Collection, Trade, and Regulation of Reptiles and Amphibians of the Chihuahuan Desert Ecoregion

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Adrian Reuter, and Craig Hoover

TRAFFIC
NORTH AMERICA

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August 2004

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Visit www.traffic.org for an electronic edition of this report, and for more information about TRAFFIC North America.

ISBN 0-89164-170-X

Suggested citation:

Fitzgerald, L.A., *et al.* 2004. *Collection, Trade, and Regulation of Reptiles and Amphibians of the Chihuahuan Desert Ecoregion*. TRAFFIC North America. Washington D.C.: World Wildlife Fund.

Front cover photos from the top, clockwise, are: ridge-nosed rattlesnake *Crotalus willardi*, ring-necked snake *Diadophis punctatus*, collared lizard *Crotaphytus collaris*, Berlandier's tortoise *Gopherus berlandieri*, and imbricate alligator lizard *Barisia imbricata*. All photos are © Joseph E. Forks.

Back cover photo, courtesy of Adrian Reuter, shows rattlesnake skins for sale at a roadside market at Charco Cercado, San Luis Potosí, Mexico.

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Acknowledgements

We thank Gracia González Porter for information and insights on Mexican herpetofauna, and all of the interviewees who shared their knowledge of the commercial trade in amphibians and reptiles in the Chihuahuan Desert Ecoregion (CDE). Special thanks are owed to R. Roegner for providing the Texas Parks and Wildlife Department (TPWD) database of nongame collectors and dealers for our use. Nongame regulations from Arizona were provided by Michael Demlong, from New Mexico by Jon Klingel, and from Texas by R. Roegner. We are also grateful for the input of Jim Dixon, Bruce D. Taubert, Andy Price, and Teresa Mulliken, who kindly reviewed drafts of this report. We would also like to thank the Walt Disney Company Foundation and World Wildlife Fund for their generous financial support for this project.

Background

TRAFFIC North America sought to obtain and compile information on the collection of and trade in reptiles inhabiting the CDE. This project was designed to provide baseline information on the species involved in legal and illegal trade, levels of trade, and status of legislation and enforcement, and to identify priorities for conservation of commercially exploited herpetofauna from the CDE. Although investigation of amphibian collection and trade was outside the scope of this project, because of their similarity to reptile collection and trade, some information on amphibians is also included.

The Mexico portion of this report was prepared by Adrian Reuter. The United States portion was prepared by Lee A. Fitzgerald and Charles W. Painter. Both sections received contributions from Craig Hoover.

Executive Summary

The Chihuahuan Desert Ecoregion (CDE), located in the central and northern regions of Mexico, and in southern Arizona and New Mexico and west Texas in the United States, comprises desert and semi-desert regions among the most biologically diverse in the world. CDE reptile and amphibian biodiversity alone consists of approximately 217 species. Many factors (e.g., habitat destruction) affect amphibian and reptile populations in the CDE. Though collection for the commercial trade may impact these populations, the magnitude of this impact has not been thoroughly investigated and is poorly understood.

The objectives of this report are to: present information gathered on collection, trade, and regulation of the amphibians and reptiles of the CDE; assess the current and potential impacts of collection and trade; evaluate the effectiveness of existing regulations; and make recommendations regarding the steps needed to ensure that collection and trade are sustainable and do not pose a significant threat to CDE reptile and amphibian populations.

Mexico

Reptiles have long played an important role in the lives of native Mexican people, as a source of food, clothing, arts and crafts manufacture, traditional medicine, and other uses. The diversity of the Mexican CDE herpetofauna is among the highest in all desert ecoregions, with more than 130 reptile species known to exist in the Chihuahuan Desert.

Mexico's legal framework includes laws, regulations, norms, international agreements, national plans, and governmental dispositions, all of which are used to promote the protection and sustainable use of Mexico's natural resources, including its native reptiles. With limited exceptions—primarily involving noncommercial, scientific use—Mexico prohibits the export of native reptiles and amphibians, and all legal shipments must be accompanied by a permit. In addition to this legal regime, there are five protected areas in the CDE in Mexico, including the Cuatro Ciénegas Area for the Protection of Flora and Fauna, the Cañón de Santa Elena Area for the Protection of Flora and Fauna, the Mapimí Biosphere Reserve, the Maderas del Carmen Area for the Protection of Flora and Fauna, and the Sierra Gorda Biosphere Reserve. These protected areas cover in excess of 1 million hectares.

Though there is some targeted hunting of reptiles, especially for more commercially valuable species such as rattlesnakes and Bolson tortoises, collecting is frequently opportunistic. Domestic demand for pet reptiles has increased in the recent past, and there is an established trade in markets and some pet stores within Mexico. Some of this trade is common in established markets, where other pet animals such as aquarium fishes or songbirds are offered; however, the numerous street markets in major urban centers as well as at some busy crossroads and stretches of road also act as selling points. Most of this trade is targeted at nationals seeking personal pets or for resale in established businesses.

At least 82 species, or approximately 63% of the approximately 130 reptile species found in the Mexico portion of the CDE, are subject to some kind of trade. Most of this trade is targeted at demand for pets, followed by demands for meat, skins, and traditional medicine. Of the 82 species identified in domestic or international trade, 6 are listed in Appendix I or II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 4 are classified as Threatened by IUCN—the World Conservation Union (2002), and 51 in the NOM 059 ECOL 2001. Seventeen of the 82 species are endemic to Mexico. Rattlesnakes, used for skins, rattles, meat, fat, venom, and as live animals, are the most commonly traded Chihuahuan Desert reptiles. Several reptile species, including Bolson tortoises *Gopherus flavomarginatus*, Coahuilan box turtle *Terrapene coahuila* and black spiny softshells *Apalone ater*, may be particularly threatened due to their population status.

Five main distribution and trade centers for CDE reptile species were identified in three major areas, including: Plateros

Magical/Religious Center, Zacatecas; Charco Cercado, San Luis Potosí; three Mexico City Marketplaces (the Mercado de Sonora, the Mercado Nuevo San Lázaro, and the Mercado Emilio Carranza). Virtually all of the trade in reptiles and amphibians in these distribution and trade centers is illegal.

There is also an international, illegal trade in Mexican reptiles and reptile products, primarily to the United States. Because Mexican law generally prohibits the export of native reptiles, virtually all export of live reptiles, reptile parts, and products from Mexico is illegal. However, the offer for sale of numerous CDE reptile species endemic to Mexico by reptile dealers outside of Mexico, especially in the United States, indicates that illegal exports are taking place. Although many of these species are now bred in captivity within the United States, the original founder stock was likely exported illegally from Mexico. Also, there are frequent seizures of live reptiles, as well as parts and products, at the U.S./Mexico border. However, neither of these information sources gives a clear picture of the extent of exports from Mexico.

Demand for live rattlesnakes, skins, and parts for use in traditional medicine appears to have led to significant population reductions in some areas, such as Plateros, Zacatecas. However, basic biological information on most CDE reptile species is scarce, making it difficult to evaluate the impact of collection and trade on wild populations. This is compounded by the fact that these species face other threats in many areas, such as habitat loss by deforestation, agriculture, overgrazing, exotic species introduction, pollution, and watershed depletion.

To ensure that collection and trade are not a threat to CDE reptile species in Mexico, TRAFFIC recommends the following:

Enforcement:

1. Enforcement programs, which involve frequent inspections of important trade centers, should be enhanced to provide a more effective deterrent to illegal trade activities.
2. Wildlife inspector numbers should be increased and specific training provided (e.g., species identification, reptile handling, etc.) to ensure more effective regulation of the large-scale trade in reptiles and other wildlife.
3. Long-term investigations of reptile traffic networks, from their natural collecting areas to their final sale, are needed to fully understand the extent and impacts of this trade.
4. Protocols for disposing of confiscated wildlife, products, and byproducts, emphasizing the proper maintenance and handling of live specimens, including the creation of centers devoted to dealing with live confiscated wildlife, should be developed as a priority.

Management:

5. The UMA (*Unidad para la Conservación, Manejo y Aprovechamiento Sustentable*) system should be assessed to determine whether sufficient controls and monitoring mechanisms are in place. If so, the system should be promoted, especially with regard to captive production of reptiles. These efforts should focus on threatened species that are in significant demand for pets or other uses. Other UMA efforts might include exhibits, ecotourism, and reintroduction programs.
6. Expanded knowledge of the biology and size of the populations of these species is imperative, especially for threatened and heavily collected species.
7. Standardized gathering and reporting of wildlife collection and trade information (investigations, seizures, repatriations, prosecutions, etc.) and greater facilitation of information exchange and consultation among government offices and other parties are greatly needed.
8. Rehabilitation and release programs for seized animals, based on scientific data on the biology and distribution of each species, taking into account the potential for disease, genetic pollution, and other risks to wild populations, should be developed.

Education:

9. Environmental education programs focusing on local communities should be developed,

to increase awareness of Mexican laws and promote the value of these communities' natural resources.

United States of America

Though dozens of reptile and amphibian species are exploited throughout the United States, little is known about the extent of these activities or their impacts on wild populations. This is particularly true for the large number of small lizards and snakes such as those found in the CDE.

The collection and sale of reptiles and amphibians in the United States is generally regulated at the state level. For CDE species, the wildlife legislation and regulations of New Mexico, Arizona, and Texas are applicable to activities involving reptiles and amphibians in each of those jurisdictions. Federal legislation and regulations generally apply to federally protected species, activities on federal lands, and interstate and international commerce.

The domestic trade in amphibians and reptiles from the CDE is almost impossible to quantify, because take of most species is not regulated in New Mexico, trade from Arizona is illegal, and Texas has only recently begun gathering data from collectors. There is no reason to believe that large numbers of animals from Arizona are commercialized. Commercialization does occur in New Mexico, but there was no current information available at the time of this study. Information on collection and sale of nongame species was available from Texas for 1999.

In Texas during 1999, 14 351 specimens of reptiles and amphibians were reported to be collected by 53 Resident or Nonresident nongame permit holders. Of these, 4861 were amphibians and 9493 were reptiles. These numbers do not include rattlesnakes collected for rattlesnake roundups, and thus the overall figure is likely to be much higher. Ninety percent of all specimens collected in the CDE in Texas in 1999 originated in only five counties, with the top eight collectors accounting for 90.3% of the total harvest.

Available data indicate that the number of snakes removed from the wild is not extraordinary. In 1999, the Texas Parks and Wildlife Department (TPWD) nongame database showed that 985 snakes were collected in the CDE. Of these, 325 were garter snakes *Thamnophis* spp. and 307 were rattlesnakes *Crotalus* spp. Seventy-three kingsnakes were collected (all species of *Lampropeltis*); 42 were gray-banded kingsnakes. Thirty-two ratsnakes *Elaphe* spp. and 48 Trans-Pecos ratsnakes *Bogertophis subocularis* were reported collected by nongame permit holders. Several other species were collected in smaller numbers.

International trade in reptiles from the CDE in the United States is difficult to assess, due to a number of factors. Though some data are available from the U.S. Fish and Wildlife Service (USFWS), these data raise as many questions as they provide answers, largely because the data collected by the USFWS are often not species-specific, do not include any locality information, and frequently don't indicate the origin (wild-caught or captive-bred) of the animals. Despite these limitations, USFWS data are of some value in an analysis of CDE species trade. A thorough review of U.S. export data showed that there are approximately 50 reptile species found at least in part in the CDE that appear to be involved in international trade.

The export of turtle species found in the CDE likely involves few, if any, turtles actually collected from the CDE. For example, the export of red-eared sliders almost exclusively involves turtles produced on farms in Louisiana and elsewhere in the southeastern United States. The same is true for the export of most other turtle species found in trade.

The export of live CDE snake and lizard species does not appear to be a significant concern. Most species are apparently being exported in small numbers, and at least some of these species are being produced in captivity, with little indication of increasing trade throughout the time period examined.

A review of USFWS data showed that at least seven species found in the CDE are traded as parts or products. Though the export of native CDE species as parts or products involves far fewer species than are involved in the live trade, this practice may be having a far greater impact on individual species because the trade in parts and products is more likely to involve wild-caught adult animals. Of some concern is the exploitation of several venomous reptile species

for meat, skins, and leather products. This is especially true of the Western diamond-backed rattlesnake, which is exported in a large array of forms. The most significant trade in this species appears to be meat, with well over 2000 kilograms of meat exported over the six-year period examined. A significant volume of skins and skin products was also exported during this period, including 1616 skins, 712 shoes/boots, 1407 small leather products/skin pieces/leather trim, 34 handbags, 79 garments, 939 pieces of jewelry, and 753 unspecified items.

Based on the lack of field studies and monitoring data on the trade in reptiles and amphibians, it is not possible to draw definite conclusions about the threats posed by collection and trade. However, based on life history pattern, geographic extent of range, and detectability, it is likely that the vast majority of reptile and amphibian species found in the CDE are widely enough distributed that collecting will not lead to regional or global species extinction. Almost all amphibian and reptile collecting is done from roads or in accessible canyons. Enormous areas are on private land or so remote that collecting for trade is inefficient, and there are extensive areas of suitable and occupied habitat that are never collected.

Collecting and trade in the CDE probably should not be considered a threat to species that are relatively widely and continuously distributed, are small in size, and that possess a life history characterized by relatively short life span and high reproductive rate. The seven most collected species from the CDE in Texas in 1998-99 accounted for 79% of all species collected. It is impossible to evaluate quantitatively the impact of collecting on the populations that were exploited without detailed information on collecting effort, geographic extent of collecting, and demographic information on the exploited populations. However, the three amphibians—tiger salamander *Ambystoma tigrinum*, Couch's spadefoot *Scaphiopus couchii*, and green toad *Bufo debilis*—are common and widely distributed. The two lizards—common side-blotched lizard *Uta stansburiana* and marbled whiptail *Cnemidophorus tigris*—are also widespread and continuous in their distributions throughout much of the CDE.

Gila monsters *Heloderma suspectum*, turtles in general, and the prairie rattlesnake *Crotalus viridis* are species that, based on natural history, may be locally vulnerable to over-collecting. Species with fragmented ranges, such as the massasauga *Sistrurus catenatus* or Western hog-nosed snake *Heterodon nasicus*, even if the geographical extent of the range is large, may also be susceptible to local population extirpation.

Because of their vulnerability and the life history characteristics of long-lived organisms, turtle populations may be eliminated from specific sites from over-collecting. The yellow mud turtle *Kinosternon flavescens* and desert box turtle *Terrapene ornata luteola* were collected in large numbers in Texas. Though both species are common and widespread, yellow mud turtles are generally found when locally concentrated in ponds, stock tanks, and playas, and desert box turtles have a low reproductive rate. It is reasonable that these and similar species could be significantly impacted by intenstive collecting.

The pattern of collecting in Texas indicates some generalities that are relevant to reptile and amphibian collecting throughout the region. First, few collectors account for the great majority of specimens collected. Second, few species were collected in large numbers. The species that were collected in large numbers are widespread, small bodied, and, except for amphibians and turtles, are relatively short lived. A third generalization was that collecting was very patchy, with a small number of areas being intensively collected. In Texas, the same stretches of roads that have been popular with collectors for decades continue to produce specimens, and remain the principal areas used by collectors. There are enormous expanses of habitat throughout the entire ecoregion that are not visited by collectors. Thus, given available information, collection and trade do not appear to be a significant threat for the vast majority of CDE reptile and amphibian species in the United States. However, for a select number of species with particular vulnerabilities and/or life history characteristics, over-collecting may at least be impacting local populations and bear further attention.

Based on this information, TRAFFIC recommends the following:

Collection and Trade Monitoring:

1. To ensure that collection and trade of CDE amphibians and reptiles is sustainable, implementation of a legally binding monitoring system of take and trade in these groups is needed. Such a monitoring system must be based on the legal status of amphibians and reptiles and rules regulating their take. Such systems have been implemented in Texas and New Mexico and have provided valuable information on the trade of amphibians and reptiles in the state.

Field Research:

2. It is not often feasible to census amphibian and reptile species directly because of the large geographic areas involved, the time and expense required to measure these populations, and the inherent difficulties in measuring amphibian and reptile populations with confidence. Instead, targeted research should be aimed at producing sufficient information about collecting amphibians and reptiles to guide management decisions.
3. Information is needed on the amount of suitable habitat available for species with relatively small distributions and that require very specific habitat types in relation to the amount of area where they are collected.
4. Research on source-sink phenomena in exploited amphibians and reptiles would be useful, and has yet to be conducted for any exploited amphibian or reptile. Information on source-sink dynamics of selected species may clarify whether populations are self-sustaining, or to what extent habitat corridors and large uncollected areas are needed to sustain populations of exploited populations on a regional basis.

SINTESIS EN ESPAÑOL

INTRODUCCIÓN

La Ecoregión del Desierto Chihuahuense (EDC) está ubicada en las regiones centrales y del norte de México, y en la parte sur de los Estados Unidos. En los Estados Unidos, la EDC se extiende del sureste de Arizona al sur de Nuevo México, y al oeste de Texas hasta la Meseta de Edwards. Se interna significativamente en México, abarcando partes de Sonora, Chihuahua, Coahuila, Durango y otros estados, y cubre aproximadamente 630 000km^2 (243 000 millas cuadradas), incluyendo las regiones desérticas y semi desérticas más diversas del mundo, desde el punto de vista biológico. Esta ecoregión se encuentra rodeada por montañas de la Sierra Madre Occidental al oeste y de la Sierra Madre Oriental al este, extendiéndose al sur hasta San Luis Potosí incluyendo islas separadas de vegetación chihuahuense en los estados de Querétaro e Hidalgo.

Todos los años, se recolectan de la EDC un número indeterminado de reptiles y anfibios, principalmente culebras, lagartijas, tortugas y sapos, para suplir la demanda de estas especies como mascotas, tanto dentro del país como en el extranjero. Los taxones frecuentemente recolectados para el comercio incluyen los lagartos cornudos *Phrynosoma* spp., las falsas corales *Lampropeltis triangulum*, y otras culebras. Los monstruos de gila *Heloderma suspectum* aparecen en el comercio a pesar de las prohibiciones de recolección de toda su gama y de las listas en que aparecen en el Apéndice II de la Convención sobre el Comercio Internacional de Especies Amenazadas de Flora y Fauna Silvestres (Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES). Algunas especies, principalmente las serpientes de cascabel, se recolectan por su piel, carne y otras partes.

Muchos factores (p. ej., la reducción del hábitat) afectan a las poblaciones de anfibios y reptiles de la EDC. La recolección para el intercambio comercial puede causar un impacto en estas poblaciones, a pesar de que la magnitud de este impacto no ha sido investigada a fondo y no se comprende bien.

Hay inconsistencias en las regulaciones de recolección y comercio tanto en los Estados Unidos como en México. Por lo tanto, se necesita más información sobre la recolección y el comercio de anfibios y reptiles silvestres, con el fin de tomar decisiones informadas sobre las prioridades de conservación para la EDC.

Los objetivos de este informe son: presentar la información reunida sobre la recolección, el comercio y la regulación de los anfibios y reptiles de la EDC; evaluar los impactos actuales y potenciales de la recolección y el comercio; evaluar la efectividad de las regulaciones existentes; y hacer recomendaciones con respecto a los pasos que se necesitan para asegurar que la recolección y el comercio sean sostenibles y no representen una amenaza significativa para las poblaciones reptiles y anfibias de la EDC.

ESPECIES DE LA EDC

Nuestra lista enumera 217 especies de anfibios y reptiles nativos a la EDC (Tabla 1). Morafka (1977) proporcionó una lista de 170 especies que habitan dentro la definición geográfica del Desierto Chihuahense más 25km a su alrededor. Nosotros hemos incluido especies adicionales que no habitan en la región definida estrictamente como el Desierto Chihuahuense, pero que se conocen por la definición más amplia de la EDC (Flores Villela, 1993; Degenhardt *et al.*, 1996; Dixon, 2000). A pesar de que no existen datos más exactos, por lo menos 130 de estas especies se sabe o espera que sean parte del intercambio comercial.

EVALUACIÓN DE LA RECOLECCIÓN, EL COMERCIO Y LAS REGULACIONES CONCERNIENTES A LOS REPTILES DE LA EDC EN LOS ESTADOS UNIDOS MEXICANOS (MÉXICO)

INTRODUCCIÓN

Históricamente, los reptiles han jugado un papel importante en las vidas de las personas nativas de México. Los reptiles fueron

adorados como representaciones de dioses, y usados como comida diaria (p. ej., los huevos y la carne de tortugas e iguanas, las piernas y colas de los cocodrilos), en las artes y la fabricación de artesanías (p. ej., cinturones, zapatos, botas), ropa, medicina tradicional (p. ej., carne, veneno y grasa de la serpiente de cascabel), por vendedores ambulantes (se usan iguanas y otros reptiles para llamar la atención a otras mercancías), e incluso en ceremonias mágico-religiosas por muchos sectores de la población (SEMARNAP- PROFEPA, 1998).

La diversidad de la herpetofauna está entre las más altas de todas las ecoregiones desérticas. De acuerdo a Levin (Cotera *et al.*, 2001), se sabe que existen más de 130 especies de reptiles en el Desierto Chihuahuense, y varias lagartijas son endémicas, incluyendo la lagartija cornuda de montaña *Phrynosoma orbiculare*, el lagarto escorpión de Lugo *Gerrhonotus lugoi*, el eslizón encinero *Eumeces lynxe*, la encinela de Taylor *Scincella silvícola* y la lagartija escofina de Mapimí *Xantusia bolsonae* (NOM 059-ECOL 2001, Tabla 2). Varios lagartos, incluyendo el huico de Nuevo México *Cnemidophorus neomexicanus* y el huico de cuadros *C. tesselatus*, surgen como clones partenogenéticos totalmente femeninos en hábitats selectos alterados (Wright y Lowe, 1968). Entre las muchas otras especies que se suman a la diversidad de reptiles de la EDC están la culebra real potosina *Lampropeltis mexicana*, la culebra sorda *Pituophis deppei*, la culebra de panza negra *Thamnophis melanogaster*, la serpiente de cascabel *Crotalus aquilus*, la tortuga de Cuatro Ciénegas *Terrapene coahuila*, la tortuga casquito *Kinosternon hirtipes*, la tortuga casquito de Sonora *Kinosternon sonorense*, la galápago de Mapimí *Gopherus flavomarginatus*, y la tortuga de casco suave de Cuatro Ciénegas *Apalone* ater (NOM 059-ECOL 2001, Tabla 2; Dinerstein *et al.*, 2000).

RESULTADOS

Marco legal

El marco legal de México incluye leyes, regulaciones, normas, acuerdos internacionales, planes nacionales y disposiciones gubernamentales. Todas estas herramientas legales se usan para fomentar la protección y el uso sostenible de los recursos naturales de México, incluyendo sus reptiles nativos. A nivel internacional, México se afilió a la CITES en 1991. Con excepciones limitadas —principalmente en lo concerniente al uso científico, no comercial— México prohíbe la exportación de reptiles y anfibios nativos, y todos los envíos lícitos deben estar acompañados por un permiso.

En el texto completo del informe se pueden hallar descripciones breves de las herramientas jurídicas que más directamente afectan la recolección, el comercio y el manejo de reptiles y anfibios de la EDC de México.

Áreas protegidas de la EDC

Hay cinco áreas protegidas en la EDC en México: el Área de Protección de Flora y Fauna de Cuatro Ciénegas, el Área de Protección de Flora y Fauna del Cañón de Santa Elena, la Reserva de la Biosfera de Mapimí, el Área de Protección de Flora y Fauna de Maderas del Carmen, y la Reserva de la Biosfera Sierra Gorda (Cuadro 2).

Cuatro Ciénegas, Coahuila *(Área de Protección de Flora y Fauna)*

El Valle de Cuatro Ciénegas ha sido estudiado desde los años treinta, y el 7 de noviembre de 1994 fue establecido como Área de Protección (INE/SEMARNAT, 1999). Esta área de protección varía de 740 a 3000 metros de elevación en la Sierra de la Menchaca, San Vicente, La Purísima, San Marcos, Pinas y La Fragua, dentro de la Sierra Madre Oriental (INE, 2001).

En el área existen 58 especies de reptiles, incluyendo varias tortugas como la tortuga de concha blanda *Apalone spinifer*, y la tortuga de Cuatro Ciénegas *Terrapene coahuila*, todas las cuales han sido recolectadas para el comercio internacional de mascotas. Otras amenazas a la herpetofauna del área incluyen la extracción de agua de las pozas para la agricultura, la contaminación del agua y de la tierra, los incendios, la matanza de serpientes de cascabel por los ganaderos, y la introducción en los estanques de tortugas de otros lugares (p. ej., la tortuga de orejas rojas de Florida *Trachemys scripta*).

En la actualidad, algunas organizaciones e instituciones nacionales e internacionales están

trabajando en el área de proyectos relacionados a la educación ambiental, documentando la importancia de la biodiversidad de Cuatro Cienágas, la introducción nuevamente de la *Terrapene coahuila*, y el comercio ilegal de vida silvestre (INE, 2001; González Porter, comunicación personal con Adrián Reuter, Mayo 2001).

***Cañón de Santa Elena** (Área de Protección de Flora y Fauna)*

Ubicada en la región noreste del Estado de Chihuahua y con un total de 277 209 hectáreas, esta reserva de la biosfera se estableció el 7 de noviembre de 1994 (Dirzo y Gómez Pompa, 1995).

Con herpetofauna caracterísa a la EDC, una cantidad de amenazas pueden tener impacto en estas poblaciones, incluyendo el sobrepastoreo, la deforestación, la minería, la recolección ilegal de vida silvestre y el turismo descontrolado (INE, 2001).

Reserva de la Biosfera de Mapimí

Esta reserva de 29 000 hectáreas de superficie se estableció en 1977, y está ubicada al norte de la Meseta Central de México, dentro del Bolsón de Mapimí, al norte de Durango en el límite entre Chihuahua y Coahuila (INE, 2001).

En el área de protección existen 36 especies de reptiles (Aguirre y Maury, 1989), incluyendo el galápago de Mapimí *Gopherus flavomarginatus*, clasificada como Vulnerable por la Unión Mundial para la Conservación (IUCN, 2002), y En Peligro bajo la NOM 059 y CITES, Apéndice I. En la reserva también hay una estación biológica donde se ha llevado a cabo un programa de conservación para esta especie. (Dirzo y Gómez Pompa, 1995).

Las mayores amenazas a los reptiles del área son la recolección ilegal de especímenes (especialmente el galápago de Mapimí) para colecciones personales, el comercio de mascotas y la matanza intencional de tortugas por parte de los ganaderos debido a que las tortugas hacen madrigueras, consideradas como amenazas al ganado (Morafka, 1982; González Porter, comunicación personal con Adrián Reuter, Mayo 2001).

***Maderas del Carmen** (Área de Protección de Flora y Fauna)*

Esta área de protección, con una superficie total de 208 281 hectáreas, se estableció el 7 de noviembre de 1994, y está ubicada en la región noreste de Coahuila.

La herpetofauna es característica de la EDC, e incluye a la culebra corredora constrictor *Coluber constrictor*, enumerada en la lista de especies amenazadas de la NOM 059 de México. Las mayores amenazas a los reptiles del área son la deforestación, el sobrepastoreo, las actividades mineras y la introducción de especies exóticas (INE/SEMARNAT, 1999).

***Sierra Gorda** (Reserva de la Biosfera)*

La Reserva de la Biosfera Sierra Gorda se estableció el 19 de mayo de 1997 y abarca un total de 383 567 hectáreas. En esta área de protección existen 71 especies de reptiles. Entre las amenazas, a los reptiles y a otras especies en esta reserva, están la tala ilegal, la contaminación del agua, la merma de las cuencas, el crecimiento de la población humana, la caza furtiva y el turismo descontrolado (INE/SEMARNAT, 1999).

Métodos de recolección

Los métodos que se usan para cazar reptiles varían grandemente dentro de la EDC. Dependiendo del tamaño del animal, las tortugas generalmente se capturan a mano, o usando atarrayas y trampas en forma de embudos. Generalmente se buscan y sacan a las tortugas de sus madrigueras.

Por lo general se matan a las serpientes en cuanto se las encuentran, probablemente como resultado del temor causado por la falta de conocimientos para identificar a las especies no venenosas de las venenosas. Usualmente, a las serpientes muertas se las desuella y se seca la carne. Las serpientes vivas son por lo general capturadas usando un palo de madera para alzarlas o guiarlas hacia una bolsa. Frecuentemente se guardan juntas varias serpientes en una sola bolsa.

