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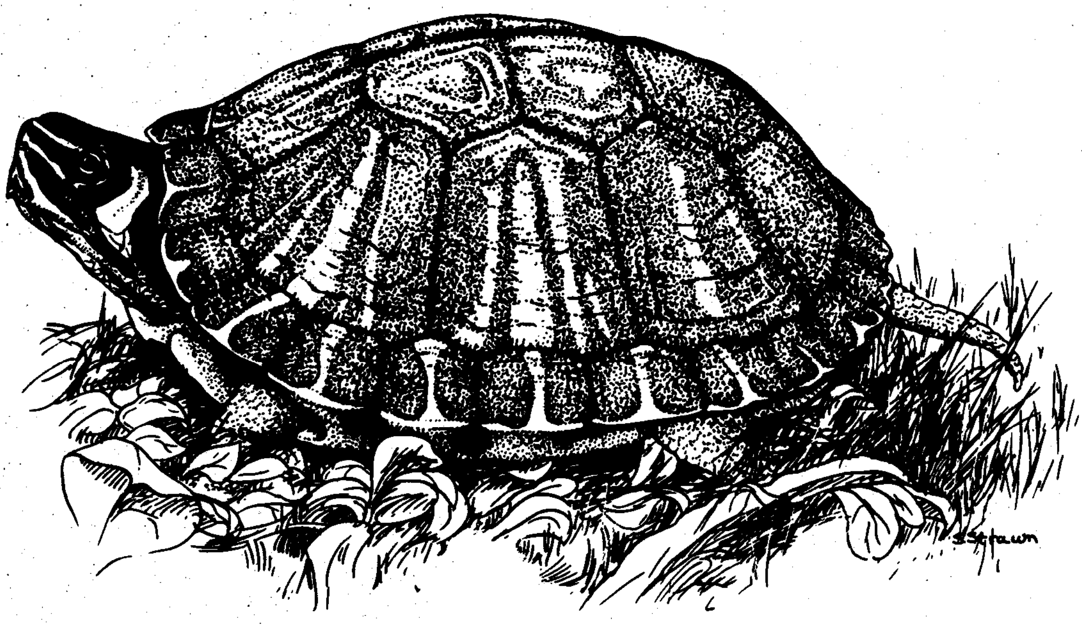
# HABITAT SUITABILITY INDEX. MODELS: SLIDER' TURTLE



Fish and Wildlife Service

U.S. Department of the Interior

Biological Report 82(10.125)
September 1986

# HABITAT SUITABILITY INDEX MODELS: SLIDER TURTLE

by

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## PREFACE

This document is part of the Habitat Suitability Index (HSI) Model Series [Biological Report 82(10)] which provides habitat information useful for impact assessment and habitat management. Several types of habitat information are provided. The Habitat Use Information Section is largely constrained to those data that can be used to derive quantitative relationships between key environmental variables and habitat suitability. This information provides the foundation for the HSI model and may be useful in the development of other models more appropriate to specific assessment or evaluation needs.

The HSI Model Section documents the habitat model and includes information pertinent to its application. The model synthesizes the habitat use information into a framework appropriate for field application and is scaled to produce an index value between 0.0 (unsuitable habitat) and 1.0 (optimum habitat). The HSI Model Section includes information about the geographic range and seasonal application of the model, its current verification status, and a list of the model variables with recommended measurement techniques for each variable.

The model is a formalized synthesis of biological and habitat information published in the scientific literature and may include unpublished information reflecting the opinions of identified experts. Habitat information about wildlife species frequently is represented by scattered data sets collected during different seasons and years and from different sites throughout the range of a species. The model presents this broad data base in a formal, logical, and simplified manner. The assumptions necessary for organizing and synthesizing the species-habitat information into the model are discussed. The model should be regarded as a hypothesis of species-habitat relationships and not as a statement of proven cause and effect relationships. The model may have merit in planning wildlife habitat research studies about a species, as well as in providing an estimate of the relative suitability of habitat for that species. User feedback concerning model improvements and other suggestions that may increase the utility and effectiveness of this habitat-based approach to fish and wildlife planning are encouraged. Please send suggestions to:

Habitat Evaluation Procedures Group
National Ecology Center
U.S. Fish and Wildlife Service
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Ft. Collins, CO 80526-2899

## CONTENTS

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# SLIDER TURTLE (*Pseudemys scripta*)

## HABITAT USE INFORMATION

### General

The slider turtle (*Pseudemys scripta*) is a predominantly aquatic turtle that inhabits southern waters from Virginia to New Mexico and as far south as Brazil, South America (Pritchard 1979). This species appears in virtually all types of water bodies (e.g., rivers, ditches, sloughs, lakes, and ponds); however, it prefers quiet water, approximately 1 to 2 m in depth (Cagle 1950), with a soft bottom, abundant vegetation, and suitable basking sites (Ernst and Barbour 1972). The habitat requirements of the slider turtle are broad. It exists sympatrically with other freshwater turtles within its range (Conant 1975). The slider is considered a diurnal turtle; it feeds mainly in the morning and frequently basks on shore, on logs, or while floating, during the rest of the day. At night, it sleeps lying on the bottom or resting on the surface near brush piles and hummocks (Ernst and Barbour 1972).

