



**EXPLORE**



**DISCOVER**



**EDUCATE**

*Institution pursues and integrates education and research, and interprets the history and systems of the Earth and its life. Our aim is to increase knowledge, educate society, and encourage wise stewardship of the Earth.*



**PALEONTOLOGICAL**  
RESEARCH INSTITUTION



**PALEONTOLOGICAL  
RESEARCH INSTITUTION**

# Annual Report

FISCAL YEAR 2018

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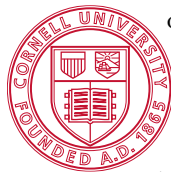
## Cornell University Affiliations

Since signing a formal affiliation agreement in 2004 the Paleontological Research Institution (PRI) and Cornell University have continuously strengthened their working relationship.

### Teaching and Research

PRI is a significant teaching resource for several Cornell programs and departments at both the undergraduate and graduate levels. In addition, a number of Cornell courses require students to participate in exercises and training at the Museum of the Earth. Our collections and facilities are regularly used by Cornell faculty, staff, and, especially, undergraduate and graduate students for both research and teaching.

PRI's Director, Warren D. Allmon, is the Hunter R. Rawlings III Professor of Paleontology in the Department of Earth and Atmospheric Sciences, a position he has held since 2008.



### Outreach

PRI continues to contribute to Cornell's historic land-grant mission by facilitating public outreach in collaboration with various faculty and departments of the University, including the Department of Earth and Atmospheric Sciences (EAS). We collaborate on the online Climate Change Science Clearinghouse, and are a subcontractor for projects providing for NSF Broader Impacts outreach.

# Director's and President's Message

PRI cares for a collection of more than 3 million specimens, one of the largest in the United States, but our activities go way beyond fossils. We educate people of all ages and backgrounds about Earth science, from preschoolers to teachers to graduate students to visitors at our two public venues, the Museum of the Earth and Cayuga Nature Center. We pursue original research in paleontology, geology, evolutionary and marine biology, and science education. We publish books, journals, and online resources for teachers, professional scientists, and the general public.

Why do we do all this? For two reasons.

First, **education**. Because we envision a world in which every member of every generation becomes educated about the Earth and its life, their history, how they came to be as they are, and how they are connected into a unique and functioning whole. Without such a broadly educated population, our society risks losing much of our health, wealth, and standard of living. If we are unable to achieve this vision, we will continue to overuse and degrade the Earth, to treat it and its life as if they are an infinite well of supply for whatever we might want to do to them. We can avoid such disaster only through opportunities for lifelong learning about the Earth and its life, opportunities such as PRI provides to tens of thousands of people every year.

Second, **research**. Because we envision a world that will always have at its disposal natural history collections like those cared for by PRI—to answer questions and solve problems. Our millions of specimens are a library for the future, which we preserve and make available for researchers—to understand the effects of climate change on evolution and of oil spills on oyster reefs, to document the history of Earth's biodiversity and explore the causes and consequences of changes in it through time, to document changes in distribution of species through time, to plumb the timeless questions of why life on this planet is as we see it. Such questions cannot be answered without archives—specimen collections—that are our only records of what has actually happened in the history of life.

PRI does so much because it matters so much.





*PRI's Board President, Brian Bauer and Director Warren Allmon, at the Cayuga Nature Center's new "Cayuga Lake: Past and Present" aquaria exhibit.*

Over  
**3 million**

specimens  
in PRI  
collections.



**4,300** students were  
served through over **200 Museum  
K-12 programs** during FY 2018.



**20** years  
of providing  
**free resources**  
for teachers.



**300** professional  
and citizen scientists came  
together to discover over

**600** macroscopic species  
and **25,000**  
species of microbes in **24** hours  
at the **PRI & Cornell BioBlitz.**



Among the  
**10** largest  
invertebrate paleontological  
collections in the United States.



**206,600** paleontological specimens cataloged,

**3,450** specimens photographed,

Over **130** species in our live animal collections.



and **392** localities georeferenced in FY 18.

**26,270** teachers in **1,950** schools received free copies of our *Teacher-Friendly Guide to Climate Change*.



Over **120** skulls on display in the Museum's "Secrets of the Skull" exhibit.



**400** campers learned science and natural history while having fun at the Nature Center's Summer Camp.



# Collections

Today, natural history collections like PRI's play a vital role in our understanding of biodiversity, evolution, and the environmental impacts of climate change—information that profoundly affects all of our lives.

## Collections Growth

PRI's collections rank among the 10 largest invertebrate paleontological collections in the United States and are the intellectual core of the Institution. Over 3 million specimens and nearly 13,000 stratigraphic “bulk” samples provide a unique resource for scientific research, teaching, and exhibitions across the country and around the world.



Volunteers and interns as well as undergraduate and graduate students have played a vital role in the success of the EPICC project. They have helped us check taxonomy, research and georeference localities, and take photographs of specimens. While graduate student at Cornell, Jansen Smith helped check taxonomic identities and authorities. He had this to say about helping out with the grant: “Working in the PRI collections on the EPICC grant has been a great learning opportunity for me and is helping me to develop skills that I will use for my entire career. In becoming well acquainted with the eastern Pacific molluscan fauna, I have learned the nuances of molluscan morphology while also experiencing first-hand the amount of effort and dedication that are required to maintain and expand research collections.”

PRI's collection continued to grow throughout fiscal year 2018. Thirty-one donations, containing approximately 12,000 specimens, were accessioned into the research collection. These specimens ranged in geologic age from the Devonian (about 419 to 358 million years ago) to today, and locations from central New York to the Philippines.

## Collections Usage

This past year, 23 scientific loans of specimens in PRI's collection were made to researchers from around the U.S. and the world. Visitors came from ten states and one foreign country to visit PRI's collections during FY 2018. PRI's collections were also cited in at least eight professional and student publications in the past year.

PRI specimens are also often used in creating exhibitions and for public outreach purposes.

## Specimen Digitization

Digitization—the process of creating or converting collections information into a digital form—is essential to make PRI's collections more available and therefore more relevant and valuable to today's scientific and educational communities. The 2018 fiscal year saw significant progress in specimen digitization, especially an ongoing NSF-funded project dubbed the “Eastern Pacific Invertebrate Communities of the Cenozoic” (EPICC). This project has nine partner institutions, led by University of California Berkeley. Each institution is cataloging, georeferencing, and photographing the Cenozoic invertebrate fossils from the west coast of the Americas, from Alaska to Chile. The goal of the EPICC project is to make 1.6 million specimen records available to the public through data aggregators such as iDigBio ([www.idigbio.org](http://www.idigbio.org)).



In FY18 we cataloged about 206,600 specimens (more than four times our original goal), taking 3,450 photographs, and georeferencing 392 localities.



# Studying giant fossil oysters in PRI's collection

PRI is best known as a repository of Cenozoic mollusks and is a mandatory stop for Cenozoic mollusk workers on any tour of major American collections. This year Maddie Gaetano, an undergraduate student from the College of William and Mary, had this to say about her visit:

“This past May I was fortunate enough to visit the Paleontological Research Institution collections as part of my undergraduate research project. I had previously spent a summer as a research intern at PRI, so its incredibly extensive coastal plain collections immediately came to mind when I began planning my summer research schedule. It was amazing to be back in Ithaca, and it reminded me just how special PRI is.



Maddie Gaetano

“For my senior thesis I’m studying a species of extinct oyster, *Striostrea gigantissima*. *S. gigantissima* is one of the largest known oyster species, growing over 30 centimeters in length. It lived along the coast of the southeast United States from the late Eocene to the early Miocene. I believe that studying how *S. gigantissima* was able to grow to its extreme size may help us understand why modern oysters are decreasing in size. Unfortunately, it’s very difficult to find localities with well-preserved, complete *S. gigantissima* specimens. Many of the historically important coastal plain localities have been destroyed by coastal development and are only “accessible” in museum collections such as PRI. My research wouldn’t be feasible without these important archives of prehistory. The PRI collection houses some of the most complete *S. gigantissima* shells I’ve worked with and measurably improved the accuracy of my dataset. These collections are an invaluable resource and I very much enjoyed my time working at the PRI as both an intern and a researcher.”

# Research

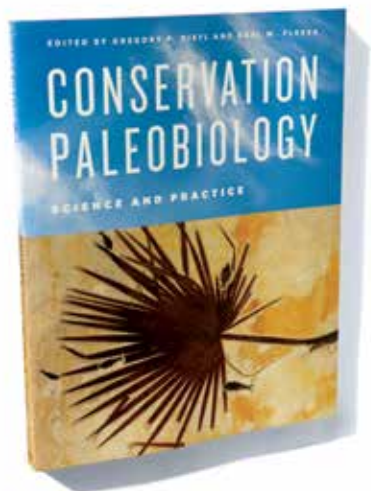
Since its founding in 1932, research has been a fundamental part of PRI's institutional activity and identity. Today, PRI staff and affiliated students from Cornell pursue primary research in a variety of areas related to the history of life, including how to use paleontological information to address contemporary environmental challenges.

## Evolution and Paleobiology

PRI is home to one of the largest collections of fossil mollusks (clams and snails) in the U.S., and research on the evolution of these groups has always been one of PRI's core scientific strengths. Today, PRI staff and students are engaged in cutting-edge studies of these abundant fossils, from discovering the history of biodiversity of marine life in the ancient Caribbean, to using both genes and fossils to reconstruct the evolutionary history of marine snails, to exploring what the shape of their fossil shells tells us about how the evolutionary process works. This research increases our knowledge of the history of the diversity of life and the evolutionary processes that have produced that diversity.

