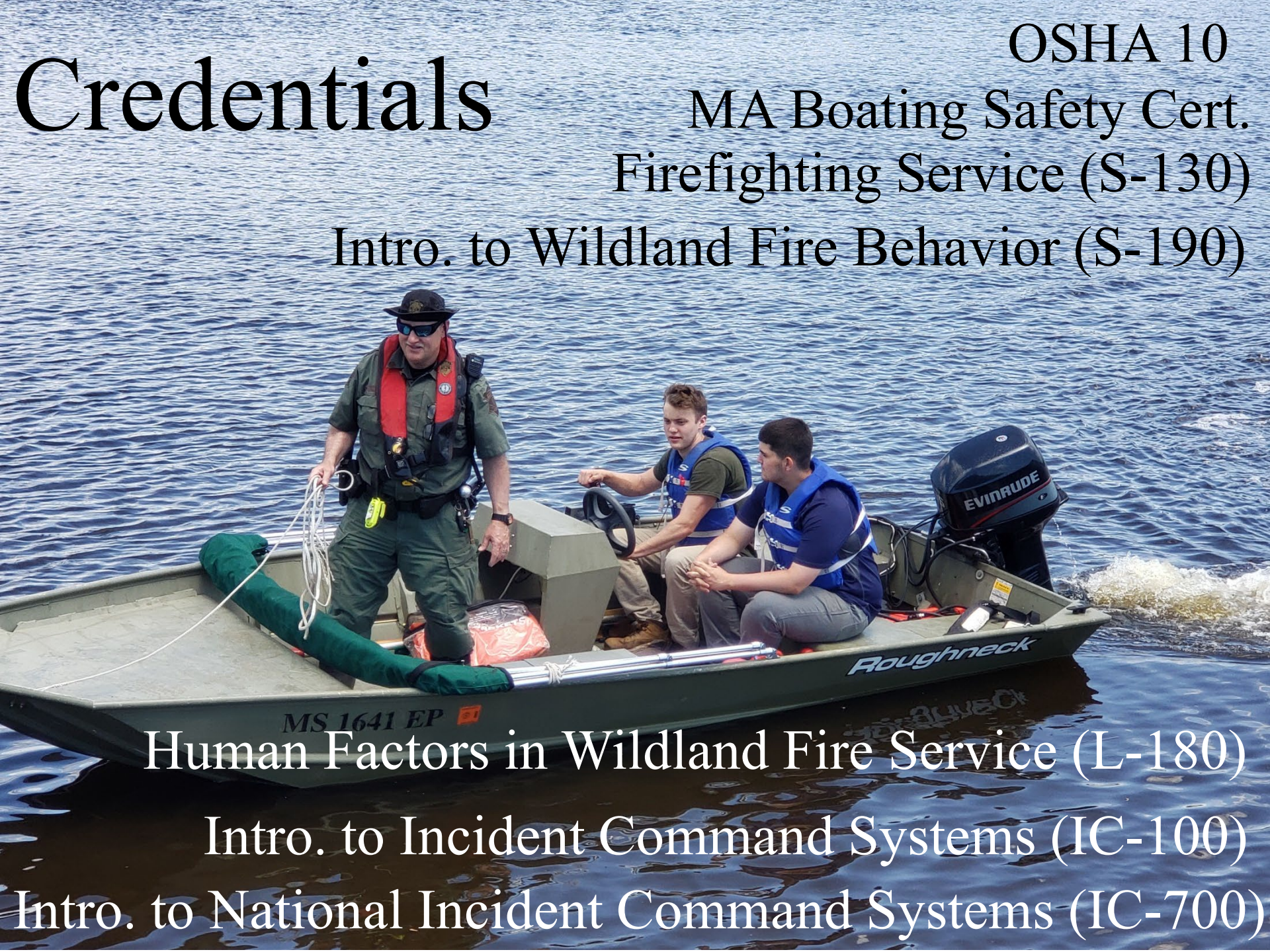
Credentials

OSHA 10

MA Boating Safety Cert.

Firefighting Service (S-130)

Intro. to Wildland Fire Behavior (S-190)



Human Factors in Wildland Fire Service (L-180)

Intro. to Incident Command Systems (IC-100)

Intro. to National Incident Command Systems (IC-700)