### Food

Sliders are omnivores. Juvenile sliders are primarily carnivorous, whereas adults tend to be herbivorous (Clark and Gibbons 1969). Animal foods include crustaceans, mollusks, adult and larval insects, fish, tadpoles, and frogs. Plants in the diet include filamentous algae, duckweed (*Lemna* spp.), and a wide variety of emergent and submerged aquatic plants.

The facultative feeding strategy of slider turtles contributes greatly to their widespread distribution (Ernst and Barbour 1972). They frequently are observed eating carrion found in the water. When a habitat provides abundant sources of both vegetation and animal protein, the slider's dietary preference tends toward increased animal protein (Parmenter 1980). A generalist diet, in conjunction with an ability to migrate both aquatically and terrestrially (Morreale et al. 1984; Parker 1984), enables sliders to thrive where resources have a patchy distribution.

### Water

Water is an essential requirement in 'the ecology of this semiaquatic species. Water considerations are discussed under Cover, Reproduction, and Interspersion.

## Cover

Highest densities of sliders occur where algae blooms and aquatic macrophytes are abundant and are of the type that form dense mats at the surface, such as spiked watermilfoil (Myriophyllum spicatum) and lily pads (Nymphaeaceae) (Schubauer 1981). Dense surface vegetation provides cover from predators and supports high densities of aquatic invertebrates and small vertebrates, which offers better foraging than open water. Similar species of aquatic turtles, such as the midland painted turtle (Chrysemys picta marginata), also prefer habitats with floating aquatic vegetation (Sexton 1959).

## Reproduction

Mating occurs in the water, but some suitable terrestrial area is required for egg-laying by nesting females. The nesting season extends from April through July in the southeastern United States, and females may nest once or twice during this period (Gibbons et al. 1982). Some females nest in open sites close to water, and nests are usually placed in loose soil that remains above the water table. Nest sites adjacent to water are not always necessary, however, since females may travel 0.4 (Moll and Legler 1971) to 1.6 km (Cagle 1950) from the nearest water to nest. Nests are located on sandy ridges, open areas in woods, meadows, old fields, levees, canal banks, and dirt roads-(Carr 1952; Ernst and Barbour 1972)

## Interspersion and Movements

Sliders move between habitats by both overland and aquatic routes (Morreale et al. 1984; Parker 1984). Movements can be induced by a necessity to find food (Cagle 1944) or to escape -desiccating aquatic habitats (Gibbons et al. 1983), and can result in the emigration of an entire population from a site. Other movements result from sexual or genetic variations among individuals. Adult females make excursions on land considerable distances from water (Cagle 1950; Moll and Legler 1971), presumably to search for appropriate nesting areas, as has been reported for other species of turtles (Obbard and Brooks 1980; Congdon et al. 1983). Nesting excursions usually end when the female returns to its original location prior to the movement. Adult males will sometimes move from one aquatic site to another and can move overland for distances >3.5 km and aquatically up to 5 km (Morreale et al. 1984). The frequency of movement between aquatic habitats is greater in males than females and has been attributed to searching for mates. The likelihood that a male will move between aquatic habitats increases with the age of the individual (Parker 1984).

Individual variation in movements between habitats can be construed as alternative strategies that maximize individual fitness. Except for nesting females, movement from an aquatic habitat is not necessary for maintaining a population, since many sliders remain in their natal habitats for years (Gibbons and Semlitsch 1982). Thus, if a habitat provides suitable resources, it can sustain a healthy population of these turtles.

## HABITAT SUITABILITY INDEX (HSI) MODEL

### Model Applicability

Geographic area. This HSI model was developed for application throughout the range of the slider turtle in the United States (Figure 1). The model contains a temperature component that was designed specifically for use in the L-reactor cooling lake at the U.S. Department of Energy Savannah River Plant (SRP) near Aiken, South Carolina. The temperature component may be useful elsewhere where water temperature is a critical component of the habitat.

