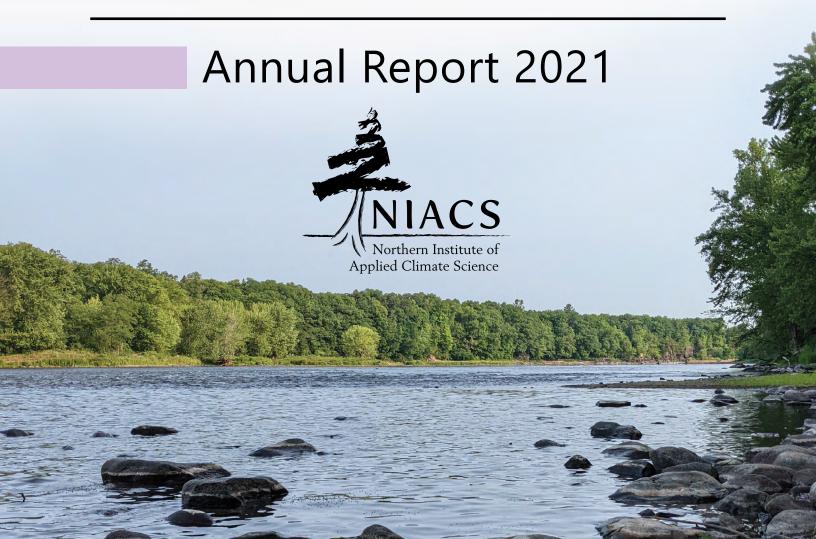
NORTHERN INSTITUTE

OF

APPLIED CLIMATE SCIENCE















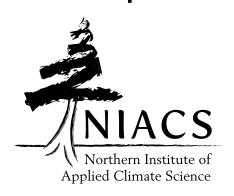


NORTHERN INSTITUTE

OF

APPLIED CLIMATE SCIENCE

Annual Report 2021



The Northern Institute of Applied Climate Science (NIACS) develops synthesis products, fosters communication, pursues science, and provides technical assistance in climate change adaptation and carbon management.

niacs.org

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WELCOME

Fast Facts 2021

20 TEAM MEMBERS

256 outreach items and publications

1500+
PARTICIPANTS

(approx.) at NIACS hosted or co-hosted workshops this FY

95,000+

USERS

on the USDA Climate
Hubs national website

> 25

Department of Navy

Environmental Compliance
Courses Supported

by the Climate Change Resource Center and
Northern Forests Climate Hub since 2015

projects supported by the Radiocarbon Collaborative

275,000+ ATLAS WEB PAGE VIEWERS 325,000 +
SEEDLINGS
PLANTED
across Adaptive
Silviculture for Climate

Change sites

13
CONSULTATIONS
on adaptation planning with management teams

500+
demonstration
projects

12 INTERACTIVE
ONLINE MODULES
developed with Michigan
State University's Forest
Carbon and Climate Program

Adaptation Strategies and Approaches menus published

WELCOME

Letter from the Director

Greetings,

NIACS is innovative by nature, which means that every year is different as the organization grows and matures. But this year has brought unexpected and exciting changes to our team, and NIACS staffing has been more dynamic than ever before. Chris Swanston is working in a well-deserved role leading the USDA Forest Service's national response to climate change, and I have taken on the leadership of the Institute. Two talented adaptation specialists joined NIACS this year, and students from Michigan Tech brought additional capacity to the team. Some of our Forest Service staff took temporary assignments to share and learn skills in other units, creating opportunities for us to invite others to temporarily join our team while filling in behind them. Our programs also continue to develop, and this year the Radiocarbon Collaborative reached a level of stability and impact that is enabling it to move out of NIACS and into its own program.

Where do we go from here? There's a line from the movie *Escanaba in Da Moonlight* (which may not be known widely outside of Michigan's U.P.!) that comes to mind:

If ya don't know where to start, go back to da beginning.

For NIACS, that means that we will emphasize what we do best: working with people to support their efforts to adapt to and mitigate climate change, and creating spaces for professionals to discuss and explore complex challenges for sustaining ecosystems in a changing world. Importantly, this focus on fundamentals is not a step backwards. Rather, it is a restatement of our organizational values and the value that we bring to climate response. As the USDA and the Forest Service—and the entire natural resources community—increase their efforts in this arena, we at NIACS are ensuring that we will meet sharply increased demand and continue providing leadership.

With kind regards,

Maria Janowiak NIACS Program Director

WHAT'S NEW?



AWARDS

CLIMATE ADAPTATION LEADERSHIP AWARD

The NIACS staff teamed up with our partners at the Wildlife Conservation Society to nominate Chris Swanston for the Climate Adaptation Leadership Award from the National Association of Fish and Wildlife Agencies. He received the 2021 Individual Award in recognition of his efforts to develop a wide array of adaptation-focused programs and resources, as well as his leadership in growing NIACS and a new professional specialization.

ECOLOGICAL SOCIETY OF AMERICA FELLOW | IUFRO AWARD OF APPRECIATION

Louis Iverson was elected as an Ecological Society of America Fellow in recognition of his career-long accomplishments, and he received an Award of Appreciation from the International Union of Forest Research Organizations (IUFRO) for his longstanding commitment, leadership, and excellent services in landscape ecology. Louis was also highlighted in the Reuters Hot List of 1,000 Climate Scientists.

SOCIETY OF AMERICAN FORESTERS BARRINGTON MOORE MEMORIAL AWARD

Longtime NIACS collaborator Linda Nagel was awarded the 2021 SAF Barrington Moore Memorial Award in Biological Science from the Society of American Foresters. NIACS staff nominated Linda because of her role in helping NIACS develop and deliver climate change-related training to land managers.

DETAILS

NIACS staff supported other Forest Service units in FY21. Since May, Chris Swanston has been serving as the Forest Service's Climate Advisor and as Acting Director of the Office of Sustainability and Climate within the agency's national headquarters. Leslie Brandt has been serving as a Network Specialist in the Office of Sustainability and Climate since June, while Stephen Handler is acting as Eastern Region Tribal Liaison this summer and fall. All have been using their details to help connect NIACS to new ideas and partners.



Toasting Chris Swanston (with mugs!) as part of his Climate Adaptation Leadership Award recipient video.

WELCOME

FY21 Highlight

ADAPTATION STRATEGIES AND APPROACHES



Adaptation Strategies and Approaches menus help natural resources managers and landowners link specific on-the-ground actions to their broader adaptation intent.

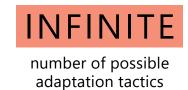
RELATED NIACS PROJECTS:

Climate Change Response Framework USDA Northern Forests Climate Hub Carbon Trends and Management Climate Change Resource Center

forestadaptation.org/strategies



menus published





NIACS first published the compilation of <u>Adaptation Strategies and Approaches</u> for forest ecosystems in 2012 as a way of providing an organized "menu" of adaptation options to support the <u>Adaptation Workbook</u>. The original menu and subsequent menus developed for urban forests and agriculture were published in 2016 and have proven to be an extremely effective way for managers to express on-the-ground intentions—so effective that our partners have requested we create new menus covering many resource areas. This has led to a proliferation of adaptation menus spanning a growing list of diverse topics. This year we published an updated urban forestry menu that integrates climate, carbon, and human health considerations and a wildlife management menu.

Finalized menus are also uploaded to the national <u>Compendium of Adaptation Approaches</u> hosted on the <u>Climate Change Resource Center</u>. Additionally, partners from outside our region have expressed interest in working with NIACS to create menus for their geographies and topics.

PUBLISHED MENUS OF ADAPTATION STRATEGIES AND APPROACHES

Forest Management
Urban Forests and Human Health
Agriculture
Forested Wetlands
Tribal Perspectives
Forest Carbon Management
Outdoor Recreation
Non-Forested Wetlands
Inland Glacial Lake Fisheries
California Forests
Wildlife Management

MENUS CURRENTLY IN DEVELOPMENT

Fire-Adapted Ecosystems
Great Lakes Coastal Ecosystems
Grassland Ecosystems
Arid Grassland Ecosystems



PROJECTS

Adaptation Services

Adaptive Silviculture for Climate Change

Carbon Trends and Management

Climate Change Resource Center

Digital Science Communication

Landscape Change Research Group

Radiocarbon Collaborative

ADAPTATION SERVICES



Adaptation services encompasses our work to enable land managers, communities, and woodland owners to incorporate climate change considerations into natural resources management.

