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SCIENCE • ADAPTATION • MITIGATION • COMMUNICATION

Adapting Access Management to Climate Change in North Cascades

Between the fall of 2011 and spring of 2012, the North Cascadia Adaptation Partnership (NCAP, www.northcascadia.org) conducted vulnerability assessments and identified adaptation strategies on four key issues vital to managers in the northern Cascades of Washington: access, wildlife, vegetation, and fish. NCAP is a science-management collaboration that focuses on 6 million acres managed by North Cascades National Park Complex (NOCA), Mount Rainier National Park, Mount Baker-Snoqualmie National Forest (MBSNF), and Okanagan-Wenatchee National Forest. A two-day workshop was held for each issue where federal land managers, research scientists, state, and private partners identified 19 adaptation strategies and 60 tactics were identified for use across the NCAP landscape.

Recently, managers in the NCAP area have been repeatedly reminded of the effects of climate on hydrology and human access along roads and trails (right). The NCAP workshop identified four main impact pathways through which transportation systems are vulnerable to climate change: higher peak flows in autumn and winter, reduced snowpack and earlier snowmelt, increased soil moisture, and lower low flows in summer.

In April 2013, land managers from NOCA, MBSNF, and the Washington Department of Transportation met with climate scientists from University of Washington and the U.S. Forest Service in a follow-up workshop to apply the NCAP results to specific areas in NOCA. Workshop goals were to: 1) elevate the dialogue on climate change and incorporate it into management of park access, 2) discuss integration of climate change into risk assessment, and 3) determine how to enhance land management planning and activities with available climate change data and NCAP vulnerability assessment. Projected climates were applied to two watersheds and alternative access management adaptations were explored. Participants evaluated data on projected climate change, including basin type, 100-year stream flows, and snowmelt date to identify exposures and sensitivities related to existing transportation facilities. Following this, adaptation strategies and tactics were identified for use at each specific site and briefings were presented to NOCA and MBSNF leadership. One adaptation strategy suggested by participants was to revise the location of a planned road-to-trail conversion because the original location contained a roadbed and culverts that were unsuited to projected higher flows. Contact: Regina_Rochefort@nps.gov



Cover: Looking west from Copper Ridge in North Cascades NP. Photo: NPS/Tanya Kitterman.
Above: Boston Creek washing out Cascade River Road, August 12, 2013. Photo: NPS/Kevork Arackellian.

Regional Climate Scenarios

As part of the National Climate Assessment, climate scenarios for each region of the United States were developed. Handy two-page briefs were produced that summarize observed changes as well as possible future conditions. You can find the two-page briefs at: <http://scenarios.globalchange.gov/content/regional-climate-trends-and-scenarios-summaries> or the full documents at: <http://scenarios.globalchange.gov/scenarios/climate>

Please Welcome Matt Holly to the CCRP

Matt Holly joined the Climate Change Response Program this summer for a detail and has accepted a position as Visual Information Specialist. Matt will oversee the public climate change web site on NPS.gov as well as the CCRP Intranet and Sharepoint pages. He will maintain the CCRP social media accounts and is involved in various other interpretive projects such as the *Interpreting Climate Change* virtual course. Matt's background is in Interpretation, having previously worked in Yosemite, Voyageurs, Acadia, and Sequoia National Parks. After nine years of working in a park setting, Matt is excited to get a chance to work in an office where he can collaborate with and support staff at a variety of different parks.



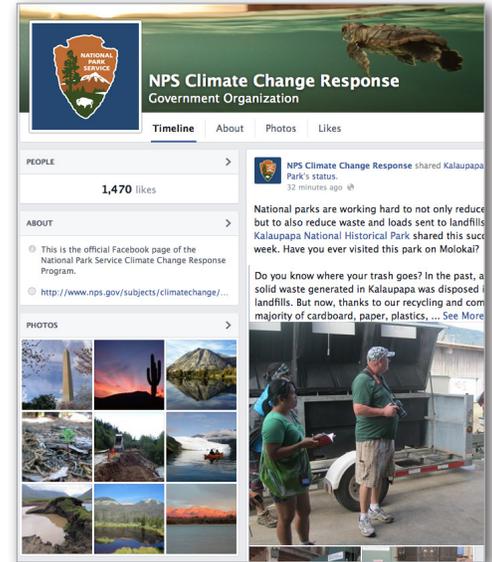
Have You Seen Our New Facebook Page?

