AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

Other Proposals

A. PROPOSAL

Inclusion of *Terrapene* spp. in Appendix II

B. PROPONENT

The Kingdom of the Netherlands.

C. SUPPORTING STATEMENT

1. Taxonomy

11. Class: Reptilia

12. Order: Testudines

13. Family: Emydidae

14. Species: *Terrapene*

The genus *Terrapene* is comprised of four species:

Terrapene carolina, the "eastern" or "Carolina box turtle", has six recoginized subspecies. These are:

- *Terrapene carolina carolina* (eastern box turtle),
- *Terrapene carolina baurii* (Florida box turtle),
- *Terrapene carolina major* (Gulf Coast box turtle),
- *Terrapene carolina triunguis* (Three-toed box turtle),
- *Terrapene carolina mexicana* (Mexican box turtle) and
- *Terrapene carolina yucatana* (Yucatan box turtle).

Wide intergrade zones exist between several of these subspecies in the southern United States (Milstead 1969).

Terrapene ornata, the "ornate box turtle", is comprised of two subspecies. These are:

- *Terrapene ornata ornata* (ornate box turtle) and
- *Terrapene ornata luteola* (desert box turtle).

Terrapene nelsoni, "Nelsons box turtle", is comprised of two subspecies. These are:

- *Terrapene nelsoni nelsoni* (Nelson's box turtle) and
- *Terrapene nelsoni klauberi* (Klauber's box turtle)

The fourth member of the genus, *Terrapene coahuila* (Coahuilan box turtle) is currently listed in Appendix I and no change in its status is recommended.

15. Common Names: USA: Box turtles
Europe: Box tortoises
Spanish: Tortuga

16. Code Numbers:

2. Biological Data

21. Distribution: The most widely distributed species, *Terrapene carolina*, is found from Canada to Mexico. Its range encompassses southern Maine southwards to the Florida Keys and westwards through southern Canada (Ontario) to Michigan, Illinois, eastern Kansas, Oklahoma and Texas. It has become quite rare or extinct at the northern periphery of its range in Maine, New Hanpshire, Ontario and Michigan. In Mexico, disjunct populations are found along the East coast (Carribean drainage): *T. carolina mexicana* occurs in southern Tamaulipas, eastern San Luís Potosí and northern Veracruz and *T. carolina yucatana* is found in the northern part of the Yucatán peninsula (Iverson, 1986). *T. ornata ornata* ranges over large sections of the midwestern US and the Great Plains, from Texas North to southern South Dakota, eastwards to Indiana. It has become rare at the periphery of its range in Wisconsin. *T. ornata luteola* has a much narrower range, from western Texas, southern Arizona and New Mexico South to the northern Mexican States of Chihuahua and Sonora (Iverson, 1986).

Terrapene nelsoni has a very small and fragmented range. It has been reported from 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* from 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 1990 Red List of Threatened Animals.

22. Population:

Population Structure: There is considerable variability in box-turtle population densities, size and reproductive output throughout the range. Most authors agree that box turtles are long-lived species, taking 10-20 years to reach sexual maturity, and often reproducing for decades thereafter. Box turtles congregate at the edges of deciduous woodland, and near streams and low, swampy areas. Although quite secretive, they become very active and are easily captured in large numbers after summer rainstorms. Although by no means complete, the following are highlights of some widely scattered studies.

Connecticut: 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, therefore 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 & in press) 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, but rarely fewer than six.

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.

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.

New York: Klemens (1990 & in press) reported that adult *Terrapene carolina* were usually in excess of twenty years old and that many were considerably older, worn completely smooth and devoid of annuli. He reported that a marked population of box turtles on Long Island (NY) of which fifteen individuals had minimum ages of between 48-86 years. Centenarian box turtles have been reported by Babcock (1928), Oliver (1953, 1954) and Graham and Hutchinson (1969).

Tennessee: Dolbeer (1969) collected 270 *Terrapene carolina* on a 22 acre site near Knoxville, Tennessee, estimating a population density of 7 to 9 turtles per acre.

Kansas: A marked 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.

Wisconsin: Doroff and Keith (1990) studied *Terrapene ornata* in South-central Wisconsin between 1977-1987. They estimated a total 54-56 adults on four occupied sites with their 8 km. sq. study area. Adult densities range from 2.9 to 5.0 per hectare. Their studies indicate a mean clutch size of 3.5, with one clutch per season.

