

THE
UNIVERSITY
OF RHODE ISLAND
DIVISION OF RESEARCH
AND ECONOMIC
DEVELOPMENT

Momentum

Research & Innovation

COVER STORY

**PASSIONATELY
CONSERVING OUR
NATURAL HERITAGE**

Featured Inside
**Developing
Technology for
Medical Diagnostics**

Featured Inside
**Digging Deeper
into the Cultural
Undertones of Music**

FALL **2019**

“From its inception 25 years ago, the RINHS has been THE institutional glue that has brought together the community of scholars, practitioners, and naturalists interested in Rhode Island’s biodiversity. It has served our students and faculty at URI, it has advanced our understanding of Rhode Island’s native plants and animals through its publications and conferences, and it has created a congenial community of people passionate about conserving our natural heritage.”

– Peter August, URI professor emeritus
RINHS founding president and board member



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FROM THE VICE PRESIDENT

With the unprecedented and disturbing flood of both domestic and geopolitical events that have saturated our lives, with each day seeming like it contains a month's worth of "breaking news," it is next to impossible to keep track of complex chains of interwoven events and stories. Many of us are feeling exhausted, worn down and unsurprised anymore by the constant barrage of poor behavior and impulsive decisions that we witness nightly on the evening news or on twitter feeds.

If you think back to June of this year, a little more than four months ago, we were then facing a steadily growing cacophony of stories pertaining to the separation of young children (including infants!) and adolescents from their parents at the U.S.-Mexico border. The dramatic acceleration of this practice led to a chaotic set of events whereby thousands of children who were too young to talk, to defend themselves, or even to describe their parents physically were separated; and effective systems to later reunify families were completely absent or broken. Adults and children alike were warehoused, many without the ability to sleep with the lights off or to simply wash themselves or brush their teeth. Several children died from treatable illnesses, and we all witnessed images and read reports from venerable and trusted news organizations of hungry and dirty children being held under terrible prison-like conditions.

Although access to information about the continuation of these practices has become more difficult to obtain in recent months, the most recent statistics provided to congressional staff by the U.S. Customs and Border Protection Service (which may be out of date by the time this issue of *Momentum* has been printed), suggests that as many as 2,000 "unaccompanied alien children" are still being held in detention facilities at any one point in time.

What does a research university, such as The University of Rhode Island, have to offer as we consider the ramifications of current national and global crises? For the humanitarian crisis at the U.S.-Mexico border, we have social scientists such as Professor Evelyn Stern (Department of History, College of Arts & Sciences), who can help frame this issue as a humanitarian crisis rather than as an immigration crisis. We have Professor Karen McCurdy (Department of Human Development & Family Studies, College of Health Sciences), who can frame the trauma these children endure in terms of lasting effects on brain development, the emergence of psychological disorders and their high risk for post-traumatic stress disorder (PTSD). We have Professor Paul Bueno de Mesquita (Department of Psychology, College of Health Sciences), who adds support to the serious concerns of lasting negative impacts of such trauma on the future socialization and mental health of the children who are being victimized. And, we have Professor Julie Keller (Department of Sociology, College of Arts & Sciences) who can demonstrate how these current detention practices are entirely inconsistent with both the past century of U.S. immigration policy as well as international conventions on the treatment of refugee children. I invite you to read an article on their important work, in this issue of *Momentum*.

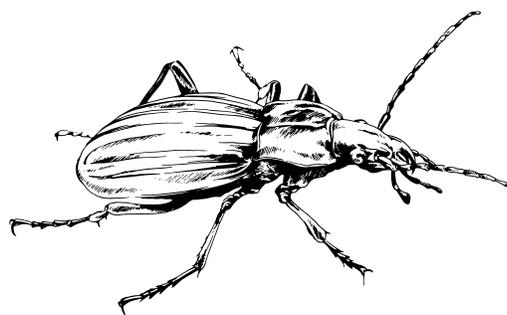
URI's faculty have expertise, knowledge and data – across a myriad of disciplines – to frame the context of this national discussion, to redirect debate to one that is based on facts and figures (as opposed to belief and bias), and to hold our leaders accountable. By doing so, we support groups right here, such as the "Never Again Action Rhode Island" movement, which has just succeeded in gaining support from our elected leaders to advance legislation that would ban private ICE detention facilities in our state. Our job as a research university is to help frame this public debate with education, with verifiable data, with deep content knowledge and with moral conviction.



