AQUATIC eDNA FOR STATE AND FEDERALLY LISTED SPECIES

eDNA applications

CRAMER FISH SCIENCES

GENIDAQS

Overview

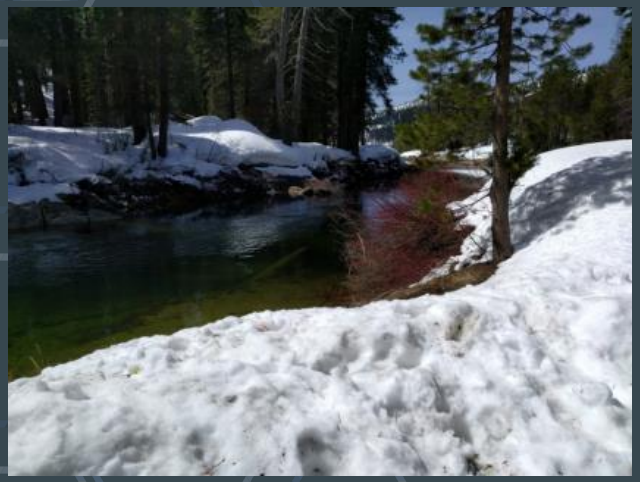
- What is eDNA?
- Why eDNA?
- How do you collect eDNA ?
- Applications

What is eDNA?

eDNA comes from biological material shed into the environment in the form of tissues, cells, feces, and naked DNA.

eDNA is a particle

Water



Why we do eDNA

1. Where are they?
2. How many are there?
3. How are they doing?

When does it make sense to use eDNA?

- Is the species rare or cryptic?
- Can you get a permit to survey otherwise?
- Do other survey techniques work?
- What is the goal of the survey?

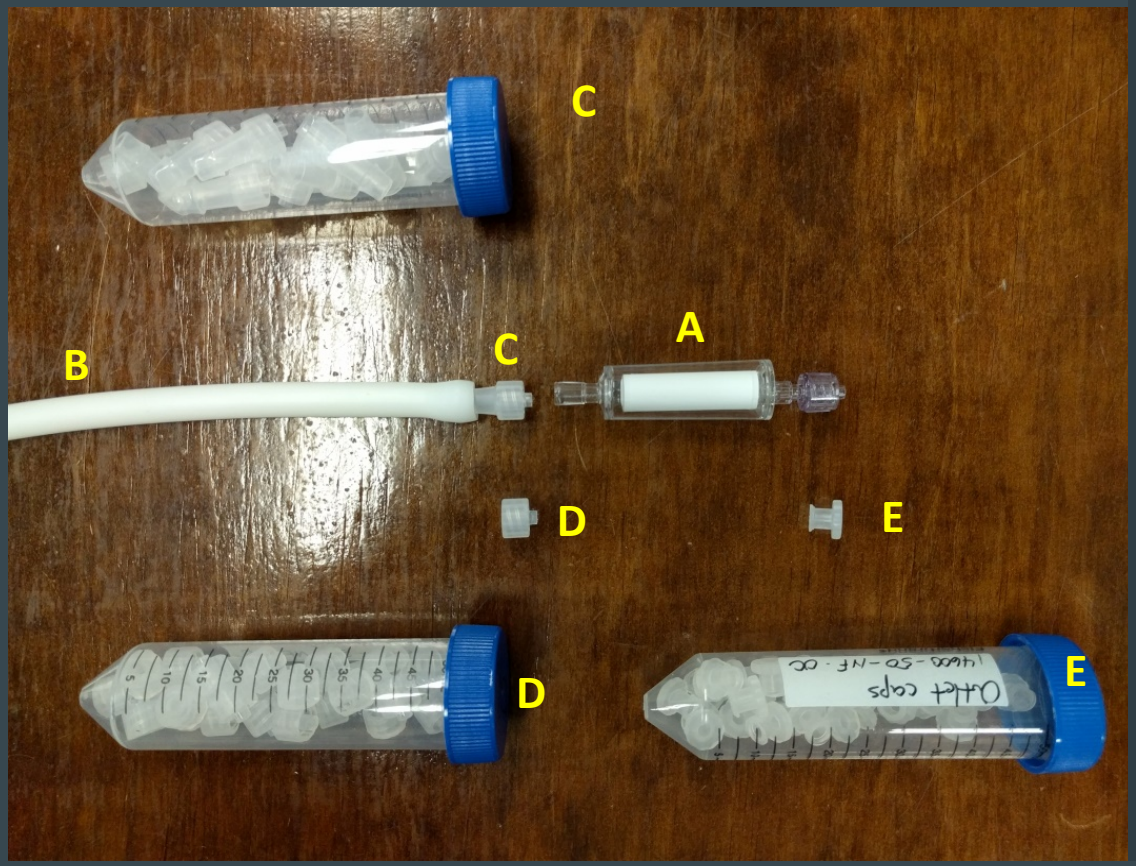
How does this work?

