Turtle Stewardship and Management Workshop

Ontario Multi-species Turtles at Risk Recovery (OMSTARR)

Toronto Zoo

March 17-19, 2008

WHY WOULD ANYONE WANT TO MANAGE TURTLES,

AND WHY SHOULD ANYONE ELSE CARE?

TURTLE CONSERVATION and MITIGATION

STEP 1

DON'T BE DISCOURAGED BY:

politics and politicians

greed and self-serving attitudes

other agendas

TURTLE CONSERVATION and MITIGATION

STEP 1

DON'T BE DISCOURAGED BY:

RON BROOKS

How do we

Mitigate for this?

Human Impacts

Environmental Pollution

How do we

Mitigate for this?

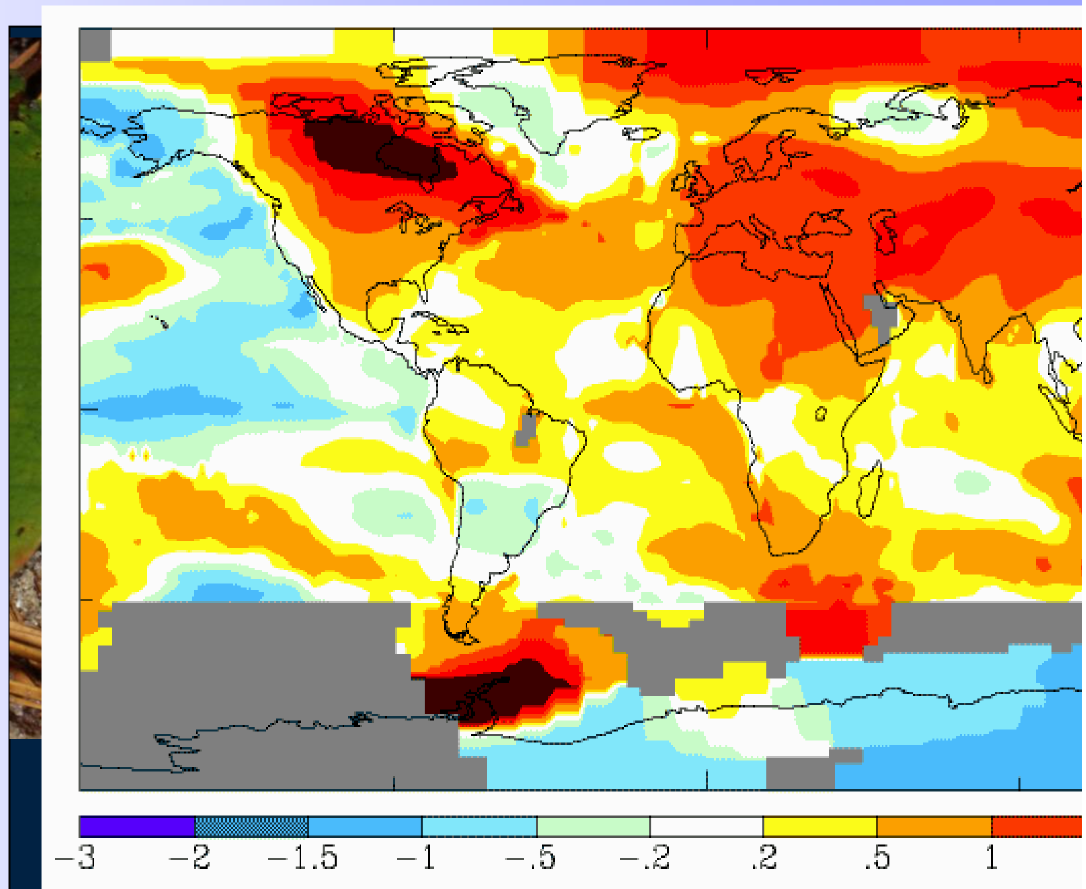
Human Impacts

Disease and Parasites

How do we

Mitigate for this?

Human Impacts



Climate Change

How do we

Mitigate for this?

Human Impacts

Introduced Species

How do we

Mitigate for this?

Human Impacts

Habitat Loss or Alteration

How do we

Mitigate for this?

Human
Impacts

Unsustainable Use

Overharvesting

from James R. Spotila. 2004. Sea Turtles. Johns Hopkins University Press

ASIAN TURTLE CRISIS

TERRAPIN . . . A Chincoteague Island waterman checks the diamondback terrapin in his pound. He sells about 4,000 a year to eastern clubs and hotels. The traditional Chesapeake delicacy is today mainly a showcase dish at elaborate dinners. Once sold for $4 apiece terrapin now bring only about $18 a dozen. Most are caught in marshes with nets.

Kiawah Island ghost trap

LESSONS IN TURTLE CONSERVATION

STEP 1

DON'T BE DISCOURAGED BY:

politics and politicians

greed and self-serving attitudes

other agendas

TURTLE CONSERVATION and MITIGATION

STEP 2

THINK POSITIVELY

1 SCIENCE-BASED EDUCATION

2 INVOLVE OTHERS

3 ???

CONSERVATION

↑

PUBLIC EDUCATION

↑

ECOLOGICAL

Inventory, Monitoring, Research

TURTLE CONSERVATION

requires

SCIENCE-BASED EDUCATION

TURTLE CONSERVATION

SCIENCE-BASED EDUCATION

requires involving others

SCIENTIFIC COMMUNITY
CONSERVATION BIOLOGISTS
LAND MANAGERS
GENERAL PUBLIC

INVOLVE OTHERS IN YOUR

TURTLE RESEARCH

AND

CONSERVATION EFFORTS

THANKS TO
SREL STUDENTS, POSTDOCTS, TECHNICIANS, VISITING SCIENTISTS CO-AUTHORS AND COLLABORATORS

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STEVE GODLEY
TIM ZIMMERMAN
PATRICIA WEST
LAURA GIBBONS
HENRY WILBUR
ERIC PIANKA


D12

INVOLVE OTHERS IN YOUR RESEARCH EFFORTS


Justin
Congdon
SREL


Jeff
Lovich


Whadya mean it's time to check turtle traps?
Jeff
Justin
HEVROLET
YSY


ECUADOR


GALAPAGOS


ECUADOR

INVOLVE OTHERS

SCIENCE-BASED PUBLIC EDUCATION

Kinosternon baurii
or
subrubrum?

