

1. Name of the project:

Marine Advanced Technology and Education (MATE) Olympic Coast Remotely Operated Vehicle (ROV) Competition – *Taking BlueTech to New Depths*

2. Lead organization and Contact:

Lead Organization: Olympic Coast National Marine Sanctuary

Contact: Nicole Harris, Education Specialist

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350-406-2082

115 East Railroad Ave

Suite 301

Port Angeles, WA

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3. Start and end dates for your project:

January 2022 – June 2022

4. Deliverables:

- Successful coordination and implementation of the 2022 MATE Olympic Coast ROV Competition
- One team training and product demonstration build workshop day
- 5 quality project photos, an MRC newsletter article, and end of project presentation to the MRC

5. Project staff:

Nicole Harris, Education Specialist for Olympic Coast National Marine Sanctuary.

Nicole plans and implements education activities for classrooms, field investigations, teacher workshops, and presentations to local and regional organizations. She also assists in the coordination and implementation of volunteer coastal cleanups. With a background in Early Childhood Education, a B.A. in Environmental Policy and a minor in Environmental Science from Western Washington University's Huxley College of the Environment, she worked as a nearshore biologist along the central coast of Strait of Juan de Fuca before joining the sanctuary team. Nicole has coordinated and run the MATE Olympic Coast ROV competition starting with the inaugural competition in 2016. Nicole has also conducted annual mentor workshops, and student team workshops each year in support of the community of ROV teams and mentors along Olympic Coast.

Partners:

Marine Advanced Technology and Engineering (MATE) organization is a partner on all MATE regional competitions internationally. MATE is responsible for setting all safety standards and requirements, all product demonstration challenges and prop building directions, and the judging template and rubric.

MATE II Inspiration for Innovation provides regional website maintenance and support and co-manages online registration.

6. Geographic Area:

The MATE Olympic Coast ROV Competition program strives to reach the communities in the coastal counties of Clallam, Jefferson, Grays Harbor, Pacific, and Wahkiakum. The competition takes place at the Forks Aquatic and Athletic Center, in Forks WA..

7. Permits:

Competition Insurance with MATE II Inspiration for Innovation.

8. Project Narrative (up to 5 pages not including attachments):

Abstract:

Olympic Coast National Marine Sanctuary is seeking \$1300 in funding to support the 4th MATE Olympic Coast ROV Competition in Forks WA. The MATE Olympic Coast ROV Competition uses underwater robots, also known as Remotely Operated Vehicles or ROVs to engage students in science, technology, engineering and math (STEM) and prepare students for technical careers. The competition provides students opportunities for hands-on experience in STEM while student teams develop and apply technical, teamwork and problem-solving skills as they tackle missions modeled after real-world scenarios from the ocean workplace.

Funding through the North Pacific Coast Marine Resource Committee will be used to support an in-person competition event for teams in 2022 as the program works to re-build ROV student opportunities for the current and future ROV community of Olympic Coast.

Background

Ocean Literacy, broadly defined, is an enduring understanding of the ocean's influence on people and people's influence on the ocean in a manner encouraging lifelong attitudes of ocean resource stewardship and personal commitment. Olympic Coast National Marine Sanctuary (OCNMS) Management Plan states that "the sanctuary and partners will continue and expand existing - and develop new - education and outreach programs around the concept of Ocean Literacy". Additionally, enhancing the public's awareness and appreciation of natural and cultural resources of Olympic Coast is a cornerstone of the sanctuary's mission, which follows directly from mandates of the National Marine Sanctuary Act.

