

Post-Release Success of Captive Bred Louisiana Pine Snakes



The Louisiana pine snake (*Pituophis ruthveni*)

- ✦ Most endangered reptile in the U.S.
- ✦ 1st and only SSP for a U.S. reptile
- ✦ Only 6% of SSP's are for native wildlife
- ✦ Precarious number in the wild
- ✦ Historically, 154 individuals
- ✦ Current captivity population status +/-70

Locality of Louisiana pine snakes



- ✧ Longleaf pine forests
- ✧ West-central Louisiana
- ✧ East Texas
- ✧ Northeast corner of Florida Parishes, LA

Pituophis ruthveni

Optimal Habitat

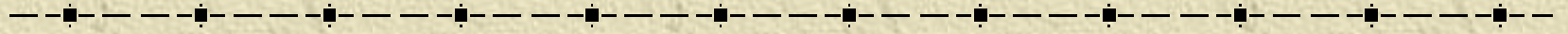


- ✦ Long leaf pine forests
- ✦ Deep, sandy soil
- ✦ Lack of midstory and herbaceous understory vegetation
- ✦ Grassy understory

Pituophis ruthveni Habitat



Historically, wildfires created and maintained these critical conditions for optimal habitat.



Habitat Management Trends

- ✦ Historically - wildfires
- ✦ Contemporary times - prescribed burning
- ✦ Presently - Herbicides

Loblolly/Slash Pine Plantations




- ✦ Forest managers are turning away from prescribed burns.
- ✦ Herbicide management- now more prevalent
- ✦ Produces lumber and paper products
- ✦ “Industrial forests”

Current Management

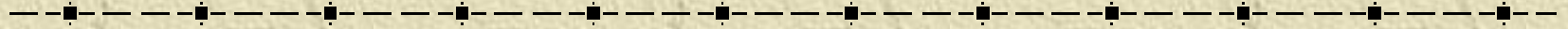


- ✦ Fire suppression
- ✦ Dense midstory
- ✦ Eliminates grassy understory



It is hypothesized that these new management practices are partly responsible for the recent decline in the Louisiana pine snake population.

Consequences of Herbicide Application on Slash Pine and Loblolly Pine Plantations



Fire suppression

Dense midstory is created

eliminates grassy understory

pocket gophers decline

LA pine snakes decline


Why perform this study?

- ✦ Geographic isolation - makes species more vulnerable
- ✦ Human encroachment - increasing
- ✦ Native species – “Backyard” vs. Exotic SSP
 - Close proximity of the animal in question to the parties involved
 - Less problematic to initiate and maintain relationships




What is the purpose of this study?

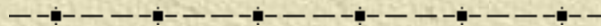




To determine the response
of captive bred and reared
Louisiana pine snakes to
repatriation into their
native habitat



We are attempting to
create a connection
between the current
Louisiana pine snake
breeding program in zoos
and future efforts to
preserve this snake in its
natural habitat.



Project initiation

- ✦ Managed by Memphis Zoo and Audubon Zoo
- ✦ Principal investigator- Dr. Steve Reichling
- ✦ Conservation Endowment Fund grant

- ✦ September 2000- the project began.

Methodology

- ✦ Funding and data from Memphis Zoo, Audubon Zoo, and AZA
- ✦ Lineage analysis
- ✦ Selective breeding
- ✦ Field work

Captive breeding



- ✦ Surgically implanted 19 captive bred and raised Louisiana pine snakes with radio transmitters at Memphis Zoo
- ✦ Performed rigorous health screens prior to their release

Pine snake hatched at Audubon Zoo



Six sites, on three patches of land
were selected for release in Louisiana.

✦ Kisatchie National Forest

✦ Winn and Natchitoches Parish

✦ International Paper land, Bienville Parish

Two replicate studies were performed.

