AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

Other Proposals

A. PROPOSAL

Inclusion of all of the species in the genus *Terrapene* in Appendix II, retaining *Terrapene coahuila* in Appendix I.

B. PROPONENT

The United States of America.

C. SUPPORTING STATEMENT

1. Taxonomy

11. Class: Reptilia

12. Order: Testudines

13. Family: Emydidae

14. Species: *Terrapene* (Linnaeus)

Terrapene taxa proposed for inclusion in Appendix II.

Terrapene carolina Group

T. c. carolina	Eastern box turtle
T. c. baurii	Florida box turtle
T. c. major	Gulf Coast box turtle
T. c. mexicana	Mexican box turtle
T. c. triunguis	Three-toed box turtle
T. c. yucatana	Yucatan box turtle

Terrapene ornata Group

T. o. ornata	Ornate box turtle
T. o. luteola	Desert box turtle

Terrapene nelsoni Group

T. n. nelsoni	Nelson's box turtle
T. n. klauberi	Klauber's box turtle

To be retained in Appendix I:

Terrapene coahuila Coahuilan box turtle

15. Common Names: English: Box turtle, box tortoise
French:
Spanish:

16. Code Numbers:

2. Biological Data

21. Distribution: The most widely distributed species, *Terrapene carolina* is found from Canada to Mexico. Its range encompasses southern Maine southward to the Florida Keys and westward through Canada (Ontario) to Michigan, Illinois, eastern Kansas, Oklahoma, and Texas. In Mexico, disjunct populations are found along the east coast (Caribbean drainage): *T. carolina mexicana* occurs in southern Tamaulipas, eastern San Luis Potosi, and northern Veracruz and *T. carolina yucatana* is found in the northern part of Yucatan peninsula (Iverson, 1986). *T. ornata ornata* ranges over large sections of the midwestern United States and the Great Plains, from Texas north to southern South Dakota, eastward to Indiana. *T. ornata luteola* has a much narrower range, from western Texas, southern Arizona and New Mexico south to the northern Mexican states of Chihuahua an Sonora (Iverson, 1986). *T. nelsoni* has a very small and fragmented range, in widely disjunct high altitude localities on the west coast of Mexico. *T. nelsoni nelsoni* occurs in the Mexican state of Nayarit and *T. nelsoni klauberi* occurs in the states of Sonora and Sinaloa (Iverson, 1986). Very little is known about the distribution of this species (IUCN/SSC, 1989); it is listed as "insufficiently known" by the IUCN in the 1990 Red List of Threatened Animals.

22. Population: There is considerable variability in box turtle population densities and reproductive output throughout the range. Most authors agree that box turtles are long-lived species, taking 10-20 years to reach sexual maturity, often reproducing for decades thereafter, and possibly living over 100 years. Box turtles congregate at the edges of deciduous woodland, and near streams and low, swampy areas. Although quite secretive, they become very active after summer rainstorms.

Box turtles have high site fidelity, and loss of adults from a population can have a significant detrimental effect on the status of the population. Klemens (1993) analyzed Doroff and Keith's (1990) data and concluded that the take of one adult per year from a Wisconsin population of *Terrapene ornata* was not sustainable. Behler (1994) reports that loss of mature females significantly affects a local population by skewing demographics and negatively altering recruitment potential. Box turtles are long-lived, have late sexual maturity, high egg and juvenile mortality, and low annual recruitment. Box turtles are important components of many terrestrial ecosystems; they play an important role in seed dispersal of a variety of forest plants (Braun and Brooks, 1987; Rust and Roth, 1981). Development activities have increasingly fragmented their habitats. When coupled with loss and degradation of habitat, late onset of sexual maturity, and low reproduction rates, over-collection can become a serious threat to the species. Since most box turtles in trade are adults, commercial trade may have its greatest impact on the reproductive portion of box turtle populations. Furthermore, losses of even a few reproducing individuals from a population can cause population extirpation, since many populations are already fragmented.

Declines in population numbers throughout the range of both *Terrapene ornata* and *Terrapene carolina* are reported (Stickel, 1978; Williams and Parker, 1987; Doroff and Keith, 1990; Penick, 1991; Schwartz and Schwartz, 1974; Yahner, 1974; Correspondence), while removal from the wild for commercial trade, including export, is increasing.