DISTRIBUTIONS IN SPACE AND TIME OF REPTILES ON THE SAVANNAH RIVER PLANT IN SOUTH CAROLINA

by

MICHAEL JAMES DUEVER

B. S., The University of Illinois, 1964

A Thesis Submitted to the Graduate Faculty

of the University of Georgia in Partial Fulfillment

of the

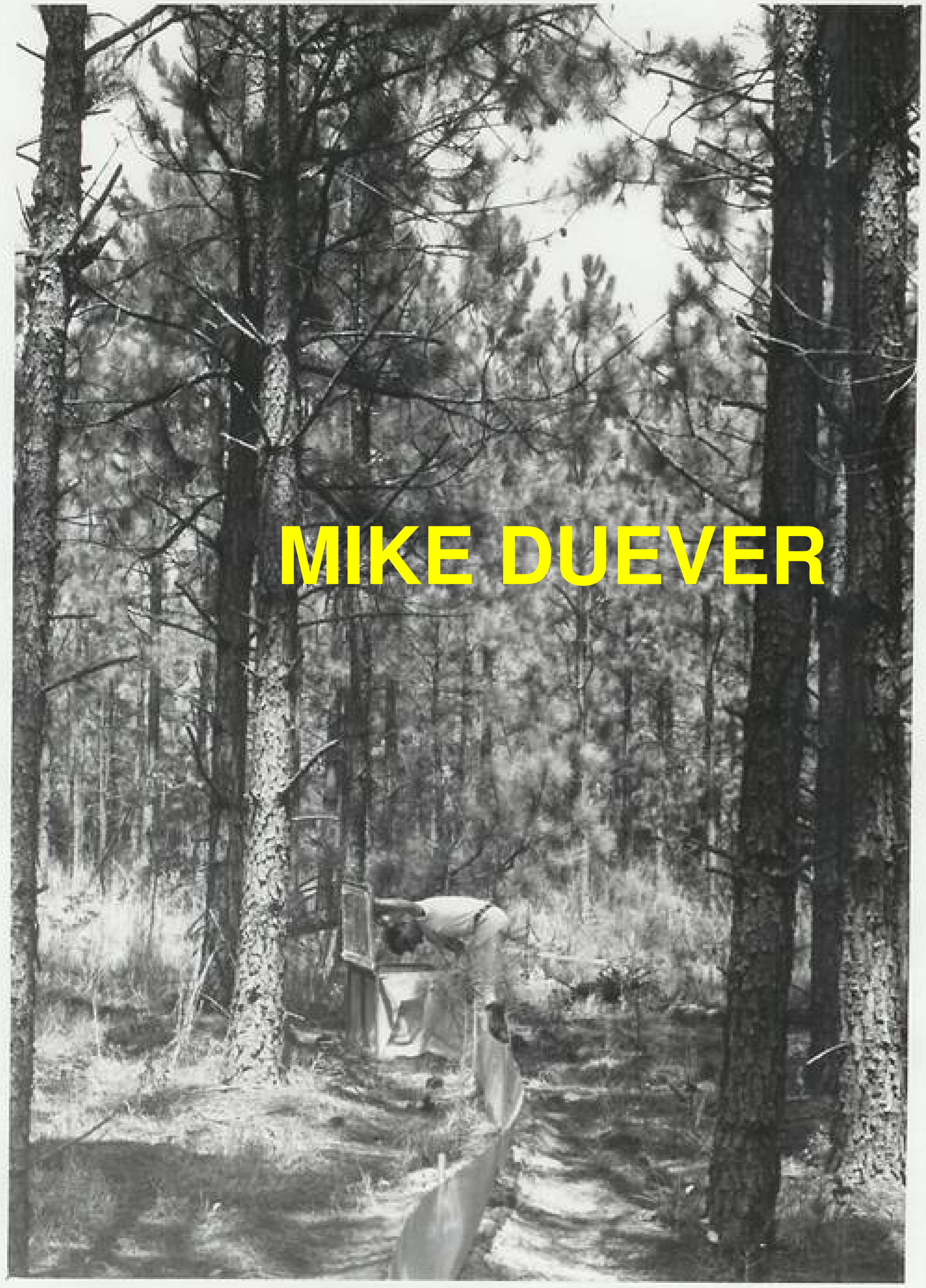
Requirements for the Degree

of

MASTER OF SCIENCE

ATHENS, GEORGIA

1967



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THE STRIPED MUD TURTLE (KINOSTERNON BAURI GARMAN) IN SOUTH CAROLINA

Michael Duever

A collection of mud turtles from the Atomic Energy Commission Savannah River Plant (SRP) near Aiken, South Carolina included several individuals of the striped mud turtle (*Kinosternon bauri*). This species has not been recorded outside of Florida until recently, when it was found along the south Georgia coast (Wharton and Howard, 1971). The SRP collection contains 56 common mud turtles (*Kinosternon subrubrum*) and 5 other mud turtles which show characteristics typical of *K. bauri*. Harry W. Freeman (pers. comm.) collected 20 of these specimens between 1952 and 1957, including one juvenile *K. bauri*. I collected the remaining 41 specimens between 1965 and 1968, four of which are *K. bauri*. Freeman's specimens are presently in the collection of the Charleston Museum, and mine are in the collection of the University of Georgia Museum of Zoology.

Uzzell and Schwartz (1955) described *K. bauri* as having a carapace coloration varying from an almost uniform light brown (unpigmented) to one that is dark brown, with or without three distinct light dorsal lines. The dorsal lines are virtually indiscernible in the unpigmented forms, and lightened areas marking the positions of the underlying bony sutures may be visible through the unpigmented laminae. They describe the head coloration as a varying from gray to black, with or without sharply-defined canthal and angular stripes. Of the five *K. bauri* from the SRP, one adult female (UG 2405) has three poorly-developed shell stripes, while two individuals (UG 2406-2407) have only a poorly-developed mid-dorsal stripe. The other two individuals (UG 2404 and CM 211), including the juvenile, have no shell stripes. All have light brown shells with lighter areas indicating the positions of the bony sutures. The head pattern on all five individuals is composed of distinct canthal and angular stripes on a predominately black background.

The SRP *K. subrubrum* show no indication of shell stripes. The head pattern varies and, in a few cases, approaches that of *K. bauri*. Examination of the head patterns of the 56 *K. subrubrum* reveal what appear to be four major types: no yellow (1 individual), scattered head spots (33 individuals), angular head stripe with few-to-many head spots (13 individuals), and elongate head spots (9 individuals). Thus there appears to be a continuum between these two species of mud turtles so far as head and shell striping characteristics are concerned. In an effort to further differentiate these two populations of mud turtles, a number of shell measurements were made including carapace length and width, and shell height. A comparison of the proportions of all combinations of these measurements showed no distinct differences between species.

Kinosternon bauri on the SRP is restricted to the bald cypress-tupelo gum swamps bordering the Savannah River, while *K. subrubrum* is widely distributed in all aquatic habitats. Despite the distance involved, the presence of *K. bauri* is not unexpected since the lowland habitats and herpetofauna (Duever, 1967) found on the SRP have much in common with those of northern and central Florida.

ACKNOWLEDGEMENTS

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Michael Duever

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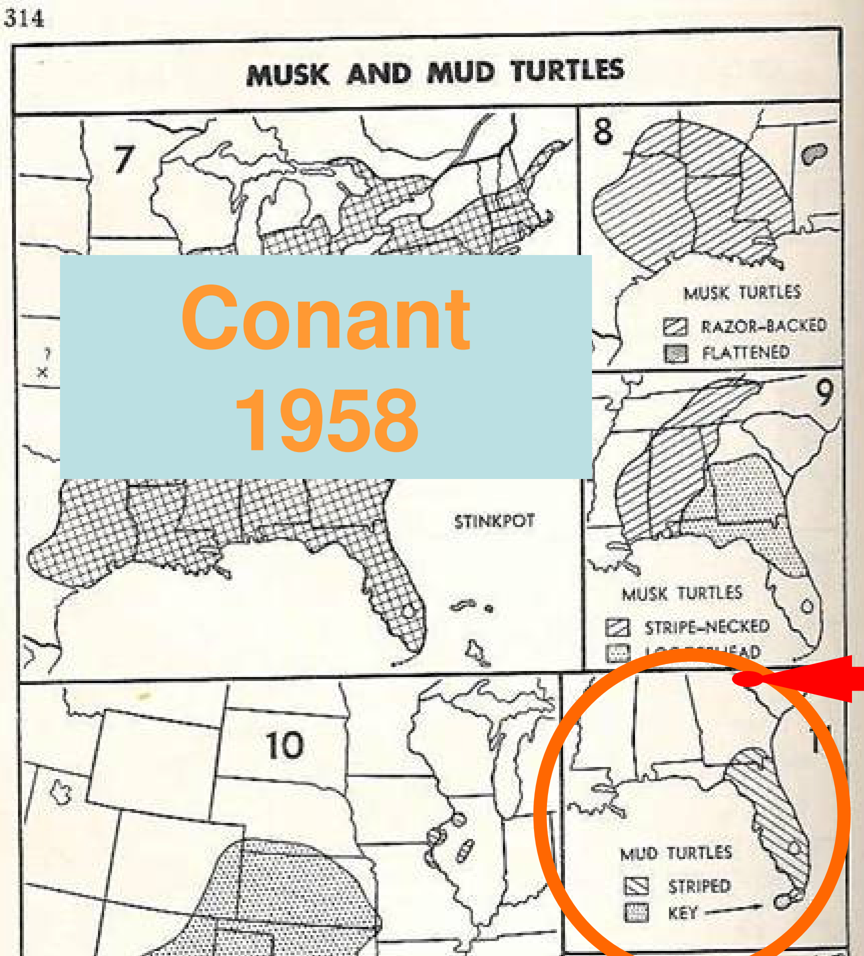

