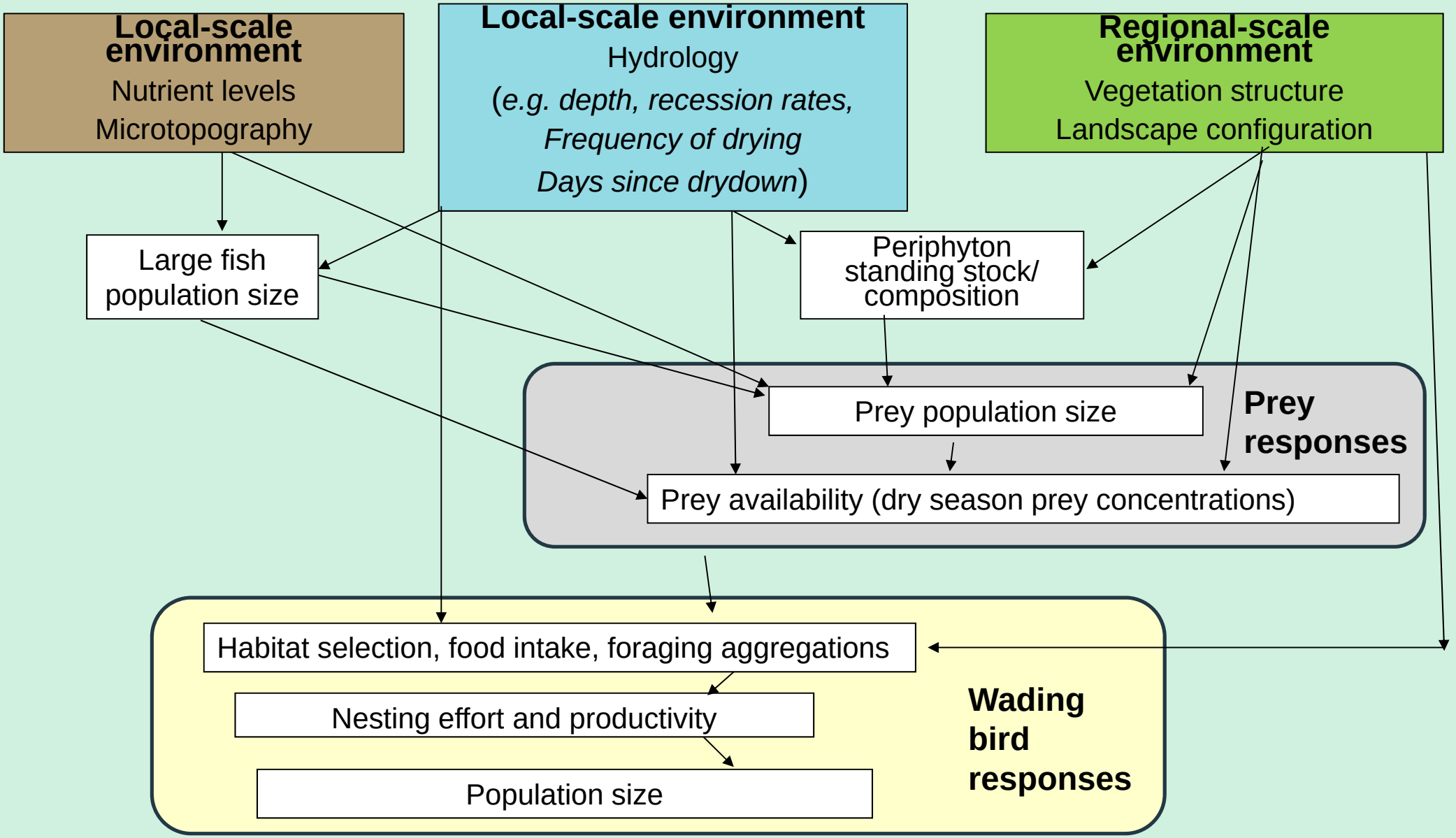
Habitat Use of Everglades Fishes in Relation to Seasonal Hydrology: Implications for Wading Bird Prey Availability