Coop. Projects

MASSWILDLIFE

NEW JERSEY DIVISION OF
Fish and Wildlife

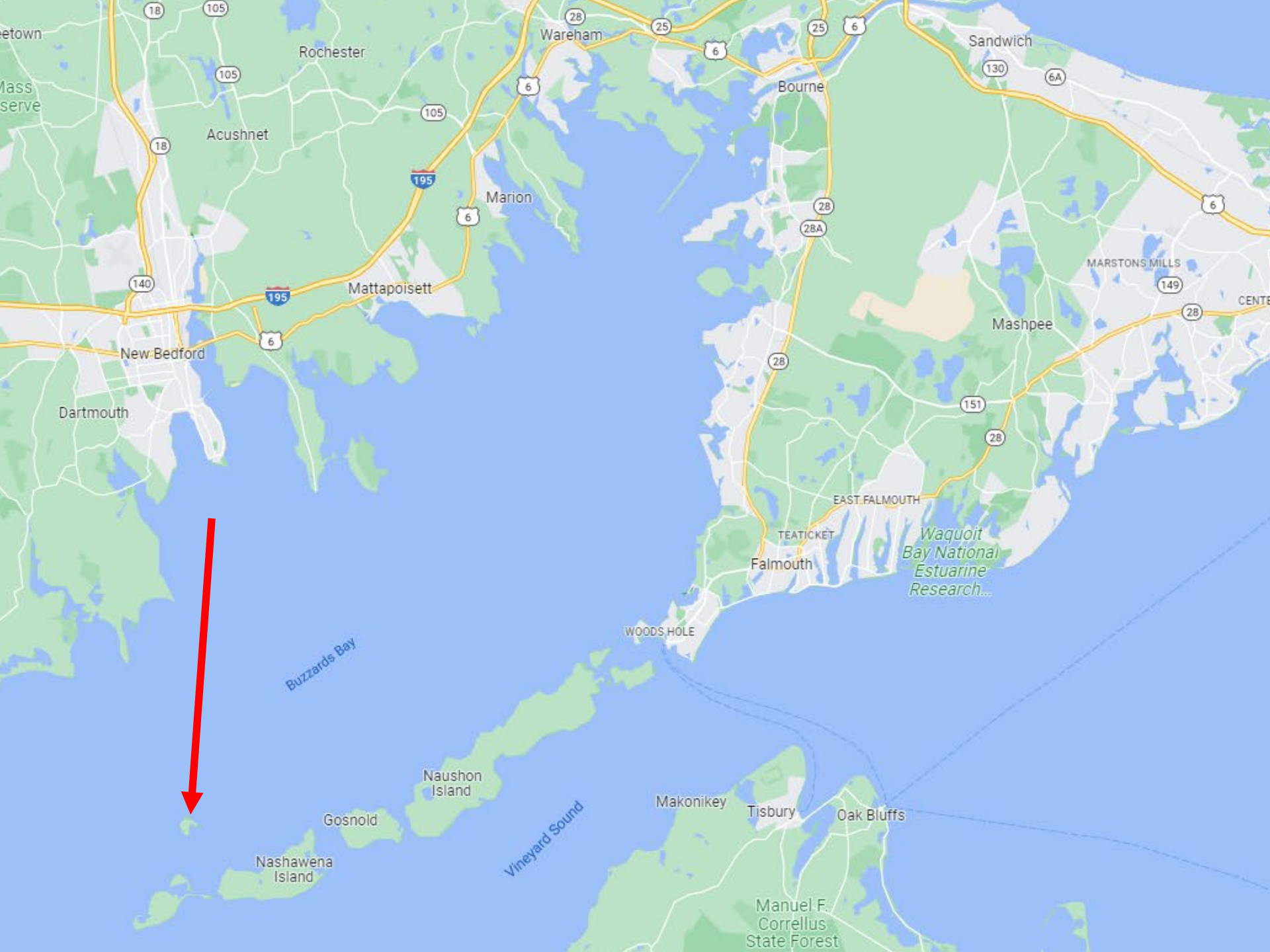
THE
AMERICAN
CHESTNUT
FOUNDATION®

ASSOCIATION
OF ZOOS &
AQUARIUMS

Savannah River Ecology Laboratory
UNIVERSITY OF GEORGIA

THE
AMERICAN
CHESTNUT
FOUNDATION®


MASSACHUSETTS
DIVISION OF FISHERIES & WILDLIFE
EST. 1866
MASSWILDLIFE


Wareham
Rochester
Acushnet
Marion
Mattapoisett
Bourne
Sandwich
MARSTONS MILLS
Mashpee
New Bedford
Dartmouth
EAST FALMOUTH
TEATICKET
Falmouth
Waquoit Bay National Estuarine Research...
WOODS HOLE
Buzzards Bay
Naushon Island
Gosnold
Nashawena Island
Vineyard Sound
Makonikey
Tisbury
Oak Bluffs
Manuel F. Correllus State Forest


MASSACHUSETTS
DIVISION OF FISHERIES & WILDLIFE
EST. 1866
MASSWILDLIFE


ABSOLUTE
-273.15


Head-starting Imperiled Turtles

Head-Starting: (verb) raising young animals in captivity until they have passed the most vulnerable stages of life.

Source:

(Me, Just Now)


Create illusion of extended summer by manipulating temperatures and photoperiod …

11 Species Head-started to Date

Blanding's Turtle

Wood Turtle

Snapping Turtle

Spotted Turtle

Painted Turtle

Eastern Box Turtle

Chicken Turtle

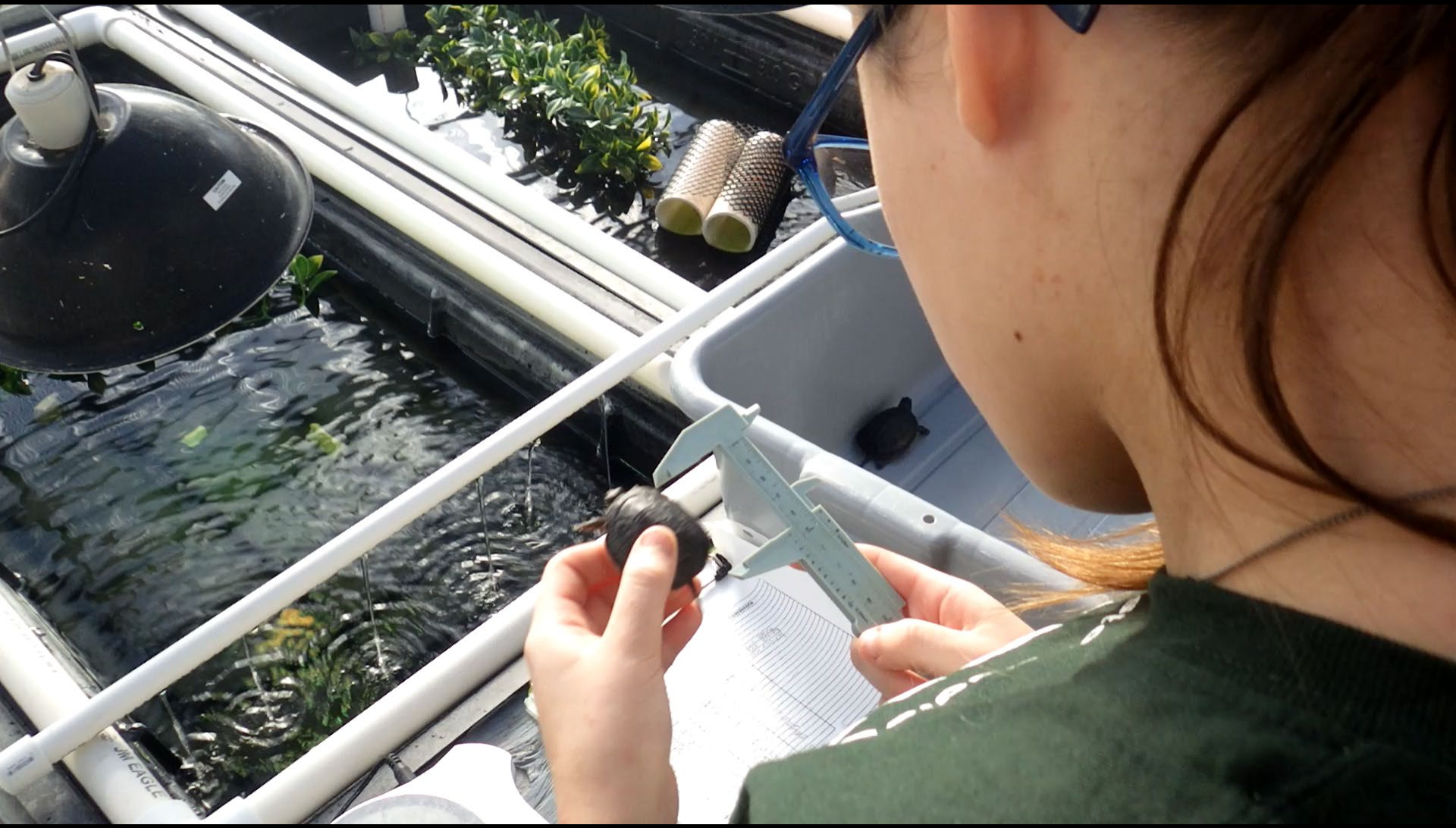
Chinese Box Turtle

Diamondback Terrapin

Common Map Turtle

Plymouth Redbelly Cooters

1,966 rare turtles released




HIGH

Herpetological Conservation and Biology 10(Symposium):436–454.
Submitted: 7 May 2012; Accepted: 20 February 2015; Published: 28 June 2015.

