

# Relationship between invasive reptiles and ecosystem restoration in the Florida Everglades: How do we move from behind the eight ball to ahead of the curve?

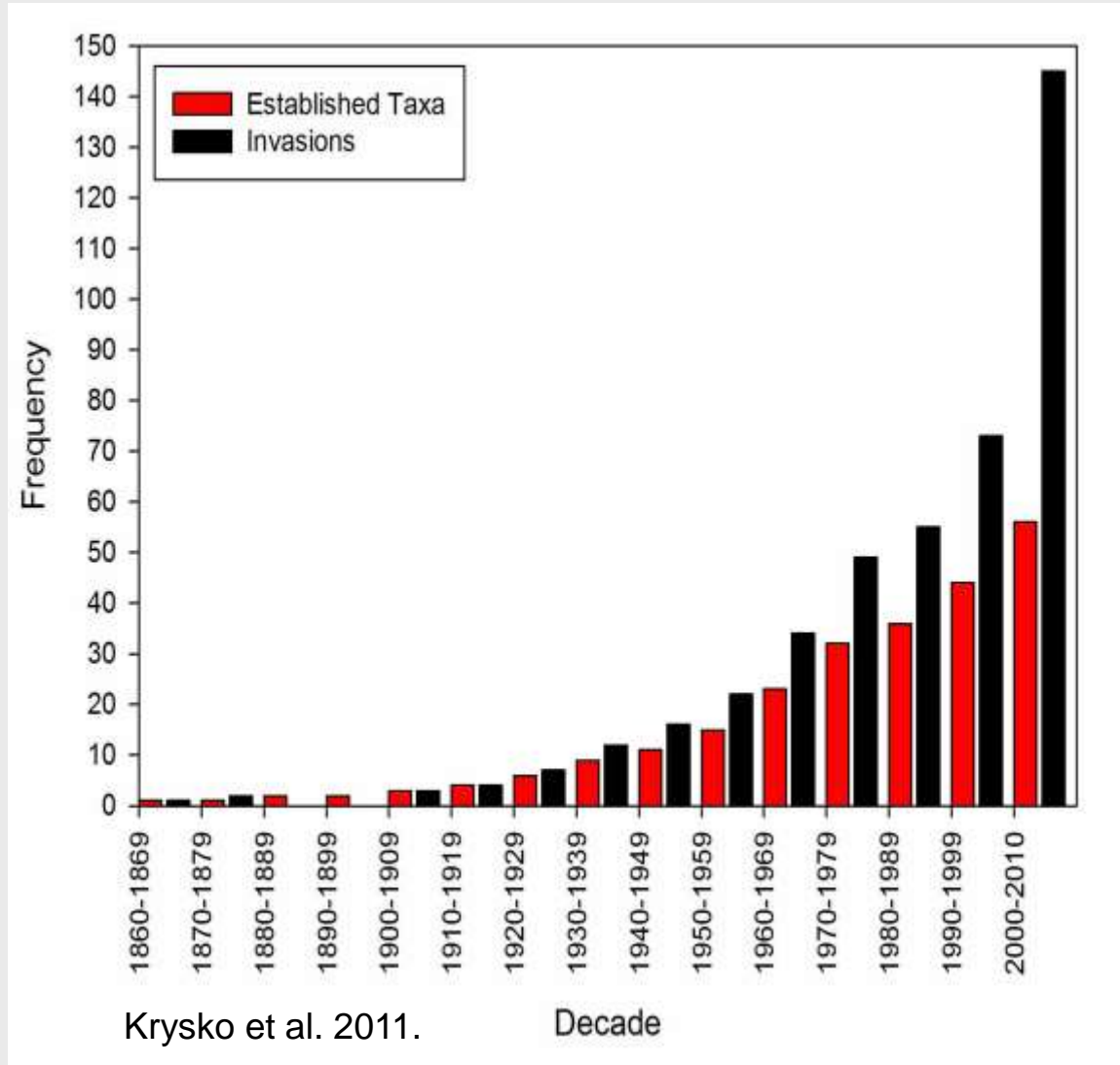


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# What is the threat?