Conant 1958

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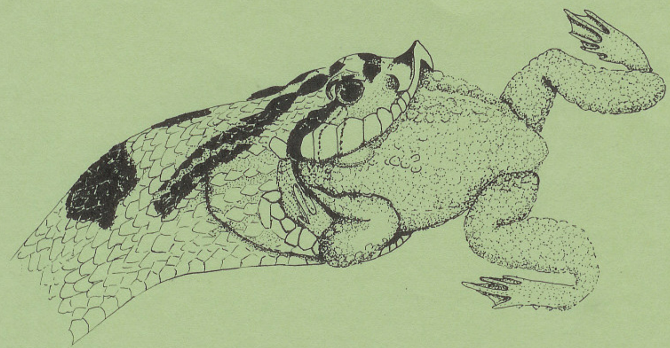
SRO—NERP—2

The Reptiles and Amphibians of the Savannah River Plant



by
J. Whitfield Gibbons
and
Karen K. Patterson
Savannah River Ecology Laboratory
Aiken, South Carolina

A PUBLICATION OF DOE'S SAVANNAH RIVER PLANT NATIONAL ENVIRONMENT RESEARCH PARK

NOVEMBER 1978

Copies may be obtained from
Savannah River Ecology
Laboratory

Hyla cinerea—Abundant. Large choruses can be located around Par Pond, some ponds and Carolina bays, and along the river swamp during spring and summer. Choruses seem less dependent on rain than most other species and will frequently call at night even after a several day dry period.
Hyla gratiosa—Locally common. Occasional specimens are found on highways during rainy periods in the spring. Isolated choruses have been located along the river swamp and at Karen's Pond (old SREL site).
Hyla femoralis—Uncommon. Small numbers of calling individuals have been noted at a variety of sites throughout the SRP but large choruses have not been reported. A consistent calling site is the artesian well located west of Brinkley Road.
Hyla squirella—Common. Large choruses of this ubiquitous species are seldom heard although individuals are frequently encountered on highways at night or during rainy periods.
Hyla chrysoscelis (and *H. versicolor?*)—Common. Primarily a summer caller, individuals might be encountered anywhere on the SRP. A few large choruses have been reported.
Hyla avivoca—Locally common. The greatest concentrations of this species appear to be in the river swamp, particularly in association with cypress trees. A large chorus has been observed behind the Hog Barn.
Pseudacris triseriata, *P. nigrita* and *P. ornata*—Locally common. These late fall and winter breeders can usually be collected on roads on rainy nights and are heard throughout the SRP.
Pseudacris brimleyi—Rare. This species has been reported from the site by Freeman (1956) but no voucher specimens are present at this time.
Limnaoedus ocularis—Uncommon. Individuals can frequen[illegible] be heard during the summer along the river swamp margin.
Gastrophryne carolinensis—Abundant. Small choruses of narrow-mouthed toads can often be heard in standing water areas on rainy nights in spring or summer throughout the SRP. Individuals are frequently encountered under litter and on highways.
Rana catesbeiana—Common. Bullfrogs are found in virtually every permanent body of water on the SRP but are seldom if ever the most abundant species present. Juveniles have been captured in pitfall traps several meters from water. Adults are most easily obtained by hand collecting around lake margins.
Rana virgatipes—Locally uncommon. Carpenter frogs were not verified by capture on the SRP until 1977. A small chorus of a dozen individuals was heard and four were collected at Steel Creek Bay in early summer, 1977. They have not been observed in any other region of the SRP.
Rana clamitans—Locally common. Bronze frogs appear to be aquatically ubiquitous on the SRP. Calling individuals can be heard during most of the warm months.
Rana utricularia—Common. Leopard frogs are more common than bronze frogs as numerous individuals can be collected on SRP highways after winter rains, often long distances from water. They can be collected from all aquatic areas on the SRP. Large numbers of breeding adults have been captured in terrestrial drift fences during winter at Ellenton Bay and Risher Pond.
Rana palustris—Rare. A small number of specimens was captured in pitfall traps over a two-year period at Risher Pond. No others have been reported from the SRP.
Rana areolata—Uncommon. Gopher frogs have been heard calling from Karen's Pond and several individuals were captured with pitfall traps over a two-year period. A few were similarly taken at Risher Pond. Additional sightings have been infrequent.
Rana grylio—Rare. A small chorus was believed to be calling from Steel Creek Bay on two different occasions in the spring of 1977. The species was also reported by Freeman (1956).

Alligator

Alligator mississippiensis—Locally common. American alligators on the SRP were spared the heavy poaching pressure of the 1950's and 1960's. Breeding adults are present on the site, particularly in the Par Pond system. Nests have been found at Upper Three Runs Creek, at Pond C, and at Steed Pond. Several successful hatches have been observed in the Par Pond system.

Turtles

Chelydra serpentina—Common. Although large numbers are unlikely to be found at any particular site, single specimens of this ubiquitous species may occur in any aquatic habitat on the SRP. Most effective capture is with baited aquatic traps.
Sternotherus odoratus—Common. This species is almost exclusively aquatic, and is seldom encountered terrestrially. The most effective capture method is with baited aquatic traps.
Kinosternon subrubrum—Abundant. This species is characteristically associated with standing bodies of water, particularly those with fluctuating levels such as Carolina bays and cypress-gum swamps. Specimens have not been reported from Par Pond, the streams, or the river. Many captures are made terrestrially as individuals hibernate on land long distances from water. Aquatic trapping frequently yields specimens. T[illegible] pitfall traps are [illegible] effective at appropriate sites.
Kinosternon bauri—Rare or absent. The presence of this species on the SRP is contested by the authors. Four individuals were reported by Duever (1972). No additional specimens have been reported and the four individuals [illegible] predominant characteristics of *K. subrub*[illegible]
Clemmys [illegible] spotted turtles have come from specimens picked up on highways.
Terrapene carolina—Uncommon. Box turtles appear to be ubiquitous on the SRP but are seldom encountered except as solitary individuals. Most captures are on highways during the morning.
Chrysemys scripta—Abundant. This is the most frequently encountered turtle on the SRP and is usually the dominant species. Specimens have been found at practically every aquatic site. All means of trapping are effective but baited aquatic traps, trot lines, and pitfall traps have yielded the largest numbers.
Chrysemys concinna—Rare. The river cooter is represented on the SRP by a single specimen collected at the SRP river dock. The species may be common in the river itself but there are no supporting data.
Chrysemys floridana—Common. This species occurs in most large aquatic habitats including Carolina bays, streams, Par Pond, farm ponds and the river swamp but has never been found in large numbers. Aquatic traps and pitfall traps have yielded the most specimens but no one means has been highly effective. This species may occur in large numbers in river and stream systems, habitats that have received only cursory examination.
Deirochelys reticularia—Locally common. Chicken turtles occur most commonly in Carolina bay habitats but are found in small numbers in other aquatic areas. Males can be trapped effectively in aquatic areas but females are captured most frequently in terrestrial drift fences and pitfall traps.
Trionyx spiniferus—Rare. A single specimen was seen in Lower Three Runs Creek below the Par Pond outfall. Extensive trapping efforts in Par Pond and other lentic habitats have failed. Several individuals have been trapped on the Savannah River below the SRP.

