Mangroves provide a key serviceto the surrounding environment such as flood and tsunami protection, carbon sequestration, and fostering biodiversity in their habitats. They are also essential to fisheries as they act as a refuge for many species of juvenile fish due to abundance of feeding resources and reduced predation. About 55% of total fish catch biomass in Indonesia is made up of species dependent on mangrove habitats.However, coastal communities in Indonesia have experienced mangrove degradation due to anthropogenic activity at an alarming rate. To address this issue, the Indonesian government has committed to restoring 600,000 hectares of mangroves in the country by 2024, the most ambitious mangrove rehabilitation program in the world. Since these efforts began in 2020, communities where this restoration has occurred have seen not only the economic benefits of flood prevention and ecotourism, but also increased fish catch. However, very little research has been done to assess the improvements in marine biodiversity of species that have resulted from this restoration project. In this study, I propose to work on Tanakeke Island in the Takalar Regency, South Sulawesi. There, mangrove restoration has been continuously occurring since 2015 and has been organized and conducted by the local community.I aim to understand how mangrove restoration is affecting the local marine biodiversity, namely in increasing populations of rabbitfishes, emperor breams, snappers, jack fish, and barracudas, all of which are commercially fished species that have experienced stock declines in recent years due to overfishing but may also be benefitting from this mangrove conservation effort. I will disseminate this research in the form of peer-reviewed scientific articles as well as to local communities to help them make informed decisions about the benefits of mangrove restoration both ecologically and economically.

I plan to conduct my research in Tanakeke Island, where the community, particularly women, have been restoring their mangrove forests and changing community dialogues around the value of mangroves. As a result, there have been reports of higher fish yield. However, no study has been conducted in this region on the role of mangrove restoration on this increased catch. I will collect data through Baited Remote Underwater Videos (BRUVs), a non-invasive, cheap camera contraption. I will deploy these BRUVs in this site, I will analyze these videos to assess what species are living in the area, create a local food web of these species, and calculate the biodiversity index of the area, a key metric in assessing ecological health. Then, I will share my findings with the local community, both conservationists and fishers alike, to help inform how effective this mangrove conservation is and commercially fished stocks are benefitting from these restoration efforts.

My timeline for the project

* September – November 2023: Focus on Bahasa Indonesia language learning in Java (contingent upon receiving the CLEA award).
* December 2023 – May 2024: Data collection in Tanakeke Island. This will involve moving to South Sulawesi and beginning to work with local people in the area. I will deploy a BRUV at three different sites in the newly restored mangrove forest. Every day I will then note the species found, how long they remained detected by the BRUV, and time of day they were spotted.
* June 2024: Data analysis, model food web creation and biodiversity assessment.
* July – August 2024: I will write up our findings, and begin developing conclusions on the benefits of mangrove restoration to present to stakeholders in the form of a report designed to be easily understood by local fishers.

In order to engage with the students at Makassar, I plan on teaching weekly workshops in the statistical programming language R, a common analysis tool in ecology in order to aid university students in their research and experience in conducting scientific analysis. I have run similar workshops during my master’s program and am familiar with the challenges new students face when learning to code. I would gain so much from a Fulbright Grant in Indonesia, and I hope to use this course to foster a mutual exchange of experience and knowledge.

I have conducted fisheries research both in the field and through data analysis. In 2017, I interned for the National Oceanic and Atmospheric Administration where I aided in a research project updating population models of Pacific fishes. Further, I participated in their bottom trawl survey, learning how to identify species in the Eastern Pacific and how fisheries are managed and regulated. I am familiar with coastal restoration research through my time at Louisiana Universities Marine Consortium, where I worked in a lab studying coastal erosion in Louisiana’s marshland. Currently, I am getting my master’s degree at University of New Hampshire’s Department of Biological Sciences where I study mathematical applications in biology. My thesis is in studying small-scale fisheries in Madagascar and I hope to continue this type of research during my Fulbright year.

Having lived abroad before, I understand not only what it’s like to become fluent in a new language but also how learning a language connects you so much more to the community around you. To understand small-scale fisheries in Indonesia, having an understanding of their culture is key which is why I will also be applying for the CLEA in order to be able to communicate effectively with my peers and colleagues. Before leaving for the country, I also plan on mastering the basics of Bahasa Indonesia through independent study using resources such as Duolingo. On top of that, I am already pursuing a formal Bahasa Indonesia course through the language course website Babel. Further, I have connected with members of a group in my area called Indonesia Community Connect that focuses on connecting Indonesian culture with the region and promotes Indonesian heritage in New Hampshire. Through this, and an online exchange program, I will meet weekly with a native speaker willing to have a language exchange where we can have conversations to practice speaking and understanding.

After Fulbright, I plan to apply for jobs at an NGO or government agency to better understand and quantify the status of our world’s small-scale fisheries. This project will aid me in that goal as it will help me gain a better understanding of the complex relationship between culture and conservation and how the best way to protect the environment is to also understand people’s relationship with it. Despite the growing threats ocean environments face, Indonesia is still home to precious marine resources that require better understanding in order to protect them.