## Conservation Paleobiology

Conservation Paleobiology is a still-new subfield of paleontology that uses the fossil record of how species and communities respond to environmental changes to inform conservation decisions. Greg Dietl, PRI's Director of Collections and Curator of Cenozoic Invertebrates, is among the leaders in this field, and his research ranges from studies of the response of oyster reefs to the Deepwater Horizon oil spill to restoration of the estuary of the Colorado River in the northern Gulf of California. Greg and his students use deposits of modern and fossil shells as baseline data, to which living communities can be compared to determine how much they have changed. Such studies are increasingly seen as providing otherwise-unavailable insights into the magnitude of ongoing environmental change.



*A major book on conservation paleobiology published in 2018 was edited by PRI's Greg Dietl and PRI Trustee Emeritus Karl Flessa.*



*PRI paleontologist and Director of Publications Jonathan Hendricks in the field in Panama. Jon is one of the world's experts on fossil cone snails. These tropical venomous mollusks are one of the most species-rich groups of animals in the world. His research focuses on documenting and explaining their extraordinary species diversity.*

For the complete list of the articles and other works by staff and affiliated students appearing in peer-reviewed publications during FY18, please see Appendix A on page 39.



*Cornell PhD student, and now postdoctoral researcher, Dana Friend recently completed her dissertation under the supervision of PRI Director and Cornell professor Warren Allmon on the evolutionary history of marine snails of the genus Athleta. Dana's work reexamined this classic example of evolutionary tempo and mode, last studied in the 1960s, and found it to be much more complicated than previously thought.*

# Publications

Publications have been an integral part of PRI since before its founding. Gilbert Harris, PRI's founder, started publishing *Bulletins of American Paleontology* (BAP) in 1895 and this scholarly journal is still in publication today. BAP provides a singularly important outlet for monographic-length research in paleontology.

The latest three issues of BAP were published during the FY18 year:

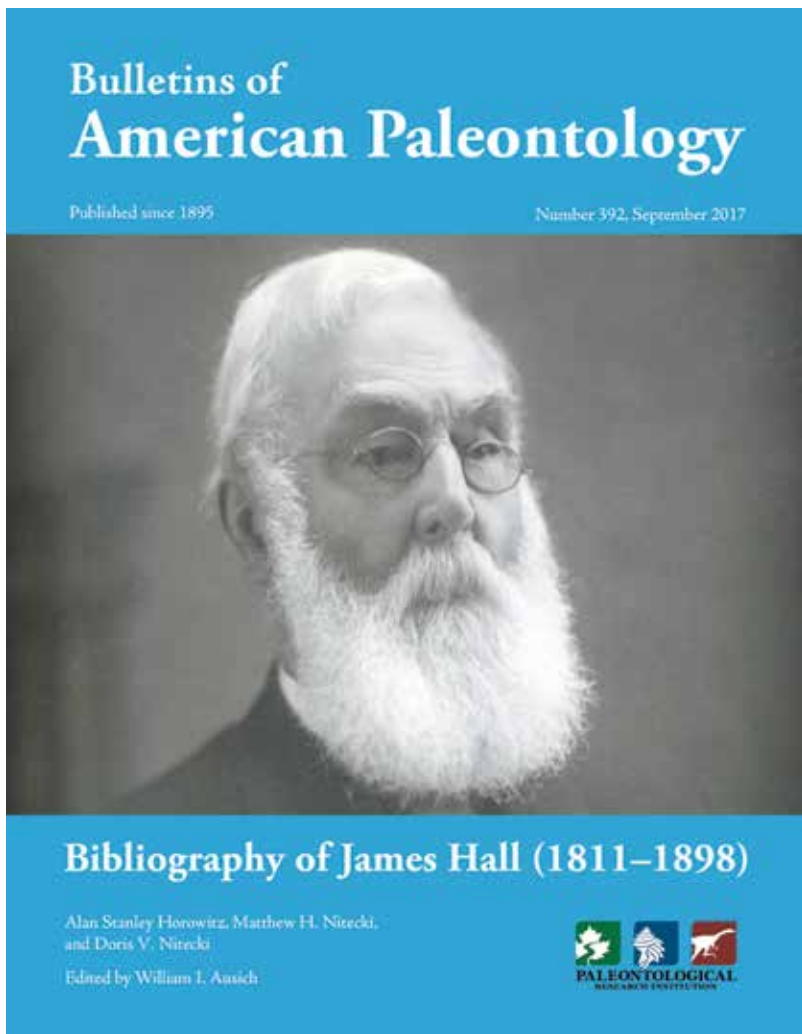
*Bibliography of James Hall (1811–1898)*, by Alan Horowitz, Matthew Nitecki, Doris Nitecki, and edited by William Ausich (BAP 392).

*Pliensbachian–Toarcian (Early Jurassic) Ammonooids from the Luning Embayment, West–Central Nevada, U.S.A.*, by Andrew Caruthers and colleagues (BAP 393).

*Toward a history of the Paleozoic Asteroidea (Echinodermata)*, by Daniel Blake (BAP 394).

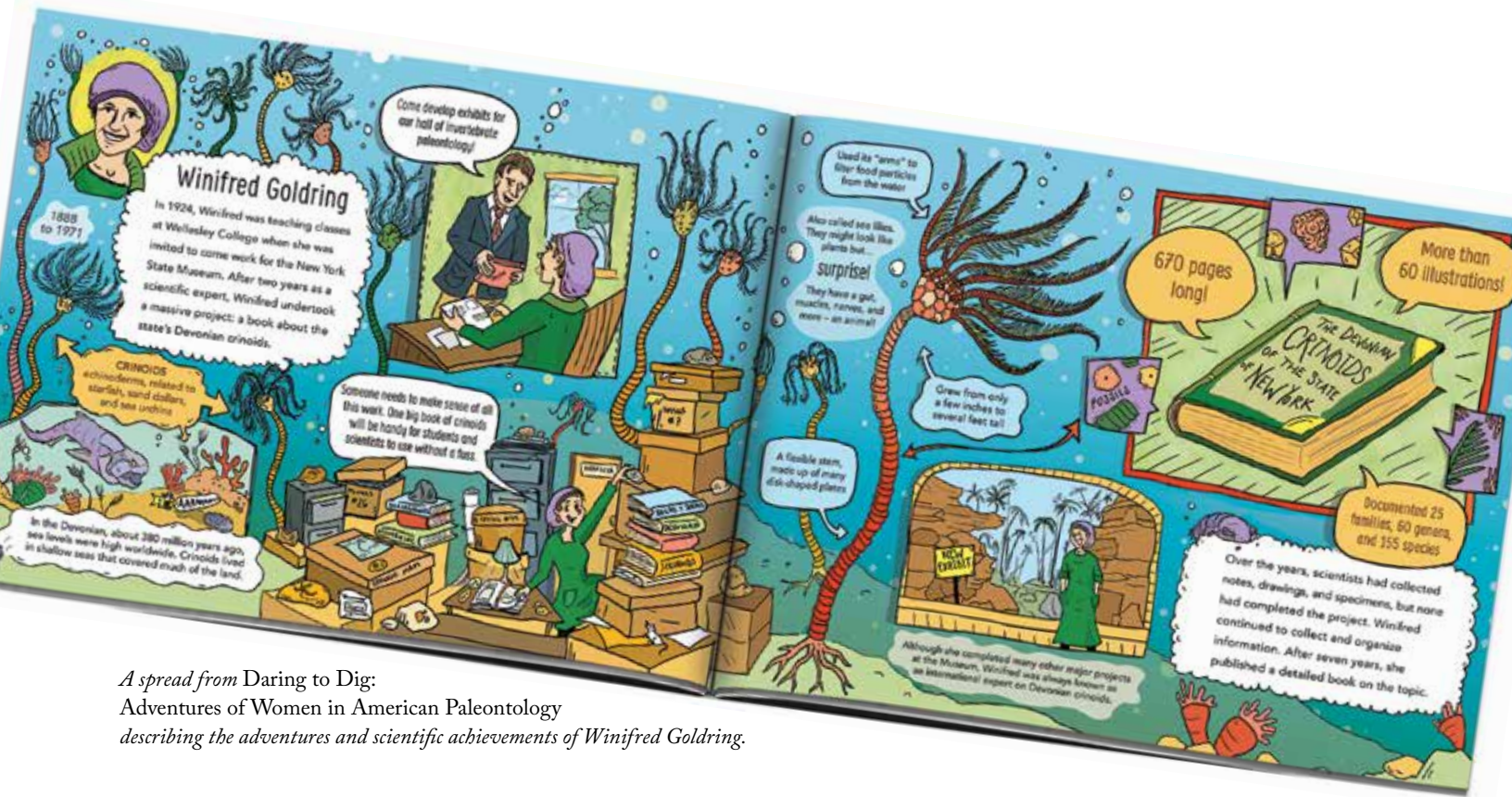
In addition to *Bulletins of American Paleontology*, two other books were published in PRI's **Special Publications** series: *Daring to Dig: Adventures of Women in American Paleontology* and *Gorges History: Landscapes and Geology of the Finger Lakes Region*.