Mark I. Cook
Everglades Systems Assessment, SFWMD

Jennifer S. Rehage, Greg Hill
Earth & Environment, SERC, FIU

FLORIDA INTERNATIONAL UNIVERSITY

Everglades Trophic Hypothesis



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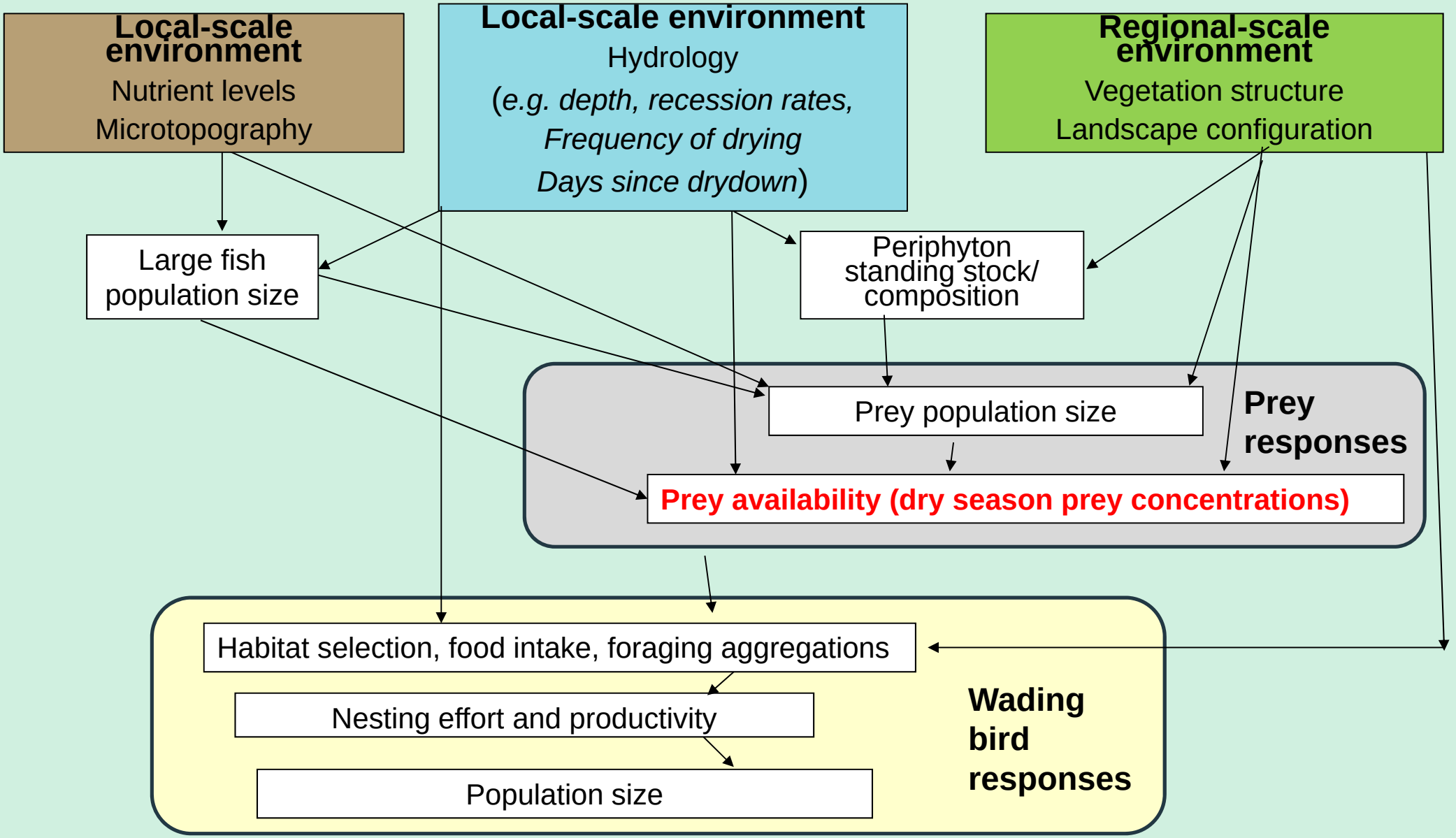
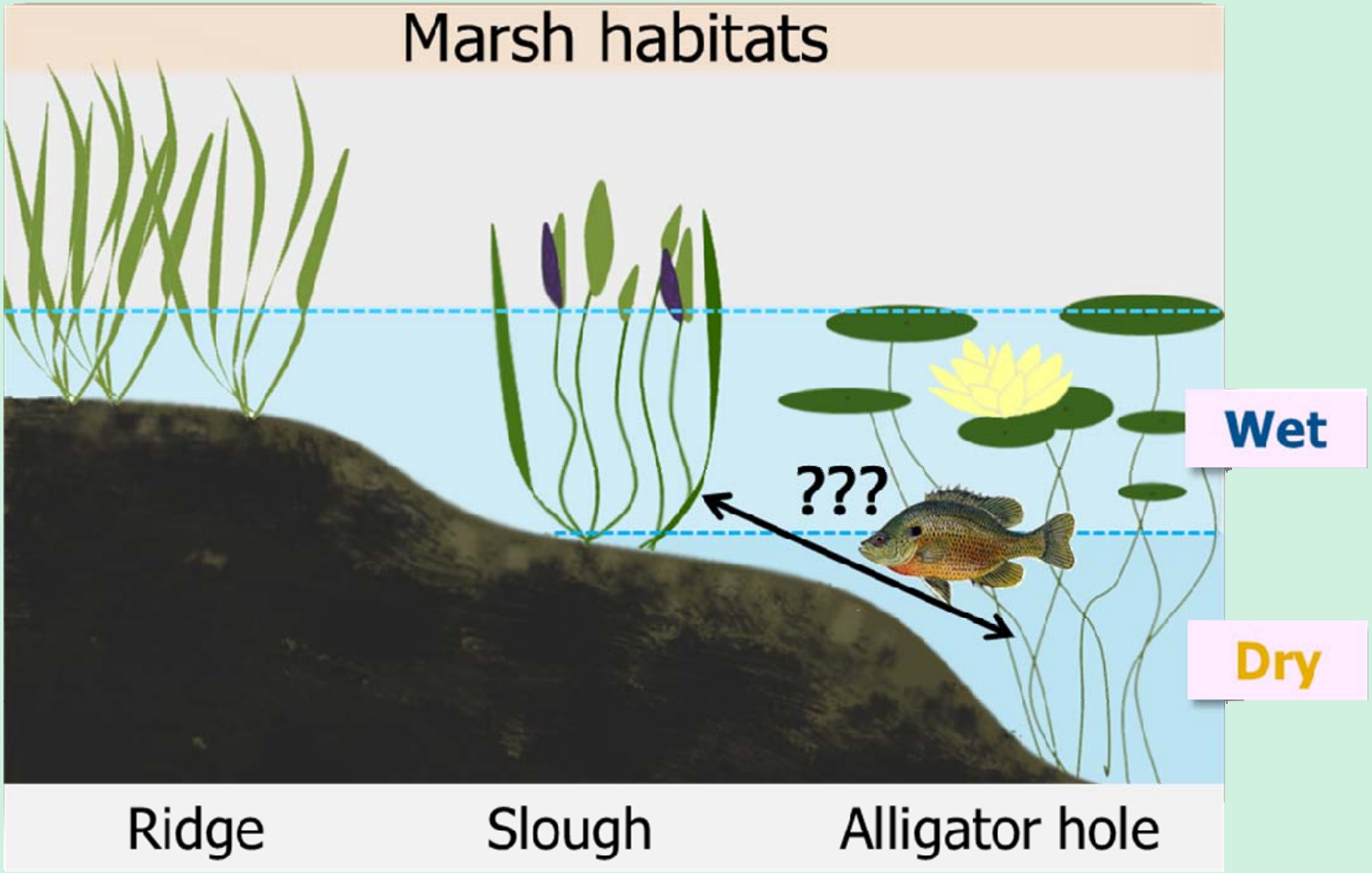


How is prey availability influenced by the fine-scale movement and habitat selection decisions of individuals?



Objectives

To understand the fine-scale movements and habitat choices of key prey species in relation to seasonal hydrology and other factors.