NIACS TEAM:

Madeline Baroli Leslie Brandt Stephen Handler Maria Janowiak Patricia Leopold Todd Ontl

Courtney Peterson Annamarie Rutledge Kristen Schmitt Danielle Shannon Chris Swanston

RELATED NIACS PROJECTS:

Climate Change Response Framework USDA Northern Forests Climate Hub

adaptationworkbook.org forestadaptation.org climatehubs.usda.gov/hubs/northern-forests

2021 FACTS

> 30 Educational Trainings and Workshops

1000 + professional participants

HUNDREDS of partners

500+

Organizations Represented

demonstration

Tribal Private Local Military State Agencies Federal Non-profit Academic projects

10 interpretive signs

13 CONSULTATIONS
on adaptation planning with management teams

TRIBAL ENGAGEMENTS

SCIENCE APPLICATIONS

Our new Adaptation Services theme recognizes the growth and demand for our work in helping to address climate impacts in natural resources management. We launched the <u>Climate Change Response Framework</u> (CCRF) in 2009 as a collaborative, cross-boundary approach among scientists, managers, and landowners to incorporate climate change considerations into natural resources management. The <u>USDA Climate Hubs</u> were initiated in 2014, and NIACS was asked to lead the <u>USDA Northern Forests Climate Hub</u> in recognition of the work that was already well underway through the CCRF. Over the years, we've expanded and deepened the work we do to support climate adaptation with our partners at USDA and the Forest Service, and across all lands. We continue to provide direct support across the Midwest and Northeast US, while also providing assistance to other USDA Climate Hubs and Forest Service Regions across the country.

ACCOMPLISHMENTS

ADAPTATION RESOURCES

NIACS produced new materials to help land managers use climate change information, including:

- Continued to develop new menus of adaptation strategies and approaches, and tested new menus with management groups.
- Published a <u>vulnerability assessment</u> for Metro Detroit and created <u>urban forest webpages</u> for eastern U.S. cities.
- Expanded our series of climate change field guides, publishing a guide for <u>southern Wisconsin forests</u> and beginning a guide for northern Michigan forests.

SUPPORT TO USDA REGIONAL CLIMATE HUBS

NIACS worked with the national network of USDA Hubs to advance climate adaptation training. In FY22, we:

- Partnered with the USDA Southwest Climate Hub and the Pacific Islands Climate Adaptation Science Center to host a workshop for tropical ecosystems in Hawai'i.
- Worked with American Forests and the USDA California Climate Hub to support two climate-informed planning efforts in California. This included one effort on the Sierra National Forest and a multi-agency effort in the San Bernardino Mountains, both of which used the newly-published adaptation menu for California forested ecosystems.
- Partnered with USDA Midwest Climate Hub to develop state-level reports on climate change for agricultural producers across eight states in the Midwest.





TRAINING AND TECHNICAL ASSISTANCE

NIACS led or co-led more than 30 adaptation workshops, trained around 1,000 professionals, and continued providing climate-related technical assistance to a variety of partners.

Eastern Region National Forests:

- Assisted 8 interdisciplinary teams across multiple forests (Chequamegon-Nicolet, Green Mountain, Monongahela, Ottawa, and Wayne) in using the Adaptation Workbook to incorporate climate change considerations into vegetation management projects.
- Discussed the carbon implications of management projects with several NFs.
- Supported the Superior NF in developing a formal Assisted Migration Plan.
- Worked with the Mark Twain NF on a recreation and infrastructure vulnerability assessment.
- Integrated climate change and adaptation considerations into the Eleven Point Wild and Scenic River Comprehensive River Management Plan.
- Tested a new grassland-focused adaptation menu with the Midewin National Tallgrass Prairie.

States:

- Worked with New York Office of Climate Change to integrate input from 3 agencies into vulnerability assessments.
- Supported the Ohio DNR in developing 10 climate-informed interpretive trail signs that reference the Climate Change Atlas as part of the Honor Camp Trail adaptation demonstration.
- Worked with Massachusetts DCR and partners to develop a <u>climate-focused template</u> for Forest Stewardship Plans and create adaptation practices for landowner incentive programs.
- Partnered with the Iowa Society of American Foresters and Iowa State University to host a 2-day adaptation workshop for managers, with help from the USDA Midwest Climate Hub.

Regional and National:

- Co-hosted a special <u>Adaptation Planning and Practices</u> (APP) training with the Western Wildland Environmental Threat Assessment Center and the Society for Outdoor Recreation Professionals for recreation professionals from across the country.
- Hosted two short courses on adaptation planning with the Land Trust Alliance.
- Supported Department of Defense climate change education using CCRC educational resources.
- Described the in-person and virtual Adaptation Planning and Practices training curriculum and our lessons learned in an article titled "Beyond Planning Tools: Experiential Learning in Climate Adaptation Planning and Practices" in the journal Climate.

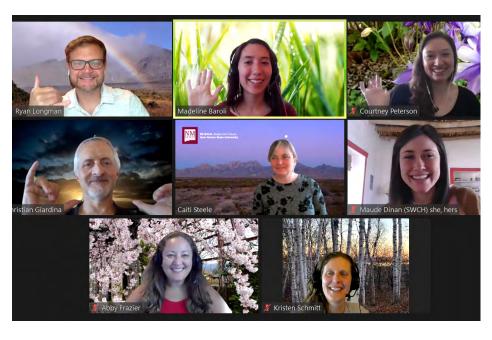
SUPPORTING TRIBES THROUGHOUT THE EASTERN US

We have increased our support of Tribes following our contribution to <u>Dibaginjigaadeg Anishinaabe Ezhitwaad - A Tribal Climate Adaptation Menu</u> by hosting or facilitating the following events in FY21:

- A session on indigenous use of fire and climate change at the 3rd Shifting Seasons Summit
- A national training on the Tribal Forest Protection Act and the Forest Service's new 638 authority
- A staff training on the Tribal Adaptation Menu for the Chippewa NF and Leech Lake Band of Ojibwe
- Discussion sessions at the United Southern and Eastern Tribes Tribal Climate Resilience Camp
- A series of roundtable discussions with Minnesota tribes and tribal organizations to inform the Superior NF's Assisted Migration Plan



PILOTING AN ONLINE ADAPTATION PLANNING & PRACTICES WORKSHOP IN TROPICAL ISLAND ECOSYSTEMS OF HAWAI'I



We partnered with the USDA Southwest Climate Hub, the East-West Center, University of Hawai'i at Manoa, Institute of Pacific Islands Forestry, and the Pacific Islands Climate Adaptation Science Center to host a workshop for tropical island ecosystems in Hawai'i. This was a chance to tailor the Adaptation Workbook process to a new ecosystem, and engage partners around cultural stewardship values. We had over 40 participants, representing Federal and State government agencies, nongovernmental organizations, academia, and private landholders.



The field guides developed by NIACS are such a great resource! They allow a great introduction to the resources in a way that is accessible to the non-expert. And then you have the longer assessment to back it up and dig deeper.



- Sharon Stephens, State Adaptation Coordinator, Minnesota Pollution Control Agency

It's amazing how nice it is to be in the smaller Zoom groups with fellow land trusters from elsewhere in the country. The sense of having colleagues thinking about these issues everywhere and seeing the commonalities is very positive. Not that we have the answers, but that we're all trying.

- Land Trust Alliance course participant

I'm over the top ecstatic about this! The pace really set a nice foundation for the coming sessions. There's definitely a lot of enthusiasm, so this is great.

- Christian Giardina, Research Ecologist, USDA Forest Service, Steering Committee Co-Lead of the Southwest Climate Hub I'm working with the National Park Service on adaptation planning for traditional use areas/archaeological sites at National Parks. We use the Tribal Adaptation Menu (TAM) all the time, it has been a wonderful resource and guide for our team.

- Courtney Hotchkiss, North Carolina State University





PARTNERSHIPS

Climate change is a cross-boundary issue that affects all lands. We foster diverse partnerships as a way to expand the capacity of individual organizations to cope with climate change complexities. The USDA Northern Forests Climate Hub collaborates across the country with other regional Hubs and national partners, and also integrates activities with the Climate Change Response Framework (CCRF) and its many partners. The Hub partnerships often work at larger scales across the region, while the integration with CCRF leverages more long-standing partnerships engaged in on-the-ground management activities.