A las lagartijas se las atrapa con la mano. Se mete la mano en los huecos donde se puedan encontrar lagartijas o se les captura mientras se están asoleando, generalmente temprano en la mañana, cuando están menos activas. Los niños del lugar también capturan lagartijas golpeándolas con ligas elásticas y sujetándolas mientras que las lagartijas están aturdidas.

A pesar de que existen algunos reptiles que son blancos de captura, en especial las especies comercialmente más valiosas como las serpientes de cascabel y las tortugas galápago de Mapimí, la recolección es frecuentemente oportunista.

Especies de reptiles halladas en el comercio

Recientemente se ha visto incrementada la demanda de reptiles domésticos, y existe un comercio establecido en los mercados y algunas tiendas de mascotas en México. Parte de este comercio es común en los mercados establecidos, donde se ponen a la venta otras mascotas, como peces para acuario o aves canoras; sin embargo, los numerosos mercados en las calles de centros urbanos importantes así como en algunas intersecciones de caminos con mucho movimiento y tramos de carreteras también funcionan como puntos de venta. También hay un comercio internacional ilegal de reptiles mexicanos, como los géneros *Abronia*, *Xenosaurus*, y *Crotaphytus*, que se venden en tiendas de mascotas y "shows" en los Estados Unidos (González Porter, comunicación personal con Adrián Reuter, Mayo 2001).

Basándose en información histórica, entrevistas, excursiones de campo, encuestas de mercado y datos de aseguramientos, TRAFFIC realizó una evaluación del número de especies de la EDC sujetas a recolección y comercio en y de México. Por lo menos 82 especies, o aproximadamente el 63% de las 131 especies de reptiles calculadas que se hallaron en la parte mexicana de la EDC (Cotera *et al.*, 2001), están sujetos a algún tipo de comercio (Cuadro 3).

De las 82 especies identificadas en el comercio doméstico o internacional, se enumeran seis en el Apéndice I ó II de la CITES, cuatro se clasifican como Amenazadas (vulnerables, en peligro, críticamente en peligro o de bajo riesgo) por la UICN (IUCN, 2002), y 51 en la NOM 059 ECOL 2001. De las 82 especies, diecisiete son endémicas de México (Tabla 2).

Basándose en encuestas de mercado realizadas en México por González Porter durante los últimos 10 años, las serpientes de cascabel que se usan para pieles, cascabeles, carne, grasa, veneno, y como animales vivos usados por merolicos y otros vendedores ambulantes, o vendidos como mascotas, son los reptiles más comúnmente comerciados en el Desierto Chihuahuense (González Porter, comunicación personal con Adrián Reuter, Mayo 2001).

Debido a que mucho del comercio es ilegal, y no se han reportado cifras de recolección y comercio, es difícil calcular el volumen de las serpientes de cascabel recolectadas y comerciadas. Sin embargo, existe un poco de información anecdótica. Después de un operativo que se llevó a cabo en la región de Plateros, Zacatecas por PROFEPA en septiembre de 1997, se calculó que el número de serpientes capturadas (principalmente de los géneros *Crotalus y Sistrurus* de la región podría llegar hasta a 400 por mes. Esta investigación reveló que el comercio ilegal es extenso y diversificado, y que la demanda principal es por pieles de reptil. Cargamentos de cientos o hasta de miles de pieles de serpiente de cascabel, así como de otros reptiles, son transportados por via terrestre a León, Guanajuato o Nautla, Veracruz. Allí se usa la piel para hacer botas y otros productos que se distribuyen a los mercados dentro y fuera de México (González Porter, comunicación personal con Adrián Reuter, Mayo 2001).

Las serpientes de cascabel también se usan frecuentemente como remedio para varias enfermedades. Por ejemplo, el texto de una botella de píldoras de serpiente de cascabel indicaba que eran útiles para curar una amplia variedad de dolencias, incluyendo: manchas de la piel, cáncer, úlceras, erupciones cutáneas, granos, verdugones, picazones, reumatismo, venas varicosas, lunares de la cara, acné, espinillas, estrés, enfermedades del corazón, diabetes, hemorroides e impotencia sexual. Estas píldoras "mágicas" están hechas de carne seca de serpiente de cascabel, que se muele y pone en cápsulas de goma. A pesar de que no se han realizado estudios científicos que apoyen estas afirmaciones sobre su eficacia, se ha demostrado que la carne, que se seca al aire libre, puede ser portadora de Salmonella; como consecuencia, las píldoras pueden ser un vector relativamente común de esta enfermedad (Rubio, 1998). Los cascabeles y la cabeza se usan como adornos (SEMARNAP-PROFEPA, 1998).

Otro género de reptil comúnmente recolectado consiste en la lagartija cornuda *Phrynosoma* spp., a la que también se conoce como tapaxin o camaleón. Algunas personas creen que estos reptiles son útiles para atraer dinero si se colocan en un cofre lleno de limaduras de hierro. Estas lagartijas, así como las lagartijas de collar *Crotaphytus* spp., son también utilizadas ampliamente como mascotas en México. Se ponen a la venta no sólo en mercados mexicanos, sino también internacionalmente en tiendas de mascotas y "shows" de reptiles (González Porter, comunicación personal con Adrián Reuter, Mayo 2001).

La mayor parte de las especies son explotadas como mascotas, seguidos por usos de su carne, de su piel, en medicina tradicional y por vendedores ambulantes (*merolicos*) (Cuadro 4).

A pesar de que en el comercio hay por lo menos 82 especies para satisfacer una diversidad de demandas, varias especies pueden estar especialmente amenazadas debido a su estatus poblacional. De las 67 especies que se pueden hallar en el comercio de mascotas, las tortugas galápago de Mapimí *Gopherus flavomarginatus* (CITES Apéndice I; NOM 059 En peligro de extinción; UICN (IUCN, 2002) Vulnerable) y las tortugas de casco suave de Cuatro Ciénegas *Apalone* ater (CITES Apéndice I, NOM 059 Sujeto a protección especial; UICN (IUCN, 2002) Críticamente en peligro) son de preocupación especial debido a sus estatus precarios de conservación. Las tortugas de concha blanda *Apalone* spp. también se usan por su carne, como las serpientes de cascabel *Crotalus* spp. y *Sistrurus* spp., todas las cuales están dentro de alguna categoría de protección en la NOM 059. Las serpientes de cascabel están también amenazadas por su uso para productos de cuero, en la medicina tradicional y para actividades mágico-religiosas.

A pesar de ser posible comerciar legalmente con cierta vida silvestre en México, en especial a través del sistema UMA, hay poca evidencia del comercio legal de especies de reptiles en la EDC durante los últimos años. Sin embargo, están disponibles algunos datos sobre el comercio ilegal y podrían ser útiles para evaluar el alcance de la recolección general y el comercio de reptiles de la EDC. Las cifras oficiales de aseguramientos de reptiles vivos entre 1995 y 2000 por PROFEPA, son bastantes bajas (Tabla 3), y no incluyen todos los aseguramientos gubernamentales, como los especimenes producto de operativos específicos. Por lo tanto, estos datos no deben ser interpretados como una indicación de la extensión del comercio ilegal, sino simplemente como una indicación de las especies recolectadas y/o comerciadas ilegalmente dentro de México.

Centros de comercio nacional importantes

En tres áreas importantes se identificaron cinco centros principales de distribución y comercio de especies de reptiles de la EDC:

1. Centro mágico-religioso de Plateros, Zacatecas

El mercado de Plateros está ubicado frente al Santuario para el Milagroso Niño de Atocha, donde se venden objetos religiosos, imágenes, velas y altares, entre otras cosas. Los remedios naturales y tradicionales derivados de reptiles, como las serpientes de cascabel secas, las píldoras de serpientes de cascabel, y los cascabeles, están a la venta. También están a la venta ranas y tortugas disecadas, así como botas fabricadas con piel de reptiles.

A partir de 1995, las autoridades de PROFEPA en Zacatecas establecieron programas de verificación e inspección periódica, identificando los sitios de venta ilegal y el número de especies que se ofrecen. Sin embargo, el comercio de vida silvestre viva, sus productos y los subproductos de la región continúa, sin tomar en consideración la legislación existente y los esfuerzos para su aplicación.

En septiembre de 1997, PROFEPA llevó a cabo un operativo en este mercado, en el que aseguró la piel de 100 serpientes de cascabel pertenecientes a cinco especies diferentes (*Crotalus molossus, C. scutulatus, C. atrox, C. lepidus, C. viridis*), así como otros subproductos (aceite de serpiente y un "bálsamo dental" hecho de una serpiente) para los que la posesión u origen legal no se pudo demostrar. Es probable que las serpientes hayan sido capturadas en la EDC, pero no hay manera de confirmar tal presunción.

Con el propósito de informar a las personas del lugar sobre la conservación de los reptiles y las regulaciones, PROFEPA, junto con otras entidades de SEMARNAP (Secretaría de Medio Ambiente, Recursos Naturales y Pesca), las municipalidades de Fresnillo, Zacatecas, Minera Peñoles, y algunas organizaciones no gubernamentales del Estado de Zacatecas y Aguascalientes, organizaron el primer "Taller de manejo y explotación de la herpetofauna en zonas áridas: las serpientes de cascabel de Zacatecas" en la ciudad de Fresnillo, Zacatecas, Julio 15-17, 1999. Los asistentes incluyeron a vendedores de vida silvestre, miembros del Colegio de Veterinarios de Aguascalientes, y a otras personas interesadas.

En noviembre de 1999, en el estado de Zacatecas, PROFEPA llevó a cabo un operativo en el mercado de Plateros, descubriendo que muchos de los vendedores de vida silvestre habían sido previamente sometidos a inspecciones, y tenían también procesos administrativos iniciados por PROFEPA contra ellos. Algunas de estas personas habían incluso asistido al taller mencionado previamente (González Porter, comunicación personal con A. Reuter, Mayo 2001).

Durante esta operación, dos puestos de productos de vida silvestre fueron inspeccionados; tenían, entre otras cosas:

- 89 serpientes de cascabel secas abiertas en canal de cabeza a cola
- 2000 cápsulas de serpientes de cascabel
- 6 cascabeles de serpiente
- 14 pares de botas vaqueras hechas con piel de serpiente de cascabel
- 800 gramos de polvo de serpiente de cascabel
- 3 *Pituophis deppei* (culebras sordas) secas abiertas en canal de cabeza a cola
- 14 paquetes de píldoras de serpientes de cascabel
- 5 bolsas de carne molida de serpiente de cascabel
- 1 tortuga de orejas rojas de Florida *Trachemys scripta*.

(González Porter, comunicación personal; Amador Sánchez, 1999).

La delegación de Zacatecas de PROFEPA impuso más de 134 multas representando un total de 1 720 000 pesos (aproximadamente USD180 000), a los vendedores involucrados en estas actividades ilícitas (Amador Sánchez, 1999).

2. Charco Cercado, San Luis Potosí

Charco Cercado está ubicado en la municipalidad de Guadalcazar (población total de 25 359), al noreste de la ciudad de San Luis Potosí, S.L.P. La población consta de aproximadamente 1100 residentes, de los cuales se cree que alrededor de 90 participan en el comercio ilícito de vida silvestre (Charqueño Puente, 2002; Reuter, 2001 observación personal). Se considera que Charco Cercado es el mayor centro de concentración y comercio de vida silvestre en el área rural de México, teniendo importancia nacional e internacional (Zarate, 1997).

Un número grande de especies de mamíferos y aves están a la venta, tanto animales vivos como productos. También se ofrecen reptiles, en especial serpientes de cascabel (principalmente *C. molossus, C. atrox* y *C. sctutulatus* como animales vivos y como productos) y lagartijas cornudas (principalmente *P. orbiculare* y *P. modestum* que se ofrecen como animales vivos) (Reuter, 2001, observación personal).

Entre las especies sujetas a comercio en Charco Cercado, existen algunas que son nativas de la región mientras que otras han sido transportadas ilegalmente de Tamaulipas, Nuevo León, Zacatecas y otros estados para ser vendidas en este lugar. Éste es generalmente el caso de las especies de aves que requieren permisos específicos para ser transportadas de estado a estado, debido a los riesgos de enfermedades avícolas, como la tuberculosis aviar o la enfermedad de Newcastle. Generalmente, personas no residentes recolectan a los animales y los confían a personas del lugar hasta ser vendidos (Reuter, 2001, observación personal).

En 1997, se realizaron investigaciones del comercio ilegal de reptiles, sus productos y subproductos. Entre los bienes identificados estaban serpientes secas, desolladas (carne y hueso), aceite de serpientes de cascabel y serpientes de cascabel vivas. El comercio se

llevaba a cabo en 30 puestos al aire libre y siete puestos dentro de establecimientos, ubicados a un lado de la carretera de San Luis Potosí a Matehuala ("El Sol de México", "El Heraldo de México", "El Nacional", "Novedades", "Uno más Uno", 22 de marzo de 1997). Se observó también que hay un comercio recurrente con la participación de intermediarios que viajan en automóvil de la Ciudad de México y León, y que se hospedan en el *ejido* (tierra común, expropiada y reasignada por el gobierno a una colectividad de trabajadores) por un día o dos, hasta que terminan sus transacciones ("El Heraldo de México", 22 de marzo de 1997).

El 21 de marzo de 1997, se realizó un operativo a nivel de interagencias (Procuraduría Federal de Protección al Ambiente (PROFEPA), Secretaría de Comunicaciones y Transportes (SCT), Policía Federal de Caminos (PFC), Procuraduría General de la República (PGR), Protección Social de la Municipalidad, Coordinación Ecológica del Gobierno Estatal y un Abogado Público), en el cual 180 oficiales de la policía desplazaron a vendedores de vida silvestre ("Novedades", "Uno más Uno", "El Sol de México", 22 de marzo de 1997; "El Universal", 23 de marzo de 1997). Como resultado de esta operación, se aseguraron 450 especimenes y productos, incluyendo pieles de animales, aves canoras, loros, aves rapaces, serpientes de cascabel y otros reptiles vivos, y mamíferos vivos ("Novedades", "El Sol de México", "El Heraldo de México", "El Nacional", 22 de marzo de 1997; "El Universal", "Reforma", 23 de marzo de 1997). Durante este operativo, se aseguraron los siguientes productos y subproductos de reptiles:

- 44 pieles de serpiente de cascabel
- 87 frascos de aceite de serpiente de cascabel
- 2 pieles de boa
- 20 frascos de polvo de serpiente de cascabel
- 332 serpientes de cascabel secas, sin piel
- 20 frascos de grasa de serpiente de cascabel
- 49 bolsas de cápsulas de serpientes de cascabel

(González Porter, comunicación personal con A. Reuter, May 2001)

Una visita, en diciembre de 2000, a Charco Cercado confirmó que el comercio continúa, observándose un número mayor que en años anteriores de serpientes vivas (serpientes de cascabel y otras) ofrecidas comercialmente (Reuter, 2000, observación personal). Las serpientes vivas (culebra sorda mexicana *Pituophis deppei*, cascabel serrana o cola negra *Crotalus molossus*, y la serpiente de cascabel *C. scutulatus*) eran ofrecidas a precios que variaban entre los 50 y 150 pesos mexicanos (aproximadamente USD4.50 a USD15), las serpientes de cascabel eran ofrecidas por 60 a 160 pesos mexicanos (aproximadamente USD5.50 a USD16), y las botellas conteniendo carne seca de serpiente o grasa de serpiente eran ofrecidas por aproximadamente 60 pesos mexicanos (alrededor de USD6). Las serpientes vivas se mantenían a 120 pies del puesto al borde de la carretera en un barril de aceite enterrado y cubierto con tablas de madera. Los cascabeles se vendían todavía unidos a la carne seca y/o a la piel, o por separado. En uno de los puestos, un hombre estaba también salando pieles de serpientes de cascabel. Al investigador se le ofrecieron pieles a la venta, probablemente debido a que la visita fue hecha justo después de que las serpientes fueran desolladas y colgadas para secar. Los clientes habituales llegan al lugar y compran pieles periódicamente para ser usadas en botas y cinturones que se fabrican en otros lugares (Reuter, 2000, observación personal).

3. Mercados de la Ciudad de México

La Ciudad de México es un centro muy importante de distribución de vida silvestre. Mucho de este comercio se realiza en o a través de mercados establecidos dentro de una tienda; los más importantes son: el Mercado de Sonora, el Mercado Nuevo San Lázaro y el Mercado Emilio Carranza, donde se ofrecen en venta especies exóticas y nativas, incluyendo a varias que se hallan en la EDC (Tabla 4). La Tabla 4 muestra la información recolectada a lo largo de diez años de visitas a estos mercados por la bióloga Gracia González Porter y no se debe considerar concluyente. Los usos de las especies que se ofrecen en la Ciudad de México se pueden ver en la Tabla 2. Todo este comercio es probablemente ilícito, considerando que estas especies de reptiles no se ofrecen abiertamente y el cliente tiene que preguntar en forma muy específica acerca de

las especies particulares que le interesan antes de que el comerciante decida si le muestra o no lo que tiene disponible. En México, la captura con fines comerciales y el comercio de especies silvestres tanto de fauna como de flora están reglamentadas, y se requieren licencias para estas actividades.

Comercio internacional de México

Debido a que la ley mexicana generalmente prohíbe la exportación de reptiles nativos, prácticamente toda la exportación de México de reptiles vivos, partes y productos de reptiles es ilegal. No hay un proceso sistemático para reunir datos acerca de la incautación ilícita de vida silvestre antes de su exportación de México. Los datos de la CITES están limitados a las seis especies de reptiles enumeradas en la CITES (tres galápagos, dos tortugas de agua, y una tortuga de concha blanda).

La oferta de venta de numerosas especies de reptiles de la EDC endémicas a México por comerciantes de reptiles fuera de México, especialmente en los Estados Unidos, indica que las exportaciones ilícitas se están llevando a cabo. A pesar de que muchas de estas especies se reproducen hoy en día en cautividad, el pie de cría original probablemente fue exportado ilegalmente de México. También hay frecuentes aseguramientos de reptiles vivos, así como de sus partes y productos en la frontera entre los Estados Unidos y México. Sin embargo, ninguna de estas fuentes de información da una ilustración clara de la extensión de las exportaciones de México.

El Sistema de Información del Manejo de la Aplicación de la Ley (Law Enforcement Management Information System - LEMIS) del Servicio de Pesca y Vida Silvestre de los Estados Unidos. (U.S. Fish and Wildlife Service - USFWS) contiene registros de todas las importaciones declaradas de vida silvestre de los Estados Unidos, así como de todas las importaciones y exportaciones ilegales interceptadas. Dada la proximidad de los Estados Unidos a México, así como la gran demanda de reptiles exóticos dentro de los Estados Unidos, es probable que este país sea el consumidor más grande de reptiles exportados de México. Hay muy poca exportación legal de reptiles de la EDC de México; muy pocos envíos han sido declarados USFWS. Sin embargo, los aseguramientos de exportaciones ilegales de México son frecuentes en los puertos fronterizos de los Estados Unidos, y esas exportaciones ingresan a LEMIS. Dada la dificultad de detectar el comercio ilegal de vida silvestre y la probabilidad de que la mayor parte de comercio legal no sea detectado por los funcionarios oficiales dedicados a la aplicación de la ley, las cifras de comercio disponibles deben ser consideradas como números mínimos en el mercado.

La Tabla 5 muestra las exportaciones de reptiles de la EDC de México a los Estados Unidos, incluyendo tanto animales vivos como partes y productos que se registraron a nivel de especies de 1996 hasta 2002. Dado que mucho del comercio de serpientes de cascabel se registra sólo a nivel de género, todas las entradas *Crotalus spp*. se incluyeron también en la Tabla 5. Generalmente estas entradas consisten en importaciones legales de especímenes científicos, importaciones ilegales de curiosidades turísticas e importaciones ilegales de animales vivos como mascotas.

Debe observarse que hay numerosas entradas registradas a nivel de género que podrían involucrar a especies de la EDC. Debido a que no se pudo llegar a resoluciones concluyentes con respecto a las especies involucradas o sus posibles orígenes, no se incluyeron en la tabla, con la notable excepción de las serpientes de cascabel. Entre el comercio más frecuentemente registrado a nivel de género estuvo la importación ilícita de productos de serpiente de cascabel del género *Crotalus*. A pesar de que mucho de este comercio probablemente involucró a especímenes alejados de las áreas de la EDC, dados los importantes volúmenes de comercio, estos datos se incluyeron en el análisis.

EVALUACIÓN DEL IMPACTO DE LA RECOLECCIÓN Y EL COMERCIO

A pesar de que la información disponible es limitada, ésta indica que un número grande de especies de reptiles de la EDC se explota en el comercio doméstico e internacional, y que esta explotación puede ser una gran amenaza, por lo menos para algunas especies de reptiles. Por lo menos el 63% de las especies de reptiles

de la EDC de México se encuentran en el comercio, y más del 60% de esas especies están bajo alguna categoría de riesgo.

Las poblaciones de algunas especies endémicas, como la tortuga de casco suave de Cuatro Ciénegas *Apalone ater*, la galápago de Mapimí *Gopherus flavomarginatus* y la tortuga de Cuatro Ciénegas *Terrapene coahuila*, han sido impactadas gravemente por una cantidad de amenazas, incluyendo la recolección y el comercio. Como otros reptiles del área (p. ej., *Lampropeltis mexicana*), su estatus endémico los convierte en una mercadería muy lucrativa para los coleccionistas y "herpetoculturistas" de los mercados internacionales.

La demanda de serpientes de cascabel vivas, de su piel y sus partes para uso en la medicina tradicional parece haber causado importantes reducciones en las poblaciones de algunas áreas, como Plateros, Zacatecas. Por ejemplo, durante un taller sobre serpientes de cascabel organizado por PROFEPA, más de 20 personas buscaron estas serpientes usando una técnica consistente en seccionar transversalmente por tres días un área con hábitat apropiado sin éxito (González Porter, comunicación personal con A. Reuter, May 2001).

La información biológica básica sobre la mayor parte de estas especies de reptiles es escasa, haciendo difícil la evaluación del impacto de la recolección y comercio de poblaciones silvestres. Esto se ve complicado por el hecho que estas especies enfrentan otras amenazas en muchas áreas, como la reducción del hábitat por la deforestación, la agricultura, el sobrepastoreo, la introducción de especies exóticas, la contaminación y la merma de las cuencas.

RECOMENDACIONES

Se dan las siguientes recomendaciones para asegurar que la recolección y el comercio no sean una amenaza a las especies de reptiles de la EDC en México:

Aplicación:

1. Los programas de aplicación, que requieren inspecciones frecuentes de centros importantes de comercio, deben mejorarse para proporcionar una medida disuasiva más efectiva para las actividades de comercio ilícitas.
2. Se debe incrementar el número de inspectores de vida silvestre y se les debe proporcionar entrenamiento específico (p. ej., identificación de especies, manejo de reptiles, etc.) para asegurar una regulación más efectiva del comercio a gran escala de reptiles y otra vida silvestre.
3. Se necesita realizar más investigación a largo plazo de las redes de tráfico de reptiles, desde sus áreas naturales de recolección a su venta final, para entender la extensión y el impacto de este comercio.
4. Se deben desarrollar, como prioridad, los protocolos para disponer de la vida silvestre confiscada, los productos y subproductos, poniendo énfasis en el mantenimiento y manejo apropiados de especímenes vivos, incluyendo la creación de centros dedicados a lidiar con especímemes silvestres asegurados vivos.

Manejo:

5. Se debe evaluar el sistema de UMA para determinar si hay suficientes mecanismos de control y monitoreo. De ser así, se debe fomentar el sistema, especialmente con respecto a la producción de reptiles en cautiverio. Estos esfuerzos deben concentrarse en las especies amenazadas, cuya demanda es significativa ya que pueden ser utilizados como mascotas y otros fines. Otros esfuerzos de UMA pueden incluir exhibiciones, ecoturismo y programas de reintroducción.
6. Es imperativo el conocimiento ampliado de la biología y tamaño de las poblaciones de estas especies, especialmente tratándose de especies amenazadas y sujetas a bastante recolección.
7. Hay mucha necesidad de una recopilación de información y preparación de reportes estandarizados sobre la recolección de vida silvestre y el comercio (investigaciones, aseguramientos, repatriaciones, procesos legales, etc.) y una mayor facilitación para el intercambio de información y consultas entre las oficinas gubernamentales y otros sectores.
8. Se deben desarrollar programas de rehabilitación y liberación de animales asegurados, basándose en datos científicos

de biología y distribución para cada especie, tomando en consideración el potencial para la enfermedad, contaminación genética y otros riesgos a poblaciones silvestres.

Educación:

9. Se deben desarrollar programas de educación ambiental que se centren en comunidades locales para aumentar el conocimiento de las leyes mexicanas y promover el valor de los recursos naturales de estas comunidades.

EVALUACIÓN DE LA RECOLECCIÓN, COMERCIO Y REGULACIONES APLICABLES A LOS REPTILES Y ANFIBIOS DE LA EDC EN LOS ESTADOS UNIDOS AMERICANOS

INTRODUCCIÓN

Existen muchos ejemplos de explotación de reptiles y anfibios nativos a los Estados Unidos para satisfacer la demanda de alimentos, mascotas, cuero, curiosidades y otros artículos. Muchas de estas actividades y especies han sido bien documentadas, como el aligator de América *Alligator mississippiensis*, las tortugas marinas *Cheloniidae*, las tortugas caimán *Macroclemys temminckii*, las tortugas terrestres *Terrapene* spp., y serpientes de cascabel del bosque *Crotalus horridus* (ver, por ejemplo, Fleming, 2001; Hoover, 1998; Fitzgerald y Painter, 2000; Pritchard, 1989). A pesar de que docenas de otras especies de reptiles y anfibios son explotadas en los Estados Unidos, se sabe muy poco sobre la extensión de estas actividades o su impacto en las poblaciones silvestres. Esto es especialmente cierto con respecto a la gran cantidad de pequeñas lagartijas y serpientes halladas en la EDC.

RESULTADOS

Leyes estatales y federales concernientes a la recolección y al comercio

Por lo general, la recolección y venta de reptiles y anfibios en los Estados Unidos se regula a nivel estatal. Para las especies de la EDC, la legislación y las regulaciones de Nuevo México, Arizona y Texas se aplican a las actividades relacionadas con reptiles y anfibios en cada una de esas jurisdicciones. La legislación federal y las regulaciones se aplican generalmente a las especies enlistadas federalmente, actividades en tierras federales y al comercio interestatal e internacional. En el texto completo del informe se pueden encontrar exámenes completos de las leyes estatales y federales y de las regulaciones concernientes a la recolección y comercio de las especies de la EDC.

Especies de reptiles y anfibios hallados en el comercio

La Tabla 7 enlista especies de la EDC en los Estados Unidos que se hallan en el comercio, o que probablemente son comercializadas, con el uso comercial correspondiente a cada especie, incluyendo las 62 especies de la EDC en Texas que se recolectaron y reportaron por poseedores de licencias para especies no cinegéticas en 1999.

Los monstruos de gila *Heloderma suspectum* aparecen en el comercio tanto doméstico como internacional, especialmente en Europa y Japón. Los herpetoculturistas, profesionales y aficionados que se especializaron en estas lagartijas, tuvieron éxito en reproducirlas, entre las décadas del ochenta y del noventa. La recolección de helodermatidae es ilegal en toda su gama en los Estados Unidos y México, y sólo hay informes anecdóticos de caza furtiva de monstruos de gila.

Métodos de recolección

A pesar de no existir datos cuantitativos, es probable que las técnicas herpetológicas de recolección sean comúnmente usadas en la EDC. Probablemente la mayor parte de serpientes se capturan durante recorridos nocturnos en caminos, a pesar de que un gran número de culebras rayadas puede ser recolectado en invernáculos o durante el día en hábitats acuáticos apropiados. Las lagartijas cornudas son vulnerables a la recolección a lo largo de las carreteras y pueden también capturarse durante la mañana o en recorridos nocturnos por caminos. Otras lagartijas se recolectan a mano o con lazo mientras se camina en un hábitat apropiado, o usando una serie de trampas. Se desconoce la ubicación de las series de trampas usadas por los

coleccionistas, pero dos aficionados entrevistados nos remitieron a un coleccionista profesional cerca de El Paso que opera una serie de trampas.

