

Building Resilience:

*** Bloomington, Indiana
October 23-25, 2018**

The Future of Natural Areas

FORTY-FIFTH

natural
areas
conference



Presented by the Natural Areas Association



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Hello, and welcome to the 45th Natural Areas Conference.

I'm pleased you could join us for this event, which is something of a homecoming for the Natural Areas Association. Bringing the conference to Bloomington was an intentional choice — the NAA was founded in this region 45 years ago to be a forum for people working in state and private natural areas programs.

Over the years, NAA has weathered changes and challenges, but we have managed to persevere and grow. We hear echoes of our history in this year's conference theme, "Building Resilience."

Resilience is a familiar topic for natural areas professionals. We expend a lot of effort trying to study, measure and enhance it in natural systems.

It's harder to appreciate the resilience that exists in ourselves. It's there in the times when we continue to do our jobs in spite of obstacles that seem to appear out of nowhere — red tape, budget cuts, policy changes. And it's there as we grapple with confounding situations, like how to manage national parks that are being simultaneously loved to death by the public and claimed for natural resources extraction by executive order.

It's true our resilience is facing unprecedented challenges. But I've learned from my years in this organization that saying, "We've never experienced this before" inevitably leads to someone remarking, "Well, actually, back in ..." Over the span of this organization's existence, we have faced long odds and lean years, and we have persevered.

If we can tap our inner resilience, stay strong, and be a voice for the conservation community, we will find a way to persist through these times. If we continue to support good science and use it as the foundation for protecting and maintaining natural areas, we can protect the core of our work.

I'm inspired when I think of our closing plenary speakers. Former director of the National Park Service Jonathan Jarvis and Dr. Gary E. Machlis co-wrote *The Future of Conservation in America: A Chart for Rough Water*. The book is prescriptive — at once hopeful and a call to action. It's about looking toward the future, putting things in context, and offering ideas for how we can be better collaborators and advocates on behalf of natural areas and ourselves.

The NAA is positioned well to lead our profession into the future. I'm inspired by the energy and forward thinking I see being put forth by our staff and board. We've finalized changes that were in process last year. We're offering more programming, continuing to advocate for our members and their work, and generating new ideas for making membership as valuable as possible.

I'd like to thank the conference planning committee for their hard work on coordinating this event. Thanks also to our sponsors for their support. And finally, thank you for joining us back where it all began!

Sincerely,

Lisa L. Smith
Executive Director, Natural Areas Association

Welcome to Bloomington and the state of Indiana!

The planning team is proud to welcome you to this year’s Natural Areas Conference. The program we’ve put together for these next three days explores the theme of “building resilience” from many angles. We hope that you come away from these presentations, field workshops, and events full of new ideas and the inspiration to put them into practice in the natural areas you steward.

This area of Indiana boasts many natural features that make it ideal for this event. The city is located in the heart of one of the largest eastern deciduous hardwood forest regions in the Midwest. There are three state parks within a 45-minute drive of the Indiana University campus. Just 10 miles south lies Lake Monroe, which at more than 10,000 acres is the largest inland lake in the state. Several of our field workshops make use of natural areas that are within about 15 minutes of the IU campus, some of which feature the sinkholes, caves and springs that comprise the region’s signature karst landforms.

We start the conference proceedings with what is sure to be a memorable opening plenary. Our keynote speaker is award-winning nature writer and Indiana University professor emeritus of English Scott Russell Sanders. Also presenting as plenary speakers are Indiana University biology professor Heather Reynolds and Indiana Department of Natural Resources plant ecologist Mike Homoya.

This year, we’re offering identification workshops in addition to field workshops as part of our conference programming. There will also be plenty of opportunities for networking during the poster session and reception, NAA awards dinner and luncheon, and of course informally after hours. We are offering a strong program for the next generation of conservation professionals with a Keys to Conservation Careers Session for students and U.S. Forest Service-sponsored job outreach event. We hope that you take full advantage of these opportunities to make new contacts, explore new habitats, and expand your conservation knowledge.

That said, the full conference experience should definitely include some time outside the Indiana Memorial Union. Bloomington boasts a restaurant scene that allows you to be as adventurous as you’d like. Go and find an amazing place to eat on 4th Street, with its selection of Tibetan, Turkish, and Thai cuisine, to name a few. Microbreweries and distilleries abound as well.

In addition to feeding your body, you can feed your soul at Bloomington’s cultural institutions. Take in the intriguing exhibits at the Mathers Museum, Indiana University’s museum of world cultures. Those musically inclined might want to attend a concert hosted by the top-ranked Jacobs School of Music at IU.

Bloomington is an active, friendly city, and the university campus is known for its beauty. We encourage you to explore all that it has to offer. We hope that you find your visit here, and the time you spend at the conference, valuable and enriching.

Sincerely,
The Conference Planning Team

Exhibitors

Frangipani Room

We want to thank this year’s exhibitors. Please stop by anytime during the conference and pay them a visit.

Cleveland Museum of Natural History
Davey Resource Group, Inc.
Eco Logic
Eppley Institute of Parks and Public Lands
Great Lakes Phragmites Collaborative
iDigBio
Indiana Academy of Science
Indiana Forest Alliance
Spence Restoration Nursery
The Nature Conservancy in Indiana
Truax Company, Inc.
USDA Forest Service
Woody Warehouse Nursery, Inc.

Questions and Conference Updates

The staff at the conference registration desk will be happy to help answer any questions you might have. We will post information concerning last-minute updates to the conference schedule and other important information at the registration desk.

Name Badges

Please wear your name badge to all conference events. It is your ticket to sessions, workshops, breaks, and social events. Look inside the sleeve of your name badge for tickets to the events you chose to attend during registration.

Cell Phones

Please silence cell phones during sessions as a courtesy to presenters and participants.

Stay Current

Please use #NACBloomington on social media related to the conference, and to stay up to date with conference events on both Facebook (www.facebook.com/NaturalAreasAssc) and Twitter (@naturalareas).

Exhibitors

Frangipani Hall, our Exhibits Area, will be open from 8 am to 6 pm on Tuesday, and 8 am to 4 pm Wednesday and Thursday.

Field Workshops

If you preregistered for a field workshop, you will find a ticket indicating your field workshop choice behind your name badge. Should you have questions regarding a scheduled workshop, please visit the conference registration desk.

Student Competition

We thank those who entered the student awards competition. A team of judges will evaluate student posters and oral presentations. The top student presenters will receive their monetary awards and certificates on Wednesday night at the awards dinner. Students must be present at the dinner to receive their awards.

WiFi Access

Wireless internet access is available free throughout the Indiana Memorial Union and IU campus. To connect, make sure your device’s wireless networking (WiFi) is turned on, and select the “attwifi” network (SSID). You may need to start your web browser to finish authenticating to AT&T. For assistance, contact the Biddle Hotel front desk at 812-856-6381.



Job Outreach Event

Located in the Exhibits Area, this event will be open to all attendees during Exhibit hours. Human Resource personnel from USFS will offer on-site help and counseling on how to use the federal government’s USAJOBS platform, as well as how to apply for and learn about current job opportunities.