Pump Apparatus

Pump Apparatus

A) Cordless drill (brushless)
B) Pump ½” driver bit
C) Peristaltic Pump mounted to 2x6

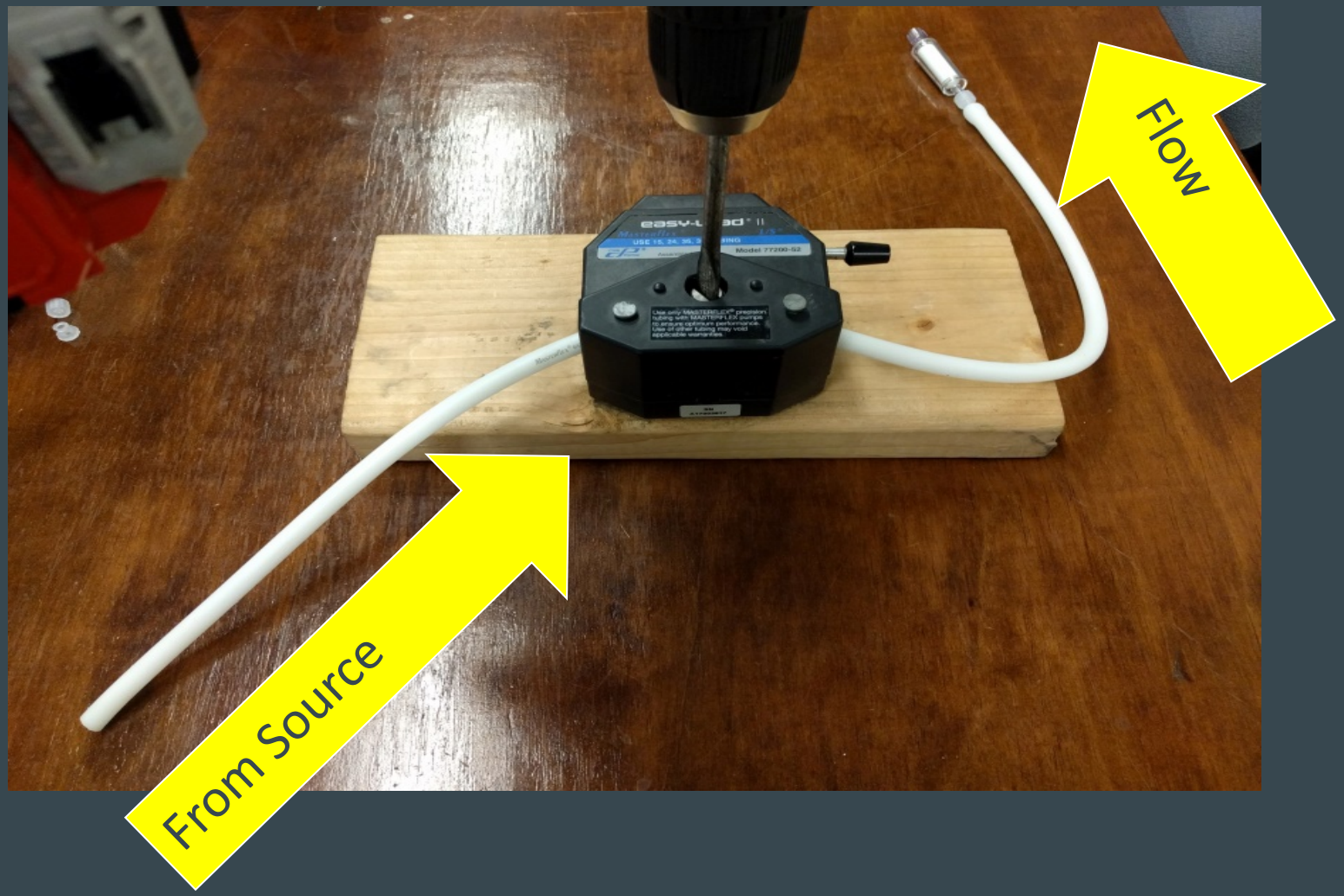
Filter apparatus



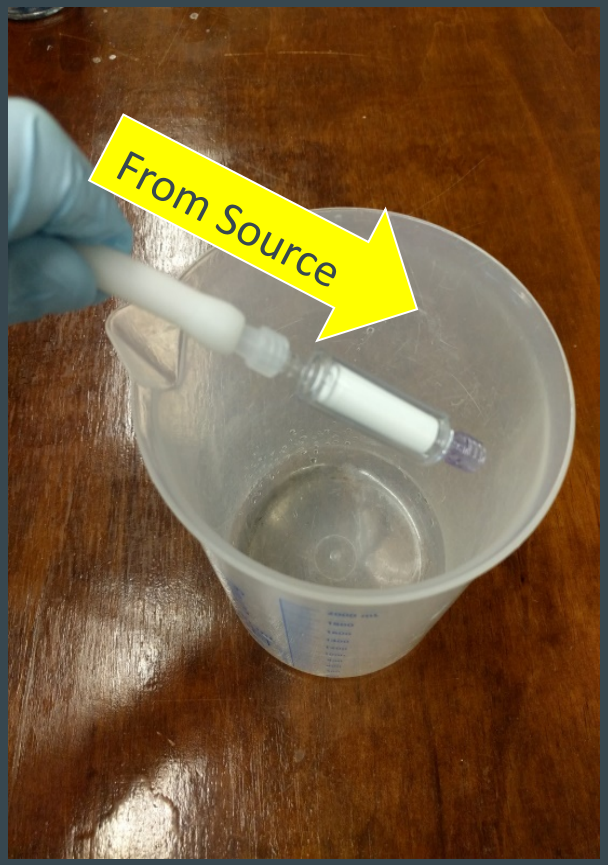
Filter Apparatus

A) Sterivex™ filter (0.45um)
B) Silicon tubing
C) Tube adaptor
D) Inlet caps
E) Outlet caps