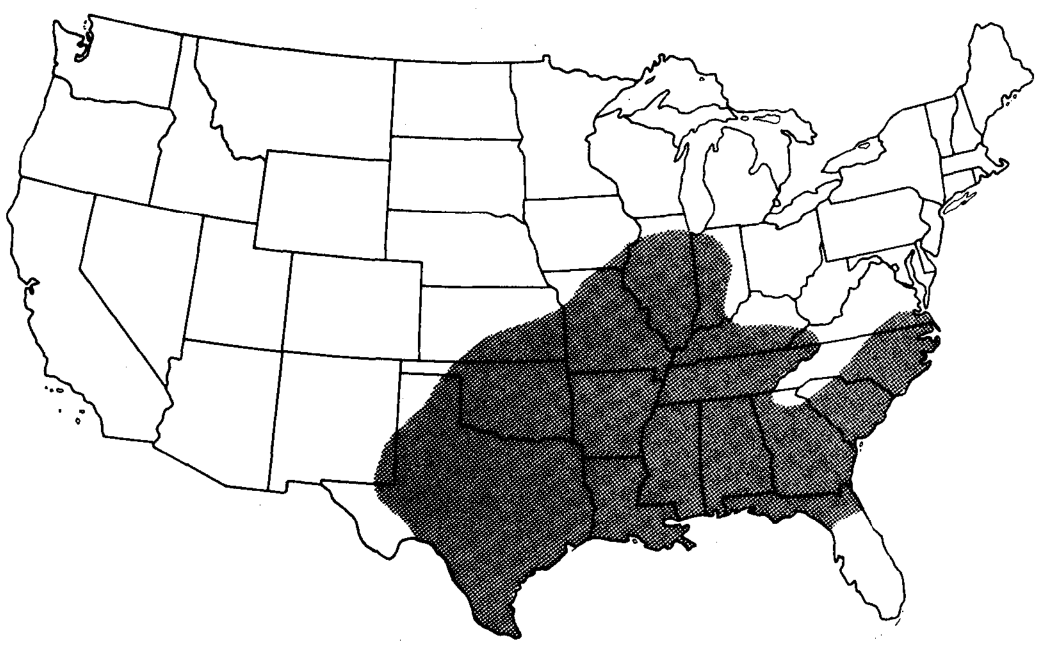

Figure 1. Geographic applicability of the slider turtle HSI model within the United States [see Ernst and Barbour (1972:152) for additional disjunct populations].

Season. The model was designed to provide an index of habitat suitability as a function of habitat requirements for the slider turtle throughout the year.

Cover types. This model was developed for application in the following cover types (terminology follows that of U.S. Fish and Wildlife Service 1981): Deciduous Forested Wetland (DFW), Deciduous Scrub-Shrub Wetland (DSW), Herbaceous Wetland (HW), Riverine (R), and Lacustrine (L).

Minimum habitat area. There is no statement in the literature of a minimum habitat size for the slider turtle. This species occupies aquatic habitats of almost any size, ranging from drainage ditches and small farm ponds to major rivers and lakes.

Verification level. This model was developed at a workshop in October 1984 at the Savannah River Ecology Laboratory. The interpretations are based on the expertise of the authors and review comments by Dr. Justin D. Congdon and Dr. Carl H. Ernst.

## Model Description

Overview. The model is intended to be applicable to most bodies of water within the range of the slider turtle in the United States. A positive, linear relationship between HSI and the carrying capacity of the habitat is assumed. The model is based on a set of habitat variables that can be empirically related to abundance of slider turtles. The variables fall into three general categories: (1) food/cover component, (2) water component, and (3) temperature component. These categories represent possible limiting factors for the slider turtle.

Two key life history requirements, nesting sites and basking areas, were omitted from this model. In our opinion, nesting areas will not be a limiting factor anywhere within the range of this species. As long as there is access to land, individual slider turtles have the capability for long-range movement to nesting areas (Cagle 1950; Moll and Legler 1971). The availability of basking sites could be considered a potential limiting factor for this species, although basking sites are abundant in most natural habitats. When no aquatic basking sites are available, sliders will readily bask along the shore or at the surface of the water. Therefore, we did not include basking sites as a component of the model.

Food/cover component. The abundance of sliders in a habitat is assumed to be directly related to the vegetative characteristics of the wetland. The presence of emergent and submerged aquatic plants can directly affect the amount of concealment from predators and exposure to direct sunlight. Vegetation is also a direct indicator of food availability, since it is a substantial portion of the adult diet. There are also some important life requisites of turtles that can be indirectly correlated to the amount and type of aquatic vegetation in a habitat. In many cases, areas with abundant vegetation support large quantities of aquatic larvae, insects, tadpoles and adult frogs, and small fish, which form the animal portion of the slider's diet. The presence of submerged aquatic vegetation is generally inversely correlated with canopy cover of overhead woody vegetation. More open area and, therefore, more basking sites, would be available in habitats with minimal canopy cover.

