

# Status of the Nile Monitor in South Florida



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# Problem: Large Old World lizards (Varanidae) in the New World

**Nile monitor**  
*Varanus niloticus*



## Status of the Nile Monitor (*Varanus niloticus*) in Southwestern Florida

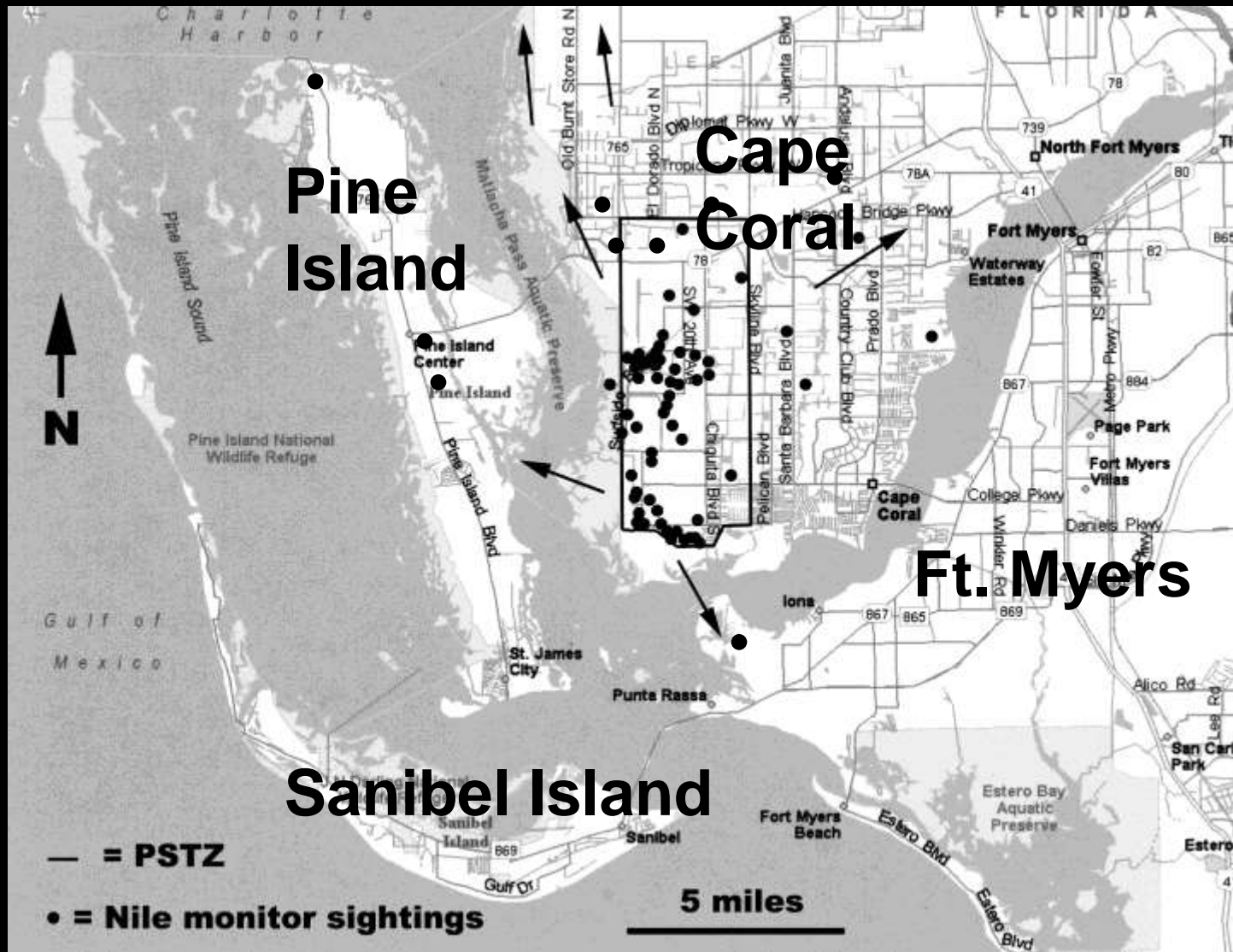
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TODD S. CAMPBELL<sup>4,5</sup>, AND F. WAYNE KING<sup>2</sup>

**Abstract** - The Nile Monitor (*Varanus niloticus*), the longest lizard in Africa, was first observed in southwestern peninsular Florida in the Cape Coral area of Lee County ca. 1990. From April 2001 through 7 July 2003, we compiled 146 sightings or captures of this species by local residents or ourselves. Numerous individuals of all size classes have been observed or collected, suggesting the occurrence of a reproducing population. Although our records are mostly confined to Cape Coral, our data indicate that *V. niloticus* has recently expanded its range northwards and to nearby islands. Because this large lizard has the potential to disperse into nearby ecologically sensitive areas and preserves where it could pose a serious threat to waterbirds, Burrowing Owls (*Athene cunicularia*), sea turtles, and other native wildlife, population monitoring and eradication are warranted.



**Cape Coral**

# Status in Cape Coral: A large, breeding, expanding nightmare



**Can we prevent Nile monitors from invading CISMA, ENP, and beyond?**



# **What you need to know to set up an effective monitor lizard EDRR Program:**

- 1. Biology of the critter**
- 2. Known and potential impacts**
- 3. How to find them (surveys)**
- 4. How to capture them (efficiently)**
- 5. How to euthanize them**
- 6. What to do with the carcasses**
- 7. Other issues specific to CISMA**
- 8. EDRR Success on Sanibel Island**

# **1. Biology of Nile monitors in Africa and Cape Coral**



David Curl (*V. panoptes*, Cogger & Zweifel 1998)