 Have you ever thought to yourself, "Wow, I really love these climate change newsletters; I wonder if there's a way I can stay up-to-date on climate change happenings on a daily basis?" No? Well, maybe you've thought, "Hey, here's a really neat thing we did in my park to respond to climate change; I wish I had a way to share it with others!" Or, "There's a really fascinating climate change impact happening in my park that I wish would receive some more attention!"

Regardless if you're looking to learn or to share, the new NPS Climate Change Response Program Facebook page can help you out. Created in June 2014, this page is sharing stories of how climate change is affecting national parks and how parks are responding to these new challenges. Since anyone in the public can access these posts, this page is a powerful tool to share with the world both the impacts and our response to our changing climate.

If you've got something going on in your park you want to share and would like to coordinate a post, contact Matt_Holly@nps.gov

Or, if you're just hoping to stay current on the latest National Park Service climate change happenings, make sure you Like the page at www.facebook.com/npsclimatechange. Even if you don't have a Facebook account, you can still read all the posts (you just won't be able to leave a comment).



Congratulations to John Morris!

In recognition of his outstanding contributions to climate change communication and training in the *Climate Change in America's National Parks* webinar series, the Climate Change Response Program awarded John Morris a special thanks for achievement (STAR) Award on March 5, 2014.

The *Climate Change in America's National Parks* webinar series is one of the longest running climate change webinar series in the country, and John Morris has played the role of webinar host and moderator since its

inception. John was critical in defining the style and format of the series, and played the role of popular webinar moderator for more than 5 years. John's extensive experience as a climate change educator contributed to an open, engaging and professional atmosphere that few other webinar series can match. John is a leader in climate change communication in the Alaska region and Servicewide. The NPS Climate Change Response Program has sincerely enjoyed working with John. To receive information about upcoming webinars, contact Melanie_Wood@nps.gov

CCRP Welcomes Laura Sturtz

Laura Sturtz will be acting as the Climate Change Communication Specialist for the next four months. She is coming to the program from Kenai Fjords National Park in South Central Alaska where she is the Interpretive Operations Supervisor. Prior to working at Kenai Fjords, Laura worked in interpretation at Cape Hatteras National Seashore and in a variety of seasonal interpretive park ranger positions. At Kenai Fjords, Laura works on a number of climate change projects in conjunction with the CCRP. She is looking forward to contributing to the NPS climate change work at the national level.



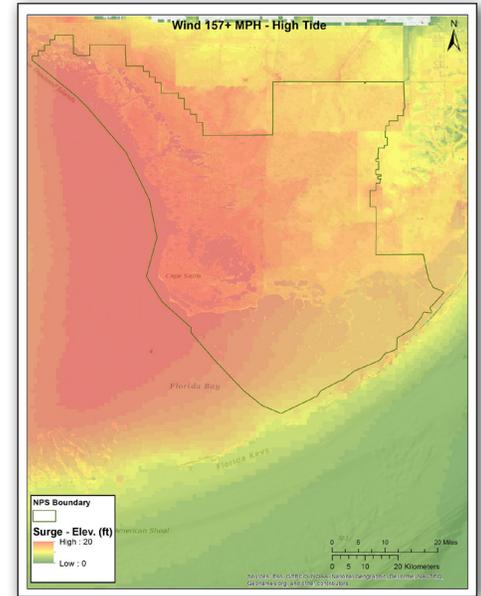
NPS Scientists Contributing to Published Research

Maria Caffrey and Rebecca Beavers have an article in *Park Science* exploring sea level rise in national parks: [http://www.nature.nps.gov/ParkScience/archive/PDF/Article_PDFs/ParkScience30\(1\)Summer2013_6-13_CaffreyBeavers_3647.pdf](http://www.nature.nps.gov/ParkScience/archive/PDF/Article_PDFs/ParkScience30(1)Summer2013_6-13_CaffreyBeavers_3647.pdf). Storm surge maps for 45 parks are also available (right), showing possible storm surges for different category hurricanes under mean and high tide conditions: <http://www.flickr.com/photos/125040673@N03/sets/>

