

# eDNA Metabarcoding and Citizen Science for fish (ichthyo- and elamosfauna) Surveying and Conservation in Marine Protected Areas



Authors: Isabelle Nakaima<sup>1a</sup>, Eduarda Valério<sup>2</sup>, Isabela Buxbaum Marinho Guerra<sup>2</sup>, Julia Silva Antonio<sup>2</sup>, Rodrigo R. Domingues<sup>1,3</sup>

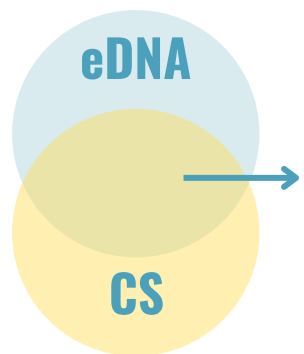
<sup>1</sup>São Paulo State University (UNESP), Bioscience Institute, Botucatu, São Paulo, Brazil

<sup>2</sup>University of São Paulo (USP), Oceanographic Institute, São Paulo, Brazil

<sup>3</sup>São Paulo State University (UNESP), Bioscience Institute, Campus do Litoral Paulista, São Vicente, São Paulo, Brazil  
a. bellenakaima@usp.br

## Introduction

Fishes play a key role in marine ecosystem dynamics. Monitoring and protecting strategic regions, such as islands, is essential for fish diversity conservation! To do this, environmental DNA (eDNA) allows for precise, non-invasive species detection<sup>2</sup> and can be contributed with Citizen Science (CS) which enhances data collection through visual censuses and water sampling<sup>3</sup>. Divers, with their unique Local Ecological Knowledge, become valuable allies in monitoring marine life, contributing to species detection, tracking ecological changes, and supporting conservation efforts<sup>4</sup>.