# Biology

- Large
- Long-lived
- Prolific
- Abundant
- Mobile
- Carnivorous
- Intelligent

# Body Size

**SVL = 805 mm**

**Tail = 1120 mm**

**TL = 1925 mm**

**WT = 12,300 g**



**SVL = 130 mm**

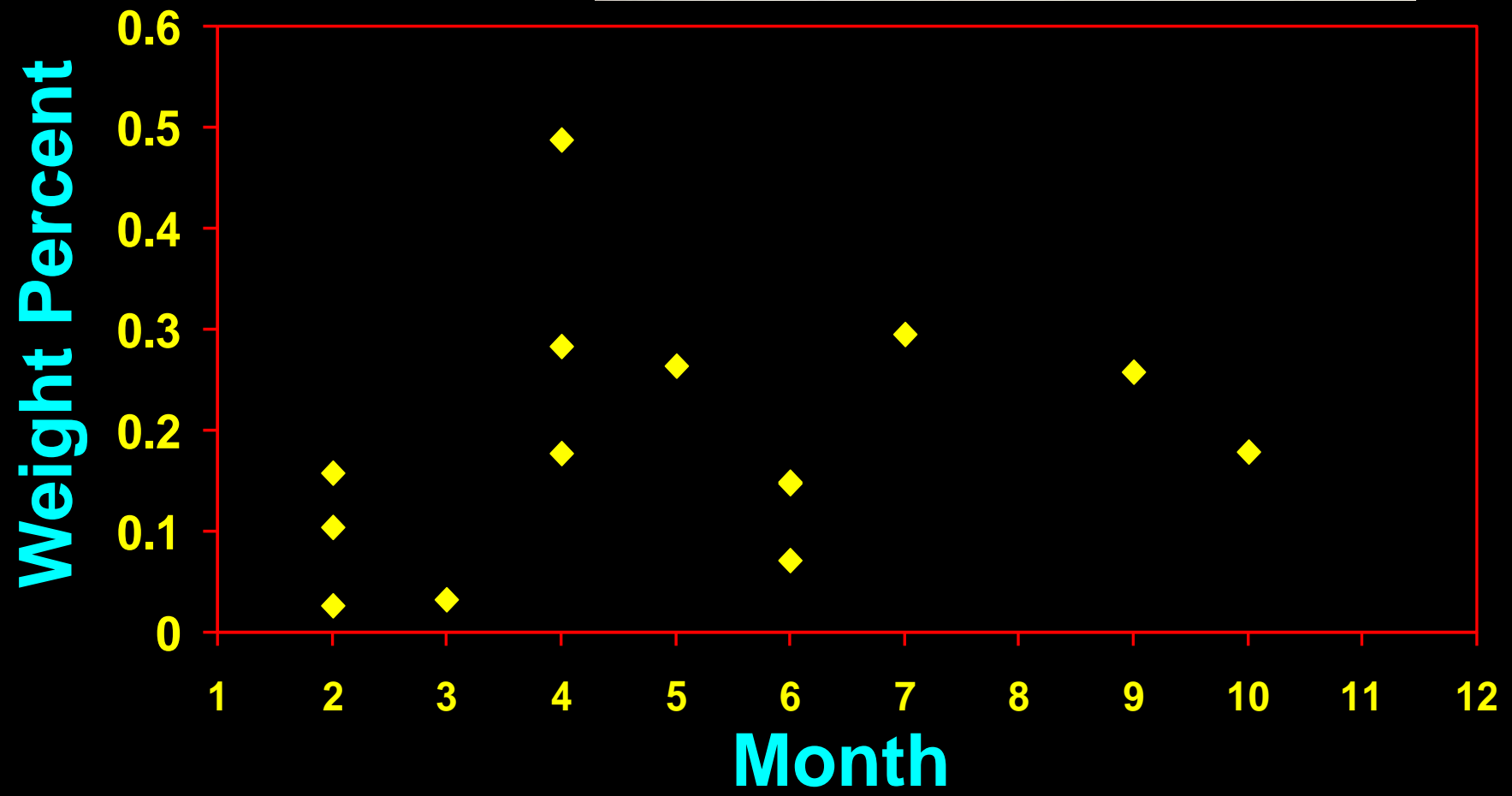
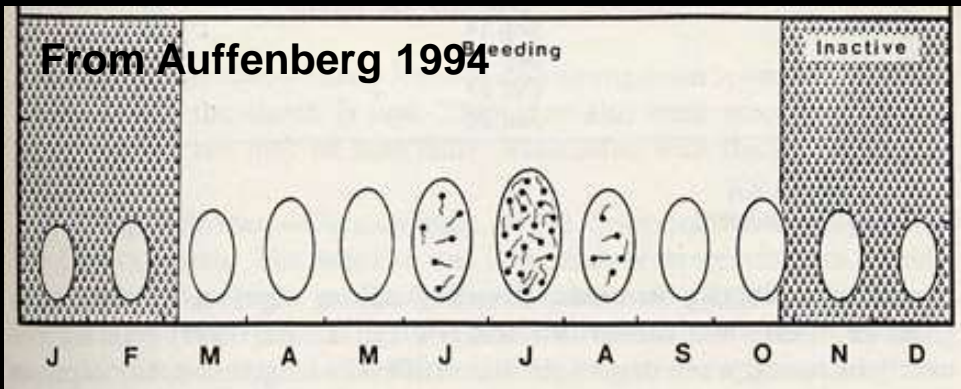
**Tail = 205 mm**

**TL = 335 mm**

**WT = 31 g**



# Testis Mass as Percent of Body Mass



# Reproductive Cycle in Cape Coral

Enlarged testes  
Developing follicles  
Eggs with yolk  
Banded oviducts  
Contracted oviducts  
Corpora leutea