Reintroduction and Head-starting: Tools for Blanding's Turtle (*Emydoidea blandingii*) Conservation

Kurt A. Buhlmann[1,5], *Stephanie L. Koch*[2], *Brian O. Butler*[3], *Tracey D. Tuberville*[1], *Veronica J. Palermo*[3], *Brian A. Bastarache*[4] *and Zachary A. Cava*[2]

[1]*University of Georgia, Savannah River Ecology Lab, Aiken, South Carolina, USA*
[2]*U.S. Fish and Wildlife Service, Sudbury, Massachusetts, USA*
[3]*Oxbow Associates, Inc., Boxborough, Massachusetts, USA*
[4]*Bristol County Agricultural High School, Dighton, Massachusetts, USA*
[5]*Corresponding author, e-mail: kbuhlmann@earthlink.net*

***Abstract.*— We reintroduced Blanding's Turtles (*Emydoidea blandingii*) to Assabet River National Wildlife Refuge, Massachusetts, USA, evaluating the relative benefits and risks of using various life stages of Blanding's Turtles collected from a donor population within the same watershed, including ings (released in autumn shortly after hatching), head-started hatchlings (raised o), juveniles, and adults. We developed a simple population model to evaluate ease strategies was most likely to result in a stable population at the recipient site egative impacts to the donor site. Model results suggested that annual releases f head-started hatchlings were most likely to achieve our goal. We released 81 61 head-started hatchlings at the refuge in 2007–2011. Head-started hatchlings 62.7 mm carapace length, 46.6 g) compared to direct-release hatchlings (mean = ength, 8.8 g). Simultaneous radio-tracking of 12 translocated sub-adults has pro- ation on habitat preferences that we used to select two sites within the refuge for also released six head-started hatchlings with radio transmitters (one in 2009 and s found dead a year after release. We plan to continue monitoring efforts to assess , and site fidelity of all released Blanding's Turtles and to compare results among l direct-release hatchlings. We will update our models and reintroduction efforts data.**

idea blandingii; adaptive management; conservation; hatchlings; head-starting;

Water exchange relationships predict overwintering behavior in hatchling turtles

M.P. Figueras,[a] B.A. Bastarache,[b] R.L. Burke[a]

[a]Department of Biology, Hofstra University, Hempstead, NY 11549, USA.

[b]Bristol County Agricultural High School, Dighton, MA 0

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PDF-Plus (512 K)

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2018.

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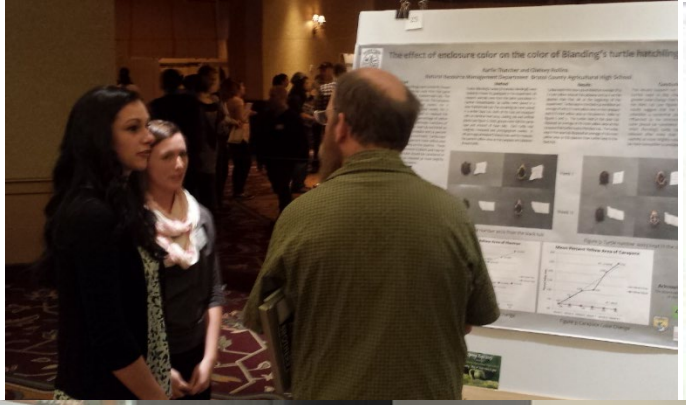


THE NORTHEAST NATURAL HISTORY CONFERENCE

Microplastic Ingestion in Northern Diamondback Terrapins within the Taunton River

Noah Hanson

Natural Resource Management, Bristol County Agricultural High School, Dighton, MA 02715

Abstract

The threat of global plastic pollution has become a large issue in society. Plastics that accumulate in the world's oceans do not degrade but simply break into smaller fragments. Fragments less than 5 mm but greater than 1 micrometer in diameter are known as microplastics. The consumption of these microplastics has repeatedly been documented across many marine taxa, including several species of sea turtle. However, no data has been collected on the consumption of microplastics by *Malaclemys terrapin* (Northern Diamondback Terrapins). *Malaclemys terrapin is* a species of brackish turtle, mainly living in estuary communities. During the Summer of 2021, *Malaclemys terrapin* feces were collected from a wild population in the Taunton River estuary. Fecal matter samples were collected from 13 individuals, varying in sex and size. Fecal samples were dyed with Nile Red and then poured through a 150-micron sieve. The contents of the sieve were analyzed using fluorescence microscopy. Control samples were also run on the tap water in which the fecal samples were collected to establish a background rate of microplastic occurrence (6.15 microplastics/250 ml, s = 2.1). The control samples' microplastic concentration was compared to the feces sample, to determine if the feces samples concentration was greater. The feces samples produced a mean microplastic concentration of 42.1 microplastics/250ml (s=20.4). There was a strong positive correlation found between terrapin weight and microplastic concentration ($R^2 = 0.76$). These results suggest that *Malaclemys terrapin* in the Taunton River estuary are consuming and accumulating microplastics.

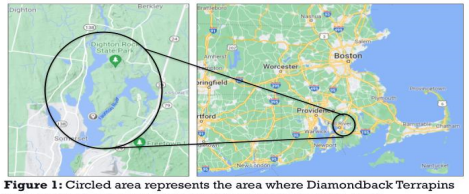


Figure 1: Circled area represents the area where Diamondback Terrapins were trapped, note the inclusion of Assonet Bay (Google, n.d.).

Significance

- Only obligate estuarine turtle in North America; threatened status in MA
- Effects of microplastics
  - Reduced Reproductive Success
  - Intestinal Blockages
  - Puncture Organs
  - Carcinogens
- Lack of research on terrapin's plastic ingestion

Figure 2: Sexual dimorphism in terrapins is associated with feeding preference.

