

# Everglades National Park

## Non-native fish and apple snails

Jeff Kline

Everglades National Park



# Invasive Species Programs



- Preserve flora and fauna in a **natural** state.  
(1934 Everglades Establishment Act)
- Maintain **natural** abundance, diversity, and ecological integrity of **native** plants and animals.  
(1989 Everglades National Park Expansion Act)

# Priority Animal Species

## Priority Animals

- The most recent introductions
- Most abundant
- And those not in ENP yet!



## Newly Detected Animal Species

- None in 2010-2011

# Monitoring

- Fish monitoring
  - Park-wide sample-Annually
  - Monthly Rocky Glades
  - Long-term monitoring
  - Other monitoring efforts- Cooperators
  - Misc observations



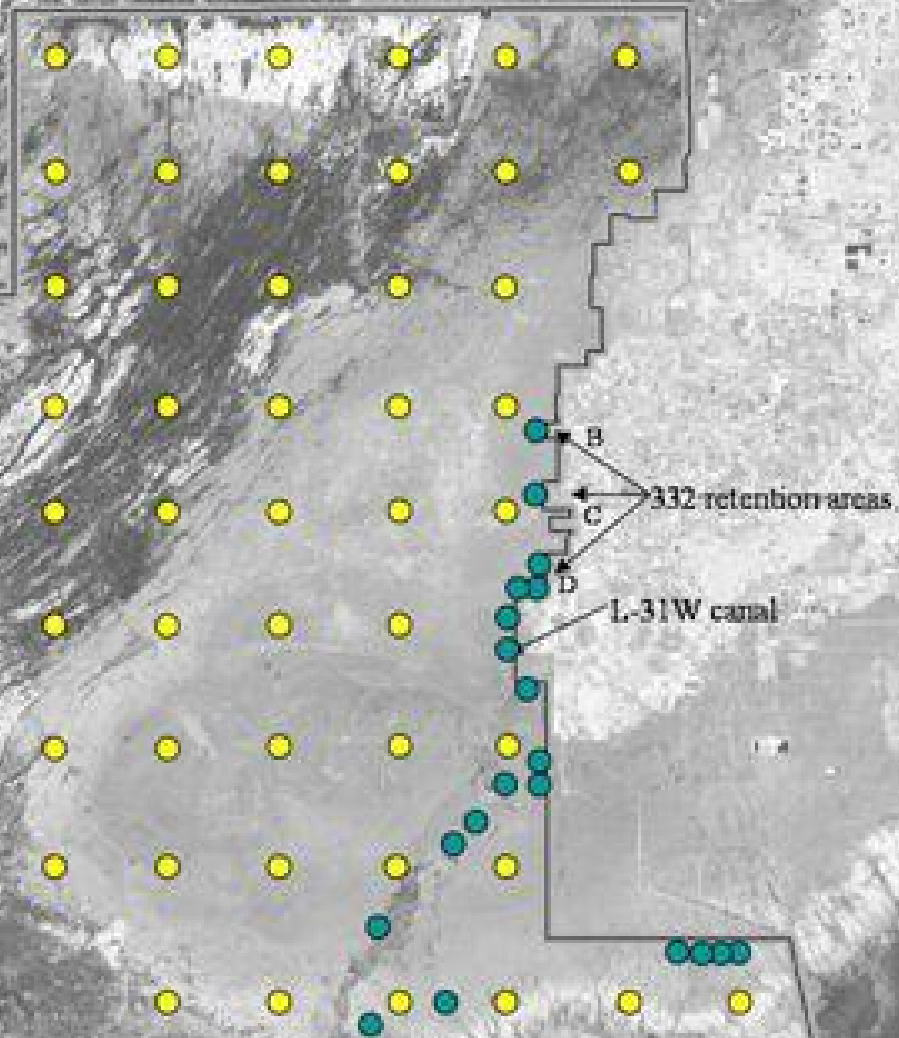
- Non-native apple snail
  - Pomacea insularum*
  - Old Tamiami Canal and L-29 Canal
  - Annual survey of border canals



# CESI Exotics 2004-2005

## Objectives:

- Spatially extensive  
"snapshot" of distribution
- An example design for  
long-term monitoring