Fragmentation of box turtle populations is exacerbated by extremely high road mortalities. Roads are reported to play a significant role in collecting for the pet trade as well. State officials report one individual having collected 400 live box turtles in one day along roadsides, all of which entered the pet trade. One state official reports that box turtle populations are threatened state-wide, due to habitat loss as a primary factor. He notes that remaining populations of box turtles are clustered along roads where habitat fragments

remain somewhat intact and serve as corridors for the species. The concentrations of box turtles along roads may give a false impression of population health.

The following are highlights of State information, including population studies and trade information:

New England states

Populations of *Terrapene* are declining in New England (DeGraff and Rudis, 1983). *Terrapene carolina* is protected from commercial collection in all of the following New England states where it has been reported: Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut. Although scattered records exist for southeastern Maine and coastal New Hampshire, the distribution and viability of *Terrapene* populations in these states is questionable (Klemens, pers. comm.) Klemens (pers. comm.) rarely encountered hatchling and juvenile *Terrapene carolina*, in contrast to Virginia where he found these age classes more frequently. He found box turtle populations in New England much smaller than in Virginia; the rarity of hatchlings and juveniles in New England may be a reflection of small population sizes. Box turtles attain very large body sizes in New England, with 81% of the specimens examined by Klemens (1990; 1993) to be in excess of 140 mm. long. He found that these large New England box turtles produce some of the largest clutch sizes reported for this species, from 3 to 11 eggs.

Connecticut

State wildlife officials in Connecticut report that "over-collection of this species may be contributing to the decline of populations in several areas."

Florida

State wildlife officials report that commercial trade in box turtles (Terrapene carolina) is prohibited in the state. Populations are reported to have declined in the state (Dodd and Franz, 1992).

Illinois

State wildlife officials report that illegal trade in reptiles in the state "is occurring on a regular basis and is much more widespread and severe than we had previously imagined." A recent undercover case provided evidence of illegal trade in box turtles and other reptiles; the state believes that the level "of collection in the wild is having a negative effect on local box turtle populations in Illinois." All commercial use of box turtles is prohibited in Illinois.

Indiana

Williams and Parker (1987) recorded a large decrease (50%) in numbers of *T. carolina* in Indiana between 1970 and 1983.

Iowa

Terrapene ornata is listed as a threatened species in Iowa, because its small, fragmented populations do not appear to be reproducing; several populations that were reported 40 years ago are now completely extirpated.

Kansas

A population of *Terrapene ornata* in Kansas consisted of 53% adult or subadult females, 31% adult males and 16% juveniles (Legler 1960). Legler's studies (1960) indicate a mean clutch size of 4.7 with a third of the population producing two clutches per season. Both *Terrapene ornata* and *Terrapene carolina* are found in Kansas, and it is illegal for anyone to deal commercially with either species in the state of Kansas.

Maryland

Stickel (1950) rarely found hatchling and juvenile *Terrapene carolina*, the latter consisting of less than 10% of the population. She found 245 adults on a 29 acre study plot and estimated that 6.7% were transients. Populations of box turtles are declining in Maryland (Stickel, 1978). State wildlife officials report an overall decline in box turtle (*T. c. carolina*) populations in the state, "probably due to a decline in habitat quality and quantity, and high mortality due to road-kills." The state notes that any further loss of adults from their populations through illegal activities would further exacerbate the effect of declines due to other factors.

Massachusetts

Massachusetts considers *Terrapene carolina* a species of special concern. Collection is prohibited without a scientific collecting permit. Klemens (1993) maps two disjunct centers of *Terrapene* distribution in Massachusetts, the Central Connecticut Lowland and the coast. Box turtles are extremely rare and localized in the Central Connecticut Lowland. This area is near the northern limit of this species' range, and has been subject to rapid urbanization. Box turtles are locally abundant along the coast in Barnstable, Bristol, and Plymouth countries (Klemens, pers. comm.). Their occurrence here is concentrated in undeveloped areas, often in small areas of woodland bordering upon salt marshes and tidal creeks.

Michigan

State wildlife officials note that *T. carolina* occurs in the southern and western portions of the Lower Peninsula of Michigan. Box turtles are listed by the state as a "species of special concern".