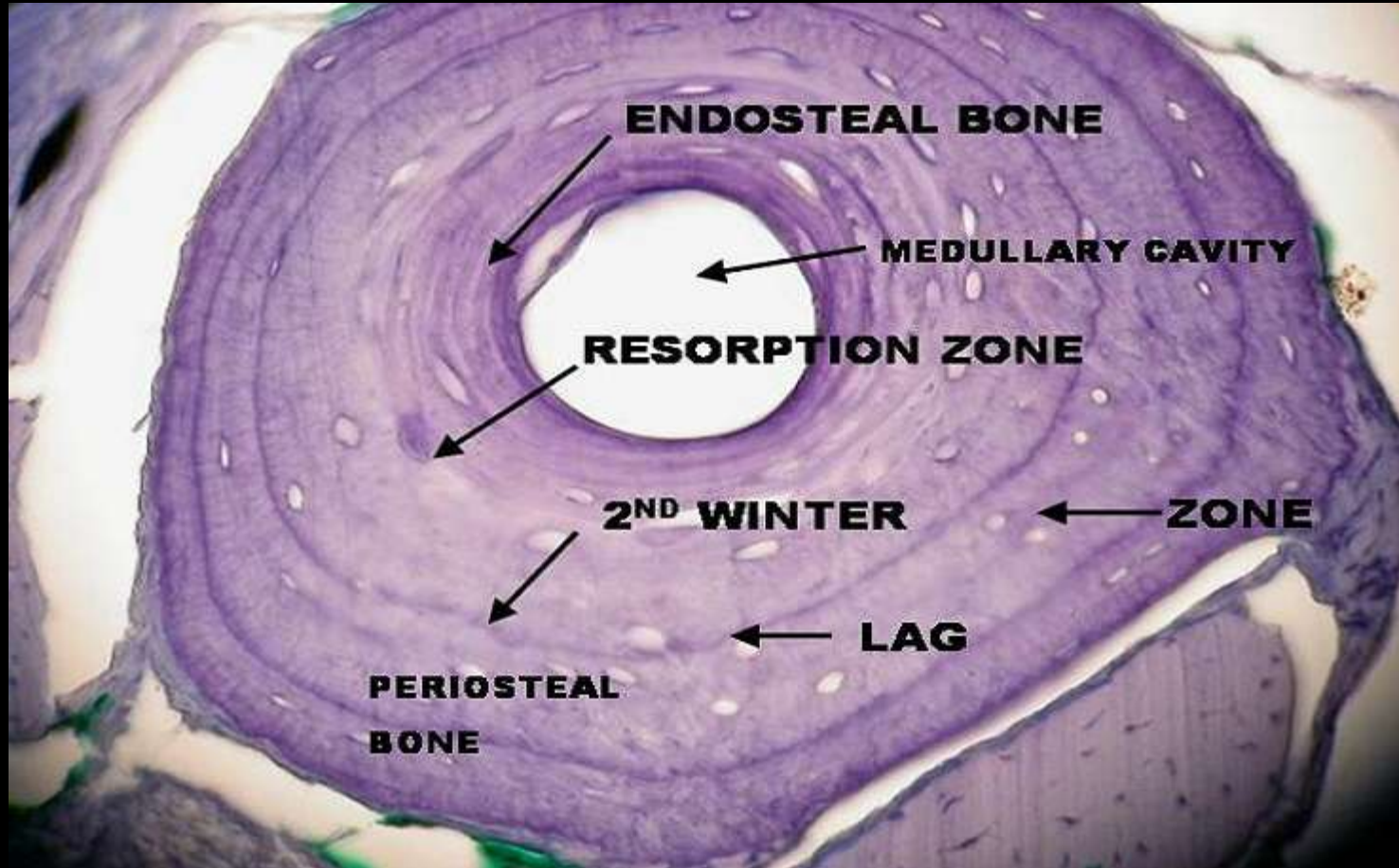
Hatchlings



1 2 3 4 5 6 7 8 9 10 11 12

Month

# Population Demography via Skeletochronology



# Sections of Femur and Fibula

