**I. PROJECT STATEMENT**

At the end of the Gunflint Trail and surrounded by the Boundary Waters Canoe Area Wilderness (BWCAW) sits the Chik-Wauk Museum and Nature Center. This unique location is where the University of Minnesota Duluth plans to develop the Boreal Observatory[[1]](#footnote-1). The plan will increase the program offerings of this facility through a collaborative partnership with the Gunflint Trail Historical Society and the Superior National Forest. The Boreal Observatory will leverage the research and expertise of UMD to create unique place-based learning experiences that will enhance the public's understanding of all things boreal: *sky, earth, water, flora, fauna, and culture.* In addition, the project will establish the site as a *forest-based university venue* that is welcoming of the public and a place where future scientists and educators can hone their skills.

The BWCAW is in the only level 1 dark sky[[2]](#footnote-2) region in the Eastern US. Efforts are underway to establish a Dark Sky Sanctuary designation over this region. In August of 2018, UMD and community partners launched a 7-day Dark Sky Caravan from Duluth to the end of the Gunflint Trail. This was followed in December by a Dark Sky Festival in Grand Marais. Featuring UMD’s mobile planetarium, telescopes and experts, the public response was impressive. The August Caravan launched with a small gathering in Duluth and culminated with over 200 visitors at the end of the Gunflint Trail. Similarly, the December festival drew capacity crowds to Grand Marais during an otherwise quiet time of year. People have a natural attraction to dark skies, and they are an important component of nature conservation, and the ecological integrity of protected areas. As the National Park Service slogan states: *Half the Park is After Dark.* Acknowledging this fact, the Boreal Observatory will embrace the dark, and extend the learning to include a more holistic window into *all things boreal,* informed by university expertise and research.

Within UMD, the Boreal Observatory is a partnership between two colleges: The Swenson College of Science and Engineering[[3]](#footnote-3) and the College of Education and Human Service Professions[[4]](#footnote-4). Collectively, they are preparing Minnesota’s future scientists, engineers, environmental educators and leaders. Developed through interdisciplinary teams, learning experiences will include formal presentations, hands on activities, and site-specific tours. Experiences will be designed to be engaging, and accessible to as wide an audience as possible.

GOALS

* To leverage university expertise and knowledge, to enhance the public's understanding and awareness of the boreal forest and protected Wilderness of the BWCAW
* To use the unique location of Chik-Wauk as a place for students and faculty to teach, learn, and engage with the public.
* To establish high quality programs that are mobile and strategically offered to area communities, camps, parks, and resorts.

**II. PROJECT ACTIVITIES AND OUTCOMES**

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| **Activity 1: Identify boreal forest program themes for development** | Budget: $164,907 |

To help define and refine the program elements of this project, UMD students and staff will work under contract to Chik-Wauk to run their summer 2019 programming. This includes running the nature center and scheduling public programs. In addition to running the existing programs, an ad hoc committee of university and community partners, will identify candidate topics for future development through this project. This will include identifying key faculty experts to guide program development, defining media and educational elements necessary for development, and identifying critical outside organizations or agencies important to the topic. Project staff will work with UMD faculty and community partners, to identify boreal forest topics for program development. University faculty experts will be identified and enlisted as content advisors. Program outlines will be developed for review. Programs will be designed to create a global to local perspective and feature first person insights of UMD and community experts, and geographic locales that the public can visit to reinforce place-based learning. E.g. programming about Minnesota’s moose, would include an understanding of the global distribution, the people behind the research of Minnesota declining moose populations, how and where to see moose while visiting, moose artifacts, and activities, etc.

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| **Outcome** | **Completion Date** |
| 1. Based on results of summer 2019 UMD pilot at Chik-Wauk, program topics for first year development selected and tested during the summer of 2020 | September 2020 |
| 2. Informed by formative evaluation, program topics refined, and new and/or refined elements selected for inclusion | March 2021 |
| 3. New and improved program experiences tested during the summer of 2021 | September 2021 |
| 4. Informed by formative evaluation, program topics refined, and new and/or refined elements selected for inclusion | March 2022 |
| 5. New and improved program experiences tested during the summer of 2022  | September 2022 |
| 6. Informed by formative evaluation, program topics refined, and final versions completed | March 2023 |
| 7. Transitional post project funding plan implemented. Summer programming implemented and supported through other TBD sources. | June 2023 |

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| **Activity 2: Production of multimodal learning experiences** | Budget: $203,538 |

Develop elements for public programs. Write narrative scripts, collect and integrate data and digital content for use in an immersive display. Collect artifacts, develop manipulatives, and craft hands-on activities. Create the technical structure that will allow presenters to interactively deliver programs. Create multi-modal versions of presenter lead programs. This includes print and web-based versions to support self-guided Boreal Tours and/or for use by others.

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| **Outcome** | **Completion Date** |
| 1. Informed by summer 2019 UMD pilot at Chik-Wauk, refine existing programs to include new content elements and mixed media delivery. i.e. use of immersive display in conjunction with hands on activities. | September 2020 |
| 2. Draft outline, script, and production plan reviewed and approved by community partners | November 2020-2022 |
| 3. Completed learning experience pilot tested at UMD with students and staff | March 2021-2023 |
| 4. Informed by formative evaluation, program elements refined and print and web-based versions completed. Mulitmodal learning experience ready for use with public | May 2021-2023 |

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| **Activity 3: Public engagement and evaluation** | Budget: $146,420 |

Develop an outreach schedule for the year that includes full-time summer programming at Chik-Wauk and off-site opportunities at resorts, camps, parks and community events. Work with UMD evaluator to establish a formative evaluation schedule to inform the iterative development and refinement of programming. The bulk of the programming will take place in the summer. Selected fall, winter, and spring events will be supported in consultation with community partners.

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| **Outcome** | **Completion Date** |
| 1. Work with community partners to scope out program schedule for the summer. Identify appropriate times for evaluation of programming (2-3 times/year) | April 2020-2023 |
| 2. Work with community partners to identify selected community events to provide programming | July 2020-2022 |
| 3. Complete and submit final project evaluation results to the LCCMR. | July, 2023 |

**III. PROJECT PARTNERS AND COLLABORATORS:**

Swenson College of Science and Engineering (UMD); College of Education and Human Service Professions (UMD); Gunflint Trail Historical Society (Chik-Wauk Museum and Nature Center); Superior National Forest (USFS); Visit Cook County.

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:**

The experiences will become integrated programs of the Chik-Wauk Museum and Nature Center, with resources available on-line. The programs will increase the awareness and understanding of the boreal forest, and the issues that impact the stewardship of this region. These programs will leave a sustainable program structure in place that benefits UMD students and faculty, and the communities served. Place matters, people matter, and

 by harnessing our shared intellectual capital, we can sustain these special places and experiences for generations to come. We estimate reaching over 40,000 visitors over the three years of funding.

1. Like the UMD Large Lake Observatory, The Boreal Observatory will be a place that focuses on understanding the boreal or taiga forest, the largest land biome in North America. [↑](#footnote-ref-1)
2. Based on the Bortle scale, a 1-9 measurement of light pollution [↑](#footnote-ref-2)
3. This includes departments like Physics and Astronomy home to the UMD Planetarium [↑](#footnote-ref-3)
4. This includes the Center for Environmental Education [↑](#footnote-ref-4)