LOOKING FORWARD

We will continue developing tools, providing training, and offering technical assistance for diverse groups of natural resources managers, and look for new opportunities to support the USDA Climate Hubs, Forest Service, and other partners in expanding their work in this arena. Numerous virtual outreach and training events are planned for FY22, including an adaptation short course designed for international participants that we are hosting in collaboration with Forest Service International Programs. We anticipate developing significant new partnerships as we promote the Climate & Health and Wildlife adaptation menus, including with the Association of Fish and Wildlife Agencies. NIACS will have new opportunities to work more closely with certified forests, as both the FSC and SFI forest certification standards are adopting new expectations for climate change adaptation and mitigation in 2022. NIACS contributed to these standards and is well-positioned to be a central resource to land managers seeking to fulfill these new expectations.

ADAPTIVE SILVICULTURE FOR CLIMATE CHANGE

The Adaptive Silviculture for Climate Change (ASCC) Network is a replicated, operational-scale experiment testing the effectiveness of climate adaptation strategies in a diversity of forest ecosystem types across North America.

NIACS TEAM:

Leslie Brandt
Maria Janowiak
Linda Nagel
Courtney Peterson
Chris Swanston

adaptivesilviculture.org

2021 FACTS

ASCC has grown over a decade

2011: **0** sites

2021: **11 sites**

325,000+ SEEDLINGS PLANTED 7
IN-PERSON
WORKSHOPS

VIRTUAL WORKSHOPS

3,850+

acres currently being harvested

(or designated no action) and measured



SCIENCE APPLICATIONS

The <u>Adaptive Silviculture for Climate Change (ASCC) Network</u> is a collaborative effort led by Linda Nagel at Colorado State University (but NIACS claims her, too!) to establish a series of experimental silvicultural trials in various forest ecosystem types across the United States and Canada. Scientists, land managers, and key partners have co-developed a network of fully-replicated, operational sites and new affiliate sites to study long-term ecosystem responses to a range of climate change adaptation actions. Silvicultural treatments at each study site were developed using NIACS' adaptation resources and encompass treatments for three broad climate adaptation options: resistance, resilience, and transition.

ACCOMPLISHMENTS

The ASCC Network continues to grow, adding four new sites over the last year. Despite the challenges of the past years, the ASCC Network has continued to find ways to do research and work on-the-ground, collect data, and "adapt" to changing and new conditions.



JOHN PRINCE RESEARCH FOREST (BC, CANADA)

Sub-boreal spruce forest type. Virtual Workshop: June 2021

CUTFOOT EXPERIMENTAL FOREST/ CHIPPEWA NATIONAL FOREST (MN)

Red-pine dominated, mixed species forest type. Workshop: July 2013

SECOND COLLEGE GRANT (NH) Northern hardwoods

Northern hardwoods forest type. Workshop: August 2016

FLATHEAD NATIONAL FOREST/ CORAM EXPERIMENTAL FOREST (MT)

Western larch, mixed conifer forest type. Workshop: June 2016

COLORADO STATE FOREST (CO)

High-elevation, spruce-fir forest type. Virtual Workshop: December 2020

SAN JUAN NATIONAL FOREST (CO)

Warm dry-mixed conifer forest type. Workshop: March 2014

CROSBY FARMS (MN)

Urban floodplain forest in Saint Paul, MN. Workshop: March 2019

PETAWAWA RESEARCH FOREST (ON, CANADA)

White pine forest type. Workshop: July 2019

DRIFTLESS AREA (IA, MN, WI)

Dry-mesic hardwood forest type. Virtual Workshop: Fall 2021

SOUTHERN NEW ENGLAND (CT, RI)

Exurban oak-hickory forest type. Virtual Workshop: October 2020



Core Site

Affiliate Site

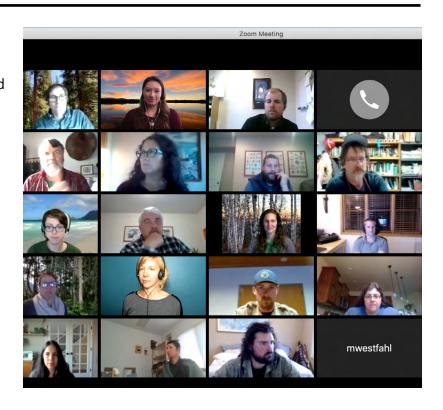
JOSEPH W. JONES ECOLOGICAL RESEARCH CENTER (GA)

Mixed pine hardwood forest type. Workshop: January 2016

HIGHLIGHT

TRANSITIONING TO VIRTUAL WORKSHOPS

Four new ASCC site workshops were hosted this past year, each of them requiring their own unique workshop structure and style to facilitate collaborative site development in a virtual setting. The typical three-day collaborative ASCC workshop approach was redesigned, finding ways to "see" site conditions normally explored during inperson visits to field sites. Online tools replaced flip charts and worksheets, and became an essential component of virtual participant engagement and ensuring all voices were heard. Virtual workshops can't replace in-person connections, but they still provide opportunities for co-creation, honesty, and feedback as we grapple with the challenges of adapting our forest ecosystems to a changing climate.





PARTNERSHIPS

ASCC is a highly collaborative network whose partners have been integral to its advancement since 2009, committing their expertise and experience in planning and execution of each study site. Manager-scientist partnerships are helping to inform research and advance communication of climate change adaptation.

My cheeks hurt from grinning so hard, I just LOVE what you all do, and I'm so excited this group of forest managers know about it now and can get engaged in your processes as able.

- Emily Jack-Scott, Program Director, Aspen Global Change Institute

Thank you for all of your work on bringing this workshop to us, especially in the virtual format. It was such an informative experience working with so many different backgrounds and areas of expertise and is something that I think we need to do more of in the future... I received some feedback from my staff who were involved in the workshop...they actually had "fun"...yes they used that word...and learned a lot.

- Kristin Garrison, Colorado State Forest Service

LOOKING FORWARD

Interest in ASCC continues to grow. We are working with new collaborators on potential ASCC core and affiliate sites at the following locations:

- An oak ecosystem-focused site in Ohio
- A lodgepole pine forest located in Taylor Park in the Grand Mesa, Uncompangre, and Gunnison National Forests (GMUG) in Colorado

We hosted an ASCC Network-wide virtual meeting in March 2021 where we reaffirmed that ASCC partners view pursuing cross-site research projects as a top priority to foster collaboration across the Network. Following up on this, we plan to convene a virtual ASCC Network "Conference" for ASCC partners to engage and collaborate with each other in 2022. The goals of a future ASCC-centered conference will be to facilitate cross-pollination of research ideas and cross-site questions, explore conceptual paper ideas, and identify future network initiatives.

CARBON TRENDS AND MANAGEMENT

Carbon Trends and Management assesses the stocks, sequestration, management, and vulnerability of carbon at ecosystem to global scales, shares this knowledge through outreach, and supports carbonand climate-informed forest management.

NIACS TEAM:

Kate Heckman Maria Janowiak Luke Nave Todd Ontl Chris Swanston

2021 FACTS

576 soil samples

shared to support carbon cycle research this FY



developed with Michigan State University's Forest Carbon and Climate Program

3 NEW

project datasets containing census and carbon inventory information for

46,659 tree measurements shared via the Environmental Data Initiative

6 peer-reviewed journal articles



SCIENCE APPLICATIONS

The Carbon Trends and Management theme includes projects that produce and share information about land use, management, and climate change impacts on the carbon cycle. Our work creates resources that help managers consider climate change risks and take actions that maintain or enhance carbon benefits, primarily on forest lands. Focal areas include: assessing land use change and forest management effects on soil carbon, quantifying forest carbon dynamics and their drivers, and identifying linkages between carbon management decisions and related ecosystem services. Outreach efforts translate this science into resources and training opportunities, involving managers and partner organizations in the codevelopment of carbon management tools.

ACCOMPLISHMENTS

LAKE STATES SOIL CARBON ASSESSMENT

A new <u>peer-reviewed assessment</u> describes how and where forestry, fires, and reforestation influence soil organic carbon in the Great Lakes region. It includes evidence-based tactics that can be used to mitigate losses or capitalize on probable gains in soil organic carbon, and a high-resolution GIS tool for anticipating forest harvest impacts on soil carbon.

SOIL ORGANIC MATTER - MECHANISMS OF STABILIZATION (SOM-MOS)

Along with our partners, we recently completed an NSF-supported project on soil organic matter, which leveraged the Radiocarbon Collaborative to produce the largest, most diverse soil radiocarbon dataset ever generated. It also yielded 9 peer-reviewed papers, 1 Ph.D dissertation, 2 M.S. student theses, 19 conference presentations, and provided education and training for laboratory scientists, undergraduate and graduate students, and postdoctoral scientists during its 7-year run.

