

POSITION ANNOUNCEMENT:

FUTURE PARK LEADERS of EMERGING CHANGE

The National Park Service (NPS) is pleased to support the *Future Park Leaders of Emerging Change* (FPL) program as a pathway for exemplary students in higher education (advanced undergraduate students, graduate students, and recent graduates) to apply their skills and ideas to park-based challenges and solutions. The Initiative offers 12-week paid internships which allow students to gain valuable work experience, explore career options, and develop leadership skills through mentorship and guidance while helping to advance NPS efforts on emerging management issues. Successful students may be eligible for non-competitive hire into federal positions for which they qualify following completion of all academic requirements.

IMPACT OF HURRICANES IRMA AND MARIA ON SOIL ELEVATION OF MANGROVE COMMUNITIES

South Florida / Caribbean Inventory and Monitoring Network
Palmetto Bay, Florida

INTERNSHIP BLURB

Determine the fate of the mangrove world in South Florida and the U.S. Virgin Islands National Parks by helping to clarify the trajectory of the soil elevation of mangrove communities after impacts from Hurricane Irma and Maria. As goes the trend in soil elevation, so goes mangrove recruitment which will dictate mangroves community recovery. Sample soil elevation, develop R code to perform analysis of soil elevation, and communicated these results graphically and in multiple media platforms.

INTERNSHIP PROJECT BACKGROUND

Hurricane Irma (183 mph winds) and Hurricane Maria (175 mph winds) impacted South Florida (EVER, BISC) and Caribbean park units (VIIS, SARI) leaving them in disarray. Besides downed trees and infrastructure damage; both of these storms impacted the mangrove communities in these park units. Mangroves are important ecosystems in these parks; they support extensive fisheries, nursery habitat, bird forage, carbon sequestration, and storm buffering properties. An emerging management issue is the long term health of the mangrove community. To manage mangroves it is necessary to understand changes in soil elevation because of its direct effects on mangrove seedling survival.

Climate change is expected to have an acute impact on South Florida and the Caribbean in the form of sea level rise. The Intergovernmental Panel on Climate Change (2007) estimates that global sea level will rise 0.2-0.6 m by the year 2100. When changing glacial dynamics are added the sea level rise is predicted to be 0.8-2.0 m by the end of the century (Pfeffer et al. 2008). Eustatic sea level is a global driver that directly affects the mangrove communities inundation time. Increased flooding levels are associated

with decreased mangrove seedling survivorship (lack of recruitment) which facilitates a transition to open water mangrove communities.

INTERNSHIP PROJECT DESCRIPTION

There is significant concern about the trajectory of mangrove communities in South Florida and the Virgin Islands. Will the parks have reduced nursery areas, will the parks need to have restoration activities to supplement natural mangrove recruitment (which occurred after Hurricane Hugo in SARI) or will there be sufficient natural recruitment? Understanding the impact of the storms on the soil elevation is critical in understanding these impacts.

The SFCN has an extensive soil elevation monitoring program that has sites in all four of these park units. The objective of the soil elevation monitoring program is to understand if the soil elevation is keeping up with sea level rise. The intern will 1) help sample the soil elevation, 2) develop a trend report for the long term soil elevation data set. This trend report will investigate and graphically display site specific records, park wide records and compare across the park units. The final goal is 3) to develop R code to automate graphical display and to facilitate analysis of the data set for long term monitoring and for event driven impacts. The intern will present these results to park Resource management staff.

Park management is the intended audience as they will have to determine the NPS response to these large scale disturbance events. Having a clear and concise understanding of the mangrove soil elevation pattern and hence the indirect effects on long term seedling survivorship is important. There is considerable interest in getting this information and having the information presented to the professional research community and to the public.

The intern will help sample the soil elevation, enter the data, and perform the QA/QC process. The intern will analyze the data and compare absolute long term trends in soil elevation with event drive (interval) soil surface elevation changes. During this analysis, process the intern will develop R code to automate graphical display and to facilitate analysis of the data set for long term monitoring and for event driven impacts. The analysis will produce repeated measures ANOVA and a repeated measures ANCOVA. The results of the study will be presented as a report. This trend report will investigate and graphically display site specific records, park wide records and compare across the park units. Finally, the intern will develop a power point presentation reporting the findings of this study.