Hyla cinerea—Abundant. Large choruses can be located around Par Pond, some ponds and Carolina bays, and along the river swamp during spring and summer. Choruses seem less dependent on rain than most other species and will frequently call at night even after a several day dry period.
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specimens. Terrestrial drift fences and pitfall traps are extremely effective at appropriate sites.
Kinosternon bauri—Rare or absent. The presence of this species on the SRP is contested by the authors. Four individuals were reported by Duever (1972). No additional specimens have been reported and the four individuals have the predominant characteristics of *K. subrubrum*.
Clemmys guttata—Rare. The handful of spotted turtles have come from specimens picked up on highways.
Terrapene carolina—Uncommon. Box turtles appear to be ubiquitous on the SRP but are seldom encountered except as solitary individuals. Most captures are on highways during the morning.
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TRIP LAMB
AUBURN HERPETOLOGY

Photo by Wayne VanDevender

SREL Reprint
 # 875

ON THE PROBLEMATIC IDENTIFICATION OF *KINOSTERNON* (TESTUDINES: KINOSTERNIDAE) IN GEORGIA, WITH NEW STATE LOCALITIES FOR *KINOSTERNON BAURI*

Trip Lamb
Savannah River Ecology Laboratory, Drawer E
Aiken, South Carolina 29801

ABSTRACT

Fifteen unusual specimens of mud turtles (*Kinosternon*) from Georgia, previously identified as *K. s. subrubrum*, were reappraised using morphometric comparisons with *K. s. subrubrum* and *K. bauri*. Discriminant analyses of shell characters were conducted separately for males and females and compared. Analyses for the two sexes were highly complementary, each demonstrating distinct separation between the *Kinosternon* in question and *K. s. subrubrum* while exhibiting extensive overlap between these specimens and *K. bauri*. Morphometrically, the unusual *Kinosternon* were judged to be *K. bauri*; thus some new state localities resulted. A discriminant function that identifies the species of *Kinosternon* from Georgia is given for each sex.

INTRODUCTION

Kinosternon bauri, a small, aquatic turtle largely confined to peninsular Florida, has been recognized from three localities in the Lower Coastal Plain of Georgia (Ernst 1974). A substantial range extension was reported by Duever (1972), who found a disjunct population inhabiting Steel Creek, a second-order stream in Barnwell County, South Carolina. Duever's account, accepted by some researchers (Ernst 1974, Conant 1975), was questioned by others (Gibbons *et al.* 1979). Iverson (pers. comm.) re-examined two of the five original specimens and considered them to have predominant characteristics of *K. s. subrubrum*, a common turtle throughout Georgia and South Carolina.

I reappraised 16 Steel Creek specimens via multivariate character analysis of shell and cranial morphology (Lamb 1983). My results showed that the Steel Creek turtles were indeed *K. bauri*. Additionally, 15 Georgia specimens, erroneously catalogued in museums as *K. s. subrubrum* or simply *K. sp.*, were discovered and determined to be *K. bauri*.

This paper documents *K. bauri* at new state localities and provides two discriminant functions that will correctly identify *Kinosternon* in Georgia.

MATERIALS AND METHODS

A detailed examination of preserved kinosternids collected in Georgia was undertaken to locate any unusual or questionable specimens. Of those identified as *K. s. subrubrum*, 15 specimens shared certain features with *K.*

Herpetologica, 39(4), 1983, 383–390

SREL Reprint
 # 882

THE STRIPED MUD TURTLE (*KINOSTERNON BAURI*) IN SOUTH CAROLINA, A CONFIRMATION THROUGH MULTIVARIATE CHARACTER ANALYSIS

TRIP LAMB

ABSTRACT: An unusual population of *Kinosternon* from South Carolina, previously identified as a disjunct population of *K. bauri*, is morphometrically compared with *K. s. subrubrum* and *K. bauri*. Discriminant analyses of shell and cranial characters demonstrate distinct separation between the South Carolina turtles and *K. s. subrubrum* but indicate extensive overlap between South Carolina turtles and *K. bauri*. These data confirm the previous taxonomic assignment of the South Carolina population and provide additional *K. bauri* localities that establish geographic continuity between the South Carolina locality and those that formerly constituted the northern border of the species' range. A discriminant function that separates the species of *Kinosternon* from South Carolina and Georgia is given for each sex.

Key words: Reptilia; Testudines; Kinosternidae; *Kinosternon*; Morphometrics

DUEVER (1972) reported a disjunct population of *Kinosternon bauri* inhabiting sloughs and swamps adjacent to Steel Creek, a second order stream draining the southwest corner of the Savannah River Plant (SRP) in Barnwell County, South Carolina. Subsequent confirmation was provided by Ernst (1974), who examined four of the five specimens. However, Duever's account was later contested (Gibbons et al., 1979) for the following reasons: (1) The Steel Creek locality extended the species' range northward some 200 km. (2) Repeated surveys on the SRP failed to produce any additional specimens. (3) Although each of Duever's specimens shared certain features with *K. bauri* (i.e., all had a head pattern composed of distinct canthal and angular stripes), none possessed a complete set of pigmentation patterns that are supposedly diagnostic for the species (i.e., head stripes and carapace stripes). (4) Upon reexamination (Iverson, personal communication), two of the original specimens were considered to have predominant characteristics of *K. s. subrubrum*, a common species on the SRP.

Kinosternon bauri and *K. s. subrubrum* represent the probable choices for the Steel Creek population, and some pigment pattern analysis would appear to be the likely approach in resolving the population's identity. However, the aforementioned pigment patterns of *K. bauri*, though characteristic, are not absolute. Iverson (1978) recently demonstrated that both head and carapace patterns of *K. bauri* range from pronounced stripes to complete obliteration over most of the species' range. The situation is further confounded by the variation in head pigmentation in *K. s. subrubrum*, which often exhibits head patterns of spots or, in extreme cases, some semblance of stripes. In fact, the western subspecies, *K. s. hippocrepis*, bears a pair of light lines on either side of the head that resemble those of *K. bauri* (Ernst and Barbour, 1972). Thus, the taxonomic utility of pigment characters is greatly diminished in a problematical situation such as Steel Creek.

In 1981, an extensive floristic and faunistic inventory of Steel Creek was conducted to predict environmental consequences of nuclear production activities on the SRP and to identify species that might warrant interest by either state or federal authorities (Smith et al., 1981). The confirmation (or refutation) of *K. bauri* received priority. This paper reports on morphometric analyses that provide an unequivocal taxonomic assessbridge the range gap between the Steel Creek population and previously accepted localities for *K. bauri* (Fig. 4). These results support Duever's earlier assessment that *K. bauri* indeed occurs in South Carolina.

