Detecting Predation of Larval Delta Smelt by Silversides Using Genetic Techniques

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Cooperative Ecological Investigations Since 1970

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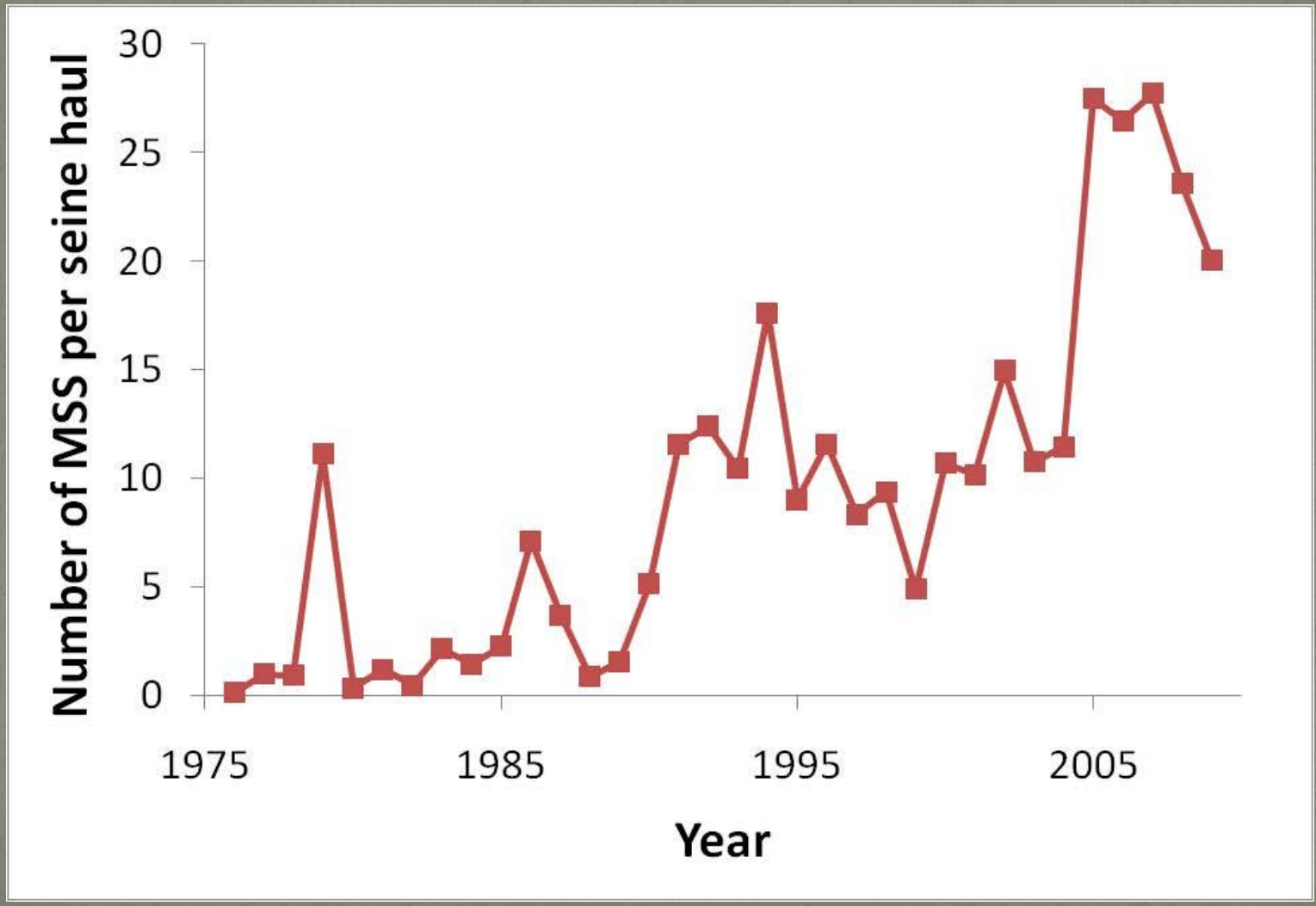
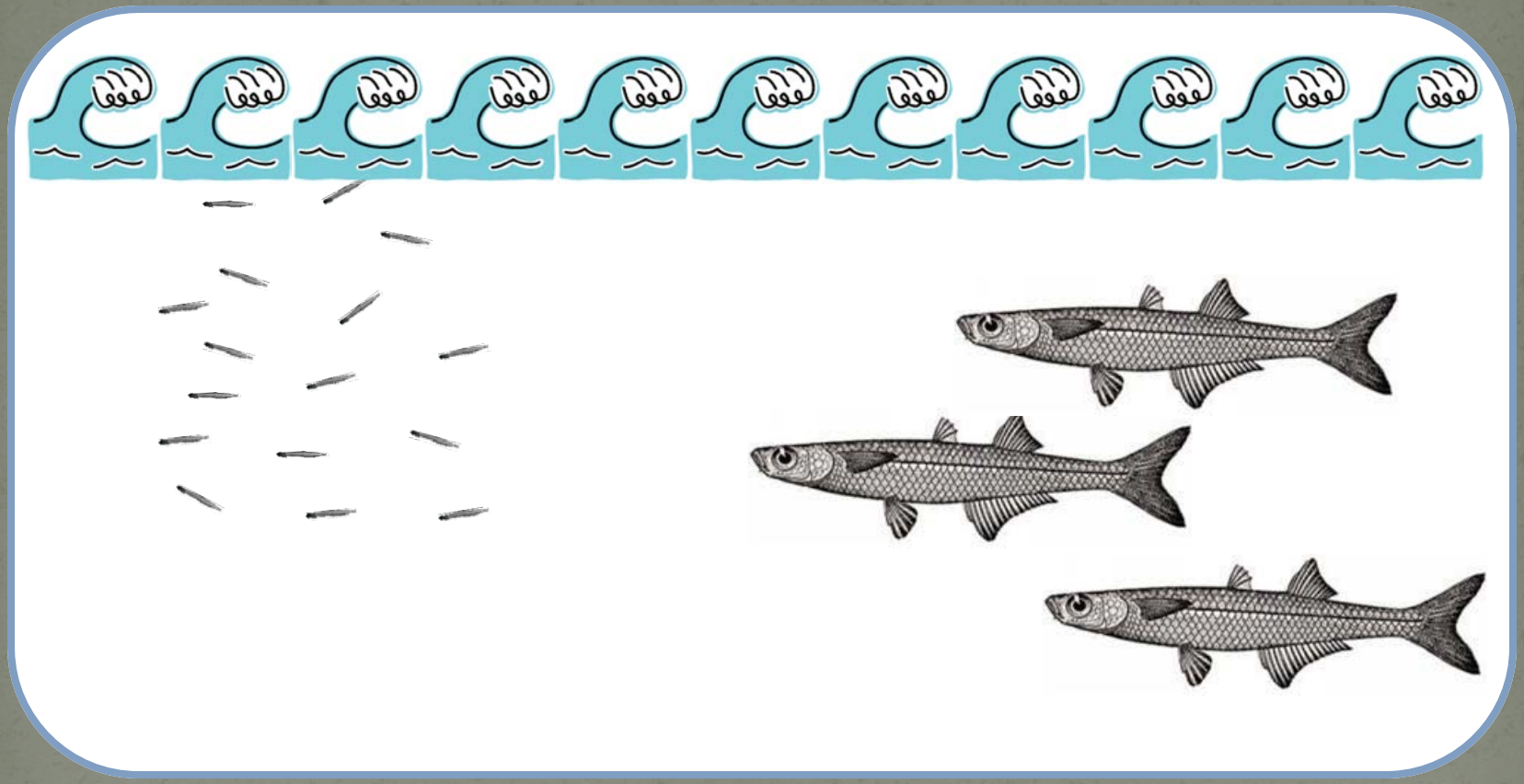
Why pick on silversides??