The intern will produce a report detailing the outcome for the trend analysis and R code for conducting the analysis. The use of R code for the analysis and the graphical display will be documented in a standard operation procedure (SOP) created by the intern. The findings from the comparison within sites, between parks and to regional patterns will be related to inundation period and seedling survivorship.

This project is doable in twelve week internship for the following reasons. The previous soil elevation data records are in a fully functioning database; the data already has had quality assurance and quality

control procedures applied to the period of record. Preliminary attempts at developing trend analysis have occurred. Intern will work with the SFCN community ecologist, data manager, and a biological technician who are all interested in completing this project.

QUALIFICATIONS

The intern should have education in: biology, basic ecology, wetland ecology, botany, soil science, marine biology, climatology, and an interest in climate change. The intern should have basic computer proficiency skills; examples include: familiar with word, excel, power point, or similar programs. The intern should be comfortable working in rough and trying field conditions. Mangrove work in the summer months is challenging. Proficiency in R code is required. A good understanding of statistics is required. A major goal of this internship is to develop R code to automatically generate: graphs, repeated measures ANOVA and a repeated measures ANCOVA.

Intern should be able to work well with a team and be able to complete tasks in a timely and professional manner. A happy person is preferred.

LEADERSHIP DEVELOPMENT

The intern will be directly supervised by the SFCN Community Ecologist who will oversee the project and collaborate with the SFCN data manager for guidance on R coding development and evaluation. The intern will meet with the community ecologist and the data manager; initially daily at the beginning of the internship, then less frequently. Once the intern has a full grasp of the project an outline will be generated by the intern with accomplishments and deadlines determined. The intern will meet regularly to give updates on the project work; reporting both successes and shortcomings. Since science is a dynamic process these interactions will help solve problems via brainstorming, redirection, and determine the most practical and defensible solutions. The intern will be evaluated using a system based on the Employee Performance Appraisal Plan (EPAP) system where there will be four critical elements.

DATES OF POSITION

Approximate start date. May 15, 2018 to August 4, 2018. We are flexible (a 2 week window) around these dates.

COMPENSATION

This initiative supports one student at \$16/hour for 12 weeks, or 480 hours.

HOUSING

Park housing is available at Pine Island in Everglades National Park; this is a substantial distance from the SFCN office (26 miles away - 40 min drive time - a personal vehicle is necessary). The housing is group housing, with up to 6 housemates. There are 3 rooms, so each room has 2 roommates. There is a shared kitchen. Interns will need to provide their own food and linens. Cleaning is responsibility of everyone and it is expected that shared living space and personnel spaces will be kept in a clean and orderly manner.

WORK ENVIRONMENT

The office environment is professional, comfortable, modern facility that allows 20 staff to work together efficiently. The field component will be short but can be very challenging to accomplish. The heat, mosquitoes, and rain storms make the work trying and taking precise measurements can be tough. Work is accomplished via small boat operations and hence the intern should be able to swim.

The majority of the work is office work. However, there is some amount of field work as the project progresses. The field work is from a small boat. Interns must be able to swim. Florida is hot and buggy in the summer months and there are frequent thunderstorms. Keen appreciation of the weather, and working in hot and humid environment is a must. Hurricanes are always a possibility in South Florida. Frost is not an issue but exposure to torrential downpours can and will chill one to the bone.

The SFCN is located between Homestead and Miami, Florida. Both areas have a very large Latino and diverse population that allow individuals to be exposed to a wide range of cultural experiences. Miami's 2.5 million residents are among the most diverse in the country. South Florida is a wonderful outdoor location with lots of water activities: boating, wind surfing, sailing, beach activities (South Beach), snorkeling, diving, and recreational fishing.

CONTACT INFORMATION

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