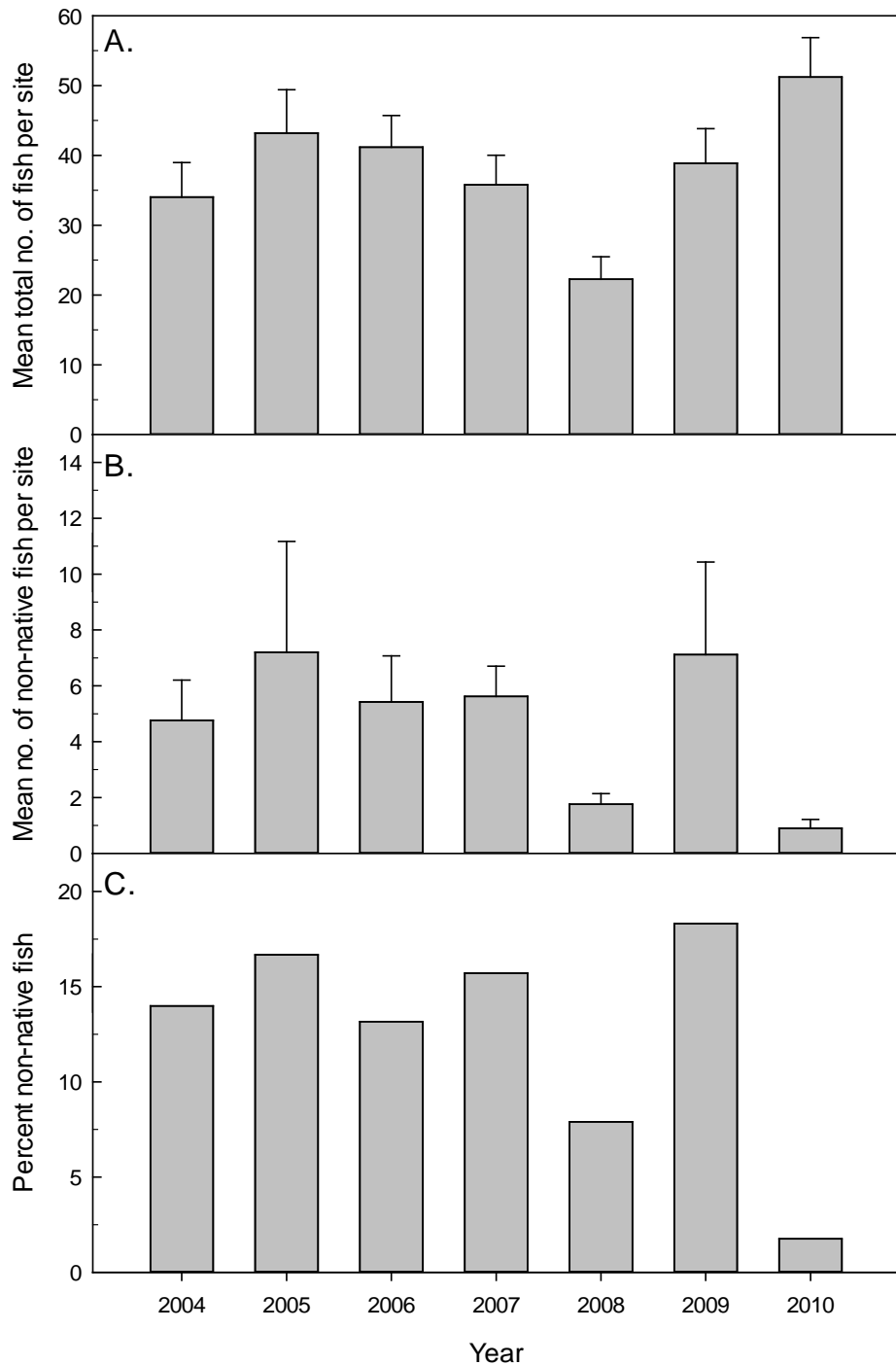


# Parkwide sample 2010

Mean Total CPUE high

CPUE of non-natives low

Percent composition low



# How do Canals Function as Habitat for Native & Non-native Fishes Across the Everglades Ecosystem?

David A. Gandy & Jennifer S. Rehage



**CESI**  
Critical Ecosystem Studies Initiative



# Everglades National Park

L-29 West

L-67A

L-29 East

L-31N North