William Monahan and Nicholas Fisichelli published an article in PLoS ONE comparing recent temperature data with historical data in 289 national parks. They found that temperatures are at the high end of their historical range across several variables including annual average temperature, average temperature of the winter months, and average temperature of the summer months. You can read the article at <http://dx.plos.org/10.1371/journal.pone.0101302>

NPS Climate Scientist Patrick Gonzalez was a co-author on a study published in *Global Change Biology* showing that up to 1/4 of NPS land is vulnerable to vegetation shifting out of its historical range. The research also identified refugia: environments that are projected to remain climatically stable and may provide habitat for species that have seen their surrounding environments change. <http://onlinelibrary.wiley.com/doi/10.1111/gcb.12669/pdf>

NPS and university scientists collaborated on a study looking at the past and future relationship between the effects of climate change and land use changes around national parks. Some parks like Great Smoky Mountains show great land use changes but less climate exposure, while others like Great Sand Dunes exhibit low land use and high climate exposure. Some parks, like Point Reyes, are high on both axes. Read the article in *Ecological Applications* at <http://dx.doi.org/10.1890/13-0905.1>



Above: Storm surge map for Everglades National Park during a Category 5 hurricane at high tide.

Guidance for Foundation Documents

Recently, a Climate Change Planning Guidance project was initiated as a collaboration of multiple programs. The goal of the project is to develop planning tools and guidance to help parks address climate change effects in planning products and decisions affecting resources, facilities, operations, and visitor experience and use of national parks.

The first outcome from this effort is, “Guidance for Addressing Climate Change in National Park Service Foundation Documents.” The guidance provides detailed instruction for considering climate change in park founda-

tion documents answering the following three questions:

- Why does climate change matter to my park?
- Where can I find climate change information for my park?
- Where does the climate change information fit in a foundation document?

Download the report at <http://www1.nrintra.nps.gov/climatechange/assets/docs/ClimateChangeFoundationDocumentGuidance.pdf>

Make Some Popcorn, Sit Back, and Enjoy

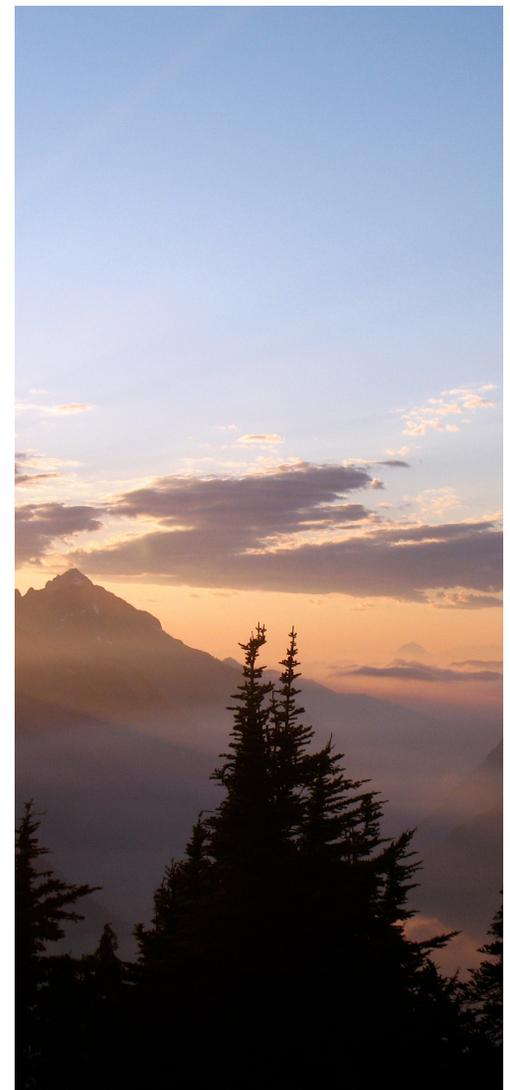
If you’re looking for some new climate change videos to watch, you’ve come to the right place!