Vegetation can be measured as the percent cover of emergent and submerged vegetation in a defined area. The relationship between emergent and submerged vegetation cover and habitat suitability (SIV1) is shown in Figure 2. Optimum conditions are assumed to occur at ≥90% cover of emergent and submerged vegetation, since peak densities of sliders occur at and above this level. Sliders also occur in small numbers where the vegetative cover is 0%. The suitability of the food/cover component (SIFC) is assumed to be equal to the suitability level determined for the percent cover of emergent and submerged vegetation (Equation 1).

$$SIFC = SIV1 \qquad (1)$$

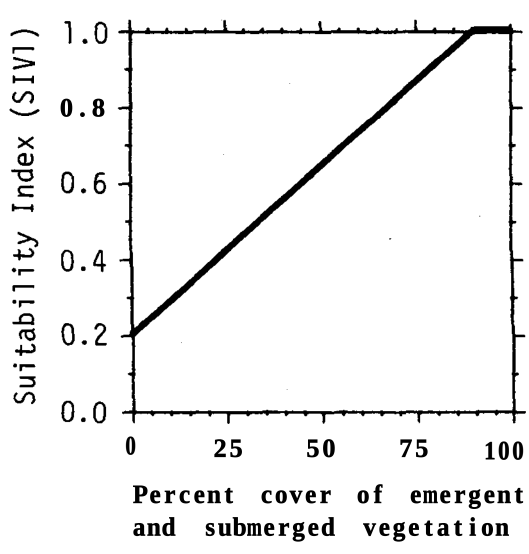


Figure 2. Relationship between the percent cover of emergent and submerged vegetation and habitat suitability for the slider turtle.

Water component. Hydrologic conditions are important to any aquatic animal. Although the slider turtle is capable of overland movements, certain limitations within the aquatic environment must be analyzed in any habitat suitability assessment. Three key variables are used in this model to quantify the suitability of the water component: velocity, water depth, and water regime. The relationship between velocity and habitat suitability is confounded by the numerous variables that are introduced in comparing habitats and channel structure. The slider prefers quiet waters, such as those existing in lacustrine environments, therefore, optimal conditions are considered to exist when velocity is 0 cm/sec (Figure 3a). Sliders have also been observed in the Savannah River in areas where average peak velocity approximates 80 cm/sec in the middle of the river. Sliders observed in rivers at such high velocity utilize microhabitats along the river margins or are simply transients. For purposes of habitat analysis, rivers with average peak velocity ≥80 cm/sec are assumed to have zero suitability for sliders. Rivers with average peak velocity <80cm/sec are assumed to contain areas of lower flow (e.g., eddies, oxbows) suitable for sliders; the sections of the river with high velocity will be avoided in favor of the low velocity areas. This assumption is appropriate for a typical river in the southeastern United States, but will be inappropriate for high gradient, narrow streams. A high gradient stream with an average peak velocity approaching 80 cm/sec will likely not provide areas of low velocity suitable for sliders.

The slider occurs most often and at the highest densities in bodies of water with a depth of 1 to 2 m. Although this species will utilize deeper waters, this appears to be limited to overwintering on the bottom and to predator avoidance. Since aquatic vegetation provides cover and foraging area for sliders, shallower littoral zones must be contiguous with deeper habitats to support this species. The slider, however, does not occur frequently in bodies of water with a maximum depth <0.5 m. Shallower waters usually do not provide proper cover and, at some times of the year, are frequently depauperate of other fauna. Although turtles will temporarily utilize shallow bodies of water during overland travel or as juveniles, shallow water habitats usually do not support this species year round. It is difficult to distinguish the proximal effects of water depth, since it is directly related to the other components in this model (Food/Cover and Temperature). For this model, it is assumed that depths of 1 to 2 m are optimal for this species, depths of 0.5 m and 3 m represent marginal habitat, and depths <0.5 m approach the limits of habitability (Figure 3b). Depths >3 m are assumed to provide a low level of suitability, with the shallower areas being most suitable.

Wetlands containing permanent water will have the highest likelihood of supporting slider turtles throughout the year. Wetlands where water is not always present are of less suitability to sliders, since sliders must emigrate from such wetlands when water is absent. Suitability indices can be assigned to wetlands based on water regime. The relationship between water regime modifiers (Cowardin et al. 1979) and habitat suitability is shown in Figure 3c (see Application of the Model for definitions of water regime modifers). Saturated wetlandsrarely have surface water present and, therefore, have zero suitability. Intermittently flooded wetlands are also assigned a zero suitability due to the unpredictability of having surface water in such wetlands.