Peter J. Snyder, Ph.D.

Vice President for Research and Economic Development
Professor of Biomedical and Pharmaceutical Sciences
Professor of Art and Art History
University of Rhode Island

Scholar-in-Residence
Rhode Island School of Design



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The URI library is evolving into a community hub of information and data in ways patrons never imagined. Dean Boughida has positioned the library system to create user and tech-based learning spaces, house a data analytics team, partner to launch a data science major, utilize 3D printers, lasers, and virtual reality to literally visualize learning and produce rapid prototyping research.

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THE UNIVERSITY OF RHODE ISLAND

David M. Dooley, Ph.D., President, URI

Peter J. Snyder, Ph.D., Vice President
URI Division of Research and Economic Development

EDITORIAL BOARD

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Allison Farrelly '16

CONTRIBUTING WRITERS

Bethany Deloof '21

Amy Dunkle

Allison Farrelly '16

Aria Mia Loberti '20

Todd McLeish

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For more information, contact:

Melissa McCarthy, MA, '99, Editor-in-Chief
Director, University Research External Relations
University of Rhode Island
75 Lower College Road, Kingston, RI 02881 USA
Telephone: 401.874.2599 E-mail: melissa@uri.edu
Website: web.uri.edu/research

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PASSIONATELY CONSERVING OUR NATURAL HERITAGE ACROSS GENERATIONS CONNECTING A COMMUNITY OF SCIENTISTS AND ADVOCATES

written by **BETHANY DELOOF '21**



Moss sample from 2019 BioBlitz at Roger Williams Zoo.



Joe Warfel (left) nationally recognized as an expert on spiders and photography of spiders with RINHS Executive Director David Gregg.

RINHS BIOBLITZ

Nancy Karraker
URI Associate Professor
Natural Resources Science

On a sunny June morning in Jamestown, RI, a group of children from Central Falls hopped off a bus and were ready for an adventure. Little did they know, as they shrieked at their first glimpse of a glistening pickerel frog, that by the end of the day they would be scouring the meadows looking for as many different kinds of frogs and toads as they could find.

The activity and excitement were part of the game of BioBlitz, the community engagement program that the Rhode Island Natural History Survey (RINHS) has organized annually for the last 20 years in cities and towns across the state. RINHS Executive Director David Gregg describes his favorite program, BioBlitz, as an opportunity to bring together community members from ages five to 95, spanning all levels of expertise, from world renowned scientists to a child wanting to learn more about frogs.

“What we try to do is match up participants from all age groups, so we have a kid who thinks the environment is really cool paired with teenagers, undergraduate and graduate students, professors, scientists, activists, and land trust representatives,” Gregg says. “People from all walks of life have something to contribute. Even the most

senior researcher doesn't know everything – and even the most 'green' beginner knows something.”

The mission of the non-profit RINHS, hosted since its 1994 founding by the University of Rhode Island (URI), is to gather and disseminate information on Rhode Island's animals and plants, geology, and ecosystems, to support the use of scientific information in the management of natural resources, and to facilitate the work of the people, agencies, and organizations interested in the state's ecology. The organization achieves this through a variety of programs, grants, partnerships, databases, tools, collections, libraries, and resource materials dating back decades.