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Striped mud turtle,
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Copeia, 1996(3), pp. 713–715

Invasion of New Aquatic Habitats by Male Freshwater Turtles

Tracey D. Tuberville, J. Whitfield Gibbons, and Judith L. Greene

Long-term field research often reveals how organisms respond to stochastic environmental events such as droughts (Gibbons et al., 1983) or changes in population structure or species composition over time (Tinkle, 1979; Parker, 1984; Pechmann et al., 1991). Studies on aquatic turtle populations have been conducted for more than 25 years on the US Department of Energy's Savannah River Site (SRS) near Aiken in the Upper Coastal Plain of west central South Carolina (Gibbons et al., 1982; Gibbons, 1990a; Frazer et al., 1991). One conclusion from these studies is that adult males residing in small, isolated wetlands are more likely than females to move overland and to move greater distances (Morreale et al., 1984).

Factors reported to stimulate overland movements by freshwater turtles include travel to and from hibernacula (Bennett, 1972; Gibbons, 1986), pond drying/filling (Cagle, 1944; Sexton, 1959; Gibbons et al., 1983), nesting activity of females (Ernst et al., 1994), and mate-searching by males (Parker, 1984; Gibbons, 1986). Although male and female conspecifics probably exhibit similar terrestrial activity in some situations, differences in reproductive strategies should produce distinct terrestrial activity patterns. Previous studies have suggested that females sometimes travel long distances on land to nest but that males may also travel long distances overland seeking aquatic habitats containing females to inseminate (Morreale et al., 1984; Gibbons, 1986; Brown and Brooks, 1993). If these predictions are correct, males should be more likely than females to encounter new aquatic habitats, including those without conspecific populations. Therefore, colonizing or invading nonresident species should have male-biased sex ratios relative to established resident species. Here we report on captures of 10 species of aquatic turtles and compare sex ratios of six established resident species to those of *Kinosternon baurii* and *Chrysemys picta*.

Materials and methods.—Observations described here are based on data collected from 1967–1993 at Ellenton Bay, a freshwater wetland located on the SRS. Ellenton Bay is a 10-ha Carolina bay with a maximum water depth of approximately 2 m. Although the bay contains water year-round during most years, surface area and water depth vary seasonally and annually (Gibbons and Semlitsch, 1991).

Turtles were captured using a variety of techniques including aquatic traps, pitfall traps along drift fences, and hand captures. All captured turtles were brought to a laboratory facility, where they were identified to species, measured, sexed, and given individual marks (Gibbons, 1990b). Each turtle was then released at the point of capture. Depending on the species, sexual maturity in males was determined by the presence of enlarged tails or elongated foreclaws. The identification of individuals not readily distinguishable as *K. baurii* or *K. subrubrum* was confirmed by performing the calculations presented by Lamb (1983).

Results.—Ten species of aquatic turtles were captured at the Ellenton Bay drift fence between 1967 and 1993: *Trachemys scripta*, *K. subrubrum*, *Pseudemys floridana*, *Sternotherus odoratus*, *Chelydra serpentina*, *Deirochelys reticularia*, *Pseudemys concinna*, *Clemmys guttata*, *Chrysemys picta*, and *K. baurii*. The first six species are known to nest at Ellenton Bay, based on the capture of hatchlings, and have been captured in most years since 1967. These species are considered resident populations. Only mature individuals have been verified for *K. baurii* (n = 30), *C. picta* (n = 5), *C. guttata* (n = 5), and *P. concinna* (n = 1). Hence, these species are considered nonresidents.

Individuals of *C. guttata*, *C. picta*, and *K. baurii* were first captured at Ellenton Bay in 1980, 1980, and 1987, respectively. Prior to 1980, 1663 adults of the six resident turtle species had been captured. An additional 1045 adults of these species were captured at Ellenton Bay after 1980. Of the 2708 mature animals of these six species captured from 1967–1993, 45–64% were males, depending on the species (Table 1).

All *K. baurii* and *C. picta* captured through 1993 at Ellenton Bay have been males (Table 1). One of five *C. guttata* and the one *P. concinna* were females. The residency times for individuals ranged from 14–32 days for *C. guttata*, 21–89 days for *C. picta* and 10–577 days for *K. baurii*. The single *P. concinna* has apparently remained in Ellenton Bay since 1980 based on recaptures over several years.

Table 1. Numbers of Adults of Each Species of Aquatic Turtle Captured at Ellenton Bay between 1967 and 1993 and the Percentage that Were Males.

Species	N	% males
Resident species		
Deirochelys reticularia	363	64
Chelydra serpentina	41	61
Sternotherus odoratus	214	55
Kinosternon subrubrum	860	54
Trachemys scripta	1098	53
Pseudemys floridana	132	45
Non-resident species		
Kinosternon baurii	30	100
Chrysemys picta	5	100
Clemmys guttata	5	80
Pseudemys concinna	1	0

Discussion.—The six resident species at Ellenton Bay occur abundantly at several nearby aquatic habitats. The Savannah River, human-made borrow pits, a small stream system, and several ephemeral wetlands are all within 2 km of Ellenton Bay, and overland movement by aquatic turtles between Ellenton Bay and several of these wetlands has been documented through mark-recapture methods (Morreale et al., 1984; Burke et al., 1995). The closest known breeding population of *C. picta* is 18.8 km away, near Jackson, South Carolina. No female *C. picta* has ever been caught in any habitat on the SRS. *Clemmys guttata* has been captured in the vicinity of a marsh-like habitat 600 m away, which is presumably the source of those found at Ellenton Bay. The marshlike area appears more characteristic of the typical habitat of the species (Ernst et al., 1994) than does a Carolina bay.

The nearest habitat where female *K. baurii* have been captured is Four Mile Swamp, 3.4 km away. The nesting behavior of *K. baurii* is not known on the site, but that of *K. subrubrum* has been studied extensively. The average distance from Ellenton Bay of 25 *K. subrubrum* nests was 49.3 m, with a range of 17.3–90.0 m (Burke et al., 1994). Although *K. baurii* nest in autumn (pers. obs.), we assume that the two species have similar nesting patterns spatially. If true, females of *K. baurii* residing in Four Mile Swamp would be unlikely to travel as far as Ellenton Bay during nesting forays.

Longer, more frequent overland travel by males relative to females has been observed in several species of terrestrial and freshwater turtles, including *T. scripta* (Morreale et al., 1984; Gibbons, 1986) and *Gopherus berlandieri* (Rose and Judd, 1975). Morreale et al. (1984) found that male *T. scripta* were three times more likely than females to move between aquatic habitats. Consequently, males are more likely than females to immigrate into new aquatic habitats, including those unoccupied by females. One possible explanation for this phenomenon is that frequent or long-distance travel by males, especially to new aquatic habitats, will increase encounter rates, and perhaps mating events, with females. We conclude, therefore, that the occurrence of *K. baurii*, as well as *C. picta*, at Ellenton Bay is a result of relatively recent invasion by adult males that have made long-range excursions not typically undertaken by females.

Acknowledgments.—We thank V. Burke for comments on the manuscript and the many individuals at SREL who assisted in the capture of turtles. This study was funded primarily through contract DE-AC09-76SROO-819 between US Department of Energy and the University of Georgia and by NSF grant DEB-79-04758 awarded to JWG for the study of freshwater turtles.