The first of these—*Daring To Dig*—was unlike anything that PRI has ever published before: a graphic novel children's book. The book describes the adventures and research achievements of a dozen women paleontologists—both from the past century and “alive and digging” today—through colorful vignettes written by Beth Stricker and illustrated by Alana McGillis. When reading the book, children learn that paleontology is a science for everyone and also discover a variety of ancient organisms that are commonly missing from children's books about prehistoric life.



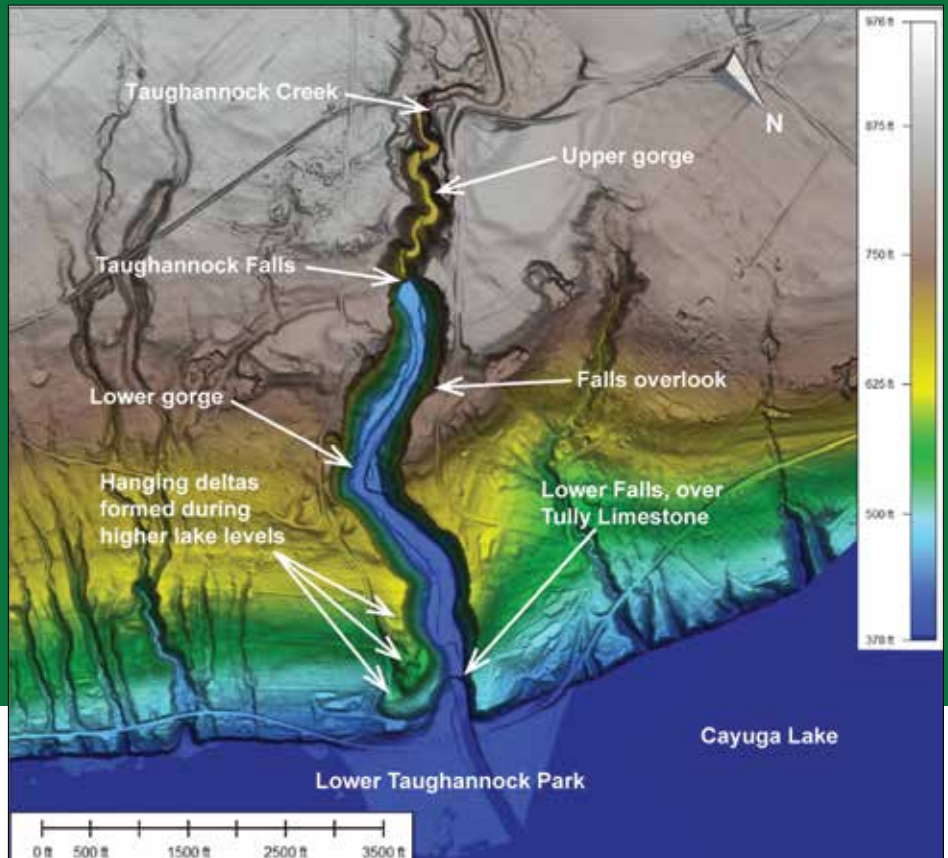
PRI Trustee and Ohio State University professor Dr. William Ausich edited the *Bibliography of James Hall* and provided the following summary of this important new work:

*“James Hall is the ‘Father of American paleontology,’ but his list of publications is a tangle of references with many items published more than once, etc. Accuracy in publication dates is essential for systematic paleontology, and the annotated bibliography of Horowitz, Nitecki, and Nitecki is the first comprehensive listing of Hall publications. This work was started by Alan Horowitz, Indiana University, who needed to determine valid names for Mississippian fossils, and Matthew Nitecki, who was sorting the extensive collection of Hall fossils at the Field Museum of Natural History. James Hall spent most of his career as the New York State Paleontologist in Albany, and he worked extensively on rocks and fossils in the state New York. So, it is most appropriate that future paleontologists who need to learn more about James Hall will now turn to the PRI in Ithaca. The James Hall Bibliography will be an invaluable reference for generations of future paleontologists.”*



*A spread from Daring to Dig: Adventures of Women in American Paleontology describing the adventures and scientific achievements of Winifred Goldring.*

PRI's latest Special Publication is *Gorges History: Landscapes and Geology of the Finger Lakes Region*, by Dr. Arthur L. Bloom, who was a geology professor at Cornell University for a half a century. Dr. Bloom had been working on this manuscript for many years, but unfortunately was unable to finish it prior to his death in 2017. His colleagues in the Department of Earth and Atmospheric Sciences at Cornell helped to finish the project, contributing numerous new color maps and diagrams that are sure to help visitors to the Finger Lakes region better understand its fascinating geological and glacial history. The final chapter of the book includes site-specific descriptions and geological tours of places (e.g., local gorges and parks) that readers can visit and explore.



*A map from Gorges History showing LiDAR topographic imagery of Taughannock Falls State Park near Ithaca, New York. Different colors correspond with different elevations.*

# Outreach

## Leadership in Earth science education

PRI provides local, regional, and national educational outreach by offering programming, publications, and resources to schools, teachers, and science educators, and by working in partnerships with other institutions.

PRI's Education and Outreach staff have been involved in the national development discussion and implementation of the new **Next Generation Science Standards (NGSS)**. A staff member is on the Science Content Advisory Panel/Science Education Steering Committee for New York State Education Department as the state begins implementation of the **New York State P-12 Science Learning Standards** that are based heavily upon the national NGSS.

PRI has partnered with educators at the University of California Museum of Paleontology to produce **Virtual Fieldwork Experiences** that allow students to visit classic

paleontological field sites along the Pacific coast and explore images and data from specimens that have been collected there—from computers anywhere in the world. The first virtual fieldwork experience from the project, on fossils of Kettleman Hills in central California, was released in spring 2018 and is available as an online resource for teachers and students. The partnership is the primary outreach vehicle for the **Eastern Pacific Invertebrate Communities of the Cenozoic (EPICC)** project, a set of nine natural history museums (one of which is PRI) who are making a comprehensive database of fossil collections along the Pacific coasts of the Americas (see page 6).

The “critical zone” is the outer skin of the Earth, extending from the top of the tree canopy to the base of the groundwater lens, and PRI is the educational outreach partner for the **Critical Zone Observatory (CZO) Network**, whose national office was established at Cornell University in 2014. There are nine CZOs that monitor biological, chemical, and geological parameters across a range of ecosystem types. PRI staff coordinated

*Professor Emeritus Brian Chabot from Cornell University giving a talk on “Maple and Climate” during Maple Fest at the Cayuga Nature Center.*



the network of outreach providers, worked on virtual fieldwork experiences for several of the CZO sites, edited an issue of National Association of Geoscience Teachers Association's *In the Trenches* (October 2017) that was dedicated to CZOs, and organized existing education resources on the CZO National Office web site.

Several of PRI's outreach staff are active members of the **Climate Literacy and Energy Awareness Network (CLEAN)**, the group responsible for the national Climate Literacy Principles that have been cited in several federal educational initiatives and requests for proposals in an array of grant programs. Don Haas, PRI's Director of Teacher Programming, assumed the role of **President of the National Association of Geoscience Teachers (NAGT)** this past year. Don will serve on NAGT's Executive Board for four years.



*Don Haas explaining erosion at Taughannock Falls State Park to a group of New York State Master Teachers.*

PRI is an active member of **Western New York Environmental Alliance (WNYEA)**, an alliance of more than 100 groups and institutions who work to resolve environmental issues in western New York, and PRI staff serve on several of their working

committees. PRI is also a member of the **Tompkins County Climate Protection Initiative (TCCPI)**—a climate action and clean energy coalition in the Ithaca, New York area made up of community leaders from the education, business, government, nonprofit, and youth sectors.

*New York City teachers watching a demonstration of a climate change education experiment during a "New York City Climate to Go" workshop.*



## Teacher professional development

PRI's Outreach division has many resources available for teachers, including their ten-volume series of "**Teacher Friendly Guides™**" developed over the past two decades, available for free at the PRI website. Most of volumes in the series were developed with funding from the National Science Foundation. Seven are regional Teacher-Friendly Guides to the Earth Science, one for each of seven regions covering the US, and two are on evolution (focused on using maize and clams as model organisms). The latest volume deals with the important current issue of climate change.

Every year PRI presents workshops for teachers across the United States. These included, for example, a day-long virtual fieldwork experience



*Every year the education staff at PRI offer various climate change and Earth science events for the public, including their popular fossil collecting trips and geology walks utilizing the local gorges to teach about geologic history.*





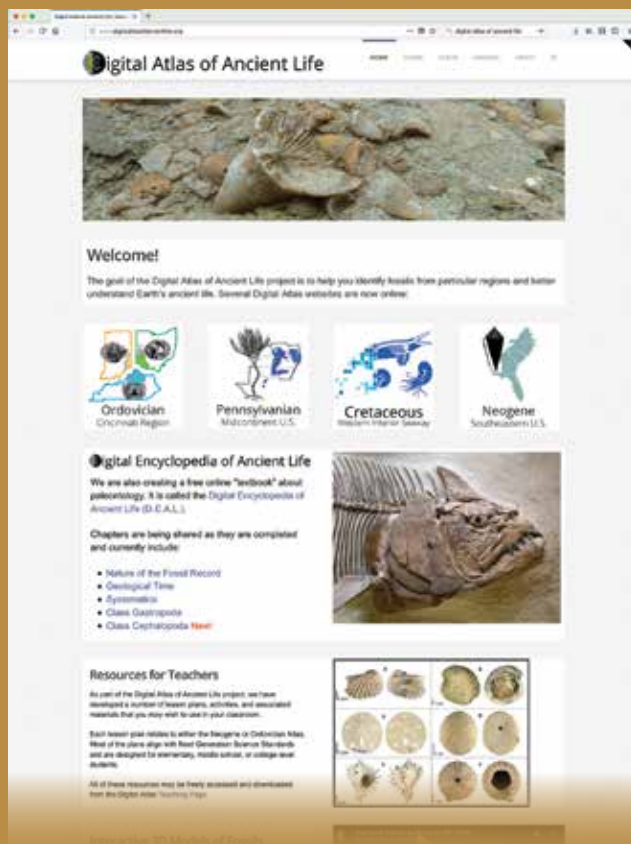
workshop and keynote address at this past year's Louisiana's Environmental Education State Symposium in Baton Rouge, and a presentation at the American Geophysical Union annual meeting on critical zone science for teachers.