We know that the K-12 audience of coastal communities of Olympic Peninsula are the next generation of managers, scientists and educators of their resources. Because of this, OCNMS has both a strong obligation and interest in providing local schools with access to marine science education that meet education standards while fulfilling needs identified by regional educators. With the adoption of the Next Generation Science Standards (NGSS) in Washington State, teachers were looking for creative and engaging ways to bring STEM education to their students. ROVs seemed a natural fit to STEM education and student engagement, and also met efforts to understand and explore Ocean Literacy Principle number 7, The ocean is largely unexplored. In early 2016 Quileute Tribal School high school students participated in an Introduction to ROVs program at Olympic Natural Resources Center. The obvious student and educator interest from this initial event led to a partnership with the MATE Pacific Northwest ROV Challenge organizers. The first mentor training and motor kit assembly workshop was held in Forks WA in November 2016. This was shortly followed in 2017 by the first Olympic Coast ROV competition in Forks WA. Teams from 6 different coastal schools; Clallam Bay, Neah Bay, Forks, Quileute Tribal School, Lake Quinault and Taholah, participated in the competition. This inaugural ROV competition saw 13 competing teams and over 25 volunteers from a variety of professional STEM careers. The

top three teams - based on accumulated points of product demonstration and poster and presentation – were recognized in two competing categories, Scout and Navigator. Discretionary awards were also provided for teams excelling in categories such as best design, best teamwork, and the MacGyver award. This competition was supported largely by the MATE Pacific Northwest Competition in Federal Way, providing the props for all underwater challenges, as well as additional volunteer judges and templates for judging and scoring. In May of 2018 the 2nd annual Olympic Coast ROV Competition was held in Forks WA, with 14 competing teams participating. Again, the MATE Pacific Northwest ROV Competition supported our then “Satellite” competition with underwater props, judging templates and volunteer judges. The top three teams in both Scout and Navigator were recognized along with discretionary awards based on judge observations and recommendations.

Not wanting to continually tax the resources of the MATE Pacific Northwest ROV Competition, we worked with the MATE organization to become autonomous from Pacific Northwest as an official regional competition known as the MATE Olympic Coast ROV Competition. The construction of underwater challenges, judge recruitment and safety standards were entirely our responsibility, however the official status provided us with MATE resources, a regional website for competition registration and event insurance covered through MATE II. On May 18th 2019, the 3rd annual MATE Olympic Coast ROV Competition was held. The top three teams in both Scout and Navigator were recognized, with the first-place teams receiving a \$250 cash prize from the Surfrider Foundation Olympic Chapter.

And then came the global pandemic. In early 2020 plans were progressing in preparation for the 4th annual ROV competition when the world as we knew it came to a screeching halt. The reality of an in-person ROV competition for 2020 was quickly removed as much of our business-as-usual shifted to the virtual world. This stretched into 2021, where the continued Covid-19 restrictions led to efforts around an ROV competition focusing on supporting student learning with the AT-Home Student STEM Challenge. This At-Home Student STEM Challenge provided students with a variety of supplies and an engineering challenge. 28 students participated in the AT-Home Student STEM Challenge, submitting photos and video entries of their at-home engineering. Every student participating received a participation “science experiment in a test tube” prize and the students with the three highest scores received a small cash prize.

As of October 2021, after more than 18 months of disrupted education opportunities and in-person activities, MATE Inspiration for Innovation is kicking off the 2022 ROV Competition year “Taking BlueTech to New Depths”. Challenges in 2022 will include the real-world scenarios of *Marine Renewable Energy*, *Offshore Aquaculture and Blue Carbon* and *The Antarctic Then and Now*. Teachers and mentors of the Olympic Coast ROV community are eager to dive-in to the engineering, problem-solving and team building that comes with the preparation of participating in an ROV Competition. Current projections from the Clallam County Health Officer suggest Spring of 2022 is well positioned for the return of safe in-person activities following continued vaccination of residents, including students aged 5-12. Keeping the necessary safety precautions into mind, it seems appropriate and important to plan for an in-person ROV competition. Knowing that engagement in ROV waned with the removal of in-person and after school learning, continued support for the program is paramount as we work to inspire and engage the upcoming generation of confident critical thinkers working with team members to problem solve our future

MRC Benchmarks

The MATE Olympic Coast ROV Competition meets the MRC benchmark of **Education and Outreach** through coordination and implementation of education and outreach programs with other organizations. Students participating in ROV programs offered through coastal schools (both in class curriculums and after school groups) and supported by OCNMS, MATE, their communities and the ROV Competition, are better prepared to enter the marine workforce with confidence and experience in critical thinking, teamwork and problem solving.