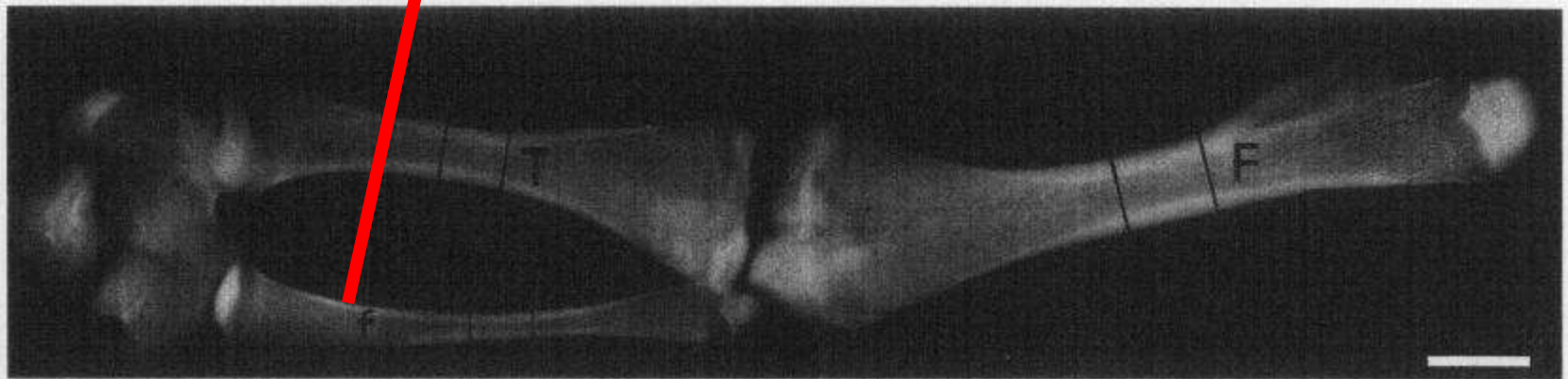
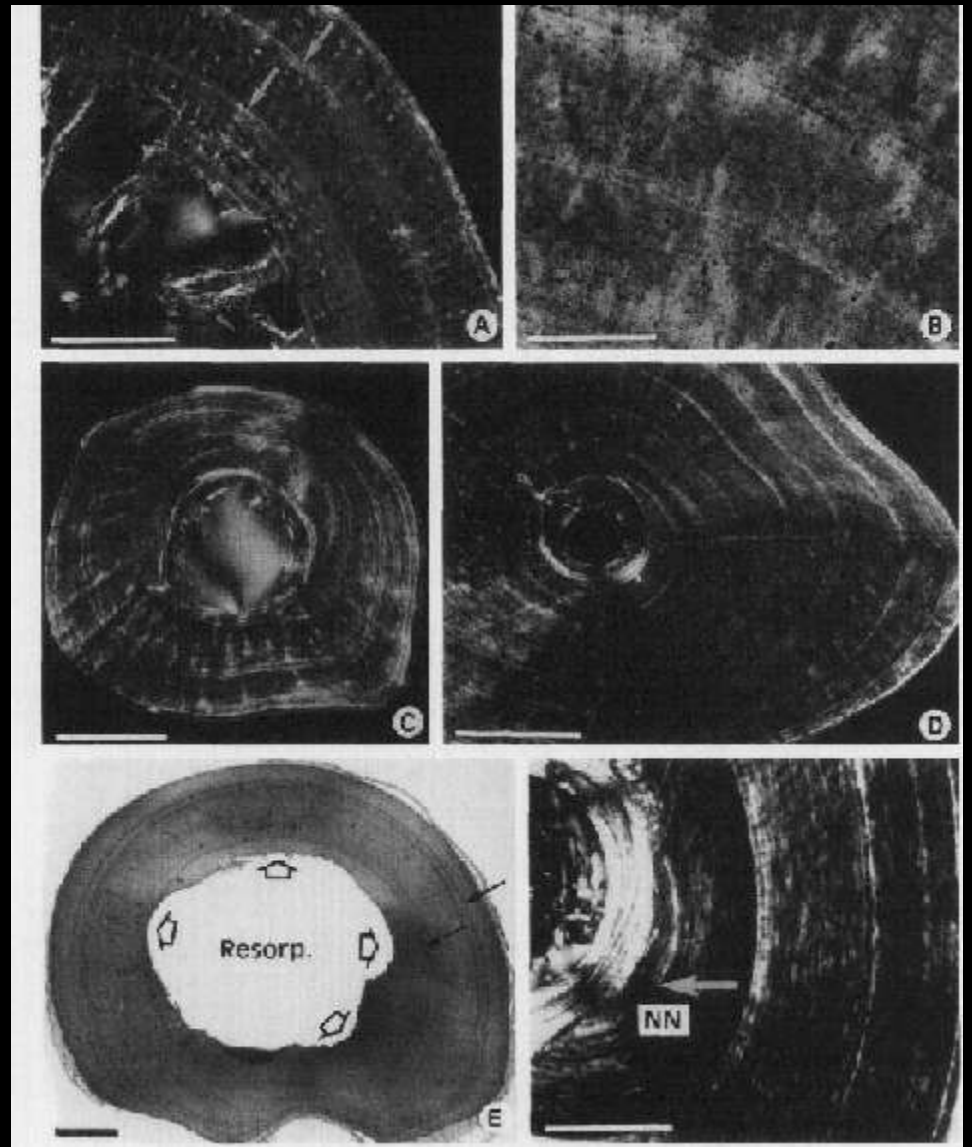
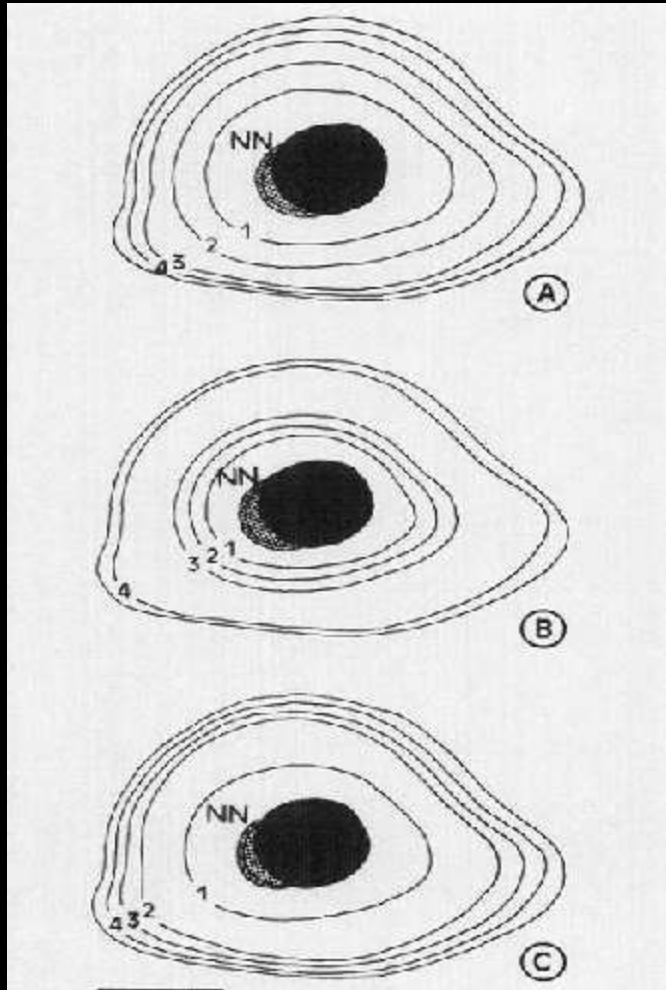
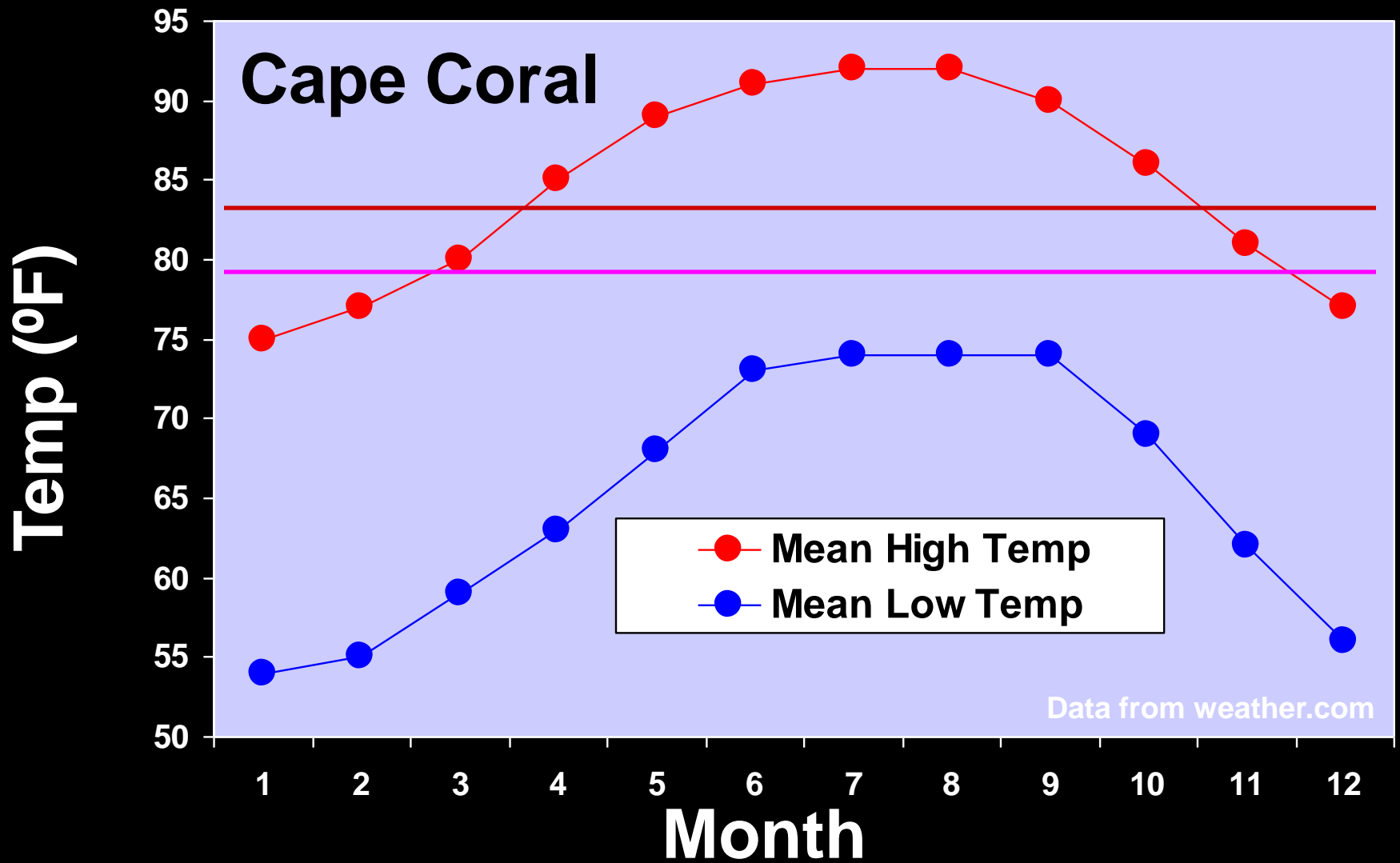