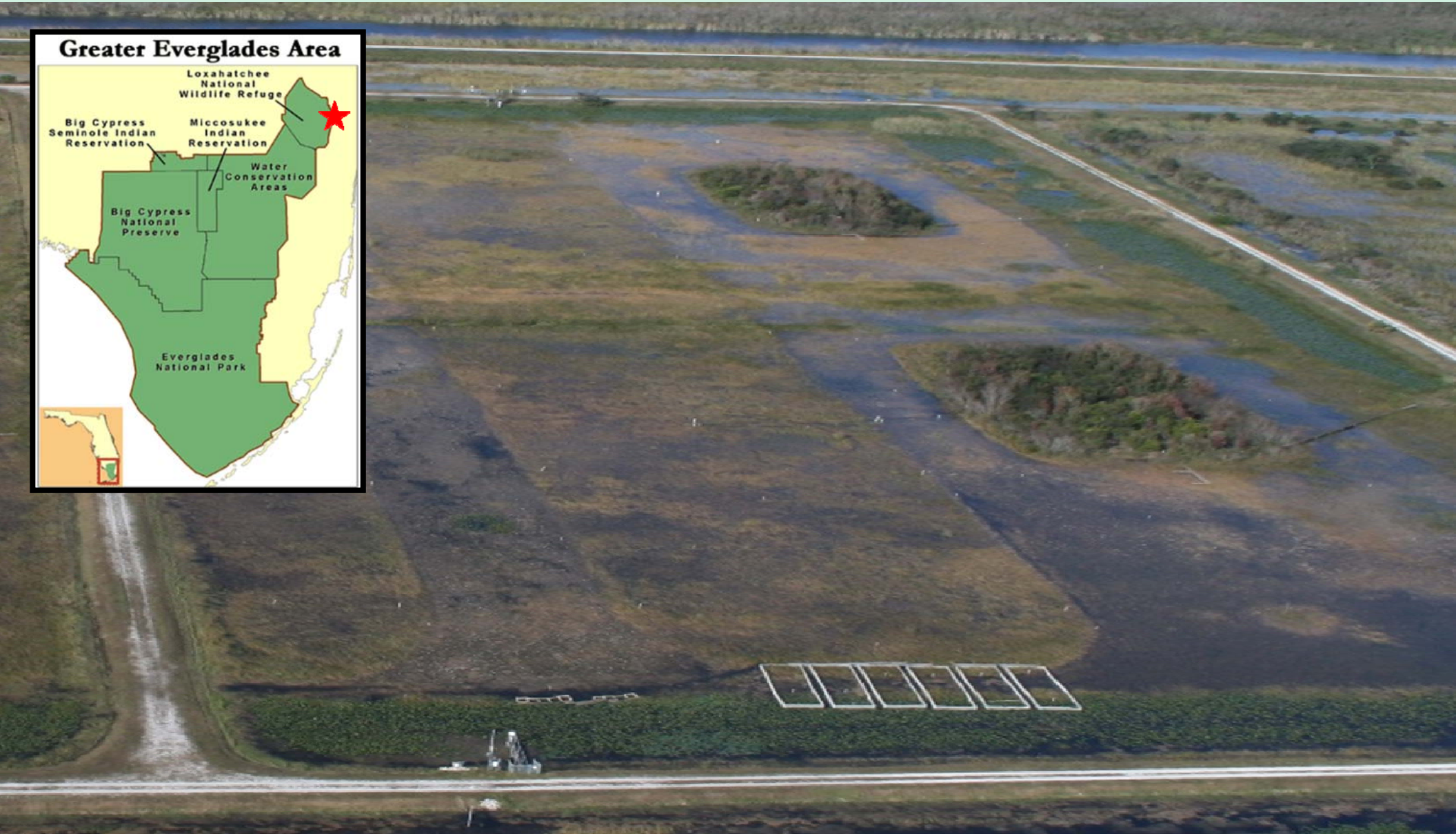
2014 Study: Warmouth *Lepomis gulosus*

Q1: How are Warmouth distributed across ridge and slough habitats?

Q2: How are these distribution patterns influenced by seasonal hydrology?

Q3: How do unseasonal reversals in the drying pattern affect distribution patterns?

Methods: Field Enclosures & Passive Detection at LILA



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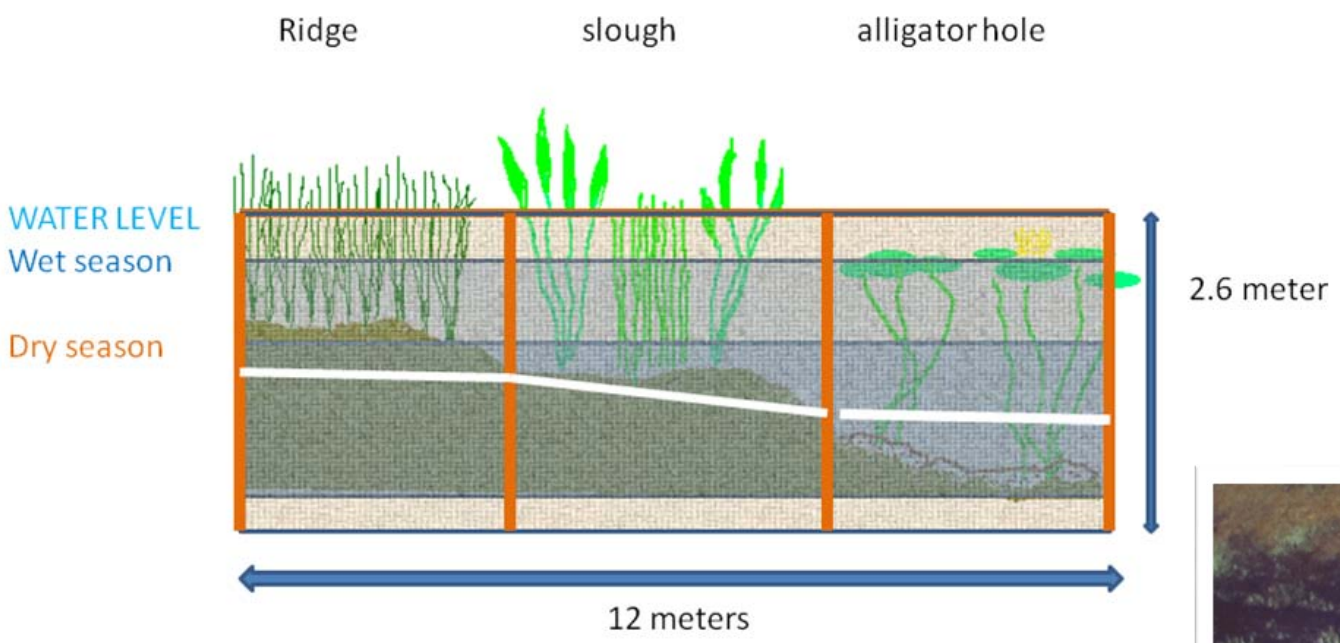