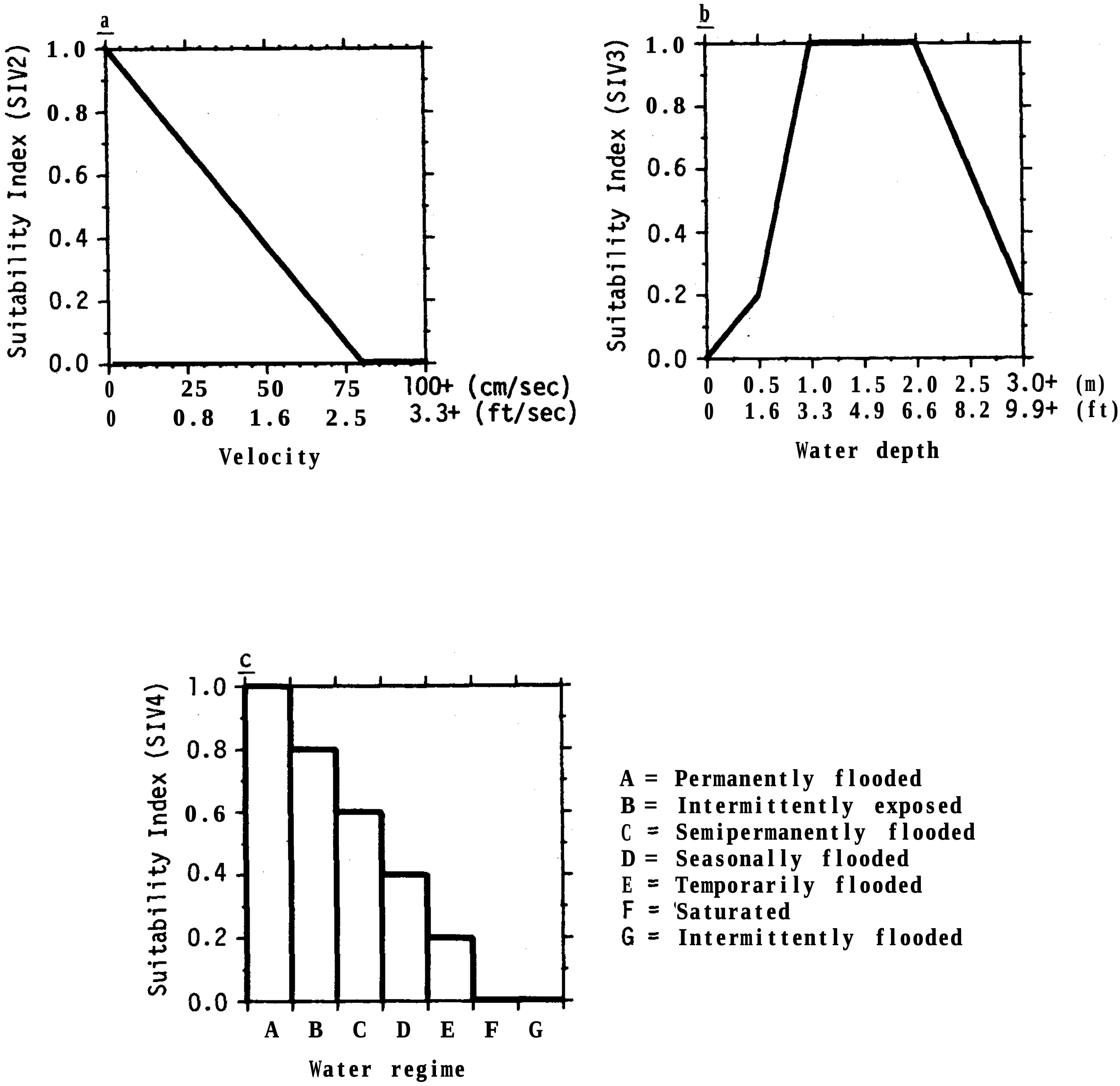


Figure 3. Relationships between habitat suitability and the variables used to evaluate the water component in the slider turtle HSI model.

The remaining modifiers (permanently flooded, intermittently exposed, semi-permanently flooded, seasonally flooded, and temporarily flooded) have been assigned suitability indices based on their relative degree of water permanence, with permanently flooded wetlands representing optimum conditions. Riverine habitats occupied by sliders are all assumed to be in the lower perennial category of Cowardin et al. (1979), where flowing water is present throughout the year. Riverine habitats will, therefore, be assigned a suitability for water regime corresponding to the permanently flooded category (i.e., SIV4=1.0).