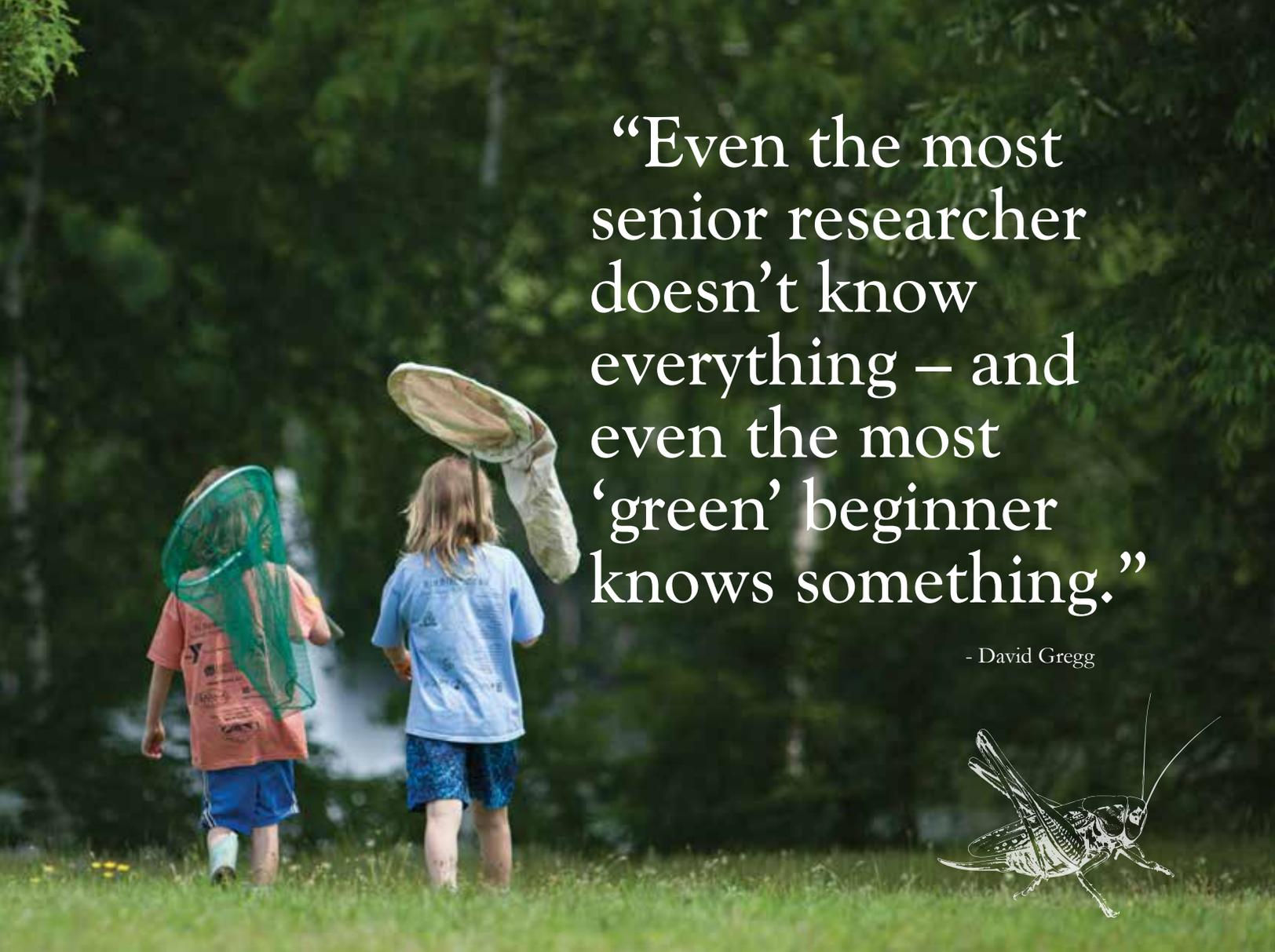
2019 BioBlitz participants collecting and reviewing samples.

“Among the greatest contributions from my perspective are the opportunities the Survey creates to connect URI undergraduate and graduate students with scientists through field outings, BioBlitz, local conservation projects, and meetings,” says Nancy Karraker, URI associate professor of natural resources science. “Seeing one of our students working side-by-side with a scientist at BioBlitz, a pair of natural historians gazing through adjacent microscopes to identify, perhaps, an aquatic insect swept up from a pond or a beetle corralled into a cup in the forest, assures me that the good work of the RINHS will be carried on into future generations.”

