

Biodiversity Survey Methods: Using eDNA Metabarcoding to Complement Existing Methods.



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The Nature
Conservancy 

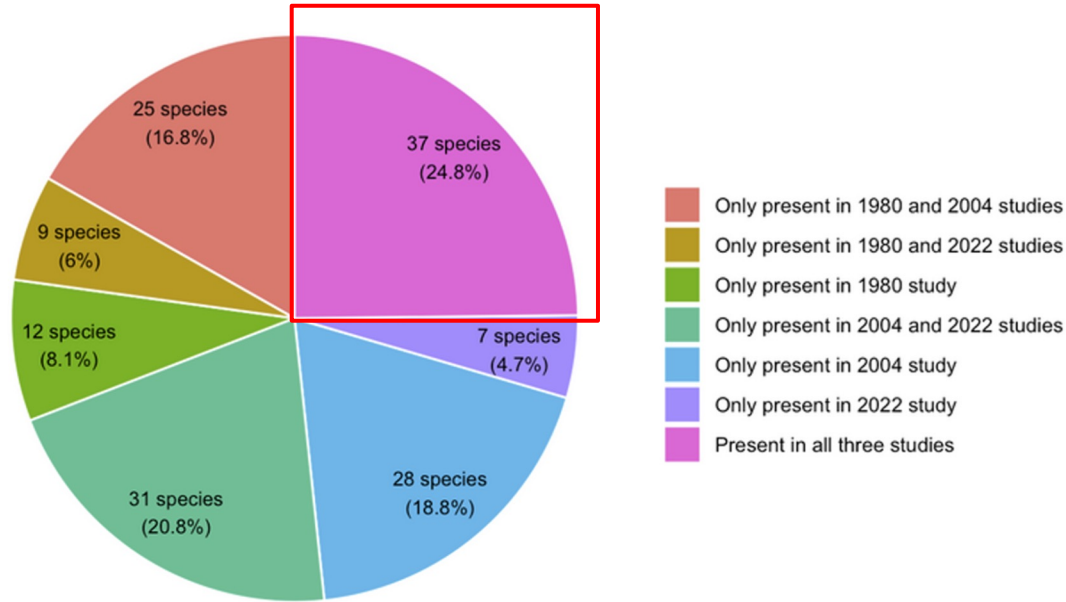




- 11- acre island
- Purchased in 1980 by TNC
- Managed marine preserve
- Annual seal pupping site
- 20+ yrs terrestrial monitoring
- 2 yrs intertidal monitoring



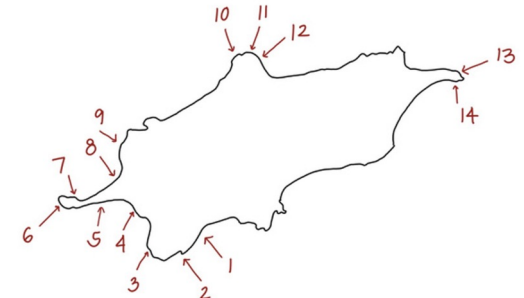
Species Presence on Yellow Island



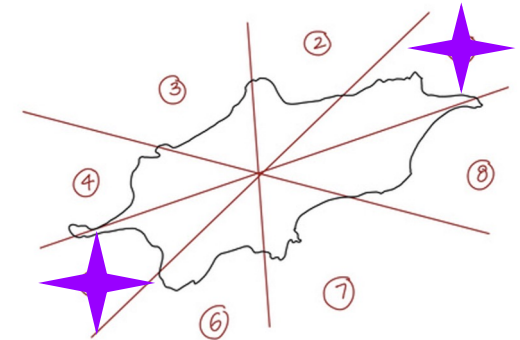
- Only 25% of species from 1980 were identifiable in 2004 and 2022.



eDNA taken from sites 1 & 5



Sites surveyed in 2004 Gelow study.



The redefined sites for our 2022 survey.

Methods - Quadrat & Transect

Benefits

- Low cost
- Easy to learn/ teach
- Translatable to terrestrial work
- Really fun!

Challenges

- Highly physical work
- Disruptive to the ecosystem
- Accurate species ID
- Data entry