The suitability of the water component (SIW) is assumed to be the lowest suitability index of the three water component variables (Equation 2).

$$SIW = \text{minimum } (SIV2, SIV3, SIV4) \quad (2)$$

Temperature component. The thermal characteristics of a wetland are more important in the L-reactor lake on the Savannah River Plant than in most habitats throughout the range of the slider turtle. The slider inhabits warm climates and is presumably limited by extreme winter cold in the more northern latitudes. For the L-reactor cooling waters, the crucial factor for habitat suitability is the high water temperature generated by reactor operations.

To quantify water temperature suitability in this model, upper avoidance temperature (37 °C, Hutchison 1979), critical thermal maxima (41 to 42 °C, Hutchison et al. 1966), and thermal preferenda reported for the species were used. The optimal range calculated from mean preferred temperatures was reported as 25.5 °C (Brattstrom 1965) and 28 °C (Standora 1982) based on behavioral observations, and from 26 to 29 °C based on digestive turnover times and feeding efficiency in the populations (Parmenter 1980). Mean surface water temperatures within the activity range of the slider are presented in divisions of five degrees Celsius in Figure 4; the mean surface water temperature is based on the average of daily maximum and minimum temperatures during the period of interest. Two assumptions are made in this portion of the model: (1) temperatures above 40 °C at any time of the year are considered to have a suitability index of 0.0, and (2) the critical period is during the slider's growing period and when ambient water temperature is at its highest level. This period corresponds to April through September in South Carolina.

The suitability of the temperature component (SIT) is assumed to be equal to the suitability index determined for the mean surface water temperature during the critical period (Equation 3).

$$SIT = SIV5 \quad (3)$$

HSI determination. The HSI for the slider turtle is based on the concept of limiting factors and is assumed to be the lowest of the suitability levels determined for the three model components (Equation 4).

$$HSI = \text{minimum } (SIFC, SIW, SIT) \quad (4)$$

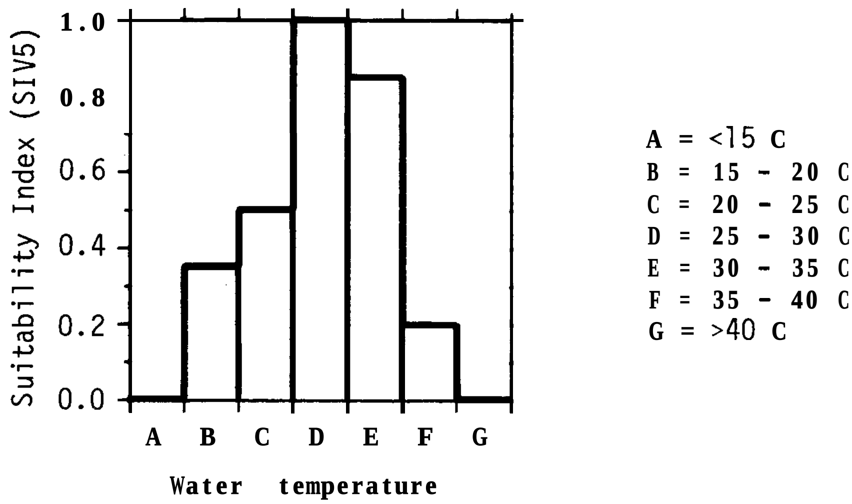


Figure 4. Relationship between mean surface water temperature and habitat suitability for the slider.

## Application of the Model

Summary of model variables. The relationships between habitat variables, life requisites (components), cover types, and an HSI for the slider turtle are summarized in Figure 5. Definitions of the variables and suggested measurement techniques are presented in Figure 6.

This model provides selected techniques for assessing the habitat suitability of wetlands or aquatic habitats within the geographic range of the slider. The characteristics chosen to describe habitat suitability, although general, are appropriate because of the ubiquity of the species and its ability to use most available aquatic habitats. In addition, the behavior and physiology of the slider turtle allow for rapid dispersal into new habitats and the capability to withstand a broad range of environmental conditions.

The water regime modifiers that are used in this model (Figure 3c) are described below (Cowardin et al. 1979:24). The modifiers are intended to apply primarily to wetlands and lacustrine cover types. Riverine cover types are assumed to always have water flowing and should be classified as permanently flooded.

