2013 NPS George M. Wright Climate Change Youth Initiative: Internship Program

Projects and Interns
October 1, 2013

National Park: Northeast Region, Climate Adaptation Program
Location: Narragansett, Rhode Island
Project Title: Tide gauge analysis to support climate adaptation decisions for Northeast coastal parks
NPS Supervisor: Amanda Babson
Pay: $12/hour for a total of 480 hours
Intern Name: Andrew Neil
University Affiliation: University of Rhode Island
Email: neilion22@gmail.com

Brief project description:
Long term tide gauges are essential to understanding local sea level rise and to support climate adaptation. Many coastal Northeast Region parks rely on NOAA's National Water Level Observation Network (NWLON), but there are gaps in coverage for part or all of some parks; some parks or partners have installed short term or low-tech alternatives, some work with insufficient information. The intern would analyze historic tide gauge data coverage for 10 Northeast Region coastal parks to identify where improved tide gauge coverage will best aid climate adaptation. The analysis results will be used to prioritize how to fill the most important gaps. The analysis also has the opportunity to make existing coverage more useful for climate adaptation by identifying where modeling can fill gaps. Additionally, this project would work with parks to connect the tide gauge information to local decisions by assessing which tidal exceedances are indicators of high inundation risk at vulnerable park locations. High accuracy elevation data for park "sentinel sites" of important natural resources, cultural resources and infrastructure is being collected. The student would develop tidal inundation frequency relationships between key sentinel sites with available tide gauge data. The intern will have the opportunity to visit nearby park units to assess sites and share results with park staff. The student will be expected to share results through a written report, a database and a seminar presentation.

National Park: Bandelier National Monument
Location: Los Alamos, New Mexico
Project Title: Develop baseline climate change data for highly significant archeological resources at Tsankawi
NPS Supervisors: Rachel Adler and Sarah Stokely
Pay: $12/hour for a total of 480 hours
Intern Name: Emily Polansky
University Affiliation: Rutgers State University of New Jersey

Email: emilypo89@gmail.com

Brief project description:
This internship will involve developing baseline data for a vulnerability assessment associated with the nationally significant archeological resources at Tsankawi Unit. This unit of Bandelier National Monument is an 828 acre discontiguous portion of the park with concentrated and varied well –preserved Ancestral Pueblo archeological sites. The project will focus on the potential effects of climate change on archeological sites by establishing baseline conditions from which changes and impacts can be monitored, including establishing variables indicative of climate change impacts. Visible changes in vegetation and drainage patterns can be seen when comparing current and historic conditions at the site. It remains undetermined if these changes can be attributed to natural environmental processes, unrestricted visitor access, climate change, or a combination of all three factors. Due to the high number of archeological sites at this unit, the project will focus only on the most significant resources. The project will include the following: archival research, field work to establish baseline monitoring, compilation of relevant geospatial datasets within GIS, mapping different variables, and developing management recommendations. The project will involve working with park staff in different disciplines, including cultural resources, natural resources, and cartography.

National Park: Grand Canyon National Park
Location: Grand Canyon, Arizona
Project Title: Be part of something grand! Explore climate change interpretation thru plant phenology
NPS Supervisor: Stephanie Sutton
Pay: $12/hour for a total of 480 hours
Intern Name: Laura Shultz
University Affiliation: Northwestern University
Email: laurashultz2013@u.northwestern.edu

Brief project description:
This project will establish a citizen science phenological monitoring program for the Division of Interpretation and Resource Education in partnership with the Division of Science and Resource Management. Phenological monitoring has become widely accepted as one of the most effective ways to detect initial impacts of climate change on species, communities, and ecosytems. In addition, because of the simplicity of its methods, phenology provides an ideal means for engaging visitors and students as citizen scientists in the collection and interpretation of scientific data. Recent developments in the Department of the Interior indicate that a coordinated effort to design and implement phenological research and education in the national parks is timely and would contribute greatly to scientific and public understanding of long-term effects of climate change on natural resources. Program materials developed

by the intern will provide the visiting public and students participating in in-parks education programs with the opportunity to observe, touch, and examine plants throughout the park, direct experiences that will enhance their understanding of climate change's impacts. Further, it will contribute to the next generation of park stewards and to a nation-wide plant phenology database while encouraging individuals to look beyond the park boundary and begin recording observations in their home communities.