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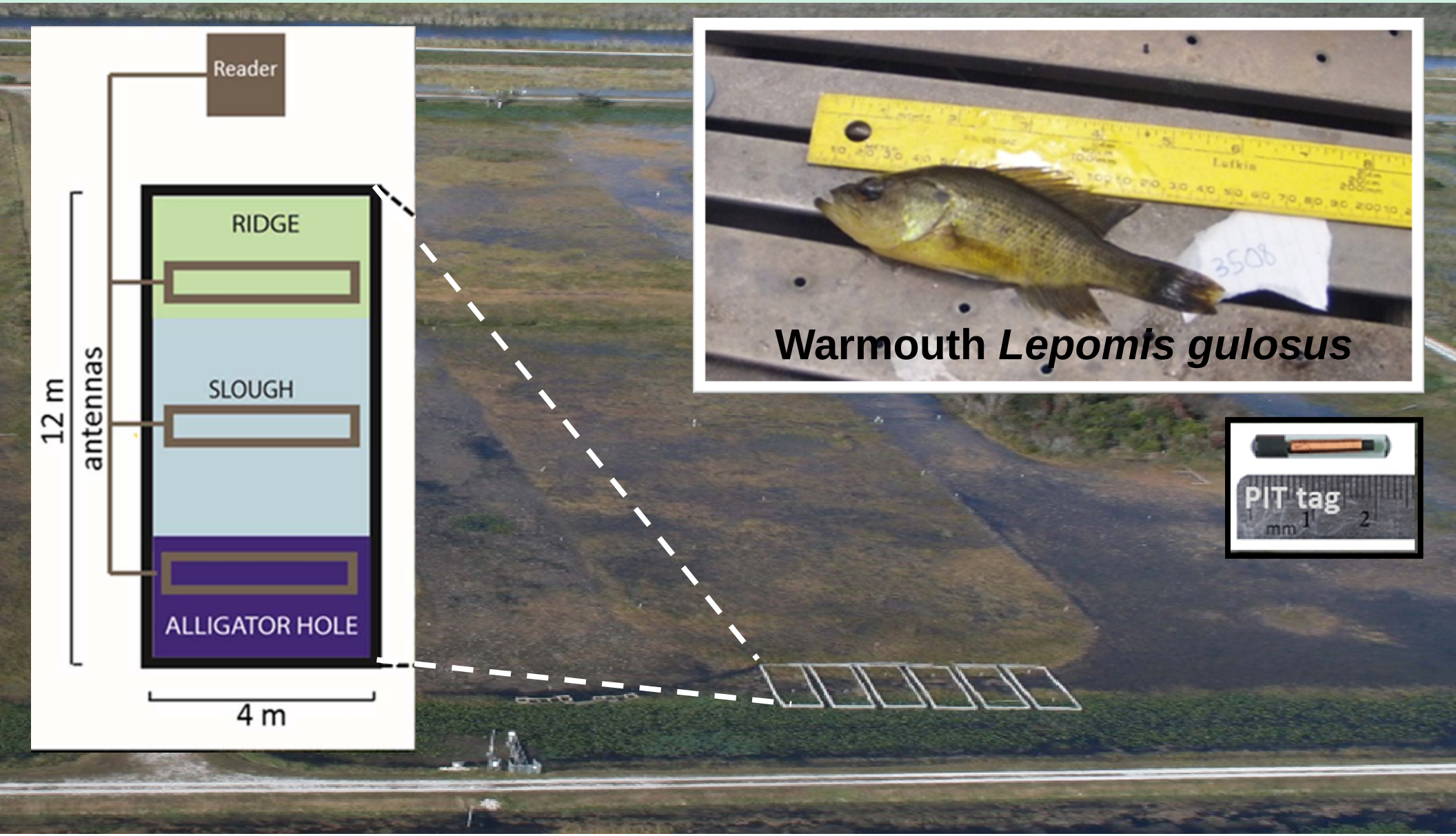
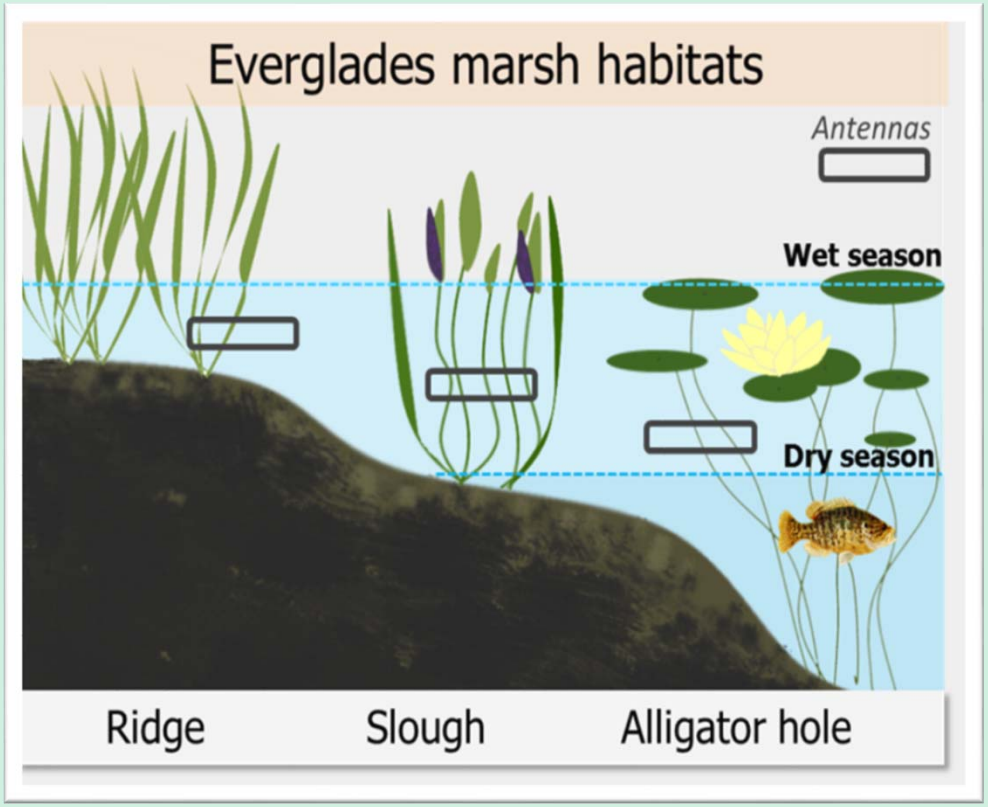
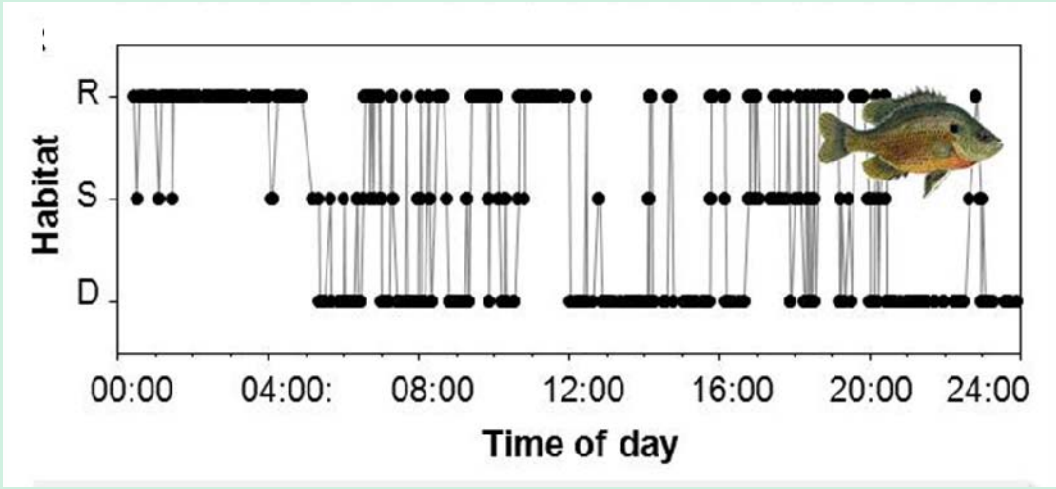


