



# MOSAICS IN SCIENCE

## Diversity Internship Program

### 2021 Project Descriptions

<b>NPS UNIT: PICTURED ROCKS NATIONAL LAKESHORE</b>	<b>PD #: 2021506</b>
<p><b>Project Title:</b> Identify Impacts of Low-head Dams in the Beaver Basin Wilderness Area with Aquarius Time-Series</p> <p><b>Position Type:</b> Mosaics PLC</p> <p><b>Primary natural resource discipline:</b> Physical Sciences</p> <p><b>Project keywords:</b> stream, discharge, data management, water quality, hydrology</p> <p><b>Location:</b> Munising, Michigan</p>	
<b>COVID-19 NOTICE</b>	
<p>As the COVID-19 pandemic continues to change and evolve, project timelines and structure remain flexible and it may be necessary to postpone start dates, begin work remotely, or reformulate the project's description. Should any development in the COVID-19 outbreak impair a project's timeline or results, the SIP Team will work with the park and project mentors to assess the situation and determine the best course of action at that time.</p>	
<b>PROJECT DESCRIPTION AND WORK PRODUCTS</b>	

**Position Description:** Lowney Creek, a tributary to Beaver Lake, is part of the 11,740-acre Beaver Basin Wilderness, designated in 2009. Lowney Creek is 3.1 km long, with two main tributaries, east (3.2 km) and west (1.3 km) branches. Prior to park establishment in 1966, the creek was dammed to create a series of fishing ponds, which led to sediment impoundment, increased water temperatures, and isolation of biological communities (U. S. Army Corps of Engineers 2013). Hydrologic baseline data is essential prior to management actions targeting restoration. In 2017, seven Hobo U20 loggers were deployed upstream and downstream of impoundments to assess stream temperatures and water levels throughout the channel. The loggers record temperature and water level hourly to allow for simultaneous comparison between sites. Stream discharge is collected at a subset of sites so that rating curves (estimated streamflow rates based on water level measurements) can be developed. As most of this data is in a raw format, the intern will apply functions in Aquarius Time-Series (a water quality database) required to import, correct, and graph continuous water quality data. On site, the intern will collect water level reference measurements, maintain data loggers, and measure stream discharge with flowmeters. The intern also will organize existing data and target field visits to fulfill gaps required for modeling streamflow. A site bulletin developed by the intern will provide a historical account of these low-head dams and their impacts to the watershed, as visitors often question the history of the landscape. Stream temperature and discharge graphs are the final product in interpreting this multi-year assessment for park managers and regional biologists, which will be included in resource reports and planning documents.

Man-made dams in the Lowney Creek watershed are in direct conflict with the Wilderness Act (Sec. 2, subsection c) which defines wilderness as “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable.” Baseline information is required for park managers to make informed decisions in considering options for dam removal. While three years of continuous water level and temperature data have been collected, the organization, editing, and graphing required for interpretation are lacking due to shortages in staffing. Data imported in Aquarius-Time Series will allow for efficient query and reporting. This effort will be part of a nationwide water quality database which will supplement and set a precedence for future water quality analysis at the park. Graphs created will also be used to develop public educational materials to further understand anthropogenic impacts on watersheds.

This position is offered through the National Park Service's Mosaics in Science Internship Program in partnership with Environment for the Americas.

**Work Products:** At the completion of this internship, the intern will have uploaded all raw continuous water quality data to Aquarius Time-Series and produced graphs of corrected temperature and water level data for seven sites. All efforts will be summarized in a final report. The intern will also complete a site bulletin to interpret the history of the Lowney Creek watershed and environmental impacts.

## **NATURAL & PHYSICAL WORK ENVIRONMENT**

Pictured Rocks National Lakeshore is a 71,397 acre lineal park stretching along 42 miles of south Lake Superior shoreline from Munising to Grand Marais in Michigan's Upper Peninsula. Within the lakeshore boundary is a diverse array of natural and cultural resources ranging from 15 miles of sandstone cliffs on the west end to the massive Grand Sable Banks and Dunes on the east end. Between the cliffs and the dunes stretch 12 miles of white sand beach. As a backdrop to these natural resources, mixed conifer-hardwood forest interspersed with lakes, waterfalls, and streams lie inland, including the Beaver Basin Wilderness Area. The population in Munising in 2018 was 2,195. Park visitation has increased over the last ten years, topping 800,000 in 2019, and viewed as a critical component of the local and regional tourism economy. Marquette and Escanaba are an hour drive from Munising and among the largest cities in the Upper Peninsula, with populations of 20,680 and 12,181 in 2018, respectively. The Upper Peninsula, influenced by the Great Lakes, has a humid continental climate. July is the warmest month in Munising, with an average high of 74 F (U.S. Climate Data). Over 15 inches of precipitation typically accrue May through September. Science personnel work in the historic Munising Range Light, a former U.S. Coast Guard Station in Munising.

### **QUALIFICATIONS**

The applicant should demonstrate career objectives in natural resources, physical sciences, or database management. Strong organizational and communication skills are required. Proficiency in creating graphs, tables, charts, and figures in relational databases is beneficial, including applications in ArcGIS. Previous experience with maintaining data in spreadsheets and following standard operating procedures in collecting and organizing field data is desirable. The ability to navigate distances up to five miles on uneven and steep terrain under inclement conditions (e.g. biting insects, humidity) while wearing a backpack is essential. The participant should work well independently and be an effective team player.

The applicant must be a U.S. citizen or U.S. permanent legal resident ("green-card-holder") between the ages of 18 and 30 years old, inclusive, or veterans up to age 35. Prior to starting this position, a government security background clearance will be required.

### **VEHICLE AND DRIVER LICENSE REQUIREMENTS**

**Applicant must have a valid drivers license and a good driving record.**

**A personal vehicle is REQUIRED for this position.**

### **HOUSING**

Park housing is available and will be provided at no cost to the participant. Housing is available at the east end of the park in Grand Marais, 50 miles from the intern's duty station in Munising. Accommodations are in a historic Coast Guard Station, containing three bedrooms, 3.5 baths, laundry, and a full kitchen. Bedrooms may be dual occupancy and local phone service is provided. The intern will need to bring personal items including bedding, laundry soap, and toiletries. The residence is within walking distance to groceries, restaurants, local shops, and a Lake Superior marina.

### **INTERNSHIP START/END DATES**

**Start Date:** 5/17/2021

**End Date:** 7/30/2021

Eleven weeks of the internship will be in the park. A mandatory Career and Leadership Workshop will be held in Washington, D.C. from August 1 – 5, 2020.

**PLEASE DIRECT ANY QUESTIONS TO ENVIRONMENT FOR THE AMERICAS**

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