PRI has a long tradition of serving New York State science teachers. PRI provides year-long professional development on virtual fieldwork experiences for teachers enrolled in the New York State Master Teachers Program. For more than 20 years, PRI's annual Teacher Resource Day has provided free resources, specimens, and publications for teachers and educators to use in their classrooms, along with tours of the Museum of the Earth and lectures. PRI annually gives workshops the meeting of the Science Teacher Association of New York State (STANYS). PRI has also been involved in New York Earth Science Teachers Association conferences since the first one in 2014.

This past year PRI's educators led a workshop on virtual fieldwork experiences for teachers in training for the American Museum of the Natural History Master of Arts in Teaching Program and ran a similar workshop for graduate students in the Cooperstown Graduate Studies Program in Museum Studies.



*Teachers have the opportunity to pick up free resources for their classrooms such as geologic specimens, fossil collections, books, posters, and more during the annual Teacher Resource Day at the Museum.*



## Digital Atlas of Ancient Life

PRI is the home of the Digital Atlas of Ancient Life ([www.digitalatlasofancientlife.org](http://www.digitalatlasofancientlife.org)) project. This initiative—which is supported by the National Science Foundation and led by Director of Publications Jon Hendricks—seeks to provide free, online digital “field guides” to fossils from particular regions to help avocational and professional paleontologists, as well as teachers and their students, identify and learn about their fossil discoveries. Digital Atlases have already been produced for the Ordovician fossils from the Cincinnati region ([www.ordovicianatlas.org](http://www.ordovicianatlas.org)), the Pennsylvanian of the midcontinent United States ([www.pennsylvanianatlas.org](http://www.pennsylvanianatlas.org)), and the Neogene of the southeastern United States ([www.neogeneatlas.org](http://www.neogeneatlas.org)). A fourth Atlas, which focuses on Cretaceous fossils from the Western Interior Seaway—which divided North America in two during the age of the dinosaurs and covered places like modern Kansas below a shallow ocean—is currently under development ([www.cretaceousatlas.org](http://www.cretaceousatlas.org)).

An additional resource that is being produced as part of this project is an all new, open access, online “textbook” about ancient life called the Digital Encyclopedia of Ancient Life (DEAL). Most of the content of this new resource—including the text itself and most of the images—has Creative Commons licensing, meaning that educators can use it as they wish with few restrictions. Over 20 chapters have been planned, five of which—Nature of the Fossil Record, Geological Time, Systematics, Gastropoda, and Cephalopoda—are now online and may be accessed at [www.digitalatlasofancientlife.org/learn/](http://www.digitalatlasofancientlife.org/learn/).

## PRI & Cornell BioBlitz— scientists and the public count as many species as possible in 24 hours



A BioBlitz is an intense period of biological surveying in an attempt to record all the living species within a designated area. PRI held its first BioBlitz over a 24-hour period on September 8-9, 2017. 300 professional and citizen scientists worked around the clock to identify and record as many species as possible at the two PRI properties: Cayuga Nature Center and Smith Woods. The event was a collaboration between PRI and Cornell University's School for Integrative Plant Science (SIPS), designed to compile a species database for the Cayuga Lake basin while engaging both the public and scientific communities in a cooperative event.

Scientists from PRI, Cornell, Ithaca College, Hobart-William Smith Colleges, SUNY Cortland, and Tompkins Cortland Community College led groups of volunteers in surveying 14 different groups of organisms at the Cayuga Nature Center property as well as nearby Smith Woods. The teams cataloged over 500 macroscopic species and 25,000 species of microbes. While most teams took a late-night break, a number of students and faculty blitzed through the night, turning the CNC lodge into a fabulous science-slumber-party.





*Scientists hunted for species from within the forest floor and at the bottom of streams to the top of the tallest old-growth trees in Smith Woods.*



*One of the most important outcomes of the BioBlitz was the opportunity for scientists to engage with the public and share with them the excitement they have about their specialties.*



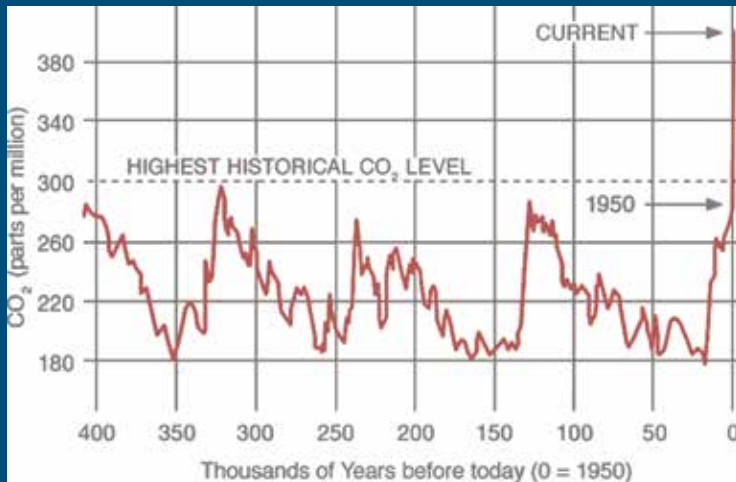
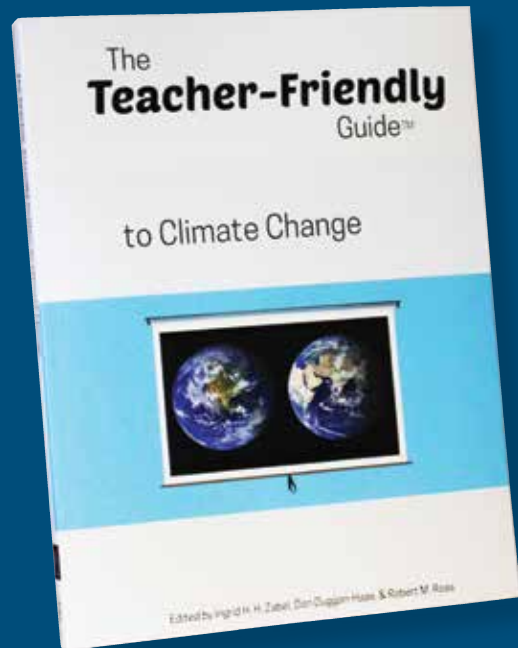
In addition to the species count and ID there were a dozen different outreach events across the two days designed to increase public awareness of local biodiversity. These included scientist-led walks and demonstrations, from Friday evening flashlight hunts for moths and spiders, to Saturday demonstrations of DNA extraction and the use of drones as ecological field tools. Taxon teams set up displays in the CNC lodge and engaged visitors with hands-on examination of the local flora and fauna.

The benefits of this event were numerous. Scientists learned a great deal about the diversity of life in the two forests; a point of special significance because the two sites represent two different stages of forest succession—an old growth forest at Smith Woods and a young secondary forest at Cayuga Nature Center. The survey also provided an essential baseline dataset at Smith Woods where the 32-acre forest was subsequently fenced to exclude white-tailed deer. CNC staff are prepared to monitor the changes in the forest in the absence of browsing pressure by deer. Additionally, hundreds of citizen-scientists were engaged in an exploration of local biodiversity and its importance to our communities, and had the opportunity to work alongside local scientists as they assess the health and abundance of species in the Cayuga Basin.

# Countering propaganda with science

On June 22, 2017 PRI launched a crowd-funding campaign to produce and distribute the recently-published *Teacher-Friendly Guide™ to Climate Change* to teachers across the country. The project was provoked by the conservative-leaning Heartland Institute's distribution of climate-change-denial propaganda to 200,000 science teachers. In response, PRI decided to put actual climate science in the hands of teachers nationwide and PRI's Teach Climate Science Project was born.

To date funding has been secured to reach 50,000 teachers—about a quarter of US high school science teachers. Students have made donations in honor of teachers who inspired them, individuals have funded entire states, and hundreds of other contributors have helped get the project off the ground and into schools.



One of the many illustrations that teachers can utilize in their classrooms. A chart of the change in atmospheric CO<sub>2</sub> measurements from Antarctica ice cores and the NOAA Mauna Loa Observatory over time from the *Teacher-Friendly Guide™ to Climate Change*.

Putting peer-reviewed climate science into the hands of the nation's high school teachers is important, and equally important is creating a strong community willing to stand up for science. News of the Teach Climate Science Project has already appeared in over two dozen print and digital media articles and podcasts, and has garnered national coverage by WGBH *Frontline* and *Sierra Magazine*.

In year two of the Teach Climate Science Project we continue to reach out to individuals and foundations, to raise sufficient funding to reach an additional 50,000 teachers, including every public high school in coastal states from Maine to Texas. Your support will help spread understanding of climate change science to every corner of the country. Visit <http://bit.ly/TeachClimateScience> to find out more.