FIG. 1. X-ray photograph of the femur (F), tibia (T) and fibula (f) of the Nile monitor, *Varanus niloticus*. The lines indicate the limits of bone sampling for histology. Bar = 1 cm.

# Castanet and De Buffrénil 2000

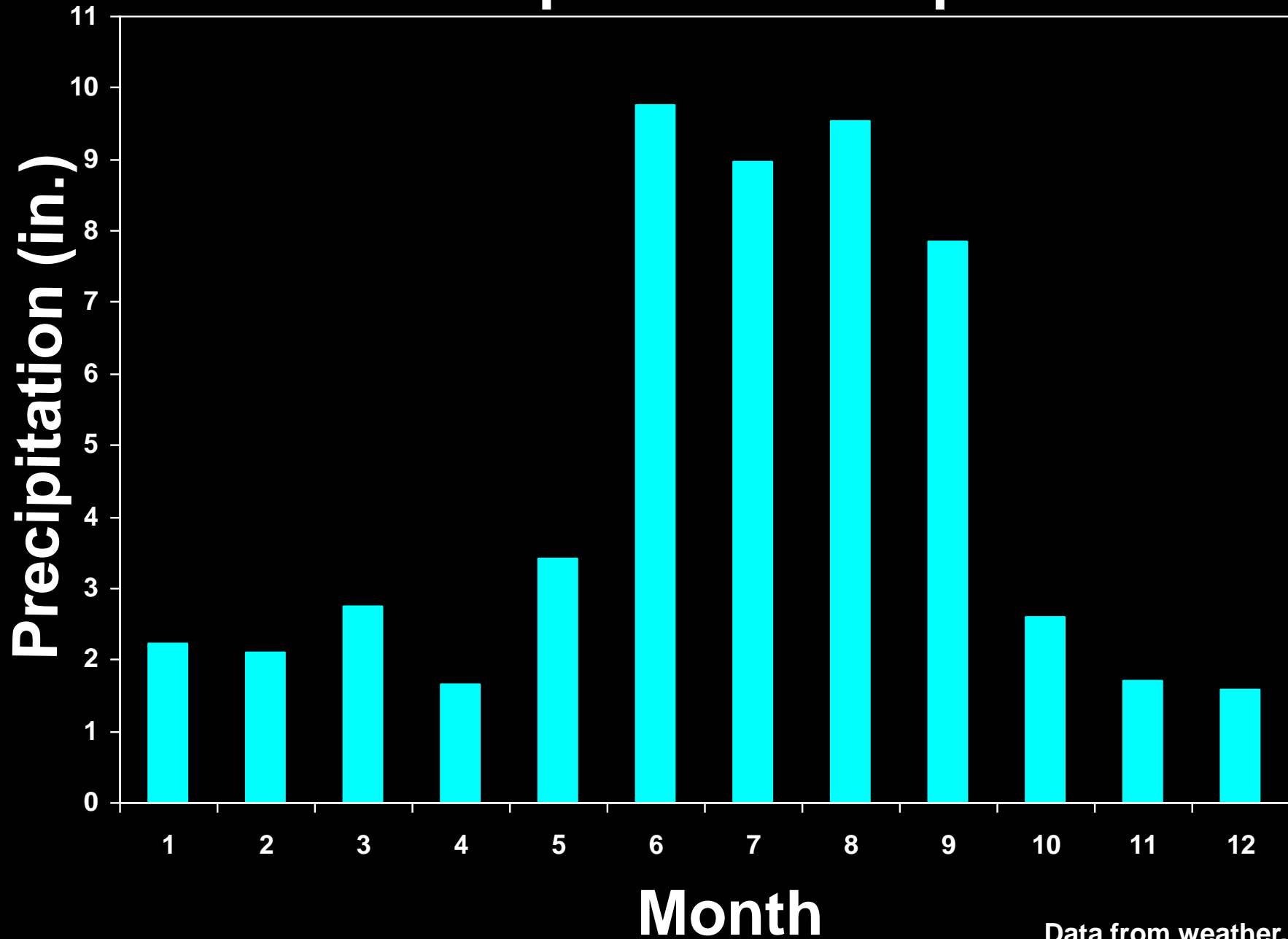




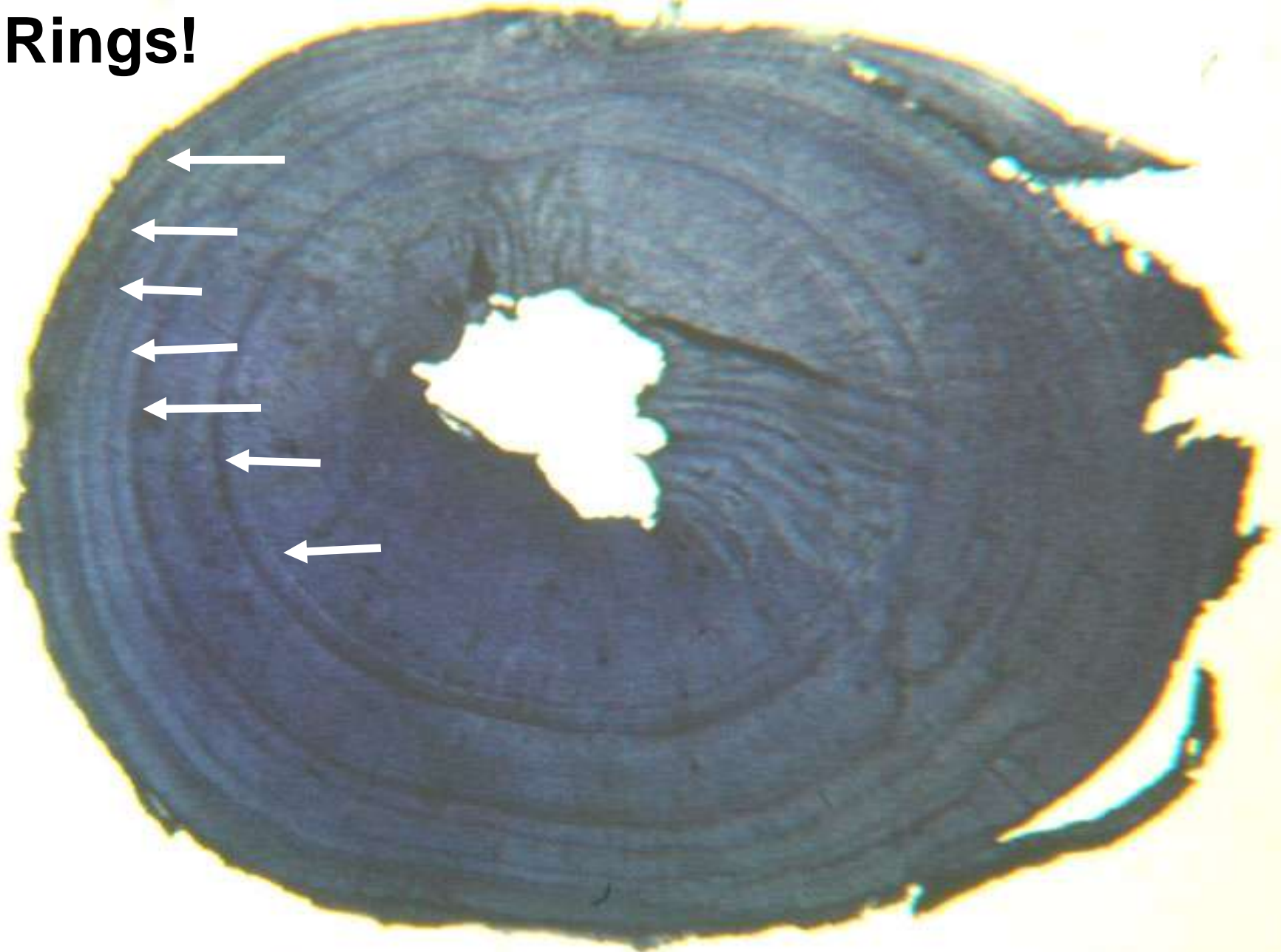
— = Mean body temperature of African Nile monitors