Las tortugas terrestres se recolectan a mano, usando perros adiestrados, manejando en automóvil durante el día por las carreteras y trampeándolas. Las tortugas morrocoy amarillo a veces viven en la alta densidad de un conjunto de troncos o solas en los arroyos, y se pueden recolectar en grandes cantidades a mano, con una jábega o con trampas en forma de embudo. Generalmente las tortugas de agua y las tortugas mordedoras se capturan con aros con mallas, en mallas en forma de embudo, o usando trampas de mallas de alambre con carnada consistente en sardinas, alimento enlatado para perros, col o cáscara de sandías. Los sapos y ranas son vulnerables en sus sitios de crianza durante y después de las lluvias, y pueden ser recolectados a mano durante la noche en grandes cantidades.

Comercio doméstico

El comercio doméstico de anfibios y reptiles de la EDC es casi imposible de cuantificar debido a que la captura de la mayor parte de especies no está regulada en Nuevo México, el comercio de Arizona es ilegal, y el comercio de vida silvestre de México es ilícito y no está monitoreado extensamente. No hay razón para creer que se hayan comercializado un gran número de animales de Arizona. La comercialización ocurre en Nuevo México, pero cuando se realizó este estudio no había información actualizada disponible. La información sobre la recolección y la venta de especies no cinegéticas está disponible en Texas desde 1999. También ha sido revisada cuidadosamente la comercialización de serpientes de cascabel en Texas y en Nuevo México (Fitzgerald y Painter 2000).

Durante 1999, en Texas se reportaron 14 351 especimenes de reptiles y anfibios recolectados por 53 residentes y no residentes poseedores de licencias para animales no cinegéticos. De estos, 4861 fueron anfibios y 9493 fueron reptiles (Tabla 8). Debe observarse que el número de serpientes de cascabel no incluyen a aquellas recolectadas en acorralamientos (*roundups*), y de este modo la cifra general es probablemente más alta.

El noventa por ciento (12 947/14 354) de todos los especímenes recolectados en 1999 en la EDC de Texas se originaron en sólo cinco condados. Se reportaron especímenes recolectados en 27 de los 43 condados de Texas que consideramos están dentro de la EDC (Cuadro 5, Tabla 7). En 1999 sólo un pequeño número de recolectores contribuyeron a la mayor cantidad total de especimenes. El recolector principal contribuyó con el 27.1% del total de especímenes. Los tres recolectores siguientes fueron responsables del 66.6% del total, y los siguientes ocho fueron responsables del 90.3% (Tabla 9). No es sorprendente entonces, que los recolectores principales operaran en los cinco condados que produjeron el 90% de los especimenes.

Los coleccionistas y el personal encargado de aplicar las normas entrevistados en Texas no tenían conocimiento del gran comercio de lagartijas y ranas. Estas personas entrevistadas indicaron que generalmente sólo unas pocas especies de serpientes eran consideradas meta, especialmente la culebra real de bandas grises *Lampropeltis alterna* y la serpiente ratonera ojona *Bogertophis subocularis*. Interesantemente, varios coleccionistas entrevistados explicaron que las ratoneras adultas de Trans-Pecos capturadas en su hábitat natural tienen poco valor comparadas a las serpientes jóvenes nacidas en cautiverio. Algunas variedades en el color de las culebras reales de bandas grises tienen poco valor (aproximadamente USD50) debido a que las especies criadas en cautividad son comunes en el mercado. Sin embargo, otras variantes y "especímenes de la localidad", como aquellos que se hallan en el sureste de Nuevo México, podrían representar hasta USD500 en el mercado comercial.

A pesar de que el comercio de serpientes como animales domésticos recibe mucha atención, los informes indican que el número de serpientes sacadas de su hábitat natural no es extraordinario (Tabla 7). En 1999, la base de datos de animales no cinegéticos de TPWD mostró que 985 serpientes fueron recolectadas en la EDC (Tabla 10). De éstas, 325 fueron culebras rayadas *Thamnophis* spp. y 307 fueron serpientes de cascabel *Crotalus* spp. Setenta y tres culebras reales fueron recolectadas (todas especies de *Lampropeltis*); 42 fueron serpientes reales de bandas grises.

Treinta y dos ratoneras comunes *Elaphe* spp. y 48 ratoneras ojonas *Bogertophis subocularis* se reportaron como recolectadas por los portadores de licencias para animales no cinegéticos. Varias otras especies se recolectaron en números más pequeños.

Comercio internacional

1. Disponibilidad y utilidad de datos de comercio

Es difícil evaluar el comercio internacional de reptiles de la EDC en los Estados Unidos debido a un número de factores. A pesar de que algunos datos están disponibles del USFWS, estos datos suscitan tantas preguntas como respuestas que puedan proporcionar.

Todas las importaciones y exportaciones de vida silvestre deben ser declaradas al USFWS. Estas declaraciones son luego ingresadas a un sistema de datos computarizados que se llama LEMIS. Estas entradas se registran frecuentemente, pero no siempre, a nivel de especie, a través del uso de códigos de cuatro letras asignadas. A pesar de que prácticamente todo el comercio de las especies enlistadas en la CITES se registra a nivel de especie, muchas especies no halladas en la CITES no reciben códigos específicos de especies. En estos casos, el comercio internacional puede ser registrado a nivel de género o familia, o simplemente como “RNCT”, o reptiles no en CITES. Más aún, incluso para entradas que se registran a nivel de especie no hay información específica de ubicación disponible. Las entradas indican el país de origen, y podrían también indicar si la vida silvestre es de origen silvestre o de cautiverio.

A pesar de estas limitantes, los datos de LEMIS tienen valor en el análisis del comercio de especies de la EDC. Una revisión detallada de los datos de exportación de los Estados Unidos mostró que hay aproximadamente 50 especies de reptiles, que se hallan por lo menos en parte en la EDC, que parecen ser parte del comercio internacional. Nuevamente, ésta debe considerarse como una cifra mínima, dado que muchas especies de la EDC no tienen código específico. Por ejemplo, a pesar de que hay sólo unas pocas entradas para especies individuales del género *Sceloporus*, hay un número grande de entradas a nivel de género. Es por eso que es difícil evaluar exactamente a las especies que están siendo comercializadas, y si son o no especies de la EDC.

Desafortunadamente, con frecuencia los datos no indican si los animales vienen de su hábitat natural o han estado en cautiverio; y, si vienen de su hábitat natural, si en realidad surgieron en la EDC. Por ejemplo, hay aproximadamente entre 7 y 12 millones de tortugas de orejas rojas *Trachemys scripta elegans* exportadas de los Estados Unidos cada año. Sin embargo, otras investigaciones han demostrado que todo, con excepción de una pequeña fracción de este comercio, se produce en granjas de tortugas en Louisiana y otros estados vecinos. A pesar de que los datos de comercio no indican esto necesariamente, es muy improbable que algo de este comercio se origine en la EDC.

Los datos disponibles muestran tendencias en el comercio con respecto a volúmenes, fuentes de hábitat natural o en cautiverio, precios y cambios en los países principales de importaciones. Algunas de estas tendencias se tratan a continuación.

2. Exportación de especímenes vivos de los Estados Unidos

La Tabla 11 presenta un resumen de los datos disponibles para las exportaciones de especímenes vivos de las especies de reptiles halladas en la EDC.

La exportación de especies de tortugas halladas en la EDC probablemente involucra sólo a unas cuantas tortugas recolectadas en realidad en la EDC. Como se mencionó anteriormente, la exportación de tortugas de orejas rojas representa, casi exclusivamente, a las tortugas producidas en granjas de Louisiana y otros lugares en el sureste de los Estados Unidos. Lo mismo es cierto para la exportación de la mayoría de especies de otras tortugas de la Tabla 11.

Basándose en estos datos, la exportación de especies de lagartijas de la EDC de los Estados Unidos no parece ser una gran preocupación. Aparentemente la mayor parte de especies están siendo exportadas en números pequeños, y por lo menos algunas de estas especies (p. ej., el gecko bandeado de Texas *Coleonyx brevis*) se están produciendo en cautiverio. Sin embargo, observando las deficiencias de los datos mencionados previamente, sería prudente

monitorear las cifras de exportación para identificar cualquier tendencia en aumento.

Tampoco representa una preocupación significativa, en su mayor parte, la exportación de especies de serpientes de la EDC para satisfacer la demanda extranjera de serpientes vivas. La mayoría de especies se comercian en muy bajos números, con poca indicación de un aumento en el comercio durante el período de tiempo examinado. Muchas de las especies más comercializadas tienen un alcance grande fuera de la EDC (p. ej., las culebras listonadas comunes *Thamnophis sirtalis*), o se producen principalmente en cautiverio (p. ej., la culebra real *Lampropeltis getula*). Finalmente, muchas especies parecen exhibir una tendencia en disminución con respecto a las exportaciones (p. ej., la serpiente de collar *Diadophis punctatus*, la culebra corredora constrictor *Coluber constrictor*).

3. El comercio de partes y productos

Una revisión de los datos de LEMIS muestra que por lo menos siete especies encontradas en la EDC se comercian como partes o como productos (Tabla 12). A pesar de que la exportación de especies nativas de la EDC como partes o como productos involucra a mucho menos especies de las que aparecen en el comercio vivo, esta práctica podría estar teniendo un impacto mucho mayor en las especies individuales debido a que mucho del comercio vivo se deriva de los esfuerzos de reproducción en cautiverio, mientras que el comercio de la mayoría de partes y productos probablemente involucre animales adultos capturados en su hábitat natural.

De nuevo, como se describió previamente, hay poca indicación de que la exportación de especies de tortugas de la EDC, involucre en realidad a animales individuales recolectados de la EDC. La exportación de la carne de tortuga mordedora común es probablemente el producto de tortuga más importante, dado que este comercio posiblemente implica tortugas capturadas en su hábitat natural. Sin embargo, esta especie tiene una distribución tremenda en los Estados Unidos, y probablemente no sea un objetivo específico en la EDC. Asimismo, la exportación de números significativos de huevos de tortugas de orejas rojas no tiene ningún impacto en las poblaciones de la EDC, dado que estos huevos son probablemente el producto exclusivo de las granjas de tortugas al sureste de los Estados Unidos.

De mayor preocupación es la explotación de varias especies de reptiles venenosos por su carne, piel y productos de cuero. Esto es especialmente cierto para la serpiente cascabel diamantada del oeste, que se exporta en una gran cantidad de formas. El comercio más significativo de esta especie parece ser la carne, con más de 2000 kilogramos de carne exportada durante el período de seis años en que se examinó. Más aun, un número significativo de volumen de pieles y productos de piel se exportaron durante este período, incluyendo 1616 pieles, 712 zapatos/botas, 1407 productos pequeños de cuero/artículos de piel/recortes de cuero, 34 carteras, 79 prendas de vestir, 939 joyas y 753 artículos no especificados.

Recolección y comercio ilegales

La recolección y el comercio ilegales suceden, pero parecen no estar extendidos en las porciones de los Estados Unidos en la EDC. Consistentemente, las entrevistas con los guardabosques del Parque Nacional Big Bend indicaron de uno a tres casos de recolección ilegal cada año. Un guardabosques reportó que alrededor de seis vehículos habían sido detenidos entre octubre y enero de 1999, pero que nada se encontró. Otro guardabosques especuló que podrían haber uno o dos recolectores ilegales en el parque, quizás una noche a la semana, probablemente llegando a los 40 acontecimientos en el parque por año. Ésta fue una especulación basada en la experiencia de ese guardabosques. El guardabosques indicó que había habido una disminución aparente de recolección ilegal de reptiles en el parque. Otro guardabosques declaró que es fácil recolectar legalmente fuera del parque, lo que probablemente reduce la recolección ilegal dentro del mismo.

Varios entrevistados sentían que los jueces no daban mucha prioridad al crimen de la caza furtiva y que, en varias instancias, cuando se presentaban casos en las cortes, las multas eran mínimas. Algunos miembros del personal entrevistados encargados de la aplicación de los reglamentos creían que aquella actitud podría disminuir los esfuerzos de aplicación de los reglamentos. Un guardabosques señaló que

era improbable que los jueces siguieran un proceso judicial a menos que el sospechoso fuera capturado durante el acto de cazar a un animal. Los guardabosques necesitan consentimiento para registrar los vehículos de los sospechosos, a menos que tengan una causa probable para creer que el sospechoso tiene a un animal. Otro guardabosques contó un caso ocurrido a fines de la década de los noventas, en el que un sospechoso fue capturado en el parque recolectando a una serpiente cascabel de cola negra con una funda de almohada. El sospechoso tenía a varios animales que se piensa eran de Arizona y estaba buscando serpientes. El juez absolvió al acusado.

Un guardabosques entrevistado señaló que muchos herpetocultores entusiastas eran muy cumplidores de la ley y tenían gran desprecio por los "malos herpetocultores". Todos los guardabosques de los parques, biólogos de agencias y otros miembros del personal encargado de la ejecución de los reglamentos estaban conscientes de los problemas de la recolección de reptiles. A pesar de que el número de personas detenidas por recolectar es bajo, la mayoría de guardabosques de parque y biólogos entrevistados consideran la amenaza de la caza furtiva de reptiles un tema serio que amerita una atención constante.

Todas las personas interesadas en el tema y los recolectores entrevistados estaban totalmente conscientes de las regulaciones y los requerimientos de licencias. En Texas y en Nuevo México, no es difícil encontrar áreas donde la recolección es legal. La mayoría de las áreas examinadas en Nuevo México están ubicadas en tierras públicas (p. ej., la Oficina de Administración de Tierras, el Servicio Forestal de los Estados Unidos o las tierras estatales de Nuevo México) y por tanto, el acceso al público está permitido. A pesar de que algunos terratenientes prohíben recolectar en su propiedad, otros granjeros en tierras privadas y públicas en Nuevo México y Texas están ansiosos de tener cazadores de serpientes en sus tierras para que capturen a las serpientes de cascabel, con la esperanza de eliminarlas.

EVALUACIÓN DEL IMPACTO DE LA RECOLECCIÓN Y EL COMERCIO

No es posible sacar conclusiones definitivas sobre las amenazas que representan la recolección y el comercio debido a la falta de estudios de campo y datos de monitoreo en el comercio de reptiles y anfibios. Sin embargo se pueden sacar conclusiones generales basándose en lo que se sabe sobre los patrones de recolección y la biología de los anfibios y reptiles de la EDC.

La gravedad del impacto de la recolección en las poblaciones de anfibios y reptiles depende de la extensión geográfica de la recolección en relación a la distribución de las especies (la escala geográfica); la habilidad de las poblaciones locales para sostener la recolección (el historial de vida de las especies); y las interacciones complejas entre la geografía y la historia de vida, como el fenómeno de la destrucción de depósitos. Las áreas donde se recolectan reptiles, p. ej., orillas de carreteras o hábitats acuáticos, pueden ser depósitos donde las poblaciones disminuyen constantemente. Áreas donde no se realizan recolecciones, contiguas a los depósitos, pueden actuar como reservas de poblaciones fuente, donde individuos que se dispersan continuamente vuelven a poblar las poblaciones explotadas.

Las especies con tasas altas de reproducción que se desarrollan rápidamente camino a la madurez serán probablemente más capaces de resistir la recolección que las especies con una reproducción tardía y tasas reproductivas bajas (Fitzgerald 1994). La distribución geográfica de las especies en combinación con la escala y frecuencia de la recolección puede también influenciar las probabilidades de que las poblaciones puedan resistir la recolección. Las especies extensamente distribuidas y recolectadas en pequeñas secciones de todo su rango tienen más probabilidades de resistir la recolección que las especies que están restringidas en su distribución y recolectadas extensamente en grandes áreas. Los patrones impredecibles de actividad resultan en una baja detección y vulnerabilidad de muchas especies de serpientes. Basándose en el patrón de historia de vida, en la extensión geográfica y en la detección, es probable que la gran mayoría de especies de reptiles y anfibios hallados en la EDC se distribuyan tan ampliamente que la recolección no causará la extinción regional o global de las especies. Casi toda la recolección de anfibios y reptiles se realiza desde las carreteras o desde los

cañones accesibles. Áreas enormes se hallan en tierra privada o tan remota que la recolección para el comercio es ineficiente, y hay áreas extensas de hábitat apropiado donde nunca se recolecta.

Probablemente la recolección y el comercio en la EDC no se debe considerar como una amenaza para las especies que son distribuidas más o menos amplia y continuamente, son pequeñas en tamaño y poseen un historial de vida caracterizado por un lapso corto de vida y una tasa alta de reproducción. La lagartija común de lados manchados *Uta stansburiana* se adapta a esta estrategia de historial de vida. Se reproduce anualmente, tiene una longitud de vida de uno a dos años, y son generalmente visibles y abundantes cuando ocurren. A pesar de que la lagartija común de lados manchados fue la especie más recolectada en Texas en 1998-99, es dudoso que la recolección de esta especie como alimento de mascotas o como mascotas causara un impacto significante en las poblaciones. Aparentemente la serpiente cascabel diamantada del oeste puede resistir largos períodos de recolección (Fitzgerald y Painter 2000), y a pesar de ser recolectada para el intercambio comercial en Nuevo México, Texas y otros lugares, es extremadamente improbable que los varios cientos de serpientes cascabel diamantadas del oeste capturadas anualmente en las porciones de Texas y Nuevo México de la EDC puedan causar peligro o extinción de esta tandifundida especie. La especie de culebra listonada que aparece en el comercio en Texas en 1999 es también común y extendida. Es también improbable que la recolección de culebras listonadas, probablemente para el comercio de mascotas, pueda causar el peligro o la extinción de estas especies muy difundidas.

Tomando en consideración que la recolección probablemente no causará la extinción global o regional de especies de anfibios y reptiles de la EDC, es probablemente más importante evaluar el impacto de la recolección en las poblaciones locales. La gran mayoría de guardabosques, vigilantes de animales cinegéticos y biólogos de los Parques y la Vida Silvestre de Texas que se entrevistaron para este informe, sentían que la recolección desalentaba a la población local. Por otra parte, los aficionados se hallaban divididos en este tema. La investigación de campo requerirá responder esta pregunta cuantitativamente. Además, los efectos de la recolección en las poblaciones son diferentes para las distintas especies.

Los monstruos de gila *Heloderma suspectum*, las tortugas en general y las serpientes cascabel del oeste *Crotalus viridis* son especies que, basadas en la historia natural, pueden ser vulnerables a la recolección excesiva. En las madrigueras se pueden hallar grandes congregaciones de serpientes cascabel del oeste, y su eliminación sistemática en sus madrigueras todos los años puede causar las extirpaciones locales. La caza en las madrigueras fue la causa de la extirpación local de la serpiente cascabel del bosque en la parte norte de esta extensión (Greene 1997). Las especies con extensiones fragmentadas, aun si la extensión geográfica es grande, pueden ser susceptibles a la extirpación de la población local, especialmente si la especie es especialista en su hábitat. La extensión de la víbora de cascabel pigmea norteña *Sistrurus catenatus*, por ejemplo, es fragmentada y la pradera donde habita es degradada en mucha de su extensión anterior (Greene 1997). Las poblaciones de la serpiente cascabel pigmea norteña están separadas y posiblemente son mucho más pequeñas de lo que fueron en el pasado reciente. Las irregularidades de su distribución geográfica han también causado diferencias en tamaño de camadas, dieta, y afinidad del hábitat en diferentes partes de su extensión. De allí que, para la serpiente cascabel pigmea norteña, la recolección por fragmentos aislados del hábitat puede tener un gran impacto, a pesar de la amplia gama del complejo entero de especies, debido a que el potencial para la recolonización de las poblaciones fuente es muy reducido. Otra especie de la EDC que podría satisfacer el patrón de Greene (1997) descrito para la serpiente cascabel pigmea norteña es la culebra nariz de cerdo *Heterodon nasicus*.

Debido a su vulnerabilidad y sus características de vida larga, las poblaciones de tortugas podrían ser eliminadas de sitios específicos debido a la recolección excesiva. Dado el hábitat acuático limitado, en particular en Nuevo México, desbordes específicos del río (p. ej., el río Black y el río Delaware) frecuentemente dejan a las tortugas muy vulnerables a la recolección excesiva durante

los períodos bajos de agua. Con la captura repetida e intensa, los recolectores pueden fácilmente causar reducciones significativas de la población en áreas específicas. Dixon (2000) cita la desaparición de las tortugas de agua de Río Grande *Pseudemys gorzugi*, una especie endémica a la EDC, de un área de Río Grande cerca a Del Río que se presume fue el resultado de recolección excesiva, posiblemente para satisfacer a los mercados asiáticos de alimentos.

Las siete especies más recolectadas de la EDC en Texas, entre 1998 y 1999, representaron el 79% de todas las especies recolectadas, y aparentemente se originaron en su mayor parte en los condados de El Paso, Hudspeth, Lubbock, Hockley y Garza Counties (Tabla 3, Tabla 4). Es imposible evaluar cuantitativamente el impacto de la recolección en las poblaciones explotadas sin la información detallada de los esfuerzos de recolección, la extensión geográfica de la recolección y la información demográfica de las poblaciones explotadas. Sin embargo, los tres anfibios: la salamandra atigrada *Ambystoma tigrinum*, el sapo cavador *Scaphiopus couchii*, y el sapo verde *Bufo debilis*, son comunes y ampliamente distribuidos. Las dos lagartijas, la lagartija de lados manchados *Uta stansburiana* y la lagartija jaspeada *Cnemidophorus tigris*, son también muy conocidas y de distribución continua en toda la EDC. Generalmente estas cinco especies comparten las características descritas anteriormente, que deben ayudarlas a resistir la recolección a pesar de que no hay suficiente información para sacar conclusiones. La tortuga amarilla del fango *Kinosternon flavescens* y la tortuga adornada *Terrapene ornata luteola* se recolectan en grandes cantidades. Las tortugas amarillas del fango son comunes y están muy difundidas, pero generalmente se encuentran concentradas localmente en charcas, depósitos y playas. Es razonable considerar la posibilidad que las poblaciones locales de tortugas amarillas del fango se puedan ver afectadas por la remoción de la mayor parte de individuos de las charcas de un área. Las tortugas adornadas son comunes y están muy difundidas, pero tienen una tasa baja de reproducción. Es razonable que las poblaciones de la tortuga adornada puedan cambiar significativamente por la remoción sistemática de adultos.

A pesar de que hay datos de sólo un año, el patrón de recolección en Texas indica algunas generalidades que son importantes para la recolección de reptiles y anfibios en toda la región. Primero, pocos recolectores son responsables de la gran mayoría de los especímenes recolectados. Conocemos a sólo unos pocos recolectores de Nuevo México que recolectan activamente reptiles y anfibios con propósitos comerciales. Segundo, unas cuantas especies se recolectaron en grandes cantidades. Las especies recolectadas en grandes cantidades son especies difundidas, pequeñas y, con la excepción de anfibios y tortugas, tienen una vida relativamente corta. Una tercera generalización fue que la recolección era muy poco uniforme, con la recolección realizada en un número pequeño de áreas. En Texas, las mismas extensiones de carreteras que han gozado de popularidad por décadas entre los recolectores, continúan produciendo especímenes, y siguen siendo las áreas principales que los recolectores usan. Hay extensiones enormes de hábitat en toda la ecoregión que estas personas no visitan. Finalmente, basándose en la base de datos de Texas, las tortugas han sido recolectadas en cantidades lo suficientemente grandes como para causar preocupación. Si la recolección de tortugas continuara al mismo nivel y se restringiera a unos cuantos lugares, las poblaciones locales podrían reducirse al punto de llegar a estar en peligro o extinguirse localmente. Un argumento similar se podría hacer para las serpientes cascabel de las praderas, debido a su vulnerabilidad en las madrigueras.

RECOMENDACIONES

Monitoreo de la recolección y el comercio:

5. Para asegurar que la recolección y el comercio de anfibios y reptiles de la EDC sea sostenible, se necesita la implementación de un sistema de monitoreo de captura y comercio de obligatoriedad jurídica. Tal sistema de monitoreo debe basarse en el estatus legal de los anfibios y reptiles, y las normas que regulan su captura. Tales sistemas han sido

implementados en Texas y en Nuevo México, y han proporcionado información valiosa sobre el comercio de anfibios y reptiles en el estado.

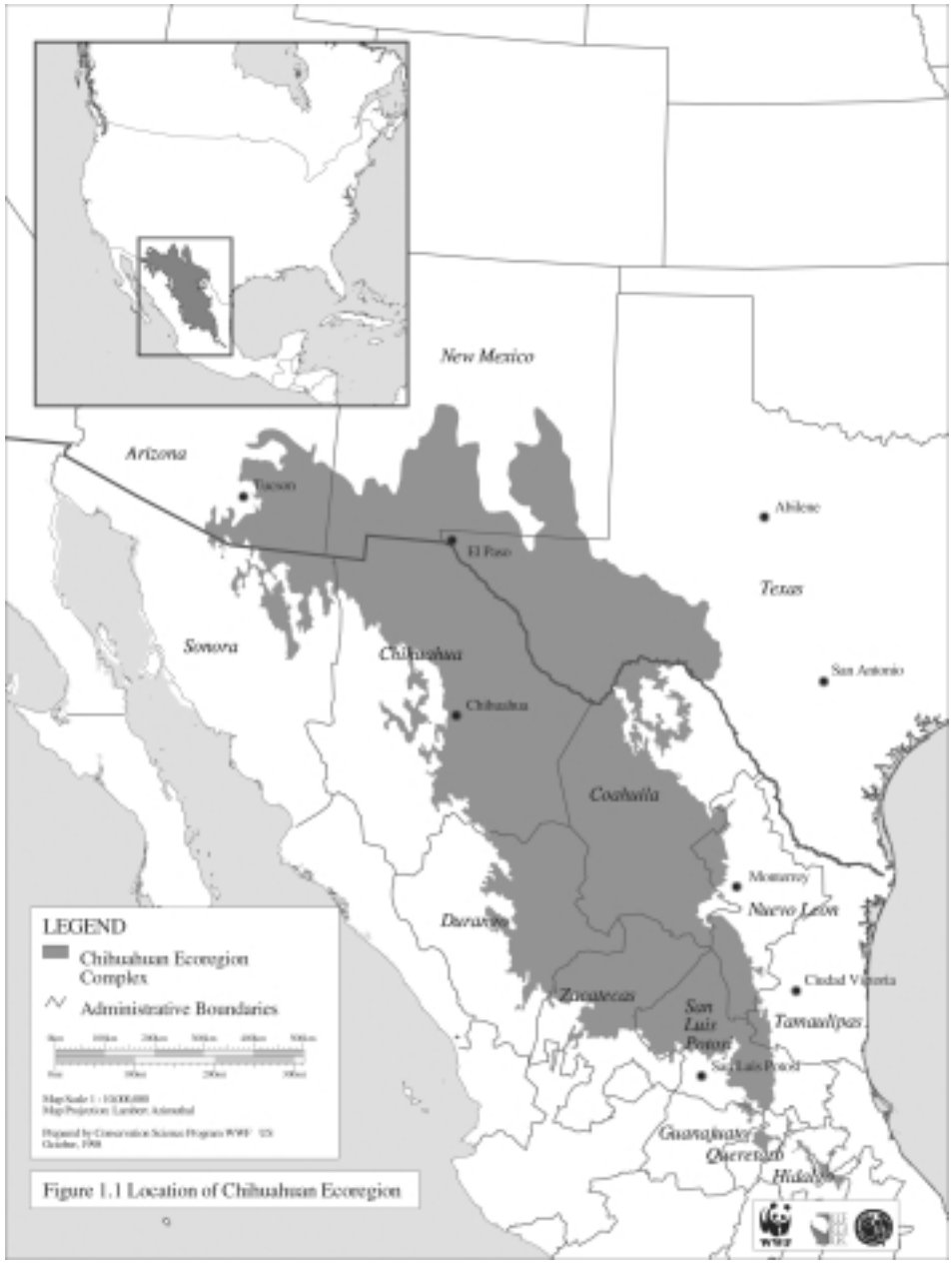
Investigación de campo:

6. No es posible censar directamente a las especies de anfibios y reptiles debido a las extensas áreas geográficas comprometidas, el tiempo y gasto que se requeriría para medir a estas poblaciones, y las dificultades inherentes de medir a estas poblaciones con seguridad. En lugar de eso, se debe dirigir la investigación a producir información suficiente sobre la recolección de anfibios y reptiles para guiar las decisiones de manejo.
7. Se necesita información sobre la cantidad de hábitat apropiado disponible para especies con distribuciones relativamente pequeñas, y que requieren de un hábitat muy específico en relación a la cantidad de área donde se recolectan.
8. La investigación sobre el fenómeno de fuentes y depósitos en anfibios y reptiles explotados podría ser útil, y todavía no ha sido realizado para ningún anfibio o reptil explotado. La información con respeto a la dinámica de fuentes y depósitos de las especies seleccionadas podría clarificar si las poblaciones son autosostenibles, o hasta qué punto se necesitan corredores de hábitats y grandes áreas en las que no se han realizado recolecciones para sostener a poblaciones explotadas regionalmente.