Intern Rachel Yalof, Ingrid Zabel, Climate Change Education Manager, and Alexandra Moore, Senior Education Associate, packing copies to ship to school teachers across the United States.



## Teachers are thrilled

Feedback from teachers who have received The Teacher-Friendly Guide™ to Climate Change has been enthusiastic:

*“Written by scientists and science teachers who know their stuff and who are excellent communicators! This book is a must-have guide for teachers who need the facts, unclouded by political agendas, in order to teach the science of climate change effectively.”*

*“An excellent collaboration on one of the most important topics of our time. This is the perfect publication for those who want to have a better grasp on climate change – at the very least it’s a great place to start, but for the layperson it’s likely much more than that. I found the graphs and charts to be useful and accessible to my students (9<sup>th</sup> graders and 12<sup>th</sup> graders). Refreshingly, human-induced climate change is not treated as a debate. The impacts of climate change are ongoing, thus it’s crucial that students receive a proper introduction to climate change in their science classes.”*

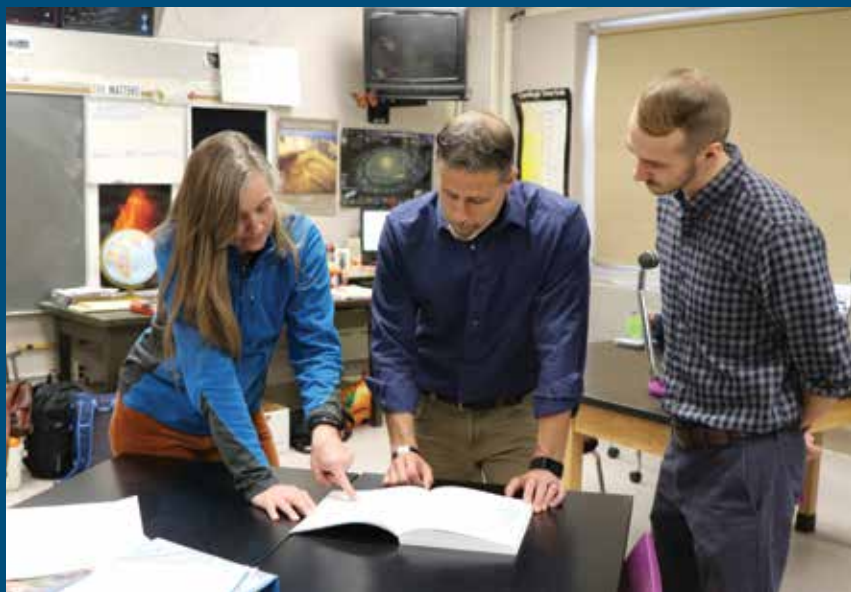


Patricia Eshelman and Heather Renyck-Bolivar, science teachers at Richburg, New York, Central Schools, show off their new copy of the Guide.

*“The organization of the book allows readers to dive in and get right down to the business of teaching climate change. The information is displayed in a manner that makes for quick reference (e.g. very helpful visuals and thought-provoking quotes) with enough accurate information pertaining to each that lessons can be quickly and effectively built around the central topics. I would say this book is a “must” for any teacher interested in accurately teaching climate science.”*

*“An important work for all educators, and anyone interested in understanding complex issues and the pursuit of solutions. The Teacher-Friendly Guide to Climate Change is written in the manner of excellent instruction; conceptual understanding is enhanced through rich factual examples that will help not only in learning, but also in the overcoming of arguments disavowing that climate change is an issue worthy of study.”*

*“The seriousness of the issue, and the peril of inaction could lead to a text replete with doomsday scenarios. Instead, there is a spirit within the work that leaves the reader hopeful and energized about the possibilities for improving present conditions and future outcomes. That sort of feeling is difficult to find in pedagogical works, and the potential good that can come from an energized teacher imparting knowledge and optimism to a cohort is impossible to measure.”*



Alexandra Moore, Teach Climate Science project leader and PRI Senior Education Associate, shows the Teacher-Friendly Guide™ to Climate Change to Dryden, New York, science teachers Travis Crocker and Eric Reisweber.

## Your support is vital

Hundreds of donors have already helped to support the Teach Climate Science Campaign. Your support will help ensure that every science teacher in the United States has access to science-based information on climate change. To find out how you can help visit: <http://bit.ly/TeachClimateScience>

# Museum of the Earth



PRI's award-winning Museum of the Earth provides meaningful learning experiences about the rich history of the Earth and its life. The Museum appeals to a wide range of audiences, from local students and their families to visitors from around the world.

The Museum hosts a variety of special events each year to provide engaging educational experiences. These include Darwin Family Day, Fossil ID Days, Museum in the Dark, the History of Life lecture series, and the annual Summer Symposium. The Museum hosts public educational hands-on programs during local Winter, Spring, and Summer school recesses, and at special events such as National Fossil Day.

Programs are geared to a wide range of audiences—from young children to older adults and educators. The Museum of the Earth is a participant in the local annual teacher appreciation week **Ithaca Loves Teachers**, providing special programming and discounts for dozens of area teachers.

The Museum hosted two special exhibits in FY18: "Secrets of the Skull: From Titanoboa to Tuatara" and "Mapping



# Secrets of the Skull: From Titanoboa to Tuatara

The latest special exhibit at the Museum opened June 30, 2017 at the Museum of the Earth titled “Secrets of the Skull: From Titanoboa to Tuatara.” Over 120 skulls—from tiny bird and mammal skulls to giant *Triceratops* and whale skulls—make up the core of the exhibit that leads the visitor on a journey of discovery about the complex structure shared by all vertebrates. An interlocking puzzle of structures that does more than just protect the brain, every part of a skull supports a specific function, including food capture and ingestion, sensory perception, defense, display and impact absorption. Fish, amphibians, mammals, birds and reptiles all share this common structure. From 300 million-year-old fossil skulls to a wide array of skulls from modern-day vertebrates, the exhibit traces the evolution of the skull’s shapes and parts and see how adaptation has optimized them for each species.

*“The exhibit mirrors exactly what the whole museum is constructed to present—a multilayered experience where both a PhD and a 6-year-old can wander about and be able to experience the same concepts through their own unique lens, each drawing something different. The exhibit is about inclusiveness, about offering ample inspiration to stoke deeper understanding of what makes all animals tick—whether you’re six-years-old or 60—a story told through in-depth diagrams, arts and crafts and even, story time.”—Nick Reynolds, Ithaca Times*





*First graders learn about life on Earth during a “Kids discover the Trail” visit.*

the Planets in Silk & Sound”, a multimedia exhibition which offered a unique perspective of our universe. Beautiful large-scale silk batiks by artist Mary Edna Fraser were combined with music composed by Mark Mercury and commentary by planetary scientist Ted Maxwell.



The Museum offers many program options for K-12 students. These programs, incorporating subjects that correspond to Museum’s exhibits and focus, such as local Devonian fossils, dinosaurs, coral reefs and glaciers, enhance students’ visits and curricular goals. In all, over 4,300 students were served through over 200 programs during FY 2018. As a member of Ithaca’s Discovery Trail, the Museum takes part in their Kids Discover the Trail! program. Each year the Museum provides fun, hands-on educational programming for students in every 1<sup>st</sup> grade class in the

*Participants in the Wine and Geology presentation at the Museum sample Finger Lakes wines and learn about how geology affects wine production.*





Ithaca, Trumansburg, Groton, Newfield, and Lansing School Districts. Through this program the Museum engaged with nearly 800 students during FY 2018.

PRI continues to develop its **Community Accessibility Program**, which was created to ensure that Earth science and environmental education are available to everyone regardless of resources or special needs. Opportunities include the Young Naturalists Accessibility Program (YNAP), Museums for All, Winter Free Days, Community Day and human service agencies group memberships.

From the very beginning of life on Earth, to the flora and fauna of your backyard, the Museum, along with its sister venues Cayuga Nature Center and Smith Woods, tells the story of life on Earth and the value in preserving and protecting it.



## Bringing real life experience to her major

Kate Rowell is a graduate student pursuing her MA in museum studies at the Cooperstown Graduate Program. Throughout the summer of 2018, she worked under Dr. Rob Ross and Helaina Blume as PRI's Exhibitions and Outreach assistant. During her time at the Institution she contributed in a number of important ways to PRI, including assisting in many aspects of the creation of the Secrets of the Skull exhibit.

Kate also put her museum studies knowledge to work in designing survey instruments to gather visitor impressions on five different topics and exhibitions—the Secrets of the Skull exhibit, the Cayuga Lake: Past and Present exhibit, the coral tanks display, an upcoming 2020 exhibit on bees, and a general visitor satisfaction survey. Kate hopes that these visitor evaluations will enable PRI to connect even more deeply with its audience, and bolster current and future content development. Kate also worked with former PRI educator and evaluator Dr. Carlyn Buckler to train Visitor Services interns in evaluation methods.

Kate enjoyed her time working at PRI, and feels it has furthered her appreciation for the challenges and rewards of communicating natural history to the public. She is eager to return soon.



# Cayuga Nature Center

Cayuga Nature Center cultivates awareness, appreciation, and responsibility for the natural world through outdoor and environmental education. The live animal ambassadors, interpretive exhibits, and miles of trails through 120 acres of woods, open fields and gorges builds knowledge, sparks curiosity, and stimulates awareness of the importance of conservation.