L-31N South

L-31W North

L-31W South

C-111 North

C-111 South



L-67EXT

L-67A

L-31N

L-31N

L-31N

C-103

L-31W

C-111

C-1W

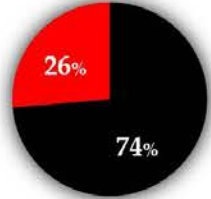
C-102

C-111

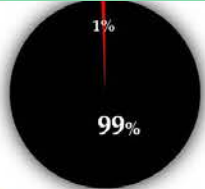
# Early wet season-June 2010

CPUE:  Native  Nonnative

## All Canals



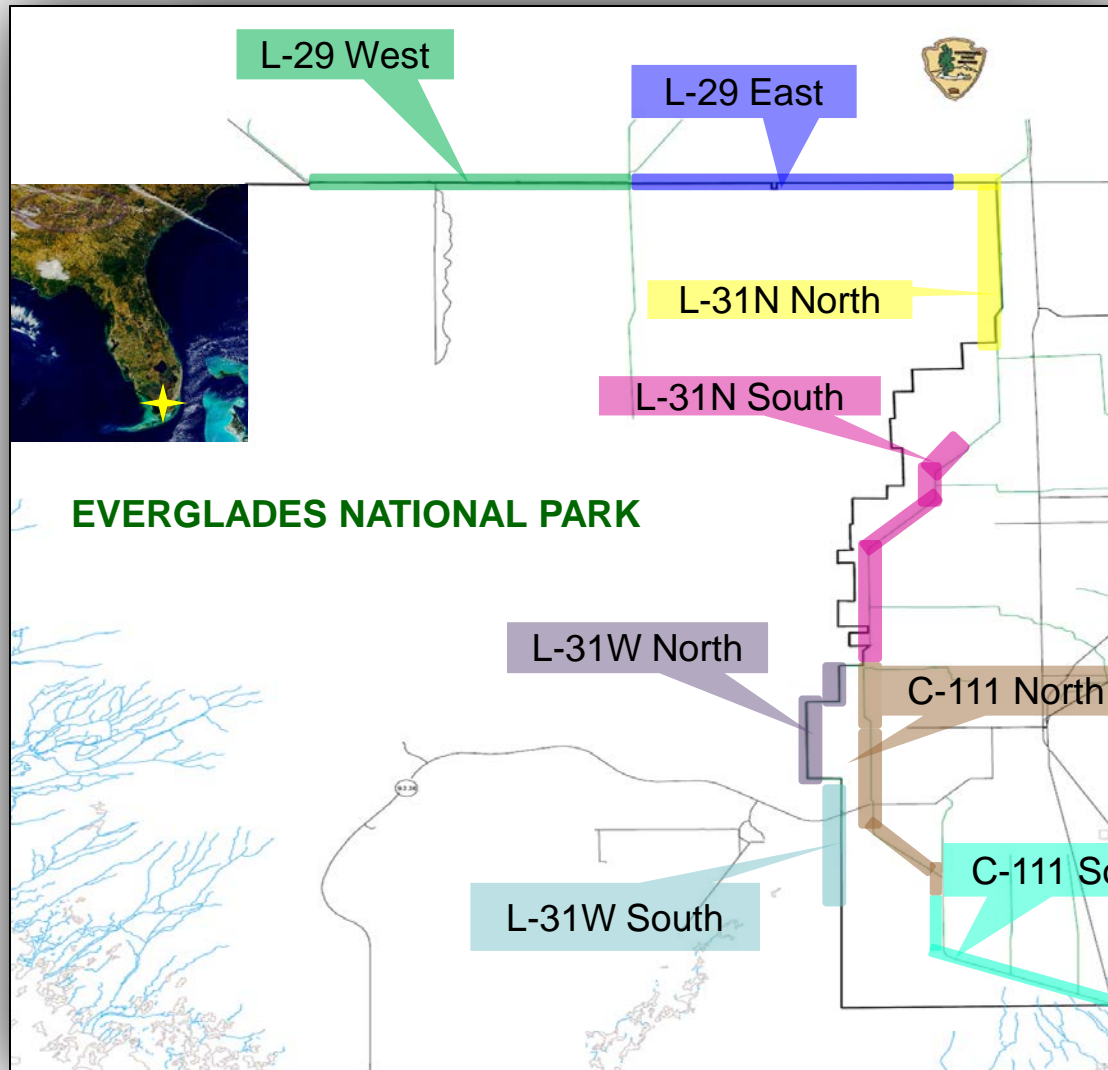
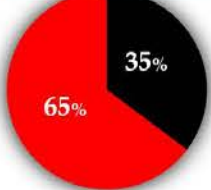
## L-29 West