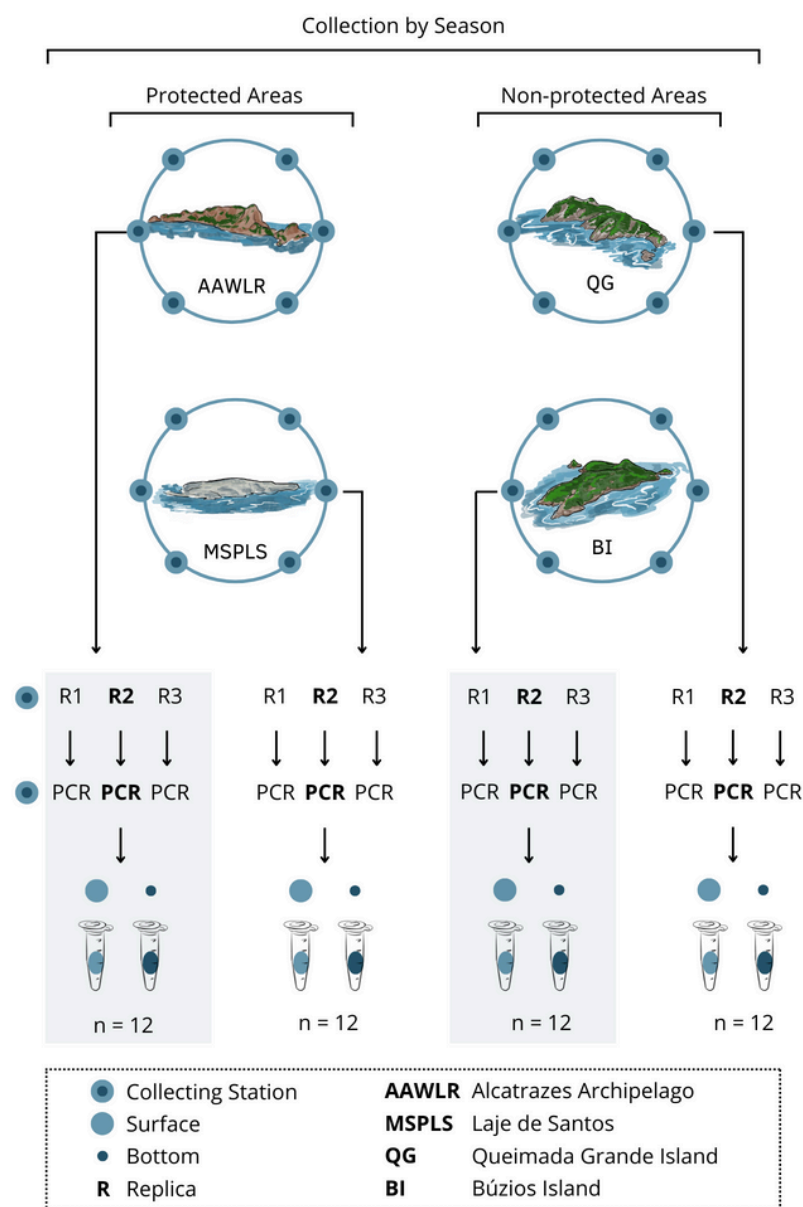


- Enhanced Data Quality.
- Comprehensive Species Inventory.
- Temporal and Spatial Monitoring.
- Open access information and community engagement.
- Environmental and Scientific education.

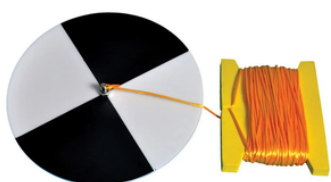
## Methods

### Environmental DNA (eDNA)

eDNA collection 2023 and 2024:



Oceanographic Variables in 2023 and 2024:



### eDNA filtration and extraction:



### eDNA bioinformatics:



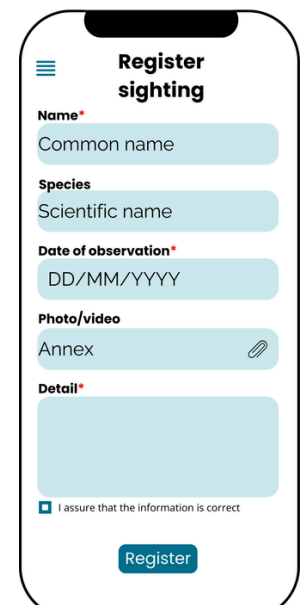
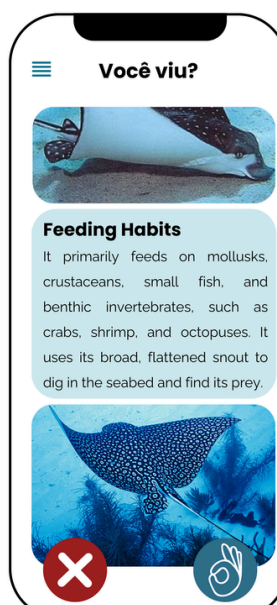
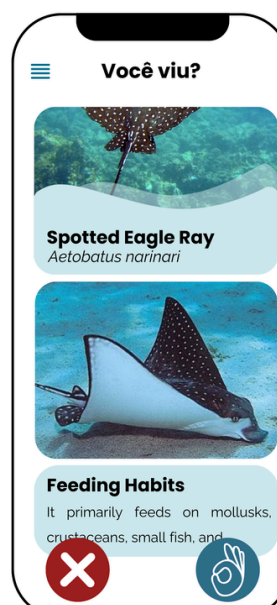
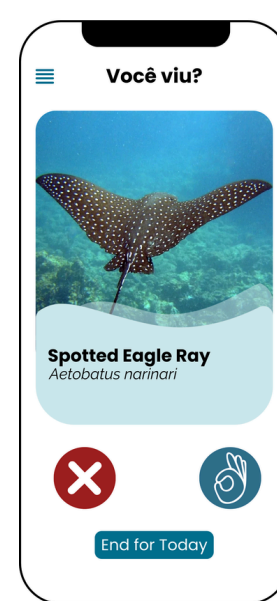
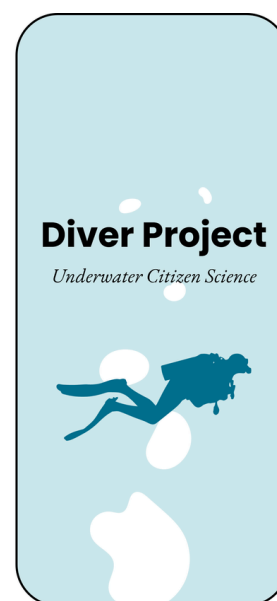
## Citizen Science (CS)

### "Mobile" Divers

- Sporadic participants:
- Tourists;
  - Non-regular divers;
  - Use implied app version;
  - Targetting broader collaborators

### "Fixed" Divers

- Permanent participants:
- Locals;
  - Regular divers;
  - Access to more app features;
  - Targetting local community.



For References, e-mail: [isabelle.nakaima@unesp.br](mailto:isabelle.nakaima@unesp.br)