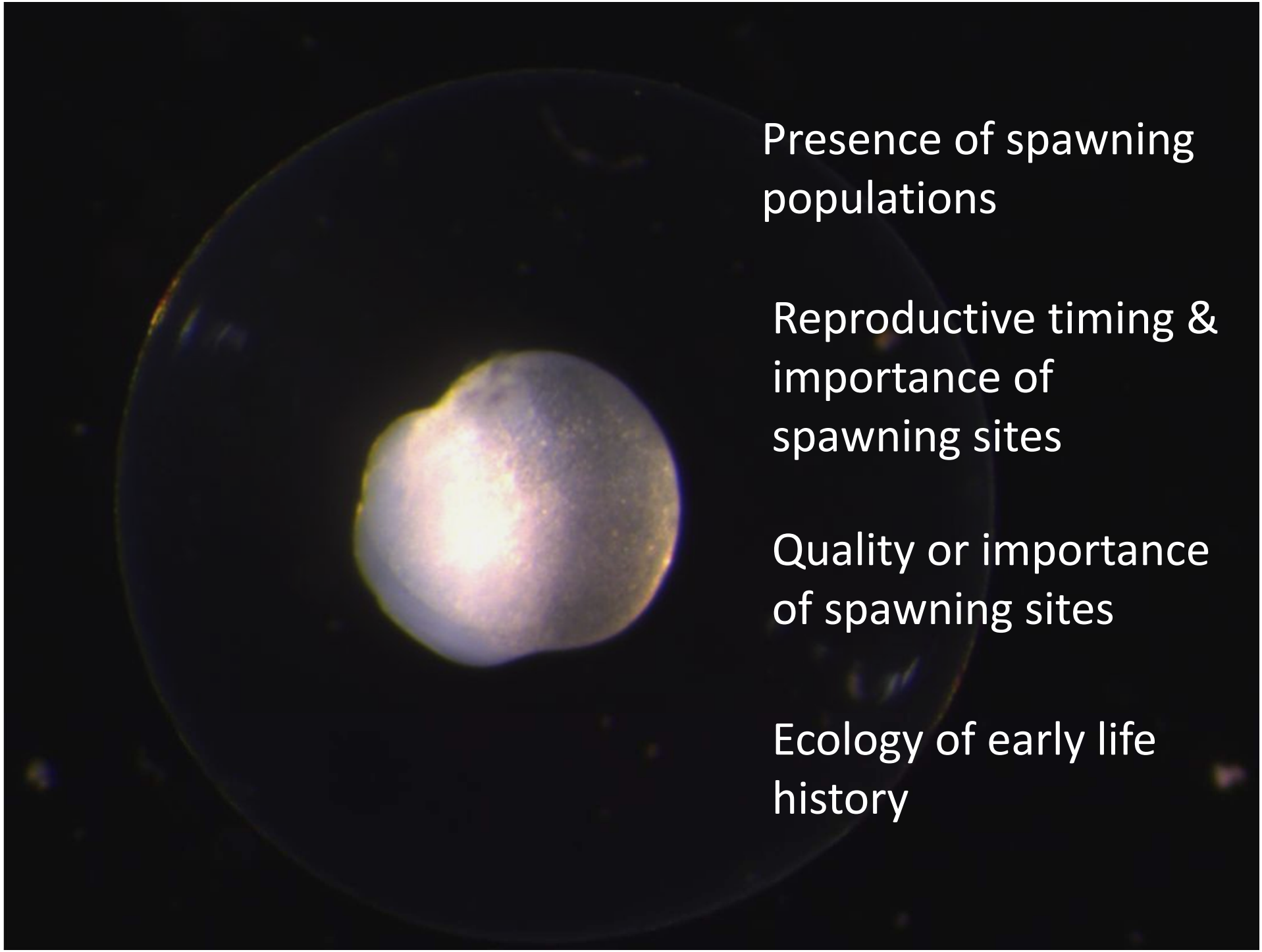
Evaluating the Efficiency of a Collection Device for Quantifying Densities of Early Life Stages of Smallmouth Bass in Streams

J. Burroughs[1], B. Brown[1], and S. K. Brewer[2]

[1]*Oklahoma Department of Wildlife Conservation*

[2]*U.S. Geological Survey, Oklahoma Cooperative Fish and Wildlife Research Unit,*
Oklahoma State University



Presence of spawning populations

Reproductive timing & importance of spawning sites

Quality or importance of spawning sites

Ecology of early life history

OBJECTIVE

Design and test efficiency of device for sampling early life stages under dominant substrate and velocity conditions.