Methods

During the summer of 2021, Diamondback Terrapin feces were collected from a wild population in the Taunton River Estuary. See Figure 1 for the map of the collection area. Fecal matter samples were collected from 13 individuals. Collected specimens were held overnight. Any feces excreted were collected and stored in glass jars. All samples were sealed until testing to reduce microplastic contamination. Jarred feces were then brought to the lab to be analyzed using fluorescent microscopy as described by Dustin (2015). My hands and all instruments were rinsed with distilled water before use. Clothing containing synthetic materials was not worn in the lab as prescribed by NOAA Marine Debris Program (2015). Jars were swirled before opening, to ensure an even distribution of microplastics as described by Labbe (2019). Nile red was then dropped into the jar with a concentration of 1 drop of Nile red per 6 ml of water. Jars were swirled, then left to sit for one hour. After one hour the jars were poured into the center of a 150-micron mesh filter. A NIGHTSEA royal blue fluorescent light was aimed at the sample. Microplastics observed were visually counted and photographed for documentation. Twenty control samples were run, testing the tap water used in the fecal matter samples for microplastics. The control samples' microplastic concentration was compared to the feces sample, to determine if the feces samples' concentration was greater.

Results

The mean control sample (n = 20) microplastic concentration was 6.15 (s = 2.1). Terrapin samples (n = 13) microplastic concentration resulted in a mean of 42.1 (s = 20.5) particles/250 ml. The highest concentration recorded in a terrapin sample was 83 particles/250 ml. The lowest was 22 particles/250 ml. There was a strong positive correlation ($R^2 = 0.76$) between terrapin mass and microplastic concentration. (See figure 3.). We are 95% confident that the difference between the control sample and the terrapin sample lies between (26.66g, 45.34g). Since the interval does not capture zero there is convincing evidence that a difference exists between the two-sample means (p = <.00001).

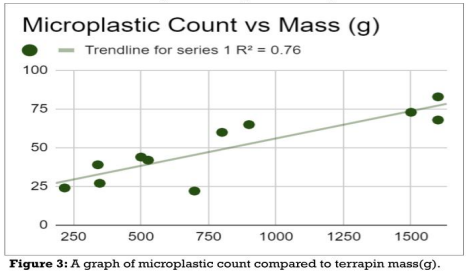
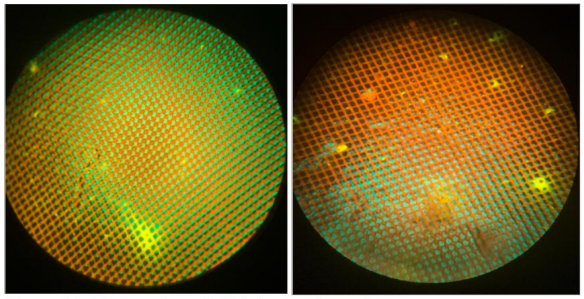


Figure 3: A graph of microplastic count compared to terrapin mass(g).



Figures 4: Left is a control sample. Right is a terrapin sample.

Discussion

Female terrapins were observed to have a higher concentration of microplastics. The results above suggest that nesting sites and reproductive output of adult female terrapins be monitored for associated effects of microplastic ingestion. Water, substrate, and prey species should be tested for microplastic concentration to better understand the sources of microplastics in the Taunton River terrapins. Most importantly, this work should continue to gather data from a larger sample of this population of terrapins.

Acknowledgments

- Brian Bastarache, Kourtnie Bouley, and George Bancroft for field research and data collection.
- Taunton River Watershed Alliance for funding the fieldwork.
- Ethan Kennefick for work as a lab assistant.
- Colin Linnehan for construction of 3D printed lab materials.
- Bristol County Agricultural School

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Wednesday, October 31, 2012

Students take pride in contributing to turtle conservation

Today, wildlife biologist Stephanie Koch and four high school students share their reflections on raising and releasing rare Blanding's turtles as part of an experimental head-starting program.

Bristol County Agricultural High School students have partnered with the U.S. Fish and Wildlife Service and others to help nurture Blanding's turtles, considered threatened in Massachusetts, and later release them with a greater likelihood of survival at Assabet River National Wildlife Refuge in Sudbury, Mass.

The program, intended to establish a new population at the refuge, involves collecting hatchlings in the wild, raising them in captivity and releasing them back in the wild when the turtles are large enough to survive most predation. Head-start programs are one of many tools that the Service considers in the conservation of species like the Blanding's turtle.

Over the last three years, Bristol Aggie teacher Brian

BLANDING'S TURTLE

Students preparing to release turtles in 2011. Credit: Keith Shannon/USFWS

Emily Faulkner, student: Being a part of this Blanding's turtle head-start program here at Bristol Aggie has taught me so much – and not just about this species. I never knew there was such a thing as a Blanding's turtle. I learned much more about myself, as well.

I never thought before that I had the potential to do anything. I used to be that person that just stood back and watched.

I now realize that I have the potential to do great things, and not be that spectator watching the world make mistakes. I can actually make a difference. So many people today have the mindset that they can just sit back, relax and let the world move for them. If everybody thought like that, this world would be a big mess. It's because of people like us here at the head-start program that this world keeps turning. I am so proud to be considered as one of those people, and if it wasn't for this project, I may never have been one of them.

This experience has made the biggest difference in my life; it was both fulfilling and educational. It helped me see the true value in myself and the importance of working as a group.

Ashleigh Dernier, student: It was sad when we released them, because it might have been the last time we will ever see them. We would not be able to feed them, weigh them or measure them every week anymore.

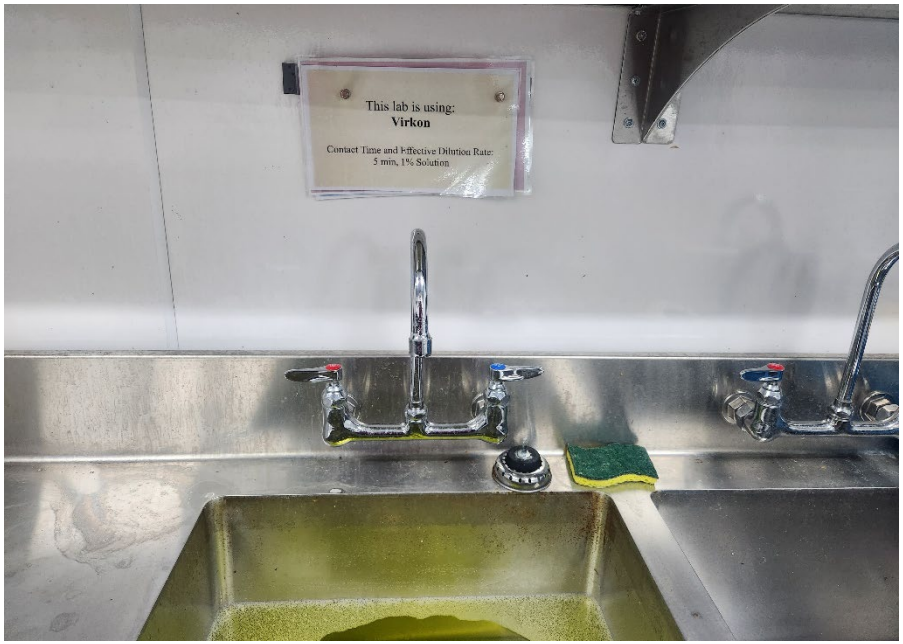
I was happy to see the turtles finally in their habitat, where they will be part of a new population at the Assabet River National Wildlife Refuge. It's exciting to see how they have grown. We learned a lot thanks to these little turtles and working with them.

