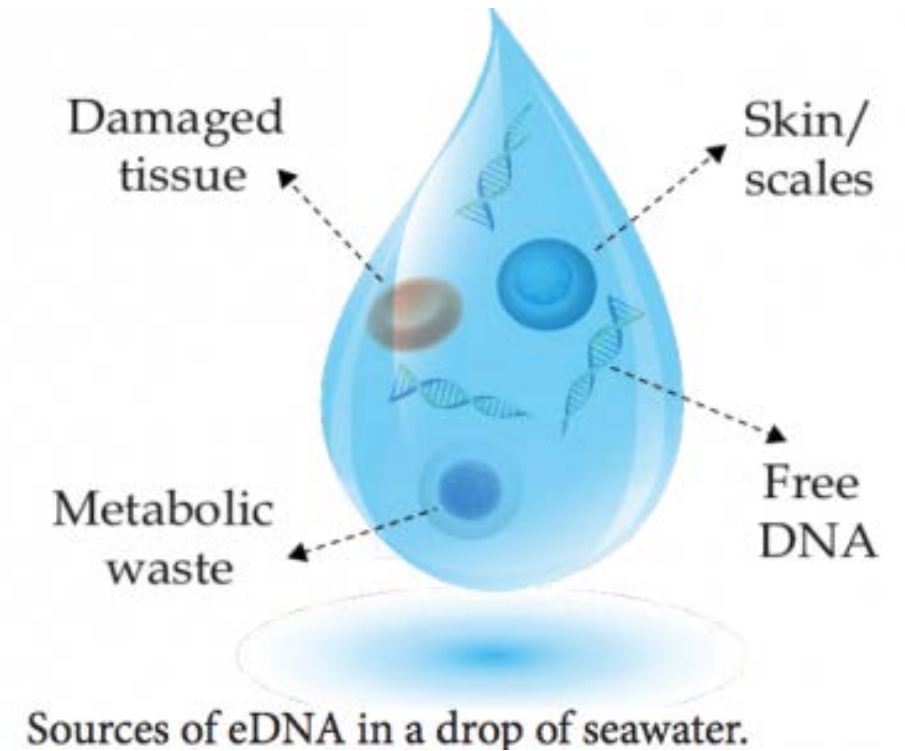


Invasive species environmental DNA (eDNA) data standards and database

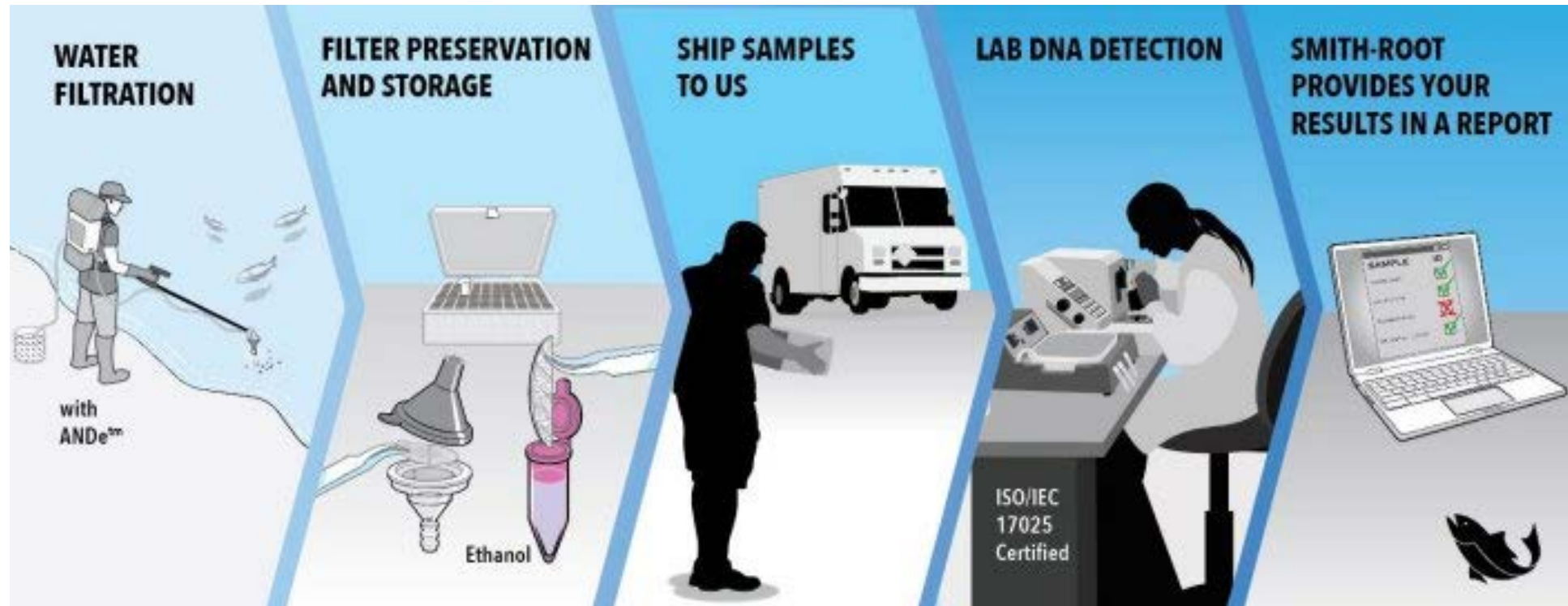
WESLEY M. DANIEL, MATT NEILSON, AND MAGGIE HUNTER