1st Study

- ✦ September 2000 - 1st release : 4 snakes
- ✦ Early 2001 - 2nd release : 5 snakes
 - Monitored 9 snakes over 18 months

2nd Study

- ✦ 2002 - 1 release: 10 snakes
 - These snakes are presently being monitored.

?Summary

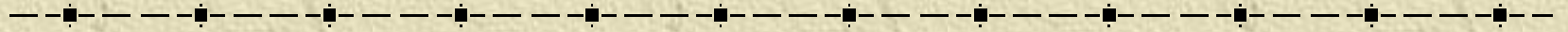
- 19 adult snakes were released and monitored from Sept 2000 – presently.
- Snakes were released over 6 separate sites
- The 6 sites – comprised of 3 experimental replicates

The 6 study sites

- ✦ Evenly distributed over 2 types of managed lands:
 - ◆ Fire-suppressed (Herbicide application)
 - ◆ Regularly burned



Relocating the snakes



- ✦ Located through radio telemetry
- ✦ Relocated at 4 – 6 week intervals



✦ Dr. Reichling
with radio
transmitter



After snakes were captured

Various samples were taken:

- ✦ Weight and length (SVL cm) recorded
- ✦ Blood, cloacal swabs and fecal samples

Weight and length measurements



Blood, fecal, & cloacal samples



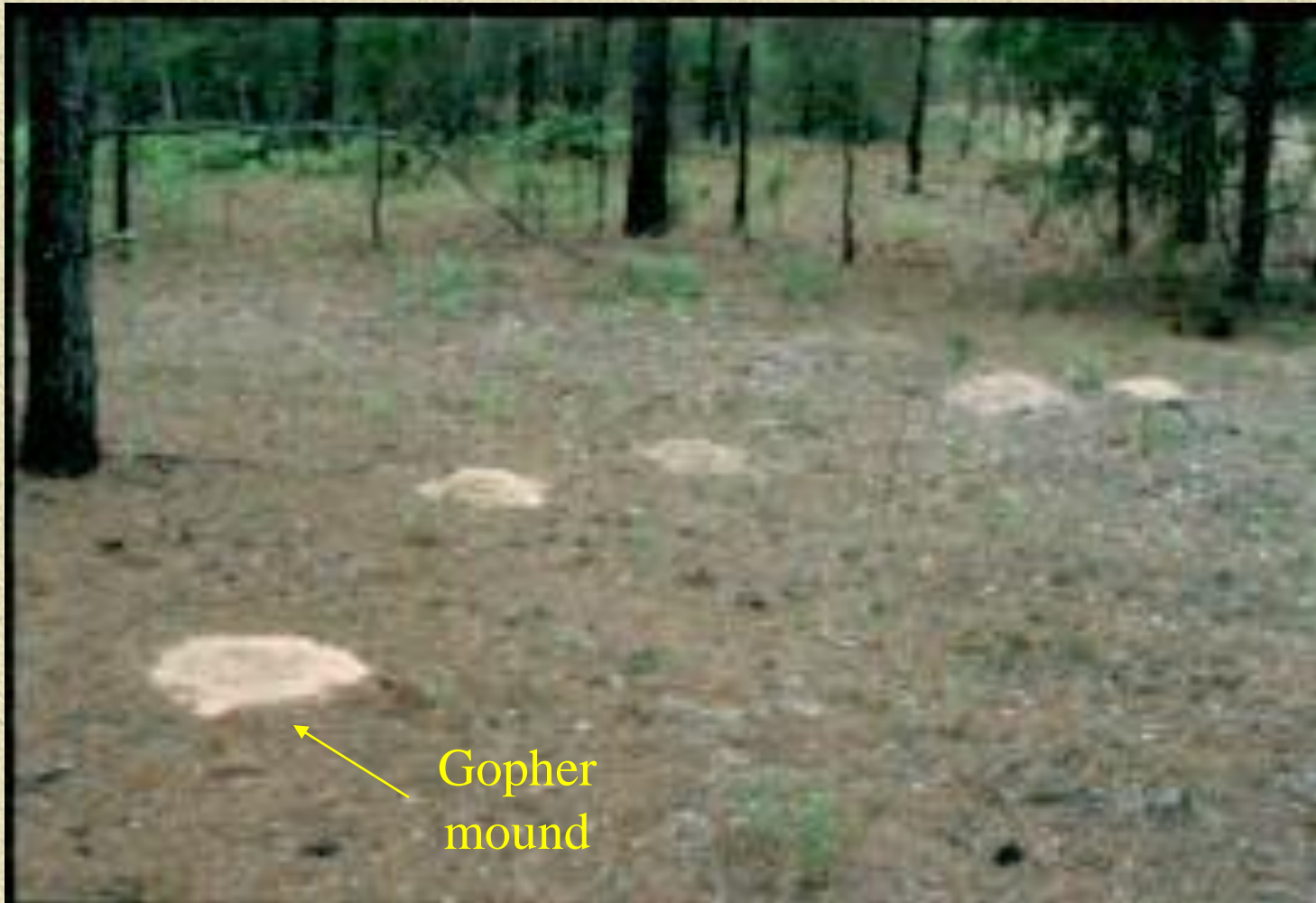
What is the radio telemetry showing us?