National Park: Great Smoky Mountains National Park
Location: Gatlinburg, Tennessee or Cherokee, North Carolina
Project Title: Climate change without oceans or glaciers: understanding climate change in the Great Smoky Mountains
NPS Supervisor: Paul Super
Pay: $12/hour for a total of 480 hours
Intern Name: Erika Bendick
University Affiliation: Sacred Heart University
Email: bendick@sacredheart.edu

Brief project description:
This internship has two key foci: maintaining and expanding a citizen science phenology monitoring program and deploying/maintaining a network of sensors that will assist with the development of localized climate models for the park. Monitoring of phenological events has been identified as a key part of Great Smoky Mountains National Park's Vital Signs Monitoring, helping to link the climatic and vegetation variables being monitored. In addition, cloud cover and its moisture are the most significant factors in determining climate change in the high elevations of the southern Appalachians but are poorly understood, hampering the development of accurate climate models. The intern will work with staff of both resource management and resource education to implement our phenology monitoring program in the Smokies. The intern will work with resource management and assist with fine tuning data sheets, establishing additional study plots, revising protocols, and assembling background information for training materials. The intern will work with resource education to train staff with field protocols to use with public programs, education groups, high school interns, and volunteers who are adopting monitoring plots. The intern will work with two university research partners who are developing a climate model for the park. The intern will assemble, deploy, and maintain cloud water (Juvik) sensors throughout the upper elevations of the park as well as leaf moisture sensors that measure the capture of moisture from ground-level clouds.

National Park: Hawaii Volcanoes National Park (HAVO)
Location: Hawaii National Park, Hawaii

Project Title: Investigate native Hawaiian plant species response to El Nino drought events
NPS Supervisor: Sierra McDaniel
Pay: $12/hour for a total of 480 hours
Intern Name: Corie Yanger
University Affiliation: University of Hawaii at Hilo
Email: cmyanger@hawaii.edu

Brief project description:
Because much of HAVO's low and mid-elevations have been degraded by centuries of alien species, fire, and human use, restoration is a major natural resource management focus. Where fundamental changes to natural systems have occurred, such as widespread invasion by alien species for which control is not possible, the park seeks realistic restoration goals focusing on native components of the system that are resilient to the novel stressors. HAVO is applying this same approach to restoration as it considers stressors associated with climate change. This project facilitates the goal of the Hawaii Volcanoes National Park to restore and build native plant communities that are resilient to climate change, particularly to recurring droughts. Down-scaled global climate change projections (IPCC 2007) indicate a 10-20% reduction in winter rains and a 5% increase in summer rainfall in Hawaii due to changes in the tradewind patterns (Timm and Diaz 2009). These changes are predicted to cause dramatic shifts in some habitats, making many currently suitable areas no longer hospitable for certain species. In addition, some models predict changes in the frequency of El Nino events (Bettencourt 2006). Past El Nino events have caused severe drought in HAVO and negatively impacted native vegetation, particularly in the montane mesic zone. New restoration strategies must be developed that incorporate these predictions, thus permitting the park to continue to preserve native species diversity and structure.

National Park: Lowell National Historical Park
Location: Lowell, Massachusetts
Project Title: Urban parks climate change education
NPS Supervisor: Rebecca Lofgren
Pay: $12/hour for a total of 480 hours
Intern Name: Devan Hawkins
University Affiliation: University of Massachusetts Lowell
Email: devan_hawkins@student.uml.edu

Brief project description:
This position will undertake climate change-related projects at Lowell National Historical Park. The intern will be located in the Boott Cotton Mills, which houses the Boott Cotton Mills Museum and the Tsongas Industrial History Center. The duties will focus on developing multi-media materials that will be used in an urban national park to inform park staff and school groups about climate change. Clear and

succinct messages and materials will allow the audience to make meaningful connections and build a deeper understanding of climate change, and inspire them to take action in their own lives. The intern will work with a Park Ranger in Education to research and create an hour-long educational program and develop products about climate change. The program and products will provide information that encourages students to learn more about climate change and become stewards and ambassadors in their own community. The intern will also research, develop, and coordinate multi-media products that will be used to train park staff. These products will include tools the staff can use to communicate this complex subject, and skills to help them understand their audience better, including predicting how the audience will relate to this information**.**

National Park: Pacific Northwest Cooperative Ecosystem Studies Unit; Mount Rainier National Park (MORA); North Cascades National Park Complex (NOCA)
Location: Seattle, Washington; NOCA and MORA, Washington
Project Title: Using GIS to assess and adapt travel in the North Cascadia region under a changing climate
NPS Supervisors: Chris Lauver and Ronda Strauch
Pay: $12/hour for a total of 480 hours
Intern Name: Mackenzie Grow
University Affiliation: Whitworth University
Email: mgrow13@my.whitworth.edu

Brief project description:
A University of Washington graduate student, with funding from the Northwest Climate Science Center, is conducting research on the response of hydrologic systems to future climate. This project combines future projections of changing precipitation and soil moisture dynamics with land surface characteristics to model potential slope failures (e.g., landslides) and their consequent impacts on roads and trails in the NCAP region. One research goal is to conduct a network analysis of roads and trails to determine optimal travel routes to high valued destinations, such as viewpoints, trailheads, and campgrounds in MORA and NOCA. Other goals are to better understand the distribution and characteristics of areas that are of increasing risk to access, structures, and ecological resources, and to examine ways to increase resilience to maintain access under a changing climate. The intern will assist in conducting this regional road/trail network analysis and in compiling data to help identify areas of increasing risk to access, structures, and resources.