Missouri

Schwartz and Schwartz (1974) found a 1:1 sex ratio among *Terrapene carolina* in their study area. Kiester *et al.* (1982) found a small number of males in a population to be transients. Transient individuals are important in maintaining gene flow between populations. State wildlife officials note that populations are stable in some areas but declining in others. All trade in box turtles is prohibited in Missouri, unless propagated in captivity (no permitted propagators in the state deal in box turtles). State officials also report that there is evidence that large numbers of box turtles are being collected illegally in the state.

New Jersey

State wildlife officials report anecdotal information that populations of the box turtle species found in New Jersey, *T. carolina*, appear to be declining. State law prohibits removal from the wild of box turtles for commercial purposes; there is evidence of illegal trade.

New Mexico

T. ornata ornata and *T. ornata luteola* are found in New Mexico. State wildlife officials report a frequent yet unquantified take from the wild.

New York

New York law prohibits the collection, killing or sale of all land turtles without a permit; state wildlife officials do not issue such permits for removal from the wild for the pet trade. State officials report "perilous" population declines, due to habitat fragmentation, road kills, and the pet trade in wild-caught box turtles. In 1993, *T. carolina* was added to the state's list of species of "special concern." State officials report that as many as 10,000 box turtles are exported through New York every year. They are concerned that large numbers of box turtles are "rejected" by exporters, and may pose a danger to the health of wild populations of box turtles if they are "dumped" in the state. Klemens (1990 & in press) reported that adult *Terrapene carolina* were usually in excess of twenty years old and that many were considerably older. He reported on a marked population of box turtles on Long Island, of which 15 individuals had minimum ages of between 48-86 years. Behler (1994) reports that box turtles have largely disappeared from the lower Hudson River drainage in New York, where they were common 20 years ago. The situation on Long Island is perhaps worse, due to development and habitat loss. Populations remaining in parks and reserves are being affected by incidental take and commercial collection. Although box turtles are protected by state law, commercial collecting is reported to continue.

Ohio

Anecdotal evidence indicates that previously healthy turtle populations have disappeared.

Oklahoma

State wildlife officials report that during 1990, 1,596 *T. carolina triunguis* and *T. ornata ornata* were legally caught in the wild and sold in Oklahoma; 9,719 were reported as sold in the state in 1991. They report that the numbers sold illegally were probably much larger. Since 1992, commercial trade in box turtles is prohibited in Oklahoma, due to concern over an increase in commercial activity in native reptiles, particularly box turtles. State officials are concerned about illegal collection and transport out-of-state.

Pennsylvania

State wildlife officials report that *T. carolina carolina* is protected in the state from commercial trade.

Tennessee

Yahner (1974) reported an annual survival rate of less than 0.80 for *Terrapene carolina* in Tennessee and suggested that this population is in decline. Dolbeer (1969) collected 270 *T. carolina* on a 22 acre site near Knoxville, Tennessee, estimating a population density of 7 to 9 turtles per acre.

Virginia

T. carolina carolina is found throughout most of Virginia, and has been declining in recent decades. Due to losses from road-kills and population fragmentation in urban areas, state wildlife officials are concerned about the loss of reproductive adults in isolated populations. State officials report declines due to collection for the pet trade. Collection for sale is not permitted in Virginia.

West Virginia

State wildlife officials report several arrests for illegal collection of turtles, and increased demand for turtles for the pet trade. State officials note that there are "no harvestable surpluses in box turtle populations."

Wisconsin

Doroff and Keith (1990) studied *Terrapene ornata* in south central Wisconsin between 1977-1987. They estimated a total of 54-56 adults occupied four sites within their 8 km2 study area. Adult densities ranged from 2.9 to 5.0 per hectare. Their studies reported a mean clutch size of 3.5, with one clutch per season. Doroff and Keith (1990) used demographic life-equation analysis to calculate long term population trends of *T. ornata* in Wisconsin in a study spanning 10 years. They reported an annual survival rate of 0.81 for their population which is well below their calculated 0.94 survival rate needed to prevent a population decline. *Terrapene ornata* was listed as a state endangered species in 1972. State wildlife officials report that populations have been "reduced to a point where they are quickly disappearing". State officials report that collecting, while illegal in the state, "continues to impact the few remaining relict populations that remain." One dealer in Wisconsin is reported to sell from 4,000-8,000 box turtles per year.