WETLAND AND AQUATIC RESEARCH CENTER,
GAINESVILLE, FL

eDNA in the NAS Database



eDNA in the NAS Database



Smith-Root

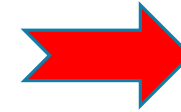
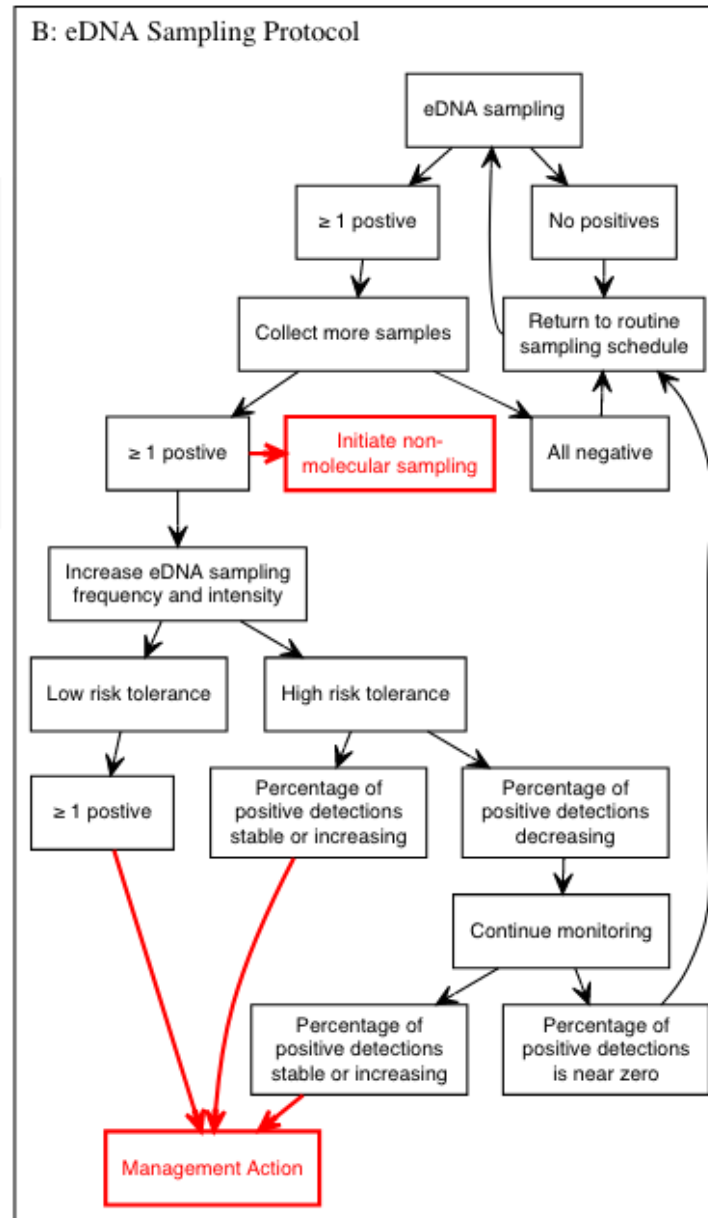
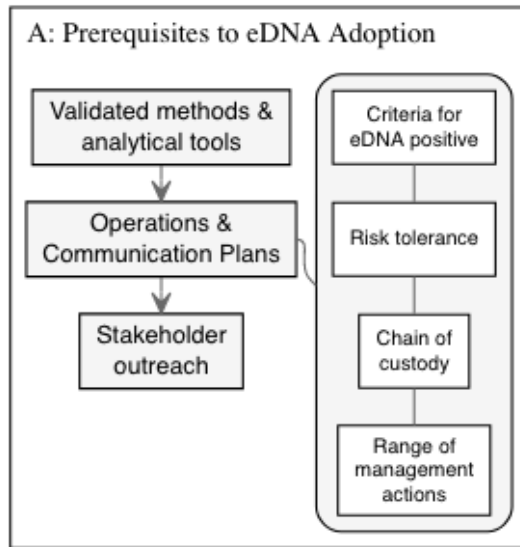
eDNA in the NAS Database