"I now realize that I have the potential to do great things, and not be that spectator watching the world make mistakes. I can actually make a difference …"


ALL VISITORS
MUST REPORT
TO MAIN OFFICE
Bristol Aggie
NRM
Born to Be Wild
Step into the foot
bath before
proceeding as required
by
biosecurity protocol.
Biosecurity protects wildlife.
Biosecurity Protocols
in Place
Do not enter without a member
of the NRM Department.
Biosecurity protects wildlife.


Ugh, mammals.


Bristol Aggie
NRM



Biosecurity Protocol

Growth and Development

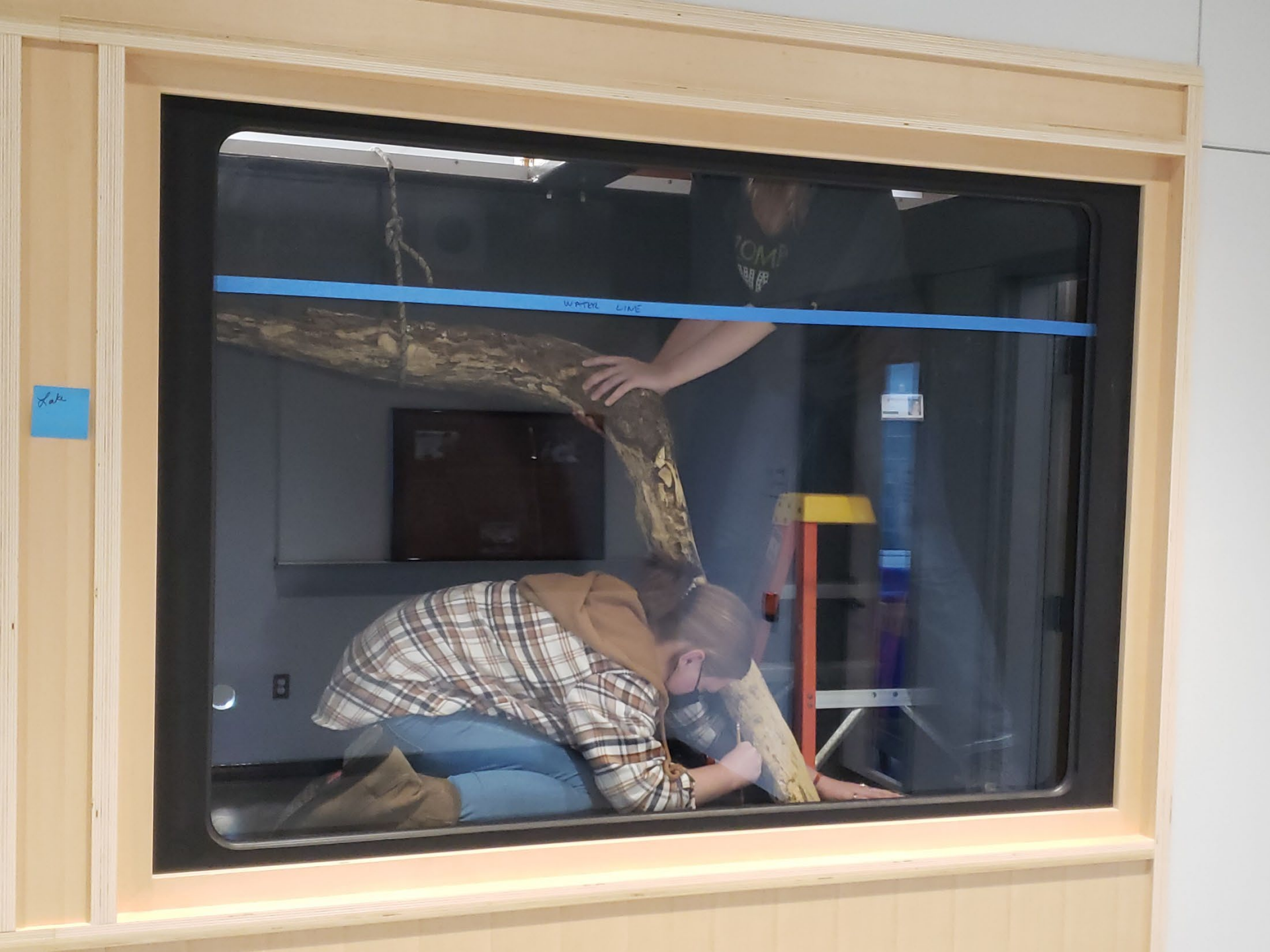
Center for Science & the Environment opened in 2021

