

## **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 and graduate students) 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.

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### **Evaluating Future Water Supply Scenarios and Developing a Stream Temperature Monitoring Network**

Mount Rainier National Park  
Longmire, Washington

#### **INTERNSHIP PROJECT BACKGROUND**

In Mount Rainier National Park, the water year of 2015 experienced above normal winter and spring air temperatures, record low snowpack, and extremely warm June temperatures, collectively resulting in a hydrologic drought. These conditions stressed water supplies that are critical to park operations, and likely stressed sensitive aquatic species (e.g., cold-water fishes and insects) as a consequence of elevated stream temperatures. Conditions resembling historical droughts, including the recent 2015 event, are projected be more likely within this century as climates warm across the region. These changes are likely to coincide with increased park visitation and growing stresses on sensitive aquatic ecosystems.

Overall, decline in glacier area and volume in the past 30 yrs, loss of perennial snowfields, combined with lower winter snowpack, and increased air temperatures are resulting in lower summer streamflow and higher summer stream temperatures region wide. Loss of glacial stream and perennial snowfield buffering at Mount Rainier may complicate efforts to sustain endangered species such as bull trout, and cold-water obligate invertebrates. In addition, park water supply depends on streams and lakes supplied by snowmelt, and perennial snowfields.

With increasing park visitation, multiple stressors on sensitive aquatic organisms and uncertainties with projected climate changes, park managers seek to identify a range of water supply options.

In addition, the park seeks to acquire high-resolution stream temperature data to develop spatial stream network models to describe park-wide patterns of stream temperature and streamflow permanence. As the probability of stressful conditions such as drought and warming temperatures increases,

understanding local factors that influence stream temperature and flow refuges for aquatic biota becomes more critical.

## **INTERNSHIP PROJECT DESCRIPTION**

The intended audience of the project work is park management, however public interest in research related to climate change and potential impacts on water supply at Mount Rainier demonstrate a need for public outreach and interpretation. The selected intern will work directly with the Aquatic Ecologist, Geologist, and Utilities Supervisor, and closely with the division of Education and Interpretation. Opportunities exist to collaborate with USGS scientists and university researchers. Results of the project will be presented to the management team.

Tasks include:

- Summarize Mount Rainier's current water supply demands, history of development, issues, changes over time, and potential impacts to aquatic organisms.
- Model potential visitor use and park operation water supply demands tied to projected regional climate models
- Develop a sampling plan for an instrumental network to track seasonal changes in temperature, water level, and flow permanence in streams within MORA, including those that are most likely to be influenced by losses of glacial meltwater, and are most likely to influence park water supplies. Deploy instruments at a subset of high priority locations over the 2018 field season and summarize data.

Products include:

- A summary of current water supply demand, issues, and changes in water use over time.
- Current and projected visitor use numbers, potential infrastructure additions, and projected environmental change based on regional models.
- A summary of alternative water supply options and water supply infrastructure needs.
- A final sampling plan for an instrumental network of temperature sensors water and water level loggers.
- A final presentation to park management and staff.

## **QUALIFICATIONS**

Applicants must be pursuing a science based graduate or undergraduate degree in a field related to hydrology, aquatic ecology, climate science, or environmental science and have experience analyzing large data sets. Applicants must also have field skills and experience installing and downloading temperature sensors, and be familiar with stream gages and water level loggers. Ideally, applicants will be familiar in R, current statistical approaches, and GIS.

Applicants must possess a valid state driver's license, personal transportation, and be willing to share housing with other seasonal park staff and commute approximately 16 miles one-way.

## **LEADERSHIP DEVELOPMENT**

The success of this project will depend a great deal upon successful development and use of leadership skills in the areas of:

**Communication and collaboration** with park visitors and park operations, protecting aquatic resources, and providing up to date information to the public on park issues and planning efforts requires interdisciplinary efforts. The selected applicant will have a unique opportunity to bring park staff from various divisions together to create a science based product intended to help management adapt to changing environmental conditions. Opportunities will exist to present results in writing and through presentations to a variety of audiences.

**Creativity:** While the project is data driven, outside the box thinking is required to develop a range of options for water supply. In addition, maintaining instruments in glacier systems and flashy streams is challenging, requires testing new methods, and problem solving techniques. Developing a sampling plan, in coordination with the park Aquatic Ecologist and Geologist, and testing methods provides ample opportunity for creativity and problem solving.

#### **DATES OF POSITION**

The preferred starting date is June 10, 2018, however dates of the position are flexible, depending upon availability. Ideally the intern will work 480 hours between June 10 and September 10.

#### **COMPENSATION**

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

#### **HOUSING**

Shared housing will be provided at Longmire, the duty station of the position located within the park, or Tahoma Woods, approximately 16 miles from Longmire. A personal vehicle is recommended due to the distance to groceries and other services and for exploring the area on days off. Housing may be a shared two-bedroom apartment or 2-3 bedroom house. Both apartments and houses are furnished, but the participant will need to bring bedding, kitchen supplies, towels, and other household items.

#### **WORK ENVIRONMENT**

Mount Rainier National Park is located approximately 2 hours south of Seattle, near the community of Ashford, WA. All services and amenities are available in nearby communities. The climate is considered moderate, but frequently overcast and rainy at lower elevations during fall, winter and spring, and early summer. At Longmire, the duty station of this position, substantial snowfall is common from November-May. Summers are normally sunny and pleasant with daytime temperatures ranging from the low 70's to low 80's and low humidity. You may visit the park's website at <http://www.nps.gov/mora>. Work will be performed both in and outdoors, with outdoor work over a variety of terrain. Fieldwork may require travel on steep rocky slopes, in forests, streams, and wetland environments in a variety of weather conditions in wilderness, surrounding an active volcano.

#### **CONTACT INFORMATION**

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