



# Climate Change Response Program Newsletter

Q4 | 2016



SCIENCE • ADAPTATION • MITIGATION • COMMUNICATION

## Young Leaders in Climate Change Internships - 2016

Today's young adults are the first generation to grow up with an awareness of climate change. They cannot take for granted the hope of traveling with their kids or grand kids to hike on glaciers in Alaska, to explore the sea of grass in the Everglades, or to see the first permanent English settlement at Jamestown. Inviting them into our national parks as they complete their education and begin careers can engage them in working on one of the biggest challenges the National Park Service (NPS)—and society as a whole—has ever faced. The skills, knowledge, and dedication of today's students will be required to manage parks in a changing climate.

This edition of the Climate Change Response Program Newsletter highlights 11 young adults selected for the 2016 George Melendez Wright Initiative for Young Leaders in Climate Change (YLCC). The YLCC Initiative supports innovative, professional internship projects in national parks and NPS program offices. Internship positions are filled by high-caliber undergraduate and graduate students. This year, students worked on everything from archaeology to phenology; from education to GIS (Geographical Information Systems). They worked autonomously, gained genuine leadership experience and skills, made recommendations to park superintendents, and engaged internal and external stakeholders at high levels.

The YLCC Initiative operates under the Department of the Interior Direct Hire Authority (**Personnel Bulletin No. 12-15**). YLCC interns are eligible to be hired non-competitively into NPS jobs for which they qualify. Because of this, the YLCC provides the NPS with a powerful tool for building a workforce capable of addressing the breadth of our stewardship responsibilities in an era of dynamic, changing conditions.

The YLCC Initiative exists at an important intersection. It helps the NPS understand and respond to climate change. It contributes to the great need of public conservation agencies to connect with youth, as articulated in Interior Secretary Jewell's Youth in the Great Outdoors Initiative. And it illustrates how science and stewardship activities advance the NPS Centennial goal of creating the next generation of park visitors and supporters.

We are pleased to present in the following pages the stories of this year's Young Leaders in Climate Change. Enjoy them and keep an ear out—you may hear more from these students in the years to come as they move into NPS jobs that focus on managing parks in a rapidly changing world.

Melanie Wood  
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## Integrating Future Hydrologic Models into Transportation Management



**Angelina Ngyuen**  
University of California - Los Angeles

Climate models predict substantial increases in annual temperature in the Pacific Northwest, projecting a warming of about 2°C by the 2040s and over 3°C by the 2080s. Changing temperature norms affect precipitation patterns in the North Cascades, shifting existing watersheds from snow-dominated systems into mixed or rain-dominated systems. These shifts can yield higher peak flows and more autumn and winter floods. Culverts are generally designed to withstand current climatic conditions, but major changes resulting from climate change will heighten the risk of culvert failure. Culvert failure deteriorates water quality, impacts stream function, acts as a barrier to aquatic organism passage, and threatens transportation infrastructure used by park staff and visitors.

The existing infrastructure database utilized by North Cascades National Park (NOCA) is not spatially referenced, preventing employees and researchers from using GIS to perform critical analyses on culverts. Hydrologic models have projected future peak flows by

location, which—coupled with geospatial culvert data—would allow park staff to pinpoint undersized or at-risk culverts. Given the hundreds of miles of roads and trails in the park, conducting an inventory of all culverts is costly. Instead, park managers initiated a citizen-science project as the most effective methodology to survey culverts and encourage public stewardship of park lands.

Developing the methodology entailed testing various cloud-based GIS apps by Esri for usability and function, resulting in selection of Survey123 for ArcGIS as the most user-friendly and powerful application. Taking into account the needs and concerns of the maintenance, geology, and aquatics divisions in the park, a comprehensive culvert survey was developed for the app. The app is functional in remote areas, storing data until connectivity is restored to sync to ArcGIS Online, and feeds into a master geodatabase, providing GIS analysts with the data necessary to support decisions to preemptively adapt infrastructure to the impacts of climate change.