- South Florida is vulnerable
  - Climate, geography, disturbance, ports, reptile dealers
- # introduced and established species is ↑



# Climate, Geography, and Disturbance



- South Florida is particularly vulnerable to invasion
  - Warm and wet
  - Peninsula
  - Disturbed environment
- Restoration of Greater Everglades Ecosystems



# Priority Nonnative Reptiles

- Small bodied, insect eating, habitat generalists from cargo; have been replaced by large, diet and habitat generalists from the pet trade
- What is here – next?
- Relationship to ecosystem restoration
- What can we do?



# Priority Reptiles

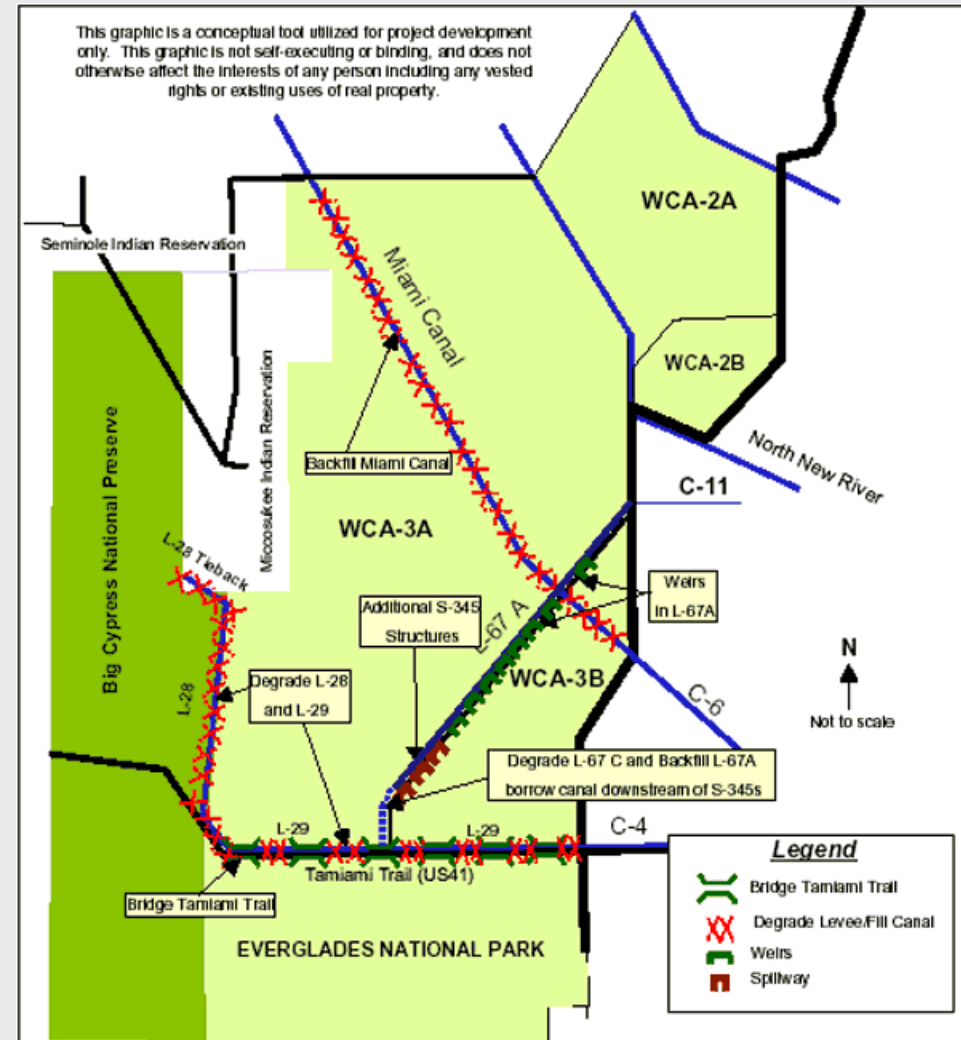
Species	Impacts
Burmese Pythons	Mammals – trophic effects Water birds – rookeries, rails Alligators – crocodiles next?
Argentine B&W Tegus	Omnivorous – eat native and non- native everything Spread non-native plants Egg predators – alligators, crocodiles, turtles, and ground nesting birds