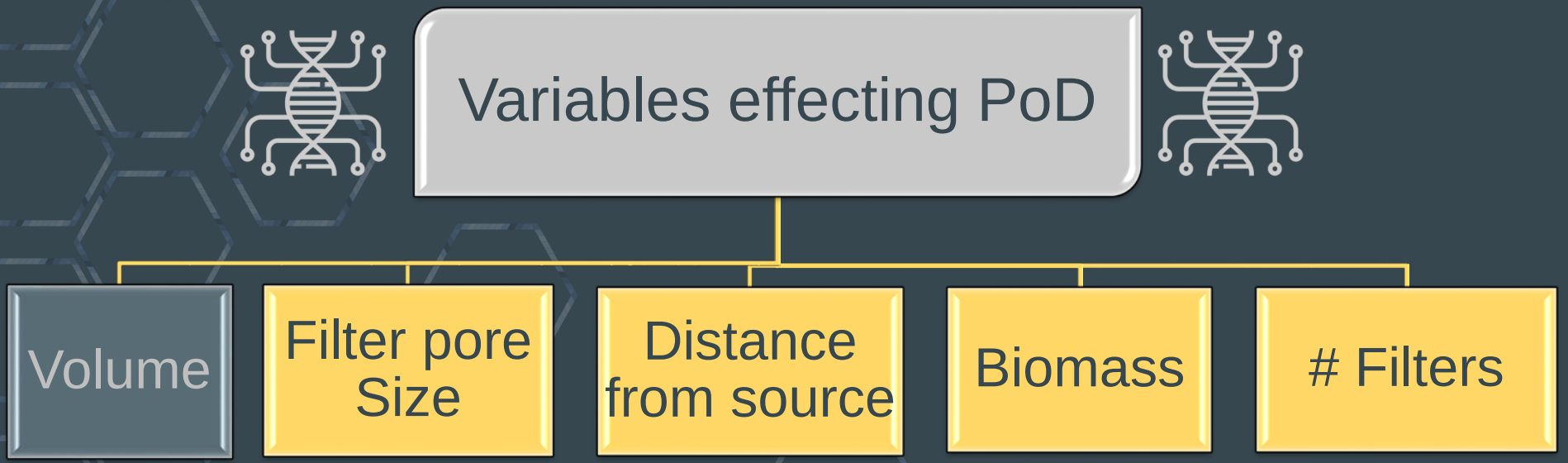
Complete Apparatus



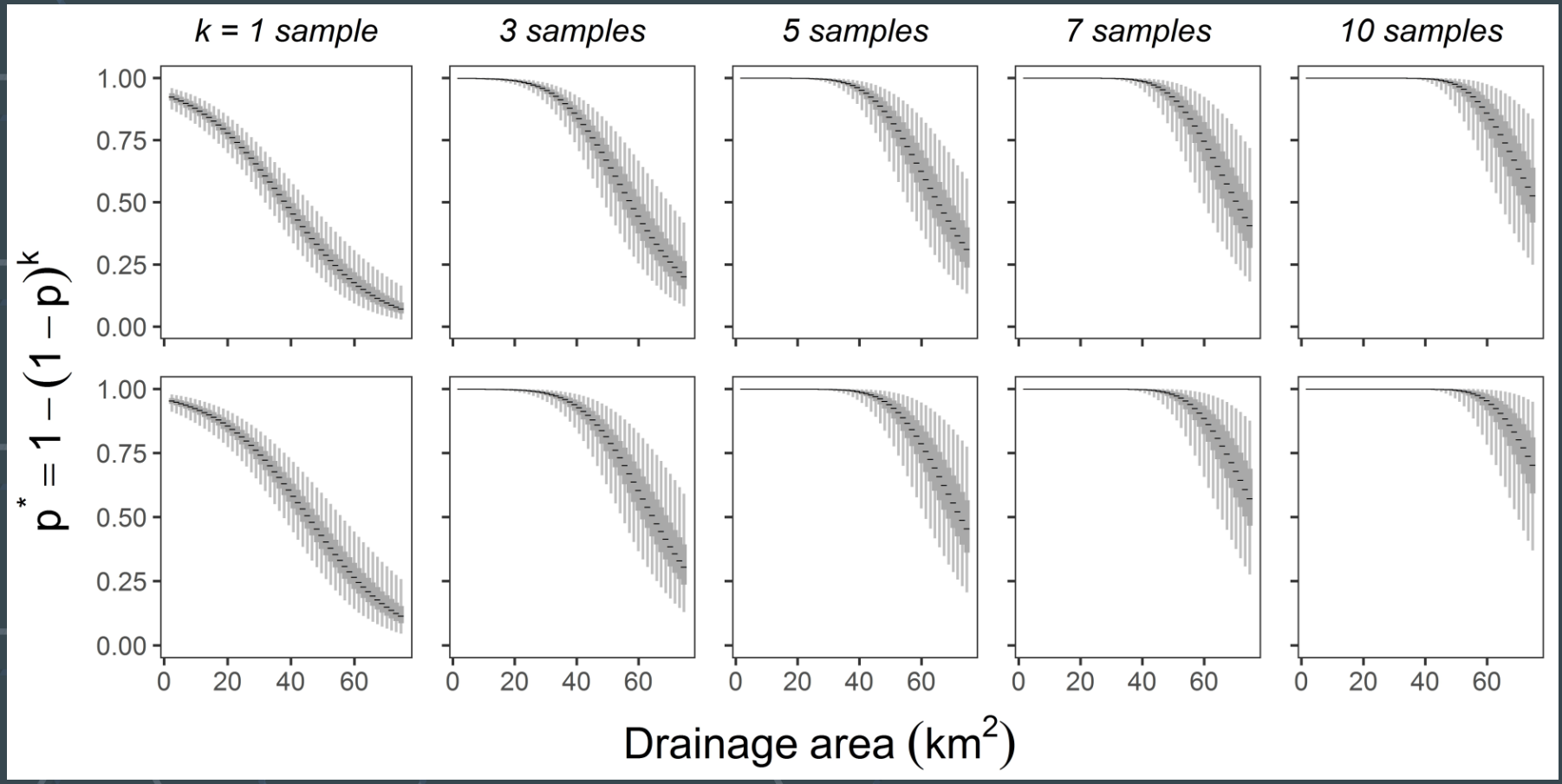
Sampling and capping



Probability of detecting (PoD) DNA in the environment given a set of variables



How many filters?