YLCC intern Angelina Ngyuen performs a culvert survey at a road-stream intersection in North Cascades National Park. NPS Image

## Planning for Adaptation and Resilience of NPS Coastal Assets



**Ashton Rohmer**

University of North Carolina - Chapel Hill

This summer I had the privilege of working with the NPS Park Planning and Special Studies office in Washington D.C. as a YLCC intern. Through the guidance and support of my supervisors, Thomas Sheffer and Rebecca Beavers, I was able to visit parks and interview superintendents, regional park planners, park facility managers, and the Hurricane Sandy recovery project manager. Structured interviews were undertaken with a desire to both learn more about how coastal parks are adapting to climate change, and assist parks elsewhere in planning for a changing climate.

Results from my interviews and first-hand experiences informed development of the *Building Resilience at our National Parks: Fact Sheets for Adapting Facilities to Reduce Risk* (NPS #133754A) report. This report highlights coastal response efforts using an innovative, fact sheet format. The fact sheets provide planners with key information about site-specific adaptation actions at a glance, lending insight on how similar issues might be addressed elsewhere.

For example, Assateague Island National Seashore has replaced traditional coastal infrastructure with portable facilities in response to the effects of rising seas and storm surge. Park staff can now move rest rooms, showers, and lifeguard stations in advance of approaching storms to minimize damage and protect public investments.

In addition, a summary document of lessons learned and best management practices supplements NPS #13375A4. This summary document provides park planning leads with a well-rounded picture of adaptation efforts which includes; challenges faced; lessons learned; and best management practices; currently underway across the service. The complexity of planning for a changing climate—coupled with the wide array of ongoing issues that must also be addressed—makes adaptation no easy feat. The compiled challenges, opportunities, and successes from across the NPS, supports park planners in more fully understanding available options for future resilience efforts.



The utilization of moveable infrastructure along the beach helps manage risk and protect investments at Assateague Island National Seashore. NPS Image

# YLCC Internship Updates

## Assessing the Vulnerability of Archaeological Resources to Climate Change: Southeast Alaska



**Caitlin Rankin**

Washington University in St Louis

The **2010 NPS Climate Change Response Strategy** recognized that cultural resources are particularly vulnerable to climate change impacts because they are fixed in place on the landscape, cannot be replaced, and their loss is permanent. Goal 7 in the Climate Change Response Strategy is to develop management strategies to preserve cultural resources vulnerable to climate change impacts. My YLCC internship project was created in an attempt to begin addressing Goal 7 at Klondike Gold Rush National Historical Park (KLGO).

Primary objectives of this project were to:

- identify which archaeological resources along the Chilkoot Trail Unit of KLGO are vulnerable to climate change impacts,
- determine the type and severity of the climate change risk,
- create a prioritization model to determine which resources are most at risk, and
- suggest recommendations for future monitoring and documentation.

My internship included a balance of literature review and field work. I spent much of my time in the office reading archaeological inventories and environmental assessments. I also spent time in the field conducting surveys of new archaeological sites that were revealed by melting ice patches, as well as monitoring sites already vulnerable to erosion from river channels.

There are four different types of climate change threats to archaeological resources at KLGO. Climate change brings about river channel instability and makes glacial lake outburst floods more likely to occur. These threats have the potential to literally wash away archaeological resources. Additionally, melting ice patches and early snow melt are already threatening archaeological resources by altering preservation conditions.

Each resource is impacted by different threats in different ways, thus there is no single response strategy for climate change threats to archaeological resources at KLGO. The takeaway message from the project is that the impacts of climate change on cultural resources can vary greatly within a land management area, so managers must determine cultural resource prioritization and develop resource specific response strategies.



Organic artifacts like these gold rush era leather shoes have been well preserved along the Chilkoot Trail Unit. Melting ice patches and early snow melt are negatively altering the preservation environment, making these artifacts vulnerable to more rapid decomposition. NPS Image



A gold rush era stove being washed into the Taiya River. This entire archaeological site will be swept away in the next 8 years if current erosion rates continue. NPS Image

# YLCC Internship Updates

## Climate Change Interpretation through Centennial Partnership with the American Solar Challenge



**Carolyn Turkaly**  
American University

I spent my summer with the YLCC at the NPS Midwest Regional Office, working on a climate change interpretation project. Nine Midwest parks served as checkpoints for the **2016 American Solar Challenge**, a competition to design, build, and drive solar-powered cars in a cross-country time/distance rally event. A team of six employees from the Midwest Regional Office traveled along with the event to provide interpretive programming about climate change.