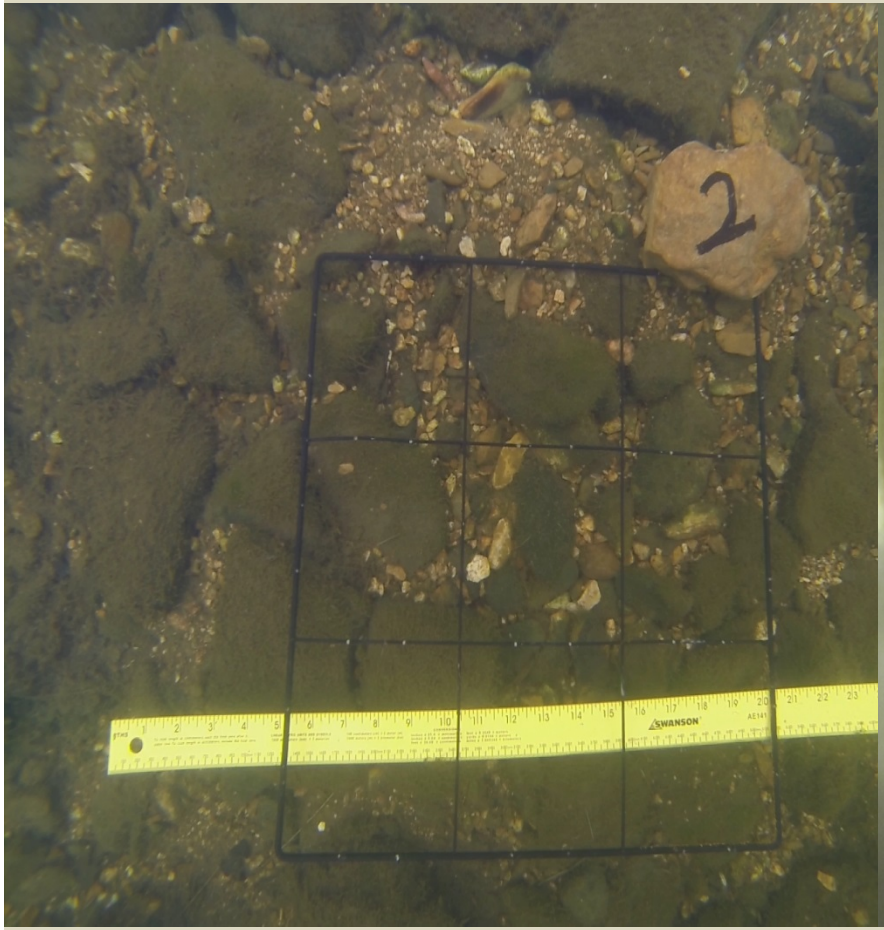
Smallmouth bass

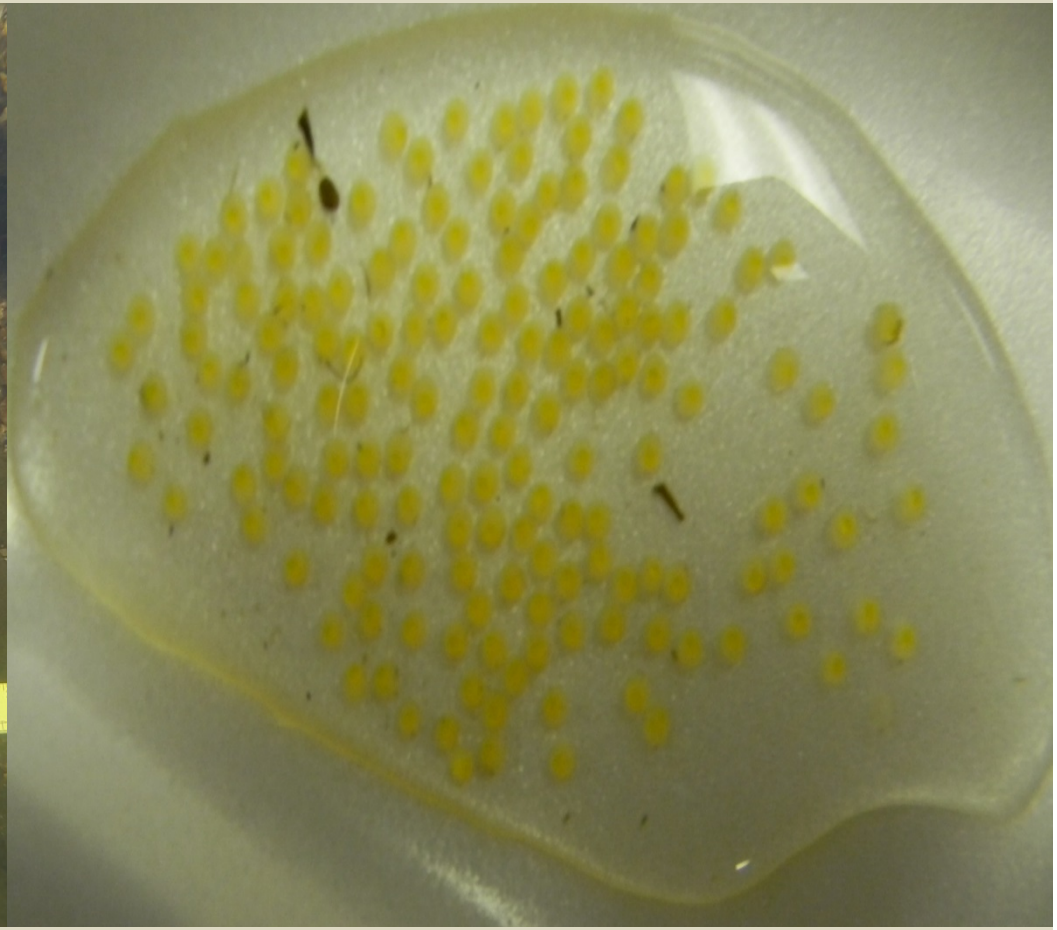
Classic spawning model

- Excavate a saucer-shaped depression in coarse substrates
- Guard nests and fry

- Neosho smallmouth bass different?