FAMILY FOREST CARBON PROGRAM (FFCP)

We contributed to the development, description, and evaluation of a set of <u>climate-informed carbon</u> <u>practices</u> for family forest owners. Landowners who enroll in the FCCP select one or more of the carbon practices to implement and then receive payments over the course of 20 years. The New England FFCP pilot implementation features forest management practices intended to increase carbon within 20 years; five landowners with nearly 2,000 acres have enrolled so far. We are also assisting The Nature Conservancy and American Forest Foundation in a pilot FFCP in the Northwoods region.

HIGHLIGHT

FOREST CARBON EDUCATION

We are working with Michigan State University's Forest Carbon and Climate Program to develop a regionally-focused online short course on forest carbon management for professionals as a complement to the Understanding Forest Carbon Management course launched in 2019. We are developing educational content on forests, climate vulnerability, and carbon management practices for three U.S. regions that include field-based videos describing real-world carbon management projects and experiments. Our efforts include:

- 3 regionally-focused listening sessions engaging 26 forestry experts
- 5 field-based climate-informed carbon management videos
- 12 interactive online modules





PARTNERSHIPS

Partnerships are an important way that we ensure our science is responsive to the goals and needs of our stakeholders. Partnerships also allow us to deliver products and expertise to practitioners through effective formats, outlets, and venues. Along with our partners, we strive to engage with practitioners, stakeholders, and other end-users early and often in project development to ensure that our work is well-rooted in the applied realm.

WOW! Thanks so much for the prompt response. This is exactly why I reach out to someone more knowledgeable than I regarding carbon.

- Amanda Fordham, Manager of Science Information, Colorado State Forest Service

This team is very fortunate to have Luke Nave on it; he is guiding us on the research to support management.

- Stephanie Connolly, Program Specialist-Field Liaison, Office of Sustainability and Climate, USDA Forest Service

LOOKING FORWARD

Additional regional soil carbon assessments are underway for the Pacific Northwest and the Southern Appalachians/Coastal Plain. In FY22 we hope to begin work on new regions, where we will move beyond a forest-focus to assess soil carbon options across the entire land sector. We will also continue to accelerate work with state-level partners to identify management scenarios that promote forest carbon sequestration in soil and non-soil pools, through our forest carbon management modeling project.

CLIMATE CHANGE RESOURCE CENTER

The Climate Change Resource Center (CCRC) is a web-based, national resource that connects land managers and decision-makers with usable science to address climate change in planning and application.

NIACS TEAM:

Hannah Abbotts Shawn Klomparens Kailey Marcinkowski Chris Swanston

fs.usda.gov/ccrc

2021 FACTS

> 25 Department of Navy
Environmental Compliance courses

supported with CCRC education modules since 2015

500 + adaptation

approaches in the Compendium of Adaptation Approaches

Most Visited **Topic Pages**

Wildlife **Bark Beetles** Grasslands **Birds Global Carbon**



SCIENCE APPLICATIONS

The <u>Climate Change Resource Center</u> (CCRC) delivers science-based, relevant, and credible information on climate change to land managers through its online platform. It is the Forest Service's largest and most comprehensive forest adaptation website designed specifically for natural resources professionals. Resources from the CCRC are also adapted for the USDA Climate Hubs and Department of the Navy, and shared through outreach, training, and educational activities.

ACCOMPLISHMENTS

The CCRC continued to expand content offerings on ecosystem-related topics, tools, and adaptation examples and resources. The <u>Compendium of Adaptation Approaches</u> grew to include more resource areas and geographies. Educational resource offerings focused on the expansion of educational videos and supporting materials. Site improvements this year include an upgrade of the content management system, the development of educational Learning Collections, and increased accessibility for translated content.

EDUCATION

New, curated Learning Collections have been developed for the site. These collections consist of relevant topic pages, videos, tools, adaptation examples, factsheets, resource links, and other multimedia gathered from within the CCRC, all on a specific topic. Collections allow for a quick educational dip into the different formats of information the CCRC has to offer on certain topics of interest.

CONTENT ADDITIONS

- 66 new approaches added to the Compendium of Adaptation Approaches
- 3 new and updated adaptation planning pages
- 6 new and updated tools
- 8 new videos

SITE INFRASTRUCTURE

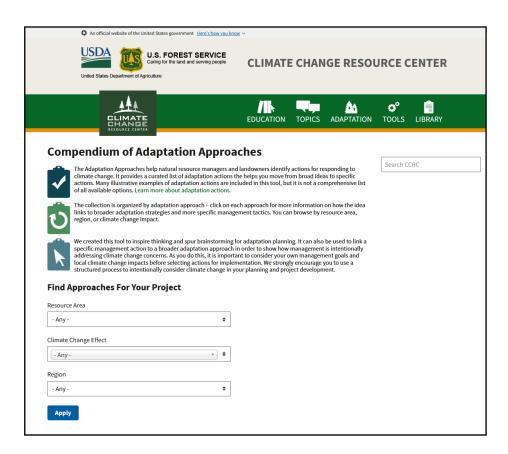
- Completed styling and layout upgrades to Drupal 9 migration, launched in August 2021
- Upgrades to tag and display related content in the right hand side bar of Topic Pages
- Major security updates

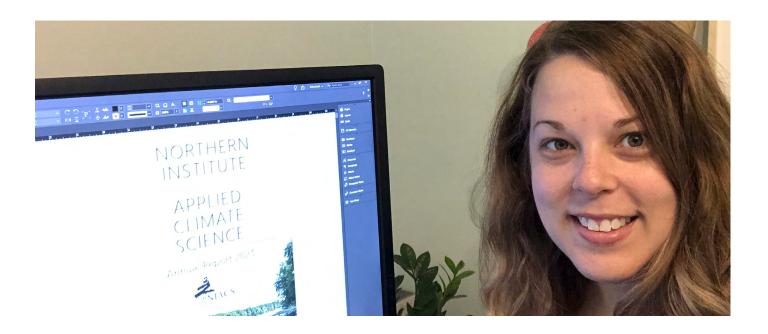
HIGHLIGHT

COMPENDIUM OF ADAPTATION APPROACHES

The Compendium of Adaptation Approaches

provides a curated collection of adaptation actions that can be used as a tool to support adaptation planning. It allows users to search for adaptation actions by resource area, climate change effect, and more. With new additions this year, the Compendium now offers over 500 adaptation approaches and a growing collection of related adaptation examples, and will continue to expand to include more resource areas and realworld examples.





PARTNERSHIPS

The CCRC is housed by the Office of Knowledge Management and Communications within Forest Service Research and Development, and is guided by a steering group with representation from across the Forest Service. Contributors to the CCRC come from all Forest Service Research Stations, numerous universities, and other federal agencies.

With reliable, well-organized content written and reviewed by scientists and professional science writers on a wide range of topics from carbon to reptiles, [CCRC] is a great resource for land managers, policy makers, communicators, and even researchers.



- Lara Murray, Science Communication Specialist, Knowledge Management and Communications, USDA Forest Service Research & Development

Thanks to everyone who participated in this effort! It was fast and you were all super accommodating with time, energy, and creative ideas. I'm glad it all came together, and I look forward to working with you on the CCRC.

- Jennifer Balachowski, Technology Transfer Specialist, Office of Sustainability and Climate, USDA Forest Service

LOOKING FORWARD

The CCRC will continue to add new content, with a focus on creating Learning Collections around popular categories that have multiple topic pages, media resources, tools, and adaptation examples. We will deepen our collaborative work with the Forest Service Research & Development Knowledge Management and Communications group and the Office of Sustainability and Climate to create stronger integrations of Forest Service resources and increase CCRC offerings.

DIGITAL SCIENCE COMMUNICATION

Digital Science Communication efforts support online science delivery through website creation, informative content, graphic design, and educational multimedia.