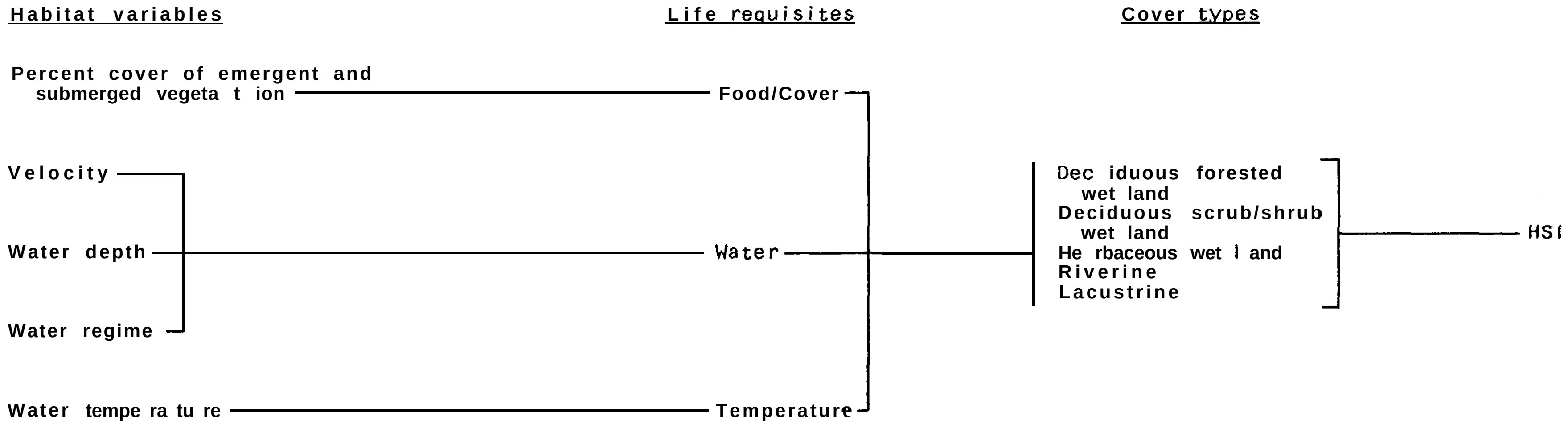


**Figure 5. The relationship of habitat variables, life requisites, and cover type to an HSI value for the slider turtle.**

| Variable (definition) | Cover types | Suggested technique |
|---|---|---|
| Percent cover of emergent and submerged vegetation (percent of midsummer aquatic substrate which, when viewed from above, is covered by leaf or stem tissue of emergent or submerged aquatic plants). | DFW,DSW,HW,R,L | Quadrat, ocular estimate |
| Velocity (the average peak rate at which water is flowing at the surface, i.e., the highest rate in the cross section of the river or wetland being evaluated; to be measured during periods of non-flooding). | DFW,DSW,HW,R,L | Flow meter, floating body |
| Water depth (the average vertical distance from the substrate to the water surface in a river or wetland; measured as the average depth within 10 m of the shore available during the April through September period, except during flooding periods). | DFW,DSW,HW,R,L | Standard depth meters, graduated rod |
| Water regime (the permanence of surface water in a wetland, defined by Cowardin et al. 1979. See text for definitions). | DFW,DSW,HW,R,L | National Wetlands Inventory maps; on-site inspection |
| Water temperature (mean surface water temperature during peak activity and growing season, April through September). | DFW,DSW,HW,R,L | Thermometers |

Figure 6. Definition of variables and suggested measurement techniques.

Permanently Flooded. Water covers the land surface throughout the year in all years. Vegetation is composed of obligate hydrophytes.

Intermittently Exposed. Surface water is present throughout the year except in years of extreme drought.

Semipermanently Flooded. Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.

Seasonally Flooded. Surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

Saturated. The substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present.

Temporarily Flooded. Surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Plants that grow both in uplands and wetlands are characteristic of the temporarily flooded regime.

Intermittently Flooded. The substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity.

Model assumptions. This model assumes that the quantification of the habitat variables presented here can be directly related to the suitability of wetland and aquatic habitats for the slider turtle. Many of the model's assumptions are based on subjective interpretation of the literature and direct experience of the authors. The values presented for the Suitability Index curves were not based on specific experimentation, but were the by-products of quantitative empirical data accumulated during long-term studies of the slider.

Although the model is intended' for broad applicability, the following assumptions could restrict its use: (1) available basking and nesting sites are not limiting factors, and (2) any aquatic habitat within the geographic range of this species is accessible (i.e., immigration and colonization are expected). Other than in exceptional circumstances, most natural and environmentally-altered habitats that the species might encounter should meet these assumptions.

## SOURCES OF OTHER MODELS

No other habitat models were found during literature searches on the habitat needs of the slider turtle.

## REFERENCES

Brattstrom, B. H. 1965. Body temperatures of reptiles. Am. Midl. Nat. 73:376-472.