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TRACEY D. TUBERVILLE, J. WHITFIELD
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Turtles are not Deer

Salamanders are not Trout

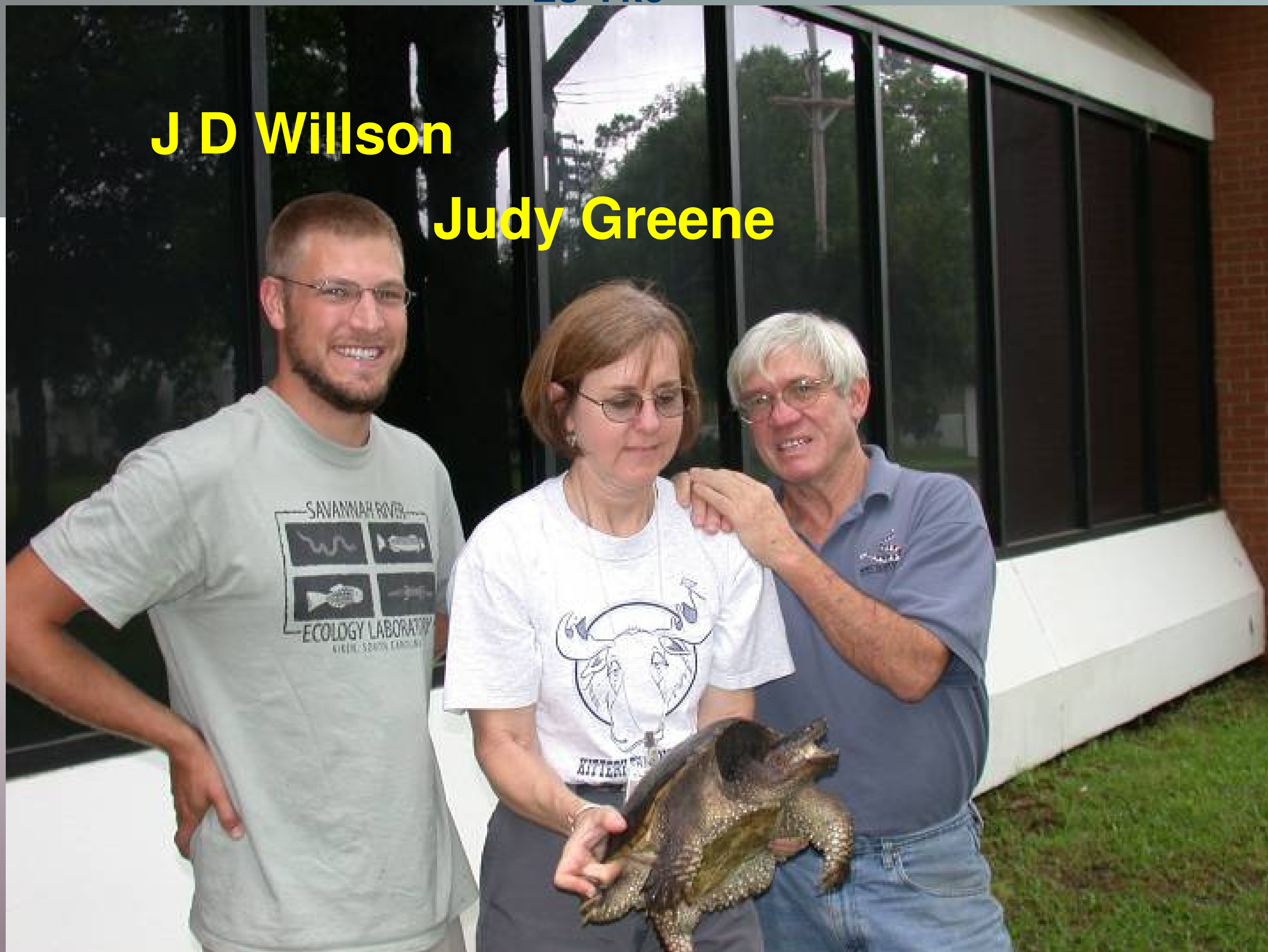
Snakes are not Bluebirds

Turtles are not Deer


1983 - 2004

Mud turtle
1969-1994
25 YRS

Common Snapper
1975-2003
28 YRS



ECOLOGICAL

INVENTORY, MONITORING

RESEARCH

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PUBLIC EDUCATION

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CONSERVATION

Could GERTRUDE STEIN HAVE SAID

“TURTLE”

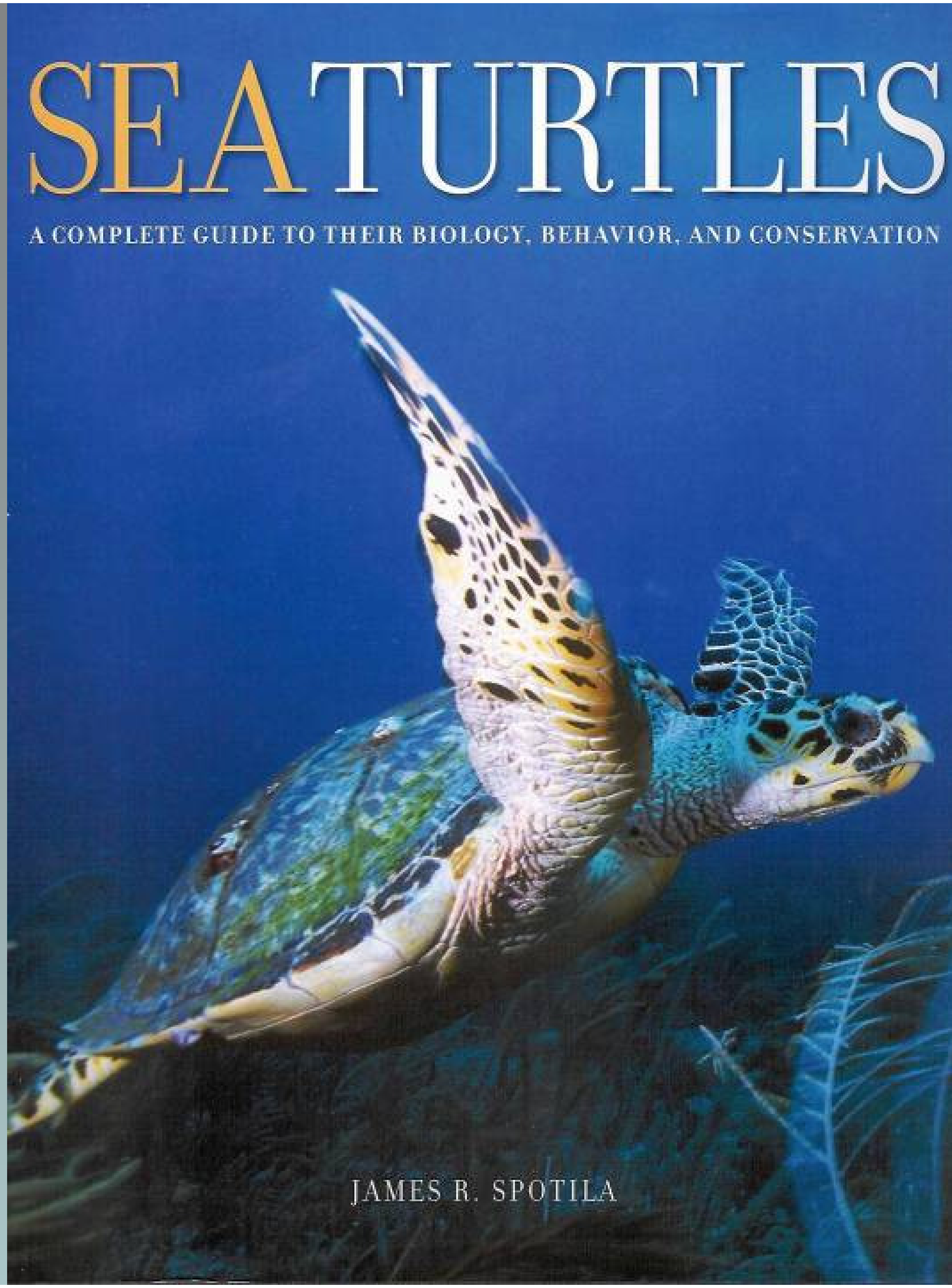
INSTEAD OF “ROSE”

?