The North Coast and Cascades Science and Learning Network has a couple new films to enjoy. *Tides of Change* (<http://youtu.be/bBo7AkIxTIs>) follows Olympic National Park marine ecologist Dr. Steve Fradkin as he surveys the intertidal zone to document changes.

Keepers of the Beat (<http://youtu.be/IJTK-mACIU6Y>) explores the alpine glaciers of North Cascades National Park along with park geologist Dr. Jon Riedel.

The Environmental Protection Agency has created a new series of videos highlighting actions we can all do in our daily lives to act on climate change. You can view the playlist of 15 videos at <http://www.youtube.com/playlist?list=PLBhfkujnoRAGTFtLreccWDfpxBIspCGv>. Not to worry; you can finish all 15 videos in under 10 minutes!

The E.O. Wilson Biodiversity Association has a new video narrated by Harrison Ford about the impacts of climate change to Adelie penguin rookeries: <http://youtu.be/-uGh3UYs5mk>



New IPCC Report Finds More Impacts and Vulnerabilities

The Intergovernmental Panel on Climate Change (IPCC) released its new report *Climate Change 2014: Impacts, Adaptation, and Vulnerability* on March 31.

The overall conclusion: “Human interference with the climate system is occurring, and climate change poses risks for human and natural systems.” Other major conclusions:

- Many terrestrial, freshwater, and marine species have shifted their geographic ranges, seasonal activities, migration patterns, abundances, and species interactions in response to ongoing climate change (high confidence).
- A large fraction of both terrestrial and freshwater species faces increased extinction risk under projected climate change during and beyond the 21st century, especially as climate change interacts with other stressors, such as habitat modification, over-exploitation, pollution, and invasive species (high confidence).
- The overall risks of climate change impacts can be reduced by limiting the rate and magnitude of climate change. Risks are reduced substantially under the assessed scenario with the lowest temperature projections (RCP2.6 - low emissions) compared to the highest temperature projections (RCP8.5 - high emissions), particularly in the second half of the 21st century (very high confidence).
- Poor planning, overemphasizing short-term outcomes, or failing to sufficiently anticipate consequences can result in maladaptation (medium evidence, high agreement).

You can find the entire volume at <http://ipcc-wg2.gov/AR5/report/final-drafts>

Contact: Patrick_Gonzalez@nps.gov

Plant Responses and Climate Pivot Points

In light of growing concerns over the impacts of drought, climate change, and land use intensification, natural resource managers have a critical need for early warning signs that indicate important shifts in the condition of ecosystems. To help inform this need, DOI has invested and is expanding efforts to monitor the status and trends of natural resources over vast regions of the U.S.

A team from the U.S. Geological Survey and National Park Service has developed a new approach to determine the responses and critical points at which plant species decline in abundance using long-term monitoring data. These plant responses and “climate pivot points” can be determined from estimates of plant canopy cover, a frequently used measurement of plant abundance, to better understand the performance of plant species over a range of climatic conditions and to forecast changes in plant species assemblages under future climates. When there are extreme or sustained climatic conditions beyond a climate pivot point, which negatively affect the cover of dominant plant species or collectively influence many plant species, there may be irreversible land degradation marked by reduced productive capacity and diversity of a site, altered food and habitat for wildlife, and services upon which human well-being depends. For example, extreme drought and freezing temperatures in Big Bend National Park in 2011 that were well beyond the climate pivot points of creosote bush, a dominant shrub across North American warm deserts, resulted in widespread reduction in cover of

the shrub and killed other plant species in the park (below).