INTRODUCTION

The CDE is located in the central and northern regions of Mexico, and in the southern part of the United States. In the United States, the CDE stretches from southeastern Arizona across southern New Mexico and west Texas to the Edwards Plateau. It runs deep into Mexico, encompassing parts of Sonora, Chihuahua, Coahuila, Durango, and several other states, and covers approximately 630 000km^2 (243 000 sq. miles), comprising desert and semi-desert regions among the most biologically diverse in the world. It is bordered by mountains of the Sierra Madre Occidental to the west and the Sierra Madre Oriental to the east, extending as far south as San Luis Potosí and including disjunct islands of Chihuahuan vegetation in the states of Querétaro and Hidalgo.

Figure 1. Map of the Chihuahuan Desert Ecoregion



The landscape of the CDE is a series of basins and ranges with a central highland extending from Socorro, New Mexico south into Zacatecas, Mexico. Because of its generally higher elevation, the CDE is cooler and has more rainfall than other warm desert ecoregions, averaging 235 mm annually (Dinerstein *et al.*, 2000). The prevailing climates in this region are desert and semi-arid types, with most rainfall during the summer (Flores-Villela, 1993).

The altitude of the CDE ranges from 600 to 2300 meters above sea level, which makes the Chihuahuan Desert one of the highest in the world. The areas of highest elevation are covered with coniferous forests (WWF Programa México, 1999). This ecoregion is home to a great diversity of species, including a high degree of endemism determined, to a great extent, by interior watersheds.

An undetermined number of reptiles and amphibians, primarily snakes, lizards, turtles, and toads are collected from the CDE each year, primarily to supply the demand for these species as pets, both domestically and from abroad. Taxa frequently collected for the trade include horned lizards *Phrynosoma* spp., kingsnakes *Lampropeltis* spp., and milksnakes *L. triangulum*. Gila monsters *Heloderma suspectum* appear in trade despite prohibitions on collection throughout their range and their listing on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Some species, especially rattlesnakes, are also collected for their skins, meat, and other parts.

Many factors (e.g., habitat destruction) affect amphibian and reptile populations in the CDE. Collection for the commercial trade may impact these populations, although the magnitude of this impact has not been thoroughly investigated and is poorly understood. There are inconsistencies in regulation of the collection and trade in the United States and Mexico. Better information on the collection and trade of wild amphibians and reptiles is needed, therefore, in order to make informed decisions about conservation priorities for the CDE.

The objectives of this report are to: present information gathered on collection, trade, and regulation of the amphibians and reptiles of the CDE; assess the current and potential impacts of collection and trade; evaluate the effectiveness of existing regulations; and make recommendations regarding the steps needed to ensure that collection and trade are sustainable and do not pose a significant threat to CDE reptile and amphibian populations.

Species in the CDE

We list 217 species of amphibians and reptiles native to the Chihuahuan Desert Ecoregion (CDE) (Table 1). Morafka (1977) provided a checklist of 170 species occurring within 25 km of the geographical definition of the Chihuahuan Desert. We included additional species that do not occur in the strictly defined Chihuahuan Desert, but are known from the more broadly defined CDE (Flores-Villela, 1993; Degenhardt *et al*., 1996; Dixon, 2000). Although no rigorous data exist, at least 130 of these species are known or expected to enter commercial trade.

Table 1. Native amphibians and reptiles of the CDE

CAUDATA	SALAMANDERS
Family Ambystomatidae	
Ambystoma rosaceum	Tarahumara salamander
Ambystoma tigrinum	Tiger salamander
Family Plethodontidae	
*Aneides hardii**	Sacramento mountains salamander
*Chiropterotriton priscus**	Primeval splayfoot salamander
*Eurycea neotenes**	Texas salamander
*Pseudoeurycea galeanae**	Galeana false brook salamander
(Chippindale *et al.* (2000) presented a systematic revision of the central Texas hemidactyline plethodontid salamanders. *Eurycea neotenes* was restricted to a small geographic area and consists of at least 4 (likely more) taxa, including *E. chisholmensis, E. naufragia, E. neotenes,* and *E. tonkawae*.)	
SALIENTIA	**FROGS AND TOADS**
Family Pelobatidae	
Scaphiopus couchii	Couch's spadefoot
Spea bombifrons	Plains spadefoot
Spea multiplicata	Mexican spadefoot
Family Leptodactylidae	
Eleutherodactylus augusti	Barking frog
*Eleutherodactylus cystignathoides**	Rio Grande chirping frog
Eleutherodactylus longipes	Long-footed chirping frog
Eleutherodactylus marnockii	Cliff chirping frog
Eleutherodactylus nitidus	Shiny peeping frog
*Syrrhophus dennisi**	Dennis' chirping frog
*Syrrhophus verrucipes**	Bigear chirping frog
(numerous authors place *Syrrhophus* in the genus *Eleutherodactylus*)	
Family Bufonidae	
*Bufo alvarius**	Colorado River toad
Bufo cognatus	Great Plains toad
*Bufo compactilis**	Plateau toad
Bufo debilis	Green toad
Bufo marinus	Giant toad
Bufo occidentalis	Pine toad
Bufo punctatus	Red-spotted toad
Bufo speciosus	Texas toad
Bufo valliceps	Gulf Coast toad
Bufo woodhousii	Woodhouse's toad
(*Bufo valliceps* has been further divided, with the CDE species believed to be *B. nebulifer* (Mulcahy and Mendelson, 2000).)	

Table 1. Native amphibians and reptiles of the CDE *(continued)*

Family Hylidae	
Acris crepitans	Northern cricket frog
Hyla arenicolor	Canyon treefrog
Hyla eximia	Mountain treefrog
Pseudacris triseriata	Western chorus frog
Smilisca baudinii	Mexican treefrog
Family Microhylidae	
Gastrophryne olivacea	Great Plains narrow-mouthed toad
Family Ranidae	
Rana berlandieri	Rio Grande leopard frog
Rana blairi	Plains leopard frog
Rana catesbeiana	Bullfrog
Rana chiricahuensis	Chiricahua leopard frog
*Rana montezumae**	Montezuma leopard frog
Rana pipiens	Northern leopard frog
Rana pustulosa	Cascade frog
*Rana tarahumarae**	Tarahumara frog
Rana trilobata	Bigfoot leopard frog
Rana yavapaiensis	Lowland leopard frog
TESTUDINES	**TURTLES**
Family Chelydridae	
Chelydra serpentina	Snapping turtle
Family Emydidae	
Chrysemys picta	Painted turtle
Pseudemys concinna	River cooter
Pseudemys gorzugi	Rio Grande cooter
*Terrapene coahuila**(I)	Coahuilan box turtle
*Terrapene ornata(*II)	Ornate box turtle
Trachemys gaigeae	Big Bend slider
Trachemys scripta	Pond slider
Family Kinosternonidae	
Kinosternon flavescens	Yellow mud turtle
Kinosternon hirtipes	Rough-footed mud turtle
Kinosternon integrum	Mexican mud turtle
Kinosternon sonoriense	Sonoran mud turtle
Family Testudinidae	
*Gopherus agassizii**(II)	Desert tortoise
*Gopherus berlandieri**(II)	Berlandier's tortoise
Gopherus flavomarginatus(I)	Bolson tortoise
Family Trionychidae	
Apalone ater(I)	Black spiny softshell
Apalone spinifer	Spiny softshell
(numerous authors list *A. ater* as a subspecies of *A. spinifer*)	

Table 1. Native amphibians and reptiles of the CDE *(continued)*

SAURIA	LIZARDS
Family Crotaphytidae	
Crotaphytus collaris	Collared lizard
*Crotaphytus reticulatus**	Reticulate collared lizard
Gambelia wislizenii	Leopard lizard
Family Phrynosomatidae	
*Callisaurus draconoides**	Zebra-tailed lizard
Cophosaurus texanus	Greater earless lizard
*Holbrookia lacerata**	Spot-tailed earless lizard
Holbrookia maculata	Common lesser earless lizard
Phrynosoma cornutum	Texas horned lizard
Phrynosoma hernandesi	Greater short-horned lizard
Phrynosoma modestum	Round-tailed horned lizard
Phrynosoma orbiculare	Mountain horned lizard
*Phrynosoma solare**	Regal horned lizard
Sceloporus arenicolus	Dunes sagebrush lizard
Sceloporus cautus	Shy spiny lizard
*Sceloporus clarkii**	Clark's spiny lizard
*Sceloporus couchi**	Couch's spiny lizard
*Sceloporus cyanogenys**	Blue spiny lizard
*Sceloporus exsul**	Queretaran spiny lizard
Sceloporus goldmani	Goldman's bunch grass lizard
Sceloporus grammicus	Graphic spiny lizard
Sceloporus horridus	Horrible spiny lizard
Sceloporus jarrovi	Mountain spiny lizard
Sceloporus maculosus	Spotted spiny lizard
Sceloporus magister	Desert spiny lizard
Sceloporus merriami	Canyon lizard
Sceloporus nelsoni	Nelson's spiny lizard
Sceloporus olivaceus	Texas spiny lizard
Sceloporus ornatus	Ornate spiny lizard
Sceloporus parvus	Bluebelly lizard
Sceloporus poinsetti	Crevice spiny lizard
*Sceloporus slevini**	Slevin's bunchgrass lizard (replaces *S. sclaris*)
Sceloporus spinosus	Spiny lizard
Sceloporus torquatus	Crevice swift
Sceloporus undulatus ssp.	Fence/Prairie lizard(s)
*Sceloporus variabilis**	Rose-bellied lizard
*Sceloporus virgatus**	Striped plateau lizard
Uma exsul	Fringe-toed sand lizard
Uma paraphygas	Chihuahuan fringe-toed lizard
Urosaurus bicarinatus	Tropical tree lizard
Urosaurus ornatus	Ornate tree lizard
Uta stansburiana	Common side-blotched lizard
Family Gekkonidae	
Coleonyx brevis	Texas banded gecko
Coleonyx reticulatus	Reticulate banded gecko
*Coleonyx variegatus**	Western banded gecko

Table 1. Native amphibians and reptiles of the CDE *(continued)*

Family Iguanaidae	
Ctenosaura hemilopha	Cape spinytail iguana
Ctenosaura pectinata	Mexican spinytail iguana
Family Teiidae	
*Cnemidophorus burti**	Canyon spotted whiptail
Cnemidophorus costatus	Western Mexico whiptail
Cnemidophorus dixoni	Gray checkered whiptail
Cnemidophorus exsanguis	Chihuahuan spotted whiptail
*Cnemidophorus flagellicaudus**	Gila spotted whiptail
Cnemidophorus gularis	Eastern spotted whiptail
Cnemidophorus inornatus	Little striped whiptail
Cnemidophorus laredoensis	Laredo striped whiptail
Cnemidophorus neomexicanus	New Mexico whiptail
Cnemidophorus septemvittatus	Plateau spotted whiptail
Cnemidophorus sexlineatus	Six-lined racerunner
Cnemidophorus tesselatus	Common checkered whiptail
Cnemidophorus tigris	Tiger whiptail
Cnemidophorus uniparens	Desert grassland whiptail
*Cnemidophorus velox**	Plateau striped whiptail
(Taxonomy of the genus *Cnemidophorus* is unstable and there are some differences in taxonomic designations among the sources used to construct the tables.)	
Family Scincidae	
Eumeces brevirostris	Shortnose skink
*Eumeces callicephalus**	Mountain skink
Eumeces lynxe	Oak forest skink
Eumeces multivirgatus	Many-lined skink
Eumeces obsoletus	Great Plains skink
*Eumeces tetragrammus**	Four-lined skink
Scincella lateralis	Little ground skink
*Scincella silvicola**	Taylor's ground skink
Family Anguidae	
*Barisia imbricata**	Imbricate alligator lizard
*Elgaria kingii**	Madrean alligator lizard
Gerrhonotus liocephalus	Texas alligator lizard
Gerrhonotus lugoi	Lugo's alligator lizard
Family Xantusidae	
Lepidophyma sylvaticum	Madrean tropical night lizard
Xantusia bolsonae	Bolson night lizard
Xantusia vigilis	Desert night lizard
Family Helodermatidae	
*Heloderma suspectum**(II)	Gila monster
SERPENTES	**SNAKES**
Family Leptotyphlopidae	
Leptotyphlops dulcis	Plains threadsnake
Leptotyphlops humilis	Western threadsnake

Table 1. Native amphibians and reptiles of the CDE *(continued)*

Family Colubridae	
Arizona elegans	Glossy snake
Bogertophis subocularis	Trans-Pecos ratsnake
*Chilomeniscus cinctus**	Banded sandsnake
Coluber constrictor	Eastern racer
Conopsis nasus	Largenose earth snake
Diadophis punctatus	Ring-necked snake
*Drymarchon corais**	Western indigo snake
*Drymobius margaritiferus**	Speckled racer
Elaphe bairdi	Baird's ratsnake
Elaphe guttata	Cornsnake
Elaphe obsoleta	Eastern ratsnake
*Ficimia streckeri**	Tamaulipan hook-nosed snake
Gyalopion canum	Chihuahuan hook-nosed snake
Heterodon nasicus	Western hog-nosed snake
*Hypsiglena tanzeri**	Tanzer's night snake
Hypsiglena torquata	Nightsnake
Lampropeltis alterna	Gray-banded kingsnake
Lampropeltis getula	Common kingsnake
Lampropeltis mexicana	San Luis Potosi kingsnake
*Lampropeltis pyromelana**	Sonoran Mountain kingsnake
Lampropeltis triangulum	Milksnake
Leptodeira punctata	Western cat-eyed snake
Leptodeira septentrionalis	Cat-eyed snake
Leptodeira splendida	Splendid cat-eyed snake
*Masticophis bilineatus**	Sonoran whipsnake
Masticophis flagellum	Coachwhip
Masticophis mentovarius	Neotropical whipsnake
Masticophis taeniatus	Striped whipsnake
Nerodia erythrogaster	Plain-bellied watersnake
Nerodia rhombifer	Diamond-backed watersnake
Opheodrys aestivus	Rough greensnake
*Opheodrys vernalis**	Smooth greensnake
Pituophis catenifer	Gopher snake
Pituophis deppei	Mexican bullsnake
*Rhadinaea gaigeae**	Gaige's pine forest snake
(listed as *Rhadinaea crassa* by Morafka, 1977)	
*Rhadinaea laureata**	Crowned graceful brown snake
*Rhadinaea montana**	Nuevo León graceful brown snake
Rhinocheilus lecontei	Long-nosed snake
Salvadora deserticola	Big Bend patch-nosed snake
Salvadora grahamiae	Eastern patch-nosed snake
Salvadora hexalepis	Western patch-nosed snake
*Senticolis triaspis**	Green ratsnake
Sonora semiannulata	Ground snake
*Storeria hidalgoensis**	Mexican yellowbelly brown snake
Storeria storerioides	Mexican brown snake
Tantilla atriceps	Mexican black-headed snake
Tantilla bocourti	Bocourt's black-headed snake
Tantilla cucullata	Trans-Pecos black-headed snake

Table 1. Native amphibians and reptiles of the CDE *(continued)*

*Tantilla gracilis**	Flat-headed snake
Tantilla hobartsmithi	Smith's black-headed snake
Tantilla nigriceps	Plains black-headed snake
Tantilla wilcoxi	Chihuahuan black-headed snake
Tantilla yaquia	Yaqui black-headed snake
Thamnophis cyrtopsis	Black-necked gartersnake
Thamnophis elegans	Wandering gartersnake
Thamnophis eques	Mexican gartersnake
Thamnophis errans	Mexican wandering gartersnake
*Thamnophis exsul**	Montane gartersnake
Thamnophis marcianus	Checkered gartersnake
Thamnophis melanogaster	Mexican black-bellied gartersnake
Thamnophis proximus	Western ribbon snake
Thamnophis pulchrilatus	Yellow-throated gartersnake
Thamnophis rufipunctatus	Narrow-headed gartersnake
Thamnophis sirtalis	Common gartersnake
Trimorphodon biscutatus	Western lyresnake
*Tropidoclonion lineatum**	Lined snake
Family Elapidae	
*Micruroides euryxanthus**	Sonoran coral snake
Micrurus distans	West Mexican coral snake
Micrurus fulvius	Texas coral snake
Family Viperidae	
Agkistrodon contortrix	Copperhead
Crotalus aquilus	Queretaran dusky rattlesnake
Crotalus atrox	Western diamond-backed rattlesnake
Crotalus lepidus	Rock rattlesnake
Crotalus molossus	Black-tailed rattlesnake
*Crotalus pricei**	Twin-spotted rattlesnake
Crotalus scutulatus	Mojave rattlesnake
Crotalus viridis	Prairie rattlesnake
*Crotalus willardi**	Ridge-nosed rattlesnake
Sistrurus catenatus	Massasauga

Source: Modified from Morafka (1977), Flores-Villela (1993), Degenhardt *et al.* (1996), and Dixon (2000). Common names follow Crother *et al.* (2000) and Liner (1994). Those species marked with "*" are peripheral species recorded from localities immediately adjacent to the CDE (Morafka 1977). Those species marked with a "(I)" are listed in Appendix I of CITES, and those species marked with a "(II)" are listed in Appendix II of CITES.

CHAPTER 1

Assessment of the Collection, Trade, and Regulation of Reptiles from the CDE in Mexico

INTRODUCTION

Mexico is considered one of the world's most biologically diverse countries, due largely to the confluence of two biogeographic regions (the nearctic and neotropical), as well as its great orographic complexity, climatic diversity, and vegetation types. With 717 species, Mexico ranks second in reptile diversity worldwide, surpassed only by Australia, which has 755 species (CONABIO, 2000). In relation to this vast abundance of herpetofauna, the geographic distribution and biology of these species are only known in the most general terms. There are few studies of Mexican reptiles generally, and studies of the species inhabiting the desert regions are especially lacking, with the exception of those in Baja California's Peninsula (Flores-Villela, 1993; Ordoñez and Flores-Villela, 1995; Grismer, 2002).

Since ancient history, reptiles have played an important role in the lives of native Mexican people. Reptiles have been adored as representations of gods, and used daily as food (e.g., eggs and flesh of turtles and iguanas, crocodile legs and tails), for arts and crafts manufacture (e.g., belts, shoes, boots), clothes, in traditional medicine (e.g., rattlesnake meat, venom, and fat), by street peddlers (iguanas and other reptiles are used to draw attention to other wares), and even in magical-religious ceremonies by many sectors of the population (SEMARNAP- PROFEPA, 1998).

The diversity of the Mexican CDE herpetofauna is among the highest in all desert ecoregions. According to Levin (Cotera *et al.*, 2001), there are more than 130 reptile species known to exist in the Chihuahuan Desert, and several lizards are endemic, including the mountain horned lizard *Phrynosoma orbiculare*, Lugo's alligator lizard *Gerrhonotus lugoi*, oak forest skink *Eumeces lynxe*, Taylor's ground skink *Scincella silvicola*, and Bolson night lizard *Xantusia bolsonae* (NOM 059-ECOL 2001; Table 2). Several whiptails, including the New Mexico whiptail *Cnemidophorus neomexicanus* and common checkered whiptail *C. tesselatus*, occur as all-female parthenogenic clones in select disturbed habitats (Wright and Lowe, 1968). Among the many other species that add to the reptile diversity in the CDE are the San Luis Potosi kingsnake *Lampropeltis mexicana*, Mexican bullsnake *Pituophis deppei*, Mexican black-bellied garter snake *Thamnophis melanogaster*, Queretaran dusky rattlesnake *Crotalus aquilus*, Coahuilan box turtle *Terrapene coahuila*, Mexican roughfoot mud turtle *Kinosternon hirtipes*, Mexican mud turtle *Kinosternon sonorense*, Bolson tortoise *Gopherus flavomarginatus*, and black spiny softshell *Apalone ater* (NOM 059-ECOL 2001, Table 2; Dinerstein *et al.*, 2000).

METHODS

To assess collection of and trade in CDE reptile species in Mexico, research was undertaken from September to December 2000. Information on Mexican federal and state laws was gathered from a bibliographic survey. Information about the different geographic areas of importance in CDE reptile trade was obtained through field trips, from data provided by the Mexico Federal Attorney's Office for Environmental Protection (PROFEPA), from interviews of personnel in various government agencies and in different localities, and from newspapers and unpublished reports.

Marketplaces in Mexico City were surveyed and data were collected from pet shops, catalogues, and the Internet. Products and byproducts found in the markets and included in official or government information (and in some newspaper articles) were identified by PROFEPA and Special Attorney of Environmental Crime (PGR) personnel.

RESULTS

1. Legal Framework

Mexico's legal framework includes laws, regulations, norms, international agreements, national plans, and governmental dispositions.

All of these legal tools are used to promote the protection and sustainable use of Mexico's natural resources, including its native reptiles. On an international level, Mexico joined CITES in 1991. With limited exceptions—primarily involving noncommercial, scientific use—Mexico prohibits the export of native reptiles and amphibians, and all legal shipments must be accompanied by a permit.

Brief descriptions of the legal tools that most directly affect the collection, trade, and management of reptiles and amphibians from the CDE in Mexico are presented below.

1.1 Federal Laws and Other Instruments

Constitución Federal de los Estados Unidos Mexicanos (Federal Constitution of the United States of Mexico), Article 27, states that natural resources are the property of the nation.

Ley General del Equilibrio Ecológico y Protección al Ambiente (General Law of Ecological Balance and Environmental Protection) calls for the rational use and protection of natural resources. Chapter Three is dedicated to wild flora and fauna.

Ley General de Vida Silvestre (General Law on Wildlife), enacted on July 3, 2000, refers to the sustainable conservation and use of wildlife and its habitat in Mexico. It also stipulates the laws that are to be applied on a federal level, and the ones to be applied on a state or local level. The regulations implementing this law are still being reviewed and should be published in the near future.

Ley Federal de Derechos (Federal Law of Rights) lists the tariffs for permits for use in management units and for hunting activities.

Ley Aduanal (Customs Law) identifies the requirements for import and export of wild flora and fauna and refers to the Ley del Impuesto General de Importación (Law on the General Imports Tax) and the Ley del Impuesto General de Exportación (Law on the General Exports Tax), laws that regulate all kinds of products and merchandise, including the imports and exports of wild flora and fauna. These laws list all species of flora and fauna they cover in a catalog that specifies the wildlife specimens, products, or byproducts subject to tariffs.

Norma Oficial Mexicana (NOM) 059 ECOL 2001 (Official Mexican Norm 059) (NOM-059-ECOL-2001) lists certain species and subspecies of wild terrestrial and aquatic fauna based on degree of threat to their survival, including: Extinct in the Wild (E); In Danger of Extinction (P), Threatened (A), Subject to Special Protection (Pr); it also indicates whether or not the species are endemic. NOM 059 ECOL 2001 applies to all activities involving specimens, parts, products, byproducts, and derivatives of listed species (see Appendix 1 for full list of species).

Programa de Conservación de la Vida Silvestre y Diversificación Productiva en el Sector Rural (Program for the Conservation of Wildlife and Productive Diversification of the Rural Sector), has the general objective of conserving Mexico's biodiversity while generating socio-economic diversification opportunities for the rural sector.

Of particular relevance in this program is the *Sistema de Unidades para la Conservación, Manejo y Aprovechamiento Sustentable de la Vida Silvestre* (SUMA) (System of Conservation, Management, and Sustainable Use of Wildlife Units), which requires that participants register with the *Dirección General de Vida Silvestre (DGVS)*, the section in the Ministry of Environment (SEMARNAT) dedicated to administrative aspects of wildlife management; provision of a management plan, certified by scientific authorities, to be verified by SEMARNAT's authorities; and submission of periodic reports of activities to the DGVS (see Section 1.2).

Código Penal (Criminal Code). In the section that refers to federal crimes on wildlife, Article 420, the following prohibitions and penalties are outlined:

From six months to six years of prison and a fine equivalent to 1000 to 20 000 days' wages to anyone who:

I. Intentionally captures, harms, or kills any sea turtle or marine mammal, or collects or trades any products or byproducts in any way, without the proper authorization;

II. Intentionally captures, transforms, gathers, transports, destroys, or trades aquatic species during the closed season without the proper authorization;

III. Hunts, fishes, or captures wild species of fauna using means forbidden by the applicable norms or threatens those species with extinction;

IV. Conducts any commercial activity with wild species of flora and fauna that are endemic, in danger of extinction, threatened, rare, or subject to special protection, including their products and byproducts, without proper permit or authorization or, if it applies, during the closed season;

V. Intentionally harms species of wild fauna or flora mentioned in the preceding section.

1.2 UMAs

The UMA *(Unidad para la Conservación, Manejo y Aprovechamiento Sustentable)* (Conservation, Management, and Sustainable Use of Wildlife Unit) is the basic unit of the SUMA *(Sistema de Unidades para la Conservación, Manejo y Aprovechamiento Sustentable de la Vida Silvestre)*, the recently adopted administrative and management scheme aimed at promoting productive alternatives compatible with biodiversity and environmental conservation through rational, ordered, and planned use of natural resources, particularly wildlife. This system creates opportunities for legal and viable sustainable use of wild resources, to compete with or complement conventional practices like agriculture, fisheries, or livestock raising. The objective of this system is to favor integral management and conservation of wildlife through the creation of incentives at the local, regional, and national levels by promoting the development of alternative income sources for legitimate landowners and rural communities. Any establishment, collection, business, or exhibit that includes the use of any kind of wildlife should be registered under this scheme.

At the time this report was written, there were only two registered UMAs in the Chihuahuan Desert that included reptiles from the region:

- The Sahuatoba Zoo in Durango with:

  9 pond sliders *Trachemys scripta*

  5 mud turtles *Kinosternon* spp.

  4 Bolson tortoises *Gopherus flavomarginatus*

  4 rattlesnakes *Crotalus* spp.

- The Friends of the Desert of Coahuila (*Amigos del Desierto de Coahuila*) in Saltillo, Coahuila with:

  3 Western diamond-backed rattlesnakes *Crotalus atrox.*

1.3 State Laws

The following state laws address a number of natural resource-related issues, including: indicating the status of wild flora and fauna, describing the activities allowed in protected and non-protected areas, and outlining guidelines and procedures for wildlife inspections.

Coahuila

- ***Constitución Política del Estado de Coahuila de Zaragoza*** (Political Constitution of the State of Coahuila de Zaragoza)
- ***Ley del Equilirio Ecológico y Protección al Ambiente del Estado de Coahuila de Zaragoza*** (Law for Ecological Balance and Environmental Protection of the State of Coahuila de Zaragoza)

Chihuahua

- ***Consitución Política del Estado de Chihuahua*** (Political Constitution of the State of Chihuahua)
- ***Ley Ecológica para el Estado de Chihuahua*** (Ecological Law for the State of Chihuahua)

Durango

- ***Constitución Política del Estado de Durango*** (Political Constitution of the State of Durango)
- ***Ley Estatal del Equilibrio Ecológico y Protección al Ambiente*** (State Law of Ecological Balance and Environmental Protection)

San Luis Potosí

- ***Constitución Política del Estado Libre y Soberano de San Luis Potosí*** (Political Constitution of the Free and Sovereign State of San Luis Potosí)

- ***Ley Ambiental del Estado de San Luis Potosí, S.L.P.*** (Environmental Protection Law of the State of San Luis Potosí)

Zacatecas

- ***Constitución Política del Estado de Zacatecas*** (Political Constitution of the State of Zacatecas)
- ***Ley Estatal del Equilibrio Ecológico y Protección al Ambiente*** (State Law of Ecological Balance and Environmental Protection)

Guanajuato

- ***Constitución Política del Estado de Guanajuato*** (Political Constitution of the State of Guanajuato)
- ***Ley para la Preservación y Protección del Ambiente del Estado de Guanajuato*** (Guanajuato's Law for the Preservation and Protection of the Environment)

Hidalgo

- ***Constitución Política del Estado de Hidalgo*** (Political Constitution of the State of Hidalgo)
- ***Ley del Equilirio Ecológico y Protección al Ambiente para el Estado de Hidalgo*** (Law for Ecological Balance and Environmental Protection for the State of Hidalgo)

Querétaro

- ***Constitución Política del Estado Libre y Soberano de Querétaro Arteaga*** (Political Constitution of the Free and Sovereign State of Queretaro Arteaga)
- ***Ley Estatal del Equilibrio Ecológico y Protección al Ambiente*** (State Law of Ecological Balance and Environmental Protection)

2. Protected Areas in the CDE

There are five protected areas in the CDE in Mexico: the Cuatro Ciénegas Area for the Protection of Flora and Fauna, the Cañón de Santa Elena Area for the Protection of Flora and Fauna, the Mapimí Biosphere Reserve, the Maderas del Carmen Area for the Protection of Flora and Fauna, and the Sierra Gorda Biosphere Reserve.