Schedule at a Glance / Venue Map

INDIANA MEMORIAL UNION

900 E. 7th St.

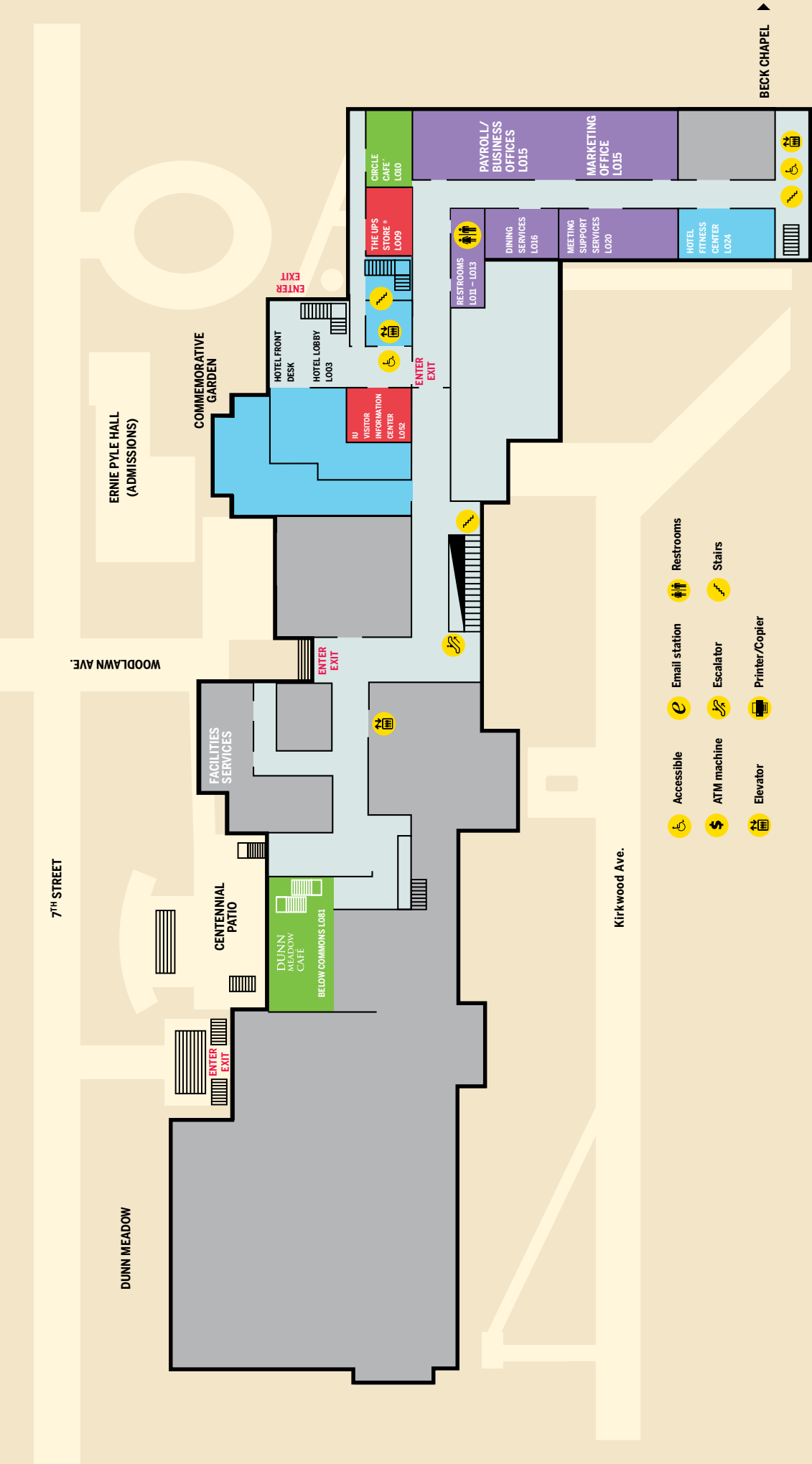
All conference events take place at this location with the exception of Field Workshops and the Keys to Conservation Careers session, which will be held at the nearby School of Public Health, Room 125, 1025 E. 7th St.

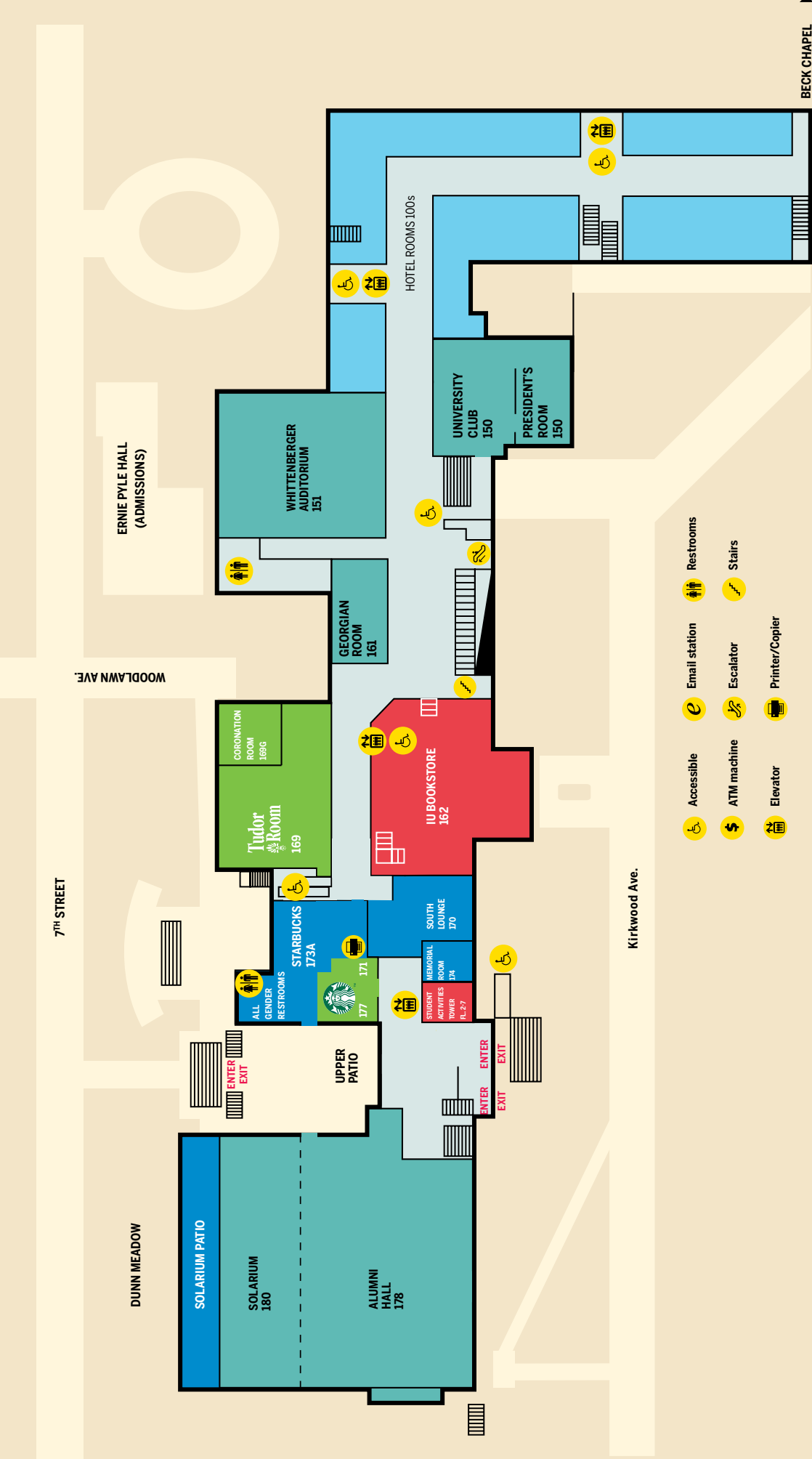
Monday, Oct. 22
9 am – 4:30 pm Walnut / Main Level Pre-conference Workshop: Adapting to Climate Change: Updating Our Approach to Land Protection and Site Management Decisions
9 am – 5 pm Persimmon / Main Level Pre-conference Workshop: Best Management Practices for Pollinators
4:30 – 8 pm East Lounge / Main Level Registration

Tuesday Oct. 23
7 – 8 am Frangipani / Main Level Exhibitor setup
7 – 8 am Solarium / First Floor Poster setup
8 am – 5 pm Frangipani / Main Level Exhibits
8 am – 5 pm East Lounge / Main Level Registration
8 – 9:30 am Maple / Main Level State Natural Areas Program (SNAP) Roundtable
9:30 am – noon Whittenberger Auditorium / First Floor Opening Plenary (p. 10)
12:15 – 1:45 pm Solarium / First Floor Student-Mentor Networking Lunch (p. 13)
1:45 – 3:15 pm Dogwood, Oak, Maple, Persimmon / Main Level Oral Sessions (p. 12)
1:45 – 3:15 pm Sassafras / Main Level Sedges ID Workshop (p. 12)
1:45 – 3:15 pm Walnut / Main Level Roundtable: Seed Mix Design for Restoration (p. 12)
3:15 pm Frangipani / Main Level Break
3:45 – 5:15 pm Dogwood, Oak, Maple, Walnut, Persimmon / Main Level Oral Sessions (p. 12)
3:45 – 5:15 pm Sassafras / Main Level Fern ID Workshop (p. 12)
5:15 pm Hoosier / Main Level Natural Areas Journal Editors Meeting
6 – 8 pm Solarium / First Floor Poster Session and Reception (p. 14)