Mississippi silversides VS larval smelt



They eat them in the lab…
but how do we detect it in the wild??

Why a genetic approach?

Plus, all the cool kids are doing it (e.g. King et al, 2008)

Questions:

1) Can a genetic approach be used to detect delta smelt DNA in the guts of predators?

2) How sensitive would a genetic approach be to smelt DNA in gut contents?

3) Do silversides predate larval delta smelt in the wild?

(1) qPCR assay development

DNA regions in delta, longfin, and wakasagi smelt sequenced

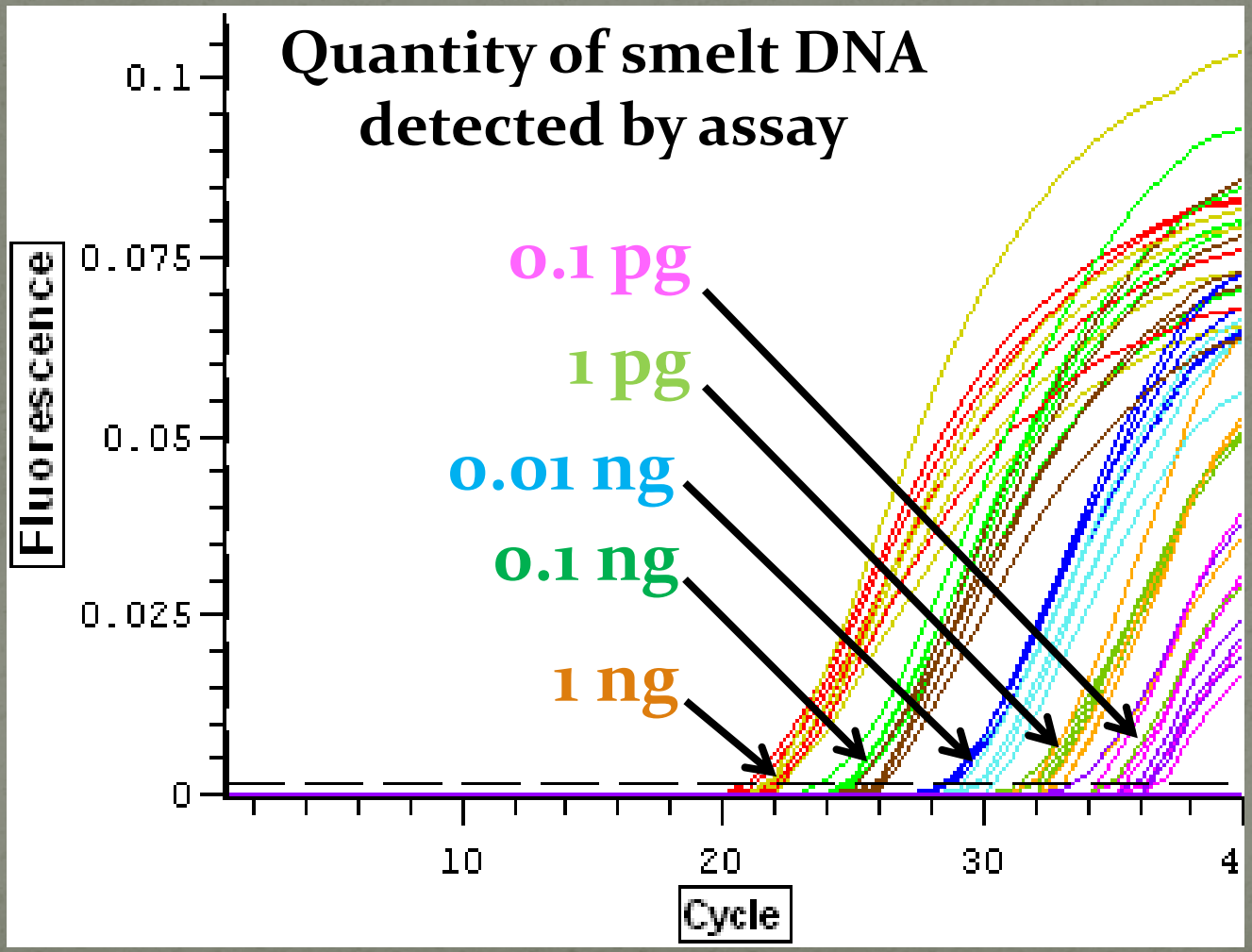
↓

Species-specific regions of mitochondrial genome identified

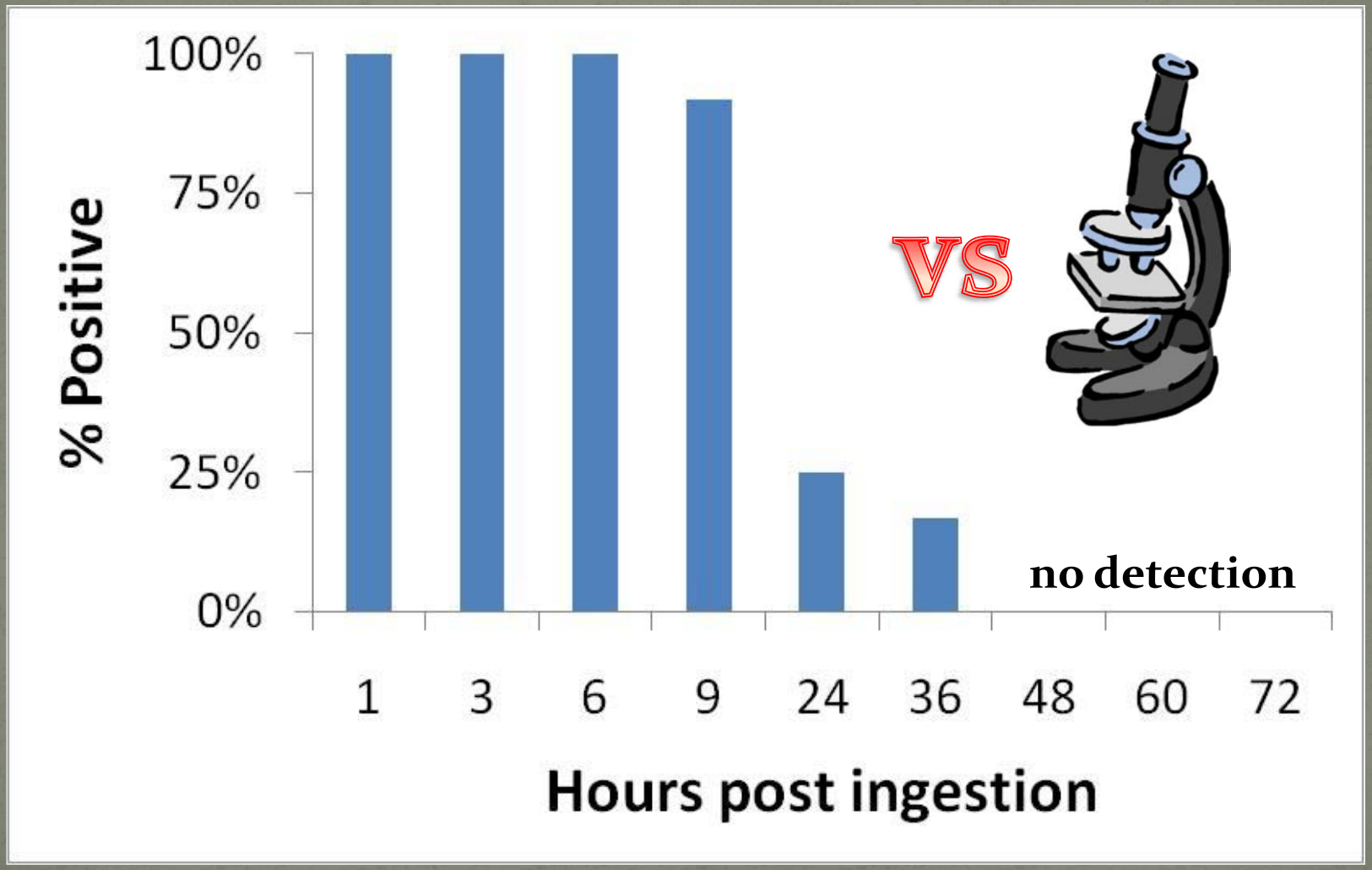
↓

13 other delta fish species tested to ensure species specific amplification

(2) Does the assay work in the lab?