* Eric Waits and Roy Martin
US EPA

Applications

Determining PoD of Delta Smelt at CVP

Sample direction

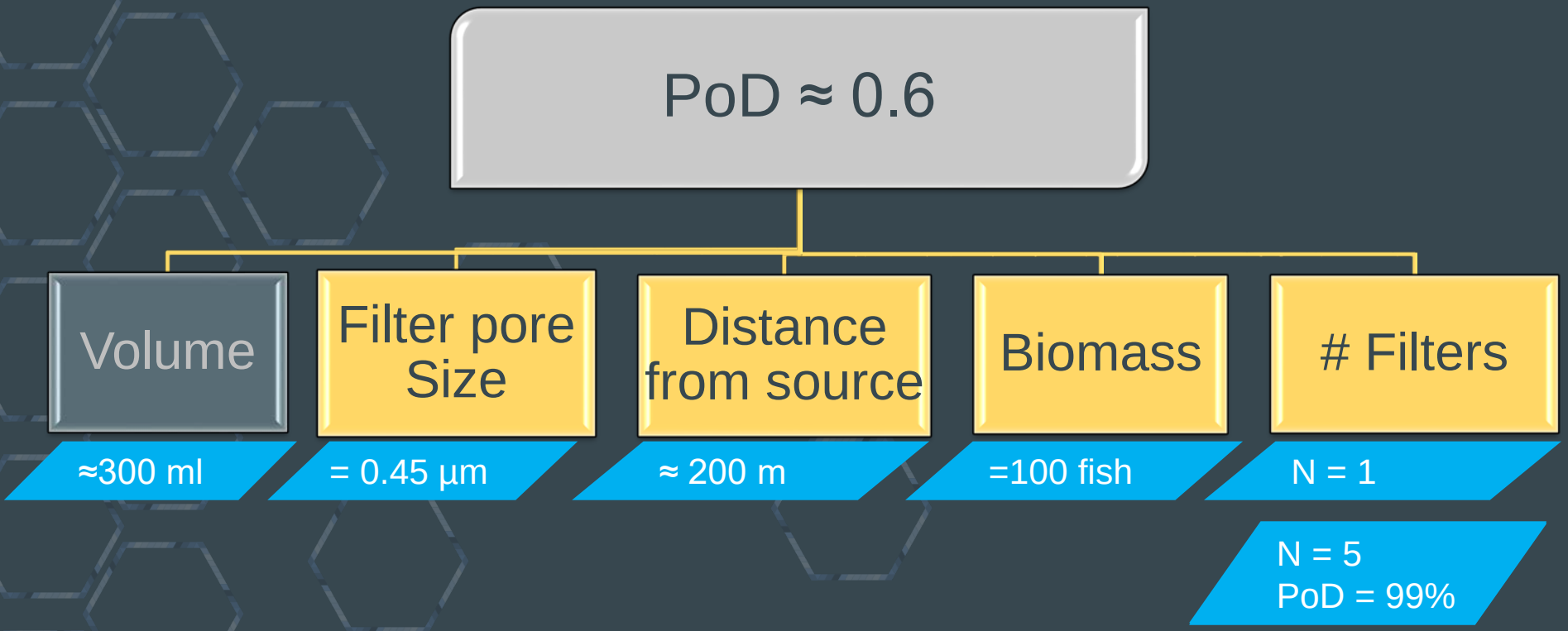
N=50 Live

N=50 Live

Distance 10 20 30 40 50 200 300 400 500 600 700 800 900 1000

This distance configuration can be adjusted based on access/safety

What is Delta Smelt PoD at CVP?