Example of Movement: Tag detections for a given individual over 24 hrs

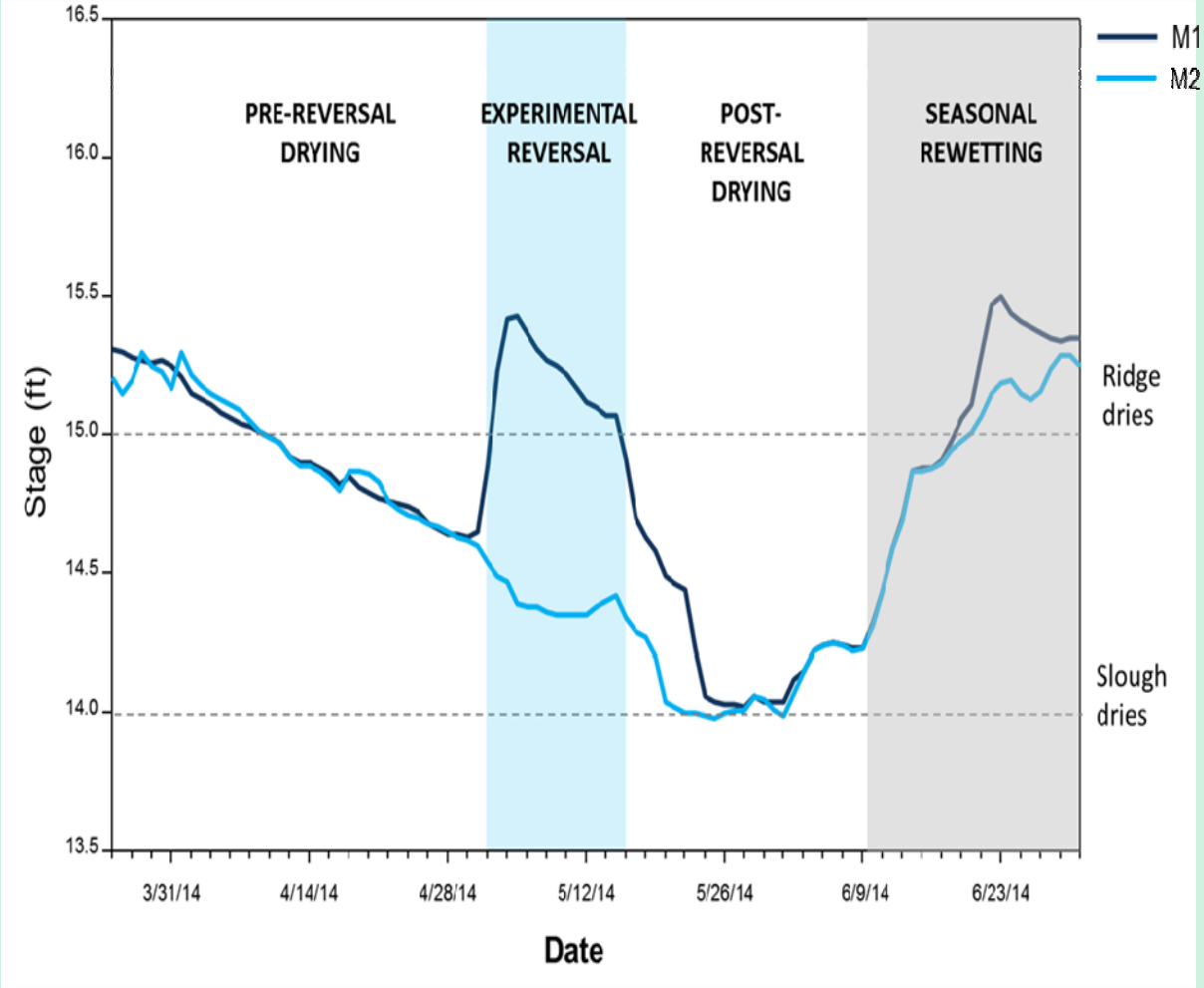




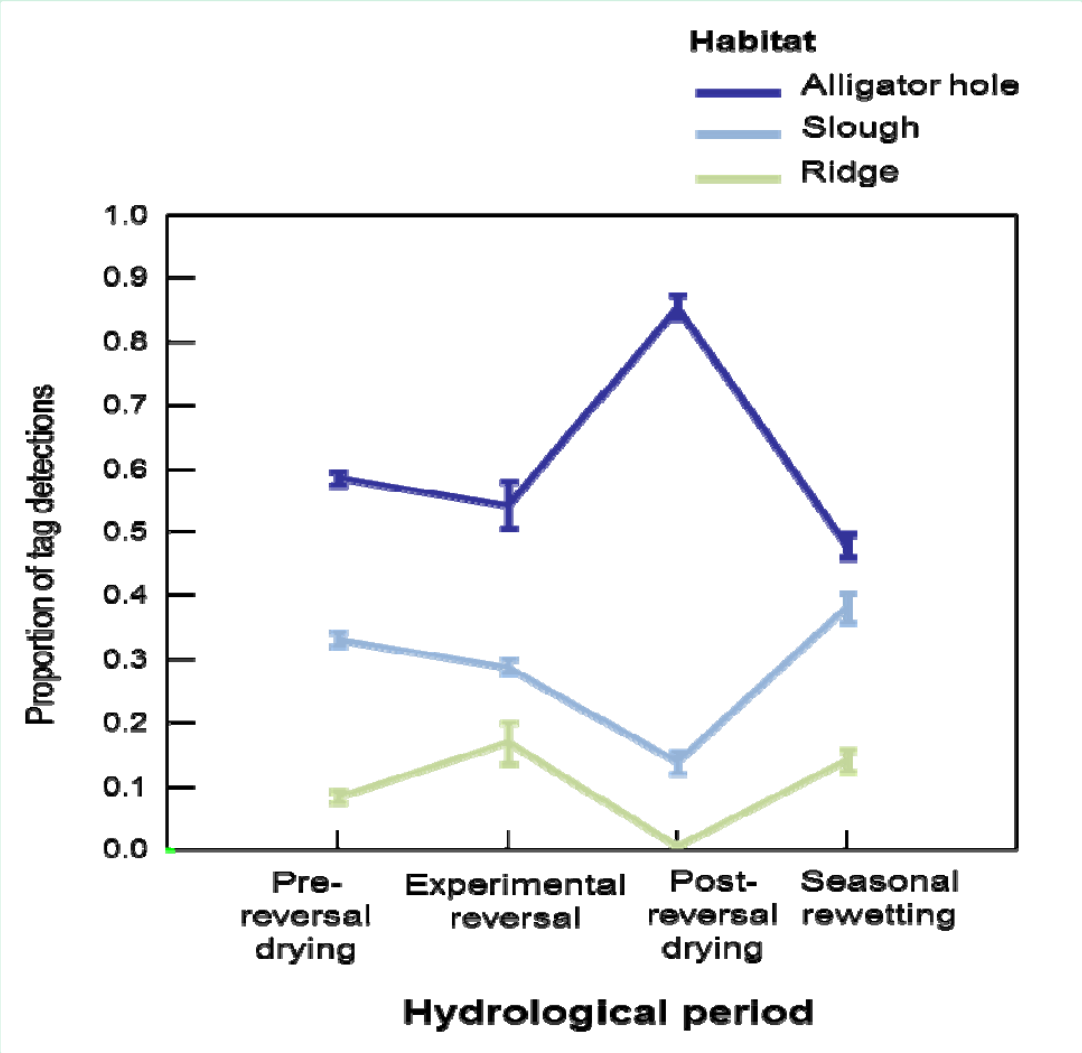
(See Rehage et al. (2014) Acta Ethologica)