Counting eggs by software
“Image J” and others





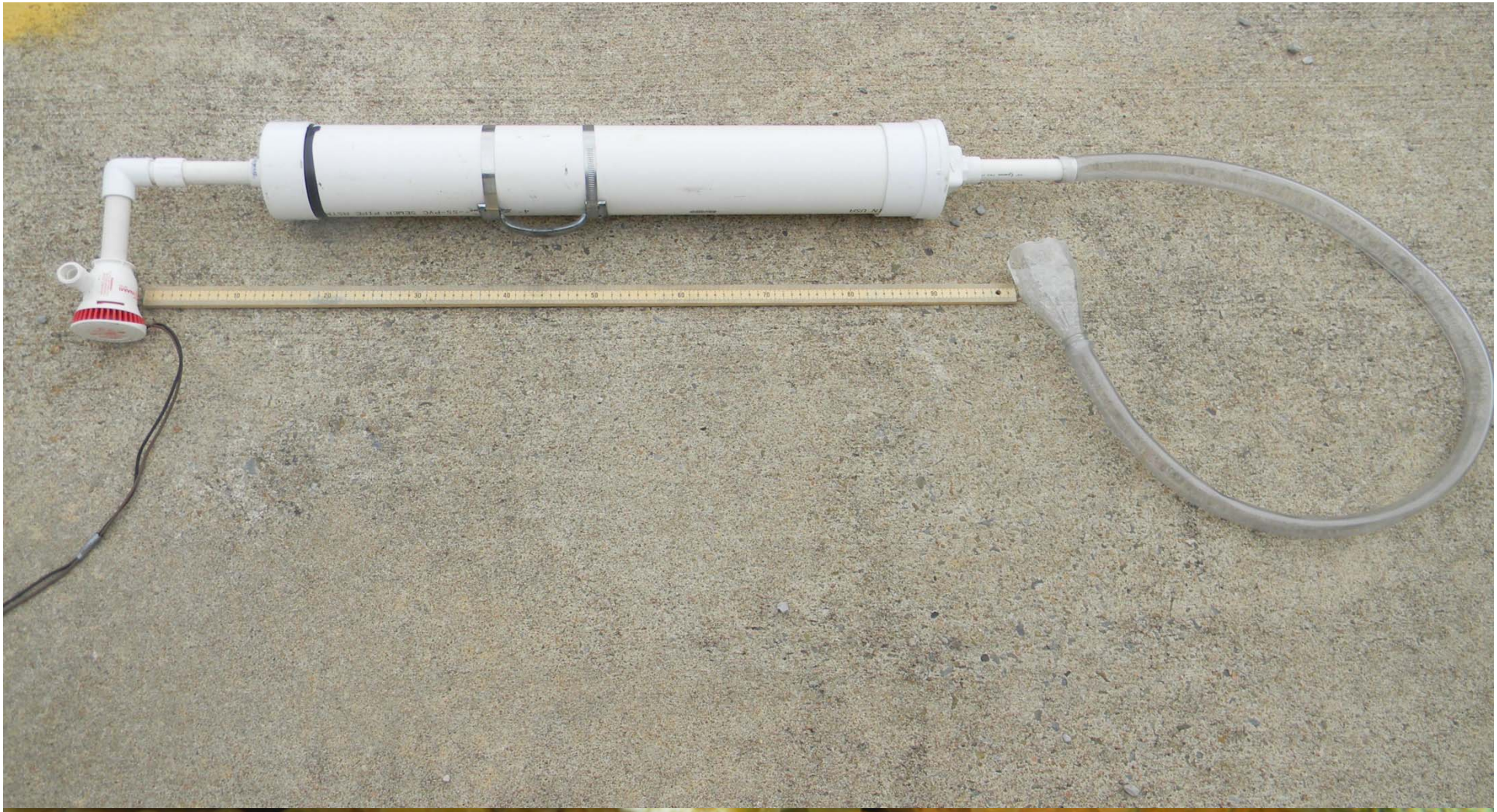
Device design……

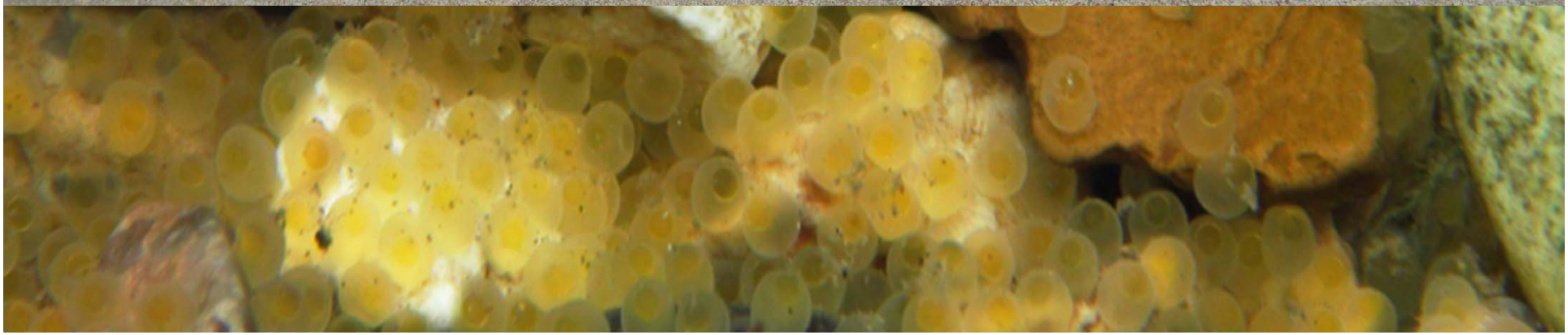
Several trial designs were constructed and preliminary tests conducted. *