— = active when temp is above 78.8°F

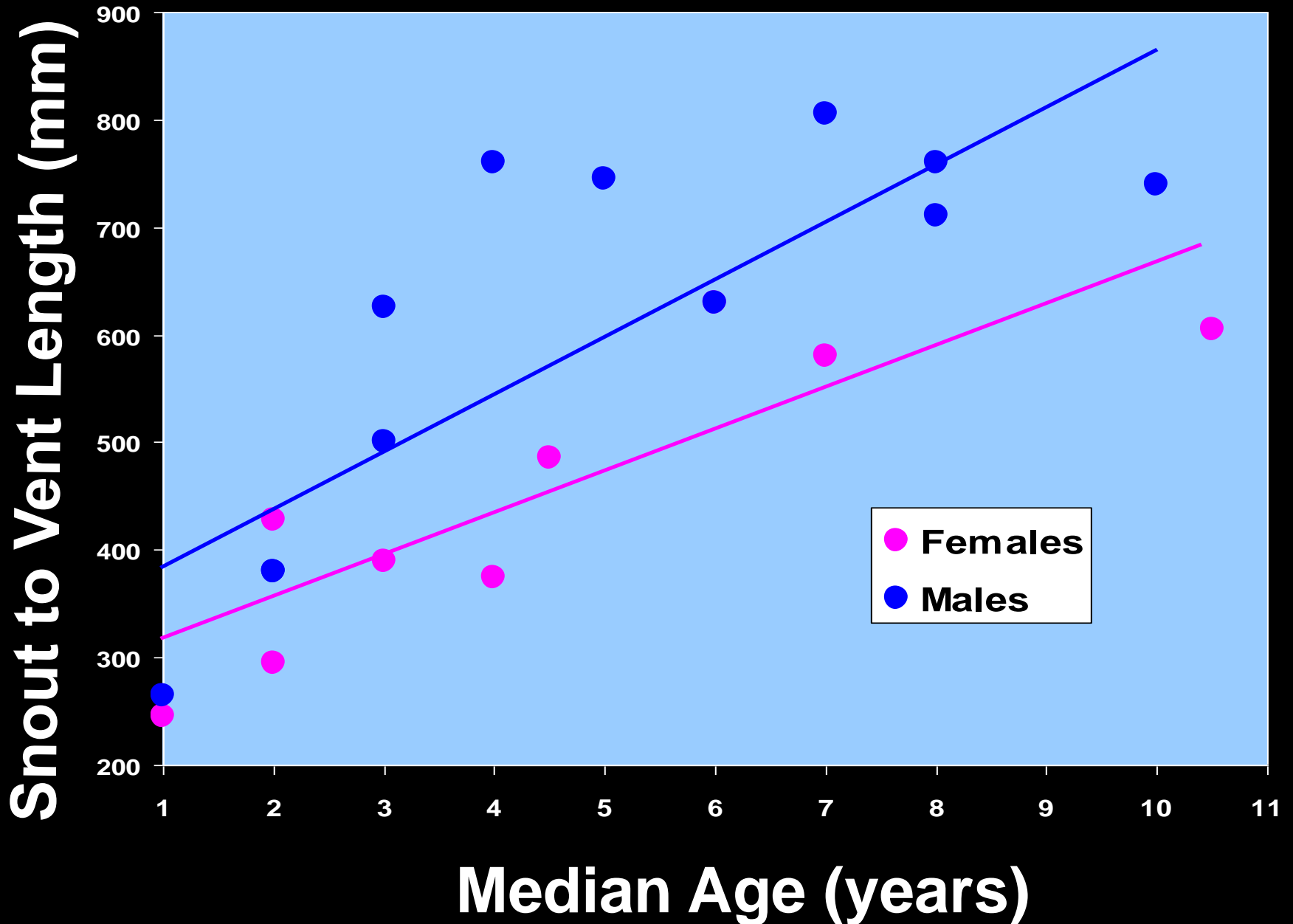
# Annual Precipitation in Cape Coral



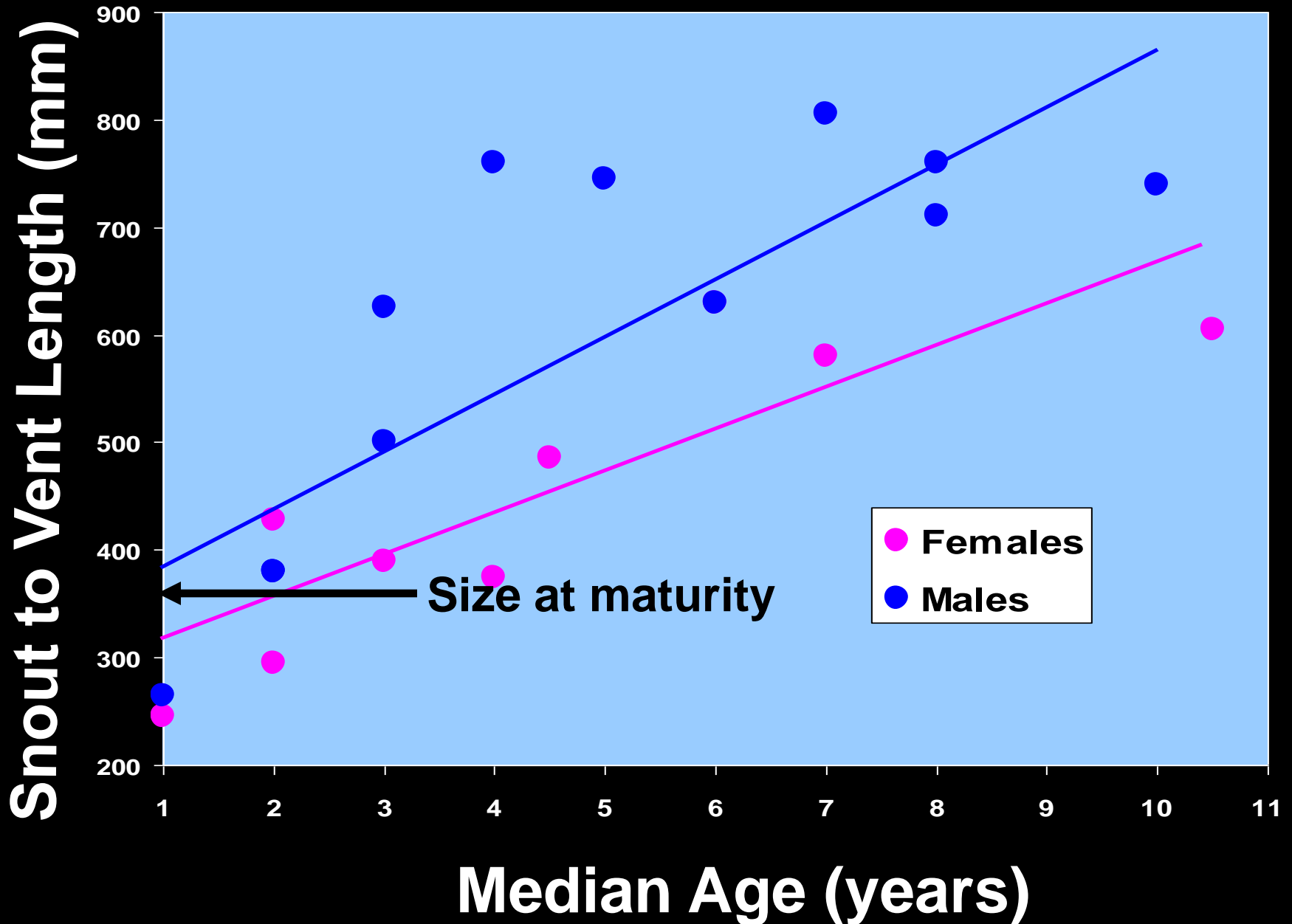
**Rings!**



# Size-Age Curve



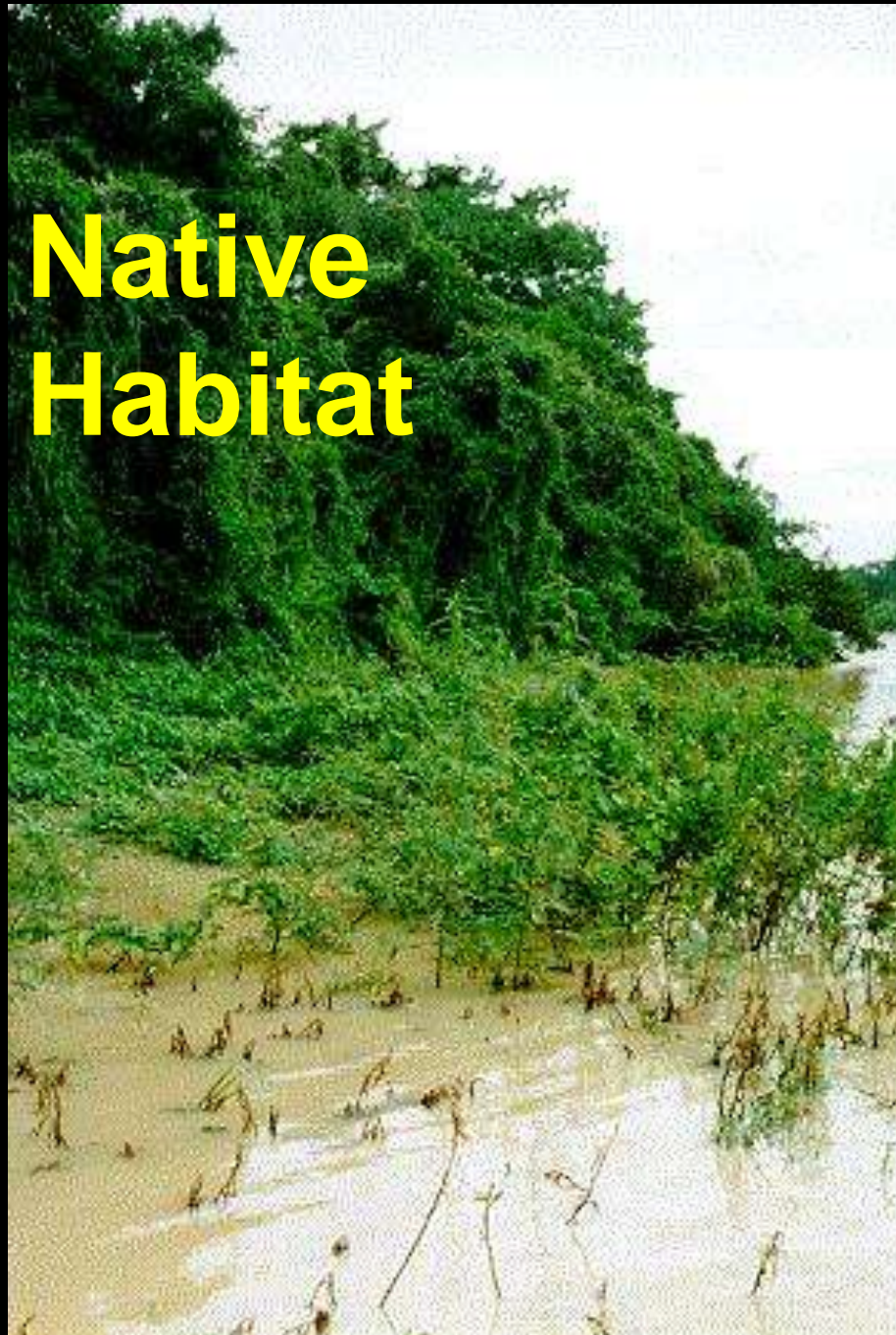
# Size-Age Curve



# Habitat Preferences: “Habitat” in Cape Coral



# Native Habitat





# Hadejia - N'Guru Wetlands, Nigeria



# Lake Chad, Africa





**TRAPPED MONITOR**



**CAPTURES OF ONE DAY**

## **2. Impacts**

# Impacts = Predation



# Invertebrates



**Oak Toad (*Bufo quercicus*)**



# 16 Cuban treefrogs!!