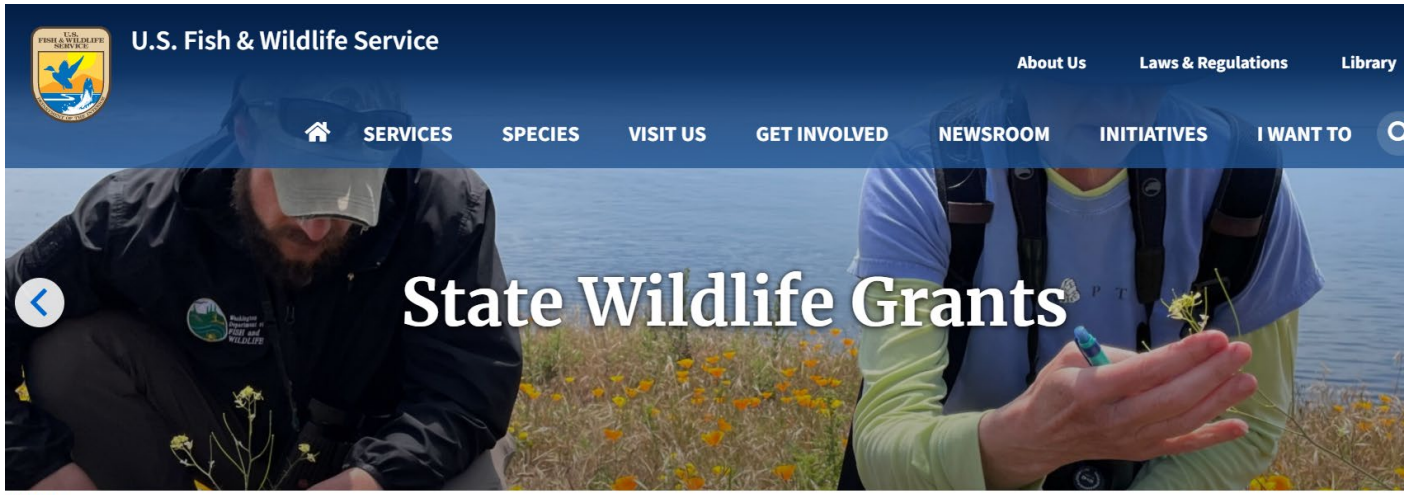
Welcome to the Bristol County Museum of Natural History

The Bristol County Museum of Natural History was established in 1992 with the creation of the Natural Resources Management Department vocational program. Originally housed in a 19th-century barn, the museum first opened with only four exhibits featuring mounted specimens of local birds bequeathed to the school in the early 1920s by eminent ornithologist, and Taunton resident, Arthur Cleveland Bent (1866-1954). Bristol Aggie students have played a central role in designing, building, and maintaining all of the exhibits. Over the years the museum and its collection have since grown beyond the barn and the Bent Collection to include exhibits featuring the range of regional biodiversity and the history of man's interactions with it, including dozens of live animals.

From the Blue Hills to Buzzards Bay, the Worcester Plateau, Race Point, Horseneck Beach, Taunton River, Wachusett Reservoir, and Nomans Island the landscape of Southern New England is extremely diverse. Dunes, swamps, woodlands, streams, pine barrens, salt marshes, lakes, meadows, bogs, family farms, bays, and rocky hills can all be found within fifty miles of this campus. Each provides an important and unique habitat for wildlife. The Bristol County Natural History Museum provides opportunities to learn about our shared natural heritage so that we may better enjoy, appreciate, and take care of it.

"Dull indeed would be the man that did not feel the thrill awakened by the first glimpse of brilliant color in the orchard, and the cheery warbling notes borne to our ears on the first gentle breath of spring!"—**Arthur Cleveland Bent**


WATER LINE



5,000 Turtle Plan

e Details

ASSOCIATION OF ZOOS & AQUARIUMS

JOBS | FIND A ZOO OR AQUARIUM | DONATE | JOIN | LOGIN

About Us | Accreditation | Animal Management | Conservation | Equity & Inclusion | AZA Services

State Wildlife Grants

About Us

Established in 2000, State
address wildlife conservat
focus on wildlife species c

CONSERVATION

HOME / CONSERVATION / CONSERVATION FUNDING / SAFE GRANTING PROGRAM

AZA SAFE Granting Program

SAFE SAVING ANIMALS FROM EXTINCTION

AZA SAFE: Saving Animals From Extinction is positioned for continued growth. SAFE invites AZA members to propose SAFE species and develop collaborative program plans that implement existing regional or global recovery, action, and/or management plans.

Established in 2019 with initial funding support from the Arthur L. and Elaine V. Johnson Foundation, AZA's SAFE granting program brings new funds to members for implementing SAFE program plans.