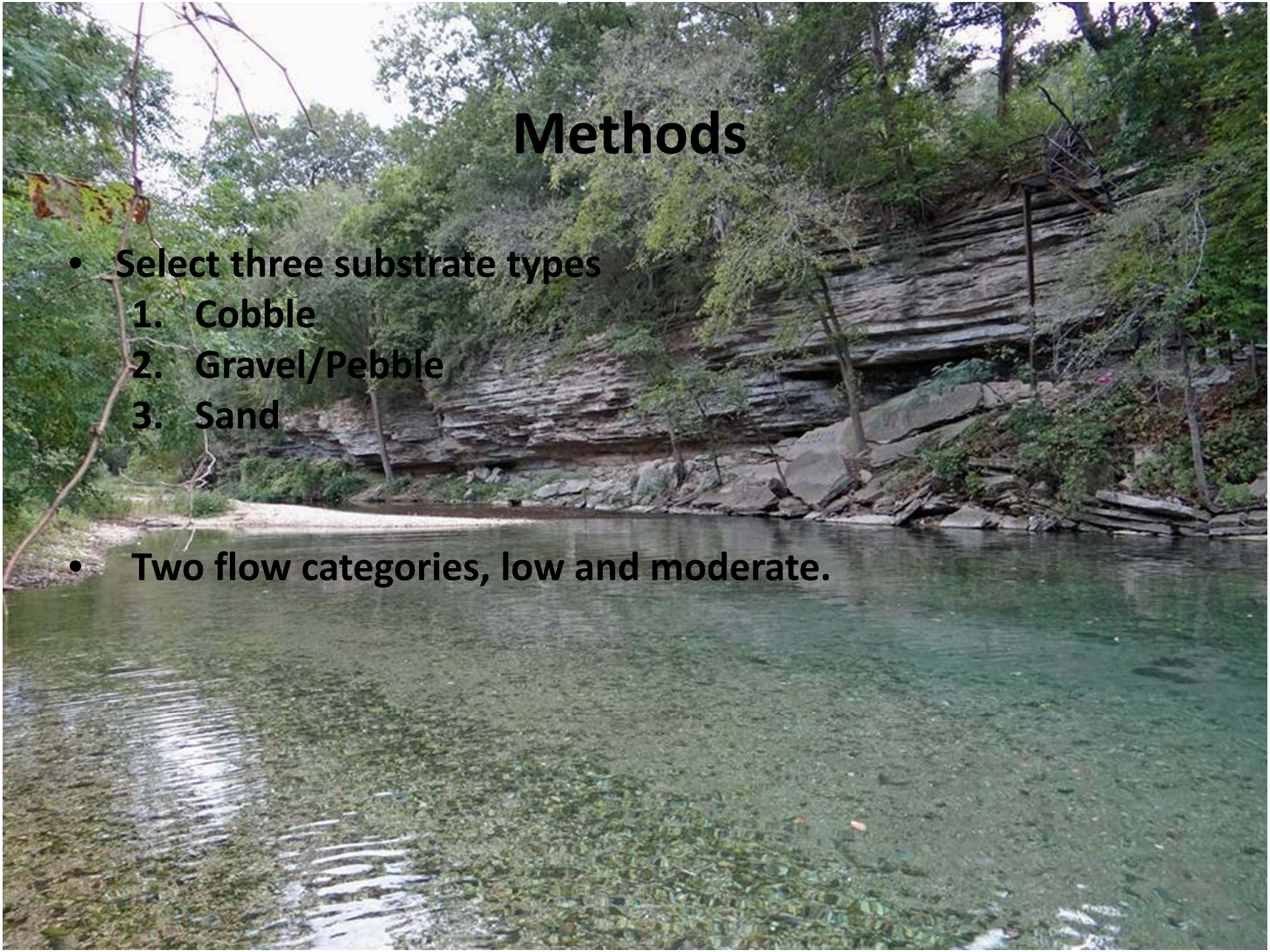
Scoop Technique

Tested Design Model

4” PVC…Approximately 28 inches in length. ¾” suction hose with attached funnel. Inline mesh collection bag. 12v bilge pump.







