

Collaborative Fisheries Science with a SMILE (Size Matters: Innovative Length Estimates)

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As global fisheries experience intense pressure, there is a need to further modernize fisheries sampling methods that are non-extractive and non-destructive, yet comprehensive, cost effective, and accurate to optimize management. Traditionally, collecting fish length data requires handling or harvesting the fish, which can impact local fish populations and require significant investments and science/management capacity that are often limited. Additionally, harvested fishes frequently represent a limited distribution of sizes and species due to harvest restrictions. The collaborative SMILE (Size Matters: Innovative Lengths Estimates) project will help expand fish length data sources into stock and ecosystem assessment processes using single laser-mounted cameras (“FishSense”). As a companion to the REEF Volunteer Fish Survey Project, SMILE equips recreational scuba divers or citizen scientists with a low-cost camera system to capture images of select target species of management priority (grouper, snapper, hogfish, and parrotfish) through roving diver surveys. Fish lengths were extracted from the images via an AI workflow. Here, we discuss preliminary outcomes from development of this project, including validation through multiple approaches including known size objects and paired surveys with a roving stereo-video system and video belt-transects. Length distributions were comparable between these methods. In addition, to better understand the citizen science interaction with the project, a formal survey has been disseminated to evaluate motivations, barriers, and user experiences related to citizen science in the context of marine conservation, conservation technology, and the SMILE project.