Recently, in a collaborative project called Operation Spadefoot RI, in which the RINHS was instrumental, URI undergraduate and graduate students put into action what they learn about in their classes – implementing conservation measures for an endangered species. The eastern spadefoot toad (*Scaphiopus holbrookii*) is endangered in Rhode Island and only one population is

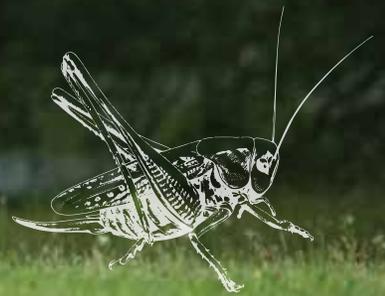
“One of the greatest contributions from my perspective is the opportunities the Survey creates to connect URI undergraduate and graduate students with scientists through field outings, BioBlitz, local conservation projects, and meetings.”

- Nancy Karraker

A photograph of two children walking away from the camera in a grassy field. The child on the left is wearing a pink shirt and blue shorts, holding a green insect net. The child on the right is wearing a light blue shirt and blue shorts, holding a white insect net. The background is a dense line of green trees.

“Even the most senior researcher doesn’t know everything – and even the most ‘green’ beginner knows something.”

- David Gregg



known to remain in the state. Their habitat was in danger of drying up due to climate change. Under the guidance of a wetland restoration specialist, Bill Buffam of the EDC, and with the coordination of the RINHS, 15 URI students joined the team to build two new breeding habitats in Richmond for this at-risk species.

“Having our students literally in the trenches for three days, working alongside conservation professionals, scientists, and members of the public, with the shared goal of saving this amphibian, embeds them in conservation communities working for positive change in the state,” says Karraker. “This was really an amazing effort by our students, and these are the kinds of connections that the RINHS is uniquely situated to make.”



2019 BioBlitz participants cataloging samples.

RINHS

THE NARRAGANSETT BAY COYOTE STUDY



Photo by Dave Hornoff/The Conservation Agency.



Photo by Dave Hornoff/The Conservation Agency.

Currently, RINHS is working on four major programs with partners across the state. The Narragansett Bay Coyote Study, funded by the RI DEM's Division of Fish & Wildlife through the U.S. Fish and Wildlife Service's Wildlife and Sport Fish Restoration Program, is developing scientifically informed coyote management practices with Roger Williams Park Zoo, the Potter League for Animals, the Norman Bird Sanctuary, and the Aquidneck Land Trust, as well as URI.

The project is led by Numi Mitchell, a biologist at The Conservation Agency in Jamestown, RI, and assisted by URI alum Kyle Hess, now at the RINHS. The program tracks coyotes on Aquidneck Island, Conanicut Island, and on mainland Rhode

“We know that the ultimate success of any coyote management strategies we propose will hinge on making successful connections with the public and government.”

- Numi Mitchell



Photo by Dave Hornoff/The Conservation Agency.

Island. Examining coyotes' movements and the food sources they use generates insights to help wildlife managers as well as increases public awareness and safety with regard to coyotes.

“The Conservation Agency – a collection of nose-to-

the ground researchers – has found the Survey, with its network of collaborators, contacts, and resources, to be an ideal partner,” says Mitchell. “We know that the ultimate success of any coyote management strategies we propose will hinge on making successful connections with the public and government. That is what they do.”



Photo by Amber Hardy '19.

RINHS also collaborates with the RI DEM on developing methods for rapidly assessing wetland conditions across the state to gather more precise information on the health and diversity of Rhode Island wetlands. This project, led by wetlands scientist Thomas Kutcher, uses GIS and remote sensing technology, as well as fieldwork, to obtain comprehensive views of watershed and wetland conditions.