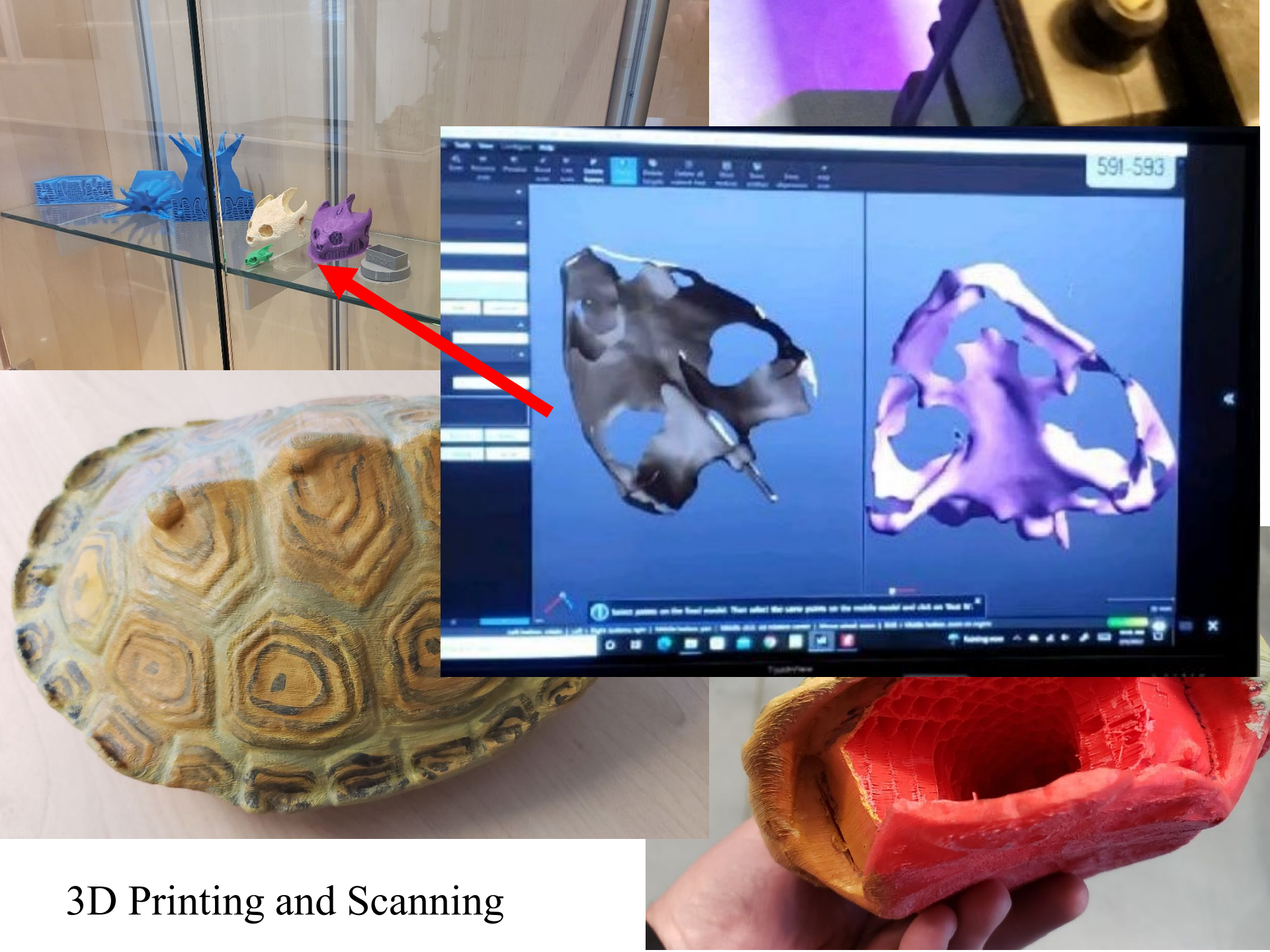
LGA LAGUARDIA AIRPORT

BRADLEY INTERNATIONAL

BOS boston logan

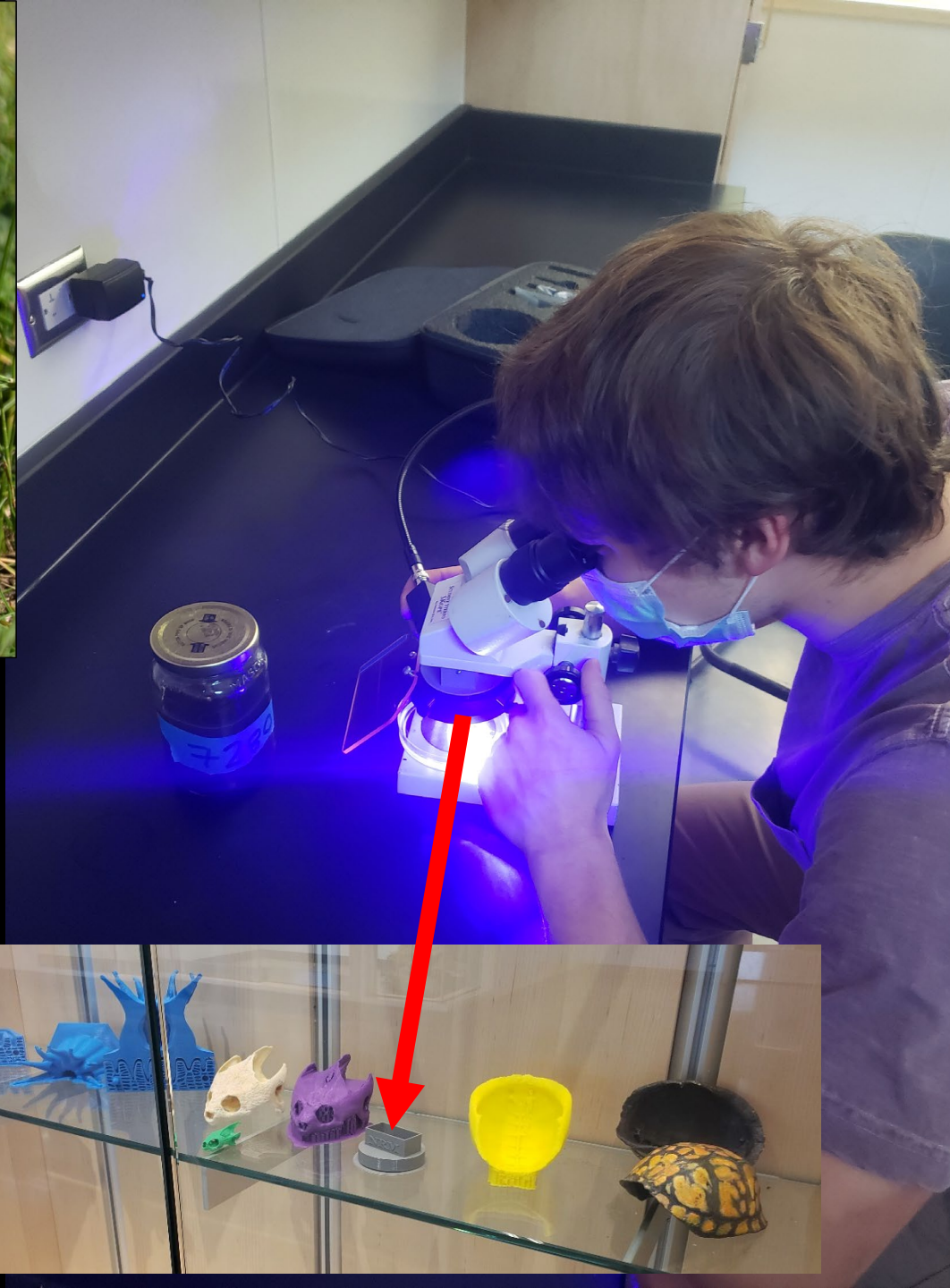
JFK JOHN F. KENNEDY INTERNATIONAL AIRPORT

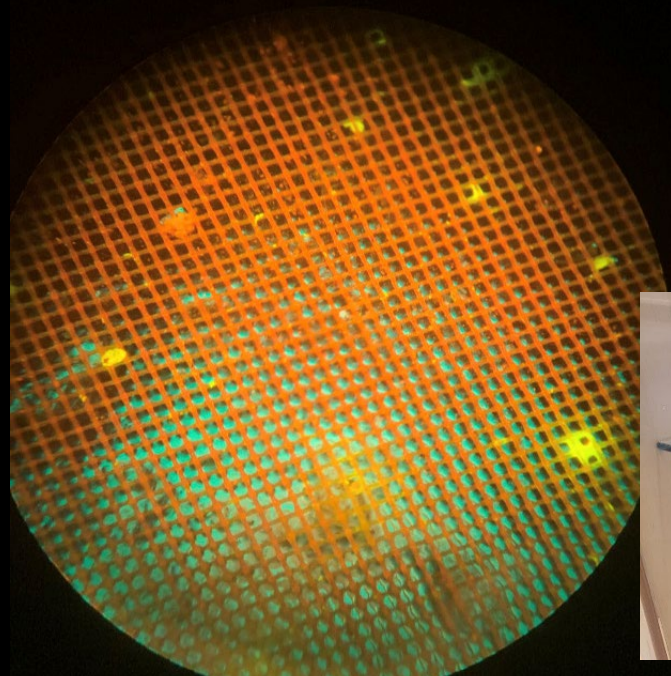
Rhode Island
T. F. Green International Airport