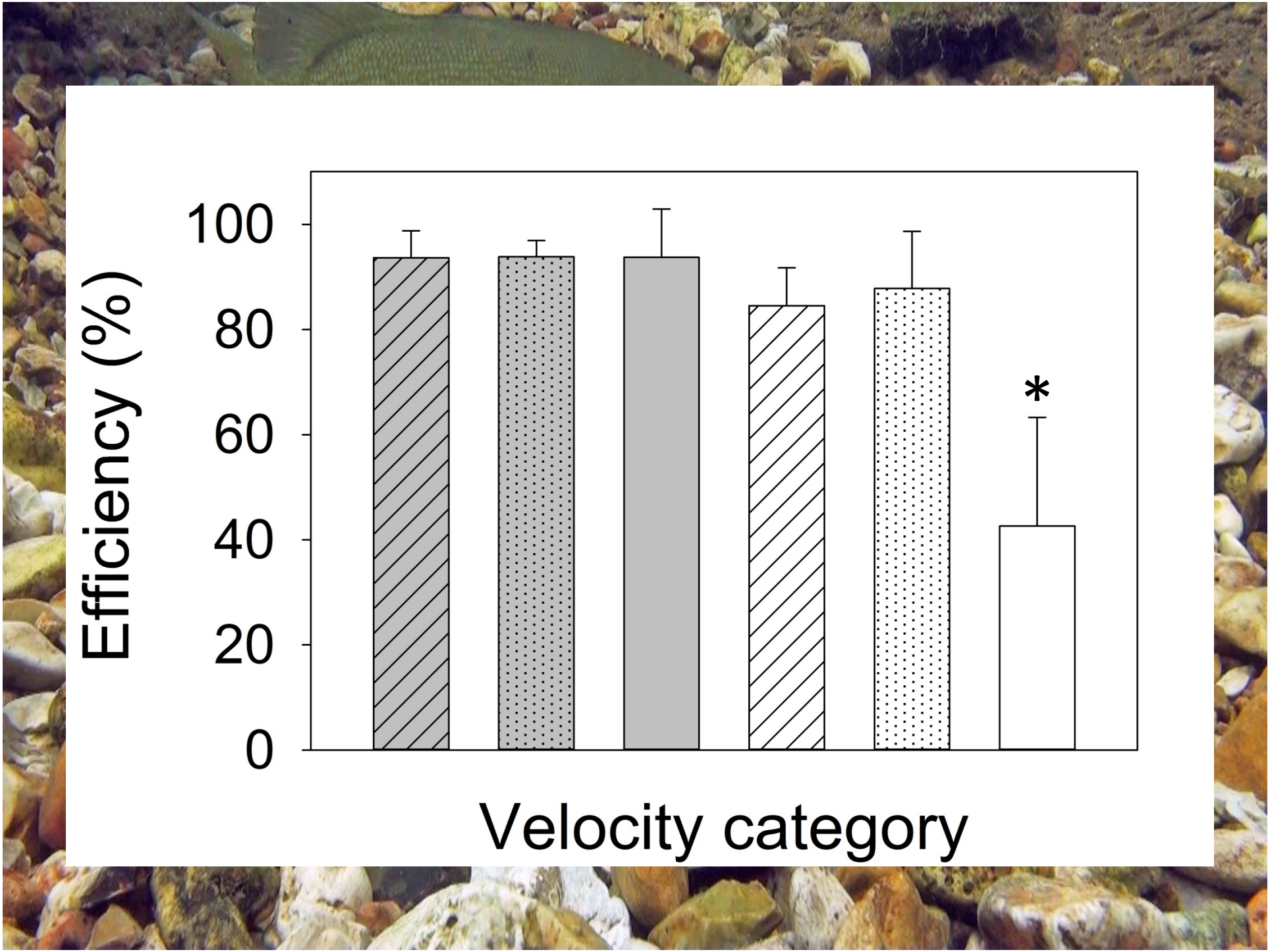
Methods

- Select three substrate types
  1. Cobble
  2. Gravel/Pebble
  3. Sand

- Two flow categories, low and moderate.