"A TURTLE

IS A TURTLE

IS A TURTLE."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FRESHWATER TURTLES, TERRAPINS, TORTOISES, SEA TURTLES

INTERCHANGEABLE IN DEMOGRAPHY AND LIFE HISTORY CONCEPTS

WHEN IT COMES TO CONSERVATION,

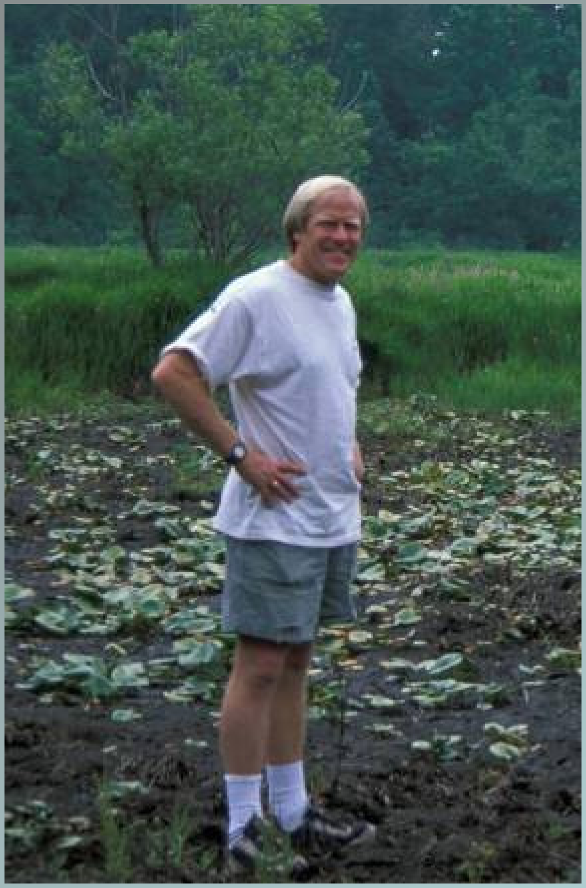
"A TURTLE

IS A NOT A TURTLE

IS NOT A TURTLE."

WHERE DO TURTLES HIBERNATE AND LAY EGGS?

KURT BUHLMANN

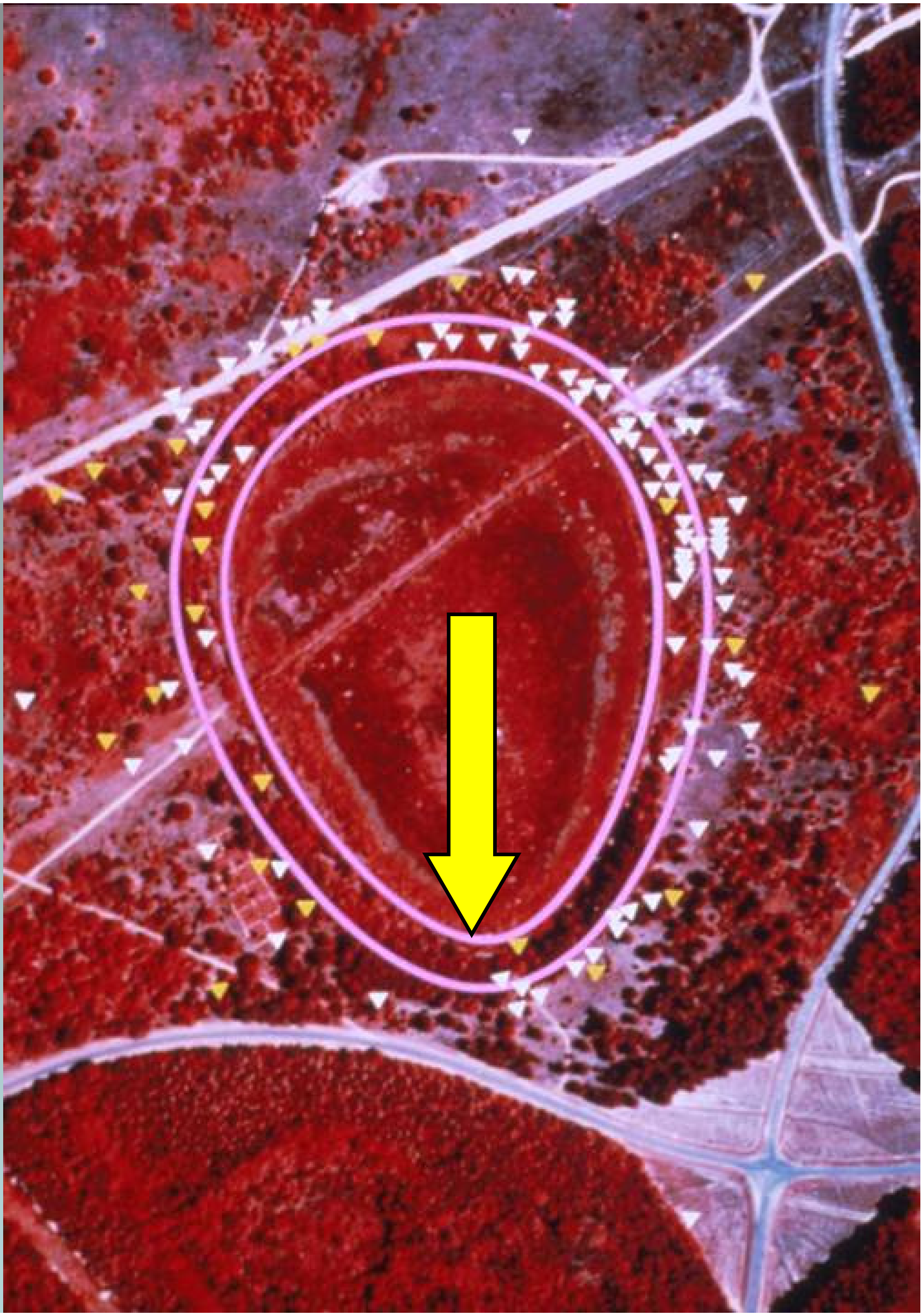


VINCENT BURKE

Terrestrial Habitat Needs of Semi-aquatic Animals

Burke and Gibbons (1995)