# *Anolis sagrei* (adults and eggs)





# Pygmy Rattlesnake



# Whole Clutches of Turtle and Snake Eggs

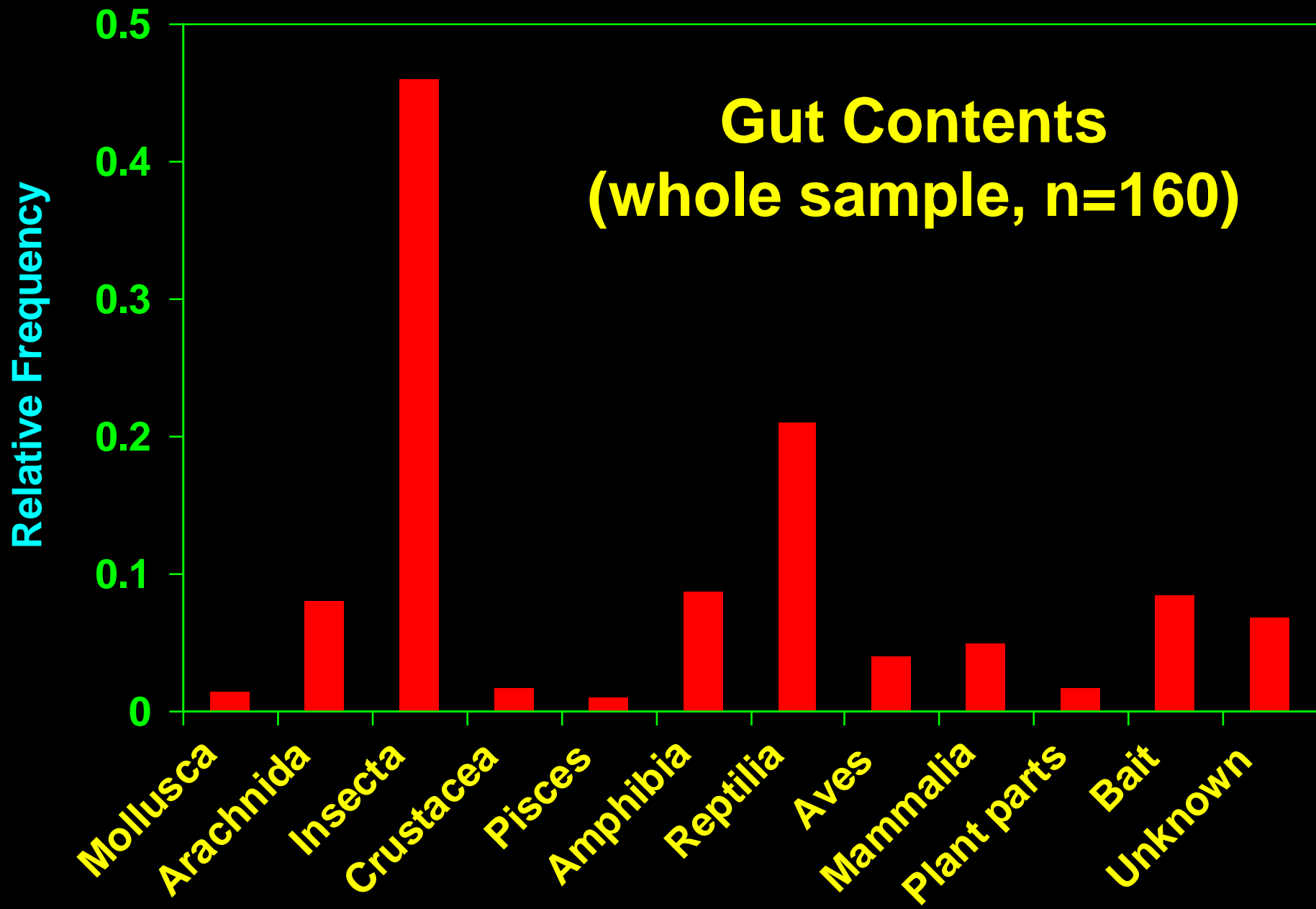


# Bird Feathers and Mammal Hair



# Florida Burrowing Owl





**Are introduced bugs, lizards, and frogs  
subsidizing the diets of Nile monitors?  
'Invasional Meltdown' (Simberloff and Von Holle 2000)**



# Species Potentially at Risk

Amphibians, lizards, snakes

Freshwater and box turtles

Gopher tortoises?

American alligators?