Mortality: Box turtles have many causes of mortality (Neill, 1948; Stickel, 1950, 1978; Wood & Goodwin, 1954; Schwartz & Schwartz, 1974; Metcalf & Metcalf, 1979; Williams & Parker, 1987; and Doroff & Keith, 1990). Many authors have reported large numbers of winter kills and/or predation during hibernation. However in many populations the leading cause of death is related to humans. Box turtles are often killed by feral animals and certain wild carnivores which attain abnormally high population levels in areas where ecosystem balance has been altered by human activity (Klemens, 1989). Many turtles are killed by cars and mechanized farm and construction equipment as well as lawn mowers (Doroff & Keith, 1990; Klemens, 1990 & in press). In addition, roads and other forms of development increasingly fragment Terrapene habitats, isolating populations into non-sustainable units and impeding gene flow (Klemens, 1989, 1990 & in press).

A gram-negative bacterial pneumonia, common in captive chelonians (Jacobson, 1981) appears to be present in some wild populations (Evans, 1983). It is thought that this disease is spread when sick captive box turtles are returned to the wild (Penick, 1991). This is potentially a serious threat as a similar disease with captive origins has decimated wild populations of the desert tortoise, *Gopherus agassizii* in the Mojave Desert in California. This has resulted in the listing of these populations as endangered by the U.S. Fish and Wildlife Service.

Population Decline: The box turtle's life history strategy of low annual energy usage, low annual reproductive output, and late maturity necessitates long adult lives for sustained, balanced populations. This life strategy is not compatible with accelerating population declines caused by humans nor will the box turtle's high site fidelity make depleted areas amenable to recolonization (Penick, 1991).

There is a consensus among the general public that abundance of box turtles has declined markedly over the last three decades (Penick, 1991). This view is substantiated by many scientific works (Schwartz & Schwartz, 1974; Yahner, 1974; Stickel, 1978; Williams and Parker, 1987 and Doroff and Keith, 1990). Schwartz and Schwartz (1974) demonstrated a population decline from 700 to less than 400 over a period of six years for *T. carolina* in Missouri. Similarly, Stickel (1978) found a substantial drop in population size of *T. carolina* in Maryland between 1945 to 1975. Williams and Parker (1987) also recorded a large decrease (50%) in numbers of *T. carolina* in Indiana between 1970 and 1983. 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. Yahner (1974) also reported an annual survival rate of less than 0.80 for *T. carolina* in Tennessee and suggested that this population is also in decline.

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 & in press). *T. ornata* is a prairie turtle, inhabiting treeless plains and gently rolling country with grass and scattered low brush as the dominant vegetation (Ernst & Barbour, 1972). *T. nelsoni* inhabits high altitude oak-savannah habitat (Pritchard, 1979).

    Box turtles are integral components of terrestrial ecosystems. They may be an asset to farmers by feeding on agricultural pests such as snails and other invertebrates (Warwick, 1986). Box turtles are important because they act as seed dispersal agents (Rust & Roth, 1981; Braun & Brooks, 1987). Ingestion of wild fruits by box turtles positively affects seedling establishment by promoting seed germination as well as establishing new colonies of plants. Box turtles are therefore important avenues of energy flow through ecosystems, as well as key players in the recruitment of new plants species into ecosystems.

    Habitat Loss: *Terrapene* habitat is being lost to development, farmland and logging operations. In the northeastern U.S. *Terrapene* 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) (see section 22. Mortality).

3. Trade Data

    31. National Utilization:

    United States: Commercialization of *Terrapene carolina* and *Terrapene ornata* is restricted in several States, but this has not prevented either legal or illegal trade, partly because of the lack of enforcement of State regulations where they exist (see Section 4).

    T. ornata appears regularly in catalogs of both Florida and California dealers, with 5 to 100 advertised per catalog from $10 to $15 each. In 1991, Kevin M. Enge (*in litt.*) of the Florida Game and Fresh Water Fish Commission reports a collector from Texas brought in a truckload of reportedly 2000 *T. ornata* to sell to South Florida dealers.

    In California, the sale of *T. carolina* is not restricted, it appears regularly on the monthly and seasonal price lists of dealers in reptiles on the West Coast. The numbers per catalog range from 4 to 12 to at $12-$17 each.

Canada: With *T. carolina* occupying a very restricted small range in Ontario where it is protected, local *Terrapene* are not traded. However *Terrapene* are imported from the U.S. (see section 32).

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: Gaski (*in litt.*) surveyed inspectors at six of the ten designated U.S Fish and Wildlife Service ports who reported that between 8,000 and 14,000 *T. carolina* are exported per year. Specifically, officials at the port of Chicago (which exports the largest number of box turtles) believes 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. The total of export estimates from other ports add 2,780 to 3,380 to Chicago estimates.