23. Habitat: *T. carolina* is predominantly a species of open woodlands, although in the northeast it also occurs in pastures and marshy meadows (Ernst & Barbour 1972) as well as edge areas between woods and fields (Klemens 1990; 1993). *T. ornata* is a prairie turtle, inhabiting treeless plains and gently rolling country with grass scattered low brush as the dominant vegetation (Ernst & Barbour 1972).

    In the United States, *Terrapene* habitat is being lost to development, farmland, and logging operations. In the northeast, *Terrapene* populations are at even greater risk because densely populated areas continue to expand into rural greenbelts (Klemens, 1985). Populations are being fragmented by roads and development into units that may be too small to be viable (Klemens 1989).

3. Trade Data

    31. National Utilization

    United States

    Trade and take of *Terrapene carolina* and *Terrapene ornata* is restricted in most states, but this has not prevented either legal or illegal trade, in part because of problems with enforcement of State regulations where they exist. In Oklahoma in 1991, for example, the last year trade was legal, 9,719 box turtles were sold. State authorities suspect that actual numbers were much higher.

T. ornata appears regularly in catalogs of both Florida and California dealers, with 5 to 100 advertised per catalog, at from $10 to $15 each; higher prices up to $40-80 have been reported. In 1991, Kevin M. Enge (*in litt.*) of the Florida Game and Fresh Water Fish Commission reported that a collector from Texas brought 200 *T. ornata* into the State to sell to South Florida dealers.

In California, the sale of *T. carolina* is not restricted; it appears regularly on monthly and seasonal price lists of dealers of reptiles on the West Coast at $12-$17 each, although prices up to $80 have been reported.

Canada

In Ontario, *T. carolina* occupies a very restricted small range, where it is protected. This may be a non-reproducing feral population. Local *Terrapene* are not traded; however, *Terrapene* are imported from the U.S.

Mexico

Information was not available on the domestic utilization of *T. carolina mexicana, T. carolina yucatana, T. nelsoni nelsoni* or *T. nelsoni klauberi* populations.

32. Legal International Trade

United States Exports

Based on U.S. Fish and Wildlife Service Law Enforcement computerized data (which may be incomplete for non-CITES species, and thereby may underestimate the numbers of animals exported), from 1988-1993 (1993 data are incomplete), 55,341 box turtles (*Terrapene* sp.) were exported from the United States, of the species *T. carolina* and *T. ornata*. In 1992, 26,817 box turtles were exported from the United States; 18,134 were exported in 1993, and 1993 data are not yet fully entered into the computer system, and are thereby incomplete. These figures represent the number of box turtles reported to the Service as being exported; it is not possible to ascertain how many were removed from the wild. Whether or not this level of international trade in these species is detrimental to populations must take into account the numbers removed from the wild for international trade, along with the numbers removed from the wild for other purposes, including but not limited to interstate and intrastate commerce, habitat loss, habitat degradation, disease, and predation.

Gaski (*in litt.*) surveyed (by telephone) inspectors at six of the designated U.S. Fish and Wildlife Service ports, which reported that between 8,000 and 14,000 *T. carolina* were exported per year prior to 1992. Specifically, officials at the port of Chicago (which exports the largest number of box turtles) believe that 5,000 to 10,000 *T. carolina* are exported annually (at the rate of 200 per week, mainly to Western Europe, Canada, and Japan).

Wildlife Inspector Joe Vandenberg at the port of New York (Gaski, *in litt.*) estimated that 800 box turtles were exported annually prior to 1992; those numbers are believed to have increased significantly since then. According to Vandenberg, one unidentified dealer shipped out wild-collected hatchlings of *T. carolina* at the rate of 200 per week to the United Kingdom. Another dealer had previously shipped out adults to Hong Kong, Japan, Germany, and the United Kingdom.

33. Illegal Trade

34. Potential Trade Threats: Box turtles are highly prized by pet keepers and hobbyists. Their small size and bright coloration and terrestrial habits have made them the choice for collectors. Various species of tortoises, now listed on CITES Appendices I and II, are difficult to obtain. Many are banned from trade by the European Community (EC). There is an ever-increasing international demand for box turtles, as evidenced by the sharp report of exports that commenced in 1984 with the EC ban on trade in Mediterranean land tortoises, *Testudo* (Warwick 1986). Prices of box turtles in Paris markets are reported to be from $50-100 for box turtles (Correspondence).

