**STATEMENT OF GRANT PURPOSE**

**Sophie Wulfing, Indonesia, Fisheries**

**The effects of mangrove restoration on marine biodiversity in Tanakeke Island, Indonesia**

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 food 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 the country have experienced alarming rates of mangrove degradation due to anthropogenic activity. 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, communities have seen the benefits of flood prevention and ecotourism. However, little research has been done to assess the improvements in marine biodiversity and benefits to fish stocks that have resulted from this restoration project. I propose to work on Tanakeke Island, South Sulawesi where mangrove restoration has been continuously occurring since 2010 by the local community.I aim to understand how mangrove restoration is affecting the local marine biodiversity and improving the sustainability of commercially fished species on this island. I will be doing stock assessments of squid, snappers, groupers, and milkfish, all of which are commercially fished species that have experienced declines recently due to overfishing but may also be benefitting from this mangrove conservation effort.

I plan to conduct my research in Tompotana village on Tanakeke Island, where mangrove forests were largely depleted due to shrimp aquaculture and charcoal production. Proving to be unsustainable, most shrimp farms were abandoned in the 1990s. As a response, the non-profit group Yayasan Hutan Biru (Blue Forests) has been working with the local community on Tanakeke to restore mangroves. Tanakeke has seen tremendous success on forest restoration and community engagement. I will work with Blue Forests to deploy Baited Remote Underwater Videos (BRUVs), a non-invasive and inexpensive camera contraption. This method has not been utilized in the area and does not require catching or killing fish to collect data. I will also develop stock-assessments of species of local and commercial interest with Fishpath, a software used by researchers to evaluate different management scenarios. I will conduct this work with Dr. Rohani Ambo Rappe from the Universitas Hasanuddin in Makassar and will disseminate my findings through peer-reviewed scientific articles and presentations to other scientists at Universitas Hasanuddin to inform their own research on mangroves in South Sulawesi.

Project Timeline: September – November 2023: Focus on Bahasa Indonesia language learning in Java (contingent upon receiving the CLEA award). December 2023 – May 2024: Data collection. With the help of Blue Forests, I will deploy a BRUV at three different sites in Tompotana village: a site that was restored in the early 2010s, a recently restored site, and a site that still have not yet been recovered from mangrove loss. The BRUVS will have been purchased prior to the start of the grant using personal funds. Every day I will analyze these videos and note the species found, how long they remained detected by the BRUV, and time of day they were spotted. June 2024: I will clean and formalize the data for analysis, calculate the biodiversity index (a key metric in assessing ecological health), and use Fishpath to create population models and evaluate different management strategies. July – August 2024: I will discuss results with Dr. Ambo Rappe and begin writing our conclusions on the benefits of mangrove restoration. In this time, I will also work with Blue Forests in creating research presentations aimed at the local communities in which they work so that they can utilize the findings in their efforts.

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Dr. Rohani Ambo Rappe is a seagrass ecologist that has worked extensively in South Sulawesi with both fisheries researchers and the local community in the region. She can provide expertise in the area, connect me with local fishers, and provide key advice for conducting science in tropical marine areas. To engage with the students at Makassar, Dr. Ambo Rappe suggested I teach weekly workshops in the statistical programming language R, a common analysis tool in ecology, to help university students conduct their scientific analysis. I have run similar workshops both when I was working in Bogotá, Colombia and during my master’s program so I am familiar with the challenges new students face when learning to code. Blue Forests will also be a key component in helping me connect with the community. I intend for this project to aid Blue Forests in their understanding of the benefits of mangrove forests and for them to be able to use my findings in presentations to local communities the benefits of mangroves. Further, Blue Forests has an annual field school for local children in the communities they work in. I will aid them in programming and running this field school, along with creating curriculum to help with education on the benefits of mangroves on fish stocks.

I have ample experience conducting fisheries research. In 2017, I interned for the National Oceanic and Atmospheric Administration where I developed population models of Pacific fishes and learned how to identify species in the Eastern Pacific. Currently, I am getting my master’s degree at the University of New. As a quantitative ecologist, my master’s thesis addresses data deficiencies in small-scale fisheries and aims to understand the process and outcomes of decision making by stakeholders. I hope to continue this type of research during my Fulbright year. My past field experiences have also taught me that when living in coastal communities, it is essential to build relationships between scientists and stakeholders. In my time at Louisiana Universities Marine Consortium, I worked in a lab studying coastal restoration in Louisiana’s marshland. Here, coastal erosion is threatening the homes and livelihood of the local community, and I got to work with a team of scientists trying to understand the drivers of this erosion and communicate this to those who live there. I understand that to work in Tanakeke, building an honest relationship with the local community will be both a challenge and a key component of my research. Blue Forests will be a helpful guide in this process, as they have agreed to connect me to the local leaders and restoration groups in Tanakeke and to help facilitate the communication of my research to stakeholders. Further, as I have lived abroad before, I understand how language fluency plays an essential role in connecting to the people around you. Therefore, I will also be applying for the CLEA and have a language learning strategy in place prior to the grant that I have outlined in my supplemental essays.

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 Fulbright project will be a building block toward that goal as it will give me hands on experience in addressing the issues that small scale fisheries face. Most crucially, I will learn how to communicate these findings to the people most affected by environmental change. Further, as many NGOs work with global datasets, I hope to utilize the relationships and connections I make in Indonesia to help bridge the gap between small-scale fisheries and these large-scale databases. Indonesia is home to one of the largest networks of small-scale fisheries in the world, and to better understand how conservation efforts are affecting fisheries here would be a vital understanding that could be applied to conserving fishing around the world.