Data collection in 2014

- **Tracked 36 tagged warmouth in 6 enclosures**
- **Encompassed the seasonal drydown & rewetting period (115 d from Mar 8 – June 30)**
- **Experimentally raised water-levels (25 cm) for 15 days in early May**



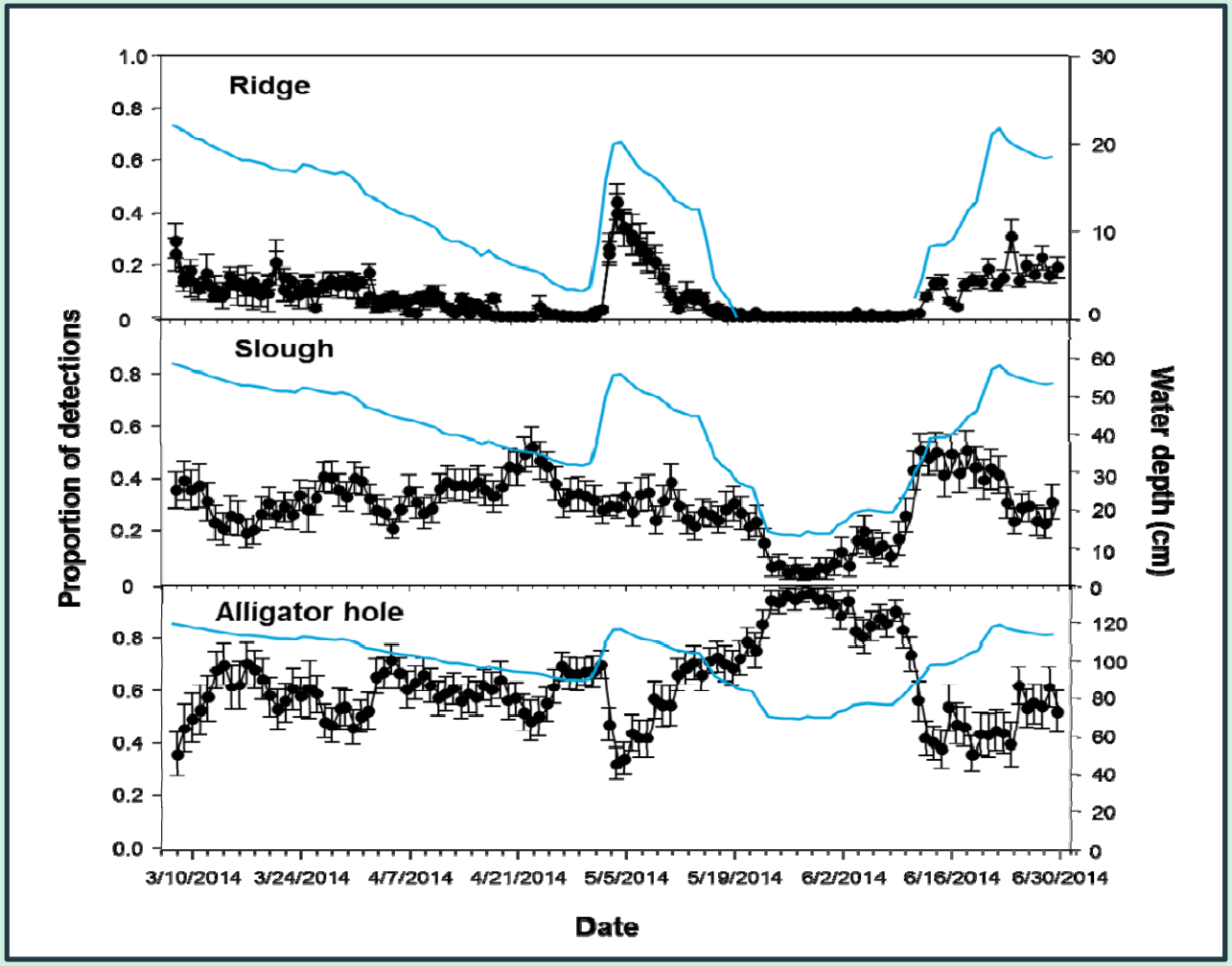
Warmouth favored deeper habitats but their distribution was strongly influenced by hydrological period