- ✦ Home range
- ✦ Release site fidelity
- ✦ Relative success rate of each pine snake released onto the two types of managed land
- ✦ “Dependency” on pocket gopher burrows

Telemetry findings

- ✦ Snakes are spending the majority of time in Baird's pocket gopher (*Geomys breviceps*) burrows.
- ✦ Not only inhabiting burrows, but we expect to confirm (through more fecal samples) they're predating on the gophers.

Almost every snake released is found within or near a pocket gopher burrow.





Pocket
gopher
burrow



They are actively using the extensive burrow systems.







Results: pre-release vs. post-release figures

- ✦ Variable
- ✦ Still being collected and analyzed

So far we have found:

- ✦ Blood samples show significantly decreased protein levels.
- ✦ Blood analysis shows shifts in differential leukocyte counts.
- ✦ Snakes have increased in length, but decreased in mass.- All specimens have lost weight.
- ✦ 5 mortalities to date

More Results

- ✦ Distinct differences in distance traveled between male and female specimens:
 - Males in industrial sites drift farther than males in more natural areas.
 - Females show greater release site fidelity in industrial areas.

So what does this mean?


- ✦ These captive-reared snakes are utilizing much smaller area home ranges compared to home range data for native Louisiana pine snakes.
- ✦ Significant protein level changes suggest that the snakes have a large reduction in food consumption after release - many are found emaciated.
- ✦ We suspect that they are unable to subdue pocket gophers, despite their instinctive ability to locate them.

More conclusions

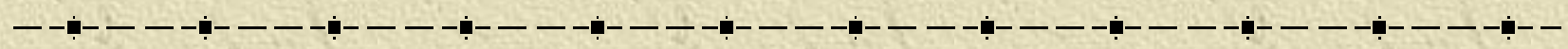
- ✦ Shifts in leukocyte counts (that point to inflammation pathology)
 - may be attributed to the implanted transmitters
- ✦ 5 mortalities – possible explanations:
 - Some snakes are resurfacing in winter.
(unnatural behavior)
 - finding partial/skeletal remains and torn radio transmitters under probable raptor perches suggest bird of prey as likely cause of death.

Transmitter and skeletal remains



- 
-
- ✦ This study is not complete.
 - ✦ As the sample size continues to increase, trends in blood chemistry changes and statistical comparisons will eventually be drawn.
 - ✦ Data will be collected until April 2004.
 - ✦ This data will enable us to determine optimum sites for releasing the most suitable captive bred snakes.

After this is established, a large-scale reintroduction program could begin to preserve this rare species.





Any
Questions?

AUG 26 2002