Employing long-term monitoring data to determine plant responses and climate pivot points can provide managers with an early warning sign of what environmental conditions lead to increased ecosystem vulnerability. Contact: smunson@usgs.gov



Above: Repeat photos of creosote bush and other Chihuahuan Desert vegetation before (top) and after (bottom) extreme drought and freezing temperatures in Big Bend National Park. Photo: Natasja van Gestel

Adaptation in NER

A new Natural Resource Report, *Overview of climate change adaptation needs, opportunities and issues: Northeast Region Coastal National Parks*, has been finalized. It provides an overview of adaptation work underway and identifies needs for Northeast Region coastal parks. The high priority coastal climate adaptation issues identified within are habitat change, landform migration, erosion, visitor experience, and damage or degradation of facilities and cultural resources. Near term priorities on climate adaptation should be research that will support selection and implementation of adaptation options and integration of climate change information into planning. You can read the entire report at <https://irma.nps.gov/App/Reference/Profile/2209091>

Contact: Amanda_Babson@nps.gov

PWR Drought Brief

A brief has been developed for park interpreters, concessioners, and other stakeholders about the current California drought conditions and climate change. It is meant to assist staff in providing consistent messaging across parks as visitors ask questions about the drought. It outlines the key research and information that support the connection between the current drought conditions and climate change. In particular, it addresses common questions, such as:

What is the connection between this year's drought and climate change? What can we say is attributable? What qualifiers exist? Can we tie this year's condition to the long term trend?

You can download the brief at http://www1.nrintra.nps.gov/climatechange/assets/docs/PWR_Drought.pdf

Introducing the George Melendez Wright Initiative for Young Leaders in Climate Change

This issue of Climate Change Response Program News highlights an important transition in the CCRP's support for young adults working on climate change in national parks. From 2010-2013 the George Melendez Wright Climate Change Youth Initiative (CCYI) funded interns who worked on a wide range of park-defined projects and graduate research fellows who conducted their own peer-reviewed research in parks. The program was funded mostly by the CCRP and conducted in partnership with the University of Washington via a Pacific Northwest CESU agreement.

The pages that follow present first-person stories from some of last year's interns and fellows. We are delighted to share them with you and to celebrate these students' accomplishments and new-found connections to national parks. Their stories are a testament to the value of immersive experiences for making parks relevant to young adults, and to youth programs for helping parks confront a complex, multifaceted, and long-term problem. Consistent with the upcoming NPS Centennial, the students herein have clearly "found their park."

A new version of the program is being launched in the Fall of 2014 and we will once again see motivated, accomplished, and

creative young adults help parks understand, mitigate, adapt to, and communicate about climate change. This new program will differ from the past in its strong emphasis on professional development of interns.

The George Melendez Wright Initiative for Young Leaders in Climate Change (YLCC) will place college students and recent graduates into paid 12-week internship positions in parks and program offices. The interns will apply climate change knowledge to real problems and needs that parks face, gain valuable work experience, explore career options, and develop leadership skills. The projects will be designed by parks and programs to be rigorous and complex, allow significant autonomy, yield clearly-defined products, and provide significant leadership development opportunities. Interns who complete all of the program and academic requirements with a high degree of success will be eligible to be hired noncompetitively into a federal job within the NPS or other Department of Interior land management bureau.

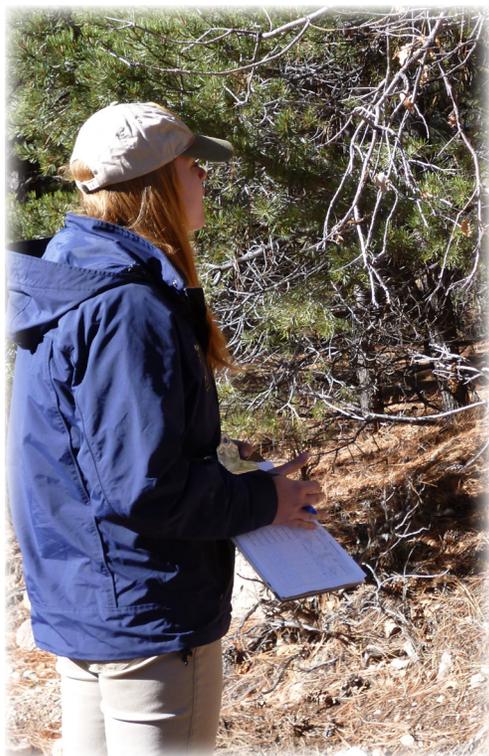
We in the CCRP are excited to see the growth and continuation of a youth initiative, and look forward to continuing the NPS's engagement of young adults interested in climate change. Contact: Tim_Watkins@nps.gov