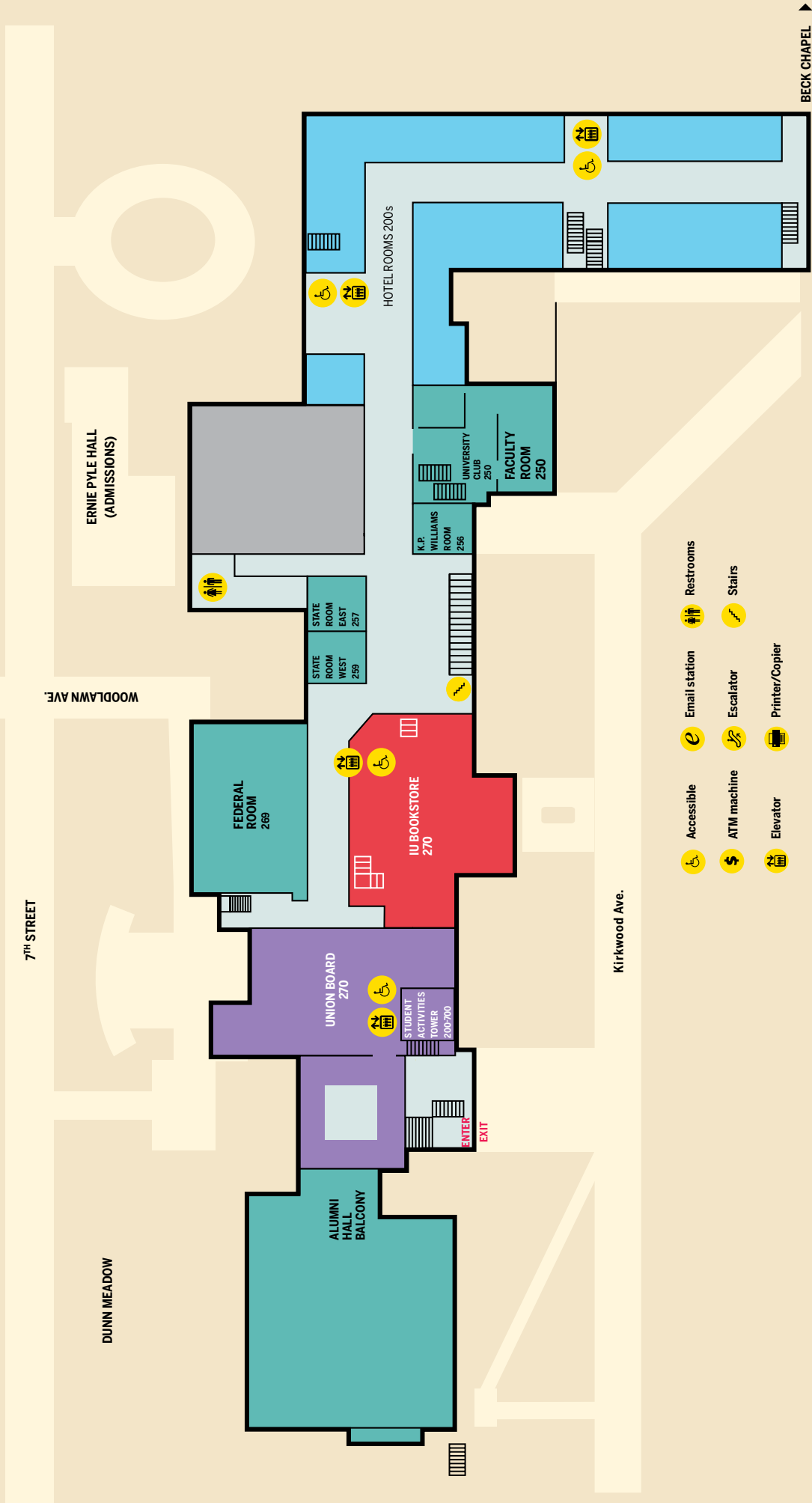
Wednesday Oct. 24
8 am – 5 pm Frangipani / Main Level Exhibits
8 am – noon East Lounge / Main Level Registration
8:30 – 10 am Dogwood, Oak, Maple, Walnut, Persimmon / Main Level Oral Sessions and Symposia (p. 16)
10 am Frangipani / Main Level Break
10:30 am – noon Dogwood, Oak, Maple, Walnut, Persimmon / Main Level Oral Sessions and Symposia (p. 16)
Noon – 6 pm East Lounge / Main Level Off-site Field Workshops (p. 17)
2 – 3:30 pm Walnut / Main Level Grasses ID Workshop (p. 16)
4 – 5:30 pm Walnut / Main Level Invasive Forest Insect ID Workshop (p. 16)
6 – 10 pm Alumni Hall / First Floor Awards Dinner (p. 18)

Thursday Oct. 25
8 – 11 am East Lounge / Main Level Registration
8 am – 3 pm Frangipani / Main Level Exhibits
8:30 – 10 am Dogwood, Oak, Maple, Walnut, Persimmon, Sassafras / Main Level Oral Sessions and Symposia (p. 20)
8:30 am – 12:15 pm Keys to Conservation Careers Session (p. 19) (School of Public Health—Room 125, 1025 E. 7th St.)
10 am Frangipani / Main Level Break
10:30 am – noon Dogwood, Oak, Maple, Walnut, Persimmon, Sassafras / Main Level Oral Sessions (p. 20)
Noon – 1:15 pm Georgian / First Floor Membership Meeting & Luncheon (p. 21)
1:30 – 3 pm Dogwood, Oak, Maple, Walnut, Persimmon, Sassafras / Main Level Oral Sessions (p. 20)
1:30 – 3 pm Persimmon / Main Level Invasive Plant ID Workshop (p. 20)
1:30 – 3 pm Walnut / Main Level Digital Herbarium Workshop (p. 20)
1:30 – 3 pm State Room East / Second Floor Roundtable: Potential Impacts of Honey Bees to Native Bees, Plant Communities and Ecosystems (p. 21)
3 pm Frangipani / Main Level Break
3:30 – 5 pm Alumni Hall / First Floor Closing Plenary (p. 22)
5 – 6 pm Alumni Hall / First Floor Closing Reception and Book Signing





FIRST FLOOR



SECOND FLOOR

Opening Plenary 9:30 am – noon Whittenberger Auditorium

The Opening Plenary offers attendees the opportunity to gather and hear from a diverse set of voices on the importance of resilience, the theme of our conference. After a welcome from Conference Chair James Farmer and NAA Executive Director Lisa Smith, NAA Board President Cliff Chapman offers a few words on the significance of solid science to our profession. Our keynote speaker, Scott Russell Sanders, calls attention to the need for a renewed national commitment to the democratic values that led to the creation of our national parks and other publicly accessible lands. Dr. Heather Reynolds describes the key role that urban green spaces are playing in helping to protect all natural areas. The plenary ends with Michael Homoya, Indiana’s state botanist, speaking about the persistent biological diversity of Indiana’s natural areas despite centuries of intensive human-driven change.