National Park: National Center for Preservation Training and Technology
Location: Natchitoches, Louisiana
Project Title: Preservation technology for climate change and historic structures
NPS Supervisors: Andrew Ferrell and Marcy Roadman
Pay: $12/hour for a total of 480 hours

Intern Name: Miriam Tworek-Hofstetter
University Affiliation: University of Texas, Austin
Email: twor0004@gmail.com

Brief project description:
The intern funded under this proposal will work with the NPS Climate Change-Cultural Resources Program (CCCRP) and the National Center for Preservation Training and Technology (NCPTT) to plan a workshop on the impacts of climate change on historic building styles and materials. Planning activities will include compilation of existing literature on environmental tolerances of traditional architecture and materials, work with NPS climate change staff developing park-level and regional climate change projections, and research and coordination with historic preservation technology and NPS facilities staff responsible for building and structure maintenance. Working with CCCRP and NCPTT mentors, the intern will help identify an appropriate target location, attendees, and case examples for the workshop, and assist with preparation of necessary funding proposals. Final products of the internship will include the workshop plan and updates to the cultural resources climate change impacts handbook (currently in preparation) based on the gathered research. The updated handbook sections will serve as supporting material for the workshop.

National Park: Saguaro National Park
Location: Tucson, Arizona
Project Title: Discovering desert waters: developing a water quantity model for Saguaro National Park
NPS Supervisor: Don Swann
Pay: $12/hour for a total of 480 hours
Intern Name: Tymon Khamsi
University Affiliation: The University of Arizona
Email: tkhamsi@email.arizona.edu

Brief project description:
This project will develop and begin testing and refining a model that will allow Saguaro National Park to evaluate trends in water resources that effect aquatic animals, terrestrial animals that require drinking water, riparian plants, hikers and campers. It will be based on nearly a decade of water monitoring data and >15 years of stream pool water data associated with monitoring of lowland leopard frogs. Although a desert park, Saguaro's biological diversity is largely driven by scattered water sources that include intermittent streams, semi-perennial rock pools (tinajas), springs, and seeps. The intern will utilize the existing data to develop a conceptual model that will allow us to make predictions about water availability in Saguaro National Park. The value of this model is that it will allow Saguaro National Park to predict which remote water sources are likely to have water at any given time based on real-time well and stream data; support wildlife conservation,

especially for vulnerable species such as leopard frogs; and develop a priority list of surface water sites based on their conservation value and potential threats.

National Park: Santa Monica Mountains National Recreation Area
Location: Thousand Oaks, California
Project Title: Public participatory science for climate monitoring through the California phenology project
NPS Supervisor: Christy Brigham
Pay: $12/hour for a total of 480 hours
Intern Name: Jessie Pearl
University Affiliation: Tufts University
Email: jessie.k.pearl@gmail.com

Brief project description:
Phenology is the seasonal timing of life cycle events like leaf-out, flowering, migration, breeding activity. The timing of such events is sensitive to changing climate, so tracking phenology over time is an important and relatively easy way to understand how species and communities are affected by climate change. Such tracking requires a lot of data collected over large areas and for many years. Training and enlisting the public in making observations of plant phenology is necessary to acquire such data, and to engage non-specialists in fun and interesting science. To that end, Santa Monica Mountains National Recreation Area is part of a statewide citizen-science phenology monitoring program called the California Phenology Project. The intern will fulfill two primary park needs: 1) lead the park citizen science phenology monitoring program and 2) develop interpretative materials on climate change and the phenology program for park visitors (both actual and virtual visitors). The intern will coordinate volunteer phenologists and work with the park's partner, NatureBridge, to involve elementary, middle, and high school classes in phenology monitoring. The intern will work with the park's Resource Management and Interpretation staff to develop materials for the public specifically related to the phenology program and anticipated climate change impacts to resources at the park.