Looking for Brook Trout on the Namekagon River

George Melendez Wright Fellow Patrick Shirey (below) conducted research on the Namekagon River in the Saint Croix National Scenic Riverway watershed to look for the presence of brook trout. Brown trout, a non-native species, have out competed the native brook trout and especially thrive in warmer waters. *St. Croix 360* tagged along with Patrick as he conducted his research; you can read the article at <http://www.stcroix360.com/2013/09/taking-the-brook-trouts-temperature/>



Phenological Citizen Science in Grand Canyon National Park



Phenology is widely accepted as one of the most effective tools for detecting initial impacts of climate change on species, communities, and ecosystems. Because of the simplicity of its methods, phenology provides an ideal means for engaging visitors and students as citizen scientists. This summer, Laura Shultz (left) laid the foundation for a formal climate change education program at Grand Canyon National Park employing phenology.

Grand Canyon National Park now has sites monitoring three species of trees on both the South and North Rims as well as in two elevations of the Inner Canyon. Data sheets were developed to integrate data collection by visitors into formal programming during summer 2014. As data is collected, the species interacting with the trees are noted, allowing a database of what species depend on these trees, and will be affected by their phenological shifts, to be assembled. The Grand Canyon School, the only K-12 school inside a national park, has established their own phenological monitoring site, and twenty students collected data weekly under Laura's supervision.

But it wasn't just current data that occupied Laura's time throughout the summer. She also conducted climate change themed roves to field test education techniques, and worked on an interpretive guide about the phenology project. In addition, the park's archives were scoured for past data points to fill in our understanding of local past climate.

Interdivisional relationships were strengthened between the science and interpretive divisions as this phenology & climate change education program took shape. Trips into the canyon to establish new monitoring sites were undertaken with science interns who work at the Native Plant Nursery. These interns help monitor sites on the South Rim and, in exchange, Laura worked in the Native Plant Nursery each week to hone her plant ID skills.

Development of a formal interpretive program that contributes to current scientific research within the park is a huge asset to both divisions, and allows visitors a more hands-on tangible connection to climate change within the parks and NPS as a whole.



Rising Seas and Storm Surges in the Northeast Region

While working as a George Melendez Wright Climate Change Youth Initiative Intern over the summer of 2013, Andrew Neil researched tide gauge coverage for 12 Northeast Region coastal parks. He mapped the sources of tidal data in relation to the parks, and created a “living” database of this information which can be used to manage valuable cultural and natural resources and park infrastructure in the face of sea level rise and increased storm surges caused by climate change. Working for the region meant that he was not stationed at a particular park and instead had the opportunity to work with multiple parks. Andrew helped monitor fish at Saugus Iron Works National Historic Site where a cultural restoration project could face new challenges with sea level rise and increased flooding on a tidal river. He toured the Boston Harbor Islands National Recreation Area by boat and on foot to understand how hardened barriers like sea walls and bulkheads affect natural processes like beach migration. He explored the vibrant green salt marshes of Cape Cod National Seashore and discussed issues related to tidal data and how it is being used to assess the vulnerability of salt marshes to climate change. At Acadia National Park, Andrew worked with a university collaborator to conduct GPS surveys of benchmarks and critical resources to accurately measure elevation. Vivid images linger in his mind from each park that he visited, and valuable lessons have helped him develop a strong understanding of using science to guide management decisions.

A Close Look at Frog Ponds in the Cascades

Amanda Kissel, a PhD student at Simon Fraser University (SFU) in British Columbia, Canada, explored the resiliency of high-elevation Cascades frogs (*Rana cascadae*) to future climate change. Her work built on years of Cascades frog and climate research by Dr. Wendy Palen (SFU), Dr. Mike Adams (USGS Amphibian Monitoring and Research Initiative), and Dr. Maureen Ryan (University of Washington) in the Pacific Northwest. She hopes to use data from these long-term monitoring efforts, as well as new data to “add up” the effects of climate change at different life-stages for Cascades frogs.