9:30 am Welcome: James Farmer, Conference Chair

9:35 am Opening Remarks: Lisa Smith, Executive Director, Natural Areas Association

9:45 am Cliff Chapman, Board President, Natural Areas Association, *Preserving Nature in an Era of Disinformation*

KEYNOTE ADDRESS

10:05 am Public Lands, Democracy, and America’s Wealth by Scott Russell Sanders

Earlier generations of Americans established parks and other protected natural areas as democratic alternatives to the private estates of Europe, where nearly all of the once-commonly shared lands had been enclosed for use by the rich. The same democratic impulse led to the establishment of free public libraries and public schools. We are now faced with relentless efforts to enclose and exploit our public lands — for mining, drilling, clear-cutting and overgrazing, or for conversion into private property. We need to defend these great natural legacies, out of gratitude toward our ancestors who protected them, and out of concern for the generations that will come after us. In honor of our meeting place in

Bloomington, this illustrated talk will draw many of its examples from Indiana, the Great Lakes Region, and the Midwest.

PLENARY ADDRESSES

10:45 am Green Cities: Wild Nature by Dr. Heather Reynolds

Thoreau wrote that “In wildness is the salvation of the world.” Today, we might say that “In cities is the salvation of wildness.” The practice of urban green infrastructure is a growing phenomenon that just might make cities a key part of protecting our cherished natural areas. After a brief review of its emergence as a concept and practice, the opportunities and challenges of managing urban green spaces as life-supporting infrastructure are explored, including their potential for biodiversity conservation in and outside of cities.

11:25 am Indiana’s Natural Regions: Wilder Than You Think! by Michael Homoya

While Indiana has one of the most altered landscapes in the country, it remains a place of remarkable natural diversity. Prior to European settlement, most of its 23 million acres were forested. However, considerable areas of prairie, barrens, and open woodland occurred, especially in the northwest. With more than three-fourths of the state previously covered by multiple advances of continental ice sheets, much of it is physically “level.” Yet a large, rugged driftless area exists in the south. Twelve natural regions are currently identified, each with a distinct assemblage of natural communities and biota, ranging from high dunes bordering Lake Michigan to towering limestone cliffs along the Ohio River. Add to these an ecological mash-up of bald cypress swamps, Virginia pine knobs, kettle lakes, limestone caverns, sandstone rock shelters, fens, tamarack bogs, grasslands, and one of the most extensively forested landscapes in the middle Midwest, and the result is a state that’s “wilder than you think!”

11:55 am Closing Words: Lisa Smith

ABOUT THE SPEAKERS

Michael Homoya

Indiana State Botanist/Plant Ecologist, Department of Natural Resources

Michael Homoya has been Botanist and Plant Ecologist for the Indiana DNR Division of Nature Preserves and Natural Heritage Data Center since 1982. His primary responsibilities are natural areas assessment, discovery and monitoring of rare species and state significant natural communities, and updating Indiana’s official list of endangered vascular plants. He is former president of the Indiana Academy of Science and recipient of its 2015 Distinguished Scholar Award. Homoya is the current president of the Indiana Native Plant and Wildflower Society and is an adjunct faculty member of Indiana University-Purdue University Indianapolis. Books he has written include *Orchids of Indiana* (1993) and *Wildflowers and Ferns of Indiana Forests: A Field Guide* (2012).



Dr. Heather Reynolds

Associate Professor of Biology, Indiana University

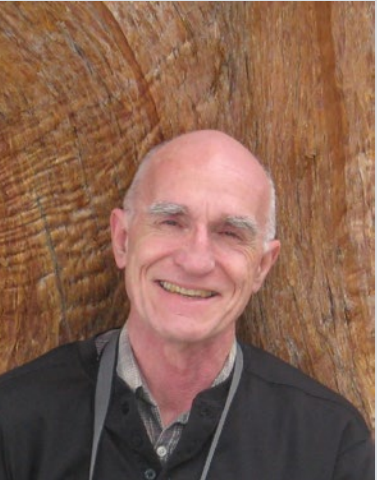
Heather Reynolds is an Associate Professor of Biology at Indiana University. She researches plant-environment interactions and their applications to restoration, promotion of green cities, and sustainable agriculture. She chairs the Indiana Invasive Species Council and works with Monroe County Identify & Reduce Invasive Species and the Bloomington Urban Woodlands Project.



Scott Russell Sanders

Author; Distinguished Professor Emeritus of English, Indiana University

Scott Russell Sanders is the author of more than 20 books of fiction and nonfiction, including *Hunting for Hope* and *A Conservationist Manifesto*. His most recent books are *Earth Works: Selected Essays* (2012); *Divine Animal: A Novel* (2014); and a collection of his eco-science fiction stories entitled *Dancing in Dreamtime* (2016). A new edition of his documentary narrative, *Stone Country*, co-authored with photographer Jeffrey Wolin, was published in 2017. Among his honors are the Lannan Literary Award, the John Burroughs Essay Award, the Mark Twain Award, the Cecil Woods Award for Nonfiction, the Eugene and Marilyn Glick Indiana Authors Award, and fellowships from the Guggenheim Foundation and the National Endowment for the Arts. In 2012 he was elected to the American Academy of Arts and Sciences. He is a Distinguished Professor Emeritus of English at Indiana University.



Oral Sessions 1:45 – 5:15 pm

Room	Dogwood Room	Maple Room	Oak Room	Persimmon Room	Walnut Room	Sassafras Room
Topic	Invasive Species	Communicating the Importance of Our Work	Maximizing Data and Technology to Inform Natural Areas Management	Urban and Wildland Interface	ROUNDTABLE Seed Mix Design for Restoration	WORKSHOP Sedges Identification
Moderator	Sarah Eysenbach	John Wenzel	Ronald Hellmich	Megan Dillon	Becky Barak	Paul Rothrock
1:45 pm	Sarah Eysenbach: Plant community response after the invasion of Emerald Ash Borer (EAB) in Northeast Ohio	Kristy Burnett: Outside science (inside parks): Engaging the next generation of conservationists	Michelle DePrenger-Levin: Accounting for spatial error in herbarium records for species distribution models of rare plant species	Kelly Borgmann: Be wildlife aware: A proactive and collaborative method to mitigate human-wildlife conflict in the Midwest	Join Becky Barak of the Chicago Botanic Garden in a discussion on seed mix design; how it plays into your restoration objectives, drivers & constraints to its process, and tools & resources for making the best decisions for your site.	Preregistration required. This workshop, suitable for beginners to more advanced learners, introduces basic vocabulary and identification tools related to the sedges (genus <i>Carex</i>), an important part of natural area plant diversity.
2:15 pm	Jordan Marshall: Forest change through exposure to Emerald Ash Borer	Kostas Stavrianakis: Does technology have a place in nature education?	Betsy Miller Vixie: A data-based future: Best practices and lessons learned from 20 years of rare plant monitoring in San Diego County	Jessica Burnett: Impacts of non-native birds on native wildlife in urban ecosystems: Where is the evidence?		
2:45 pm	Deborah Stone: The Spatial Invasive Infestation and Priority Analysis (SIIPA) Tool	John Wenzel: Web-based digital tools and distance learning allow promotion of research and outreach far from population center	Matt Schulz: Engaging citizens through technology in the field: An overview of iNaturalist in Colorado's state parks	Megan Dillon: Urban wildlife conservation in practice		
3:15 pm	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK
Topic	Fire Ecology	Monitoring Species Populations and Natural Areas	Restoration Ecology	Native Plant Materials in Natural Areas Management	Invasive Species	WORKSHOP Midwestern Fern Identification
Moderator	Marc Milne	Tracy Evans	Steve Shelly	Clair Ryan	John Taylor	Roger Hedge
3:45 pm	Megan Dornbusch: Fuel structure and moisture dynamics in a Kentucky bluegrass-invaded prairie	Tracy Evans: Firefly abundance tied to weather variables two years before observation	Heather Herakovich/Holly Jones: The effects of bison reintroduction on grassland bird nest success in tallgrass prairie	Courtney Gutman: Cultivating a flourishing market from a good idea: Identifying conditions necessary for a sustainable seed market	Roger Anderson: Extreme climate events affect density of the invasive biennial garlic mustard (<i>Alliaria petiolata</i>)	Preregistration required. This workshop, geared toward beginners, introduces basic vocabulary and field identification tools related to some common Midwestern ferns.
4:15 pm	Bill Kleiman: Tracking progress: The new Illinois Fires Accomplished Map	Mahalah Wilson: Population ecology of cancer root at Blossom Hollow Nature Preserve in central Indiana	Mike Leahy: Twenty years of Tallgrass Prairie reconstruction and restoration at Pawnee Prairie Natural Area, Missouri	Chris Newbold: Evaluating the success of a prairie reconstruction project in Missouri: How do you know when you're close enough?	Kimberly Ordonez: Using a psychological distance lens to examine family forest owners' perceptions of invasive plant risks	
4:45 pm		Tom Swinford: The Odonota of the Pigeon River and associated wetlands: An annotated checklist	Duke Rankin: Buck Creek serpentine restoration: A case study in fire management	Clair Ryan: Revegetating invaded sites with natives: New resources for local invasive species management groups and beyond		
5:15 pm	ADJOURN	ADJOURN	ADJOURN	ADJOURN	ADJOURN	ADJOURN

Student-Mentor Networking: Passing the Drip Torch

12:15 – 1:45 pm Solarium

Students and young professionals are urged to take advantage of this opportunity to make connections with professionals in their future fields. Chat with those in a diverse range of conservation careers and meet potential employers. Lunch will be provided for those who have preregistered.