The purpose of this work is to prioritize wetlands for protection, to assess and monitor impacts on wetlands due to degradation of habitats, and to monitor the location and extent of invasive species that affect state wetlands. Additionally, the project aims to develop a database to evaluate trends and identify causes, and to thereby consider and recommend management policy changes when needed.

"It's really important that the state has the tools and processes in place to understand and manage our wetlands," says Kutcher, "because they're so important for people and wildlife."

Salt marshes are one of the major environments at risk in Rhode Island.

Gregg notes: "Due to sea level rise salt marshes are disappearing. They need a break twice a day when the tide goes down. The problem is now that sea level is rising, they're getting less and less of a break from inundation. So, at first, they become unhealthy and then they outright die. The plant roots don't hold the marsh together and the marsh breaks off in chunks



RINHS Executive Director David Gregg. Photo by Kim Gaffett.

“Due to sea level rise salt marshes are disappearing. They need a break twice a day when the tide goes down. The problem is now that sea level is rising, they’re getting less and less of a break from inundation.”

- David Gregg

that mycorrhizal associations — connections between the plants’ roots and fungi in the soil — as well as the plants’ relationships with other plants around them, play an important role in plant survival. Without this communalism, the salt marsh plants won’t survive, and neither will the marshes.

“As a botanist trying to understand the various tolerances of the individual species, I was able in a sense, *to see* the environmental conditions created by the distribution of plant species across the project area,” says Leeson. “Combining my observations and documentation with physical data collected by others added another layer of understanding to the project results, and the insights gained are informing plans for future salt marsh enhancement projects.”

and erodes away. The marshes are actually falling apart and disintegrating.”

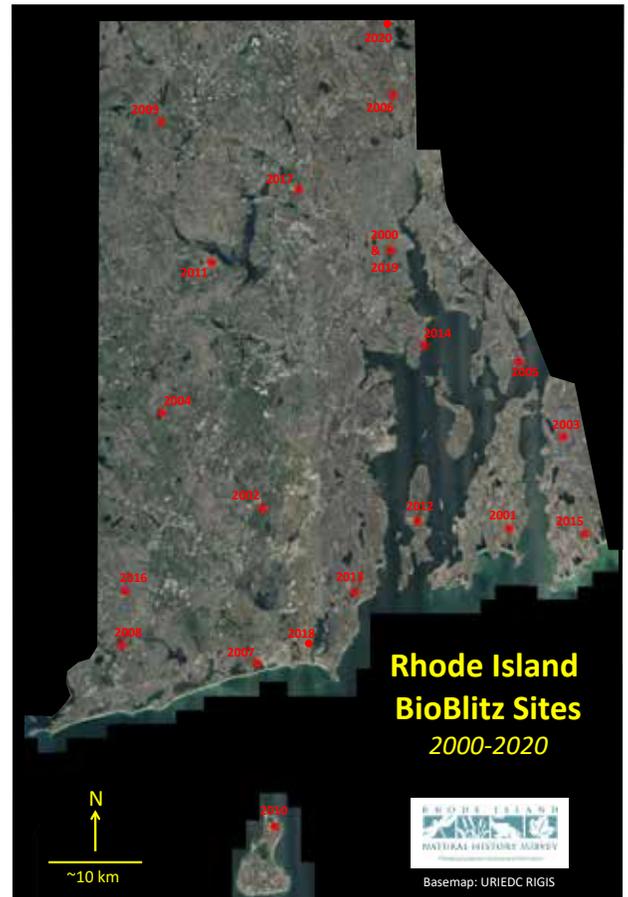
There are dozens of species that live only in salt marshes, according to Gregg. If all the salt marshes disappear, the state will lose a critical part of the ecosystem – with all of those species that depend on these marshes for survival, including birds, plants and insects.

The potential societal and health impacts of such erosion are both difficult to fully predict and potentially devastating. For example, salt marshes help to absorb storm energy such as the nor’easters common in New England. Fringing marsh land insulates the shore from waves and storm energy. Salt marshes also help to absorb sediments and pollution runoff from upland sources.