Amanda spent the summer of 2013 bouncing between North Cascades National Park, Olympic National Park, and Mt. Rainier National Park, and hiked over 180 miles to collect missing baseline data on tadpole mortality of Cascades frogs as a direct result of pond-drying. She estimated reproductive effort in over 50 high-elevation ponds, and revisited sites throughout the summer to assess tadpole growth and mortality. The ponds span a spectrum of wetland hydro-period types, ranging from short (dries almost every summer) to permanent (never dries), and are typically fed by snowmelt in the early summer. The intention is to use these data to look at population-level responses of Cascades frogs under future climate scenarios, in which ponds are expected to dry more frequently and earlier in the summer. National parks are the perfect setting for this study, given that other disturbances usually

attributed to amphibian decline are for the most part absent, allowing her to isolate the effects of climate.

Climate change has already been implicated in global amphibian declines, but for specialized alpine amphibians such as Cascades frogs, it is unclear whether climate change will result in population increases or population decreases. Unlike their low-elevation counterparts, amphibians living in the sub-alpine are subject to unusually short growing seasons, and have spent thousands of years adapting to the harsh climate. Will longer summers allow adults to increase resource intake, resulting in an increase in reproductive fitness? Or will the increased unpredictability of climate negatively affect these well-adapted populations? These are the types of questions that Amanda hopes to answer with her work, using this well-established study system to answer new questions about the future stability of montane amphibians in national parks.



Climate Education in Lowell NHP



During the summer of 2013, Devan Hawkins was a George Wright Climate Change intern at the Lowell National Historical Park. His project was to design a one-hour educational program about climate change incorporating the Park’s themes and mission statement that could be used for middle-school aged visitors to the park and could travel to area schools.

The task of incorporating the themes of an urban historical park to climate change was initially difficult since climate change is often considered solely an environmental issue. The first two weeks of the internship Devan spent touring Lowell and gaining an in-depth understanding of the history of the city. This helped him draw a deep connection between the history of the park and climate change.

The story of the transition of Lowell’s mills from water to coal power and how the increasing use of fossil fuels since the Industrial Revolution has led to accelerating climate change formed the centerpiece of the educational program he developed. It ultimately included hands-on exercises about what fossil fuels are, how they provide energy, and how they contribute to climate change. It also included a role-playing activity challenging students to imagine that they were alive in Lowell in the 18th century and to debate whether the city’s mills should begin using coal for power.

After designing the curriculum and finding materials to use for the program, Devan was able to pilot it directly on multiple occasions. These experiences allowed him to see that his work was not just text on a piece of paper, but a real program conducted with students.

How Might Climate Change Impact the Eastern Tent Caterpillars?

Eastern tent caterpillars inhabit the East Coast of the United States, from southern Canada to Northern Florida. Therefore, as a species, they experience very different spring regimens.

Mariana Abarca Zama, a graduate student at the George Washington University, wanted to find out if different populations are adapted to their local conditions, or if all eastern tent caterpillars could thrive anywhere along the East Coast.

To do this she spent the summer and early fall of 2013 collecting egg masses of eastern tent caterpillars from national parks and other locations from Maine to Florida. The moths of eastern tent caterpillars lay their eggs in masses on their main food plant, black cherry trees, so she searched more than 1000 black

cherry trees to find over 400 egg masses. She brought the egg masses back to her lab and put them in growth chambers to simulate warming conditions.

Since eastern tent caterpillars feed only on the expanding foliage of black cherry trees, if they hatch too early, they face starvation and harsh weather conditions, and if they hatch too late, they miss the small window of opportunity in which they can feed (when the black cherry leaves are expanding). She hopes to find out how temperature affects the time at which they hatch, which can help her determine how climate change is affecting them and to predict what may happen to their populations under warming conditions.



Field Notes from a Climate Change Educator

“COOL!” I turn to see one boy’s face light up with eyes-wide and a huge grin. The rest of his fifth grade class is smiling too, as they look around at each other and back at me. It’s the kind of reaction I’d get when pulling out a bear skull or telling students they own 401 national parks. I just told them they’re about to become scientists and study ice cores from Antarctica and tree cores from Sequoia and Kings Canyon National Parks. Today, we’re learning about climate change.

