Environmental DNA: A CRAB-tivating Case Study of Science Communication

Justine Jadallah*, Program on the Environment, University of Washington
Site Supervisors: Sean McDonald, Emily Grason, Abigail Keller, Washington Sea Grant
Faculty Advisor: Ryan Kelly, School of Marine and Environmental Affairs, University of Washington

Background
- European green crab, an invasive species in the Puget Sound that threatens important eelgrass habitat, are projected to increase with climate change (Parks, 2020)
- eDNA is a controversial and under-utilized genetic sampling tool that can detect species
- Understanding the barriers could benefit current invasive species monitoring efforts if it were applied to environmental policy (Figure 1)

Research Question
- What are the benefits of eDNA and barriers to adopting eDNA into environmental policy?

Internship and Methods
- I interned with the Crab Team, a volunteer monitoring program that detects European green crab along inland shorelines in the Puget Sound (Figure 2)
- As an outreach intern, I produced a series of blog posts about eDNA and a Crab Team eDNA follow up case
- I interviewed 17 eDNA experts about its social barriers, which aided in outreach materials

Results
Benefits
Most to Least Common
- Early Detection Rapid Response
  - Allow for faster follow up of invasive species, therefore quicker detection of potential new invasive species area
- Sensitive Sampling Method
  - Can detect even smallest hint of species
- Cost Effective
  - Cheaper than other sampling methods- take an environmental sample vs. nets
- Survey Broader Areas
  - A sample can collect data from larger areas
- Decreased Sampling Effort
  - Easier to take samples compared to traditional methods
- Community Composition
  - Allows us to measure the biodiversity of an area to learn more about communities

- All 17 interviewees answered “yes” when asked if eDNA is a valuable scientific resource

Barriers
Most to Least Common
Misperceptions and Misinterpretation
- Interpretation of eDNA result
- Miscommunicating b/w managers, public, and researchers

Standard Protocol
- Question of what to do post-detection
- Standard response/follow-up efforts

Funding
- Difficult to acquire funding for eDNA projects
- Management impacts funded projects

- 7 out of 17 interviewees said “yes but with limitations” when asked about eDNA’s potential to benefit policies

Implications
How Can We Overcome Barriers?
Communication!
- Creating standard protocol at an agency level can reduce communication errors between managers and researchers

Education!
- Create an educational program on eDNA provided for free to managers so they can better understand how to use eDNA to inform decision making

The work that the Crab Team does demonstrates how pairing both eDNA technology and standard trapping methods can allow us to improve early detection and give more response time to reduce the impacts of future invasive species introductions (Figure 3, Figure 4)

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