Prescribed burn at Bethel Prairie Conservation Area, a tallgrass prairie remnant in western Missouri.
PHOTO COURTESY OF THE MISSOURI DEPARTMENT OF CONSERVATION

Tuesday, Oct. 23

BLOOMINGTON, INDIANA

2018 NATURAL AREAS CONFERENCE

Tuesday, Oct. 23

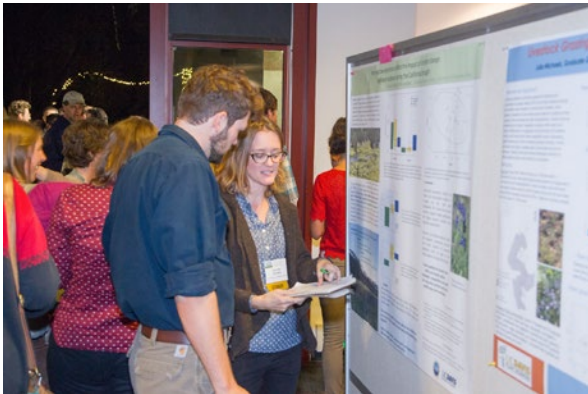
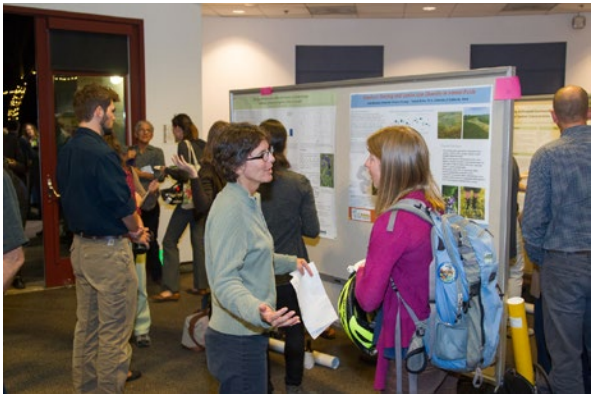
Poster Session & Reception 6 - 8 pm Solarium

Join us for the first networking event of the Natural Areas Conference. Everyone's invited to talk with our poster presenters, socialize with new and old friends, and enjoy complimentary hors d'oeuvres and a beverage from the cash bar.



- A walk in the park? Developing evidence-based outdoor programming for the public's psychological health **Kristina Anderson**
- Simulated herbivory affects plant-soil feedback dynamics among native and invasive woodland plants **Savannah Bennett**
- Biological integrity of mixed-grass prairie topsoils subjected to long-term stockpiling **Pamela Block**
- Genetic diversity of the federally endangered Avon Park Harebells in *ex situ* and natural populations **Diana Bolton**
- Effects of predation pressure on *O. virginianus* behavior in Wayne County, Indiana **Anna R. Carlson**
- Benthic macroinvertebrate development and community composition in mitigated wetlands in southwest Pennsylvania **Matt Carter**
- Using a baseline bee survey to inform future management guidelines along an urban greenway in Denver, Colorado **Liam Cullinane**
- Prairie microgeography: The study of the Tangled Prairie **Mary Damm**

- Invasive plant response to windstorm forest canopy damage **Melissa Daniels**
- Determining the role of biotic interactions on the restoration success of the federally endangered *Astragalus bibullatus* **Noah Dell**
- Mixed-grass vegetation response to grazing management strategies in Kentucky bluegrass-invaded pastures **Megan Dornbusch**
- Effects of seed source on drought performance and implications for native prairie restoration **Katherine Fu**
- Pre-emergence control of Japanese stiltgrass (*Microstegium vimineum*) in a state park using indaziflam **Victor Maddox**
- The Hardwood Ecosystem Experiment: Findings from the first 10 years **Charlotte Owings**
- Identifying and assessing vernal pools to inform conservation planning and management in light of climate change **Desiree Robertson**
- Investigating land-use history impacts on oak-hickory forests in the Shawnee Hills of Southern Illinois **Charles Ruffner**
- Municipal mallards: Movement ecology and harvest of urban ducks **Bradly Wehus-Tow**



Connect and learn

Tuesday, Oct. 23

BLOOMINGTON, INDIANA

2018 NATURAL AREAS CONFERENCE

Tuesday, Oct. 23

Oral Sessions & Symposia

8:30 am – noon

Room	Dogwood Room	Maple Room	Oak Room	Persimmon Room	Walnut Room
Topic	Collaborative Approaches to Conservation	Endangered Species Conservation	SYMPOSIUM Urban Restoration Through Collaboration	SYMPOSIUM Using Digital Specimen Data in Conservation Research and Practice	SYMPOSIUM Natural Partners: Using the Humanities in Conservation Work
Moderator	John Bacone	Michael Homoya	Naureen Rana	Gil Nelson	Cliff Chapman
8:30 am	Leo Acosta: National Natural Landmark Designation: A valuable tool to advance conservation of natural heritage in Indiana	Michael Homoya: The historic occurrence and current status of canebrakes in the Lower Ohio River Valley of Indiana	Matt Freer: Addressing the challenge of managing natural areas in an urban context through institutional partnerships	Gil Nelson: Introduction: Digitization and the accumulation of digital specimen data for conservation	Leah Nahmias: Next Indiana campfires: Connecting nature and literature to spark conversations about Indiana's future
9:00 am	John Bacone: Fifty years of natural area protection in Indiana: The product of successful partnership collaboration	Sara Tangren: Clover Stem Borer causes decreased reproductive capacity in Sundial Lupine (<i>Lupinus perennis</i>)	Jason Steger: Balancing biodiversity and aesthetics in Chicago's natural areas	Dwayne Estes: Use Case 1: Journey to Grasslandia: Can biological specimen records, ecological data, landscape models, historical information, and art be used to build an interactive "time machine" that can be a new, innovative tool for conservation?	Patrick Solomon: Canebrake habitat in 19th century Arkansas
9:30 am	Derek Nimetz: Collaborative approach to sand savanna restoration and natural area management within Indiana Dunes State Park	Andrea Weissgerber: <i>Cypripedium candidum</i> in the southeast glacial plains of Wisconsin: Distribution, ecology, and threats	Naureen Rana: Using art and culture to engage people in the Burnham Wildlife Corridor	Alexis Mychajliw: Use Case 2: Fossil and historic collections reveal the ecological legacy of California's lost bears	Kevin McKelvey: Arts, creativity and placemaking in conservation
10:00 am	BREAK	BREAK	BREAK	BREAK	BREAK
Topic	Urban and Wildland Interface	Fire Ecology	SYMPOSIUM Urban Restoration Through Collaboration (Cont.)	SYMPOSIUM Using Digital Specimen Data in Conservation Research and Practice (Cont.)	SYMPOSIUM Natural Partners: Using the Humanities in Conservation Work (Cont.)
Moderator	Dennis Nyberg	Marc Milne	Naureen Rana	Gil Nelson	Cliff Chapman
10:30 am	Dennis Nyberg: Bush honeysuckle in an urban (Chicagoland) preserve, 3 kg per square meter	Matthew Albrecht: Fire seasonality influences the demographic performance of the endangered limestone glade endemic, <i>Astragalus bibullatus</i>	Lauren Umek: Connecting restoration ecology and historic landscape design in Jackson Park	Herrick Brown: Use Case 3: The use of herbarium specimens in distribution and dispersal modeling and conservation planning: The answer is blowing in the wind	Kristina Anderson: Communicating the land: Storytelling through science and art
11:00 am	Julia Rogers: The impact of forest management on edge effects in roadside forests	Marc Milne: The short-term effects of cutting and burning on spider abundance, diversity, and taxonomic composition in forests in NC	Forrest Cortes: Building investment in urban, natural areas and surrounding communities through activation	Molly Phillips: Discovering taxa, specimens, and distributions using digital data from the iDigBio portal	Holly Gastineau-Grimes/Mary Ellen Lennon: Wondrous World: Introducing nature-study and the history of female naturalists and conservationists to girls
11:30 am			Discussion	Discussion	Discussion
Noon	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH