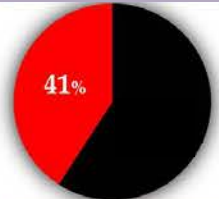
## L-29 East



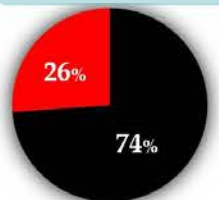
## L-31N South



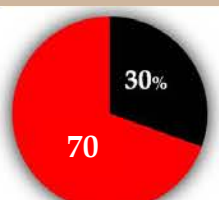
## L-31W North



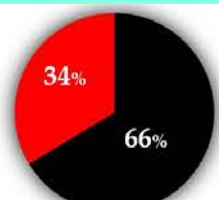
## L-31W South



## C-111 North



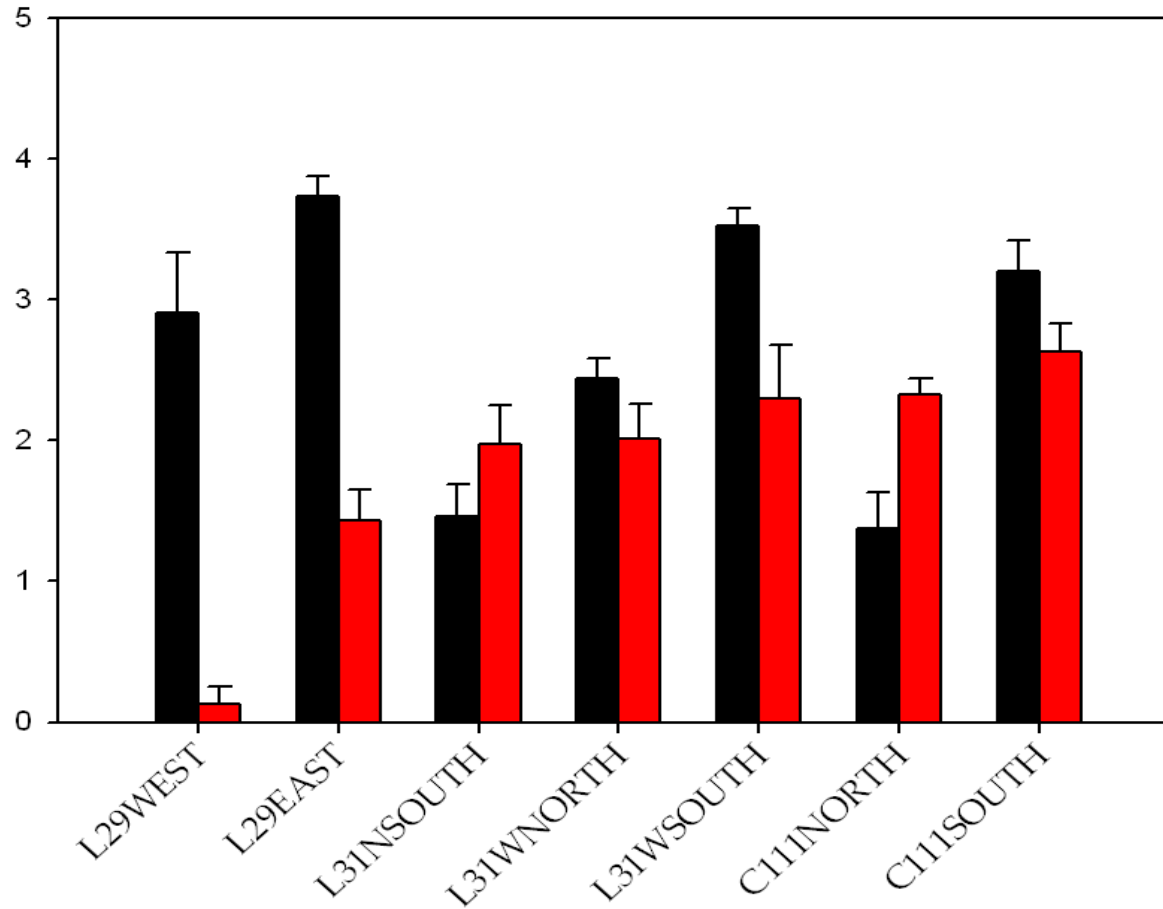
## C-111 South



In this June 2010 (Early wet only) sampling event, **nonnative** fishes on average account for about 26% of fish numbers, with high variation among canals & sampling units. (Note- L31N North is excluded do to lack of safe boat launch site)

# Mean CPUE by Canal: Natives vs. **Nonnatives** (Early Wet -Only)

**Ln(CPUE + 1)**



# Late Wet Season-Oct/Nov 2010

CPUE:  Native  Nonnative

All Canals



L-29 West



L-67A



L-29 East



L-31N South



L-31W North



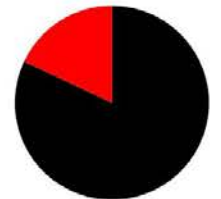
L-31W South



C-111 North



C-111 South



# Monitoring

Island apple snail  
*Pomacea insularum*

2011  
L-29 Canal & L-31N



# Needs & Gaps

- Prevention is key with fish and aquatic inverts!
- Non-native species must be considered when designing water management changes
  - Non-native species are “bio-pollution”.
  - Study alternative ways of delivering water without delivering non-native species.
  - Restore unnatural habitats
- How do we work better with external management agencies with different mandates and objectives to meet our mandates?