Along the coast, salt marshes and sea grasses capture and hold carbon, creating what is called a carbon sink. These coastal systems, though much smaller in size than the planet’s forests, sequester this carbon at a much faster rate, and can continue to do so for millions of years. Most of the carbon taken up by these ecosystems is stored below ground. When those soils disappear, the sequestered carbon returns to the atmosphere.

Gregg explains that people are trying to save the salt marshes by depositing thin layers of sand, putting up various types of barriers, and digging shallow ditches or “runnels” to let the water drain off. But now the question remains how will the plant life of the marsh respond to these efforts?

To research the impact of these interventions, RINHS, Coastal Resource Management Council (CRMC), and the National Oceanic and Atmospheric Administration (NOAA) are funding Hope Leeson, a botanist who studied the intricate plant communities in Rhode Island’s salt marshes in summer of 2018. She discovered



The 2020 RINHS BioBlitz will be at Mercy Woods, Cumberland, RI in early June.

“An enormous piece of the puzzle is conserving enough habitat.

To that end, I help federal, state, and local decisionmakers to consider the needs of wildlife in their policy, programs, and funding decisions, as well as to help local land-use planners make smart siting decisions that result in healthy, well-designed built spaces and to leave enough room for nature.”

- Amanda Freitas



Operation Spadefoot RI, releasing the endangered species into its new habitat. Photo by David Gregg.

The Rhode Island Natural History Survey also originated and helps support a full-time position to improve coordination between RI DEM and municipalities for wildlife conservation. Amanda Freitas is the Rhode Island Wildlife Action Plan (RIWAP) community liaison, funded by the U.S. Fish and Wildlife Service. The RIWAP brings together scores of scientists and educators from across the Ocean State to assess the health of non-game wildlife species and their habitats.

RIWAP identifies our most vulnerable animals and the greatest threats to their habitats in a statewide plan. Much of the conservation effort happens locally, however, among municipal planners, boards, and commissions. The community liaison, therefore, helps communicate to towns and cities the sometimes technical priorities set by the plan, and reciprocally helps communicate the priorities and constraints on municipal action to state wildlife managers. The liaison improves implementation of the current plan and improves future ones.

“An enormous piece of the puzzle is conserving enough habitat,” says Freitas. “To that end, I help federal, state, and local decisionmakers to consider the needs of wildlife in their

policy, programs, and funding decisions, as well as to help local land-use planners make smart siting decisions that result in healthy, well-designed built spaces and to leave enough room for nature.”



Under the guidance of a wetland restoration specialist, and the RINHS, 15 URI students worked alongside conservation professionals, scientists and members of the public, to build a new habitat for the spadefoot toad. Photo by Nancy Karraker.