Wildlife Inspector Joe Vandenberg at the port of New York (Gaski, *in litt.*) estimates 800 per year. According to Vandenberg, one unidentified dealer ships 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.

According to one unidentified dealer mentioned to Gaski (*in litt.* 3 by Wildllife Inspector Ron Driftka of the port of Los Angeles, 300-1,000 turtles each are exported at about $5 each and exported to Canada and France. He estimates 1,500 per year are exported from Los Angeles.

The Head Wildlife Inspector Patrick Hyde at the port of Miami reported to Gaski (*in litt.*) that "often" there were shipments of box turtles.

Wildlife Inspector Paul Beiringer at the port of Atlanta reports that 2 or 3 monthly shipments of 20-30 Terrapene go out monthly, approximately 480-1,080 per year (Gaski *in litt.*).

United Kingdom and Other European Imports: Joseph (1986) surveyed pet shops in the U.K. Box turtle prices ranged from £17-100 ($28-180). According to Teresa Mulliken of TRAFFIC International, prices of *T. carolina* in the U.K. in 1986 ranged from 5.50 to 6.50 pounds sterling. In 1984, *T. carolina* imports in the U.K. grew exponentially: up to 3,222, 23.5 times more than the 138 imported in 1983 (U. K. Department of Environment, 1984).

International trade in *Terrapene* was reported to have increased dramatically since the institution in 1984 of a ban on imports of three species of European tortoises, *Testudo graeca, T. hermanni*, and *T. marginata*. In the years up to the import ban, these species were imported in numbers of up to 40,000 per annum, and once the ban was instituted importers shifted to other sources of supply for similar species. Kirby (1987) reported on trends in imports into the United Kingdom as a result of the European tortoise ban, providing the following figures:

Pre-import ban:	
1981:	22
1983:	138
Post-import ban:	
1984:	3,222
January 1986-March 1987:	3,959

This marked rise in importing box turtles is reported to be the pet trade's response to the closing of the EC market to Mediterranean land tortoises, which became effective in January 1984 (Warwick, 1987). According to Warwick (pers. comm. to A. Brautigam, 1990), although trade in this species into other European countries may have levelled off, imports into the U.K. appear to be increasing.

33. Illegal Trade: In Florida, sale of *T. carolina* is illegal because large-scale collecting of Gulf Coast box turtles, *Terrapene carolina major* was decimating wild populations (K. Enge, *in litt.*). As trade is prohibited, there are no trade data on *T. carolina*. However, trade in *T. ornata* is still permitted. In over twenty-one years, Captain Barry Cook of the Florida Game and Fresh Water Fish Commission (pers. comm.), has observed numerous interstate shipments comprised of thousands of *Terrapene* yearly. He also anticipates that there is still a substantial amount of trade (illegal) in *T. carolina*.

34. Potential Trade Threats:

United States Jurisdiction: The complications caused by differing trade restrictions and differing enforcement priorities among the States is manifest in the problem of international trade. Because the Federal Government does not restrict exports, *T. ornata* tor example, a species not native to Florida, brought in from the midwestern U.S. (where it is not uniformly protected in all States), is legally exported through the port of Miami. One can similarly categorize both local sales and exports of *Terrapene* in the state of California, well beyond the range of *Terrapene* species.

International Demand: Box turtles are highly prized by pet keepers and hobbyists. Their small size and bright coloration and terrestrial habits have made them the logical choice for collectors as various species of tortoises, Testudinidae [now listed on CITES Appendices I and II and many banned from trade in the European Community (EC)], are expensive and difficult to obtain. There is a growing international demand for box turtles, as evidenced by sharp growth in exports that commenced in 1984 with the EC ban on trade in Mediterranean land tortoises, Testudo (Warwick, 1986).

4. Protection Status

41. National: *T. carolina* and *T. ornata* are protected by various state (U.S.) and provincial (Canada) legislations in over 50% of the political jurisdictions where they occurs (see section 34). Habitat destruction remains a threat to *Terrapene* listed as "endangered", "threatened" where concomitant regulations protecting habitat rarely exist, except Massachusetts.

42. International: The variations in laws from State to State allow for laundering of international trade shipments. Appendix-II listing of *Terrapene* will set up a trade monitoring scheme at the federal level and assist in buttressing state protective legislation, currently undermined because of lack of uniform regulation among the various States.

43. Additional Protection Needs: The problem of illegal interstate commercialization is a result of differing restrictions between States. This implies that federal interstate commerce regulation would be extremely helpful in monitoring the traffic in these species. In addition, state listings for protection require concomitant habitat protection in order to be truly effective.

5. Information on Similar Species

6. Comments from Countries of Origin

7. Additional Remarks

8. References

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