Cuatro Ciénegas, Coahuila (*Area de Protección de Flora y Fauna*)

The Cuatro Ciénegas Basin has been studied since the 1930s and was established as a Protected Area on November 7, 1994 (INE/SEMARNAT, 1999). This protected area ranges from 740 to 3000 meters in elevation on the Sierra de la Menchaca, San Vicente, La Purísima, San Marcos, Pinas, and La Fragua, within the Sierra Madre Oriental (INE, 2001).

There are 58 reptile species in the area, including several turtles such as black spiny softshell *Apalone ater*, spiny softshell *Apalone spinifer*, and Coahuilan box turtle *Terrapene coahuila*, all of which have been collected for the international pet trade. Other threats to the herpetofauna in the area include water extraction from ponds for agriculture, water and soil pollution, fires, killing of rattlesnakes by ranchers, and the introduction of alien turtles (i.e., pond slider *Trachemys scripta*) into ponds.

Some national and international organizations and institutions are currently working in the area on projects related to environmental education, documenting the importance of Cuatro Ciénegas' biodiversity, the reintroduction of *Terrapene coahuila*, and the illegal trade of wildlife (INE, 2001; González Porter, pers. comm. to Adrián Reuter, May 2001).

Cañón de Santa Elena *(Area de Protección de Flora y Fauna)*

Located in the northeast section of the State of Chihuahua and having a total of 277 209 ha, this biosphere reserve was established on November 7, 1994 (Dirzo y Gómez Pompa, 1995).

With herpetofauna characteristic to the CDE, a number of threats may impact these populations, including overgrazing, deforestation, mining, illegal collection of wildlife, and uncontrolled tourism (INE, 2001).

Mapimi Biosphere Reserve *(Reserva de la Biósfera de Mapimí)*

This 29 000-ha reserve was established in 1977, and is located north of the Mexican Central Plateau, within the Bolson of Mapimi, in northern Durango at the border of Chihuahua and Coahuila (INE, 2001).

There are 36 reptile species in the protected area (Aguirre y Maury, 1989), including the Bolson Tortoise *Gopherus flavomarginatus*, classified as Vulnerable by IUCN (2002), and

Endangered under NOM 059 and CITES Appendix I. There is also a biological station in the reserve where a conservation program on this species has been implemented (Dirzo y Gómez Pompa, 1995).

The biggest threats to reptiles in the area are illegal collection of specimens (especially Bolson tortoise) for personal collections and the pet trade, and intentional killing of tortoises by ranchers because the tortoises dig burrows, which are viewed as a threat to cattle (Morafka, 1982; González Porter, pers. comm. to Adrián Reuter, May 2001).

Maderas del Carmen *(Area de Protección de Flora y Fauna)*

This protected area, with a total of 208 281 ha, was established on November 7, 1994, and is located in northeastern Coahuila.

The herpetofauna are characteristic of the CDE, and include the Eastern racer *Coluber constrictor*, a species listed as threatened by Mexico's NOM 059. The main threats to the reptiles of the area are deforestation, over-grazing, mining activities, and introduction of exotic species (INE/SEMARNAT, 1999).

Sierra Gorda *(Reserva de la Biósfera)*

The Sierra Gorda Biosphere Reserve was established on May 19, 1997, and covers a total of 383 567 ha. There are 71 species of reptiles in this protected area. Among the threats to reptiles and other species in this reserve are illegal logging, water pollution, watershed depletion, human population growth, poaching, and uncontrolled tourism (INE/SEMARNAT, 1999).

3. Collecting Methods

The methods used to catch reptiles vary widely in the CDE. Depending on the size of the animal, turtles are usually caught by hand, or by using casting nets and funnel traps. Tortoises are usually searched for within and removed from their burrows.

Snakes are usually killed as soon as they are found, most likely as a result of fear caused by ignorance of venomous and non-venomous species. Dead snakes are usually skinned and the flesh is dried. Live snakes are generally captured by using a wooden stick to lift or guide them into a bag. Several snakes are often kept together in a single bag.

Lizards are caught by hand, either by reaching into holes where lizards might be found, or catching them while they are basking, usually early in the morning, when they are less active. Local children also catch lizards by hitting them with rubber bands and catching them while the lizards are stunned.

Though there is some targeted hunting of reptiles, especially for more commercially valuable species such as rattlesnakes and Bolson tortoises, collecting is frequently opportunistic.

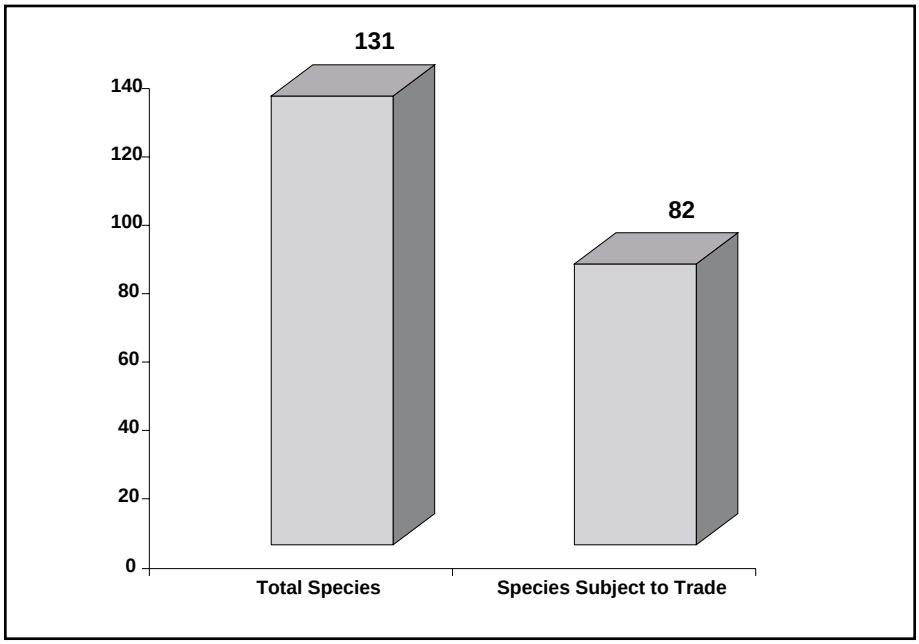
4. Reptile Species Found in Trade

The demand for pet reptiles has increased in the recent past, and there is an established trade in markets and some pet stores within Mexico. Some of this trade is common in established markets, where other pet animals such as aquarium fishes or songbirds are offered; however, the numerous informal street markets in major urban centers as well as at some busy crossroads and stretches of road also act as selling points. Most of this trade is targeted at nationals seeking personal pets or for resale in established businesses. There is also an international, illegal trade in Mexican reptiles, such as specimens from the genera *Abronia*, *Xenosaurus*, and *Crotaphytus*, which are sold at pet stores and "shows" in the United States (González Porter, pers. comm. to Adrián Reuter, May 2001). For example, on October 19, 1999, a U.S. citizen was caught in possession of more than 200 illegally collected reptiles, likely destined for markets in the United States (Gonzalez Porter, pers. comm. to Adrián Reuter, May 2001).

Based on historical information, interviews, field trips, market surveys, and seizure data, TRAFFIC assessed the number of CDE species subject to collection and trade in and from Mexico. At least 82 species, or approximately 63% of the 131 estimated reptile species found in the Mexico portion of the CDE (Cotera *et al.*, 2001), are subject to some kind of trade (Figure 2).

Of the 82 species identified in domestic or international trade, 6 are listed in Appendix I or II of CITES, 4 are classified as Threatened (vulnerable, endangered, critically endangered, or lower risk) by IUCN (2002), and 51 in the

Figure 2. Total Chihuahuan Desert Ecoregion reptiles found in Mexico, and total number found in trade



NOM 059 ECOL 2001. Seventeen of the 82 species are endemic to Mexico (Table 2).

Based on market surveys conducted in Mexico by González Porter over the past 10 years, rattlesnakes which are used for meat, fat, venom, and as live animals used by street peddlers and sold as pets, are the most commonly traded Chihuahuan Desert reptiles (González Porter, pers. comm. to Adrian Reuter, May 2001).

Because much of the trade is illegal, and collection and trade figures are not reported, an estimation of the number of rattlesnakes collected and traded is difficult. However, some anecdotal information exists. After a sting operation conducted in the Plateros, Zacatecas region by PROFEPA in September 1997, it was estimated that the number of captured snakes (primarily rattlesnakes *Crotalus* spp. and *Sistrurus* spp.) from that region could be as high as 400 individuals per month. This investigation revealed that illegal trade is extensive and diversified, and that the primary demand is for reptile skins. Shipments of hundreds or even thousands of rattlesnake skins, as well as skins from other reptiles, travel via ground transportation to León, Guanajuato or Nautla, Veracruz. There the skins are used to make boots and other products that are distributed to markets within and outside of Mexico (González Porter, pers. comm. to Adrián Reuter, May 2001).

Rattlesnakes have also frequently been used as a remedy for various diseases. For example, the text on a bottle of rattlesnake pills indicated that they were useful for curing a wide variety of ailments, including: skin stains, cancer, sores, rashes, pimples, welts, itching, rheumatism, varicose veins, face spots, acne, blackheads, stress, heart disease, diabetes, hemorrhoids, and sexual impotence. These "miracle" pills are made from dried rattlesnake flesh, which is ground and placed in jelly caps. Though no scientific studies have been conducted to support these claims of efficacy, it has been shown that the flesh, which is dried outdoors, can carry *Salmonella*; therefore, the pills could be a vector of this disease (Rubio, 1998). The rattles and the head are used as ornaments (SEMARNAP-PROFEPA, 1998).

Another commonly collected reptile genus comprises the horned lizards *Phrynosoma* spp., which are also referred to as tapaxin or chameleons. These reptiles are believed by some to be useful to attract money, if placed in a chest filled with iron filings. These lizards, as

Table 2. CDE reptile species subject to trade in and/or from Mexico

SPECIES	COMMON NAME	CITES	NOM O59	RED LIST	PLACE OF TRADE	USE
Chrysemys picta	Painted turtle		Pr		Pet shops	Pets
Pseudemys gorzugi	Rio Grande cooter		Pr		Pet shops	Pets
Terrapene coahuila	Coahuilan box turtle		Pr*	EN	Pet shops	Pets
Terrapene ornata	Ornate box turtle	II	Pr	LR/nt	Pet shops	Pets
Trachemys scripta	Pond slider		Pr		Local markets and pet shops	Pets; meat
Kinosternon flavescens	Yellow mud turtle				Local markets	Pets
Kinosternon hirtipes	Rough-footed mud turtle		Pr		Local markets	Pets
Kinosternon integrum	Mexican mud turtle		Pr*		Local markets	Pets
Kinosternon sonoriense	Sonoran mud turtle				Local markets	Pets
Gopherus berlandieri	Berlandier's tortoise	II	A		Local markets and pet shops	Pets
Gopherus flavomarginatus	Bolson tortoise	I	P*	VU	Local markets and pet shops	Pets
Apalone ater	Black spiny softshell	I	Pr*	CR	Local markets and pet shops	Pets; meat
Apalone spinifera	Spiny softshell		Pr		Local markets and pet shops	Pets; meat
Gerrhonotus liocephalus	Texas alligator lizard		Pr		Pet shops and shows	Pets
Gerrhonotus lugoi	Lugo's alligator lizard		A*		Pet shops and shows	Pets
Coleonyx brevis	Texas banded gecko		Pr		Pet shops and shows	Pets
Coleonyx reticulatus	Reticulate banded gecko		Pr		Pet shops and shows	Pets
Crotaphytus collaris	Collared lizard		A		Pet shops and shows	Pets
Gambelia wislizenii	Leopard lizard		Pr		Pet shops and shows	Pets
Cophosaurus texanus	Greater earless lizard		A		Pet shops and shows	Pets
Ctenosaura hemilopha	Cape spinytail iguana	II	Pr*		Local markets	Meat
Ctenosaura pectinata	Mexican spinytail iguana	II	A*		Local markets	Meat
Phrynosoma cornutum	Texas horned lizard		A		Local and Mexico City markets	Traditional medicine
Phrynosoma modestum	Round-tailed horned lizard				Local markets, pet shops and shows	Traditional medicine; Pets
Phrynosoma orbiculare	Mountain horned lizard		A*		Local and Mexico City markets	Traditional medicine
Sceloporus jarrovi	Mountain spiny lizard				Pet shops and shows	Pets
Sceloporus torquatus	Crevice swift				Pet shops and shows	Pets
Sceloporus undulatus	Fence lizard				Pet shops and shows	Pets
Uta stansburiana	Common side-blotched lizard		A*		Pet shops and shows	Pets
Eumeces brevirostris	Shortnose skink				Pet shops and shows	Pets
Eumeces lynxe	Oak forest skink		R*		Pet shops and shows	Pets
Eumeces tetragrammus	Four-lined skink				Pet shops and shows	Pets
Scincella silvicola	Taylor's ground skink		Pr*		Pet shops and shows	Pets
Cnemidophorus exsanguis	Chihuahuan spotted whiptail				Pet shops and shows	Pets
Cnemidophorus gularis	Eastern spotted whiptail				Pet shops and shows	Pets
Cnemidophorus inornatus	Little striped whiptail				Pet shops and shows	Pets
Cnemidophorus laredoensis	Laredo striped whiptail				Pet shops and shows	Pets
Cnemidophorus neomexicanus	New Mexico whiptail		Pr		Pet shops and shows	Pets
Cnemidophorus tesselatus	Common checkered whiptail				Pet shops and shows	Pets
Cnemidophorus tigris	Tiger whiptail				Pet shops and shows	Pets

*Species endemic to CDE.

Table 2. CDE reptile species subject to trade in and/or from Mexico *continued*

SPECIES	COMMON NAME	CITES	NOM O59	RED LIST	PLACE OF TRADE	USE
Cnemidophorus uniparens	Desert grassland whiptail				Pet shops and shows	Pets
Xantusia bolsonae	Bolson night lizard		A*		Pet shops and shows	Pets
Xantusia vigilis	Desert night lizard				Pet shops and shows	Pets
Arizona elegans	Glossy snake				Pet shops and shows	Pets
Coluber constrictor	Eastern racer		A		Pet shops	Pets
Conopsis nasus	Largenose earth snake				Pet shops	Food for other snakes
Diadophis punctatus	Ring-necked snake				Pet shops	Pets
Drymarchon corais	Western indigo snake				Pet shops, shows and shoe stores	Pets; skin
Elaphe bairdi	Baird's ratsnake				Pet shops and shows	Pets; skin
Elaphe guttata	Cornsnake				Pet shops and shows	Pets
Heterodon nasicus	Western hog-nosed snake		Pr		Pet shops and shows	Pets
Lampropeltis alterna	Gray-banded kingsnake		A		Pet shops and shows	Pets
Lampropeltis getula	Common kingsnake		A		Pet shops and shows	Pets
Lampropeltis mexicana	San Luis Potosi kingsnake		A*		Pet shops and shows	Pets
Masticophis bilineatus	Sonoran whipsnake				Pet shops and markets	Pets
Masticophis flagellum	Coachwhip		A		Pet shops and markets	Pets
Masticophis mentovarius	Neotropical whipsnake				Pet shops and markets	Pets
Masticophis taeniatus	Striped whipsnake				Pet shops and markets	Pets
Nerodia erythrogaster	Plain-bellied watersnake		A		Local markets	Pets
Nerodia rhombifer	Diamond-backed watersnake				Local markets	Pets
Pituophis deppei	Mexican bullsnake		A*		Local markets and pet shops	Pets; peddlers
Pituophis catenifer	Gopher snake				Local markets and pet shops	Pets; peddlers
Rhinocheilus lecontei	Longnose snake				Pet shops and shows	Pets
Thamnophis cyrtopsis	Black-necked gartersnake		A		Local markets and pet shops	Pets
Thamnophis eques	Mexican gartersnake		A		Local markets and pet shops	Pets
Thamnophis errans	Mexican wandering gartersnake				Local markets and pet shops	Pets
Thamnophis exsul	Montane gartersnake		A*		Local markets and pet shops	Pets
Thamnophis marcianus	Checkered gartersnake		A		Local markets and pet shops	Pets
Thamnophis melanogaster	Mexican black-bellied gartersnake				Local markets	Pets
Thamnophis proximus	Western ribbon snake		A		Local markets and pet shops	Pets
Thamnophis sirtalis	Common gartersnake		Pr		Local markets and pet shops	Pets
Micrurus distans	West Mexican coral snake		Pr*		Laboratories	Venom
Micrurus fulvius	Texas coral snake		Pr		Laboratories and pet shops	Venom; pets
Agkistrodon contortrix	Copperhead				Pet shops and shows	Pets
Crotalus aquilus	Queretaran dusky rattlesnake		Pr*		Local markets	Meat; traditional medicine

*Species endemic to CDE.

Table 2. CDE reptile species subject to trade in and/or from Mexico *continued*

SPECIES	COMMON NAME	CITES	NOM O59	RED LIST	PLACE OF TRADE	USE
Crotalus atrox	Western diamond-backed rattlesnake		Pr		Local markets and pet shops	Skin; meat; traditional medicine
Crotalus lepidus	Rock rattlesnake		Pr		Local markets	Meat; traditional medicine
Crotalus molossus	Black-tailed rattlesnake		Pr		local markets	Skin; peddlers; traditional medicine
Crotalus pricei	Twin-spotted rattlesnake		Pr		Local markets	Meat; traditional medicine
Crotalus scutulatus	Mojave rattlesnake		Pr		Local markets and pet shops	Skin; traditional medicine
Crotalus viridis	Prairie rattlesnake		Pr		Local markets	Meat; traditional medicine
Crotalus willardi	Ridge-nosed rattlesnake		Pr		Local markets	Meat; traditional medicine

*Species endemic to CDE.

well as collared lizards *Crotaphytus* spp., are also widely used as pets in Mexico. They are offered for sale not only in Mexican markets, but also internationally in pet shops and "reptile shows" (González Porter, pers. comm. to Adrián Reuter, May 2001).

Most species are exploited for use as pets, followed by use as meat, for the skin, in traditional medicine, and by peddlers *(merolicos)* (Figure 3).

Though there are at least 82 species found in trade to meet a variety of demands, several species may be particularly threatened due to their population status. Of the 67 species that can be found in the pet trade, Bolson tortoises *Gopherus flavomarginatus* (CITES Appendix I; NOM 059 In Danger of Extinction; IUCN (2002) Vulnerable) and black spiny softshells *Apalone ater* (CITES Appendix I, NOM 059 Subject to Special Protection; IUCN (2002) Critically Endangered) are of particular concern due to their precarious conservation status. Softshell turtles *Apalone* spp. are also used for meat, as are rattlesnakes *Crotalus* spp. and *Sistrurus* spp., all of which are in some protected category in the NOM 059. Rattlesnakes are also threatened by their use for leather products, for traditional medicine, and magic-religious activities.

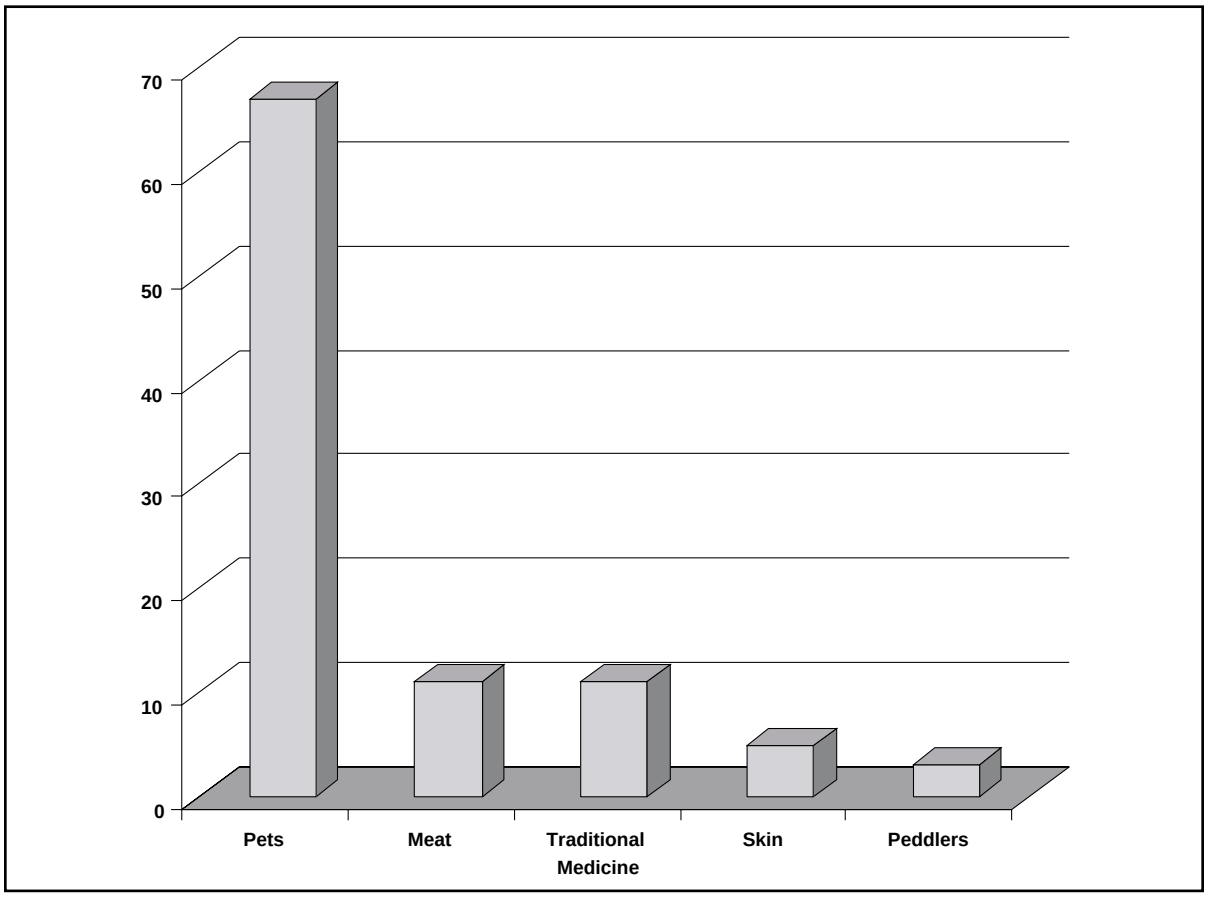
Though it is possible to trade legally in certain Mexican wildlife, particularly via the UMA system, there is little evidence of legal trade in CDE reptile species over the last few years. However, some data regarding the illegal trade are available and may be useful in assessing the scope of the overall collection and trade of reptiles from the CDE. Official figures on seizures of live reptiles by PROFEPA between 1995 and 2000 are quite low (Table 3), and do not include all government seizures, such as the specimens seized in specific sting operations. Therefore, these data should not be interpreted as an indication of the extent of illegal trade, but simply as an indication of the species collected and/or traded illegally within Mexico. There were no data showing any seizures in Zacatecas or Hidalgo.

5. Significant Domestic Trade Centers

Five main distribution and trade centers for CDE reptile species were identified in three major areas:

1. Plateros Magical-Religious Center, Zacatecas
2. Charco Cercado (roadway), San Luis Potosí
3. Mexico City Marketplaces:
   - Mercado de Sonora (Market of Sonora), Mexico City
   - Nuevo Mercado San Lázaro (New Market of San Lázaro), Mexico City
   - Mercado Emilio Carranza (Emilio Carranza Market), Mexico City.

Figure 3. Common uses of species subject to trade



5.1 Plateros Magical/Religious Center, Zacatecas

The Plateros market is located in front of the Sanctuary for the Miraculous Child of Atocha, where religious objects, images, candles, and altars, among other things, are sold. Natural and traditional remedies derived from reptiles, such as dried rattlesnakes, rattlesnake pills, and rattles, are offered for sale. Stuffed toads and turtles, and boots manufactured with reptile skins are also for sale.

Starting in 1995, the Zacatecas authorities of PROFEPA have established verification and periodic inspection programs, identifying the illegal points of sale and the number of specimens offered. However, the trade in live wildlife, products, and byproducts of this region continues, disregarding the existing legislation and enforcement efforts.

In September 1997, PROFEPA carried out a sting operation in this market, in which 100 rattlesnake skins belonging to five different species (*Crotalus molossus, C. scutulatus, C. atrox, C. lepidus, C. viridis*) were confiscated, as well as other byproducts (snake oil and a "dental balm" made from a snake) for which legal possession or source could not be shown. It is likely that the snakes were captured in the CDE, but there is no way to confirm that assumption.

For the purpose of informing local people about reptile conservation and regulations, PROFEPA, together with other entities from SEMARNAP (Secretaría de Medio Ambiente, Recursos Naturales y Pesca), the municipalities of Fresnillo, Zacatecas, Minera Peñoles, and some non-governmental organizations of the States of Zacatecas and Aguascalientes, organized the first "Workshop of Management and Exploitation of Herpetofauna in Arid Zones: The Rattlesnakes from Zacatecas" in the City of Fresnillo, Zacatecas, July 15-17, 1999. Attendees included wildlife vendors,

Table 3. Live reptile seizures from 1995 to 2000

Species	Common name	Quantity	Year	State where seizure occured
Ctenosaura pectinata	Mexican spinytail iguana	1	1995	San Luis Potosí
Trachemys scripta	Pond slider	1	1996	Querétaro
Pituophis deppei	Mexican bullsnake	1	1996	Guanajuato
Kinosternon spp.	Mud turtle	1	1997	Guanajuato
Crotalus spp.	Rattlesnake	50	1997	San Luis Potosí
Crotalus spp.	Rattlesnake	2	1998	Durango
Coluber constrictor	Eastern racer	11	1998	Guanajuato
Crotalus atrox	Western diamond-backed rattlesnake	3	1998	Guanajuato
Ctenosaura pectinata	Mexican spinytail iguana	1	1998	Guanajuato
Crotalus atrox	Western diamond-backed rattlesnake	1	1999	Guanajuato
Crotalus spp.	Rattlesnake	13	1999	Guanajuato
Ctenosaura pectinata	Mexican spinytail iguana	1	1999	Guanajuato
Drymarchon corais	Western indigo snake	9	1999	Guanajuato
Gopherus agassizi	Desert tortoise	2	1999	Guanajuato
Lampropeltis spp.	Kingsnake	15	1999	Guanajuato
Pituophis deppei	Mexican bullsnake	12	1999	Guanajuato
Thamnophis spp.	Gartersnake	13	1999	Guanajuato
Thamnophis spp.	Gartersnake	1	1999	Coahuila
Drymarchon corais	Western indigo snake	2	1999	Coahuila
Masticophis flagellum	Coachwhip	3	1999	Coahuila
Crotalus spp.	Rattlesnake	2	1999	Coahuila
Gopherus spp.	Tortoise	6	1999	Coahuila
Lampropeltis spp.	Kingsnake	1	1999	Coahuila
Lampropeltis getula	Common kingsnake	1	1999	Coahuila
Pituophis deppei	Mexican bullsnake	11	1999	Coahuila

Source: PROFEPA

members of the Veterinary College of Aguascalientes, and other interested people.

In November 1999, PROFEPA in the state of Zacatecas carried out a sting operation in the Plateros market, discovering that many of the wildlife vendors had previously been subjected to inspections, and previously had administrative procedures brought against them by PROFEPA. Some of these people had attended the above-mentioned information workshop (González Porter, pers. comm. to A. Reuter, May 2001).