*Matt Sacco, Outdoor Education Manager, teaching about maple syrup production during the Nature Center's Winter Break camp.*



*The new porcupine enclosure.*

*Denison Falls*



*Summer campers enjoy the new pavilion.*

*Visitors enjoying the pancake breakfast during the Nature Center's annual Maple Fest.*



*Fish in the new "Cayuga Lake: Past and Present" aquaria.*

The Nature Center is critical to PRI's goal to create premier educational resources for teaching and learning about evolution and the impact of climate change on the fauna and flora of Central New York. Each year thousands of people are reached through public programs, school programs, and camps. The Nature Center hosts 800 Tompkins County 5th graders each year who participate in the Center's TEAM challenge course as part of the Kids Discover the Trail! Program.



*The runners take off in Cayuga Nature Center's annual Fox Trot 5K Trail Run.*

To enhance the permanent exhibits on layers of life in the Cayuga Lake's bioregion, climate change, and evolution, Cayuga Nature Center is home to an expanding number of live Animal Ambassadors. The animals who call the Nature Center home are all non-releasable back into the wild because of injuries or having been born in captivity. PRI's dedicated staff trains and cares for a wide range of animals—everything from hawks and foxes to domino cockroaches and turtles. Our live animal collection includes over 130 species at Cayuga Nature Center and the Museum of the Earth, including a number of species native to the Cayuga Lakes bioregion.



*Horton, the Barred Owl*

Over the past year we have acquired two eastern grey squirrels, an opossum, an American robin, native salamanders, three musk turtles, fire-bellied toads, ribbon snakes, a wood turtle, a barred owl, an American crow, and a black rat snake. In addition, our new Cayuga Lakes: Past and Present aquaria exhibit now is home for dozens of both the native and non-native fish that inhabit Cayuga Lake. All of these Animal Ambassadors play an important role in representing their species, advocating for wildlife conservation, and being part of our programming to educate the public on the importance of humans' ecological footprint.

## Cayuga Lake: Past and Present exhibit

Two new 640-gallon fresh water aquaria are now located on the first floor of the Cayuga Nature Center as centerpieces of the new “Cayuga Lake: Past and Present” permanent exhibit. This exciting addition to the Cayuga Nature Center lets visitors see into the past showing how life in Cayuga Lake looked after the last ice age, and how it has changed since the first European settlers came into the Finger Lakes region.

Cayuga Lake—38 miles long, up to 435 feet deep, and covering almost 43,000 acres—is the second largest of Central New York's 11 Finger Lakes and among the 40 deepest lakes in the United States. The surrounding land surface that drains into the lake, the Cayuga Lake Basin, covers around 785 square miles. Changes in the region's biota and landscape occurred with the arrival of European settlers in the late eighteenth and early nineteenth century. As a result of these changes, the kinds and communities of plants and animals that live in and around Cayuga Lake today are very different than they were just two centuries ago.

Cayuga Lake is currently home to approximately 80 species of fishes, at least nine of which were introduced by humans over the past two centuries. The lake is also home to a growing number of additional introduced and invasive species of plants and animals, many of which have substantial negative environmental, aesthetic, or economic impacts. All of these are considered in the new exhibit and associated programming.

The exhibit is designed to give a unique opportunity to see live fishes in a representation of their native Finger Lakes environment. One aquarium represents the biota of the Lake today, and the other the biota before the major impacts of European settlers. Visitors come away with an increased knowledge of life in and around Cayuga Lake, how it has changed in recent history, and the implications of these changes for the future of the lake.

Besides the aquaria themselves, this comprehensive exhibit also contains information on how Cayuga Lake works as a natural system, and how human activity affects the ecology of the lake. Displays in the exhibit explain Cayuga Lake's complex ecology and rich biodiversity. Displays and interactive videos inform visitors about fish species that are native to the Finger Lakes, as well as facts about some of the introduced species.



### FISHES OF CAYUGA LAKE

 <b>ATLANTIC SALMON</b> Anadromous fish that spends most of its life in the ocean and returns to fresh water to spawn.	 <b>SMALLMOUTH BASS</b> A popular sport fish found in the western and central basins of Cayuga Lake.	 <b>BROOK TROUT</b> A cold water fish that is native to the Adirondack region.
 <b>BROOK SILVERSIDES</b> A small, silvery fish that is common in the shallow waters of Cayuga Lake.	 <b>BROOK TROUT</b> A cold water fish that is native to the Adirondack region.	 <b>BROOK TROUT</b> A cold water fish that is native to the Adirondack region.
 <b>LAKE TROUT</b> A cold water fish that is native to the Adirondack region.	 <b>BROOK TROUT</b> A cold water fish that is native to the Adirondack region.	 <b>BLUEGILL</b> A warm water fish that is common in the shallow waters of Cayuga Lake.
 <b>YELLOW PERCH</b> A warm water fish that is common in the shallow waters of Cayuga Lake.	 <b>BROOK TROUT</b> A cold water fish that is native to the Adirondack region.	 <b>LARGEMOUTH BASS</b> A warm water fish that is common in the shallow waters of Cayuga Lake.

The new "Cayuga Lake: Past and Present" exhibit at the Cayuga Nature Center



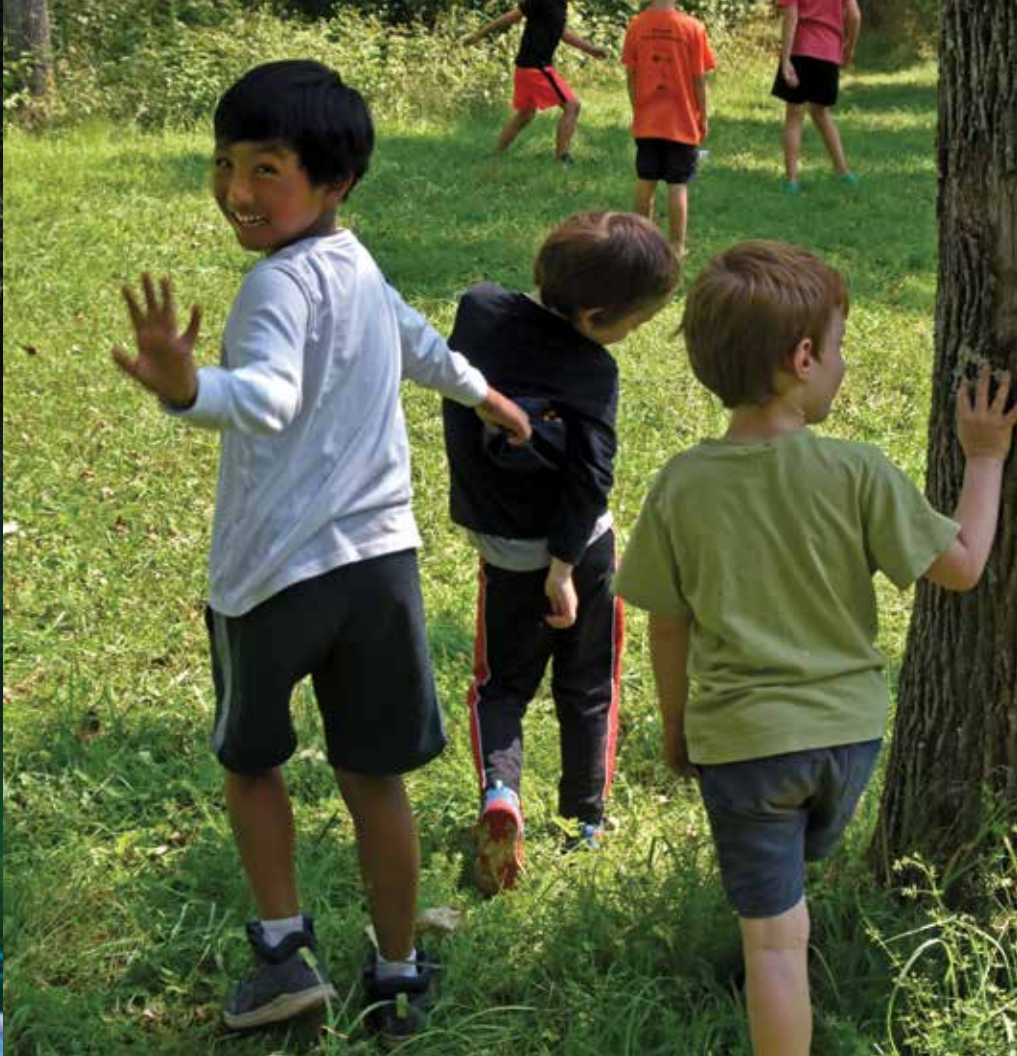
## Summer Camp

The Cayuga Nature Center Summer Camp welcomes over 400 campers each season ranging in age from 3 to 16 years old. For many of these campers, their return to the camp is an annual tradition that represents a defining point of each summer. Much of the seasonal camp staff also return year after year. A few just ended their tenth consecutive summer working with the camp program, followed by many who returned this year for their fourth or fifth consecutive seasons. The value of experience and knowledge that veteran staff bring to the Nature Center's program is evident in the recurring commentary from camp parents regarding the Camp's most valuable attribute: the high quality of the staff.

Nature Center camp staff and educators excel at bringing to life the camp curriculum, which offers a wide variety of enriching educational experiences for campers. Where the educators truly shine is in utilizing the outdoors as a platform to engage campers in meaningful experiences suited to a multitude of different learning styles. For many of the campers, finding success in learning not only builds their knowledge of the natural world, but also helps them build confidence during their time at camp.