NIACS TEAM:

Hannah Abbotts Shawn Klomparens Kailey Marcinkowski

adaptivesilviculture.org climatehubs.usda.gov fs.usda.gov/ccrc fs.usda.gov/research radiocarbon.forest.mtu.edu

2021 FACTS

5 websites maintained

WEBSITE ICONS
in support of the 2020 Resources
Planning Act (RPA) web presence

95,000 + users

on the USDA Climate Hubs national website

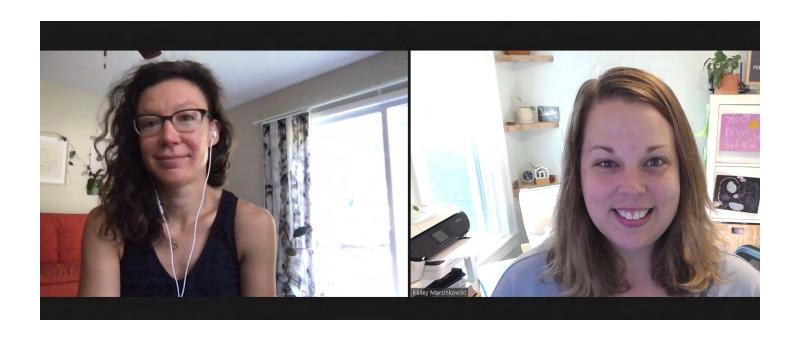
an increase of

38%

over FY20

FY22 Live Launch

for the USFS R&D modernized website



SCIENCE APPLICATIONS

The Digital Science Communication team works on a growing portfolio of web-based activities that help to convey information, tools, and other resources regarding climate change and other land management challenges. We organize, create, manage, and maintain numerous websites as a means to provide user-friendly online platforms for delivering climate change science information. These efforts also use graphic design as a communication tool to visually represent and clarify scientific information and ideas.

ACCOMPLISHMENTS

The Digital Science Communication team continues to provide assistance, web development expertise, and design services for several major web-based platforms and communication outlets, including the <u>USDA</u> <u>Climate Hubs</u> and <u>Forest Service Research and Development</u> (FS R&D) at a national level.

DIGITAL SCIENCE COMMUNICATIONS HIGHLIGHTS FOR FY21 INCLUDE:

- Worked with FS R&D to modernize its national web presence at fs.usda.gov/research
- Overhauled and expanded the content of the <u>niacs.org</u> website, which was designed to convey the breadth of NIACS activities and partners.
- Provided ongoing technical assistance to USDA Climate Hubs regional web content managers, including individual consultation and coaching, tutorials, documentation and guides, and problem-solving.
- Expanded the <u>Adaptive Silviculture for Climate Change</u> website to keep pace with the ASCC Network expansion.
- Continued critical "under the hood" work—maintenance and security updates—for the <u>Radiocarbon</u> <u>Collaborative</u>, Adaptive Silviculture for Climate Change, and NIACS websites.
- Created graphic design products and publication layouts used to support NIACS and partner organizations.
 - Science infographics used in newsletters, presentations, and social media outreach by the Forest Service Washington Office, complementing the work of the FS R&D's Knowledge Management and Communications group
 - Resource area and website icons in support of the 2020 Resources Planning Act Assessment

HIGHLIGHT

FOREST SERVICE RESEARCH & DEVELOPMENT WEB MODERNIZATION

The FS R&D website was nearly 10 years old, used an outdated design, and didn't include a content management system. We built a new accessible and mobilefriendly site with the latest version of the open-source Drupal content management system, adhering to US Government web design standards. We created custom programs to import and restructure legacy content from the old site, as well as support content being served from other systems, such as researcher profiles and publication records. Based on user feedback that was collected, we participated in new content development and site functionality refinement. Currently we are working to pull data from archived PDF publications to create searchable, accessible, full-text versions. Public launch of the modernized site is expected in FY22.







Icons created for the 2020 Resources Planning Act web presence

PARTNERSHIPS

The Digital Science Communication team is a core component of NIACS' communication efforts, creating and supporting digital media and websites that clearly deliver usable, science-based management information on climate change. The team works across all of the major NIACS efforts, but we also partner externally with Forest Service Research & Development and the USDA Climate Hubs at the national level.

I am super psyched! After all, your team's products made it to the White House for One Trillion Trees (infographics) so I have high expectations!



- Tracy Hancock, Director, Knowledge Management and Communications, USDA Forest Service Research & Development

[The Research & Development website] is a major improvement! Thank you to those who have undertaken this project!

- Research & Development Feedback Survey Response

LOOKING FORWARD

We are continuing to refine the USFS R&D website, based on feedback collected in user listening sessions, in anticipation of a public launch in early FY22. The next phase of the R&D site improvements will be led by the National R&D office. We will migrate each of the regional research stations into this new National R&D site and grow the site to meet the specific needs of each station. We will also maintain and expand our existing web projects and design efforts.

LANDSCAPE CHANGE RESEARCH GROUP



The Landscape Change Research Group specializes in creating ecological assessments and projections using large amounts of biological, climatic, and terrain data with statistical and simulation models and geographic information systems (GIS).

NIACS TEAM:

Louis Iverson
Stephen Matthews
Matthew Peters
Anantha Prasad

fs.fed.us/nrs/atlas

2021 FACTS

807,000 + pageviews

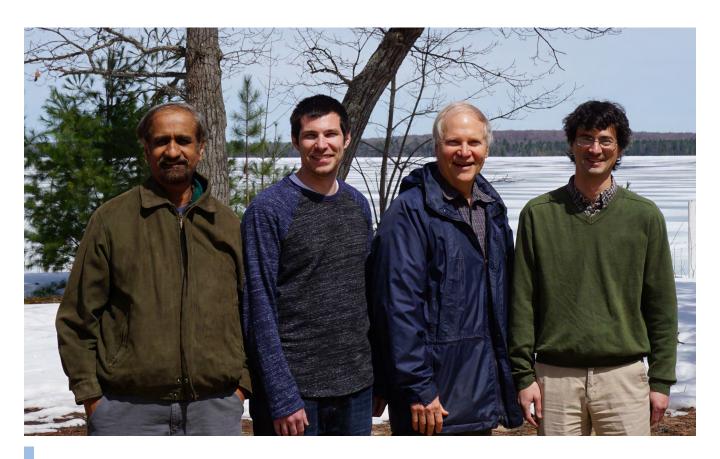
on the Atlas websites this FY

Scientific Publications

Authored or Co-Authored

275,000+ ATLAS USERS 807 CITATIONS ON GOOGLE SCHOLAR

(an average for LCRG this FY)



SCIENCE APPLICATIONS

The Landscape Change Research Group (LCRG) creates original research as well as valuable tools and data sets for resource managers and decision makers. The LCRG works to effectively deliver relevant information to land managers, collect valuable feedback from users, address information needs for forest adaptation, and inspire new research. We also take advantage of local opportunities, working directly with scientists and managers to inform land management decisions in Ohio.

ACCOMPLISHMENTS

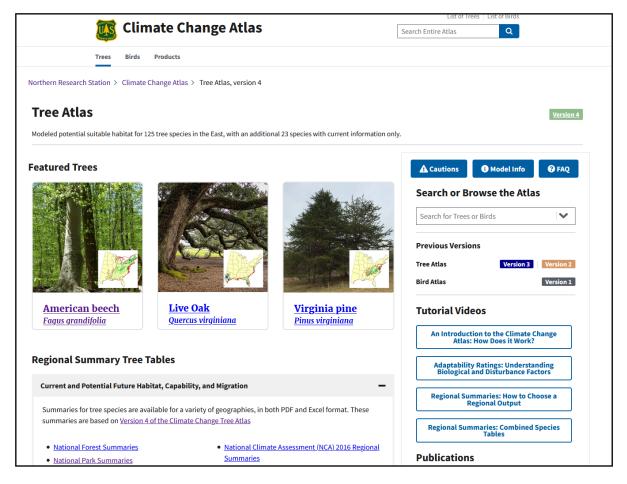
The <u>Climate Change Atlas</u> remains one of the Forest Service's most widely used models of climate impacts on forests, with more than 807,000 page views in the last year. Building on major accomplishments in 2019, we continue to update the Climate Change Atlas. The latest version includes updated DISTRIB-II and SHIFT outputs, regional summaries for various geographic entities, and four new tutorial videos. These products have been featured in several virtual presentations and workshops.