National Park: Sequoia and Kings Canyon National Parks
Location: Three Rivers, California
Project Title: Phenology intern: engaging students through interactive webpages
NPS Supervisors: Denise Robertson and Danielle Cessna
Pay: $12/hour for a total of 480 hours
Intern Name: David Russell Sanford II
University Affiliation: Oregon State University
Email: sanfordd@onid.orst.edu

Brief project description:

Plant phenology refers to the timing of events such as flowering and leaf-out and is closely linked to climate. Phenology monitoring provides important information to managers on how ecosystems are responding to climate change. In addition, phenology monitoring is easily accomplished by students and people from all walks of life. Because of this, it provides an ideal venue to engage students in climate change challenges in our National Parks and the Central Valley of California. Student phenologists use science based monitoring to contribute to the National Park Service priorities that engage students in outside activities that build on scientific literacy and advancing climate change science. The intern will work with the division of Resource Management and Interpretation to gain an in-depth understanding of plant phenological monitoring, protocols and its connection to NPS Climate Change Response Program. The intern will develop a photo timeline for the interactive phenology website. This webpage will be an introduction to phenological monitoring, the CPP, Project Budburst and local climate change challenges that affect national parks and their local communities while serving as a test pilot for advancing phenology web based education. Additional webpages may be created to link to climate change education and current resource strategies these parks are engaged in to further student and general public understanding and appreciation of climate change management strategies.

National Park: Sitka National Historical Park
Location: Sitka, Alaska
Project Title: Small park, big resources
NPS Supervisors: Becky Latanich, Angie Richman, and Christopher Sergeant
Pay: $12/hour for a total of 480 hours
Intern Name: Emily Noyd
University Affiliation: University of Washington
Email: emilynoyd@gmail.com

Brief project description:
Sitka National Historical Park (SITK) works closely with the Southeast Alaska Network (SEAN) to conduct long-term monitoring of natural resources directly influenced by climate change. Under the mentorship of the SEAN ecologist, the intern will be responsible for leading water quality and streamflow monitoring in the Indian River. The intern will download and report water quality data, maintain water quality instrumentation, and work closely with an ecologist mentor to preserve long-term data that is essential for park natural resource management. If motivated and qualified, the intern may also have an opportunity to analyze existing data and assist the ecologist in preparing peer-reviewed scientific publications. Sitka National Historical Park maintains a burgeoning Facebook page and has a dedicated group of nationwide followers who are eager to stay abreast of resource developments at the park. The intern will be responsible for not only chronicling weekly his/her experience as a climate change intern at the park, but will also be required to post weekly about climate change topics related to Southeast Alaska.

The candidate will also work with the SEAN network to edit and update the "Nature and Science" section of the park's website by revising the existing text and supplementing with photographs.

National Park: Associate Directorate for Interpretation and Education (ADIE)
Location: Washington, D.C.
Project Title: Producing climate science videos for interpreters
NPS Supervisor: Tim Watkins
Pay: $12/hour for a total of 960 hours
Intern Name: Regan Alsup
University Affiliation: American University
Email: regan_alsup@partner.nps.gov

Brief project description:
ADIE's goal is to increase scientific literacy by producing short (< 10 minute) on-line videos that address a variety of issues related to the science of climate change and its effects on national parks. The intended audience is interpretive rangers, who can view the videos informally on their own or more formally in the context of professional training courses. The videos will clearly explain essential scientific concepts and examine how scientists study and draw conclusions about climate change. Topics might include sea level rise, ocean acidification, changing wildfire regimes, altered hydrology, shifts in the distribution and phenology of species, etc. Both natural resources and cultural/historic resources will be included. The videos may include footage of climate-related phenomena in the parks, interviews with research scientists and park staff, and possibly demonstrations that can be used by interpreters in their public programs. The intern will work with staff in Interpretation and Education, the Climate Change Response Program, and the Harpers Ferry Training Center, who will provide general guidance and direction for achieving the educational and professional development objectives of the project. The intern will have a great deal of independence and latitude in nearly all aspects of pre-production, production, and post-production.

National Park: Western Arctic National Parklands
Location: Kotzebue, Alaska
Project Title: Climate change effects on cultural resources in Northwest Alaska
NPS Supervisor: Michael Holt
Pay: $12/hour for a total of 480 hours
Intern Name: Robin Gibbs
University Affiliation: University of New Mexico
Email: rgibbs49@unm.edu

Brief project description:

The purpose of this internship opportunity is to support the Western Arctic National Parklands' cultural resources projects to be carried out during the summer of 2013. These will include: A 4-6 week archaeological investigation (survey and subsurface testing) of coastal areas (coastline, barrier islands and intertidal lagoons) within the Bering Land Bridge National Preserve; and a 2-3 week archaeological investigation of the Nigu River in the Noatak National Preserve. At the conclusion of archaeological investigations, the successful applicant will develop various social media elaborating the park's responses to the effects of climate change on cultural resources.