16

Grasses Identification Workshop

2 – 3:30 pm Walnut Room

After a short introduction/review of the floral and vegetative characteristics, as well as associated terminology, of grasses, we will examine the characteristics of various groups/genera of grasses (and to some species), such as *Poa*, *Phalaris*, *Phragmites*, *Setaria*, and *Elymus*.

Instructor: Don Ruch. Pre-registration required.

Invasive Forest Insect Identification Workshop

4 – 5:30 pm Walnut Room

Learn about the biology of, and how to identify, invasive forest pests including emerald ash borer, Asian longhorned beetle, hemlock woolly adelgid, and spotted lanternfly.

Instructor: Elizabeth Barnes. Pre-registration required.

Conference Field Workshops

12:30 pm East Lounge

Your field workshop selection is indicated on a ticket in the sleeve of your name badge. If you have questions regarding your scheduled trip, visit the registration table.

Field workshops will depart from the Indiana Memorial Union circle drive. **Please arrive 20 minutes before your scheduled departure time to pick up your lunch in the East Lounge and assemble with your group outside the Biddle Lobby doors.** Bring appropriate outdoor gear, sunscreen, and your water bottle. Transportation will depart promptly at the scheduled departure time.

- **Indiana Karst Landforms and Their Communities: Sinkholes, Caves and Springs (noon – 5:30 pm)**
- **Exploring Unique Karst Features of the Lost River System on the Hoosier National Forest (12:15 – 5 pm)**
- **Scout Ridge Nature Preserve (12:15 – 5 pm)**
- **Collaborative Conservation in Practice: The Hills of Gold (12:30 – 5 pm)**
- **Long-term and Landscape-level Effects of Forest Management: The Hardwood Ecosystem Experiment (12:30 – 4:45 pm)**
- **Beanblossom Bottoms Boardwalk: Successes and Challenges of a Wetland Preserve and Public Access Site (12:45 – 4:45 pm)**
- **Working Woodlands for Birds, Bats and Resilience (12:45 – 4:45 pm)**

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The Hills of Gold at Glacier's End Nature Preserve, a state dedicated nature preserve that is owned and managed by the Central Indiana Land Trust. PHOTO BY DICK MILLER

Wednesday, Oct. 24

BLOOMINGTON, INDIANA

2018 NATURAL AREAS CONFERENCE

Wednesday, Oct. 24

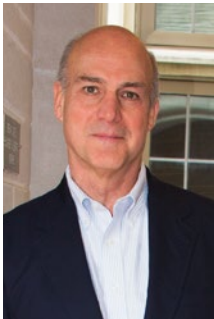
Natural Areas Association Awards Dinner 6 - 10 pm Alumni Hall

6 pm cocktails 7 pm dinner 7:15 pm program commences 10 pm evening concludes

Doors will open to the Indiana Memorial Union’s soaring Alumni Hall at 6 pm, when guests can enjoy drinks from the bar and connect with friends and colleagues. It’s a great opportunity to review the select items to be auctioned off later in the evening. All auction proceeds support the Natural Areas Association. Our featured speaker will be Arthur Pearson, author of *Force of Nature: George Fell, the Founder of the Natural Areas Movement*. NAA will recognize our student poster and presentation competition winners, and honor the distinguished recipients of the Carl N. Becker Stewardship Award and the George B. Fell Award. The evening will conclude with a longstanding conference tradition: the Prairie Fire Auction.

THE GEORGE B. FELL AWARD

The George B. Fell Award, the NAA’s highest award, recognizes exceptional achievements in the natural areas profession.



W. William Weeks holds the Scolnik Clinical Chair in Conservation Law at the Indiana University Maurer School of Law. He is also the director of the Bloomington-based Conservation Law Center, which provides legal counsel to conservation organizations, works to improve conservation law and policy, and offers law

students clinical experience in the practice of law and the profession’s public service tradition. Prior to this, Weeks practiced law in Indianapolis and Washington, D.C. He has also worked with The Nature Conservancy as state director, director of the Center for Compatible Economic Development, chief operating officer, and executive vice president. Weeks is the author of numerous publications relating to conservation of biodiversity and conservation easement law. In 2011 and 2012, he chaired the Indiana Sustainable Natural Resources Task Force. From 2015 to 2018 he was chair of an American Bar Association section task force that considered reforms to conservation easement law.

THE CARL N. BECKER STEWARDSHIP AWARD

The Carl N. Becker Stewardship Award recognizes individuals or groups for excellence and achievement in managing the natural resources of reserves, parks, wilderness, and other protected areas.



For 31 years, Joyce Bender managed the state nature preserve system for the Kentucky State Nature Preserves Commission. Bender began her career with the Ohio Division of Natural Areas and Preserves in 1980 and worked for The Nature Conservancy in Ohio and Minnesota prior to her arrival in Kentucky. During her time with

the commission, Bender began working on invasive species and was a founding member and officer of both the Kentucky and Southeast Exotic Pest Plant Councils. She also successfully obtained fire law exemptions for state employees conducting prescribed burns and was a founding member and vice president and president of the Kentucky Prescribed Fire Council. Bender was recognized for her work by the Kentucky Natural History Society, Kentucky TNC chapter and the National Board of Wild Ones. She received a Lifetime Achievement Award from the Kentucky Environmental Quality Commission. In retirement, Bender remains dedicated to protecting Kentucky’s natural areas and engaging the public in valuing natural places.

Wednesday, Oct. 24

BLOOMINGTON, INDIANA



Keys to Conservation Careers

8:30 am - 12:15 pm Indiana University School of Public Health — Room 125 1025 E. 7th St., Bloomington

This session is designed for students and young professionals interested in careers in conservation and natural areas management. The session includes a panel of presentations by representatives of different career areas, followed by time for discussion and questions. After a break, the session continues with workshops on using the USAJOBS system and how to take advantage of the U.S. Forest Service Pathways Program.

CAREER PANEL

8:30 am	Welcome and session introduction — Dr. Brian Forist, Indiana University
8:40 am	Federal representative — Michael Coleman, Park Ranger, U.S. Army Corps of Engineers at Monroe Lake (Ind.)
8:55 am	State representative — Dan Bortner, Director, Indiana State Parks
9:10 am	County representative — Sarah Wolf, Naturalist, Hendricks County (Ind.) Parks
9:25 am	City representative — Mallory Kirby, Naturalist, Holliday Park (Indianapolis Parks and Recreation)
9:40 am	Nonprofit representative — Adam Schmutte, Urban Naturalist Manager, Keep Indianapolis Beautiful, Inc.
9:55 am	Business representative — Evan Elsbury, Arborist/Manager, Franks Tree Care and Arborist Services (Columbus, Ind.)