During this operation, two wildlife products stands were inspected; they had, among other things:

- 89 dried rattlesnakes split open from head to tail
- 2000 rattlesnake capsules
- 6 rattlesnake rattles
- 14 pairs of rattlesnake-skin cowboy boots
- 800 grams of rattlesnake powder
- 3 dried Mexican bullsnakes *Pituophis deppei* split open from head to tail
- 14 rattlesnake pill packages
- 5 bags of ground rattlesnake meat
- 1 stuffed pond slider *Trachemys scripta*.

(González Porter, pers. comm. to A. Reuter, May 2001; Amador Sanchez, 1999).

The Zacatecas delegation of PROFEPA imposed more than 134 fines totaling 1 720 000 pesos (approximately USD 180 000), on vendors involved in these illegal activities (Amador Sanchez, 1999).

5.2 Charco Cercado, San Luis Potosí

Charco Cercado is located in the municipality of Guadalcazar (total population of 25 359),

situated northeast of the city of San Luis Potosí, S.L.P. The population comprises approximately 1100 residents, of which about 90 are suspected of being engaged in illegal wildlife trade (Charqueño Puente, 2002). Charco Cercado is considered the biggest wildlife acquisition and trading center in rural Mexico, having national and international significance (Zarate, 1997).

Cattle production and seasonal agriculture are the main economic activities throughout the region. A few locals offer services like roadside auto-repair shops and small grocery stores. A large percentage of the population in the area (mostly men) migrate north in search of better opportunities. For the last 30 years, many of the local residents have been illegally trading in wildlife. This wildlife is offered at improvised stands along the roadway, although a great part of the trade is "specially ordered" and the transactions are made in a less obvious manner.

A large number of mammal and bird species are offered for sale, both as live animals and as products. Some reptiles are also offered, particularly rattlesnakes (primarily *Crotalus molossus, C. atrox*, and *C. sctutulatus* offered both as live animals and products) and horned lizards (primarily *Phrynosoma orbiculare* and *P. modestum* offered as live animals) (Reuter, pers. observ. 2001).

Among the species subject to trade at Charco Cercado, some are native to the region, while others are illegally transported from Tamaulipas, Nuevo León, Zacatecas, and other states for sale at Charco Cercado. This is usually the case for bird species that require specific permits to be transported between states, due to the risks of avian diseases such as avian tuberculosis or Newcastle disease. The animals are generally collected by other people and entrusted to the locals until they're sold (Reuter, pers. observ. 2001).

In 1997, investigations were conducted on the illegal trade of reptiles, their products, and byproducts. Among the identified goods were dried, skinned snakes (flesh and bone), rattlesnake oil, and live rattlesnakes. The trade was carried out in 30 outdoor stands and seven indoor stands located on the side of the highway, from San Luis Potosí to Matehuala ("El Sol de México," "El Heraldo de México," "El Nacional," "Novedades," "Uno mas Uno," 22 March 1997). It was also observed that there is a recurrent trade involving dealers who travel by vehicle from Mexico City and León and who stay in the *ejido* (common land, expropriated and reallocated by the government to a workers' collective) for a day or two, until they complete their transactions ("El Heraldo de México," 22 March 1997).

On March 21, 1997, an inter-agency (comprising the Office of the Attorney General for the Protection of the Environment (PROFEPA), Communications and Transports Ministry (SCT), Fedral Highway Police (PFC), Office of the Attorney General (PGR), Social Protection of Municipality, General Ecological Coordination of the State Government, and a Public Attorney) sting operation was carried out in which 180 police officers displaced the wildlife vendors ("Novedades," "Uno más Uno," "El Sol de México," 22 March 1997; "El Universal," 23 March 1997). As a result of this operation, 450 specimens and products were seized, including animal hides, songbirds, parrots, raptors, rattlesnake pills, live mammals, and live reptiles ("Novedades," "El Sol de México," "El Heraldo de México," "El Nacional," 22 March 1997; "El Universal," "Reforma," 23 March 1997). The state government tried to ensure that the operation would be conducted without violence, but community members threw rocks at the police and their vehicles. During this sting operation, the following reptile products and byproducts were secured:

- 44 rattlesnake skins
- 87 flasks of rattlesnake oil
- 2 boa constrictor skins
- 20 flasks of rattlesnake powder
- 332 skinned, dried rattlesnakes
- 20 flasks of rattlesnake fat
- 49 bags of rattlesnake capsules

(Gonzalez Porter, pers. comm. to A. Reuter, May 2001)

The seized fauna were taken to confiscation centers, and the products and by-products were destroyed ("Novedades," "Uno mas Uno," "El Sol de México," "El Nacional," 22 March 1997).

Following the sting operation, a meeting with the implicated parties was held at the General Ministry of Government. At that meeting, the inhabitants of Charco Cercado voiced their need for support from the government, including assistance for electricity and water supply, and in development of poultry and pig farms.

A visit to Charco Cercado in December 2000 confirmed that trade continues, with a larger number of live snakes (rattlesnakes and others) observed being offered for trade than in previous years (Reuter, pers. observ. 2000). Live snakes (Mexican bullsnake *Pituophis deppei*, Black-tailed rattlesnake *Crotalus molossus*, and Mojave rattlesnake *C. scutulatus*) were offered at prices ranging from 50 to 150 MXP (approximately USD 4.50 to 15), dried rattlesnakes were offered for 60 to 160 MXP (approximately USD 5.50 to 16), and bottles containing either dried snake meat or fat were offered for approximately 60 MXP (approximately USD 6). Live snakes were kept 120 feet away from the roadside stand in a buried oil drum covered with wooden boards. Rattles were sold either still attached to the dried meat and skin or separately. In one of the stands, a man was also salting rattlesnake skins. Skins were offered for sale to the researcher, probably because the visit was made just after the snakes were skinned and hung to dry. Regular customers come to the area and buy skins periodically for use in boot and belt making(Reuter, pers. observ. 2000).

5.3 Mexico City Marketplaces

Mexico City is an extremely important wildlife distribution center. Much of this trade is done in or through established, indoor markets; the most important of these are the Mercado de Sonora, the Mercado Nuevo San Lázaro, and the Mercado Emilio Carranza, where exotic and native species, including several which are found in the CDE, are offered for sale (Table 4). Table 4 shows information gathered from 10 years of visits to these markets by biologist Gracia González Porter and should not be considered to be comprehensive. The uses of the species offered in Mexico City can be seen in Table 2. All of this trade is likely to be illegal, considering that these reptile species are not openly offered and the customer has to ask very specifically about the particular species of interest before the dealer decides whether to show what might be available.

6. International Trade from Mexico

Because Mexican law generally prohibits the export of native reptiles, virtually all export of live reptiles, reptile parts, and products from Mexico is illegal. There is no systematic process for compiling data on illegal wildlife seized prior to export from Mexico. CITES data are limited to the six CITES-listed reptile species (three tortoises, two box turtles, one softshell turtle).

The offer for sale of numerous CDE reptile species endemic to Mexico by reptile dealers outside of Mexico, especially in the United States, indicates that illegal exports are taking place. Although many of these species are now bred in captivity within the United States, the original founder stock was likely exported illegally from Mexico. Also, there are frequent seizures of live reptiles, as well as parts and products, at the U.S./Mexico border. However, neither of these information sources gives a clear picture of the extent of exports from Mexico.

The U.S. Fish and Wildlife Service's (USFWS's) Law Enforcement Management Information System (LEMIS) contains records of all declared wildlife imports to and exports from the United States, as well as all intercepted illegal imports and exports. Given the United States' proximity to Mexico, as well as the enormous demand for exotic reptiles within the United States, it is likely that the United States is the largest consumer of reptiles exported from Mexico. As was stated above, there is very little legal export of CDE reptiles from Mexico, so very few shipments have been declared to the USFWS. However, seizures of illegal exports from Mexico are frequently made at U.S. border ports, and those exports are entered into LEMIS. Given the difficulty of detecting illegal wildlife trade and the likelihood that the majority of trade goes undetected by enforcement officials, available trade figures should be considered as minimum numbers in trade.

However, not all LEMIS entries are recorded at the species level. In many instances, the trade is recorded at the genus or family level, or simply as "non-CITES reptiles." Table 5 shows imports to the United States from Mexico of CDE reptiles, including live animals as well as parts and products that were recorded at the species level for 1996 through

2002. Given that much of the rattlesnake trade is recorded only at the genus level, all *Crotalus* spp. entries were included in Table 5 as well. These entries generally consist of legal imports of scientific specimens, illegal imports of tourist curios, and illegal imports of live animals as pets.

It should be noted that there are numerous entries recorded at the genus level that may involve CDE species. Because no conclusive determinations could be made regarding the species involved or their likely origins, they were not included in the table, with the notable exception of rattlesnakes. Among the most frequently recorded trade at the genus level was illegal importation of rattlesnake products of the genus *Crotalus*. Though much of this trade likely involved specimens removed from areas outside of the CDE, given the significant volumes in trade, these data were included in the analysis.

ASSESSMENT OF THE IMPACTS OF COLLECTION AND TRADE

Though available information is very limited, some information indicates that a large number of CDE reptile species are exploited for domestic and international trade, and that this exploitation may be a significant threat for at least some reptile species. At least 63% of Mexico's CDE reptile species are found in trade, and more than 60% of those species are under some category of risk.

Populations of some endemic species, such as the black spiny softshell *Apalone ater,* Bolson tortoise *Gopherus flavomarginatus,* and Coahuilan box turtle *Terrapene coahuila*, have been severely impacted by a number of threats, including collection and trade. Like other reptiles in the area (i.e., *Lampropeltis mexicana*), their endemic status elevates them to very profitable merchandise for collectors and "herpetoculturists" in international markets.

Demand for live rattlesnakes, skins, and parts for use in traditional medicine appears to have led to significant population reductions in some areas, such as Plateros, Zacatecas. For example, during a workshop on rattlesnakes organized by PROFEPA, more than 20 people sought these snakes using a direct transect technique for three days in an area with suitable habitat with no success (González Porter, pers. comm. to A. Reuter, May 2001).

Basic biological information on most of these reptile species is scarce, making it difficult to evaluate the impact of collection and trade on

Table 4. CDE reptile species offered in Mexico City markets

	SCIENTIFIC NAME	COMMON NAME
1	*Kinosternon hirtipes*	Rough-footed mud turtle
2	*K. integrum*	Mexican mud turtle
3	*Gopherus berlandieri*	Berlandier's tortoise
4	*Trachemys scripta*	Pond slider
5	*Apalone spinifer*	Spiny softshell
6	*Thamnophis spp.*	Gartersnakes
7	*Nerodia spp.*	Watersnakes
8	*Sceloporus torquatus*	Crevice swift
9	*Phrynosoma orbiculare*	Mountain horned lizard
10	*Crotaphytus spp.*	Collared lizards
11	*Crotalus atrox*	Western diamond-backed rattlesnake
12	*C. scutulatus*	Mojave rattlesnake
13	*C. molossus*	Black-tailed rattlesnake
14	*Elaphe spp.*	Ratsnake
15	*Lampropeltis spp.*	Kingsnake
16	*Drymarchon corais*	Western indigo snake
17	*Masticophis flagellum*	Coachwhip

Source: (Gonzalez Porter, pers. comm. to A. Reuter, May 2001)

Table 5. Legal and illegal imports to the United States of CDE reptile species from Mexico

Common Name	Scientific Name	1996	1997	1998	1999	2000	2001	2002
Ornate box turtle	*Terrapene ornata*		2 live	2 live	1 live	2 live		
Pond slider	*Trachemys scripta*	29 live 1 shell 1 shell product 202 stuffed	11 live 5 shells 1 shell product 6 stuffed 1 carcass	22 live 2 shells 3 stuffed	7 live 1 stuffed 1 body 1 unspec.	15 live	24 live 2 bodies	7 live 5 bodies
Desert tortoise	*Gopherus agassizi*	7 live 1 shell	12 live 2 shell products	1 shell product		4 live 1 carapace	4 live 1 carapace	2 live
Berlandier's tortoise	*Gopherus berlandieri*			2 live		2 live	1 live	
Bolson tortoise	*Gopherus flavomarginatus*					69 sci. spec.		
Spiny softshell	*Apalone spinifer*			2 sci. spec.		2 meat	1 live	
Zebra-tailed lizard	*Callisaurus draconoides*					3 sci. spec.		
Texas banded gecko	*Coleonyx brevis*	2 live						
Western banded gecko	*Coleonyx variegatus*					3 sci. spec.		
Collared lizard	*Crotaphytus collaris*	1 sci. spec.						
Gila monster	*Heloderma suspectum*				14 leather pieces			
Texas horned lizard	*Phrynosoma cornutum*		1 sci. spec.				1 live	
Crevice spiny lizard	*Sceloporus poinsetti*	8 sci. spec.	15 sci. spec.					
Rose-bellied lizard	*Sceloporus variabilis*				140 live	172 live		
Common side-blotched lizard	*Uta stansburiana*		18 sci. spec.			2 bodies	23 sci. spec.	
Baird's ratsnake	*Elaphe bairdi*						6 live	
Common kingsnake	*Lampropeltis getula*					1 sci. spec.		
Milksnake	*Lampropeltis triangulum*	1 stuffed						1 sci. spec.
Coachwhip	*Masticophis flagellum*			1 sci. spec.				
Gopher snake	*Pituophis catenifer*					1 sci. spec.		
Mexican bullsnake	*Pituophis deppei*	1 sci. spec. 1 dead						
Long-nosed snake	*Rhinocheilus lecontei*	2 live						
Ground snake	*Sonora semiannulata*					2 sci. spec.		
Western diamond-backed rattlesnake	*Crotalus atrox*	2 skins 26 shoes 1 meat	6 skins 1 stuffed	1 skin		3 sci. spec.	3 skin 1 skin pc. 3 medicine	
Rock rattlesnake	*Crotalus lepidus*					10 live	2 live 1 unsp.	
Black-tailed rattlesnake	*Crotalus molossus*		1 sci. spec.			2 sci. spec.		

Table 5: Legal and illegal imports to the United States of CDE reptile species from Mexico *(continued)*

Common Name	Scientific Name	1996	1997	1998	1999	2000	2001	2002
Twin-spotted rattlesnake	*Crotalus pricei*						3 live	
Mojave rattlesnake	*Crotalus scutulatus*			50 gm medicine				
Prairie rattlesnake	*Crotalus viridis*	1 sci. spec.	1 sci. spec. 1 leather product			1 sci. spec.		
Ridge-nosed rattlesnake	*Crotalus willardi*					8 live		
Rattlesnakes	*Crotalus* spp.	5 meat	5 carcass	8 skins	200 gm medicine	1 carcass	1 meat	3 meat
		2 carcass	4 skins	2 carcass	1 skin	1 meat	1 body	1 kg meat
		7 stuffed	6 shoes	2 shoes		1 unsp.	1 skin	2 bodies
		1 kg unsp.	7 unsp.	1 meat			5 live	
		10 skins	1 stuffed	1 unsp.				
		52 items medicine		1 stuffed				
				50 gm medicine				

Source: derived from USFWS LEMIS data.

wild populations. This is compounded by the fact that these species face other threats in many areas, such as habitat loss by deforestation, agriculture, overgrazing, exotic species introduction, pollution, and watershed depletion.

RECOMMENDATIONS

The following recommendations are made to ensure that collection and trade are not a threat to CDE reptile species, as well as other wildlife, in Mexico:

Enforcement:

1. Enforcement programs, which involve frequent inspections of important trade centers, should be enhanced to provide a more effective deterrent to illegal trade activities.
2. Wildlife inspector numbers should be increased and specific training provided (e.g., species identification, reptile handling, etc.) to ensure more effective regulation of the large-scale trade in reptiles and other wildlife.
3. Long-term investigations of reptile traffic networks, from their natural collecting areas to their final sale, are needed to fully understand the extent and impacts of this trade.
4. Protocols for disposing of confiscated wildlife, products, and byproducts, emphasizing the proper maintenance and handling of live specimens, including the creation of centers devoted to dealing with live confiscated wildlife, should be developed as a priority.

Management:

5. The UMA system should be assessed to determine whether sufficient controls and monitoring mechanisms are in place. If so, the system should be promoted, especially with regard to captive production of reptiles. These efforts should focus on threatened species that are in significant demand for pets or other uses. Other UMA efforts might include exhibits, ecotourism, and reintroduction programs.
6. Expanded knowledge of the biology and size of the populations of these species is imperative, especially for threatened and heavily collected species.
7. Standardized gathering and reporting of wildlife collection and trade information

(investigations, seizures, repatriations, prosecutions, etc.) and greater facilitation of information exchange and consultation among government offices and other parties are greatly needed.

8. Rehabilitation and release programs for seized animals, based on scientific data on the biology and distribution of each species, taking into account the potential for disease, genetic pollution, and other risks to wild populations, should be developed.

Education:

9. Environmental education programs focusing on local communities should be developed, to increase awareness of Mexican laws and promote the value of these communities' natural resources.

CHAPTER 2

Assessment of the Collection, Trade, and Regulation of Reptiles and Amphibians from the CDE in the United States

INTRODUCTION

There are numerous examples of the exploitation of reptiles and amphibians native to the United States to supply the demand for food, pets, leather, curios, and other items. Many of these activities and species have been well documented, such as the American alligator *Alligator mississippiensis*, sea turtles Cheloniidae, alligator snapping turtle *Macroclemys temminckii*, box turtles *Terrapene* spp., and timber rattlesnake *Crotalus horridus* (see, for example, Fleming, 2001; Hoover, 1998; Fitzgerald and Painter, 2000; Pritchard, 1989). Though dozens of other reptile and amphibian species are exploited throughout the United States, little is known about the extent of these activities or their impacts on wild populations. This is particularly true for the large number of small lizards and snakes such as those found in the CDE.

METHODS

Information on state and federal laws pertaining to the collection and trade of amphibians and reptiles from the U.S. portion of the CDE was compiled through a query of state wildlife management agencies in Arizona, New Mexico, and Texas, and review of federal statutes and regulations.

To gather data on domestic U.S. trade levels, data from the Texas Parks and Wildlife Department county-based database of nongame collectors and dealers for 1999 were analyzed. In this analysis, we broadly defined the CDE to include all counties that existed entirely or in part in the CDE, as well as those adjacent to and containing habitat characteristic of the CDE. Counties west of the Pecos River and in the CDE included: El Paso, Hudspeth, Culberson, Reeves, Jeff Davis, Pecos, Terrell, Presidio, and Brewster. The following counties lie east of the Pecos River but contain habitat characteristic of the CDE: Crockett, Val Verde, Kinney, and Maverick. The following counties north of the Pecos River extend to the city of Lubbock and were included in our analysis because species reported from that region also occur in parts of the CDE: Ward, Crane, Upton, Winkler, Ector, Midland, Andrews, Fisher, Jones, Yoakum, Lynn, Garza, Hockley, and Lubbock. Only counties where collecting activity was reported were listed (Figure 4).

To compile anecdotal information on trade levels, use, and enforcement, we interviewed National Park Rangers, game wardens, agency biologists, academic biologists, hobbyists, and collectors. Names and responses of individuals are not listed in the report in order to preserve the interviewees' anonymity. We asked each interviewee the following questions:

- What are the amphibians and reptiles that are traded? Are snakes, lizards, and frogs traded, and, if so, what species?
- How many animals do you think may be involved in the trade of amphibians and reptiles from CDE?
- How many collectors do you think are involved?
- What are the most important areas for collecting?
- Do you think collecting is a problem?

We also asked enforcement personnel how many incidents there had been in which collectors were caught, and what the outcomes of those incidents had been.

To compile information on international trade in CDE species, we obtained and analyzed wildlife import/export data compiled by the USFWS's Division of Law Enforcement.

Common names are used throughout the text of this report. However, to assure accuracy, the current scientific name is also given the first time a common name is used.

RESULTS

1. State and Federal Laws Pertaining to Collection and Trade

1.1 New Mexico

All native, free-ranging amphibians and reptiles in New Mexico, except those collected in rattlesnake roundups, for fish bait, or for lizard races, are classified as protected nongame wildlife for commercial taking purposes (Section 17-2-4.2 New Mexico Statutes Annotated 1978). ("rattlesnake roundups" are defined as an organized public event where the purpose is to display, buy, sell, and trade rattlesnakes of the genus *Crotalus*; "fish bait" is limited to the aquatic larval stage of the tiger salamander *Ambystoma tigrinum*; and "lizard races" are the organized, competitive racing of any lizard not listed as threatened or endangered.) It is unlawful for any person to take native, free-ranging amphibians and reptiles in New Mexico for commercial purposes without purchasing and having in their possession a valid commercial collecting permit.

In addition, nonresidents must purchase and have in their possession a nonresident hunting license as called for under Section 17-3-13 NMSA 1978 for the year in which the taking is done. Exceptions include: 1) when there is an emergency situation involving an immediate threat to human life or private property, rattlesnakes may be captured, removed, or destroyed without a permit; 2) no permit is necessary for the take of free-ranging amphibians and reptiles for the purposes of rattlesnake roundups, fish bait, or lizard races; 3) all other species of snake (other than rattlesnakes) collected and displayed for rattlesnake roundups shall not be bought, sold, or traded unless the person collecting such snakes is in possession of a commercial take permit; and 4) amphibians and reptiles held in captivity prior to July 1, 2001 and their progeny are not subject to these regulations. A list of native, free-ranging amphibians and reptiles known to occur in the state of New Mexico wherein take is allowed, with the annual bag limit for each, must be established and maintained by the Director of the New Mexico Department of Game and Fish (Director's Amphibian and Reptile List). It is unlawful to exceed the annual bag limit of any species of amphibian or reptile listed on the Director's Amphibian and Reptile List for the current year of the license. Each person who purchases a Commercial Collecting Permit is required to file a year-end report on a standardized form approved by the New Mexico Department of Game and Fish.

All species of amphibians and reptiles listed as threatened or endangered by the New Mexico State Game Commission are protected from take. These species are listed in Table 6.

The only unit within the New Mexico Department of Game and Fish that is charged with the management of nongame amphibians and reptiles is the Endangered Species Program in the Conservation Services Division, which has responsibility for research, conservation, and management of listed species.

During the 41st Legislature, Second Session 1994, Senate Memorial 27 was passed requesting the State Game Commission to compile information on the extent of the commercial trade in amphibians and reptiles and to recommend additional legislation to protect these species. That memorial was completed during December 1994 (Appendix 2). At least 52 species or approximately 43% of the native amphibians and reptiles in New Mexico were reported to be commercially exploited.

1.2 Texas

Prior to implementation of a permit system in Texas, nongame wildlife (including reptiles and amphibians) could be collected and sold with a valid hunting license. By the late 1990s, anecdotal and substantiated reports of commercial use of unregulated nongame wildlife were common, and purported numbers of animals taken from the wild seemed alarming in some cases. The trade in live black-tailed prairie dogs *Cynomys ludovicianus*, and wild-caught amphibians and reptiles of all species was at the forefront of discussions, but numbers were impossible to corroborate or interpret. Despite the stated mission of the Texas Parks and Wildlife Department (TPWD) — to manage the state's wildlife so that a viable and harvestable population is maintained — it was unclear whether collection of certain nongame species was great enough to affect the sustainability of wild populations. The goal of TPWD was to obtain a baseline dataset of the levels of commercial use of nongame wildlife (all

Table 6. Amphibians and reptiles native to the CDE listed as threatened or endangered or otherwise fully protected by New Mexico State Game Commission Statute

CAUDATA	SALAMANDERS
Family Plethodontidae	
Aneides hardii	Sacramento mountains salamander
SALIENTIA	**FROGS AND TOADS**
Family Bufonidae	
Bufo alvarius	Colorado River toad
Family Microhylidae	
Gastrophryne olivacea	Great Plains narrow-mouthed toad
Family Ranidae	
Rana chiricahuensis[T]	Chiricahua leopard frog
Rana yavapaiensis	Lowland leopard frog
TESTUDINES	**TURTLES**
Family Emydidae	
Pseudemys gorzugi	Rio Grande cooter
SAURIA	**LIZARDS**
Family Phrynosomatidae	
Phrynosoma cornutum	Texas horned lizard
Phrynosoma hernandesi	Greater short-horned lizard
Phrynosoma modestum	Round-tailed horned lizard
Phrynosoma solare	Regal horned lizard
Sceloporus arenicolus	Dunes sagebrush lizard
Sceloporus slevini	Slevin's bunchgrass lizard
Family Teiidae	
Cnemidophorus burti	Canyon spotted whiptail
Cnemidophorus dixoni	Gray checkered whiptail
Family Scincidae	
Eumeces callicephalus	Mountain skink
Family Helodermatidae	
Heloderma suspectum	Gila monster
SERPENTES	**SNAKES**
Family Colubridae	
Lampropeltis alterna	Gray-banded kingsnake
Nerodia erythrogaster	Plain-bellied watersnake
Senticolis triaspis	Green ratsnake
Thamnophis eques	Mexican gartersnake
Thamnophis proximus	Western ribbon snake
Thamnophis rufipunctatus	Narrow-headed gartersnake
Family Viperidae	
Crotalus lepidus lepidus	Mottled rock rattlesnake
Crotalus willardi obscurus[T]	New Mexico ridgenose rattlesnake

Note: Common names follow Crother *et al.* (2000). Those species marked with "T" are listed by the U.S Fish and Wildlife Service as Threatened under the U.S. Endangered Species Act.

species, not just amphibians and reptiles) through a permit/reporting system. The TPWD website (http://www.tpwd.state.tx.us/news/news/faq/faqnongame.htm) explains the regulations and reasoning for this nongame permit system as follows: “These regulations were created by the department to gather information on pressures exerted on nongame populations because of take by hobbyists and other collectors such as commercial dealers. Anecdotal evidence has indicated that in some cases, collection of certain nongame species is great enough to possibly affect the overall sustainability of wild populations. It is TPWD's mission to manage the state's wildlife so that a viable and harvestable population is maintained.”

Nongame regulations were put into place in Texas in 1998 after more than two years of study, planning, and public hearings. Implementation of the system was controversial among amateur herpetologists, regional herpetological societies, prairie dog collectors and dealers, agency biologists, and managers. These regulations resulted in the creation of a permit system that requires commercial users of nongame wildlife to register their activities and file annual reports.

Regulations (Appendix 3) limit individuals to possession of 10 specimens of a species and 25 total individuals without a commercial collection or dealer permit. To sell or trade animals previously purchased requires a Resident or Nonresident Nongame Dealer’s Permit. A Resident or Nonresident Nongame Collection Permit is required to sell or trade animals that were collected in the wild or bred in captivity. Collection of nongame wildlife also requires a Texas hunting license. A commercial collection permit is required to sell or trade nongame species, even if a collector did not exceed the possession limit.

The possession limit of 10 specimens/species, 25 total specimens was created as an enforcement mechanism for the nongame regulations. If an individual possesses more than the limit, it is assumed that the individual is involved in some type of commercial activity. The possession limit was not designed to manage populations or constrain current levels of use.

There are exceptions to the nongame regulations that should be considered when evaluating the collection and trade of amphibians and reptiles. According to the TPWD website: “(f)inally processed products made from parts of wildlife are also exempt from permit requirements. These products are defined in regulation as parts of nongame wildlife that do not require treatment to prevent decomposition (rattlesnake rattles, for example) or which have been treated by means other than refrigeration or freezing to prevent decomposition. Albinos or animals possessed under a bait dealer's license are exempt from nongame permit requirements. Persons aged 16 and younger and grade school teachers provided they are not engaged in commercial activities [are exempt from permit requirements], as are establishments selling nongame for immediate consumption in individual portions, not refrigerated or frozen” (TPWD, 2000, http://www.tpwd.state.tx.us/news/news/faq/faqnongame.htm).

Under current regulations, establishments selling reptiles such as turtles, western diamond-backed rattlesnakes *Crotalus atrox*, and other snakes processed into curios and clothes are exempt from permit requirements, as are establishments selling meat or parts from turtles, frogs, and snakes for immediate consumption. However, removal of these animals from the wild for commercial purposes requires a nongame collector permit, thus making it possible to monitor take of the species. Tiger salamanders A*mbystoma tigrinum* are commercially traded as fishbait and can be collected and sold under a bait dealer’s license. It is unclear whether the number of salamanders collected and sold by bait dealers is monitored and linked to the nongame reporting system.

The TPWD nongame permit system requires permit holders to file reports by September 15th of each year. The first reporting year for the nongame permit system was 1999. The reporting information pertaining to the CDE was analyzed and is included below in the section on Domestic Trade (R. Roegner, pers. comm. to L.A. Fitzgerald, September 2000).

