

# MONITORING A PROBLEM: EVALUATING THE ECOLOGICAL STATUS OF THE NILE MONITOR IN FLORIDA AND FORECASTING POPULATION EXPANSION THROUGH COMPUTATIONAL GIS

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# NILE MONITOR (*VARANUS NILOTICUS*)



# HISTORY OF NILE MONITORS IN FLORIDA

- 6/30/1981 – Lake Kanahapa, Alachua County
- Established populations
  - Miami & Homestead
  - Cape Coral
  - Palm Beach



WHY STUDY NILE MONITORS?

# WE KNOW SO LITTLE

- Inadequate study of population dynamics
- Lack of modeling studies
- Environmental cost and potential expansion unknown
- Control measures insufficient

# THREAT TO FLORIDA ECOSYSTEMS

# THEY ARE HIGHLY ADAPTABLE

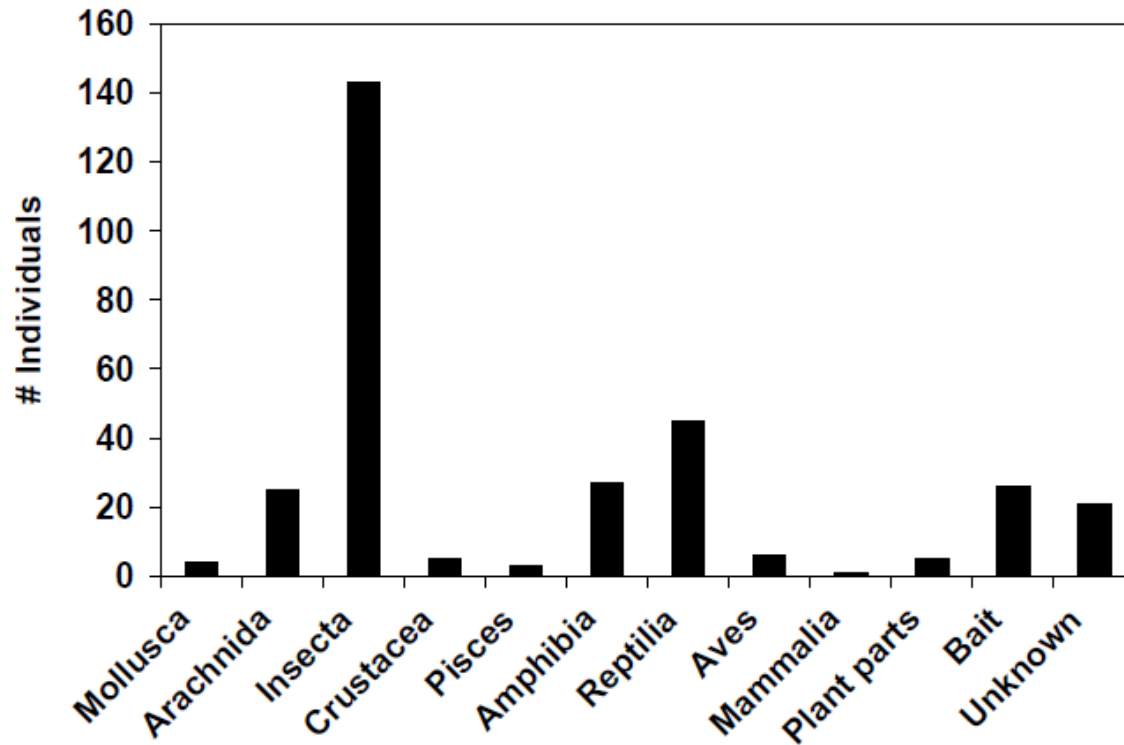


# THEY ARE HIGHLY ADAPTABLE





# THEY EAT EVERYTHING



**Figure 8.** The taxonomic distribution (by number of individuals) of 311 prey items retrieved from the stomachs of 80 Nile monitors collected in Cape Coral, Florida.

# OBJECTIVES

- Analyze distribution from georeferenced records
- Habitat preferences
- Bioclimatic preferences

# DATA SOURCES

- EDDMapS
  - Web reports
  - Linked state agency records
- FLMNH Herpetology Collection
  - Voucher records
- Chris Lechowicz
  - Sanibel Island

**Record ID** 633240

#### Reporter Information

Reporter FWCC Exotic Species Database , Florida Fish and Wildlife Conservation Commission  
**Observation Date** July 02, 2007  
Year Accuracy Actual  
Date Entered January 23, 2010  
Date Updated January 04, 2012  
Fwc Observation Id 9149  
Source Type Bulk Data

#### Species Information

Common Name Nile monitor  
Scientific Name *Varanus niloticus*  
Reference Kraig Hankins, City of Cape Coral, personal communication

#### Verification and Review

Verification Method Specimens  
Identification Credibility Verified  
Reviewed Verified

#### Infestation Information

Infestation Status Positive

#### Location Information

Locality Cape Coral, 2710 El Dorado Pkwy W  
Location Lee County, Florida, United States