Cagle, F. R. 1944. Home range, homing behavior, and migration in turtles. Misc. Publ. Univ. Michigan Mus. Zool. 61:1-34.

__________ 1950. The life history of the slider turtle, Pseudemys scripta troosti (Holbrook). Ecol. Monogr. 20:32-54.

Carr, A. F. 1952. Handbook of turtles. Comstock Publ. Assoc., Ithaca, NY. 542 pp.

Clark, D. B., and J. W. Gibbons. 1969. Dietary shift in the turtle Pseudemys scripta (Schoepff) from youth to maturity. Copeia 1969(4):704-706.

Conant, R. 1975. A field guide to reptiles and amphibians of eastern and central North America. Houghton Mifflin Co., Boston. 429 pp.

Congdon, J. D., D. W. Tinkle, G. L. Brietenbach, and R. van Loben Sels. 1983. Nesting ecology and hatching success in the turtle, Emydoidea blandingi. J. Herpetol. 39:417-429.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish Wildl. Serv. FWS/OBS-79/31. 103 pp.

Ernst, C. H., and R. W. Barbour. 1972. Turtles of the United States. Univ. Kentucky Press, Lexington. 347 pp.

Gibbons, J. W., and R. D. Semlitsch. 1982. Survivorship and longevity of a long-lived vertebrate: How long do turtles live? J. Anim. Ecol. 51:523-527.

Gibbons, J. W., J. L. Greene, and J. D. Congdon. 1983. Drought-related responses of aquatic turtle populations. J. Herpetol. 17:242-246.

Gibbons, J. W., J. L. Greene, and K. K. Patterson. 1982. Variation in reproductive characteristics of aquatic turtles. Copeia 1982(4):776-784.

Hutchison, V. H. 1979. Thermoregulation. Pages 207-288 in M. Harless and H. Morlock, eds. Turtles: perspectives and research. John Wiley and Sons, New York.

Hutchison, V. H., A. Vinegar, and R. J. Kosh. 1966. Critical thermal maxima in turtles. Herptologica 22:32-41.

Moll, E. O., and J. M. Legler. 1971. The life history of a neotropical slider turtle, Pseudemys scripta (Schoepff), in Panama. Bull. Los Angeles County Mus. Nat. Hist. Sci. 11:1-102.

Morreale, S. J., J. W. Gibbons, and J. D. Congdon. 1984. Significance of activity and movement in the yellow-bellied slider turtle (Pseudemys scripta). Can. J. Zool. 62:1038-1042.

Obbard, M. E., and R. J. Brooks. 1980. Nesting migrations of the snapping turtle (Chelydra serpentina). J. Herpetol. 36:158-162.

Parker, W. S. 1984. Immigration and dispersal of slider turtles (Pseudemys scripta) in Mississippi farm ponds. Am. Midl. Nat. 112:280-293.

Parmenter, R. R. 1980. Effects of food availability and water temperature on the feeding ecology of pond sliders (Chrysemys s. scripta). Copeia 1980(3): 503-514.

Pritchard, P. C. H. 1979. Taxonomy, evolution, and zoogeography. Pages 1-42 in M. Harless and H. Moslock, eds. Turtles: perspectives and research. John Wiley and Sons, New York.

Schubauer, J. P. 1981. The ecology and behavior of an aquatic turtle, Pseudemys scripta, inhabiting a thermally altered reservoir, Par Pond, South Carolina. M.S. Thesis. State University of New York, Buffalo. 95 pp.

Sexton, O. J. 1959. Spatial and temporal movements of a population of the painted turtle, Chrysemys picta marginata (Agassiz). Ecol. Monogr. 29:113-140.

Standora, E. A. 1982. A telemetric study of the thermoregulatory behavior and climate-space of free-ranging yellow-bellied turtles, Pseudemys scripta. Ph.D. Dissertation. University of Georgia, Athens. 153 pp.

U.S. Fish and Wildlife Service. 1981. Standards for the development of Habitat Suitability Index models. 103 ESM. U.S. Fish Wildl. Serv., Div. Ecol. Serv. n.p.

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15. Supplementary Notes

16. Abstract (Limit: 200 words)


A review and synthesis of existing information were used to develop a Habitat Suitability Index (HSI) model for the slider turtle (Pseudemys scripta). The model consolidates habitat use information into a framework appropriate for field application. and is scaled to produce an index between 0.0 (unsuitable habitat) and 1.0 (optimum habitat). HSI models are designed to be used with Habitat Evaluation Procedures previously developed by the U.S. Fish and Wildlife Service.


17. Document Analysis a. Descriptors

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Slider turtle
Pseudemys scripta
Habitat suitability

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