Our team created a traveling interpretive exhibit highlighting climate impacts in the Midwest, such as increased algae blooms in the Great Lakes and longer ragweed seasons. I also ran an activity called The Forty-Year Forecast. Using a puzzle map of the United States, I illustrated projected warming for a visitor's home state by comparing it to a southern state's current average temperature. For example, in forty years Indiana will feel as warm as Northern Alabama does right now if we continue to emit greenhouse gases at the current rate.

Coordinating logistics was a large part of my summer, in order to ensure that my team arrived at each park prior to the solar cars. I helped generate buzz for each event by crafting press releases, and helped to answer

potential questions by creating a guide on climate change for individuals. And in an effort to help to ensure a more climate conscious student body, I wrote a high school climate curriculum.

During the American Solar Challenge, over 500 people interacted with our exhibits and activities. Through these conversations, I found that the key challenge in climate communication is striking the balance between conveying the urgency and severity of the threat and cultivating a sense of hope and agency. While the solar cars certainly were signs of hope, Midwest parks can continue to serve as spaces for learning and talking about climate change long after the American Solar Challenge.

*“The support from YLCC is the best intern support I have ever experienced!”*

*– Lauren Blacik, Midwest Regional Office*



Carolyn Turkaly talks about climate impacts in the Midwest with visitors. NPS Image



A solar car travels past Scotts Bluff National Monument during the American Solar Challenge. NPS Image

# YLCC Internship Updates

## Changing Climate, Changing Policy: Subsistence Use and Wilderness Values in Arctic Alaska



**Chris Dunn**

University of Colorado at Boulder

Both scientists and holders of traditional ecological knowledge agree that changing temperatures and precipitation patterns in Alaska are inducing cascading effects on northern ecosystems. These changes are not only a concern for plants and animals, but also for the native Alaskans who rely on these resources for cultural and economic stability.

During my YLCC internship in the summer of 2016 I spent time in Anaktuvuk Pass, an Alaskan native village wholly within the boundaries of Gates of the Arctic National Park and Preserve. Through informal interactions within the community and in the field, I was able to study local residents' ecological observations and experiences of alterations of their subsistence use due to changing climate patterns. The information gleaned from these meetings will be used to help inform policy decisions made by park administration.

One major outcome from this project was to document current and potential effects of climate change as experienced by community members of Anaktuvuk Pass. Information sought covered topics such as local climate, ecology, and landscape use. Of particular interest is whether snow machine access is being impeded by poor winter travel conditions and/or a shorter winter season.

In addition to this major project, I was able to work on other projects during my internship. This work included coordinating with the Alaska region sound monitoring program and with relevant entities in Anaktuvuk Pass Village, including writing up a mutually agreed upon proposal. I received installation training for these sound monitoring programs, and was given the opportunity to independently select a site and install a sound station.

*“This is a well-run program that is thoughtfully constructed and administered.”*

*– Jeff Rasic, Gates of the Arctic National Park and Preserve*



Anaktuvuk Pass surrounded by a snowy June landscape. NPS Image



Exposed permafrost along the John River. NPS Image

## Monitoring movement of Mangroves in Everglades National Park



**Jennifer Chandler**  
University of Wisconsin - Madison

One major impact of global climate change is that sea levels are predicted to rise as much as 0.8-2.0 m by the year 2100. Since the majority of Everglades National Park (EVER) is less than 1 m in elevation, sea level rise poses a serious threat to the park's freshwater marsh communities. Due to salt water intrusion from rising seas, the salinity of marshes will increase, enabling the expansion of saltwater-tolerant mangroves inland. Mangrove encroachment on freshwater marshes may eventually result in loss of important habitat for wildlife in EVER.

The primary objective of my 2016 YLCC internship at the South Florida/Caribbean Inventory and Monitoring Network (SFCN) was to develop protocols for monitoring the movement of the mangrove-marsh ecotone (the boundary between mangrove and freshwater marsh habitat). Mentored by SFCN Quantitative Ecologist, Dr. Andrea Atkinson, and SFCN Botanist, Brooke Shamblin, I used GIS to create digital maps of the current location of the mangrove-marsh ecotone based on aerial imagery. By comparing the digitized mangrove-marsh ecotone to GPS locations of the ecotone taken on the ground, I was able to refine standard operating procedures to improve the accuracy of digitized ecotone lines. I also developed procedures for analyzing change in the ecotone over time.