At Sequoia and Kings Canyon National Parks, our education staff strives to constantly reevaluate and adapt our programs. As we looked at our *Discover Your Changing Climate* education program for local fifth and sixth graders, we challenged ourselves to make it more engaging. Apart from teaching kids about climate change, could we inspire them to continue learning? And instead of scaring kids into taking the topic seriously, could we let them come to their own conclusions about what they think and how they feel?

We developed a mock climate science summit activity as a way to meet both objectives—to get kids excited about science and to show them how to use scientific objectivity as a tool for understanding complex change. After going over the basics of climate, weather, and the greenhouse effect, we tell students the National Park Service needs their help to investigate what’s happening with our climate. Each group gets an ice core, sediment core, or tree core, a mission brief, and a set of questions to guide their analysis.

“Congratulations,” I say, handing an ice core activity to one group, “you just got back from your research in Antarctica. How was it?”

Afterwards, the class comes back together so each group can share what they’ve learned. Together, the students piece together a picture of climate change and its potential impacts on their community. By the end of the program, students know the mechanics of climate change, they’ve practiced scientific analysis, and they’re starting to think about what this all means to them.

We tell our students that they’ll hear more about climate change, and soon they will be the ones faced with tough choices. But now that they know how to think like scientists, they can find the facts to inform their decisions.

“The best part,” I tell my fifth graders on this day, “is that you get to decide what the future will look like.”

The students are quiet, processing all that they’ve just learned. But they’re still smiling. I am, too. Climate change will keep giving us some pretty big challenges. But after watching our students dig into our program, I’ve got some hope. These challenges are starting to look like opportunities.

Written by Caitlin Campbell, SEKI Education Technician

New CCRP Video: Climate Change and Cherry Blossoms

The Climate Change Science video reel is getting longer all the time. The newest video was released in August 2014 and features NPS staff from the D.C. area. This video examines how climate change impacts spring blooming and other phenological events and what it means for the cherry blossoms in Washington, D.C. View the video at:

<http://youtu.be/Ju8kPKp7FHg>

Download the full video from the NPS Climate Change web site at: <http://www.nps.gov/subjects/climatechange/sciencevideos.htm>

There are now 15 videos available on the Climate Change Response Program YouTube channel, and each video description includes a link to download the full video to use for training or other offline purposes:

<http://www.youtube.com/user/NPSClimateChange/videos>



Farewell for now...



As many of you know I have resigned from my position to pursue my passion for Astronomy. August 30th will be my last day. That is sixteen years to the day since I began my career in the National Park Service.

As I prepare to hang up my flat hat for now, I have two thoughts I would like to leave with each of you.

In the NPS we protect and preserve remarkable resources. That is just as true of our people as it is the natural and cultural resources. I have been honored to be part of this NPS family, past and present, and during my time one of the guiding thoughts of my work with this family comes from Horace Albright. He said, "Do not let the Service become just another government bureau; keep it youthful, vigorous, clean and strong."

Those words - written in 1931 - are still relevant today as the NPS approaches its Centennial. As you think how the NPS can thrive over the next 100 years, I hope you'll live those words by focusing inward and remembering that the best way for the Service to stay "youthful, vigorous, clean and strong" is to take care of each other - our NPS employees.

Second, I have found my work over the last 16 years very satisfying because each day I was given a chance to make a difference - most significantly in night sky preservation and climate change.

If I could ask just one thing of each of you, it would be that you resolve to go home and change one outdoor light fixture to a night sky friendly one, or have one conversation with someone you wouldn't normally talk to about climate change. Then I will know that even my leaving made a difference.

All my best to you until our paths cross again.

Sincerely,

More Information

This newsletter is a regular forum to share the latest actions relating to NPS efforts to manage our parks in a changing climate.

Dr. Leigh Welling, Chief
Climate Change Response
Leigh_Welling@nps.gov

Comments, Submissions:
Matt_Holly@nps.gov

CCRP websites:

Public: <http://www.nps.gov/climatechange>

Internal: <http://www1.nrintra.nps.gov/climatechange>

Facebook: <http://www.facebook.com/NPSClimateChange>

Youtube: <http://www.youtube.com/user/NPSClimateChange>