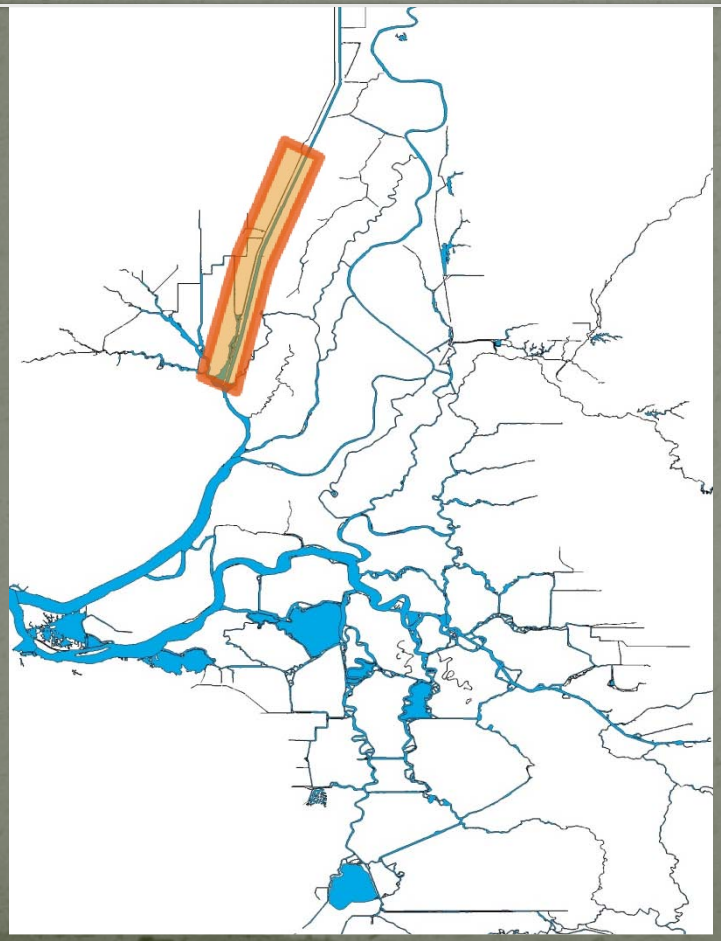


(2) How about with captive fish?



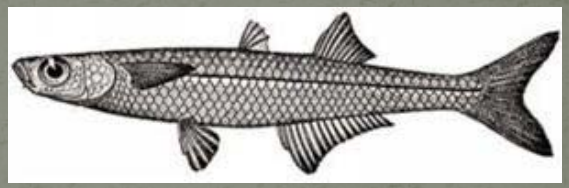
(3) Predator sampling

Sampling location



Species kept for analysis

- 658



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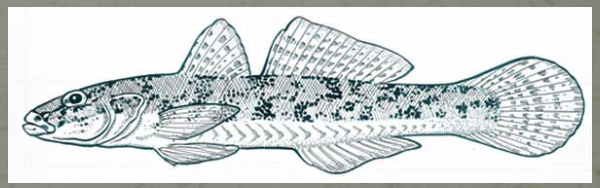

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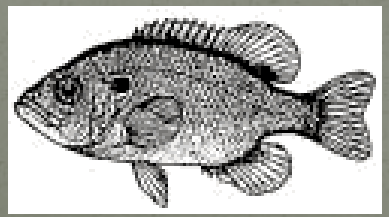