**Coordinates** 26.5489,-82.0305

Florida Location Id 4564

#### Survey Information

Data Type Point Record  
Method Reported  
Precision Accurate  
Datum WGS84

Data Type  
Method  
Precision  
Datum  
Comments

**Record ID** 633239

#### Reporter Information

Reporter FWCC Exotic Species Database , Florida Fish and Wildlife Conservation Commission  
**Observation Date** July 02, 2007  
Year Accuracy Actual  
Date Entered January 23, 2010  
Date Updated January 04, 2012  
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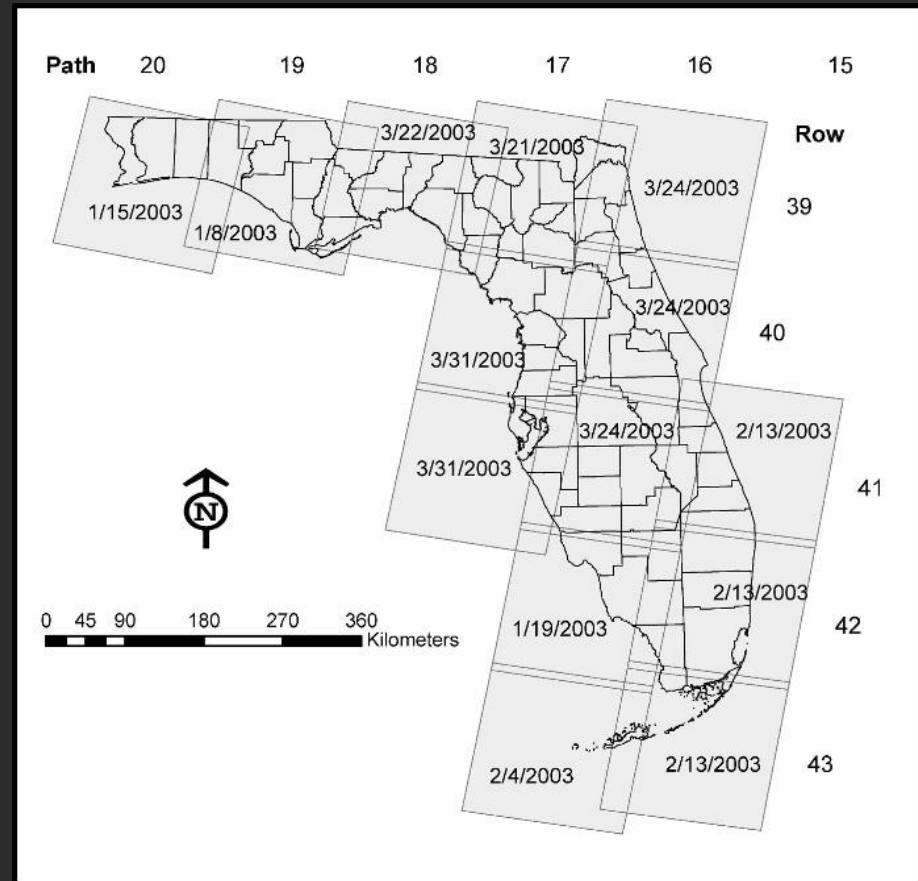
**Collected by:** Jake Edwards, Murray Stanford, Kelly Gastring, Received from: Jake Edwards, **Removed: Yes, removed via shotgun**

# HABITAT CLASSIFICATION MAP

# LANDSAT 8 OLI/TIRS

- 14 images

- Jan 21 – May 02, 2015



# HABITAT CLASSIFICATION

- Iterative series of classification steps
- Georeferenced records linked to habitat map
- Analyze habitat usage
- Identify corridors of spread



# BIOCLIMACTIC FACTORS



# WORLDCLIM

- BIO1 = Annual Mean Temperature
- BIO2 = Mean Diurnal Range (Mean of monthly (max temp - min temp))
- BIO3 = Isothermality (BIO2/BIO7) (\* 100)
- BIO4 = Temperature Seasonality (standard deviation \*100)
- BIO5 = Max Temperature of Warmest Month
- BIO6 = Min Temperature of Coldest Month
- BIO7 = Temperature Annual Range (BIO5-BIO6)
- BIO8 = Mean Temperature of Wettest Quarter
- BIO9 = Mean Temperature of Driest Quarter
- BIO10 = Mean Temperature of Warmest Quarter
- BIO11 = Mean Temperature of Coldest Quarter
- BIO12 = Annual Precipitation
- BIO13 = Precipitation of Wettest Month
- BIO14 = Precipitation of Driest Month
- BIO15 = Precipitation Seasonality (Coefficient of Variation)
- BIO16 = Precipitation of Wettest Quarter
- BIO17 = Precipitation of Driest Quarter
- BIO18 = Precipitation of Warmest Quarter
- BIO19 = Precipitation of Coldest Quarter



ization



World  
Weather •



# QUESTIONS



[http://media.eol.org/content/2012/09/13/09/97803\\_orig.jpg](http://media.eol.org/content/2012/09/13/09/97803_orig.jpg)