- First effort to aggregate **ALL** aquatic invasive species eDNA data in a single database
- Collaborative effort with:

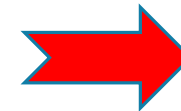


NAS's approach to adding eDNA

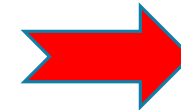
- Inform a State **first** of any eDNA sighting
- Development conservative minimum data standards to help guide eDNA monitoring and adding information into the Database
 - Based on consensus of agencies and experts
- Use a easy to interpret hierarchy of statuses to help understand what a positive eDNA sighting means
- Work closely with the eDNA community (Federal and State)



Inform the State



Inform NAS Database



Inform the Public

Draft version

Adam Sepulveda

(USGS)

NAS's approach to adding eDNA

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How to reach consensus

We expect there will be other perspectives we haven't considered— let's discuss...

Some standards seem straight-forward

- Date, latitude/longitude, etc.

Some may need discussion

- Isolation approaches – List of approved? Trust a trusted source?

Some will be challenging – detection and quantification

- Should low shedding animals require higher sample volume
 - Min volume per species or class?
- How/if to report inhibition?

NAS's approach to adding eDNA

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		Type of Detection Error	
		False Positive (Type I)	False Negative (Type II)
Source of Detection Error	Method	Problem: Detect species when no target species eDNA is present in the sample Sources: (1) Incorrect detection of non-target species (i.e., insufficient assay sensitivity) or (2) DNA contamination Solution: Improve assay specificity and exercise care when collecting, handling, and processing samples. Include negative controls in experimental design.	Problem: Fail to detect species when target species eDNA is present in the sample Sources: (1) Insufficient assay sensitivity or (2) method failure during sample processing Solution: Improve assay specificity and exercise care when collecting, handling, and processing samples. Include positive controls in experimental design.
	Process	Problem: Detect target-species eDNA when species is absent from the ecosystem Sources: (1) Persistence of eDNA in the environment or (2) transport of eDNA from distant sources (e.g., barge traffic, boaters, avian deposition) Solution: Improve knowledge of the "ecology" of eDNA in the environment	Problem: Fail to detect species when present in the ecosystem because viable target-species eDNA absent in sample Sources: (1) Failure to collect eDNA in sample or (2) eDNA degraded in sample Solution: Improve sample collection, handling, and processing methods.

DNA ≠ Specimen

From Evans et al. 2017



Asian Carp Regional Coordinating Committee. 2013. Environmental DNA Calibration Study, Interim Technical Review Report. Kelly Baerwaldt, editor. 112 pages. Available at <http://www.asiancarp.us/>



Asian Carp Regional Coordinating Committee. 2013. Environmental DNA Calibration Study, Interim Technical Review Report. Kelly Baerwaldt, editor. 112 pages. Available at <http://www.asiancarp.us/>



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Regional
townhall
eDNA
webinars

2020 MARCH						
SUN	MON	TUE	WED	THU	FRI	SAT
1	2 		4	5	6	7
8	9 		11	12	13	14
15	16 		18	19	20	21
22	23 		25	26	27	28
29	30 					

Thank You

- Wesley Daniel – Inverts, Mollusks, Herps, and Mammals
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