Habitat effect: $p = 0.001$

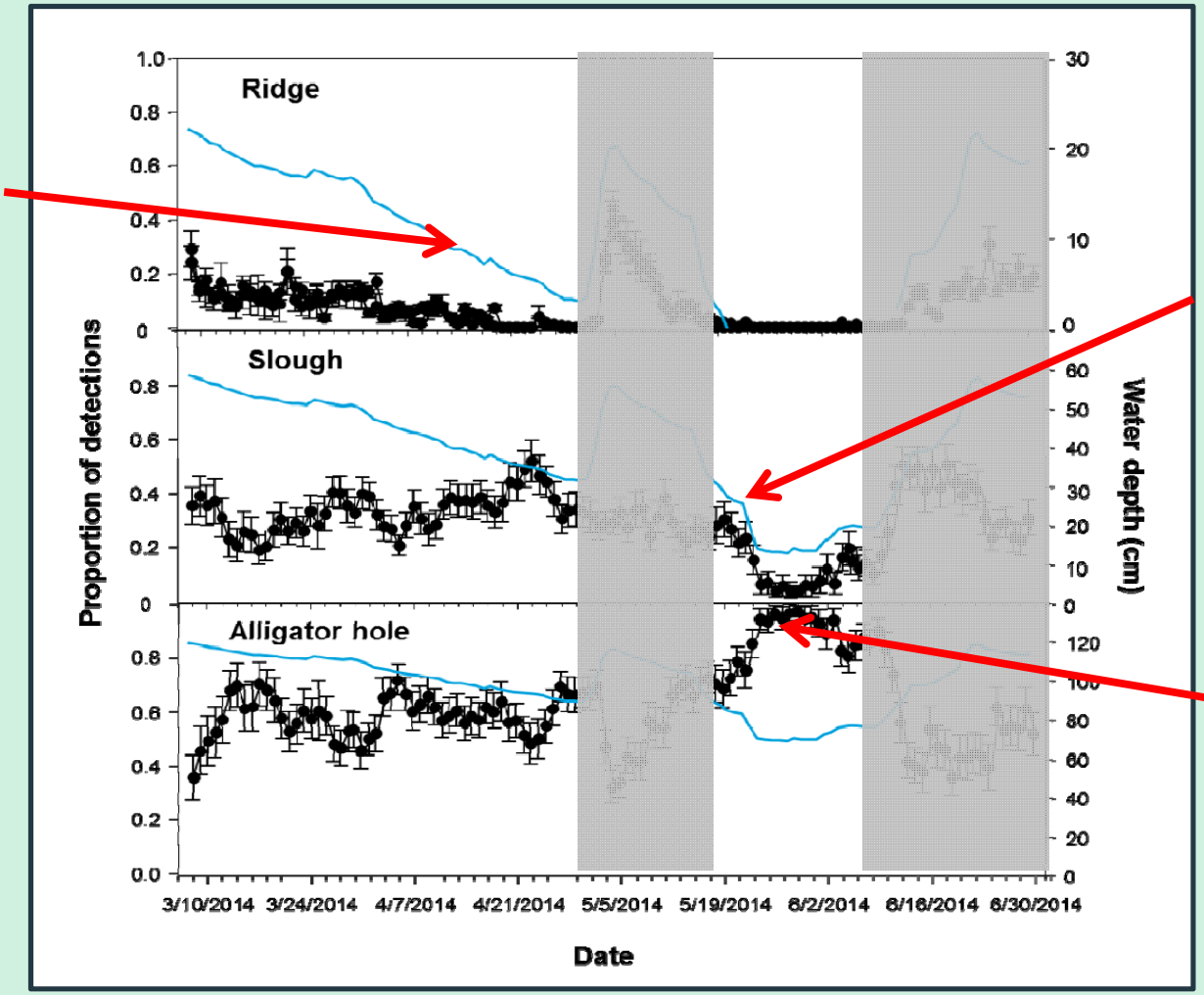
Hydrological period x habitat: $p = 0.0001$

Distributions in relation to seasonal changes in water depth



Seasonal Drydown: Maximum use of the gator hole occurred when the slough was relatively deep (~15 cm)

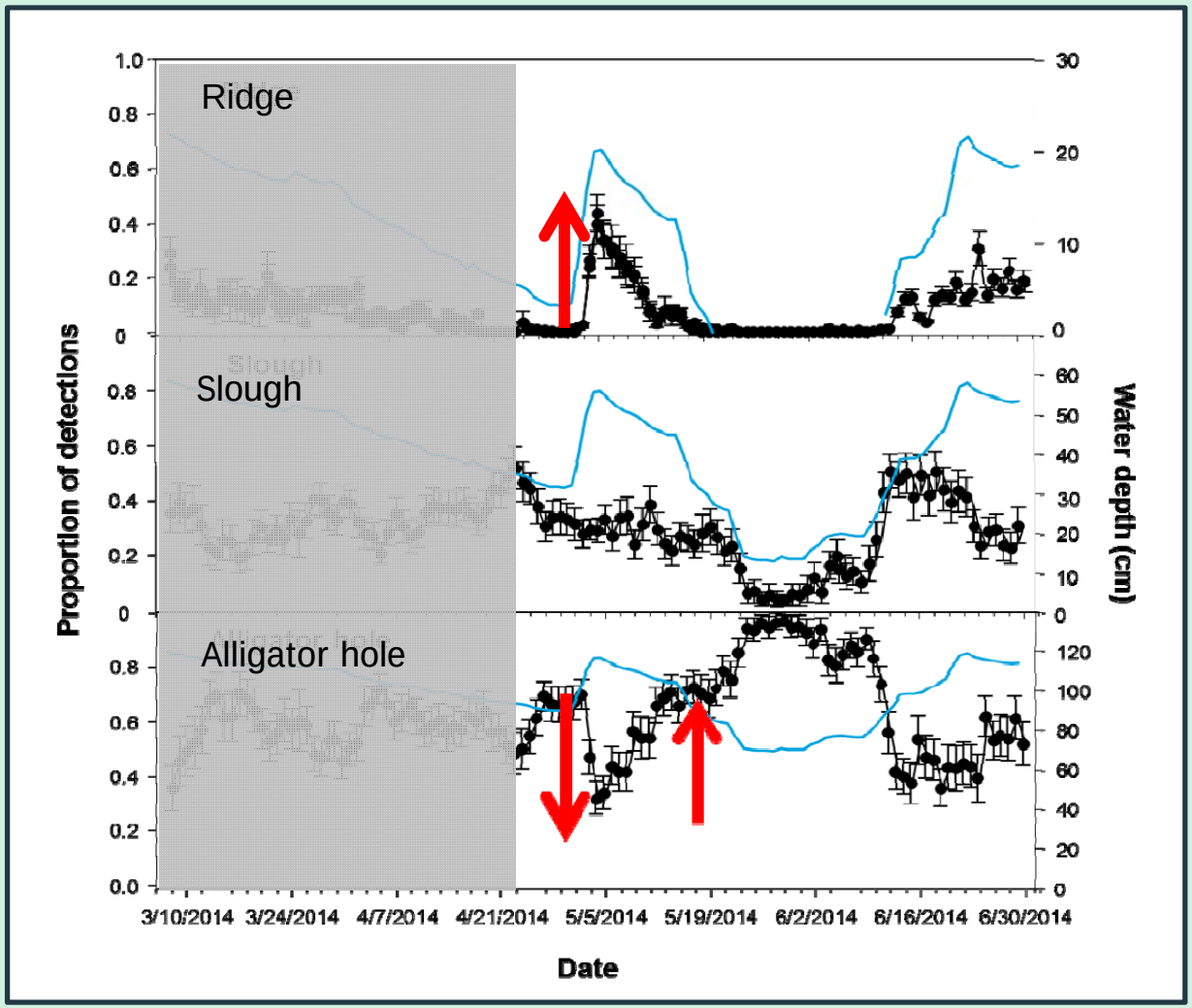
Ridge: minimal & declining use to ~8 cm



Slough: moderate & constant use, then a rapid decline in use between 25 – 15 cm

Gator hole: greatest use after slough drops to ~15 cm

Experimental and seasonal reversals: Fish rapidly vacated deeper habitats and moved to newly re-flooded habitats