PRI's Young Naturalist Access Program (YNAP) provides local youth in need a free PRI membership which includes





a free week of summer camp at Cayuga Nature Center as well as providing young people and their families/caregivers all of the benefits of a regular PRI membership—including free access to all of our ticketed events, such as Maple Fest and local Fossil Field Trips. This past year 99 youth were enrolled in YNAP.

*“This will be my daughter’s third summer here. From the diversity of topics learned to activities she wouldn’t have been able to have access to, all was enjoyable. Enjoyable not only through what she said about her days at camp but as a parent I saw personal development and growth in knowledge. As always the camp counselors were attentive and caring, providing independent space and guided learning to all campers. The Cayuga Nature Center is an incredible place to service the need(s) of getting youth to connect with nature. Which in this day and age is invaluable to instill to make life lasting impressions.”*



# Smith Woods

Henry A. Smith Woods is a 32-acre old-growth forest located just outside of Trumansburg, New York. It is one of the largest remaining flat tracts of old-growth forest in central New York. This small but spectacular place, with its enormous trees, dense forest canopy, and never-plowed ground, is a glimpse into the past. A walk through this small forested area may be the closest one can get in the region to experiencing a landscape that European settlers first witnessed. Old-growth forests are important both ecologically and culturally, providing a unique habitat and embodying local history. Sadly, these forests have declined every year since European settlement of the continent. According to the Old Growth Forest Network, only 1% of original forests in the Northeast US remain. Most Americans will never get to see an old-growth forest.

Named for its last owner, Henry Atterbury Smith (1822-1891) this undeveloped forest fragment was left to the Village of Trumansburg in 1909 to be preserved as a public park forever. The purpose of the park is “the preservation of the park in its natural state and for educational and recreational purposes”.

In 2007, ownership of this forest was transferred to Cayuga Nature Center, and PRI has committed itself to preserving the integrity of the forest in keeping with the original intent of the trust. The educational mission of the park is continued by PRI through school visits and public hikes. Smith Woods is also open to the public year round.

In 2017, PRI installed fencing around the entire perimeter of the forest. Smith Woods, like many forested areas, had seen a stripping away of its undergrowth because of the rapid rise in local deer populations. Within the first year the undergrowth has sprung back with a new life, helping to preserve the unique character of this old-growth forest for future generations.



*Contractors installing deer fencing along the border of Smith Woods.*



*A Trillium fruit in Smith Woods after the deer fence was installed. Prior to that the plants would be eaten by the deer before the Trillium could reproduce.*





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**Wren Martinson**, Program Assistant

## Internships / Work-Study

PRI works to educate for the future, and opening doors to college students to intern here is one of the ways PRI fulfills its educational mission. These opportunities are an extension of the students' education where they share their knowledge with the staff of PRI and expand their own understanding of their project's subject. Spending time in a PRI internship or assistantship is a wonderful resume builder. Most students during the school year commute from local colleges such as Cornell University or Ithaca College, but during the summer they come from all over the United States, even overseas. These students find working with PRI staff a wonderful and fulfilling experience.

### Interns

Maria Altier  
Emily Barbay  
Elle Bent  
Shaolin Censullo  
Claire Derry  
Matthew DiLorenzo  
Ann Dunn  
Maddie Gaetano  
Siddharth Gavirneni  
Marie Jimenez  
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Rachel Rosenburg  
Shawn Taylor  
Liza van Kapel  
Megan Woodrow  
Rachel Yalof

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Emily Hauf  
Ming Kahn  
Kate Rowell  
Michael Zelco

### Work-Study students

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Krystal Chindori-Chininga  
Kelly Crandall  
Leah Hoffman  
Zach Keller  
Alberto Matute  
Ure Obioma  
David Jose Ospina  
Zachery Siper  
Tyler Stepke  
Tamara Thompson  
Sara Waldeck

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Binghamton University  
Colorado College  
Cornell University  
Ithaca College  
Mesalands Community College  
Mt Holyoke College  
Oberlin College  
Rochester Institute of Technology  
St. Lawrence University  
SUNY Cortland  
SUNY Geneseo  
SUNY Geneseo Graduate School  
SUNY Onenota - Cooperstown  
SUNY Oswego  
Syracuse University  
TC3  
Tulane University  
Wageningen University (Netherlands)  
The College of William and Mary

# Volunteers

Volunteers contribute substantially to almost every aspect of our operations. While the majority help to maintain our collections, educate our visitors, and care for our live animals, each of our nearly 200 volunteers bring unique knowledge and expertise to expand our capabilities and help to achieve our mission. By contributing over 7,600 hours this fiscal year, volunteers accounted for nearly four extra full-time staff members. From individuals to organizations, they illustrate the hands-on engagement of our local community with PRI.. Our thanks to all the following volunteers:

Kara Abbott  
Alina Achenbach-Schill  
George Adams  
Alexandra Allmon  
Elizabeth Altier  
Maria Altier  
Annastasia Alvarado  
Zeb Alvarado  
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Marissa Zuckerman

*Our thanks also go out to the following  
volunteer organizations and initiatives:*  
Cornell Alpha Phi Omega  
Cornell Cooperative Extension of  
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Cornell Flora Rose House  
Cornell Greeks Give Back Cornell  
Cornell Into the Streets  
Cornell Multicultural Greek and Fraternal  
Council  
Cornell Pre-Orientation Service Trips  
Cornell Science of Earth Systems Student  
Association  
Keybank Ithaca  
The Learning Web of Tompkins County

## Climate internships make a difference

Creating opportunities for internships is an integral part of PRI's educational mission, and PRI can be an important component in a student's educational experience. Our Teach Climate Science project has been fortunate to have enthusiastic and dedicated interns helping to reach its goals.

"I remember when I first learned what climate change was," Elle Bent said on her first day as a summer climate intern at PRI. "It was 6th grade, at the end of the year. Our science teacher put on Al Gore's film *An Inconvenient Truth*. I'll never forget the fear I felt watching New York City—my hometown—slowly submerge under water in a simulation that predicted sea level rise over the next few decades. As I watched each computer-animated building slowly sink into the ocean I felt powerless—like I was drowning. Three years later Hurricane Sandy devastated the eastern coast of the United States. My high school—like many along the east coast—closed for an entire week. Seeing the flooded streets and rows of destroyed houses made me realize that the scary simulation wasn't just a distant threat any more."

Intern Sarah Lieberman encountered climate change in her high school classes in a very different way. "I grew up in Lawrence, Kansas. On my first day in AP Biology class my teacher told us that she didn't believe in climate change. Or evolution either. I didn't know what to do!"

Elle and Sarah (both at Cornell) joined climate interns Claire Derry (Colorado College) and Rachel Yalof (Ithaca College) on PRI's Teach Climate Science project. Interns have written fundraising appeals and press pieces, created package inserts, video clips, and most recently have been working on a crowd-source translation project to create a Spanish language edition of the Teacher-Friendly Guide to Climate Change. As the threat of climate change becomes ever more apparent, our climate interns are a key connection with the student communities we hope to inspire to action.



*Climate interns Claire Derry, Elle Bent, and Sarah Lieberman represent PRI at the GrassRoots Festival Sustainability Fair.*