1.3 Arizona

Reptiles and amphibians have legal status in Arizona (Appendix 4). A fishing license is required for collection of amphibians and spiny softshell turtles *Apalone spinifera*; a hunting

license is required for collection of all other reptiles. Collection allows personal use only. With few exceptions, all commercial activities involving native reptiles and amphibians are prohibited. There is no open season on Tarahumara frog *Rana tarahumarae*, plains leopard frog *R. blairi*, Chiricahua leopard frog *R. chiricahuensis*, northern leopard frog *R. pipiens*, lowland leopard frog *R. yavapaiensis*, relict leopard frog *R. onca*, and Ramsey Canyon leopard frog *R. subaquavocalis*. Several amphibians are legal to collect in Arizona. Bag and possession limits of 10 individuals per day, live or dead, apply to the Great Plains toad *Bufo cognatus*, red-spotted toad *B. punctatus*, Couch's spadefoot *Scaphiopus couchii*, and Mexican spadefoot *Spea multiplicata*. Tiger salamanders may be collected without limit, live or dead, except in portions of Santa Cruz and Cochise counties in order to protect the Threatened Sonoran tiger salamander *Ambystoma tigrinum stebbinsi*, a non-CDE subspecies (R. Murray, pers. comm.). Clawed frogs *Xenopus* spp. and giant toads *B. marinus* are exotics in the West, though only the former is known to be established in the western United States (McCoid and Kleberg, 1995). These species may be collected and possessed dead, without limit. Bullfrogs *R. catesbeiana* have a live possession limit of 12, although collecting them is restricted in a few national wildlife refuges.

The bag and possession limit for most reptiles in Arizona is four per year, live or dead. The bag and possession limit for rosy boa *Lichanura trivirgata*, green rat snake *Senticolis triaspis*, Sonoran Mountain kingsnake *Lampropeltis pyromelana*, and milk snake *L. triangulum* is two per year or four in possession, live or dead. A variety of small-bodied, widespread, lizard and snake species have bag and possession limits of 20 per day in the aggregate (Appendix 4). Spiny softshell turtles may be possessed without limit, although there are 22 areas (reservoirs, stream reaches, river reaches) specified where collecting is not allowed (Appendix 4). Red-eared sliders *Trachemys scripta*, and members of the family Chelydridae (snapping turtles) may be possessed dead without limit. There is a closed season for rock rattlesnake *Crotalus lepidus*, twin-spotted rattlesnake *C. pricei*, ridgenose rattlesnake *C. willardi*, massasauga *Sistrurus catenatus*, flat-tail horned lizard *Phrynosoma mcallii*, Gila monster *Heloderma suspectum*, and desert tortoise *Gopherus agassizii*.

However, A.R.S. Sec. 17-371 indicates under "Transportation" that "Heads, horns, antlers, hides, feet or skin of wildlife lawfully taken, or the treated or mounted specimens thereof, may be possessed, sold and transported at any time . . ." So, there is some opportunity for commercialization of a limited number of reptile species parts or products.

1.4 Federal Laws

Federal regulation of reptile harvest and trade is fairly limited, given that most activities involving non-migratory wildlife are left to the states to regulate. However, federal laws and regulations do apply to several areas, including interstate and international movement of reptiles and amphibians, and activities involving federally listed threatened and endangered species. The following text in this section is excerpted from *The U.S. Fish and Wildlife Service Division of Law Enforcement: A Review of the Program Primarily Responsible for Enforcing CITES* (Hoover and Tarr, 1997). Two federal statutes provide the foundation for federal regulation of reptiles and amphibians, as well as other wildlife species, in the United States. In order of enactment, they are the Lacey Act of 1900, and the Endangered Species Act of 1973. CITES is specifically implemented by certain provisions of the Endangered Species Act, while the other laws provide related and complementary legal standards. These and other relevant laws and regulations are summarized as follows:

Lacey Act. The Lacey Act, 16 U.S.C. §3371 et seq., prohibits:

(a) the import, export, transport, sale, receipt, acquisition or purchase of fish, wildlife, or plants taken, possessed or sold in violation of any wildlife law, treaty, or regulation of the U.S., or in violation of any Indian tribal law; it also prohibits attempts to commit these acts.

(b) the import, export, transport, acquisition, receipt, sale, or purchase in interstate or foreign commerce of any fish or wildlife taken, possessed, transported, or sold in violation of any wildlife law or regulation

of any state, or in violation of any foreign wildlife law; it also prohibits attempts to commit these acts.

In addition, the Lacey Act prohibits the attempted or actual falsification of information, records, or accounts regarding species that have been imported, exported, transported, sold, purchased, or received in interstate or foreign commerce. The Lacey Act makes it illegal to import, export, or transport in interstate commerce, any container or package containing fish or wildlife unless it has "previously been plainly marked, labeled, or tagged" in accordance with USFWS marking regulations; authorizes the USFWS to detain any package or container (and accompanying papers) being imported into or exported from the United States; and places the USFWS in charge of enforcing the law requiring the humane shipment of live wildlife transported to the United States.

An individual convicted of violating the Lacey Act may be imprisoned for up to one year and fined up to USD 100 000 for a misdemeanor offense, and up to five years and USD 250 000 for a felony offense. Fines for organizations that violate the Lacey Act are USD 250 000 for a misdemeanor and USD 500 000 for a felony.

Endangered Species Act. The Endangered Species Act, 16 U.S.C. §1531 et seq., makes it illegal for any person subject to U.S. jurisdiction to import, export, deliver, receive, carry, transport, ship, sell, or offer for sale in interstate commerce and in the course of a commercial activity, any species of plant or animal that has been listed as threatened or endangered pursuant to the Act. The Act also makes it unlawful to take any listed species within the United States or its territorial seas. Certain exceptions to these prohibitions may be authorized by permit.

There are currently four reptile species, one reptile subspecies, and one amphibian species found in the CDE that are listed as Threatened (T) or Endangered (E) under the U.S. Endangered Species Act. These are: Bolson tortoise *Gopherus flavomarginatus* (T), Desert tortoise *Gopherus agassizi* (T), Black spiny softshell *Apalone ater* (E), Coahuilan box turtle *Terrapene coahuila* (E), New Mexican ridgenose rattlesnake *Crotalus willardi obscurus* (T), and Chiricahua leopard frog *Rana chiricahuensis* (T).

Violators of the Endangered Species Act are subject to imprisonment for up to one year, and fines of up to USD 100 000. Organizations may be fined up to USD 200 000.

The U.S. Endangered Species Act also serves as the implementing legislation for CITES. Several provisions of the Act pertain specifically to wildlife trade control and CITES.

CITES Violations. Section 9(c) of the U.S. Endangered Species Act makes it unlawful for any person to engage in the trade of any specimens of wildlife or plants contrary to the provisions of CITES, or to possess any specimens "traded contrary to the provisions of the Convention."[1] The USFWS Division of Law Enforcement has primary responsibility for controlling trade in wildlife.

Regulations. Section 11(f) of the U.S. Endangered Species Act authorizes the Secretaries of Interior, Treasury, and Transportation to promulgate any regulations appropriate to enforce the Act. The USFWS promulgated 50 CFR Part 17 to enforce the Endangered Species Act, and 50 CFR Part 23 to enforce CITES.

Criminal Code. Several provisions of the Criminal Code (Title 18, United States Code) are routinely used by Federal prosecutors in conjunction with wildlife laws to prosecute wildlife trade violations. In major cases involving illegal commerce in wildlife, the Department of Justice may seek to obtain an indictment and criminal penalties for violations of Title 18 in addition to penalties for violations of wildlife laws.

The principal Title 18 provisions used to prosecute violations of CITES are as follows:

"Document" Smuggling. 18 U.S.C. 542 makes it illegal to import or otherwise enter merchandise into the United States by means of false or fraudulent declarations or documents, or by means of any false oral or written statement. Violation of the statute by an individual is

[1]Mere possesion of an unlawfully imported specimen is illegal under the act (see 50 CFR Part 23); however, the USFWS must prove that the specimen was illegally imported to obtain a conviction for possession.

punishable by up to three years imprisonment and a fine of up to USD 250 000.

Clandestine Smuggling. Under 18 U.S.C. 545, it is illegal to knowingly and willfully import or clandestinely introduce into the United States any merchandise contrary to law. It is also illegal to buy, sell, receive, conceal, or facilitate the transportation of merchandise that has illegally entered the United States. Violation of this provision by an individual is punishable by up to six years imprisonment and a fine of up to USD 250 000.

False Statements. 18 U.S.C. 1001 makes it illegal to knowingly and willfully falsify a material fact, or make a false or fraudulent statement or entry. This section is often filed in conjunction with 18 U.S.C. 542 above. Individual violators may be imprisoned for up to six years and fined up to USD 250 000.

Conspiracy. Under 18 U.S.C. 371, when two or more persons conspire to commit any offense against the United States, or to defraud the United States, and one of the conspirators commits any act to implement the conspiracy, each conspirator may be punished by imprisonment of up to six years and a fine of up to USD 250 000.

1.5 Protected Areas in the United States (national parks, refuges, state parks, management areas)

There are numerous protected areas that are entirely within or overlap with the CDE in the United States. These areas include national wildlife refuges, parks, monuments, historic sites, and recreation areas, as well as state parks, refuges, and monuments. The degree to which wildlife is protected within these areas varies, depending on the agencies that regulate those areas and the activities permitted on those lands. All collecting is illegal in all national parks, state parks, and state and federal refuges and other protected lands in the CDE without a specific permit from the state or federal agency charged with management of each particular area.

2. Reptile and Amphibian Species Found in Trade

Table 7 lists CDE species in the United States that are found in trade, or likely to be traded, with the commercial use corresponding to each species, including 62 species from the CDE in Texas that were collected and reported by nongame permit holders in 1999.

Gila monsters *Heloderma suspectum* appear in the trade both domestically and abroad, and especially in Europe and Japan. Professional and amateur herpetoculturists who specialize in these lizards became successful at breeding them in the 1980s and 1990s. Gila monsters bred in captivity are sold on the international market. Collection of helodermatids is illegal throughout their range in the United States and Mexico, and there are only anecdotal reports of poaching of Gila monsters.

3. Collecting Methods

Although no quantitative data exist, it is likely that widely accepted herpetological collecting techniques are commonly used in the CDE. Nocturnal road cruising is probably how most snakes are collected, although large numbers

Table 7. Native amphibians and reptiles of the CDE that are known or expected to be taken for sale or personal use

SALAMANDERS		
Family Ambystomatidae		
Ambystoma tigrinum [1, 2]	Tiger salamander	fishbait as larvae; pets as adult
FROGS AND TOADS		
Family Pelobatidae		
Scaphiopus couchii [2]	Couch's spadefoot	pets
Spea bombifrons [2]	Plains spadefoot	pets

Table 7. Native amphibians and reptiles of the CDE that are known or expected to be taken for sale or personal use *(continued)*

Family Leptodactylidae		
Eleutherodactylus augusti	Barking frog	pets
Syrrhophus marnocki	Cliff chirping frog	pets
Family Bufonidae		
Bufo alvarius[1]	Colorado River toad	pets; drug trade
Bufo cognatus [2]	Great Plains toad	pets; garden pests control
Bufo debilis [2]	Green toad	pets
Bufo punctatus [1, 2]	Red-spotted toad	pets
Bufo speciosus [2]	Texas toad	pets; garden pests control
Bufo woodhousii [1, 2]	Woodhouse's toad	pets; garden pests control
Family Hylidae		
Hyla arenicolor [2]	Canyon treefrog	pets
Family Ranidae		
Rana berlandieri	Rio Grande leopard frog	high sch. lab dissection
Rana blairi	Plains leopard frog	high sch. lab dissection
Rana catesbeiana	Bullfrog	larvae and adults to stock fish ponds
TURTLES		
Family Chelydridae		
Chelydra serpentina	Snapping turtle	food
Family Emydidae		
Chrysemys picta [1]	Painted turtle	pets, food
Pseudemys concinna	River cooter	pets, food
Pseudemys gorzugi [1, 3]	Rio Grande cooter	pets, food
Terrapene ornata [2]	Ornate box turtle	pets; races; pest control
Trachemys gaigeae	Big Bend slider	pets
Trachemys scripta [1]	Pond slider	pets
Family Kinosternonidae		
Kinosternon flavescens [2]	Yellow mud turtle	pets
Kinosternon hirtipes	Rough-footed mud turtle	pets
Kinosternon sonoriense	Sonoran mud turtle	pets
Family Testudinidae		
Gopherus agassizi	Desert tortoise	pets
Gopherus berlandieri	Berlandier's tortoise	pets
Family Trionychidae		
Apalone spinifer	Spiny softshell	pets; food
LIZARDS		
Family Crotaphytidae		
Crotaphytus collaris [1, 2]	Collared lizard	pets
Crotaphytus reticulatus	Reticulate collared lizard	pets
Gambelia wislizenii [1, 2]	Leopard lizard	pets

Table 7. Native amphibians and reptiles of the CDE that are known or expected to be taken for sale or personal use *(continued)*

Family Phrynosomatidae		
Callisaurus draconoides [1]	Zebra-tailed lizard	pets; snake food
Cophosaurus texanus [1]	Greater earless lizard	pets; snake food
Holbrookia maculata	Common lesser earless lizard	snake food
Phrynosoma cornutum [1]	Texas horned lizard	pets
Phrynosoma hernandesi	Greater short-horned lizard	pets
Phrynosoma modestum [1, 2]	Round-tailed horned lizard	pets
Phrynosoma solare	Regal horned lizard	pets
Sceloporus clarkii [1]	Clark's spiny lizard	pets
Sceloporus cyanogenys	Blue spiny lizard	pets
Sceloporus jarrovii [1]	Mountain spiny lizard	pets
Sceloporus magister [2]	Desert spiny lizard	pets
Sceloporus merriami	Canyon lizard	pets
Sceloporus olivaceus	Texas spiny lizard	pets
Sceloporus poinsetti [1, 2]	Crevice spiny lizard	pets
Sceloporus undulatus ssp. [1, 2]	Fence/Prairie lizard(s)	pets; snake food
Sceloporus variabilis	Rose-bellied lizard	pets
Sceloporus virgatus [1]	Striped plateau lizard	pets; snake food
Uma exsul	Fringe-toed sand lizard	pets; snake food
Urosaurus ornatus [1, 2]	Ornate tree lizard	snake food
Uta stansburiana [1, 2]	Common side-blotched lizard	snake food
Family Gekkonidae		
Coleonyx brevis [1, 2]	Texas banded gecko	pets
Coleonyx reticulatus	Reticulate banded gecko	pets
Coleonyx variegatus	Western banded gecko	pets
Family Teiidae		
Cnemidophorus exsanguis [2]	Chihuahuan spotted whiptail	pets; snake food
Cnemidophorus gularis	Eastern spotted whiptail	pets; snake food
Cnemidophorus inornatus [2]	Little striped whiptail	pets; snake food
Cnemidophorus neomexicanus [2]	New Mexico whiptail	pets; snake food
Cnemidophorus sexlineatus	Six-lined racerunner	pets; snake food
Cnemidophorus tesselatus [1]	Common checkered whiptail	pets; snake food
Cnemidophorus tigris [1, 2]	Tiger whiptail	pets; snake food
Family Scincidae		
Eumeces callicephalus	Mountain skink	pets
Eumeces multivirgatus	Many-lined skink	pets
Eumeces obsoletus [1, 2]	Great Plains skink	pets
Eumeces tetragrammus	Four-lined skink	pets
Scincella lateralis [2]	Little ground skink	pets
Family Anguidae		
Elgaria kingii [1]	Madrean alligator lizard	pets
Gerrhonotus liocephalus	Texas alligator lizard	pets

Table 7. Native amphibians and reptiles of the CDE that are known or expected to be taken for sale or personal use *(continued)*

Family Xantusidae		
Xantusia vigilis	Desert night lizard	pets
Family Helodermatidae		
Heloderma suspectum [1]	Gila monster	pets
SNAKES		
Family Leptotyphlopidae		
Leptotyphlops dulcis	Plains threadsnake	snake food
Leptotyphlops humilis	Western threadsnake	snake food
Family Colubridae		
Arizona elegans [1, 2]	Glossy snake	pets
Bogertophis subocularis [1, 2]	Trans-Pecos ratsnake	pets
Coluber constrictor	Eastern Racer	pets
Diadophis punctatus [2]	Ring-necked snake	pets; snake food
Drymarchon corais	Western indigo snake	pets
Drymobius margaritiferus	Speckled racer	pets
Elaphe bairdi [2]	Baird's ratsnake	pets
Elaphe guttata [1, 2]	Cornsnake	pets
Elaphe obsoleta [2]	Eastern ratsnake	pets
Heterodon nasicus [1, 2]	Western hog-nosed snake	pets
Hypsiglena torquata	Nightsnake	pets; snake food
Lampropeltis alterna [1, 2]	Gray-banded kingsnake	pets
Lampropeltis getula [1, 2]	Common kingsnake	pets
Lampropeltis mexicana	San Luis Potosi kingsnake	pets
Lampropeltis pyromelana [1]	Sonoran Mountain kingsnake	pets
Lampropeltis triangulum [1, 2]	Milksnake	pets
Leptodeira septentrionalis	Cat-eyed snake	pets
Masticophis flagellum [1, 2]	Coachwhip	pets
Masticophis taeniatus [1, 2]	Striped whipsnake	pets
Nerodia erythrogaster	Plain-bellied watersnake	pets
Nerodia rhombifer	Diamond-backed watersnake	pets
Opheodrys aestivus	Rough greensnake	pets
Pituophis catenifer [1, 2]	Gopher snake	pets
Rhinocheilus lecontei [1, 2]	Long-nosed snake	pets
Salvadora grahamiae [1, 2]	Eastern patch-nosed snake	pets
Salvadora deserticola [2]	Big Bend patch-nosed snake	pets
Senticolis triaspis [1]	Green ratsnake	pets
Sonora semiannulata	Ground snake	pets; snake food
Tantilla hobartsmithi [1]	Smith's black-headed snake	snake food
Tantilla nigriceps [1]	Plains black-headed snake	snake food
Tantilla cucullata	Trans-Pecos black-headed snake	snake food

Table 7. Native amphibians and reptiles of the CDE that are known or expected to be taken for sale or personal use *(continued)*

Thamnophis cyrtopsis [2]	Black-necked gartersnake	pets
Thamnophis elegans [1]	Wandering gartersnake	pets
Thamnophis eques	Mexican gartersnake	pets
Thamnophis marcianus [2]	Checkered gartersnake	pets
Thamnophis proximus [1, 2]	Western ribbon snake	pets
Thamnophis rufipunctatus	Narrow-headed gartersnake	pets
Thamnophis sirtalis	Common gartersnake	pets
Trimorphodon biscutatus	Western lyresnake	pets
Family Elapidae		
Micruroides euryxanthus	Sonoran coral snake	pets
Micrurus fulvius [2]	Texas coral snake	pets; rattlesnake roundups
Family Viperidae		
Agkistrodon contortrix [2]	Copperhead	pets
Crotalus atrox [1, 2]	Western diamond-backed rattlesnake	pets; rattlesnake roundups; fashion apparel; trinkets; gall bladders; venom research
Crotalus lepidus [1, 2]	Rock rattlesnake	pets; rattlesnake roundups; fashion apparel; trinkets; gall bladders
Crotalus molossus [1, 2]	Black-tailed rattlesnake	pets; rattlesnake roundups; fashion apparel; gall bladders
Crotalus pricei	Twin-spotted rattlesnake	pets
Crotalus scutulatus	Mojave rattlesnake	pets; venom research
Crotalus viridis [1, 2]	Prairie rattlesnake	pets; rattlesnake roundups; fashion apparel; trinkets; gall bladders; venom research
Crotalus willardi ssp. [1]	Ridge-nosed rattlesnake	pets
Sistrurus catenatus [1, 2]	Massasauga	pets; rattlesnake roundups; fashion apparel; trinkets; gall bladders

[1] Species confirmed to enter the pet trade in New Mexico. Charles W. Painter collected these data during 1994 when compiling a list of New Mexico species for a legislative memorial to investigate the commercial amphibian and reptile trade in New Mexico. All are documented through newspaper clippings, shipping invoices, communication with dealers, collectors, or Game Wardens, etc.

[2] Species known to enter the trade in Texas; TPWD database (Table 8).

[3] Not listed in the TPWD database for 1999, but mentioned in Dixon (2000). Other species in this list are included based on international trade data, professional opinion or verification through communication with reliable sources since publication of the New Mexico legislative memorial. Regarding inclusion of similar species, if one species of *Cnemidophorus* was documented as entering the trade, it is likely that all wide-ranging species would also be exploited. We did not include geographically restricted species such as *C. dixoni* or *C. laredoensis* that, to our knowledge, are not considered prized by collectors.

of gartersnakes may be collected at hibernacula or during the day in suitable aquatic habitat. Horned lizards are vulnerable to collection along roads and may also be picked up during morning or late afternoon road cruising. Other lizards are mostly collected by hand or noosing while walking through suitable habitat, or in trapping arrays. Locations of specific trapping arrays used by collectors are unknown, but two hobbyists interviewed referred to a professional collector near El Paso who operates pitfall arrays. This anecdote is supported by the fact that the majority of CDE herps collected in Texas originated in El Paso and Hudspeth Counties.

Common side-blotched lizards *Uta stansburiana*, marbled whiptails *Cnemidophorus tigris marmoratus*, and greater earless lizards *Cophosaurus texanus* were collected in large numbers (Table 8, Table 9), and are vulnerable to pitfall trapping. Box turtles are collected by hand, with trained dogs,

by diurnal road cruising, and in pitfall traps. Yellow mud turtles sometimes occur in high density in stock tanks or isolated pools in arroyos, and can be collected in large numbers by hand, with a seine, or in funnel traps. Cooters and sliders are usually trapped in hoop nets or other funnel-type net or wire mesh traps, baited with sardines, canned dog food, cabbage, or watermelon rinds. Frogs and toads are vulnerable at their breeding sites during and after rains and can be collected at night in large numbers by hand.

4. Collecting Areas

4.1 Arizona

Though commercial collecting is prohibited in Arizona, recreational collecting is permitted with a valid hunting license. Collecting often occurs along roads, especially in Cochise County. Some target species, such as Sonoran Mountain kingsnakes *Lampropeltis pyromelana*, are also collected by hiking the "sky islands" within the CDE. Illegal collection of protected species, such as ridge-nosed rattlesnakes *Crotalus willardi*, rock rattlesnakes *C. lepidus*, twin-spotted rattlesnakes *C. pricei*, and massasaugas *Sistrurus catenatus* occurs using the same methods and areas (Averill-Murray, pers. comm.).

4.2 New Mexico

Roads that are not within protected areas (parks and wildlife management areas) are the primary collecting sites for most collectors.

Although many species of amphibians and reptiles are collected opportunistically, most commercial collecting in New Mexico and Texas occurs in areas that are well known for the desirable species likely to be encountered in the area. Most of the isolated mountain ranges in southern New Mexico are believed to be visited by commercial collectors. The primary collecting areas in New Mexico include: Dark Canyon Road and Sitting Bull Falls Road in the Guadalupe Mountains near Carlsbad; the Organ Mountains near Las Cruces; the Florida Mountains near Deming; higher elevations of the Black Range in the vicinity of Hillsboro; the Magdalena Mountains near Magdalena; the vicinity of the Gila Wilderness; and the Peloncillo Mountains, especially at the higher elevations and along NM Hwy 9 and NM Hwy 80. In central New Mexico, areas around Belen and Socorro are well known for desert kingsnakes and massasauga. New Mexico milksnakes are often collected in central New Mexico in the vicinity of Corona, Willard, and Vaughan. One commercial collector who obtains hundreds of lizards collects mostly around Artesia and in areas southeast of Roswell. Most commercial exploitation of aquatic turtles in New Mexico occurs at the Elephant Butte, Caballo, Ft. Sumner, Brantley, and Conchas reservoirs and in the Pecos and Black Rivers. Western river cooters, Big Bend sliders, red-eared sliders, and spiny softshells are all documented in the trade. Box turtles are collected from numerous sandy areas in southeast New Mexico and adjacent Texas for entry into the Box Turtle races held annually at the Curry County Fair in the town of Clovis.

4.3 Texas

In Texas, most collecting for the commercial trade of CDE herps occurs in the Trans-Pecos region. It is illegal to collect wildlife from a vehicle in Texas, therefore, while road cruising, collectors stop their vehicles, get out, collect the animal on foot, and then resume road cruising. Primary collecting areas in the region include: the River Road (FM 170) from Study Butte to Presidio; the Christmas Mountains north of Study Butte along TX Hwy 118; along U.S. Hwy 277 in the vicinity of Loma Alta; in the vicinity of Sanderson, especially along U.S. Hwys 90 and 285; in the vicinity of Langtry, especially along U.S. Hwy 90; in the vicinity of Comstock, especially Juno Road (FM 163), which runs north from Comstock toward the abandoned town of Juno; Davis Mountains and vicinity, including the area between Alpine and Ft. Davis (Musquiz Canyon), the area around Lympia Creek and the Boy Scout Road along Hwy 17, and Hwy 118 running northwest between Ft. Davis and Kent. Lesser-known areas include: the vicinity of the McDonald Observatory in the Davis Mountains; the vicinity of Ft. Landcaster; near Sheffield in northern Pecos County; and the vicinity of Iraan. Most of these areas are well known by commercial and private snake collectors who are interested in obtaining gray-banded kingsnakes *Lampropeltis alterna*. Other snakes in these areas that are often collected for resale include: Trans-Pecos ratsnake, Baird's ratsnake,

Great Plains ratsnake, hognose snake, milksnake, bullsnake, longnose snake, and lyresnake. The smaller, burrowing snakes known from this region (e.g., threadsnakes, nightsnake, groundsnake, black-headed snakes) are mostly ignored by collectors, although they are occasionally collected for resale as pets or pet food (probably as snake food), to help defray travel expenses. All of the above areas have been mapped in detail and photographs of individual specimens taken at these areas are shown at www.kingsnake.com/trans_pecos/. In the extreme southern tip of Texas, where indigo snakes, cat-eyed snakes, and spotted racers occur, much of the collecting of these species is suspected to occur illegally within the state parks. Collecting western diamond-backed rattlesnakes for commercial trade at rattlesnake roundups occurs in a widespread area throughout the species' range in New Mexico and Texas (Fitzgerald and Painter, 2000).

5. Domestic Trade

The domestic trade in amphibians and reptiles from the CDE is almost impossible to quantify, because take of most species is not regulated in New Mexico, trade from Arizona is illegal, and wildlife trade from Mexico is illegal and not extensively monitored. There is no reason to believe that large numbers of animals from Arizona are commercialized. Commercialization does occur in New Mexico, but there was no current information available at the time of this study. Information on collection and sale of nongame species is available from Texas for 1999. Also, the commercialization of rattlesnakes in Texas and New Mexico has been thoroughly reviewed (Fitzgerald and Painter, 2000).

In Texas during 1999, 14,351 specimens of reptiles and amphibians were reported to be collected by 53 Resident or Nonresident nongame permit holders. Of these, 4861 were amphibians and 9493 were reptiles. The most common reptiles collected were common side-blotched lizards (4855), yellow mud turtles (865), box turtles (528), whiptails *Cnemidophorus* spp. (701), collared lizards (573), rattlesnakes (307), earless lizards (370), gartersnakes (325), roundtail horned lizards (215), Texas banded gecko (166), spiny lizards and fence lizards *Sceloporus* spp. (138), kingsnakes *Lampropeltis* spp. (73), ratsnakes *Elaphe* spp. (32), and Trans-Pecos ratsnakes (48). The most common amphibians were barred tiger salamanders (2705), Couch's spadefoots (1384), green toads (406), Texas toads (203), and red-spotted toads (82) (Table 8). It should be noted that the numbers for rattlesnakes do not include those collected for rattlesnake roundups, and thus the overall figure is likely to be much higher.

With the exception of National Park Service rangers, who were concerned about the poaching of geckos, enforcement personnel and others interviewed were generally not aware that lizards were collected in large numbers in Texas.