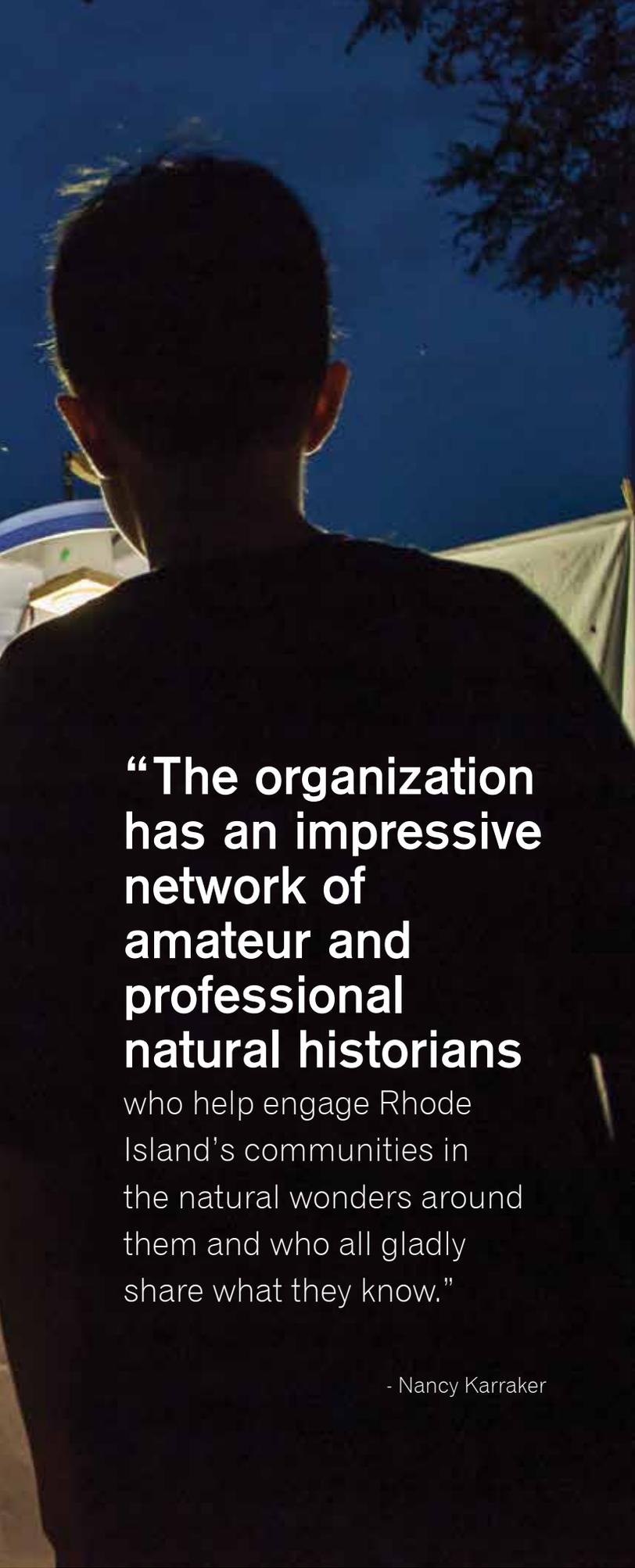


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- Nancy Karraker

RINHS





“The organization has an impressive network of amateur and professional natural historians

who help engage Rhode Island’s communities in the natural wonders around them and who all gladly share what they know.”

- Nancy Karraker



Northern Saw-whet owls believed to be a rare species in Rhode Island. Photo by Adriana Hughes '19.

These are only a few of the projects the RINHS is doing to preserve and protect the natural resources of Rhode Island. They also develop assessment tools for city and town land trusts. The RINHS facility, located on URI’s East Farm campus, also includes a classroom, conference room, and a library that includes a vast plethora of information spanning decades about the state’s biodata of plants, animals, rare species, invasive species, ecological communities and geological systems.

“The Rhode Island Natural History Survey is one-stop shopping for information on the natural history of orange sulphur butterflies, tupelo trees, harbor seals, snowy owls, spadefoot toads, or any other plant or animal, geologic formation, or unique soil type that a person is interested in,” says Karraker. “The organization has an impressive collection of amateur and professional natural historians, who help engage Rhode Island’s communities in the natural wonders around them and who all gladly share what they know.”

RINHS does this so Rhode Island’s natural scientists, educators, and decision makers have scientific data that can be used to help make informed management decisions, and to foster the preservation of the state’s natural history collections and provide educational outreach.

“From its inception 25 years ago, the RI Natural History Survey has been THE institutional glue that has brought together the community of scholars, practitioners, and naturalists interested in Rhode Island’s biodiversity,” says Peter August, URI professor emeritus, and RINHS founding president and board member. “It has served our students and faculty at URI, it has advanced our understanding of Rhode Island’s native plants and animals through its publications and conferences, and it has created a congenial community of people passionate about conserving our natural heritage.”



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Peter J. Snyder, Ph.D.
Vice President for Research and
Economic Development
University of Rhode Island
75 Lower College Road
Kingston, Rhode Island 02881 USA

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