Ground-nesting birds

Burrowing owls

Wading birds, rookeries

Small mammals



# **3. How to Find Them (and then kill them)**



**Look for wetlands with breeding habitat nearby**



# Habitat Surveys





# Track Surveys















# Burrow Surveys



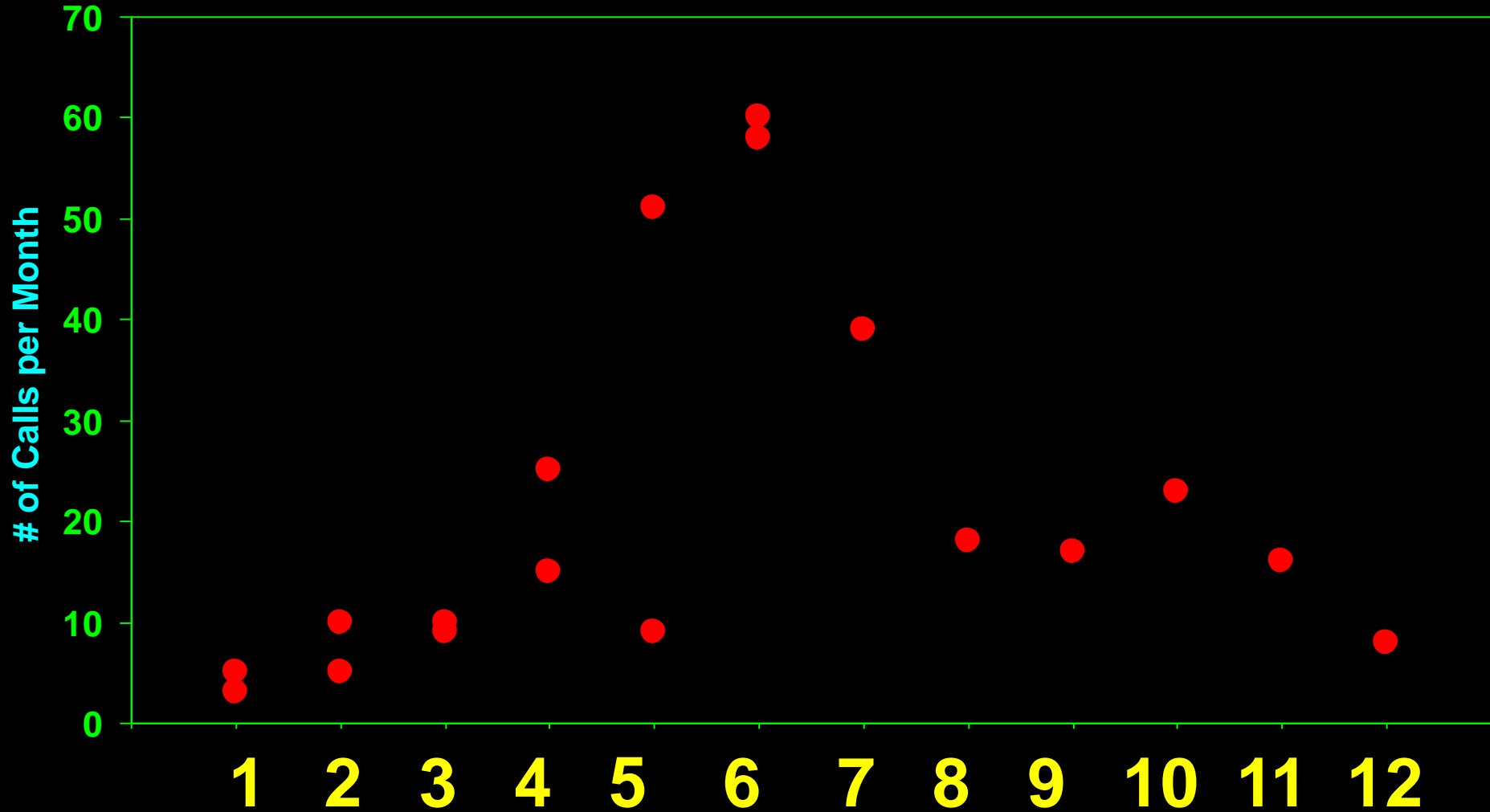
Gregg Klowden

**Ask the Public!**





# Frequency of phone calls by month



## **4. How to catch them**

# The hand grab



# Noose Mats



**Hand-catching adults is ineffective at best**



# Havahart Traps (Models 1078 and 1079)





WILDLIFE RESEARCH  
DO NOT DISTURB

DECONTAMINATED WATER STORAGE TANK NO. 1









**Baits: rotting squid, chicken, and fish**



**Acetaminophen as a  
Poison Bait (USDA-WS)**

**Now what?**



## **5. How to euthanize them**

# Ethical Euthanization



# Transfer to Kill Tube



JUL 18 2007



**Isoflurane  
Chloroform  
CO<sub>2</sub>**

**JUL 18 2007**

## **6. What to do with the carcass**

# Data to Collect



**Dig in!**



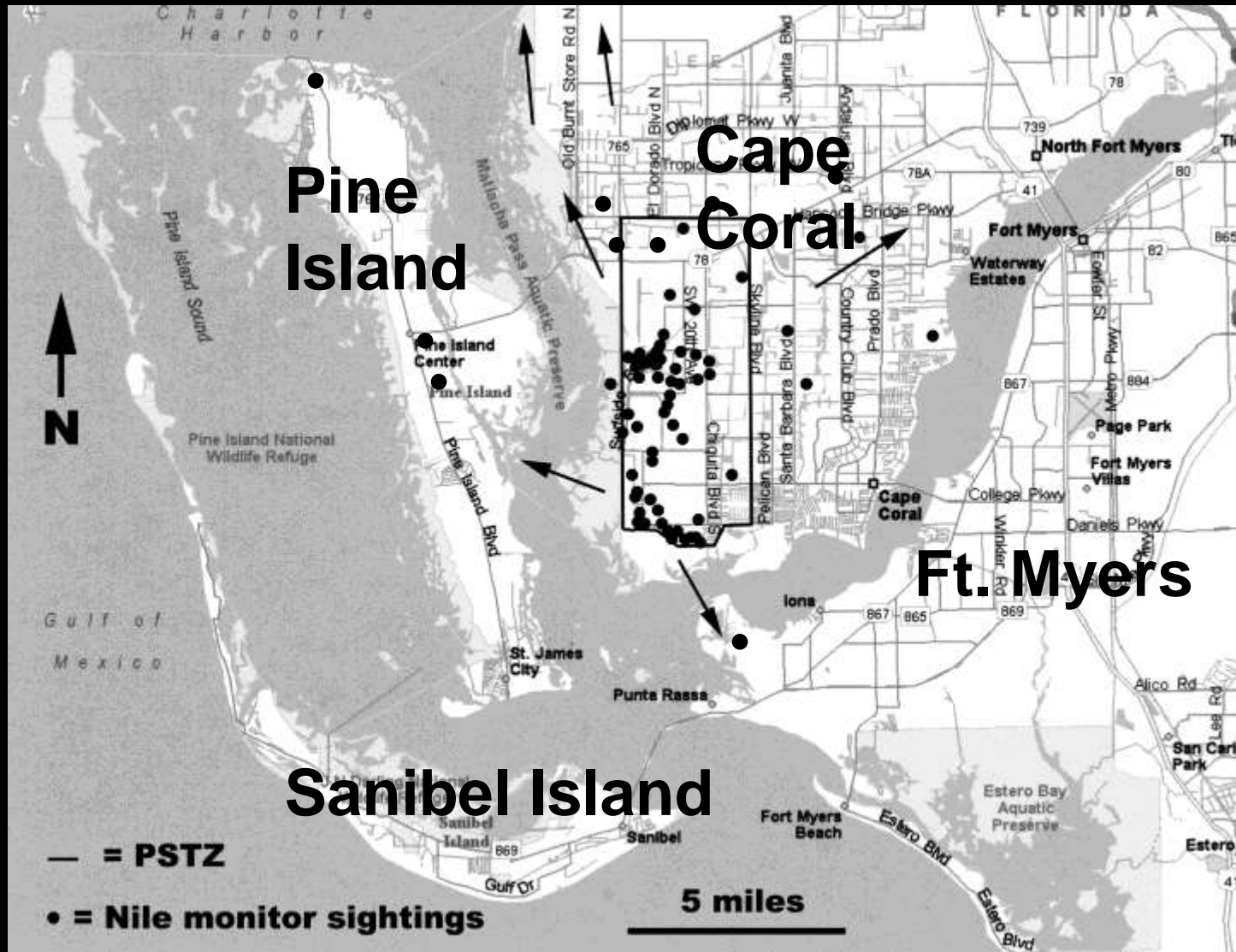
**Size, shape, color, pattern**  
**Abdominal fat body weight**  
**Reproductive condition**  
**Tissues for genetics & ecotox**  
**Stomach content analysis**  
**External & internal parasites**

**\*\*Pursue questions that lead to eradication!!\*\***

## **7. Other Issues:**

- How to document progress**
- The utility of radiotracking**
- Public education & outreach**
- Recruiting the public to help**

# 8. Sanibel Island EDRR: A Potential Success Story



# **EDRR on Sanibel Island**

- 1. Motivation of the City of Sanibel**
- 2. Focus on breeding individuals**
- 3. Extensive surveys for nesting habitat**
- 4. Agency involvement (FWS, SCCF)**
- 5. Public education and outreach**
- 6. Sufficient, regular, follow-up**
- 7. Long-term commitment**
- 8. Willing to help eradicate the source**

# Importance of Early Detection, Rapid Response, and Accurate Identification



**Monitor Lizard from West Palm Beach**



## **CISMA and ENP Issues:**

- 1. Propagule Pressure**
- 2. Canals and corridors**
- 3. Vast, ideal habitats**
- 4. Remote locations**
- 5. Lizards will be missed**

**\*\*Focus on Reproducing Lizards!\*\***

**Happy  
Hunting!**



LeatherClassic.