These analyses will enable SFCN to provide periodic updates on the rate of movement of the ecotone and change in the amount of freshwater marsh habitat within each region of the park.

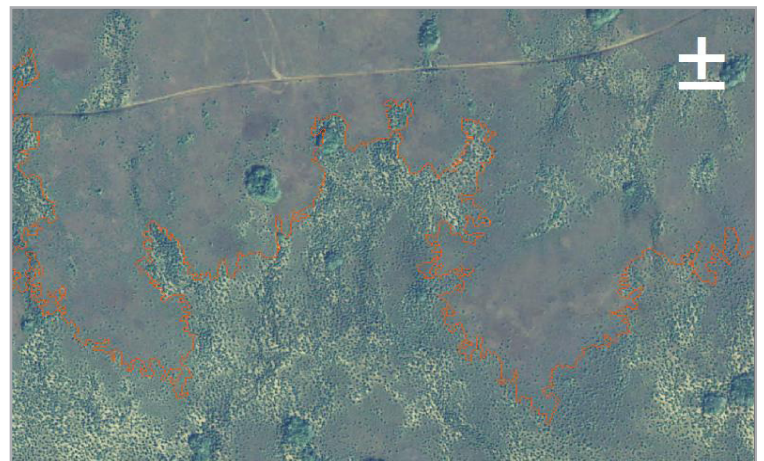
The products of this internship will facilitate accurate monitoring of the movement of mangroves and inform future park management decisions as sea level rises. The long-term monitoring of the mangrove-marsh ecotone will increase understanding of the effects of sea-level rise on EVER and has potential to inform future management plans that may help mitigate the effects of sea level rise on freshwater marshes threatened by mangrove encroachment.

*“She took charge of her project and exceeded all our expectations which is why we are making her a co-author on the protocol.”*

*– Andrea Atkinson, South Florida/  
Caribbean Inventory and  
Monitoring Network*



Chandler taking GPS coordinates of the mangrove-marsh ecotone (i.e., the boundary between mangrove and marsh) in Everglades National Park. NPS Image



A segment of the digitized mangrove-marsh ecotone line (orange) in Everglades National Park. NPS Image

## Climate Change Interpretation through Citizen Science



**Lauren Salvato**  
Indiana University Bloomington

Grand Canyon National Park is adored by many, with over five million visitors per year. What is not necessarily recognized by each visitor is that climate change is changing this remarkable place. Since 1916, average temperatures at the Grand Canyon have increased 2.4°F (Fisichelli et al., 2015), resulting in extended dry periods and decreased precipitation. These changes have impacted the diverse ecology and stressed valuable water supplies in the area. In an effort to better understand the effects of localized climate change, the park started citizen science programs at the North Rim, South Rim, and Phantom Ranch to help inform future natural resource management decisions as the park is met with increasing annual visitation.

My work at the North Rim consisted of two main projects: 1) outreach and education and 2) phenology data collection. I created ranger programs to communicate local climate change impacts and inspire visitors to get involved in the phenology citizen science program. Phenology is the study of life stages of flora and fauna, a scientific discipline that is linked to weather and climate. Collecting data is simple to do and all ages can be involved, no professional degree or previous experience is required. Trees that are sensitive to temperature changes

are monitored weekly and provide information about how seasons are shifting. The phenology citizen science program at the North Rim began in September 2015, and my role was to collect data twice per week to help establish the preliminary data set. At least five years of data is needed to demonstrate whether spring is arriving earlier, and by how much.

Moving forward, incorporating climate change into ranger programs is important in order to communicate and educate visitors about the challenges faced by the Grand Canyon and all national parks. Citizen science serves as a proactive solution to gain information to address these threats.

*“I enjoyed working with Lauren and fostering her growth throughout the program.”*

*– Mandi Toy, Grand Canyon National Park*



Phenology data was collected on the Quaking Aspens twice per week at the North Rim. NPS Image



# YLCC Internship Updates

## Monitoring Soil Moisture and Fuel Loads in the Recharge Zone at Hot Springs National Park for Climate Change Effects



**Leslie Fowler**  
University of Idaho

I had the pleasure of spending this past summer working at Hot Springs National Park in Arkansas on a YLCC internship. Being from Idaho, the humidity was brutal but my experiences were priceless. My primary focus was monitoring soil moisture and fuel loading within the recharge zone and investigating the potential impact of climate change on fire occurrences, water quality, and water quantity within the park.