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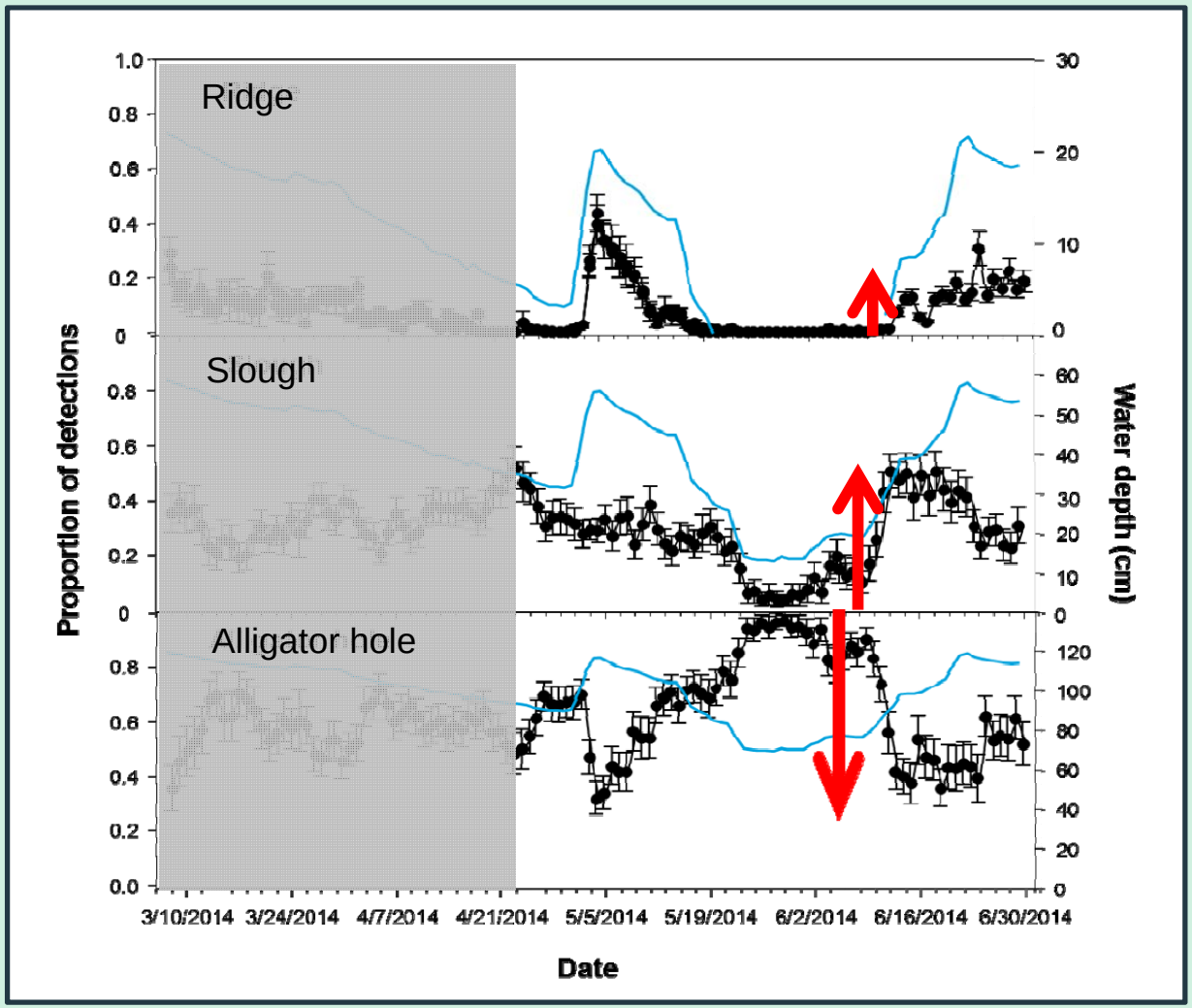
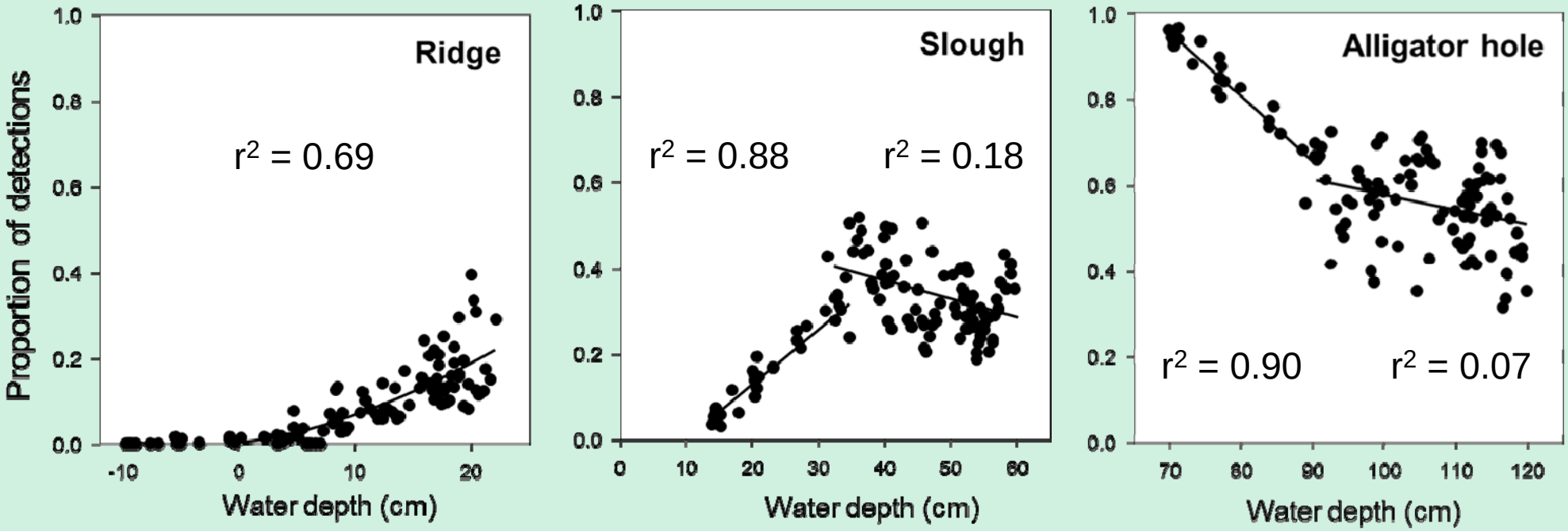


The relationship between habitat use and water depth was habitat specific, nonlinear and varied in strength



Segmented regressions

Summary

- Warmouth primarily use deeper habitat but alter distributions rapidly (daily scale) as water levels rise and fall with seasonality.
- Responses to water level may be non-linear, habitat specific, threshold dependent.
- Max densities of warmouth (concentration events) occur in the deepest habitats when the slough is still relatively deep (~15 cm).
- Water level reversals cause fish to move to recently reflooded habitats (loss of concentration)
- Effects of reversals on fish movements may vary
- Warmouth can potentially re-concentrate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