From 1985 onwards, North American *Terrapene* spp. have been available in most pet stores in the United Kingdom. Typical prices in 1992 were in the $50 range. Imports into the United Kingdom from the United States of box turtles for 1986-1990 were 1,512 specimens (Smart and Bride, 1993). The RSPCA reports that EC data on CITES imports indicate that the United Kingdom imports 5-10% of CITES chelonians imported into the EC.

In the New Jersey-New York area, local pet store owners or out-of-state collectors pay local people small amounts ($3-$5 is cited by New Jersey state authorities) to collect local turtles. One pet store owner in Suffolk County, New York, had over 200 adult box turtles in his store being readied for shipment to the U.K. and had paid one local child in white mice (Correspondence). A Virginia collector (Correspondence) wrote expressing his concern and related that he himself had worked with one dealer and estimated that they had shipped several thousand turtles per year to Europe in the past. One law enforcement action in one county in Michigan found 300 turtles in the possession of one dealer. Of these, 19 were *Terrapene* spp., and 19 adult box turtles could well represent that area's entire box turtle population (Correspondence). State wildlife authorities in Mississippi report receiving inquiries from out-of-state collectors indicating their interest in acquiring 10,000-20,000 box turtles for the pet trade. [Note: Commercial trade is prohibited in Mississippi.]

There is evidence that illegal trade in box turtles, which are protected in most of the states, is occurring frequently. In Illinois, for example, a recent undercover investigation resulted in 23 arrests for illegal sale of reptiles and amphibians, a number of which were box turtles. Many U.S. range states (e.g., Maryland, Michigan, Mississippi, Missouri, New Jersey, New York, Oklahoma, Virginia, West Virginia and Pennsylvania) believe that extensive illegal trading in box turtles is occurring, and that a CITES listing and subsequent permit issuance requirements would provide critical data on the actual numbers being exported.

4. Protection Status

41. National: *T. carolina* and *T. ornata* are protected by various state (U.S.) and provincial (Canada) legislation in over 50% of the political jurisdictions where they occur. *T. nelsoni* is protected in Mexico.

42. International: None.

43. Additional Protection Needs: Appendix II listing of *Terrapene* species will set up a trade monitoring scheme at the federal level and assist in buttressing state protective legislation. Several state wildlife officials report that all box turtles in commercial trade are wild-caught. It is not commercially feasible at this time to breed box turtles in captivity to marketable size, due to the fact that they are long-lived, slow to reach sexual maturity, and slow-growing.

5. Information on Similar Species

T. coahuila is found only in Cuatro Cienegas, Mexico. It has been reported in illegal trade.

Both Blanding's turtle (*Emydoidea blandingii*) and box turtles (*Terrapene*) are members of the same subfamily, Emydinae. They also share similar demographic traits, including delayed sexual maturity, low reproductive output, and adult longevity. Congdon *et al.* (1993) reported that life history traits of long-lived organisms consist of co-evolved traits that result in severe constraints on the ability of populations to respond to chronic disturbances. The study reported the need to reduce the mortality of older juveniles and adults in any successful management and conservation program of turtles or tortoises.

6. Comments from Countries of Origin

This is contained in the population status information, above.

7. Additional Remarks

The Coahuilan box turtle (*T. coahuila*) from Mexico is currently listed in Appendix I, where it should be retained.

8. References

Behler, J. Chairman, IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. 1994. Correspondence with U.S. Fish and Wildlife Service.

Braun, J. and G.R. Brooks, Jr. 1987. Box turtles as potential agents for seed dispersal. Am. Midl. Naturalist 117(2):312-318.

Congdon, J.D., A.E. Dunham, and R.C. Van Loben Sels, 1993. Delayed sexual maturity and demographics of Blanding's turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. Conservation Biology 7(4):826-833.

Correspondence. 1994. Communications in writing with U.S. Fish and Wildlife Service, from state wildlife officials, non-governmental organizations, and private citizens.

DeGraff, R.M. and D.D. Rudis. 1983. Amphibians and reptiles of New England: Habitats and natural history. The University of Massachusetts Press, Amherst, MA. 83 pp.

Dodd, C.K. and R. Franz. 1992. The need for information on "common" species. Abs. Proc. 35th Mtg., Soc. Study of Amphibians and Reptiles, El Paso, TX. 44 pp.