CONSERVATION BIOLOGY



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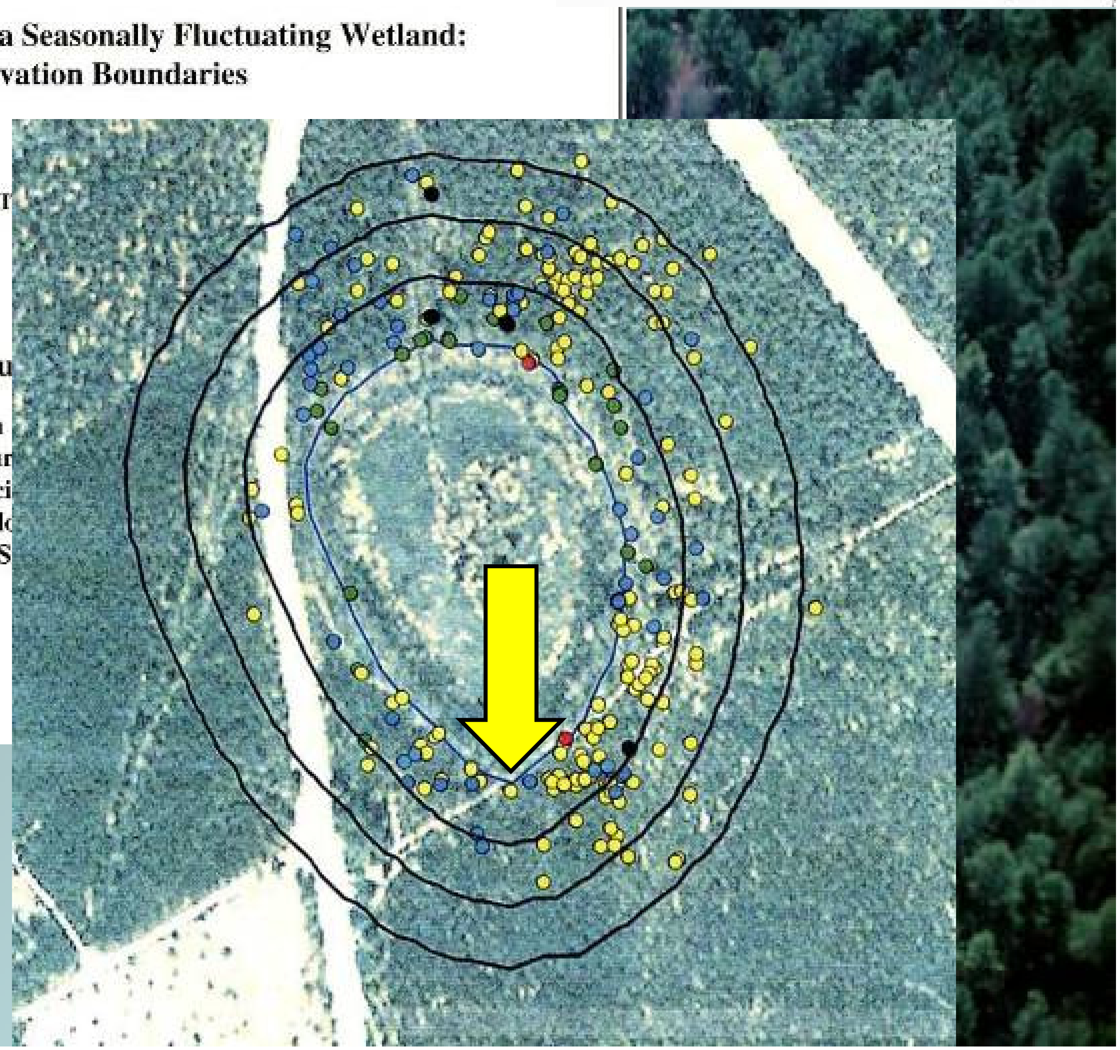
International Journal of Turtle and Tortoise Research

Volume 4, Number 1 *September 2001*

Terrestrial Habitat Use by Aquatic Turtles from a Seasonally Fluctuating Wetland: Implications for Wetland Conservation Boundaries



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and IUCN (The World Conservation Union) – S

TURTLE CONSERVATION and MITIGATION

STEP 2

THINK POSITIVELY

1 SCIENCE-BASED EDUCATION

2 INVOLVE OTHERS

3 ???

LESSON # 3

ENJOY YOUR

WORK

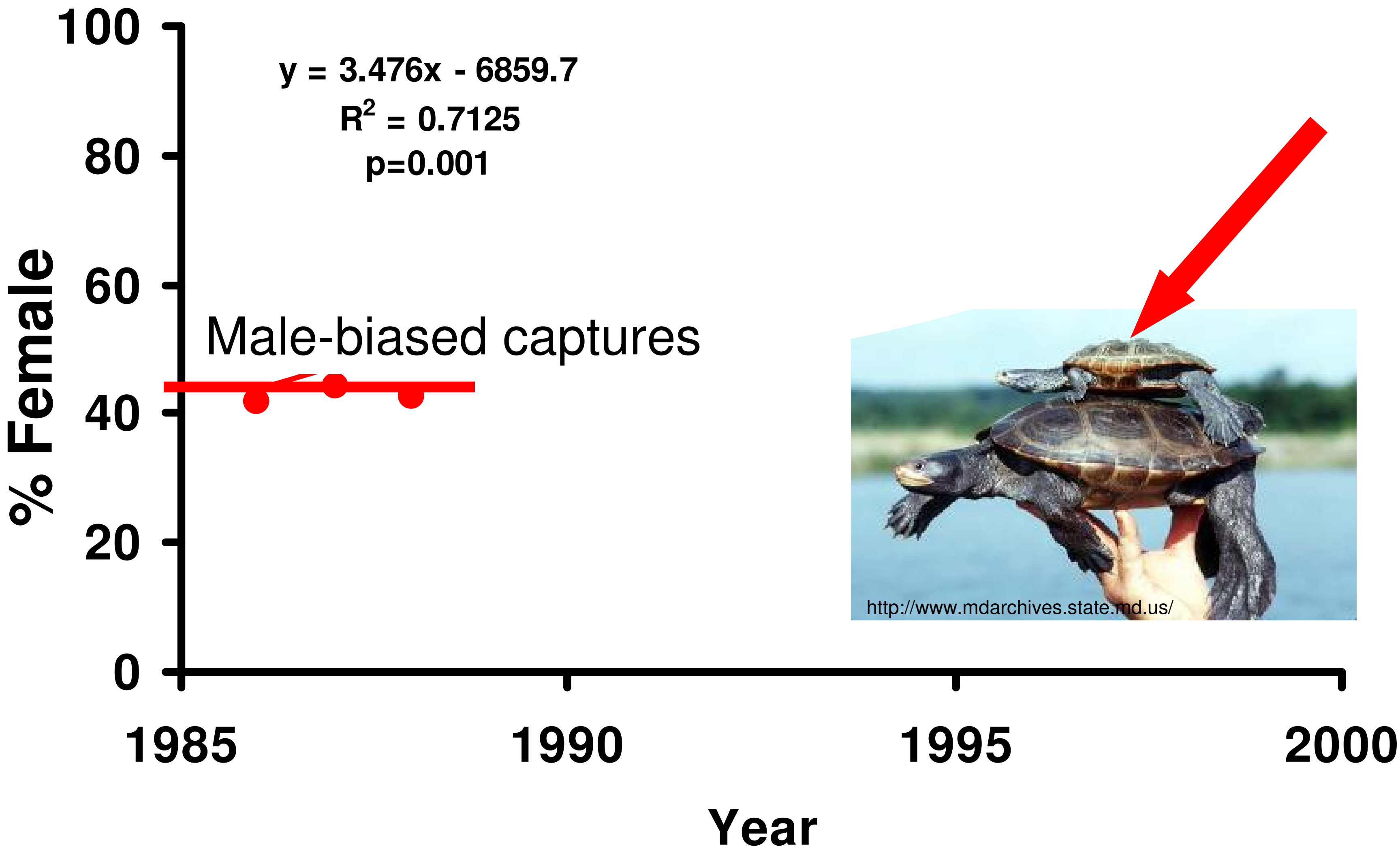

MICHI CRAFT


CRAFT

Terrapin Studies at Kiawah Island, S.C.

> 2700 captures/ recaptures

Changes in Sex Ratio Over Time



Meg Hoyle





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