Project Objectives

Objectives for the MATE Olympic Coast ROV Competition include:

- Continue successful coordination and implementation of the annual MATE Olympic Coast ROV Competition, the 4th competition following two years of absent competitions due to Covid-19 restrictions.

Project Timeline

The program will kick off in early 2022 with a Mission Overview and Prop Build Workshop. This workshop will focus on existing mentors at Quileute Tribal School, Forks Middle School, Lake Quinalt Middle School, Taholah Middle and High School, and Olympic Peninsula Academy, while working to engage mentors and student teams in Clallam Bay and Neah Bay as we work to build the success of in-class and after-school ROV program participation. Prop building involves assembling the underwater product demonstration challenges that make up the pool portion of the competition day. Providing a mission overview from the Regional Coordinator offers student teams the chance to ask questions and clarify mission objectives to prepare and practice for the competition event. This workshop also provides the opportunity for teams to share and inspire design and build elements of ROVs to meet the competition challenges.

Following the Mission Overview and Prop Build Workshop, the 4th “annual” MATE Olympic Coast ROV Competition will take place in May of 2022

- Feb/March 2022 – Mission Objective and Prop Build Workshop
- May 2022 – 4th MATE Olympic Coast ROV Competition
- June 2022 – Images and project reports available to NPC MRC

Methods, procedures, equipment,

Mentor trainings and student workshop will use all appropriate tools and safety equipment for motor kit assembly and ROV production.

MATE regional competitions adhere to strict safety standards for competing teams, requiring teams to pass a safety check before any pool entry with their ROV.

“Triage” stations, where teams can access tools to aid in last minute mechanical, electrical or design emergencies on competition day, will also adhere to the same strict safety standards.

Impact:

The MATE Olympic Coast ROV competition will work to have at least 8 competing teams reaching approximately 30-40 students from around the Olympic Coast.

The competitions will also reach approximately 20-25 community and regional volunteers that support the event as safety judges, product demonstration judges, poster and presentation judges, along with other event coordination.

Future

The MATE Olympic Coast ROV Competition has every intention to continue into the future. Before the Covid-19 pandemic, the feedback from participating teachers and students was

overwhelmingly supportive. The interruption of a global pandemic stalled the smooth continuation of the MATE Olympic Coast ROV Competition that was sailing on the momentum of growing teams and community support. However, as teachers and students are returning to in-person learning and after-school activities, students are once again encouraging and building teams and looking to build a vehicle that can help them problem solve the challenges presented to them in the MATE 2022 Competition season.

As we continue to grow and expand the ROV program on the Olympic Peninsula, there is great potential to develop a student mentor/internship program. Developing a student mentor/internship program will provide additional resources and opportunities for coastal community youth. Following the successful template of the MATE program, students that go through the ROV competition can take on leadership roles that support the competition, while building on their own skills and experience.

Category	Detail	MRC Request	Matching Contribution (not required)	Total
Salaries and Benefits or hourly wages	NA			
Supplies/Equipment	Forks Athletic and Aquatic Pool rental (Friday evening set up(\$150 and all-day Saturday \$650)	\$800		\$800
Supplies/Equipment	Prop Build supplies	\$240	\$400	\$640
Supplies/Equipment	Workshop participant lunch		\$400	\$400
Supplies/Equipment	Competition Day participant lunch(teams and judges)		\$500	\$500
Supplies/Equipment	Competition awards and prizes		\$400	\$400
Travel				
Contracted services	ONRC Forest Hemlock Room for hosting workshop	\$260		\$260
Indirect expenses (All such expenses should be itemized.)	NA			
Other				
Totals		\$1300	\$1700	\$3000