General Linear Model (Proc Glimmix)

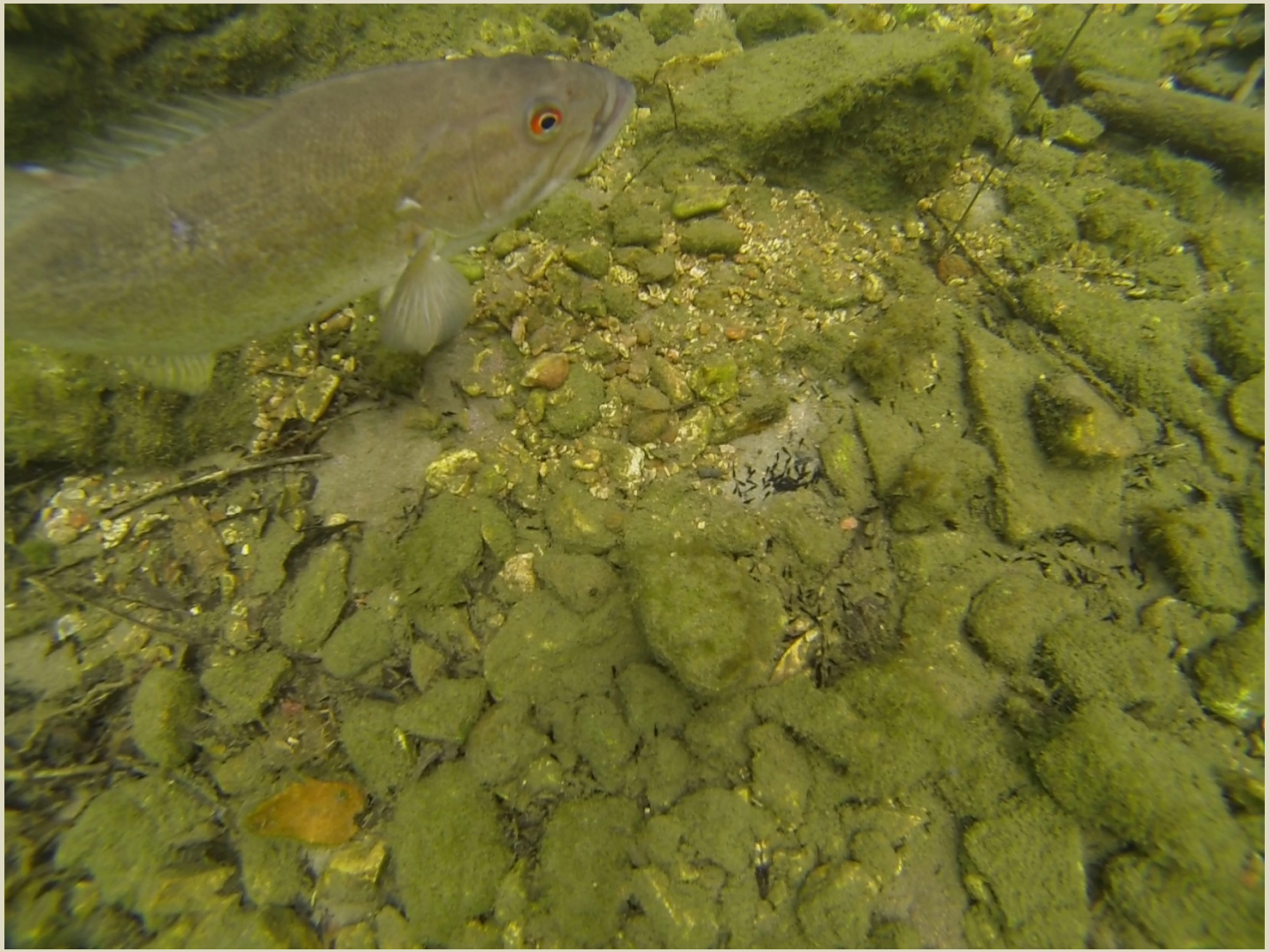
Effect	Num DF	Den DF	F Value	Pr > F
velocity	1	23	42.81	<.0001
substrate	2	23	27.58	<.0001
velocity*sub	2	23	27.38	<.0001
depth	1	23	1.29	0.2678


Efficiency (%)
100
80
60
40
20
0
*
Velocity category

Summary

- Efficient at collecting egg surrogates in all substrates under low velocity conditions
- Efficiency greatly reduced in shifty sand substrates in moderate velocities
- Useful gear for collecting eggs of nest builders under various conditions

Fry collection also shows great promise. *



Additional testing will be required but in two trials 3100 and 2100 fry were collected with only 3 and 7 fry present upon later inspection.

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- OSU
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