(3) Gut contents analysis

- Sterilize everything
- Dissect fish
- Preserve guts
- UCD analyzes samples

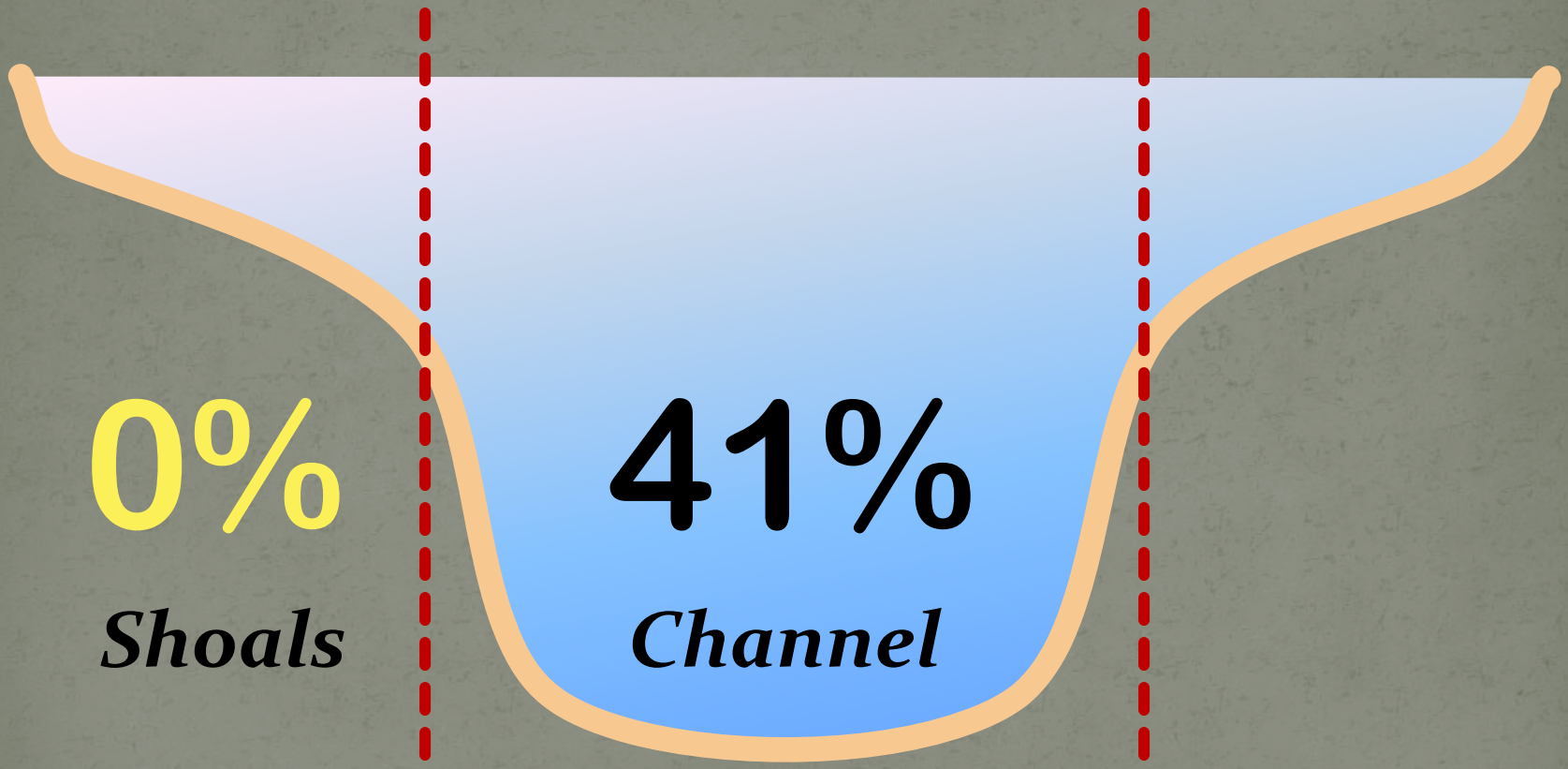
(3) RESULTS - Silversides

Total silversides captured

(3) RESULTS - Silversides

Silversides positive for smelt

(3) RESULTS - Silversides



Percent positive for smelt

(3) Interpretation of results

Density of larval smelt in ship channel
(Grimaldo & van Ark, unpublished)

Summary

We developed a cutting-edge new method

We detected predation!

Our initial results make sense

Future directions…with more $$

Focus on channel vs. shoal sampling

Expand to include areas near Sherman Island

Expand to include new predator species

Thank you…any questions?

Acknowledgements:

- Thank you to Cramer Fish Sciences for analyzing additional samples.
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