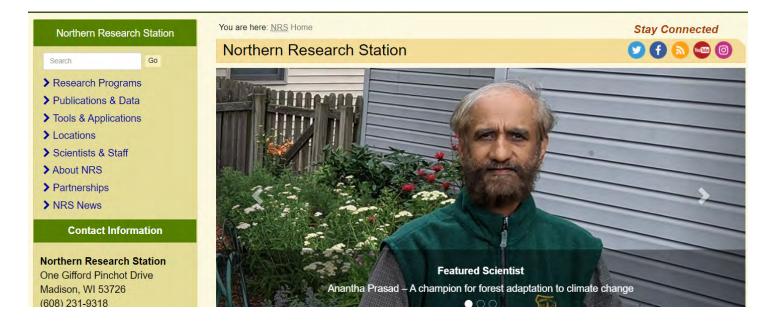
The LCRG remains a busy and productive research group, publishing 9 journal articles, giving 13 scientific presentations, and producing a soil carbon assessment data set this past year. We continue to work with the Ohio Interagency Forestry Team and Wayne National Forest on promoting oakdominated forests in the 17-county project area of a USDA Joint Chiefs' Restoration Partnership. We are also contributing to a recreation and infrastructure vulnerability assessment for the Mark Twain National Forest.

HIGHLIGHT

CLIMATE CHANGE TREE ATLAS VERSION 4

The <u>Climate Change Tree Atlas</u> is an online tool that explores habitat suitability for 125 eastern U.S. tree species. Version 4 of the Climate Change Tree Atlas launched in April 2021, providing a new website design for improved usage of the Atlas and its updated models and information. Habitat suitability from the DISTRIB model and future colonization likelihoods from the SHIFT model are available for individual species, and have also been summarized for various regions (national forests and parks, ecological regions, states, watersheds, and 1×1-degree grids). Four tutorial videos were created to get users started exploring the new site design and using the updated information.





PARTNERSHIPS

The LCRG works with scientists and land managers to create products that support land management and new research, and our partners are from federal agencies, state agencies, universities, and other regional organizations.

Thank you for all of your in-depth analyses for the assessment Louis. It is a wonderful resource and we very much appreciate you taking the time and interest to do this!

- Maria Lemke, The Nature Conservancy

I wanted to thank you all for an excellent session. I really appreciate the time and effort that you all put into planning and executing the event. I think it was really well received and valued by the participants.

- Kaitlyn Wilson, University of Minnesota's Sustainable Forest Education Cooperative

LOOKING FORWARD

We will continue to publish new research, provide support for mapping soil carbon impacts from land use and management, and continue to collaborate with partners wanting to use information from the Climate Change Atlas. Plans for next year include:

- Update the Bird Atlas with new models incorporating results from the latest version of the Tree Atlas.
- Expand and enhance our models to the conterminous US, the full range of the species, and populations of species.
- Characterize forest types and their departures using novel analysis.
- Collaborate on a book chapter on future forests.

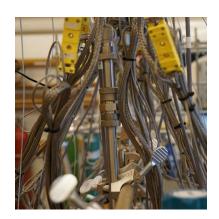
RADIOCARBON COLLABORATIVE

The Radiocarbon Collaborative is dedicated to advancing climate and carbon cycle science by making radiocarbon analysis accessible, decipherable, and collaborative.

NIACS TEAM:

Kate Heckman Chris Swanston Paula Zermeño







radiocarbon.forest.mtu.edu

2021 FACTS

750 radiocarbon targets produced

530 radiocarbon unknowns processed

New Partner Projects
in FY21

Completed and Ongoing Projects

25 SOIL CARBON PERSISTENCE

15 PEATLANDS

11 ECOLOGY

10 FIRE DYNAMICS

6 WILDLIFE CONSERVATION

6 HERITAGE PROGRAM (ARCHAEOLOGY)

5 PERMAFROST

1 GEOLOGY



SCIENCE APPLICATIONS

The <u>Radiocarbon Collaborative</u> assists researchers in the application of radiocarbon analysis to a wide array of scientific investigations. We generally apply radiocarbon analysis to questions regarding how carbon is cycled and stabilized in ecosystems, and how land management and climate change may influence these processes. These projects include permafrost loss, blue carbon, peatland warming, harvest impacts on soil, and bioenergy cropping systems among others. We also provide traditional artifact dating for archaeologists at the Forest Service Heritage Program and dendrochronology for ecologists studying threatened tree species. We assist researchers from all backgrounds and levels with projects as small as a single bone to investigations as large as a global survey of tropical peatland accumulation rates.

ACCOMPLISHMENTS

In 2021, the Radiocarbon Collaborative:

- Completed radiocarbon measurements for a global survey of tropical peatlands in collaboration with the Sustainable Wetlands Adaptation and Mitigation Program. This information will lend insight into climate and land use influences on peat accumulation or loss in these understudied systems.
- Began two new exciting international collaborations! Both of these projects will utilize institutional archives of soils with the goal of understanding climate and land use impacts on soil carbon stocks.
 - Agriculture and Agri-Food Canada, a department of the Government of Canada
 - SCION, a Crown research institution of New Zealand
- Continued our NIFA-sponsored work with Oregon State University. This work uses archives of soils from the Forest Service's Long-Term Soil Productivity experiments and will allow us to assess forest harvest impacts on soil carbon stocks.
- Concluded our work with Michigan Technological University assessing fire return interval on hemiboreal peatlands in Michigan and Wisconsin. This information will directly inform land management decisions in these vulnerable ecosystems.



Map of Radiocarbon Collaborative
Partner Sites

Soil C persistence (26)
Peatlands (15)
Peatlands (15)
Pire (10)

Heritage program (6)
Wildlife conservation (6)
Permafrost (4)
Geology (1)



PARTNERSHIPS

In addition to support from the Forest Service for core staffing and facilities, the Radiocarbon Collaborative also receives valuable support from the University of California Irvine, which provides measurement of the samples we process in our facility. Michigan Technological University generously provides administrative and grants/agreements assistance. These three organizations allow the Radiocarbon Collaborative to thrive and provide services and collaboration to the greater scientific community.

ПП

Thanks again for doing this. It would not be possible for me, as a faculty member at a small school, to keep my research going without it.

- Zack Taylor, Associate Professor, Berry College

I can't even begin to tell you how significant these dates are to our interpretation... I will be digesting the new dates, adding them to my map, thinking about their implications, and will contact you with any questions... I look forward to sharing some of the findings with you and Paula and telling you about where I go from here with these results.

- Craig A. Chesner, Professor Emeritus, Department of Geology and Geography, Eastern Illinois University

LOOKING FORWARD

We look forward to continuing our partnerships with Forest Service researchers, university partners, and state agencies. The Radiocarbon Collaborative will be shifting our formal team membership from NIACS to the Climate, Fire, and Carbon Cycle Sciences research group at the Forest Service Northern Research Station, which reflects the Collaborative's increased growth and stability. This realignment will allow for better integration of the Collaborative's services into the basic research community of the Northern Research Station. We will always value our time with NIACS, and will continue to seek out opportunities for collaboration with the whole NIACS team.



OUTREACH AND SCIENCE

Posters

Presentations

Press

Proposals

Sessions

Workshops

Publications

OUTREACH AND SCIENCE

Posters

Presentations

Press

1

poster

122

presentations

18

press items

INTERNATIONAL ANNUAL MEETING

American Society of Agronomy

Crop Science Society of America

Soil Science Society of America 104 INVITED PRESENTATIONS

8 FOREST SERVICE NEWS HIGHLIGHTS

poster

title

Impacts of Land
Use and Forest
Management on Soil
Organic Carbon Stocks
at Ecoregional to
Landscape Levels: Case
Studies from Three
Ecoregions of the U.S.

88 webinars

17
NIACSers
gave presentations

7
news
articles

magazine article

Proposals

Sessions

Workshops

15

proposals

16

convened sessions

45

hosted workshops

10 FUNDED OR IN REVIEW

12 MONTHLY
WEB MEETINGS

U.S. Climate Alliance Natural and Working Lands Web Series

1500+
PARTICIPANTS

(approx.)

5USDA/USFS proposals submitted

CASC proposals submitted

FS R&D feedback sessions

annual professional meetings

partner organizations involved

36
adaptation
workshops

OUTREACH AND SCIENCE

Publications

Berryman, E., Hatten, J., Page-Dumrose, D.S., Heckman, K.A., D'Amore, D., Puttere, J., SanClements, M., Connolly, S.J., Perry, C.H., Domke, G.M. 2020. Soil Carbon. In: Forest and Rangeland Soils of the United States Under Changing Conditions: A Comprehensive Science Synthesis (Eds. R Pouyat, D Page-Dumrose, T Patel-Weynand, L Geiser). Springer Nature Switzerland AG.