The impact of fire on water quality and quantity is of particular concern here, because the park's primary resource is geothermal spring water. Over the past century, Hot Springs National Park and the communities surrounding it aggressively suppressed wildfires. Ninety-five percent of the recharge zone has not burned in over 100 years. This exclusion of fire has allowed fuel to accumulate over many years. And in addition to heavy fuel loads, climate change increases the likelihood of catastrophic wildfires within the recharge zone.

The YLCC internship provided me a unique opportunity to apply my skill set and knowledge to benefit Hot Springs National Park. The objectives of this study were to measure and analyze 1) soil moisture, 2) fuel loading, and 3) fuel and duff moisture within the recharge zone to establish a baseline for future monitoring.

During my internship I determined the best methods to provide deliverables for the park's natural resource manager. These products included fuel loading data, fuel distribution maps, analyses of soil moisture trends, calibration for a duff moisture meter, and a resource brief. The findings will benefit fire and natural resource managers, and inform future decisions regarding allocation of firefighting resources, prescribed fire planning, and water quality monitoring needs.

Among project deliverables, I also provided an action plan that synthesized scientific evidence, budgetary constraints, short-term and long-term planning objectives, and prioritization of prescribed burn units for both ecological benefits and fuel reduction near the wildland-urban interface.

*“Leslie and I had a great mentoring relationship, with open communication and persistence in working together.”*  
– Shelley Todd, Hot Springs National Park



Fowler takes weather conditions that will be used later for analyses of fuel and duff moisture responses to environmental conditions. NPS Image



Data from soil moisture monitors was collected periodically throughout the summer for continuous monitoring. Monitors were installed on four sites that represented low and high elevations, as well as northern and southern aspects. NPS Image

# YLCC Internship Updates

## Establishing Fisheries Baselines for a Changing Arctic, Kobuk Valley National Park, Northwest Alaska



**Ross Smith**  
University of Oregon

Archaeological sites preserve evidence of long-term human and animal interactions useful for understanding and managing the effects of current climate-induced changes in Arctic Alaska. During my 2016 YLCC internship I studied existing archaeological collections from northwest Alaska to evaluate their utility as long-term records of fish populations and Alaska Native fisheries in the region.

Working in collaboration with curators at the University of Alaska Museum of the North (UAMN) and NPS repositories in Fairbanks and Anchorage, I inventoried 64 existing collections from archaeological sites in Kobuk Valley National Park, Gates of the Arctic National Park and Preserve Noatak National Preserve, Cape Krusenstern National Monument, and Bering Land Bridge National Preserve. I also compared the locations of ethnohistoric Inupiat placenames and known archaeological sites to identify areas where additional archaeological fishing sites may be located along the Kobuk River.

In the course of my research I observed that fish remains are generally underrepresented in existing archaeological faunal assemblages. I concluded this is due in part to past field methods and data collection strategies, including the

types of sites and features that were selected for intensive investigations. I also found that many of the named fishing locations had not been surveyed by archaeologists.

I recommended that existing bulk sediment samples at UAMN and NPS repositories be processed to recover the remains of fish, and that the NPS systematically survey and inventory archaeological and historical resources at named locations to document evidence of fishing-related activities. I also recommended that survey priority be given to named locations in areas threatened by climate change effects, such as named locations at low elevation on the outside bend of a river channel meander that may be subject to erosion, or along steep unconsolidated south facing slopes that may be susceptible to permafrost thawing and slumping.

*“Ross Smith’s project was pretty tightly defined and regimented and that worked well for him at his stage of research.”*

*– Jeff Rasic, Gates of the Arctic National Park and Preserve*



An antler leister barb from Noatak National Preserve. NPS Image



An ivory fish lure from Bering Land Bridge National Park. NPS Image

# YLCC Internship Updates

## Develop 4th Grade Climate Change Curriculum in Concert with Climate Change Study



**Tearina Asiata**  
University of Hawaii - Hilo

During my summer 2016 YLCC internship, I worked collaboratively with the National Park of American Samoa in developing a climate change curriculum targeting 4th graders across the territory.