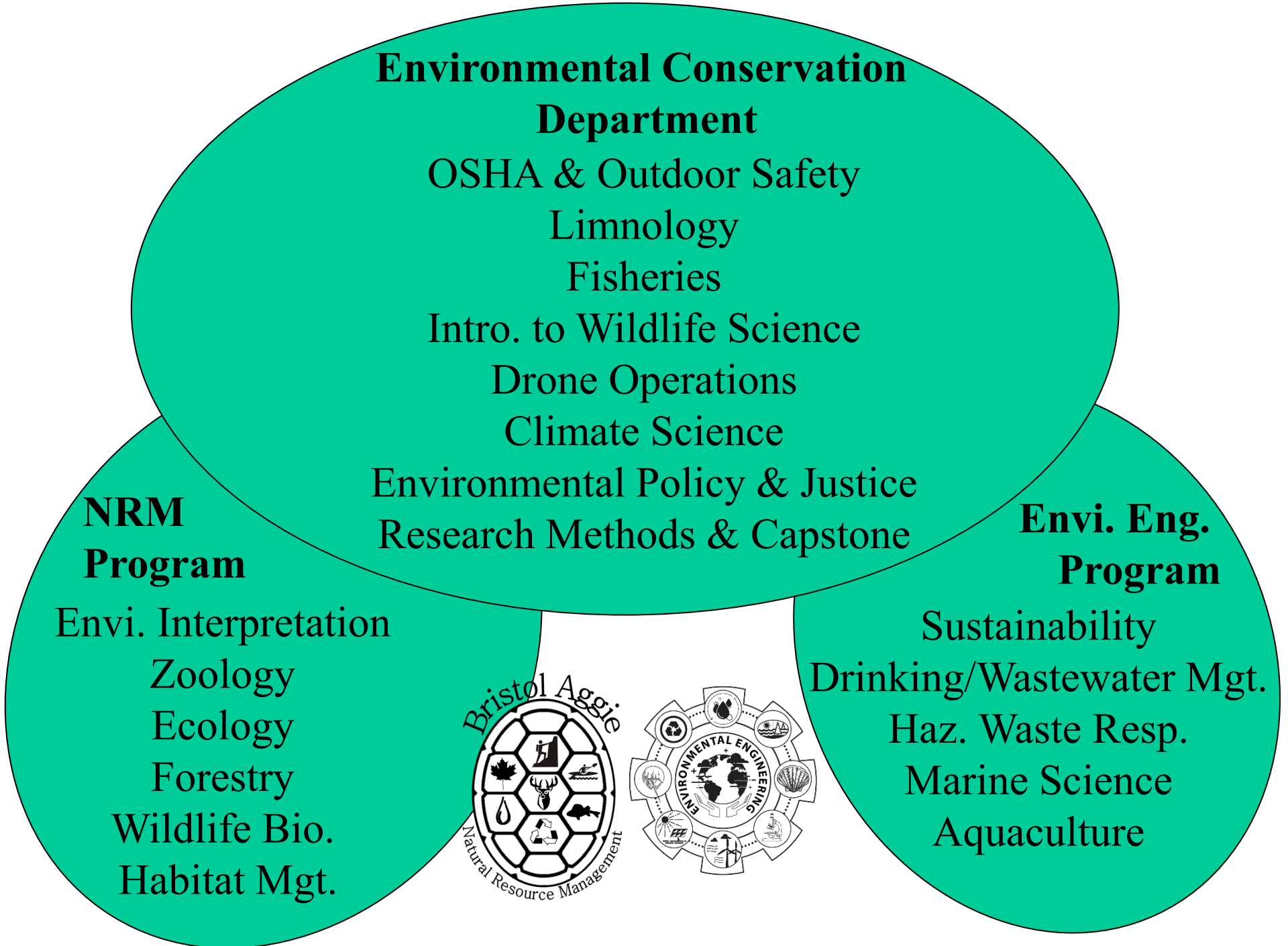


3D Printing and Scanning


7033






Environmental Conservation Department
OSHA & Outdoor Safety
Limnology
Fisheries
Intro. to Wildlife Science
Drone Operations
Climate Science
Environmental Policy & Justice
Research Methods & Capstone
NRM Program
Envi. Interpretation
Zoology
Ecology
Forestry
Wildlife Bio.
Habitat Mgt.
Envi. Eng. Program
Sustainability
Drinking/Wastewater Mgt.
Haz. Waste Resp.
Marine Science
Aquaculture
Bristol Aggie
Natural Resource Management
Environmental Engineering

Cooperative & Integrated (Draft) Curricula

2024-2025	NRM	Shared	Envi. Eng.
Term	**Major Course**	**Related Course**	**Major Course**
Freshman 1	Exploratory 1: Limnology (KB)		Exploratory 1: Soil Science (LD)
Freshman 2	Exploratory 2: Forestry & Habitat (KB)		Exploratory 2: Climate Science (LD)
Freshman 3	Exploratory 3: Wildlife Mgt. (KB)		Exploratory 3: Marine Science (LD)
Freshman 4	OSHA & Outdoor Safety (KB)	*(Freshmen placed in majors.)*	OSHA & Outdoor Safety (LD)
Sophomore 1	Intro to Wildlife (BB)	Oceanography (LD)	Watershed Mgt. (SC)
Sophomore 2	Limnology (SC)	Marine Biology (LD)	Intro to Wildlife (BB)
Sophomore 3	Ornithology (BB)	Envi. Professionalism (KB)	Limnology (SC)
Sophomore 4	Ichthyology/Freshwater Fisheries (BB)	Ecology & Wildlife Mgt.(KB)	Water Resources (Waste, Stormwater, Drinking)(SC)
Junior 1	Forestry (KB)	Scientific Methods (BB)	Marine Tetrapods (LD)
Junior 2	Habitat Mgt. (KB)	Sci. Communication (BB)	Energy Resources (LD)
Junior 3	Marine Fisheries & Aquaculture (CR)	Env. Legislation & Justice (SC)	Habitat Mgt. (KB)
Junior 4	Herpetology & Mammalogy (KB)	Sustainability & Public Health (SC)	Marine Fisheries & Aquaculture (LD)
Senior 1	Envi. Interpretation (BB)		Site Mgt. & Remediation (Hazwoper) (SC)
Senior 2	Drone Operations (BB)		Climate Science (SC)
Senior 3	Climate Science (SC)		Drone Operations (BB)
Senior 4	Senior Capstone (BB)		Senior Capstone (SC)


Thank you.
Questions?