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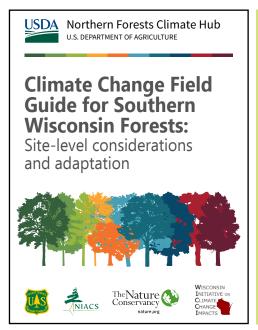
Gough, C.M., Bohrer, G., Hardiman, B.S., Nave, L.E., Vogel, C.S., Atkins, J., Bond-Lamberty, B., Fahey, R.T., Fotis, A.T., Grigri, M.S., Haber, L.T., Yang, J., Kleinke, C.L., Mathes, K.C., Nadelhoffer, K.J., Stuart-Haëntjens, E., Curtis, P.S. *In press*. Rising net ecosystem production a decade after moderate severity disturbance: Revisiting the core hypothesis of the Forest Accelerated Succession Experiment. Ecological Applications.

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Iverson, A.L., and Iverson, L.R. *In press*. Contrasting Indigenous Urarina and Mestizo Farms in the Peruvian Amazon: Plant Diversity and Farming Practices. Journal of Ethnobiology.



Iverson, L. 2021. An Assessment of the Impacts of Climate Change in Illinois, Chapter 6: Climate Change Impacts on Ecosystems, Supplemental Forest Data. University of Illinois at Urbana-Champaign. doi: 10.13012/B2IDB-3459813 V1

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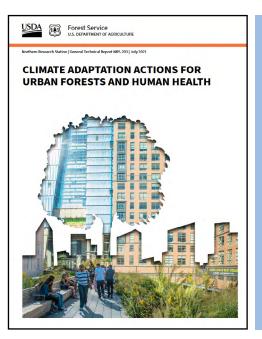
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Janowiak, M.K., Brandt, L.A., Wolf, K.L., Brady, M., Darling, L., Lewis, A.D., Fahey, R.T., Giesting, K., Hall, E., Henry, M., Hughes, M., Miesbauer, J.W., Marcinkowski, K., Ontl, T., Rutledge, A., Scott, L., Swanston, C.W. 2021. Climate adaptation actions for urban forests and human health. Gen. Tech. Rep. NRS-203. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station. 105 p. doi: 10.2737/ NRS-GTR-203

Kaarakka L., Cornett, M., Domke, G., Ontl, T.A., Dee, L. Improved Forest Management as a Natural Climate Solution – A Review. Ecological Solutions and Evidence. doi: 10.1002/2688-8319.12090

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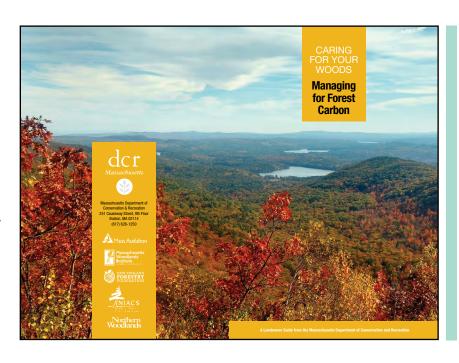
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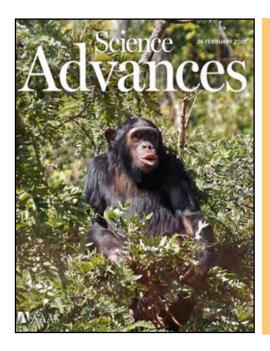


OUTREACH AND SCIENCE

Publications

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Prasad A.M., and Leites L. 2021. Ecological analysis of intraspecific variability of eastern white pine (Pinus strobus) under climate change by combining provenance and demographic data. Landscape Ecology. doi: 10.1007/s10980-021-01333-4

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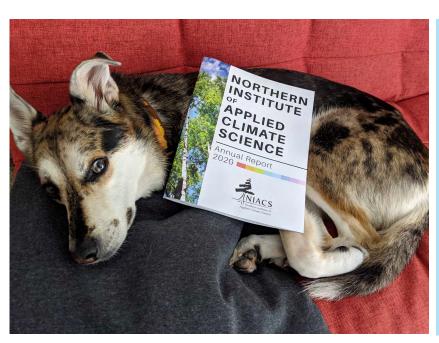
Swanston, C.W., Brandt, L.A., Butler-Leopold, P.R., Hall, K.R., Handler, S.D., Janowiak, M.K., Merriam, K., Meyer, M., Molinari, N., Schmitt, K.M., Shannon, P.D., Smith, J.B., Wuenschel, A., Ostoja, S.M. 2020. Adaptation Strategies and Approaches for California Forest Ecosystems. USDA California Climate Hub Technical Report CACH-2020-1. Davis, CA: U.S. Department of Agriculture, Climate Hubs. 65 p.

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24 PEER-REVIEWED JOURNAL ARTICLES

9

Reports and Book Chapters





PEOPLE

Meet the NIACS Staff

NIACS Partner Organizations

NIACS Members

NIACS Students









PEOPLE

Meet the NIACS Staff



Hannah Abbotts

Hannah is the content manager for the Forest Service Climate Change Resource Center and USDA Climate Hubs. In addition to creating and managing web content, she plays a supporting role in site building on many projects. Hannah enjoys running and skiing and all things outside. (https://dwabbottomtu.edu)



Madeline Baroli

As a Climate Adaptation Specialist, Maddy supports partners in adaptation planning through climate science communication, resource development, and training. She also works on Climate Change Response Framework projects within New England and helps to manage NIACS' social media. Outside of work, Maddy coordinates a community science project focused on assisted migration, enjoys the outdoors with her partner and their two pet rats, and has been learning to play the electric bass. (mjbaroli@mtu.edu)



Leslie Brandt

Leslie leads climate change vulnerability and adaptation work in urban areas for NIACS. Current projects include the Mississippi National River and Recreation Area ASCC project and a recreation infrastructure vulnerability assessment for the Mark Twain NF. She lives in St. Paul, MN, with her husband, two kids, and her two cats. This summer she went on a 2-week road trip with the human members of her family and somehow survived. (leslie.brandt@usda.gov)



Stephen Handler

As a Climate Change Specialist at NIACS, Stephen coordinates the Northwoods Climate Change Response Framework across Minnesota, Wisconsin, and Michigan. This includes preparing vulnerability assessments, working with partners, and planning real-world adaptation projects to illustrate climate-informed land management. Stephen built a deck this summer, and he hopes you'll come visit. (stephen.handler@usda.gov)

Kate Heckman

Kate's research is primarily focused on the soil carbon cycle, examining mechanisms of carbon stabilization in the context of climate change. Additionally, Kate runs the Radiocarbon Collaborative, an educational outreach organization focused on increasing researcher access to radiocarbon analysis. When she's not digging through data, she enjoys digging in her yard. (katherine.a.heckman@usda.gov)



Louis Iverson

Louis is now retired, but hangs around for some NIACSy and LCRG stuff. Because he wants to and NIACS people are cool! His career was built around landscape ecology, and especially learning about the impacts of climate change on trees. He now enjoys more time for family, especially grandchildren, and many hobbies. A new big one is beekeeping. (louis.iverson@usda.gov)



Maria Janowiak

Maria was excited—also nervous, but mostly excited!—to take on the role of Acting Director of NIACS and the USDA Northern Forests Climate Hub in May 2021. Maria celebrated her 14th NIACS-versary this year, and is grateful for all of this experience as she takes on leadership of the dynamic, productive, and fun NIACS team. She's continued to work on a handful of projects with managers and scientists in New England and elsewhere. Maria enjoys riding her fat bike and growing vegetables and tree seedlings in her garden. (maria.janowiak@usda.gov)



Shawn Klomparens

Shawn is the web developer for the Climate Change Resource Center and USDA Climate Hubs, and is involved in the Forest Service R&D modernization project. He is a longtime advocate for Open Source software and is dedicated to clear and effective presentation of information online in a technically efficient fashion. A Michigan native now living in Jackson, Wyoming with his wife and two children, Shawn enjoys running, cycling, and camping in the summer, and Nordic and backcountry skiing in the winter. (scklompa@mtu.edu)



Patricia Leopold

Patricia is a Climate Adaptation Specialist and coordinates the Mid-Atlantic and Central Appalachians Climate Change Response Framework, where she is expanding partnerships, creating resources, and promoting implementation of adaptation actions in inland and coastal forest ecosystems, and at scales ranging from state agency planning to on-the-ground projects. Patricia adapted well to working from home this year, while at the same time welcoming a new baby boy to the family (pleopold@mtu.edu).