# Priority Reptiles cont'd

<u>Species</u>	<u>Impacts</u>
Nile	Reptiles and amphibians
Monitors	Eggs – reptiles and birds? Cane toads – bait?
Caiman	Competition with alligators and crocodiles – very aggressive
Chameleons	Social more than ecological – deliberately seeded
Iguanas(?)	Structural damage

# Relation to Ecosystem Restoration

- Remove canals and levees and restore natural hydro-patterns
  - Levees – habitat and dispersal routes for pythons and tegus
  - Canals – habitat and dispersal routes for monitors and caimans
  - Pythons avoid deeper water marshes



# Relation to Ecosystem Restoration: Caveats

- Structural and operational changes planned as part of CERP/CEPP should be detrimental to invasive wildlife, but
- Restoring hydrology and freshwater flow in Biscayne Bay wetlands could improve habitat suitability for caimans
- Are we overlooking the potential for damage to water control structures (levees, pump stations, etc.) by iguanas – population explosion?

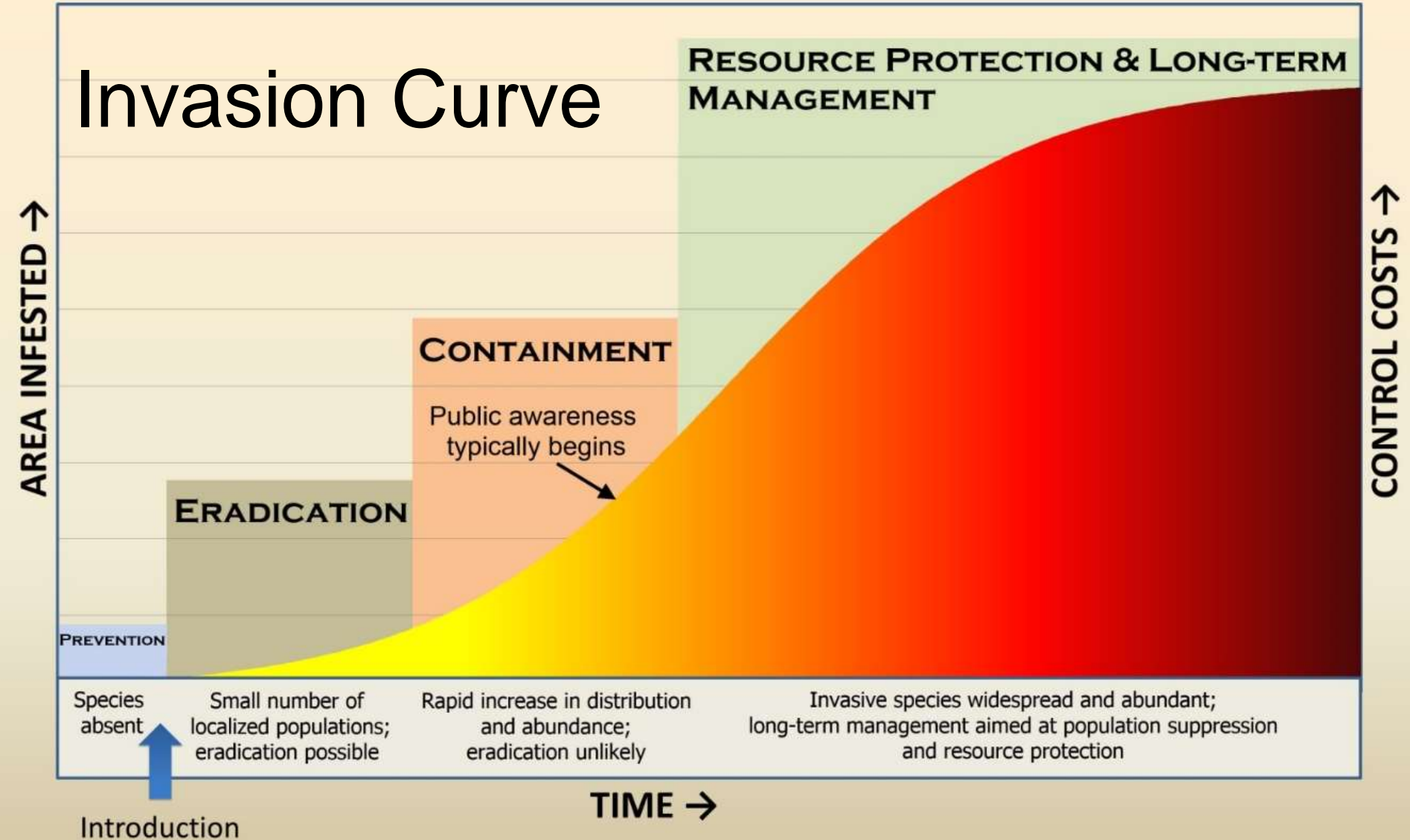


None of this offers a permanent solution to the presence of invasive reptiles (wildlife).

For the big 3, pythons, tegus, and monitors, we seem to be facing long odds just to contain them and to protect vulnerable resources.

**How do we get from behind the 8-ball to ahead of the curve?**

# Invasion Curve

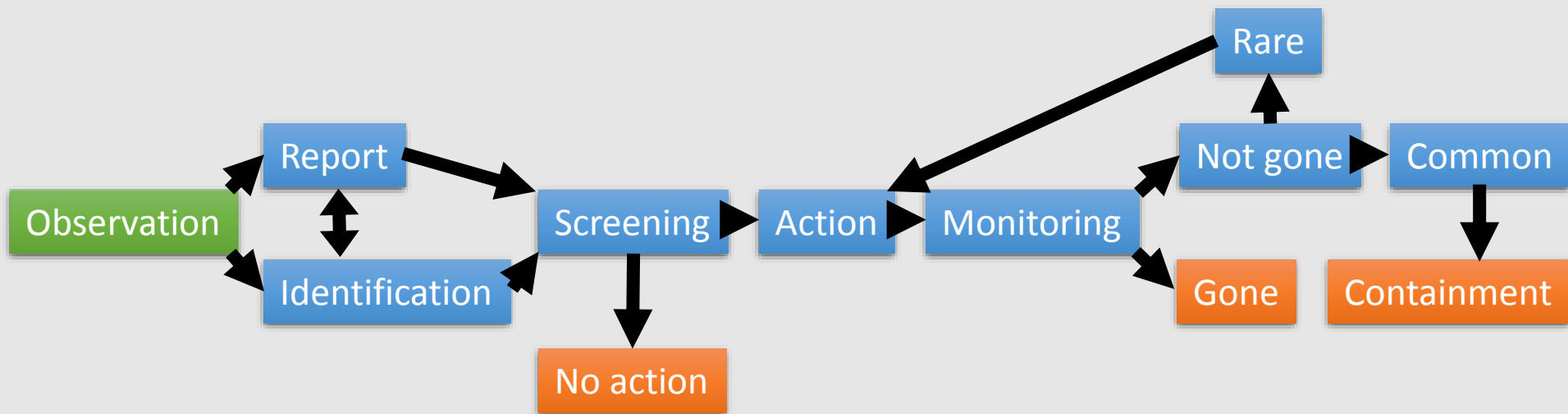


Adapted from Invasive Plants and Animals Policy Framework, State of Victoria, AU, Department of Primary Industries, 2010.