Methods - eDNA

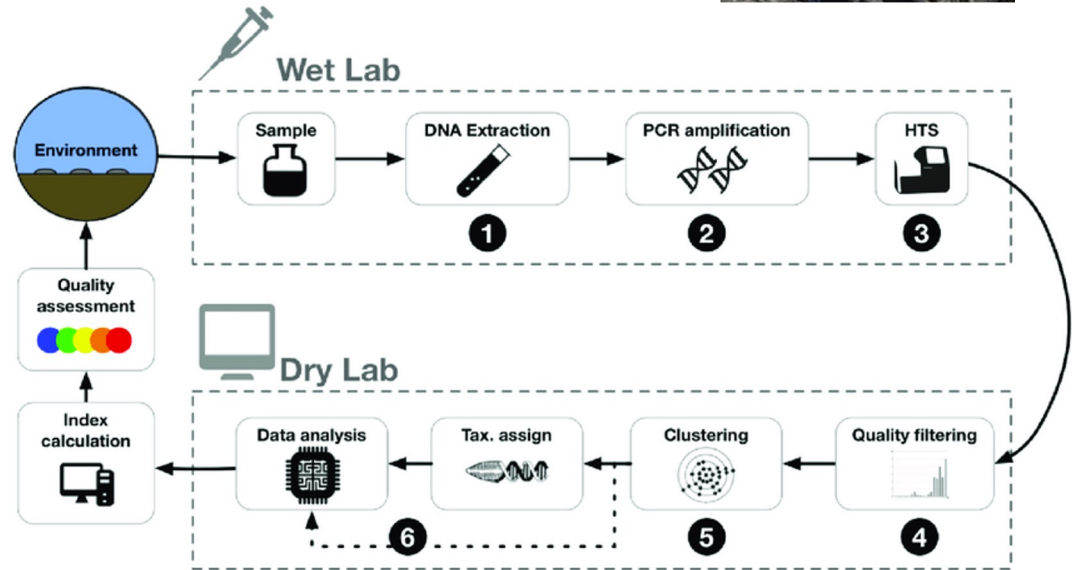
Benefits

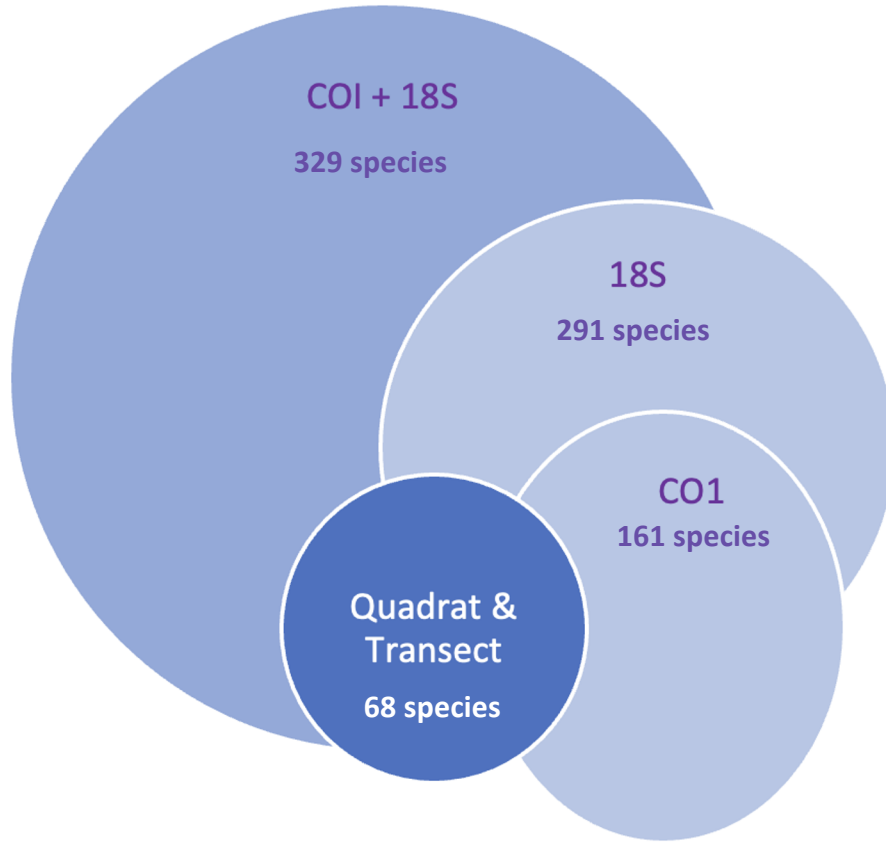
- Quick & easy collection
- Easy to learn/ teach
- Translatable to terrestrial work
- Increases accessibility



Challenges

- Bioinformatics heavy
- Costly
- Requires lab & field space
- Lots of preplanning





CALeDNA

IN



Blue Mussel
Mytilus edulis



Chiton
Mopalia imporcata



Nudibranch
Rostanga pulchra



Buccinum Whelks
Buccinum pemphigus



Kelp
Laminaria pallida



Amphipod
Melphidippa borealis

The screenshot shows the eDNA Explorer website. At the top, there's a navigation bar with links: EXPLORE, EVENTS, RESOURCES, ABOUT US, and a search icon. The main header features a large image of dolphins with the text "Welcome to eDNA Explorer" and a sub-header: "Easily analyze, share, and explore eDNA data. Connect with researchers and contribute to a comprehensive dataset of biodiversity." Below this is a search bar. A section titled "POPULAR SEARCHES" includes four cards: "LA River", "Wildfire Recovery", "Tualatin Monitoring", and "Island Invertebrates". The "How it Works" section is divided into three columns: "Explore" (with a globe icon and text about exploring shared projects), "Analyze" (with a flask icon and text about uploading data for organism lists and environmental variables), and "Share" (with a network icon and text about sharing projects with teams or the world).

www.ednaexplorer.org

OUT



Human
Homo sapiens



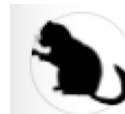
Wild Boar
Sus scrofa



Buzzing Spiders
Arachosia proseni



Harbor Seal
Phoca vitulina



Merriam's Kangaroo Rat
Dipodomys merriami



Limitations

- Costly
- Snapshot in time
- Bioinformatics heavy
- Limited molecular resources

Next Steps

- Complete analysis
- Compare NGS & TGS tools for accuracy
- Adjust and repeat



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DORIS DUKE
CONSERVATION SCHOLARS PROGRAM



Special Thanks

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- Camille Gaynus
- 2022 Crew