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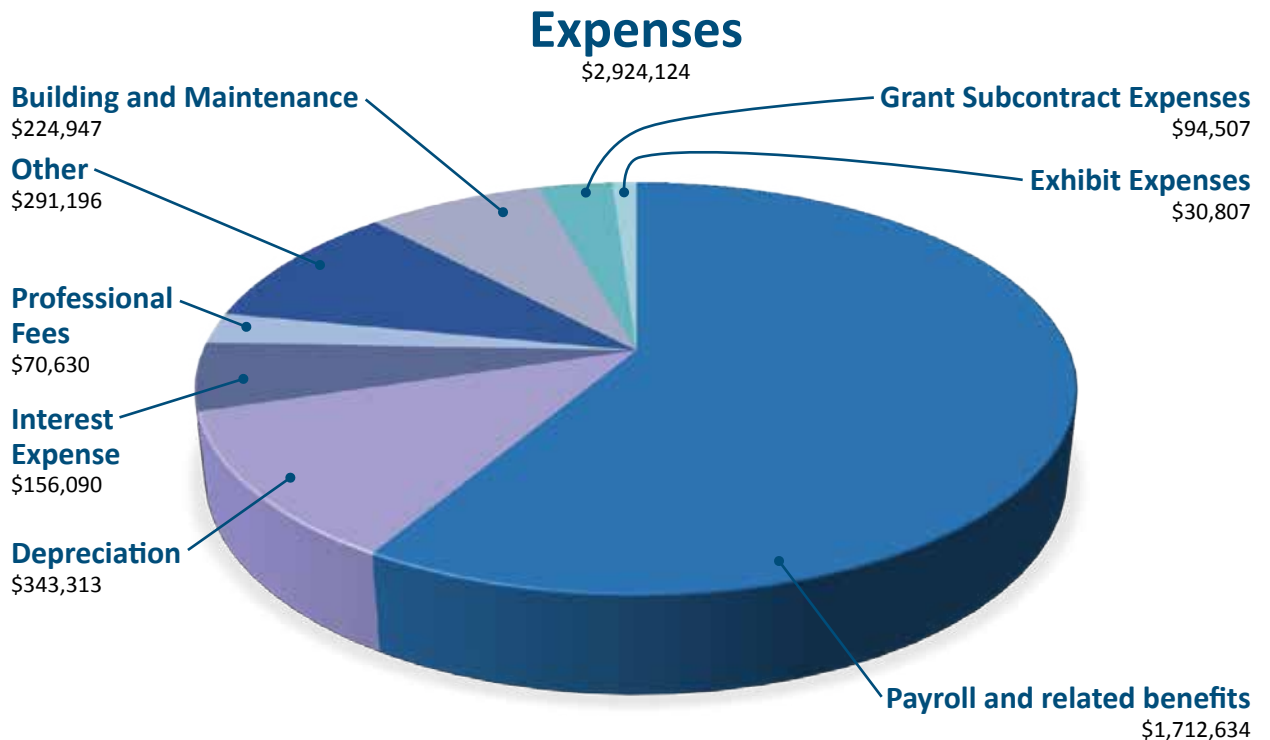
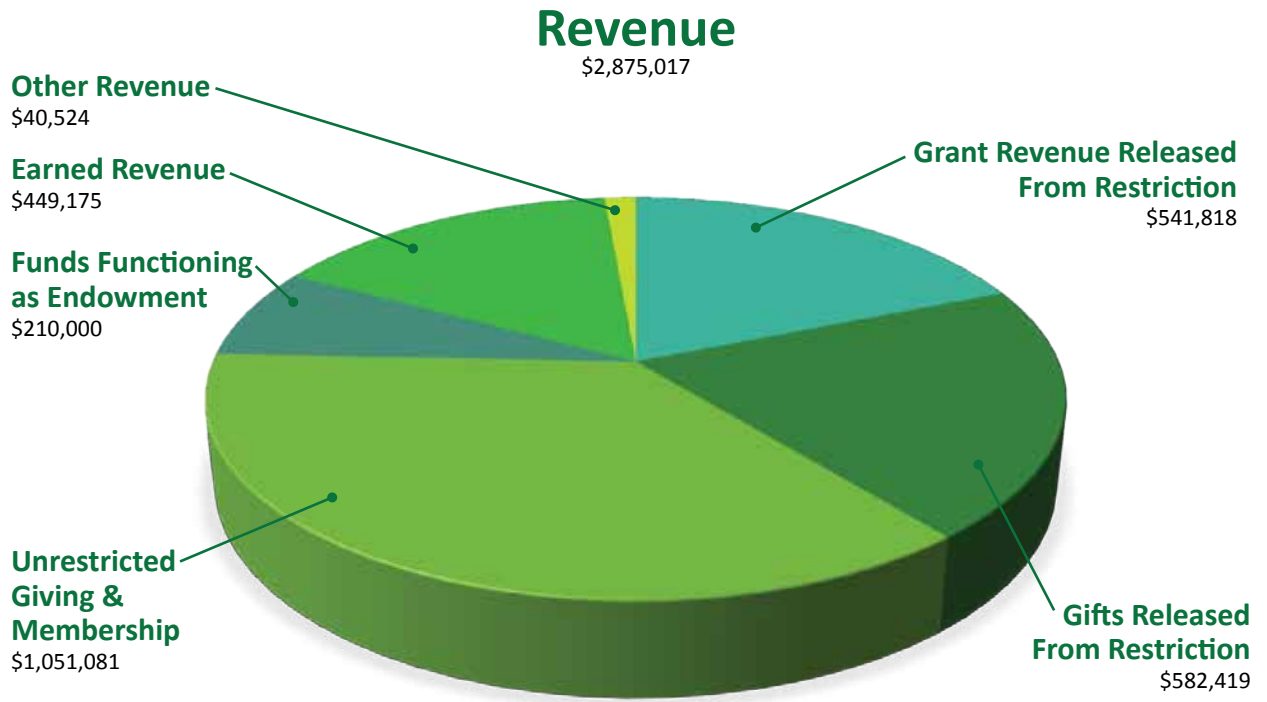


# Appendix: Research Reports

## Peer-reviewed publications by staff and affiliated students

- Allmon, W.D., & Ross, R.M., 2017, Evolutionary remnants as widely accessible evidence for evolution: The structure of the argument for application to evolution education. *Evolution: Education and Outreach*, 11:1 <https://doi.org/10.1186/s12052-017-0075-1>
- Allmon, W.D., Dietl, G.P., Hendricks, J.R., & Ross, R.M., 2018, Bridging the two fossil records: Paleontology's "big data" future resides in museum collections. In Rosenberg, G.D., & Clary, R.M., eds., *Museums at the forefront of the history and philosophy of geology: History made, history in the making*. Geological Society of America Special Paper 535, p. 35-44.
- Anderson, B.M.†, & Allmon, W.D., 2018, When domes are spandrels: On septation in Turritellidae and other gastropods. *Paleobiology* 44(3) 444-459.
- Boyer, A.G., Brenner, M., Burney, D.A., Pandolfi, J.M., Savarese, M., Dietl, G.P., & Flessa, K.W., 2017, Conservation paleobiology roundtable: From promise to application. In Dietl, G.P. & Flessa, K.W., eds., *Conservation paleobiology: Science and practice*. University of Chicago Press, Chicago, pp. 291-302.
- Das, S.S., Saha, S., Bardhan, S., Mallick, S., & Allmon, W.D., 2018, The oldest turritelline gastropods: from the Oxfordian (upper Jurassic) of Kutch, India. *Journal of Paleontology*, 92(3): 373-387.
- Dietl, G.P., & Flessa, K.W., eds., 2017, *Conservation paleobiology. Science and practice*. University of Chicago Press, Chicago, 316 p.
- Dietl, G.P., & Flessa, K.W., 2018, Should conservation paleobiologists save the world on their own time? In Tyler, C.L., & Schneider, C.L., eds., *Marine conservation paleobiology. Topics in Geobiology 47*, Springer Nature, Cham, Switzerland, pp. 11-22.
- Dietl, G.P., & Smith, J.A.†, 2017, Live-dead analysis reveals long-term response of the estuarine bivalve community to water diversions of the Colorado River. *Ecological Engineering*, 106 (B): 749-756.
- Dietl, G.P., & Flessa, K.W., 2017, Conservation paleobiology in the Anthropocene. In Dietl, G.P. & Flessa, K.W. (eds.). *Conservation paleobiology: Science and practice*. University of Chicago Press, Chicago, pp. 303-305.
- Duggan-Haas, D., 2017, Teaching About the Critical Zone. In the Trenches, October 2017. <https://nagt.org/nagt/publications/trenches/v7-n4/index.html>
- Durham, S.R.†, Gillikin, D.P., Goodwin, D.H., & Dietl, G.P., 2017, Rapid determination of oyster lifespans and growth rates using LA-ICP-MS line scans of shell Mg/Ca ratios. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 485: 201-209.
- Hendricks, J.R., 2018, Diversity and preserved shell coloration patterns of Miocene Conidae (Neogastropoda) from an exposure of the Gatun Formation, Colón Province, Panama. *Journal of Paleontology*, 92(5): 804-837.
- Ivany, L.C., Pietsch, C.†, Handley, J.C., Lockwood, R., Allmon, W.D., & Sessa, J.A., 2018, Little lasting impact of the Paleocene-Eocene Thermal Maximum on shallow marine mollusk faunas. *Science Advances*, 4: eaat5528
- Kelley, P.H., Dietl, G.P., & Visaggi, C., 2018, Training tomorrow's conservation paleobiologists. In Tyler, C.L., & Schneider, C.L., eds., *Marine conservation paleobiology. Topics in Geobiology 47*, Springer Nature, Cham, Switzerland, pp. 209-225.
- Kosloski, M.E.†, Dietl, G.P., & Handley, J., 2017, Anatomy of a cline: Dissecting anti-predatory adaptations in a marine gastropod along the U.S. Atlantic coast. *Ecography*, 40: 1285-1299.
- Marshall, C.R., Finnegan, S., Clites, E.C., Holroyd, P.A., Bonuso, N., Cortez, C., Davis, E., Dietl, G.P., Druckenmiller, P.S., Eng, R.C., Garcia, C., Estes-Smargiassi, K., Hendy, A., Hollis, K.A., Little, H., Nesbitt, E.A., Roopnarine, P., Skibinski, L., Vendetti, J., & White, L.D., 2018, Quantifying the dark data in museum fossil collections as palaeontology undergoes a second digital revolution. *Biology Letters*, 14: 20180431.
- Moore, A., Duggan-Haas, D., Lubinski, & Ross, R.M., 2017, Explore the Critical Zone with the CZO resource collection. In the Trenches, October 2017. <https://nagt.org/nagt/publications/trenches/v7-n4/index.html>
- Pierrehumbert, N.D.†, & Allmon, W.D., 2018, Morphology of crab predation scars on Recent and fossil turritellid gastropods. *Palaeogeography, Palaeoecology, Palaeoclimatology*, 497: 1-10.
- Smith, J.A.†, Handley, J.A., & Dietl, G.P., 2018, On drilling frequency and Manly's alpha: towards a null model for predator preference in paleoecology. *Palaios*, 33(2): 61-68.
- Smith, J.A.†, S.R. Durham†, & Dietl, G.P., 2018, Conceptions of long-term data among marine conservation biologists and what conservation paleobiologists need to know. In Tyler, C.L., & Schneider, C.L., eds., *Marine conservation paleobiology. Topics in Geobiology 47*, Springer Nature, Cham, Switzerland, pp. 23-54.

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