

## Emerging Conservation Technologies for Fisheries Assessment and Conservation

### Tecnologías de conservación emergentes para la evaluación y conservación de la pesca

### Technologies de conservation émergentes pour l'évaluation et la conservation des pêches

BRICE X. SEMMENS<sup>1\*</sup>, CHRISTY V. PATTENGILL-SEMMENS<sup>2</sup>, ALLI C. CANDELMO<sup>2</sup>, SCOTT A. HEPPELL<sup>3</sup>

<sup>1</sup>*Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA, USA*

<sup>2</sup>*Reef Environmental Education Foundation (REEF), 98300 Overseas Highway, Key Largo, FL, USA*

<sup>3</sup>*Oregon State University, Corvallis, Oregon 97331, USA*

\* email: [bsemmens@ucsd.edu](mailto:bsemmens@ucsd.edu)

#### EXTENDED ABSTRACT

Fisheries sampling methods that are non-extractive and non-destructive, capture a large portion of the population, and are cost effective and accurate are crucial to modernizing fisheries assessment. Current assessments rely heavily on direct human observation – typically catch and release measurements, dockside interviews, and/or visual census of fish populations. Thus, current sampling methods require significant investments and science/management capacity that often do not exist, especially in the thousands of small-scale, data-limited fisheries operating around the world. However, rapid advancement in imaging technologies hold promise for new sampling methodologies that democratize data collection. This talk discussed new and evolving imaging technologies, including depth-sensing cameras, and the emerging citizen-science data collection programs associated with these tools. Case studies include Grouper Spotter, an artificial intelligence assisted Web platform for tracking individual groupers based on natural markings, and FishSense, an underwater 3-dimensional imaging camera system for generating fish length frequency data. This latter effort was funded with the help of the Fish & Wildlife Foundation of Florida via proceeds from the ‘*Discover Florida’s Oceans*’ license plate.

KEYWORDS: conservation technology, length frequency, fisheries, depth cameras, artificial intelligence