# Shoot first and ask questions later!

- **Early detection and rapid response (EDRR)**
  - New species
  - Existing species at new locations
- Sometimes action is cheaper and more effective than assessment
- The coarsest filter we can use is – if we do not know what it is and what it will do, remove it – then find out

# Simplified Approach to EDRR



# Scientific Framework for EDRR

## Science/Management Questions

- How do you deal with imperfect detection, while removing target species?
- How do you know when you have reached zero? Statistically – Practically
- When do you kickout from EDRR to containment?
- How do you determine ROI?

# Lessons from EIRAMP EDRR

- Trained professional biologists
  - Cryptic/dangerous species
- Rapid persistent response.
- Targeted outreach
- Taking a multi-species approach that integrates outreach, research, and response, with monitoring and evaluation is effective
- EDRR requires a dedicated and sustainable source of funding



# Lessons Learned from EDRR Efforts

- Goals and objectives
- Monitoring and evaluation (ROI)
- Assessments (screening) should be proactive
- A multi-species approach
- Can't wait to determine impacts
- Active and passive observation networks
- Success = early, rapid, and application of brute force
- Rapid means fast or quick

# Important Points

- Species identification is often overlooked
- Forecast (horizon scan)
- Proactively determine agency responsibilities
- Invasive wildlife management needs to become part of Greater Everglades Ecosystem Restoration and the Peninsular Florida Landscape Conservation Cooperative

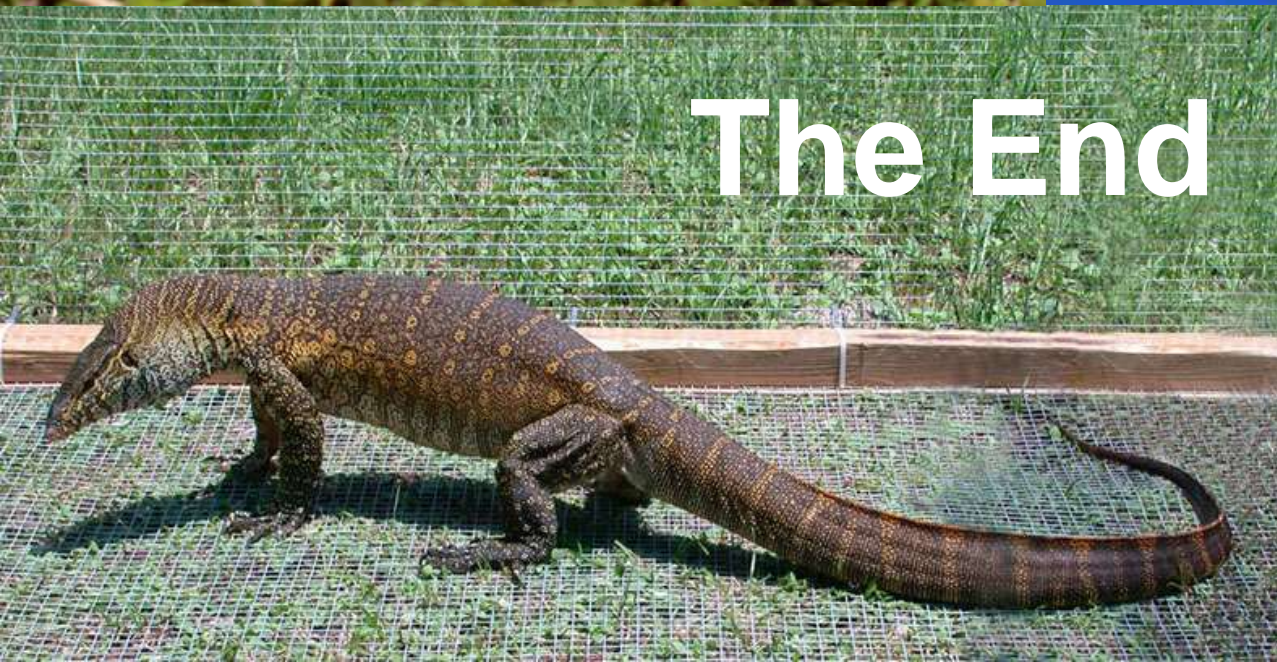


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**This is Not**



**The End**