PEOPLE

Meet the NIACS Staff



Kailey Marcinkowski

Kailey is a Climate Change Education Specialist with NIACS, working with the Climate Change Resource Center to expand online education materials. She focuses on developing graphic visualization resources to make climate change science more accessible, fun, and understandable for everyone. Kailey added a baby girl to her family this year and now has two little girlies to love. (kfmarcin@mtu.edu)



Stephen Matthews

Stephen is Associate Professor of Wildlife Landscape Ecology in the School of Environment and Natural Resources at Ohio State University and also holds an affiliation as an ecologist with the U.S. Forest Service Northern Research Station. His research focuses on how climate and land use change influences forests and birds. Outside of work Steve spends time with his family exploring the outdoors and the kitchen. (matthews.204@osu.edu)



Luke Nave

Luke is a forest ecologist, disguised as a carbon cycle scientist, who spends most of his work time on soil problems—of which there are many. Fortunately, there are also many existing datasets useful for solving soil problems, so he spends as much time working with these big datasets as he does digging holes in the ground. When not working, Luke loves his family and being active outdoors, whether in pursuit of fitness, goods from the woods, or just a tired back at the end of the day. (lukenave@umich.edu)



Todd Ontl

Todd's focus as a Climate Adaptation Specialist is coordinating efforts to integrate adaptation and mitigation goals in land management in the Northeast and Midwest. He creates educational content on forest carbon management, works with managers and scientists to develop and model carbon outcomes for forest management scenarios, and helps integrate climate information into planning efforts for carbon goals. When Todd isn't outside chasing around his 3-year-old daughter and their energetic cattle dog, he likes to build stuff in his woodshop and play his banjo. (taontl@mtu.edu)

Matthew Peters

Matt is an Ecologist and provides technical support for the Climate Change Atlas by conducting spatial analyses and data processing, statistical modeling, and generating cartographic products. He provides GIS analyses for Northern Research Station scientists and various National Forests within the region. Matt enjoys camping and hiking with his family and built a practice rock climbing wall during the SARS-CoV2 pandemic. (matthew.p.peters@usda.gov)



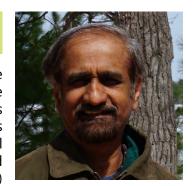
Courtney Peterson

Courtney is a Research Associate at Colorado State University. She provides coordination and leadership for the Adaptive Silviculture for Climate Change project, facilitating development of new sites and maintaining Network cohesion. She is also a NIACS climate adaptation specialist, supporting partners in the Intermountain and Southwest with adaptation communication, planning, and training. Courtney loves playing violin, traveling, and outdoor adventures with her family, friends, and fiancé. (Courtney.Peterson@colostate.edu)



Anantha Prasad

Prasad is a Research Ecologist primarily interested in modeling macro-scale forest dynamics under climate change. He currently works with LCRG to integrate suitable habitats and migration potential of tree species across conterminous US and Canada. He is also interested in evaluating intraspecific responses of population groups to climate change from an evolutionary-ecological perspective. In his spare time, Prasad likes to garden, read about cosmic and earth history, and walk in nearby parks. (anantha.prasad@usda.gov)



Annamarie Rutledge

Annamarie is a Climate Change Outreach Specialist focused on science communication, urban forestry adaptation projects, general NIACS support, and leading the Education and Outreach Committee for Crosby Farm Regional Park. Based in Saint Paul, Minnesota, Annamarie enjoys cheering on all MN sports, visiting local restaurants and breweries, and spending time on Burntside Lake with her partner and two pups. (amrutled@mtu.edu)



Kristen Schmitt

Kristen is a Climate Adaptation Specialist working in support of the USDA Northern Forests Climate Hub. She works with a variety of partners to create new tools and to plan and execute trainings that help natural resources professionals integrate climate change into their work. Lately, this has included adaptation work with partners in California and in Great Lakes Coastal ecosystems. Kristen has been spending her free time catching up with family and continually watering vegetables in the midst of a northern Minnesota drought (kmschmit@mtu.edu).



PEOPLE

Meet the NIACS Staff



Danielle Shannon

Danielle Shannon is a Climate Adaptation Specialist and the coordinator of the USDA Northern Forests Climate Hub. Danielle helps land managers cope with and adapt to the challenges of climate change, particularly in the field of forest hydrology and the management of forested watersheds. After work, you can find her hanging out with her two adventurous kids, learning new recipes, completing house projects, or folding laundry. (dshannon@mtu.edu)



Chris Swanston

Chris Swanston served as director of NIACS from 2008 to 2021 and played an active role in most of the Institute's major efforts, including directing the USDA Northern Forests Climate Hub. Chris now serves as the Forest Service's Climate Advisor and leads the Office of Sustainability and Climate. He stays engaged with NIACS behind the scenes in a supportive role. Chris does not like cooked vegetables or mushrooms, because they're gross. (christopher.swanston@usda.gov)



Paula Zermeño

Paula manages the Carbon, Water and Soils Lab and has over 20 years of expertise in the preparation of environmental samples for radiocarbon dating. Paula serves as a vital part of the Radiocarbon Collaborative, providing expert laboratory analysis as well as serving in the role of mentor to students and technicians. When not moving snow, Paula enjoys hiking with her pups and traveling near and far. (Paula.Zermeno@usda.gov)



WELCOME OUR NEW DETAILER, RYAN TOOT

Ryan holds a water resources-focused Geological Engineering undergraduate degree and a Master's of Science degree in Natural Resources Science and Management from the University of Minnesota. He has worked for the Forest Service since 2019 as a Watershed Forestry Specialist with State and Private Forestry. His work with NIACS will involve supporting climate change adaptation activities, with an emphasis on forested watersheds, waters resources, and Great Lakes coastal ecosystems. He enjoys being on lakes, rivers, and in the forest, harvesting wild food and exploring, or crafting with wood and bark. (Ryan.Toot@usda.gov)

RYAN WILL BE DETAILING BEHIND STEPHEN HANDLER

NIACS Partner Organizations

Partner Organization	Steering Group Member	Programmatic Contact
American Forests	Jad Daley	Rebecca Turner
Great Lakes Indian Fish & Wildlife Commission	Jonathan Gilbert	Robert Croll
Michigan Technological University	David Reed	Andrew Storer
National Council for Air & Stream Improvement	Darren Miller	Kevin Solarik
University of Minnesota, College of Food, Agriculture and Natural Resource Science	Brian Buhr	Marcella Windmuller- Campione
University of Vermont	Nancy Matthews	Anthony D'Amato
USDA Forest Service Eastern Region	Gina Owens	Bob Lueckel
USDA Forest Service Northern Research Station	Cynthia West	Lon Yeary

NIACS Members

Name	Title	NIACS Affiliation
Lauren Cooper	Program Director, Forest Carbon and Climate Program, Michigan State University	Carbon Trends and Management
Richard Kobe	Department of Forestry, Michigan State University	Carbon Trends and Management
Linda Nagel	Department Head, Forest & Rangeland Stewardship Department, Colorado State University	Adaptive Silviculture for Climate Change (ASCC)

NIACS Summer Students



NIACS was lucky to have Mattison Brady (left), Rebecca Rooney (right), and Emma Jones as student workers this year. Mattison is currently pursuing a Master of Forestry degree and a Master of Science in Forestry at Michigan Tech and is attending Fall Camp for the Fall semester. Rebecca finished her Bachelor of Science at Michigan Tech this past year and moved to Duluth, Minnesota, to begin a Master of Science degree at the University of Minnesota. Emma also completed her undergraduate work at Michigan Tech and is pursuing a Master of Geographic Information Science this year while continuing to support the NIACS team. We appreciate all of their hard work and enthusiasm, and wish them the best as they move on in their careers!









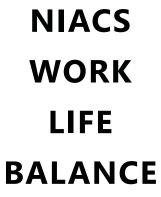


















NIACS.ORG

Adaptation Workbook

adaptationworkbook.org

Adaptive Silviculture for Climate Change

adaptivesilviculture.org

Climate Change Atlas

fs.fed.us/nrs/atlas

Climate Change Resource Center

fs.usda.gov/ccrc

Climate Change Response Framework

forestadaptation.org

Radiocarbon Collaborative

radiocarbon.forest.mtu.edu

USDA Northern Forests Climate Hub

climatehubs.usda.gov/hubs/northern-forests

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NIACS

A Collaborative Partnership

American Forests

USDA Forest Service Northern Research Station (NRS)

USDA Forest Service Eastern Region (R9)

Great Lakes Indian Fish & Wildlife Commission (GLIFWC)

Michigan Technological University

National Council for Air and Stream Improvement (NCASI)

University of Minnesota - College of Food, Agriculture and Nature Resource Science

University of Vermont