Climate change has affected people all over the world in many ways. Some islanders within the Pacific region have been forced to leave their island homes behind, and relocate to other areas, due to issues such as sea level rise. Impacts from sea level rise and coastal erosion are already present on the islands of American Samoa. However, the majority of the population thinks lightly of such problems, and remains unaware of how serious this matter is.

During my internship, I researched ideas for how to design an education curriculum focusing on climate change. Several hours per day were spent compiling information used for the different lessons. I convened meetings with some of the local preceptors (teachers) to help clarify what would most benefit the students. I also delivered educational programs with the teachers of Ta'u and Ofu-Olosega Islands elementary schools.

The resulting curriculum guide helps educate students and raise awareness about the effects of climate change on our islands. In addition, it highlights effective solutions

that can be practiced in order to alleviate the effects of climate change across the islands. With successful implementation, the guide can serve as a model for other Pacific Islands and territories.

Aside from the curriculum, I was given the chance to train the field crew to conduct field work. For several weeks, I was assigned to oversee some of the work being done within the Rainforest Crew, such as entering data into the database and designing maps using GIS.

*“Excellent! The project has achieved what we designed it to achieve.”*

*– Tavita Togia, National Park of American Samoa*



Asiata and coworkers conducted hikes for summer school programs. NPS Image

Items	Week 1	Week 2	Week 3	Week 4
<b>Topics</b>	Climate vs. Weather; Climate Change; Causes of Climate Change	Climate Change Impacts; Flora and Wildlife	Flora and Wildlife; Marine Ecosystem	Climate Change Solutions and Champions
<b>ASDOE Science Standards</b>	ASDOE ES Standard 4.6.2, 4.6.3	ASDOE ES Standard 4.6.2, 4.6.3, 4.6.4	ASDOE ES Standard 4.6.2, 4.6.3, 4.6.4	ASDOE ES Standard 4.6.2, 4.6.3, 4.6.4
<b>Lessons Covered</b>	Climate and Weather basics; Climate Change Science 101	Global and local impacts of Climate Change; Impacts and Intro to Flora and Wildlife	Traditional uses and significance of flora and wildlife; intro to climate change impacts on marine ecosystems	Reduce, Reuse and Recycle; Rainforest Program climate change project and class field trip
<b>Activities Involved</b>	Research, Group work, Individual work, Presentations	Research, Hands-on activities, Presentations	Hands-on activities	Hands-on Activities, Hike

The 4th grade curriculum guide put together by Asiata tied climate change lessons to standards and benchmarks established by the American Samoa Department of Education. NPS Image

# YLCC Internship Updates

## Interpreting Climate Change in Coal-Dependent Communities



**Tori Walker**  
American University

New River Gorge National River is located in “coal country”, an area historically dominated by coal and lumber industries, which has led to trade-offs between employment and environmental impacts. Fears surrounding job security and political campaigns from industries have led to misunderstandings of climate science and have made the topic extremely difficult to address with local audiences.

The goal of my YLCC internship was to find a way to start this difficult conversation and evolved to distinct efforts: create a curriculum for high school programs, and develop talking points for informal interpretive programs.

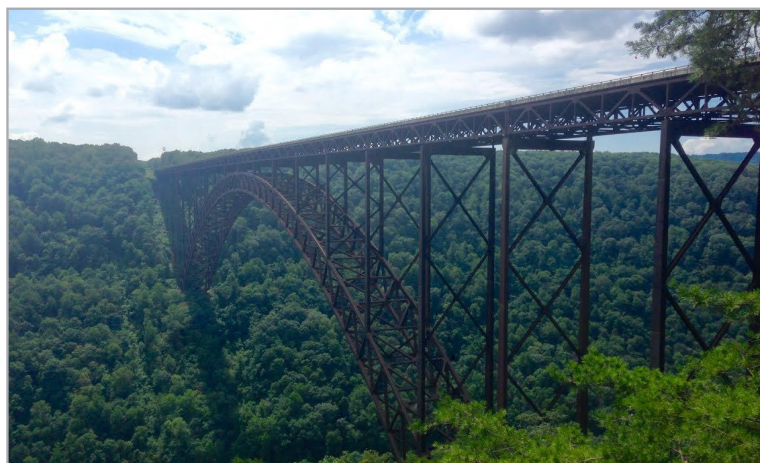
For the first part, I developed a three-unit, eight-lesson curriculum that will be introduced in high schools in the spring. The lessons, including phenology and weather monitoring, are place-based and hands-on, allowing students to go into the field to learn how climate science works. The last unit focuses solely on solutions, and encourages students to think critically about problems that West Virginia will face and how they could be addressed by policy makers.