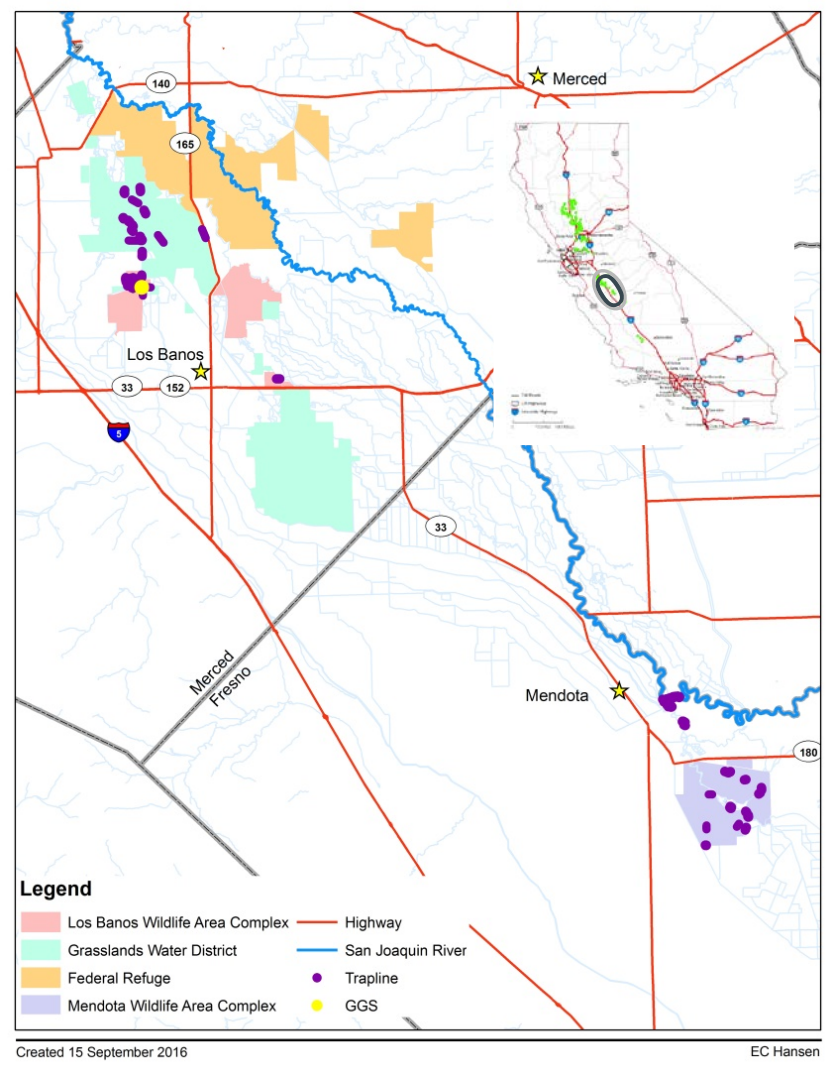
Giant Garter Snake eDNA

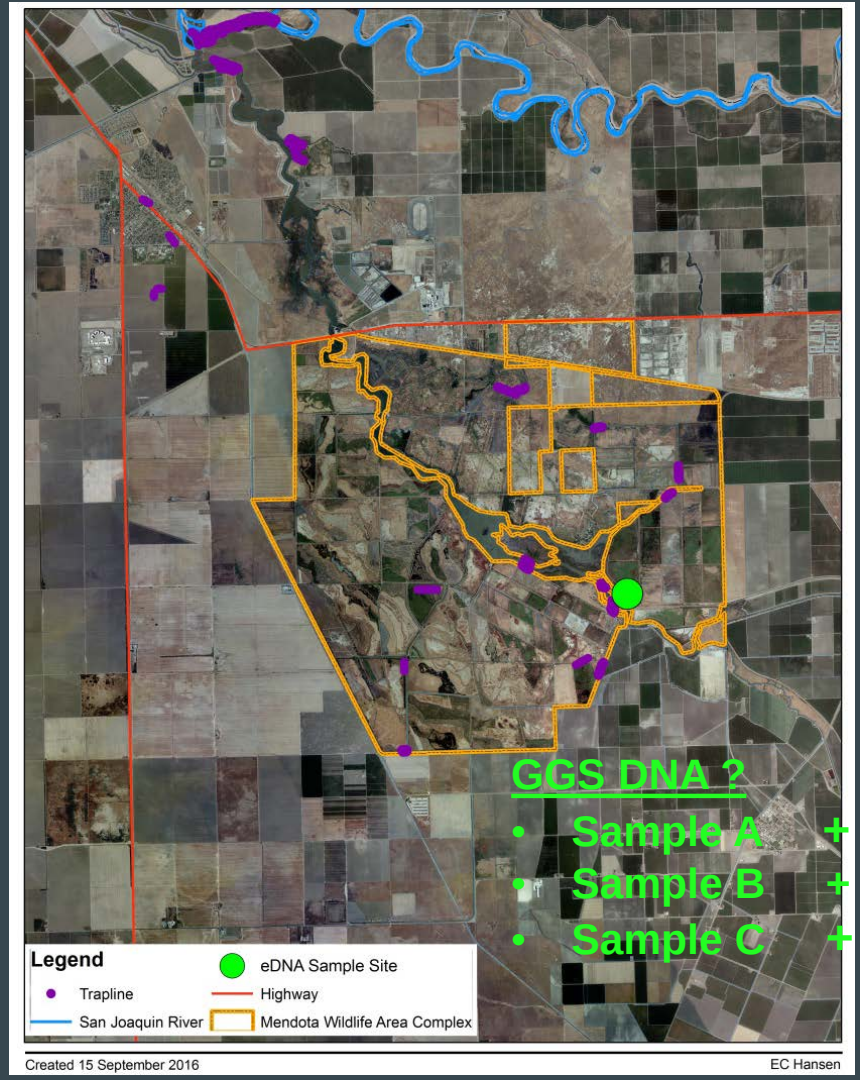
Gregg Schumer, Eric Hansen, and Scott Blankenship

Site 1 Distance away from source

Distance	GGS DNA ?
1000m	-
500m	-
300m	+
200m	+
100m	+
50m	+
0m	+

Results: Site 2





Development of Environmental DNA (eDNA) Methods for California Red-Legged Frog (*Rana draytonii*)