10:10 am	Federal representative — Dr. William Carromero, National Botanist, USDA Forest Service
10:25 am	Academia representative — Dr. Gary Machlis, University Professor of Environmental Sustainability, Clemson University
10:40 am	Q&A session
11:20 am	10-minute break

CAREER WORKSHOPS

11:30 am	USAJOBS training
11:50 am	Pathways Programs
12:15 pm	Session ends

2018 NATURAL AREAS CONFERENCE

Thursday, Oct. 25

Oral Sessions & Symposia 8:30 am – 3 pm

Room	Dogwood Room	Maple Room	Oak Room	Persimmon Room	Walnut Room	Sassafras Room
Topic	Private Land Conservation	Restoration Ecology	Maximizing Data and Technology to Inform Natural Areas Management	SYMPOSIUM Improving Restoration Outcomes in the U.S.: Research Related to the Native Seed Strategy	SYMPOSIUM Karst Conservation and Management	SYMPOSIUM Indiana's Grassroots Efforts for a Statewide Partnership to Address Invasives
Moderator	Cliff Chapman	Rebecca Swab	Ronald Hellmich	Kayri Havens	Jerry Lewis	Dawn Slack
8:30 am	Cliff Chapman: Saving the best, to last: A new conservation plan for Central Indiana	Alexys Nolan: Hardwood tree seedling growth and survival under varying planting treatments on reclaimed mine land	Will Overbeck: Bridging the gap between technology and restoration using adaptive management in the fight against invasive <i>Phragmites</i>	Kayri Havens: Prairie restoration: How to make the best decisions about what seed provenances to collect and where to use them	Jerry Lewis : Karst landforms and their unique communities	Allison Shoaf: Brown County native woodlands project: The beginning of a movement
9:00 am	Kealie Vogel: Family forest landowner management in southern Illinois: A qualitative study of goals, trends, and opportunities	Rebecca Swab: Restoring mine land: Tradeoffs and benefits of prairies	Angela Sturdevant: Show me the money: Calculating long-term stewardship costs for successful conservation	Andrea Kramer: Assessing capacity of the U.S. native plant production industry to support the restoration of species diversity	Scott Johnson: Mammalian inhabitants of Indiana karst environments: Challenges and tactics for solutions	Katherine Green: The effects of teamwork in the Indiana Coastal Area
9:30 am			John Taylor: Evolution of a weed-mapping program	Jessamine Finch: Effects of seed source vary among species, early life stages, and field sites for two milkweeds (<i>Asclepias</i> sp.)	Rick Olson: Managing the world's longest cave	Cheryl Coon: SICIM history and future: Why the need for a CISMA in every county
10:00 am	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK
Topic	Pollinators in Natural Areas Management	Genetic Diversity & Biodiversity	Maximizing Data and Technology to Inform Natural Areas Management	SYMPOSIUM Improving Restoration Outcomes in the U.S.: Research Related to the Native Seed Strategy	SYMPOSIUM Karst Conservation and Management	SYMPOSIUM Indiana's Grassroots Efforts for a Statewide Partnership to Address Invasives
Moderator	Scott Black	Don Ruch	Ronald Hellmich	Kayri Havens	Jerry Lewis	Dawn Slack
10:30 am	Scott Black: An overview of the potential impacts of honey bees to native bees, plant communities, and ecosystems in wild landscapes	Leslie Bishop: Secondary old growth forests in Indiana: State forest legacy, opportunity and debatable future	Liz Christeleit: How open-source technology is maximizing data value and fostering collaboration for large land management organizations	Rebecca Barak: Drivers and constraints of seed mix design for prairie restoration	Wil Orndorff: Rare and endangered species in the Appalachian karst	Dawn Slack: Indiana's Invasive Initiative
11:00 am	Carianne Campbell: Creating restoration planting palettes to support pollinators in a changing climate	Marc Milne: Where the glaciers end: Newly discovered spiders highlight high diversity at a Central Indiana nature preserve	Marcia Moore: Indiana Plant Atlas: An online data and technology tool	Katie Kucera: Variation in seed germination requirements and response to gibberellic acid among populations of <i>Penstemon pachyphyllus</i> : Implications for the production of genetically diverse mixed-source seed lots	Mike Slay: Ozark perspectives on karst conservation	Ellen Jacquart: Grow Indiana natives: Another way to fight invasives
11:30 am	Anand Persad: Plant invertebrate relationships and seasonal dynamics of invertebrates in natural areas with emphasis on pollinators	Rae Schnapp: Taxonomic inventory of the back country area in Morgan-Monroe and Yellowwood State Forests	Kevin Rohling: A collaboration to address invasive plants using GIS and a phone application	Discussion	Discussion	Discussion
Noon	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
Topic	Collaborative Approaches to Conservation	Land Management in Light of Climate Change	Restoration Ecology	Invasive Plant Identification Workshop	Digital Herbarium Workshop	Working Landscapes Conservation
Moderator	Amy Silva	John Shuey	Jessica Ray	Instructors: Dawn Slack and Ellen Jacquart	Instructor: Paul Rothrock	Stephanie Frischie
1:30 pm	Nathan Gregory: Managing oak woodlands in Orange County, California: A model collaborative approach to conservation	Brian Forist: Climate change-related interpretation: Findings from a qualitative study in two national parks	Jacob Bannister: Do's and don'ts: Lessons learned in natural area restoration, installation, and maintenance	Pre-registration required. This workshop will focus on educating conservation partners including students, landowners, land managers, and educators, about invasive plants impacting the Midwest.	Pre-registration required. Learn how to use the Digital Herbarium (midwestherbaria.org) for accessing species information, area specific plant lists, field photos, plant ID tools, and much more.	Stephanie Frischie: Wilder working lands: Native seeds, oats, olives, bees, bugs, blossoms and bison
2:00 pm	Amy Silva/Betsy Yankowiak: Collaborative project to stop the spread of Asian Carp and other invasive species from a land trust's perspective	Cassandra Hauswald: Developing a conservation strategy for riverine fish habitat in oxbow lakes along the Wabash and White rivers in Indiana	David Kriska: Mentor Marsh: History, tragedy, recovery			Marion Holmes: Population and community dynamics of non-native species differ with agricultural land-use history
2:30 pm		John Shuey: Designing restorations to increase ecological resilience in oak barrens/sand prairie mosaics for a new climatic future	Jessica Ray: Restoring coastal habitats through compromise beach management in New Jersey			
3:00 pm	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK

NAA Annual Membership Meeting & Luncheon

Noon – 1:15 pm Georgian Room

All current NAA members are encouraged to attend. Meet new friends and reunite with old ones, all while hearing about what's new and in the works for the organization — and what we're doing for you, our members. Those who preregistered for the luncheon will have tickets in the sleeve of their name badge.



Roundtable Discussion

1:30 – 3 pm State Room East

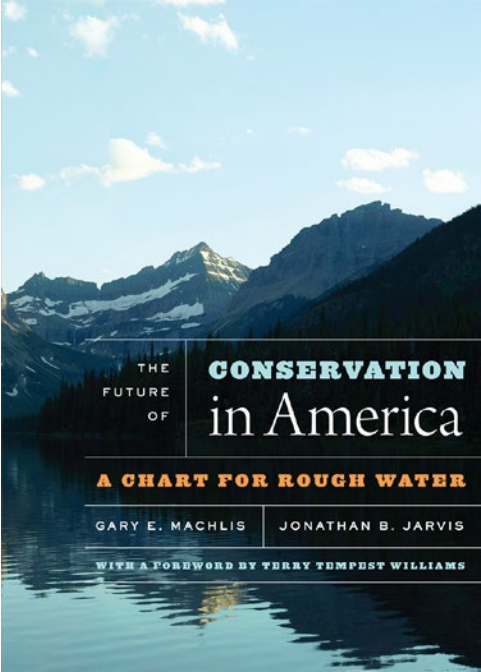
Honey Bees & Native Bees
Join a panel of experts to discuss the implications and challenges of permitting introduced managed pollinators on public lands and natural areas.