In order to successfully incorporate climate change into interpretive programs, I needed to talk to people. I began by setting up visitor contact tables at overlooks with climate change props. Through my conversations—many with locals and retired coal miners—I learned the vital components needed for any successful climate change interpretive program. These include empathy and story sharing. Instead of throwing facts and figures at people, it is much more effective to ask questions and listen. These experiences are weaved throughout the talking points and facilitated dialogue guides that I created for park employees.

I think now more than ever, climate change communication is crucial. I am excited to see how my work is improved upon and used in schools and programs in the future at New River Gorge.



Tori Walker, celebrating the centennial while teaching junior rangers about the role of the NPS and importance of our national parks at New River Gorge. NPS Image



The forest surrounding New River Gorge bridge, once almost completely logged, is now part of one of the largest carbon sinks in the US. NPS Image

# Training and Education Updates



## Climate Change Response Program Natural Resource Stewardship and Science

This quarterly newsletter celebrates the latest initiatives and accomplishments by National Park Service sites and programs in response to climate change.

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## Common Learning Portal: Training Updates

The Association of Climate Change Officers (ACCO) is offering a series of 2-day training academies in Golden, Colorado to enable attendees to satisfy all course requirements for the CCP® Designation, a credential issued through ACCO's CCO Certification Program.

Produced and offered in partnership with the National Renewable Energy Laboratory and Colorado Water Conservation Board, workshop participants will learn from experts about greenhouse gas management and accounting, the energy-water-food nexus, organizational change, stakeholder engagement and basic adaptation planning frameworks with a regional focus added for Colorado and the Rockies. Professionals from the public and private sectors, higher education and the NGO community will benefit from the classroom-style, interactive training activities.

This workshop enables decision makers across roles, functions and sectors to develop a better understanding of how the implications of climate change intersect with their decision making.

### More information

### Interpreting Climate Change Course- February 28 - March 2, 2017

This course provides an overview of the practical knowledge and skills that will enable interpreters to develop effective, engaging climate change programming for both natural and cultural sites. Participants will consider a range of engagement techniques such as facilitated dialogue, skills for dealing with controversy, and presenting multiple perspectives. These and other techniques will be applied to an overview of climate science and audience research. Participants will engage in group discussions to share best practices, build confidence and identify meaningful site connections.

### More information

Ryan Stubblebine  
[ryan\\_stubblebine@nps.gov](mailto:ryan_stubblebine@nps.gov)

## CCRP Welcomes: Amanda Carlson

Amanda Carlson is joining the CCRP team as a Geoscientists-in-the-Park climate change adaptation assistant. She is currently a 2nd-year PhD student at Colorado State University in the Graduate Degree Program in Ecology, researching how multiple disturbances interact to influence forest species migration in response to climate change in the Rocky Mountains. For the past year, she has worked on the West Fork Complex burn area in southwest Colorado to understand the influence of bark beetle outbreaks on vegetation recovery from wildfire. Before coming to CSU, Amanda earned a Bachelor's in environmental science and earth and planetary science from UC Berkeley and a Master's degree in GIS from the University of Edinburgh.

As a member of the CCRP team, Amanda will be working on analysis and visualization of climate vulnerability data from across the National Park system. She will also be working on a database of adaptation management. Contact Amanda at (970) 267-7165 or at [amanda\\_carlson@partner.nps.gov](mailto:amanda_carlson@partner.nps.gov).



Amanda Carlson

## Monthly Webinar Series

Join CCRP for presentations by leading climate change scientists and communicators on the second Tuesday of every month from 2:00 to 3:30 PM EST.

**January 12** | *Climate change is Advancing Spring Onset Across the U.S. National Park System.*  
William Monahan, USDA Forest Service, and Alyssa Rosemartin, USA National Phenology Network

[Register for the webinar here](#)



William Monahan



Alyssa Rosemartin