

Harnessing the Power of eDNA Metabarcoding to Monitor Salt Marsh Biodiversity

Shannon Dickey and Julie Lockwood

Shannon.dickey@rutgers.edu and Julie.lockwood@rutgers.edu

Background

- Salt marshes are highly productive ecosystems that harbor immense biodiversity
- Sea level rise threatens salt marshes globally, leading to the loss of habitat for marsh birds
- While nature-based solutions help counter the impacts of climate change, many lack long-term biodiversity monitoring plans
- eDNA metabarcoding is an emerging tool that characterizes entire ecological communities

Problem

- Although marsh birds are negatively impacted by climate change, there is no established metabarcoding protocol to track changes in bird diversity within salt marshes

Project Goal

Is eDNA an effective tool to track the diversity of birds long-term?



FIG 1. Collection of aquatic eDNA samples

Field Methods

- Marsh pools were sampled from June to August 2023 within the Jacques Cousteau National Estuarine Research Reserve
- Submerged sterile bottles to collect 1-liter aquatic samples
- eDNA samples were filtered using glass fiber filters (1.5 μm pore size)
- Filtered samples were placed immediately on ice

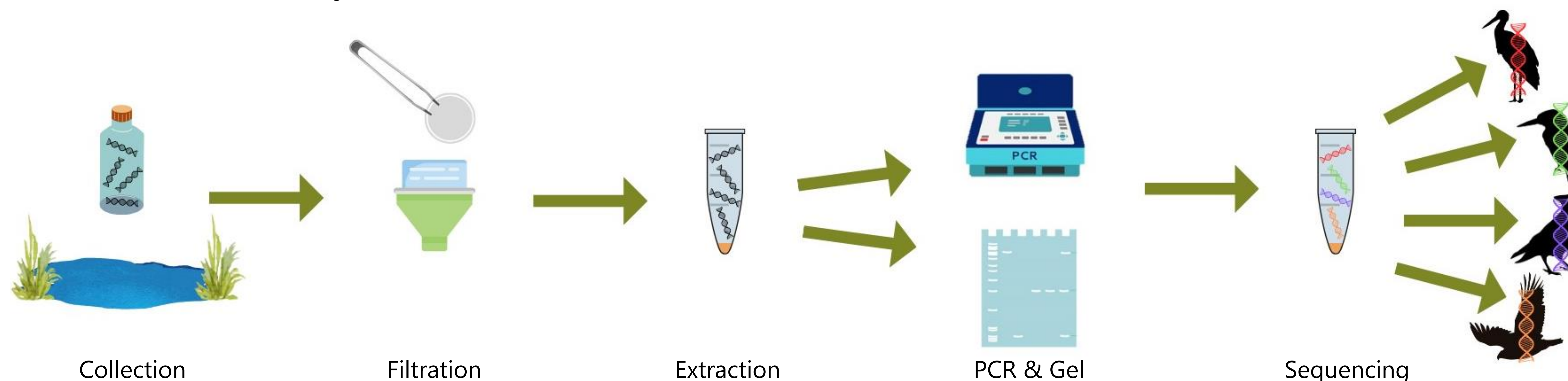
Proposed Methods

- Samples will be processed in the Rutgers eDNA Laboratory
- DNA will be extracted from filters, amplified with polymerase chain reaction, and visualized with gel electrophoresis
- Library preparation for Illumina sequencing
- Identify the taxonomy of sequences using bioinformatics

Future Directions

- How many species can eDNA metabarcoding detect in a single sample
- How to incorporate eDNA into salt marsh management

FIG 2. eDNA Metabarcoding Process



RUTGERS