Moderator: Alix Cleveland

Our Closing Plenary session is devoted to two leaders in conservation whose recent book has offered an inspiring blueprint for moving conservation efforts forward in the face of huge challenges. We welcome Dr. Gary Machlis and former National Park Service chief Jonathan Jarvis as they talk about their “chart for rough water” and what it means for natural areas practitioners. A Q&A session will follow their presentation.

3:30 pm The Future of Conservation in America: A Chart for Rough Water by Gary E. Machlis and Jonathan Jarvis

As part of a national book tour, Gary Machlis and Jon Jarvis present their views on the current state of conservation in America and strategies for positive progress in the near and long-term future. Their lecture is based on their new book, *The Future of Conservation in America: A Chart for Rough Water* (University of Chicago Press, 2018). This candid and caring book about conservation has been described by Pulitzer Prize-winning scientist E.O. Wilson as “a call to action written with authority and passion” and by former President Jimmy Carter as “a course for a new generation of conservation action and leadership.” Terry Tempest Williams, who wrote the foreword for the book, calls it “a clarion call for citizen engagement ... a visionary pragmatism that is clear, concise, and prescriptive.” Machlis and Jarvis discuss their experiences in conservation politics and their new book.



Book Signing

Please join the authors following their presentation as they sign copies of their book, which will be available for purchase.

ABOUT THE SPEAKERS

Jonathan B. Jarvis

Jonathan B. Jarvis served for 40 years with the National Park Service (NPS) as ranger, biologist, and superintendent in national parks across the country. In 2009, he was nominated by President Obama and confirmed by the Senate as the 18th Director of the NPS, serving for the entire Obama administration. During his tenure, he led the agency through its Centennial, adding 22 new parks, achieving its largest budget in history, and raising over \$400 million in philanthropic support. Retired from the NPS in 2017, Jarvis is now the executive director of the Institute for Parks, People and Biodiversity at the University of California, Berkeley. Jarvis is the recipient of numerous awards and recognitions, including the National Recreation and Park Association's Legend Award, Sierra Club's Edgar Wayburn Award, International Union for the Conservation of Nature's Fred Packard Award, and the American Alpine Club's David R. Brower Conservation Award.



Dr. Gary E. Machlis

Dr. Gary E. Machlis is university professor of environmental sustainability at Clemson University, where he has been on faculty since 2013. He served as science advisor to the director, U.S. National Park Service (NPS) during both terms of the Obama administration. He was the first scientist appointed to this position within the NPS, and advised the director on a range of science policy issues and programs. Machlis also served as co-leader of the U.S. Department of the Interior's Strategic Sciences Group, which conducts scientific assessments during major environmental crises. He was on the faculty at the University of Idaho from 1979-2013. Machlis has written numerous books and scientific papers on issues of conservation, human ecology, and sustainability. He has been a leader in collaborative higher education, and serves as an advisor to the American Association for the Advancement of Science (AAAS) National Committee on Opportunities for Women and Minorities in Science. He was instrumental in the development of the Cooperative Ecosystem Studies Units (CESU) Network, which includes 13 U.S. federal agencies and over 200 universities, and served as its national coordinator from 1998 to 2006. For this work, Machlis was a recipient of the Department of the Interior's 2000 Conservation Service Award, one of the highest awards of the department granted to private citizens. Machlis is active in international conservation, and is a member of the IUCN's Commission on National Parks and Protected Areas. Most recently, he has helped advance environmental science and sustainability collaborations between the U.S. and Cuba. His current research activities include science for parks, applying human ecology to sustainability issues, the environmental impacts of warfare and its resulting humanitarian crises, and the conduct of science during major environmental crises. In 2010, Machlis was elected as a fellow of the AAAS.



Conference Planning Team

We want to thank everyone who had a hand in making this year’s conference a success. The Natural Areas Association believes that our community is better together, and there is no finer expression of that belief than the teamwork that goes into putting on a Natural Areas Conference.

For more than two years, a committed group of people has labored, often far behind the scenes, to make this event a reality. We name just some of them and their supportive institutions below.

Planning Committee

James Farmer, **Conference Chair**, Indiana University
Alice Heikens, **Program Chair**, Franklin College
Kate Angell, NAA
John Bacone, Indiana Department of Natural Resources
Cliff Chapman, Central Indiana Land Trust
Brian Forist, Indiana University
Spencer Goehl, Eco Logic
Terri Hogan, National Park Service
Melissa Page, Indiana University
Dawn Slack, The Nature Conservancy — Indiana Field Office
Lisa Smith, NAA
Amy Wills, NAA
Joanna Woodruff, Central Indiana Land Trust

Additional support from:

Renee Boronka, Cleveland Museum of Natural History
Ruark Cleary, Florida Fish and Wildlife Commission
Christopher Evans, University of Illinois
Fran Harty, The Nature Conservancy
Ryan Klopf, Virginia Department of Conservation and Recreation
Mike Leahy, Missouri Department of Conservation
Roger McCoy, Tennessee Department of Environment and Conservation
Sarah Mincey, Indiana University
Richard Myers, Virginia Department of Conservation and Recreation
Steve Olson, U.S. Forest Service
Miranda Redmond, Colorado State University
Jody Shimp, Illinois Department of Natural Resources (ret.)
John Taylor, Ball State University

Colophon

Editorial Services: Sarah K. Riehl Graphic Design: Juliano Boronka Icon: Mortar Board by Catia Marsh Mallow from the Noun Project

On the cover, top to bottom: Dunes State Park, Porter County; Prophetstown State Park, Tippecanoe County; Hovey Lake at Twin Swamps Nature Preserve, Posey County. Photos courtesy of Indiana DNR.

BLOOMINGTON, INDIANA

Emergency Preparedness: the Need for Seed



Native plant communities are key to ecosystem integrity and resilience. Human influences such as invasive species, altered wildfire regimes, and natural disasters are negatively affecting our ecosystems. Our ability to repair these damaged lands and stem the loss of cultural and economic benefits to society depends upon appropriate seed, research, decision tools, and public support for ecological restoration. Through collaboration and communication, we can more effectively manage public lands and protect our valuable natural resources.

- >10 million acres burned by wildfires in 2017
- Harvey, Irma, and Maria cost \$265 Billion in damages, the costliest year for U.S.
- ~80 million weed infested acres on Bureau of Land Management (BLM) lands
- BLM brought 200 species into commercial production
- BLM spends ~\$13 mil on seed from private sector seed producers supporting ~430 jobs



Visit [BLM.gov/SeedStrategy](https://www.blm.gov/SeedStrategy) for more information!

Join Us

The Natural Areas Association has been supporting the community of natural areas practitioners for more than 40 years.

Stand with your community

Become a member of NAA today and get access to the quarterly *Natural Areas Journal*, discounted registration for NAA regional workshops and conferences, and more - plus the satisfaction of standing with your community. New members who join before Dec. 31 will receive 30% off - use the code NACNEW online. *We're better together.*



Go to naturalareas.org and click **Join** or visit the NAA table during the conference. We'll see you there!

2019 Natural Areas Conference

October 8-10, 2019
Sheraton Station Square
Pittsburgh, PA

**At the Water's Edge:
Managing Our Land and Water in a Changing Landscape**

Greg Funka. Photo courtesy of the Western Pennsylvania Conservancy.

natural
areas
association

Mark your calendar and plan to join us for the Natural Areas Conference in **Pittsburgh, Pennsylvania**, October 8-10, 2019.

The theme for 2019 focuses on a crucial locus for the work of natural areas professionals — the interaction between land and water in a time of accelerating change.

**The Call for Proposals will
open November 2018.**

Some of the topics featured include:

- Mitigating the Impact of Energy Development
- Best Management Practices for Freshwater Ecosystem Integrity
- Advances in State Forest Management
- Management of Wildlife Habitat
- Urban Natural Areas & Green Infrastructure

We're excited to be partnering with the **Western Pennsylvania Conservancy**, **Pennsylvania Natural Heritage Program** and the **Pennsylvania Department of Conservation and Natural Resources** for this event.

Sponsorship and exhibitor opportunities are available.



Save the Date
2020 Natural Areas Conference
Oct. 13-15 - Duluth, Minnesota

Information at naturalareas.org