Gregg Schumer, Dan Chase, and Rob Schell

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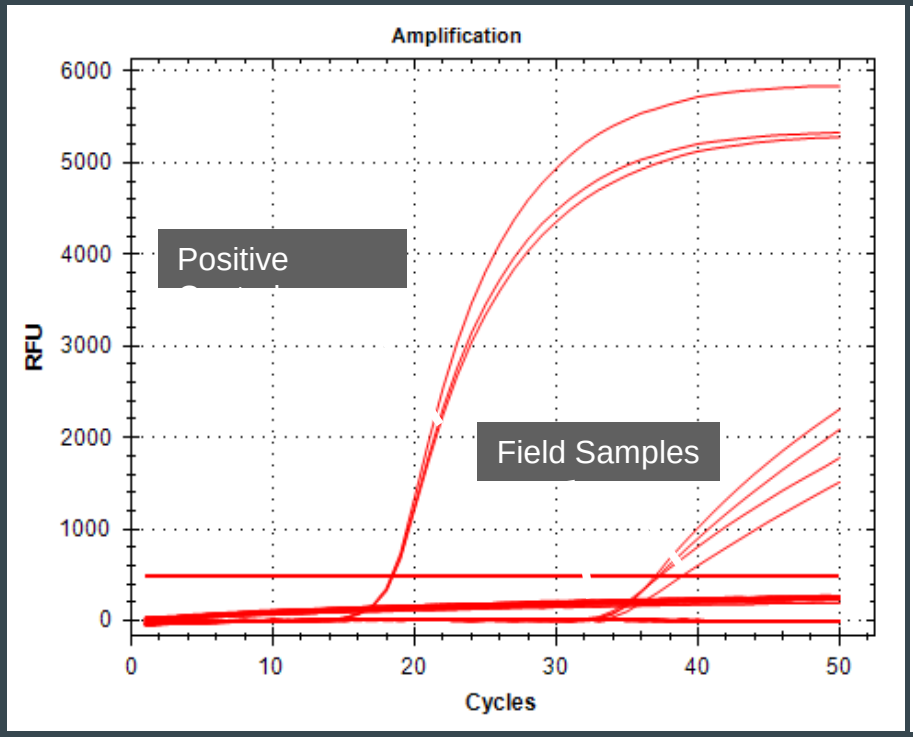
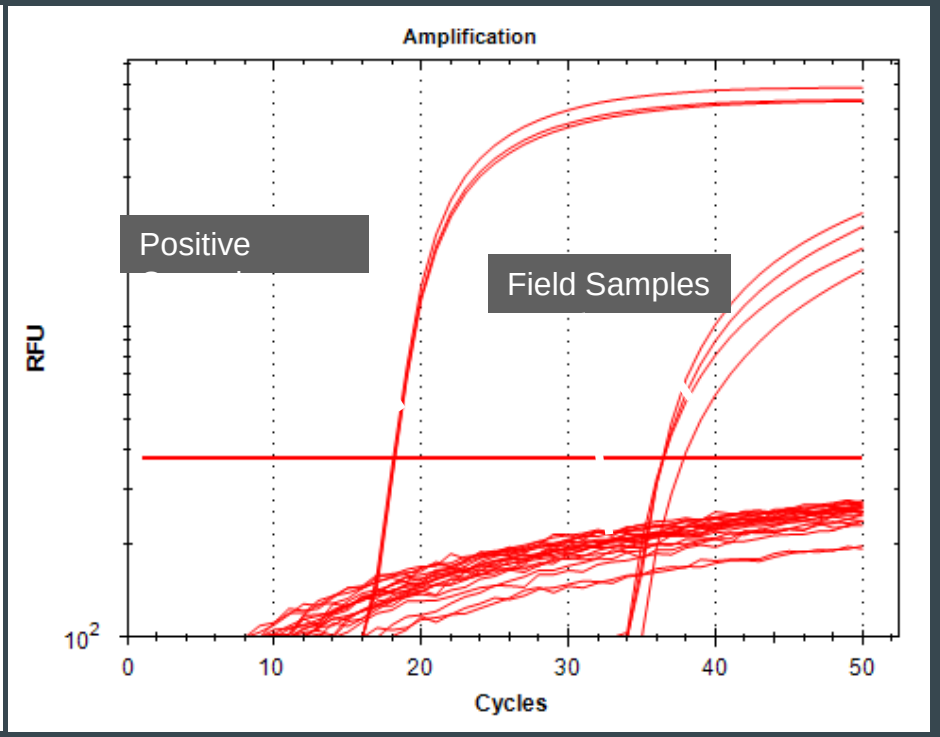
ENVIRONMENTAL CONSULTANTS

Field Survey



Standard Scale



Log Scale

Translating Data and Communicating eDNA data

Molecular Diagnostic Report

Shiny is an R package that enables building interactive web apps

https://fishsciences.shinyapps.io/edna-visualization/

Terminé

Thanks!