Dolbeer, R.A. 1969. A Study of Population Density, Seasonal Movements and Weight Changes, and Winter Behavior of the Eastern Box Turtle, *Terrapene carolina*, in Eastern Tennessee. M.Sc. Thesis. Univ. Tennessee, Knoxville, Tennessee. vii 53 pp. +

Doroff, A.M. and L. Keith, 1990. Demography an Ecology of an Ornate Box Turtle Population in South-central Wisconsin. Copeia 1990: 387-399.

Enge, K.M. 1991, *in litt.*

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

Gaski, A. 1991, *in litt.*

IUCN 1990. 1990 Red List of Threatened Animals.

IUCN/SSC (D. Stubbs, Compiler). 1989. Tortoises and Freshwater Turtles: An Action Plan for Their Conservation. 27 pp.

Iverson, J. B. 1986. A Checklist with Distribution Maps of the Turtles of the World. John B. Iverson, Earlham College, Richmond, Indiana. 282 pp.

Joseph, John. 1986. An Investigation into the United Kingdom Trade in Tortoises and Terrapins. Honors Thesis in Environmental Studies, Hatfield Polytechnic, Hatfield, England. 98 pp.

Kiester, A.R., C.W. Schwartz and E.R. Schwartz. 1982. Promotion of Gene Flow by Transient Individuals in an Otherwise Sedentary Population of Box Turtles (*Terrapene carolina triunguis*). Evolution 36(3):617-619.

Kirby, T. 1987. The "Moneybox" Tortoise. BBC Wildlife, July 1987.

Klemens, M.W. 1985. Survivors in Megalopolis: Reptiles of the Urban Northeast. Discovery 18(1):21-25.

1989. The Methodology of Conservation, in Swingland, I.R. and M.W. Klemens (eds.). The Conservation Biology of Tortoises. Occas. Papers.IUCN/SSC 5:1-4.

1990. The Herpetofauna of Southwestern New England. Ph.D Diss. University of Kent at Canterbury, Kent, England.

1993. The Amphibians and Reptiles of Connecticut and Adjacent Regions. Connecticut Geol. Nat. Hist. Surv. Bulletin 112:xii-318.

Legler, J.M. 1960. Natural History of the Ornate Box Turtle, *Terrapene ornata ornata* Agassiz. Univ. Kansas Publ. Mus. Nat. Hist. (11):527-669.

Penick, D. 1991. Status of Box Turtle (*Terrapene*) populations in the U.S. Unpub. report. Drexel University. Philadelphia. 5pp.

Pritchard, P.C.H. 1979. Encyclopedia of Turtles. T.F.H. Publications. Neptune New Jersey. 895 pp.

Rust, R.W. and R.R. Roth. 1981. Seed production and seedling establishment in the mayapple, *Podophyllum peltatum* L. Am. Midl. Naturalist 105(1):51-60.

Schwartz, C.W. and E.R. Schwartz 1974. The three-toed box turtle in central Missouri: Its population, home Range, and movements. Pub. Miss. Dept. Conser. Terr. Series 5:1-28

Smart, A.C. and I.G. Bride, 1993. The U.K. Trade in Live Reptiles and Amphibians. A report to the RSPCA on the nature and status of the reptile and amphibian pet trade between 1980 and 1992. Durrell Institute of Conservation and Ecology, Canterbury, Kent, UK.

Stickel, L.F. 1950. Population and Home Range Relationships of the Box Turtle *Terrapene carolina*. Ecological mono. 20:352-378.

Stickel, L.F. 1978. Changes in a Box Turtle Population During Three Decades. Copeia. 78:221-225.

United Kingdom Department of Environment, 1984. Statistics on Licenses and Imports of *Terrapene carolina*.

Warwick, Clifford. 1986. The Rise and Fall of North American Box Turtles. Unpub. report. People's Trust for Endangered Species. Surrey, England. 10 pp.

Williams, E.C. and W.S. Parker. 1987. A long term study of a box turtle population at Allee Memorial Woods, Indiana, with emphasis on survivorship. Herpetologica 43:328-335.

Yahner, R.H. 1974. Weight Change, Survival Rate, and Home Range Change in the Box Turtle. Copeia 1974:546-548.