Ninety per cent (12 947/14 354) of all specimens collected in the CDE in Texas in 1999 originated in only five counties. Specimens were reported collected from 27 of the 43 Texas counties we considered to be within the CDE (Figure 4, Table 7). El Paso County accounted for 40.2% (5767/14 354) of specimens reported by nongame collectors in 1999. Following in order of number of specimens per county were Hudspeth Co. (23.5%), Lubbock Co. (12.0%), Hockley Co. (9.8%), and Garza Co. (4.8%).

Only a small number of the collectors contributed most of the take in 1999. The top-ranked collector contributed 27.1% of the total take. The top three collectors accounted for 66.6% of the total, and the top eight accounted for 90.3% (Table 9). Not surprisingly, the principal collectors operated in the five counties that produced 90% of the specimens.

Hobbyists and enforcement personnel interviewed in Texas were not aware of the large trade in lizards and toads. These interviewees indicated that generally just a few species of snakes were targeted, especially the gray-banded kingsnake *Lampropeltis alterna* and the Trans-Pecos ratsnake *Bogertophis subocularis*. Interestingly, several hobbyists interviewed explained that adult wild-caught Trans-Pecos ratsnakes have little value compared to juveniles born in captivity. Some color variants of gray-banded kingsnakes have low value (approximately USD 50) because captive-reared individuals are common on the market. However, other variants and "locality specimens," such as those found in southeast New Mexico, may bring up to USD 500 on the commercial market.

Table 8. Number, percent of total, and cumulative percent of amphibians and reptiles collected by nongame permit holders operating in the CDE in Texas in 1999

Species common name (scientific name)	Number collected	Percent of total	Cumulative percentage
Common side-blotched lizard *(Uta stansburiana)*	4855	33.8%	33.8%
Barred tiger salamander *(Ambystoma tigrinum mavortium)*	2705	18.8%	52.7%
Couch's spadefoot *(Scaphiopus couchi)*	1384	9.6%	62.3%
Yellow mud turtle *(Kinosternon flavescens flavescens)*	865	6.0%	68.3%
Marbled whiptail *(Cnemidophorus tigris marmoratus)*	686	4.8%	73.1%
Green toad *(Bufo debilis insidior)*	406	2.8%	75.9%
Desert box turtle *(Terrapene ornata luteola)*	374	2.6%	78.5%
Speckled earless lizard *(Holbrookia maculata aproximans)*	370	2.6%	81.1%
Western plains garter snake] sic[1] (misidentified *Thamnophis* spp.)	305	2.1%	83.3%
Collared lizard *(Crotaphytus collaris)*	305	2.1%	85.4%
Chihuahuan collared lizard *(Crotaphytus collaris fuscus)*	268	1.9%	87.2%
Western diamond-backed rattlesnake *(Crotalus atrox)*	250	1.7%	89.0%
Round-tailed horned lizard *(Phrynosoma modestum)*	215	1.5%	90.5%
Texas toad *(Bufo speciosus)*	203	1.4%	91.9%
Texas banded gecko *(Coleonyx brevis)*	166	1.2%	93.1%
Ornate box turtle *(Terrapene ornata ornata)*	154	1.1%	94.1%
Red-spotted toad *(Bufo punctatus)*	82	0.6%	94.7%
Crevice spiny lizard *(Sceloporus poinsetti poinsetti)*	63	0.4%	95.1%
Ornate tree lizard *(Urosaurus ornatus schmidti)*	51	0.4%	95.5%
Trans-Pecos ratsnake *(Bogertophis subocularis)*	48	0.3%	95.8%
Gopher snake (*Pituophis catenifer* (= *P. melanoleucus*) ssp.)	48	0.3%	96.2%
Western hog-nosed snake (*Heterodon nasicus* ssp.)	47	0.3%	96.5%
Desert spiny lizard *(Sceloporus magister bimaculosus)*	43	0.3%	96.8%
Gray-banded kingsnake *(Lampropeltis alterna)*	42	0.3%	97.1%
Great Plains toad *(Bufo cognatus)*	41	0.3%	97.4%
Glossy snake *(Arizona elegans elegans)*	38	0.3%	97.6%
Great Plains skink *(Eumeces obsoletus)*	38	0.3%	97.9%
Southern prairie lizard *(Sceloporus undulatus consobrinus)*	32	0.2%	98.1%
Plains spadefoot *(Spea bombifrons)*	28	0.2%	98.3%
Great Plains ratsnake *(Elaphe guttata emoryi)*	25	0.2%	98.5%
Desert kingsnake *(Lampropeltis getula splendida)*	24	0.2%	98.7%
Texas longnose snake *(Rhinocheilus lecontei tessellatus)*	23	0.2%	98.8%
Rock rattlesnake *(Crotalus lepidus lepidus)*	22	0.2%	99.0%
Black-tailed rattlesnake *(Crotalus molossus)*	18	0.1%	99.1%
Prairie rattlesnake *(Crotalus viridis)*	15	0.1%	99.2%
Checkered gartersnake *(Thamnophis marcianus)*	13	0.1%	99.3%
Chihuahuan spotted whiptail *(Cnemidophorus exsanguis)*	12	0.1%	99.4%
Massasauga *(Sistrurus catenatus)*	10	0.1%	99.4%
Canyon treefrog *(Hyla arenicolor)*	10	0.1%	99.5%
Western coachwhip *(Masticophis flagellum testaceus)*	9	0.1%	99.6%
New Mexico milksnake *(Lampropeltis triangulum celaenops)*	7	0.0%	99.6%
Black-necked gartersnake *(Thamnophis cyrtopsis)*	7	0.0%	99.7%
Prairie ring-necked snake *(Diadophis punctatus arnyi)*	5	0.0%	99.7%
Baird's ratsnake *(Elaphe bairdi)*	5	0.0%	99.7%

Table 8. Number, percent of total, and cumulative percent of amphibians and reptiles collected by nongame permit holders operating in the CDE in Texas in 1999 *(continued)*

Species common name (scientific name)	Number collected	Percent of total	Cumulative percentage
Leopard lizard *(Gambelia wislizenii)*	4	0.0%	99.8%
Eastern patch-nosed snake *(Salvadora grahamiae)*	3	0.0%	99.8%
Mexican hog-nosed snake *(Heterodon nasicus kennerlyi)*	3	0.0%	99.8%
Central Texas whipsnake *(Masticophis taeniatus girardi)*	3	0.0%	99.9%
Big Bend patch-nosed snake *(Salvadora deserticola)*	3	0.0%	99.9%
Copperhead *(Agkistrodon contortrix)*	2	0.0%	99.9%
Texas ratsnake *(Elaphe obsoleta lindheimeri)*	2	0.0%	99.9%
Glossy snake *(Arizona elegans)*	2	0.0%	99.9%
No name given	2	0.0%	99.9%
New Mexico whiptail *(Cnemidophorus neomexicanus)*	2	0.0%	99.9%
Banded rock rattlesnake *(Crotalus lepidus klauberi)*	2	0.0%	100.0%
Trans-Pecos striped whiptail *(Cnemidophorus inornatus heptogrammus)*	1	0.0%	100.0%
Southwestern Woodhouse's toad *(Bufo woodhousii australis)*	1	0.0%	100.0%
Gulf Coast toad *(Bufo valliceps)*	1	0.0%	100.0%
Little ground skink *(Scincella lateralis)*	1	0.0%	100.0%
Ornate tree lizard *(Urosaurus ornatus ornatus)*	1	0.0%	100.0%
Coral snake *(Micrurus fulvius tenere)*	1	0.0%	100.0%
TOTAL	**14 351**		

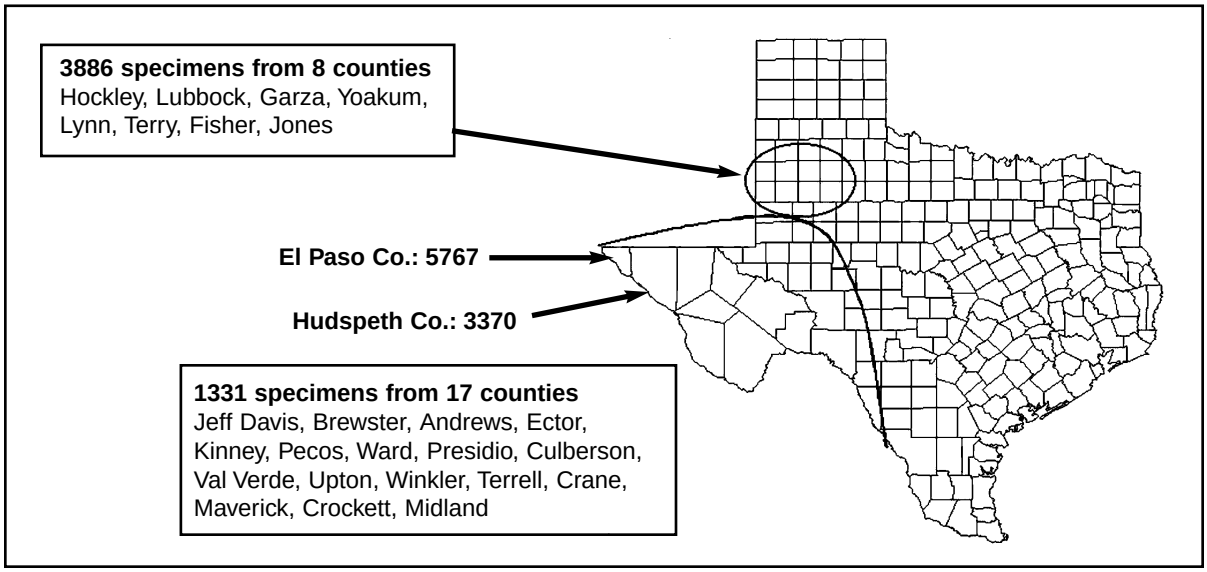
Source: Counties in Texas included in the CDE are listed in Figure 5. Names follow Crother (2000) and/or Dixon (2000); specimen identification as reported in individual collectors' reports.

[1] Western plains garter snake *Thamnophis radix haydeni* is known only from a few counties in the extreme northern panhandle of Texas. These specimens were reported in the TPWD nongame database as collected in Kinney County, well outside the range of *T. radix*. It is more likely that these were Western ribbon snakes *T. proximus*.

Although the trade in snakes for pets receives a lot of attention, reports indicate that the number of snakes removed from the wild is not extraordinary. In 1999, the TPWD nongame database showed that 985 snakes were collected in the CDE (Table 9). Of these, 325 were garter snakes and 307 were rattlesnakes. Seventy-three kingsnakes were collected (all species of *Lampropeltis*); 42 were gray-banded kingsnakes. Thirty-two ratsnakes and 48 Trans-Pecos ratsnakes were reported collected by nongame permit holders. Several other species were collected in smaller numbers. Although purely anecdotal, conversations with interviewees about the numbers of animals collected seemed to be consistent with the limited reporting data available. A professional herpetologist and hobbyist interviewed claimed that the history of gray-banded kingsnake collection is well known and traceable. This interviewee claimed that a total of approximately 40 gray-banded kingsnakes had been collected from the road through the Black Gap Wildlife Management Area since the 1970s, and that the most gray-banded kingsnakes collected from that popular road cruising site in one year was six in 1992.

Similarly, this person estimated that 20 gray-banded kingsnakes collected yearly originated in the Davis Mountains, and another 25-30 collected yearly came from the Sanderson area. This collector has never noticed a drop-off in the number of Trans-Pecos ratsnakes collected along River Road (along Rio Grande west of Big Bend National Park), and it is still common to find as many as six individuals in a single night of road cruising. Another interviewee pointed out that, in the Trans-Pecos region, collecting is most intense during Spring Break, when out-of-state collectors are more likely to visit the region. When asked how many collectors might be active in the area where that person worked, the interviewee estimated the number to be 14 people per year, from spring through fall. These numbers of snakes collected and the numbers of collectors

Figure 4. Distribution of 14 354 amphibians and reptiles collected in 27 Texas counties within the CDE during 1998-99.



Source: Data from TPWD Nongame Permit Program.

Table 9. Number of snakes, lizards and turtles reported as collected by nongame permit holders in Texas in 1999

	Taxonomic Suborder of Reptilia			
Genus	**Lacertilia**	**Serpentes**	**Testudines**	**TOTAL**
Copperheads and cottonmouths *Agkistrodon* spp.		2		2
Glossy snakes *Arizona elegans*		2		2
Trans-Pecos ratsnake *Bogertophis subocularis*		48		48
Whiptails *Cnemidophorus* spp.	701			701
Banded geckos *Coleonyx* spp.	166			166
Speckled earless lizards *Holbrookia maculata aproximans*	370			370
Rattlesnakes *Crotalus* spp.		307		307
Collared lizards *Crotaphytus* spp.	573			573
Ring-necked snakes *Diadophis punctatus* ssp.		5		5
Ratsnakes *Elaphe* spp.		32		32
Skinks *Eumeces* spp.	38			38
Leopard lizards *Gambelia wislizenii*	4			4
Hog-nosed snakes *Heterodon* spp.		50		50
Mud turtles *Kinosternon* spp.			865	865
Kingsnakes *Lampropeltis* spp.		73		73
Coachwhip and whipsnakes *Masticophis* spp.		12		12
Coral snakes *Micrurus* spp.		1		1
Horned lizards *Phrynosoma* spp.	215			215
Bullsnake and gopher snakes *Pituophis* spp.		48		48
Long-nosed snake *Rhinocheilus lecontei* ssp.		23		23
Patch-nosed snakes *Salvadora* spp.		6		6
Spiny lizards and fence lizards *Sceloporus* spp.	140			138
Ground skink *Scincella lateralis*	1			1
Massasauga *Sistrurus catenatus*		10		10
Box turtles *Terrapene* spp.			528	528
Gartersnakes *Thamnophis* spp.		325		325
Tree lizards *Urosaurus ornatus*	52			52
Common side-blotched lizards *Uta stansburiana*	4855			4855
GRAND TOTAL	**7115**	**944**	**1393**	**9450**

Table 10. Number of specimens collected by 53 nongame permit holders operating in the CDE in Texas in 1999.

The ranked contributions by the top 26 collectors are shown. The remaining 27 collectors contributed only 145 specimens to the total 14 354 and are not shown.

Collector rank	Total	Cumulative	% of total	Cumulative %
1	3891	3891	27.11%	27.11%
2	3467	7358	24.15%	51.26%
3	2195	9553	15.29%	66.55%
4	1129	10 682	7.87%	74.42%
5	781	11 463	5.44%	79.86%
6	683	12 146	4.76%	84.62%
7	426	12 572	2.97%	87.59%
8	386	12 958	2.69%	90.27%
9	208	13 166	1.45%	91.72%
10	192	13 358	1.34%	93.06%
11	127	13 485	0.88%	93.95%
12	105	13 590	0.73%	94.68%
13	79	13 669	0.55%	95.23%
14	69	13 738	0.48%	95.71%
15	65	13 803	0.45%	96.16%
16	54	13 857	0.38%	96.54%
16	54	13 911	0.38%	96.91%
18	53	13 964	0.37%	97.28%
19	52	14 016	0.36%	97.65%
20	33	14 049	0.23%	97.88%
20	33	14 082	0.23%	98.11%
22	32	14 114	0.22%	98.33%
23	30	14 144	0.21%	98.54%
24	23	14 167	0.16%	98.70%
25	21	14 188	0.15%	98.84%
26	21	14 209	0.15%	98.99%

Source: Data from TPWD Nongame Permit Program.

estimated to operate in the area are consistent with the total of 42 gray-banded kingsnakes reported in the TPWD database in 1999.

6. International Trade

6.1 Availability and Usefulness of Trade Data

International trade in reptiles from the CDE in the United States is difficult to assess, due to a number of factors. Though some data are available from the USFWS, these data raise as many questions as they provide answers.

All wildlife imports and exports must be declared to the USFWS. These declarations are later entered into a computerized database called the Law Enforcement Management Information System (LEMIS). These entries are often, but not always, recorded at the species level through the use of assigned four-letter codes. Though virtually all trade in CITES-listed species is recorded at the species level, many non-CITES species are not afforded species-specific codes. In these cases, international trade may be recorded at the genus or family level, or simply as “RNCT,” or reptiles — non-CITES. Further, even for entries that are recorded at the species level, there is no locality-specific information available. Entries indicate the country of origin, and may also indicate whether the wildlife is of wild or captive origin.

Despite these limitations, LEMIS data are of some value in an analysis of CDE species trade. A thorough review of U.S. export data showed that there are approximately 50 reptile species

found at least in part in the CDE that appear to be involved in international trade. Again, this should be considered a minimum figure, given that many CDE species do not have species-specific coding. For example, though there are only a few entries for individual species in the genus *Sceloporus*, there are a large number of entries at the genus level. Thus, it is difficult to assess exactly which species are being traded and whether or not they are CDE species.

Unfortunately, the data often do not indicate whether the animals are of wild or captive origin or, if of wild origin, whether they actually originated in the CDE. For example, there are roughly between 7 and 12 million red-eared slider turtles *Trachemys scripta elegans* exported from the United States each year. However, other research has shown that all but a very small fraction of this trade is produced on turtle farms in Louisiana and surrounding states. Though the trade data don't necessarily indicate this, it is very unlikely that any of this trade originates in the CDE.

The available data show trends in the trade in these species with regard to volumes, wild or captive source, price, and shifts in major countries of import. Some of these trends are discussed below.

6.2 Export of Live Specimens from the United States

Table 11 gives a summary of available data for reported U.S. exports of live specimens of reptile species found in the CDE.

The export of turtle species found in the CDE likely involves few, if any, turtles actually collected from the CDE. As mentioned above, the export of red-eared sliders almost exclusively involves turtles produced on farms in Louisiana and elsewhere in the southeastern United States. The same is true for the export of most other turtle species in Table 11.

Two possible exceptions to this rule would be spiny softshell turtles *Apalone spinifer* and ornate box turtles *Terrapene ornata*. The export of these species involves a significant number of wild-caught turtles. The export of spiny softshell turtles involves hatchlings produced on turtle farms from Florida and elsewhere, as well as the export of larger turtles in demand for food in Asia. The data indicate that at least some of the softshell turtle trade has been recorded in kilograms, rather than in individual turtles. This proportion of the trade most likely involves wild-caught adult turtles. However, it is impossible to determine whether any of these turtles originated in the CDE. Most likely, they did not. Likewise, the trade in ornate box turtles is supplied primarily by wild-caught turtles. However, all box turtles of the genus *Terrapene* were listed on CITES Appendix II in 1995, and very few ornate box turtles have been exported since that listing.

Based on these data, the export of CDE lizard species from the United States does not appear to be a significant concern. Most species are apparently being exported in small numbers, and at least some of these species (e.g., Texas

Table 11. U.S. exports of live reptile species found in the CDE

Scientific Name	Common Name	1995	1996	1997	1998	1999	2000
Apalone spinifer	Spiny softshell	704 320 kg	4156 102 kg	3260 55 kg	3732	2876	4752
Chelydra serpentina	Snapping turtle	17 759	19 527	19 255	16 008	11 575	19 122
Chrysemys picta	Painted turtle	4674	26 520	27 011	13 890	14 701	22 610
Pseudemys concinna	River cooter	6748	18 116	31 675	19 902	22 185	100
Terrapene ornata	Ornate box turtle	61	0	0	1	0	4
Trachemys scripta	Pond slider	7.79 million	8.24 million	11.18 million	9.82 million	7.58 million	9.51 million
Callisaurus draconoides	Zebra-tailed lizard	208	104	172	357	250	238
Coleonyx brevis	Texas banded gecko	27	70	381	145	234	123
Coleonyx variegatus	Western banded gecko	50	146	78	108	38	16
Cophosaurus texanus	Greater earless lizard	0	0	3	125	258	40
Crotaphytus collaris	Collared lizard	355	1633	2913	2864	5206	2775
Eumeces obsoletus	Great plains skink	50	25	28	4	45	87
Gambelia wislizenii	Leopard lizard	340	259	805	1052	1028	1057

Table 11. U.S. exports of live reptile species found in the CDE *(continued)*

Scientific Name	Common Name	1995	1996	1997	1998	1999	2000
Heloderma suspectum	Gila monster	0	6	16	6	15	22
Holbrookia maculate	Lesser earless lizard	0	0	0	17	1	39
Phrynosoma cornutum	Texas horned lizard	0	0	0	0	4	0
Phrynosoma modestum	Round-tailed horned lizard	0	0	0	0	5	40
Sceloporus magister	Desert spiny lizard	116	97	201	331	378	364
Sceloporus olivaceous	Texas spiny lizard	12	0	3	125	172	350
Sceloporus poinsetti	Crevice spiny lizard	232	78	1167	920	1024	672
Sceloporus variabilis	Rose-bellied lizard	25	0	0	0	42	217
Scincella lateralis	Ground skink	100	119	54	177	117	0
Urosaurus ornatus	Ornate tree lizard	28	16	828	143	256	120
Uta stansburiana	Common side-blotched lizard	43	272	2343	3988	3505	1282
Agkistrodon contortrix	Copperhead	6	27	5	6	8	14
Arizona elegans	Glossy snake	59	27	143	95	83	18
Bogertophis subocularis	Trans-Pecos ratsnake	0	0	0	12	17	11
Coluber constrictor	Eastern racer	397	289	258	166	98	79
Crotalus atrox	Western diamond-backed rattlesnake	30	33	25	21	32	8
Crotalus lepidus	Rock rattlesnake	9	22	12	123	69	30
Crotalus molossus	Black-tailed rattlesnake	2	9	2	54	36	9
Crotalus scutulatus	Mojave rattlesnake	0	4	4	4	12	6
Crotalus viridis	Prairie rattlesnake	19	50	29	21	48	14
Diadophis punctatus	Ring-necked snake	78	1234	2485	229	58	68
Drymarchon corais	Western indigo snake	1	3	3	6	8	7
Elaphe bairdi	Baird's ratsnake	0	0	0	9	18	6
Elaphe guttata	Cornsnake	6054	4915	5617	4110	5472	4485
Elaphe obsolete	Eastern ratsnake	624	956	1100	862	1197	622
Lampropeltis alterna	Gray-banded kingsnake	0	0	0	83	152	110
Lampropeltis getula	Common kingsnake	1723	1858	2137	1892	2524	1874
Lampropeltis mexicana	San Luis Potosi kingsnake	0	0	12	100	221	270
Lampropeltis pyromelana	Sonoran Mountain kingsnake	0	0	0	27	67	146
Lampropeltis triangulum	Milksnake	631	937	1014	988	1785	1348
Masticophis flagellum	Coachwhip	25	4	48	82	63	15
Nerodia rhombifer	Diamond-backed watersnake	337	83	88	0	13	17
Opheodrys aestivus	Rough greensnake	1364	1470	4301	2733	5676	5813
Pituophis catenifer	Gopher snake	0	0	3	27	70	91
Rhinocheilus lecontei	Long-nosed snake	36	22	97	41	57	415
Salvadora grahamiae	Mountain patch-nosed snake	0	1	12	2	11	2
Sistrurus catenatus	Massasauga	2	9	3	26	10	1
Sonora semiannulata	Groundsnake	0	0	0	3	86	31
Thamnophis marcianus	Checkered gartersnake	1	3	110	120	156	88
Thamnophis sirtalis	Common gartersnake	14 643	11 590	11 309	7147	9695	5282

Source: TRAFFIC analysis of USFWS LEMIS data.

banded gecko *Coleonyx brevis*) are being produced in captivity. However, noting the shortcomings of the data mentioned above, it would be prudent to continue monitoring export figures to identify any increasing trends.

Nor does the export of CDE snake species to supply foreign demand for live snakes, for the most part, raise significant concerns. Most species are traded in very low numbers, with little indication of increasing trade throughout the time period examined. Many of the most heavily traded species either have a large range outside of the CDE as well (e.g., common gartersnake *Thamnophis sirtalis*), or are primarily produced in captivity (e.g., common kingsnake *Lampropeltis getula*). Finally, many species appear to exhibit a declining trend with regard to exports (e.g., ring-necked snake *Diadophis punctatus*, Eastern racer *Coluber constrictor*).

6.3 Trade in Parts and Products

A review of LEMIS data showed that at least seven species found in the CDE are traded as parts or products (Table 12). Though the export of native CDE species as parts or products involves far fewer species than are involved in the live trade, this practice may be having a far greater impact on individual species, because much of the live trade is derived from captive breeding efforts, while the trade in most parts and products is more likely to involve wild-caught adult animals.

Again, as described above, there is little indication that the export of turtle species found in the CDE actually involves individual animals harvested from the CDE. The export of common snapping turtle meat is likely the most significant turtle product export, given that this trade likely involves wild-caught turtles. However, this species has a tremendous range in the United States, and is not likely to be targeted specifically in the CDE. Likewise, the export of significant numbers of red-eared slider eggs has no impact on CDE populations, given that these eggs are probably exclusively the product of turtle farming in the southeastern United States.

Of far greater concern is the exploitation of several venomous reptile species for meat, skins, and leather products. This is especially true of the Western diamond-backed rattlesnake, which is exported in a large array of forms. The most significant trade in this species appears to be meat, with well over 2000 kilograms of meat exported over the six-year period examined. Further, a significant volume of skins and skin products was also exported during this period, including 1616 skins, 712 shoes/boots, 1407 small leather products/skin pieces/leather trim, 34 handbags, 79 garments, 939 pieces of jewelry, and 753 unspecified items.

7. Illegal Collection and Trade

Illegal collection and trade occur, but appear not to be extensive in the U.S. portions of the CDE. Interviews with rangers in Big Bend National Park consistently indicated one to three cases of illegal collecting each year. One ranger reported that about six vehicles had been stopped between October and January 1999, but that nothing was found. Another ranger speculated that there could be one or two illegal collectors in the park, maybe one night a week, perhaps amounting to 40 events in the park per year. This was speculation based on that ranger's experience. The ranger indicated that there had been an apparent decrease in illegal reptile collecting in the park. Another ranger pointed out that it is easy to collect legally outside the park, which probably reduces illegal collecting inside the park.

Several interviewees felt that judges did not place a high priority on the crime of reptile poaching and that, in the few instances when cases were brought before the court, the fines were minimal. Some enforcement staff interviewed believed that such an attitude could undermine enforcement efforts. One ranger pointed out that judges were unlikely to prosecute unless the suspect was caught in the act of picking up an animal. Rangers need consent to search suspects' vehicles unless they have probable cause to believe that the suspect has an animal. Another ranger related a case from the late 1990s in which a suspect was caught in the park handling a blacktail rattlesnake and a pillowcase. The suspect had several animals thought to be from Arizona and was looking for snakes. The judge dismissed the case.

One ranger interviewed pointed out that many herp enthusiasts were very law abiding and

Table 12. U.S. exports of reptile parts and products derived from species found in the CDE

Scientific Name	Common Name	1995	1996	1997	1998	1999	2000
Apalone spinifer	Spiny softshell		82 kg meat				
Chelydra serpentina	Snapping turtle	3 skulls 353 kg meat	18 skulls 272 kg meat	2 skulls 10 shells 22 kg meat	19 kg unsp. 18 kg meat 19 items meat	228 kg meat 1 skull	12 items meat 1 shell product
Trachemys scripta	Pond slider	1 skull 72 500 eggs	227 kg meat 30 750 eggs 700 carcasses	26 shells 200 eggs	2 unsp.	100 eggs	1 carapace 50 eggs 4 leather pcs 1 skull 2 sci. spec. 3 bodies 2 unsp.
Agkistrodon contortrix	Copperhead		913 small leather products		966 unsp. 366 leather pieces		1 sci. spec.
Crotalus atrox	Western diamond-backed rattlesnake	525 kg meat 372 shoes/ boots 518 small leather products 9 skins 63 stuffed 531 pcs jewelry 11 unsp. 6 skin pcs 8 leather trim 79 garments	141 kg meat 90 shoes/ boots 466 small leather products 725 skins 2 carcasses 2 stuffed 228 pcs jewelry 415 unsp. 34 handbags	1278 kg meat 49 shoes/ boots 71 small leather products 208 skins 3 stuffed/ trophies 130 pcs jewelry 167 unsp. 2 rugs	203 kg meat 19 items meat 75 shoes/ boots 144 small leather products 2 skins 3 stuffed/ trophies 40 pcs jewelry 46 carcasses 107 unsp. 3 stuffed 4 leather pcs 120 leather trim 2 skulls 250 bio. samples	1 body 68 leather pcs 413 kg meat 57 shoes 613 skins 1 skull 53 unsp.	10 jewelry 1 leather pc 490 kg meat 69 shoes 59 skins 1 skin pc 2 trophies
Crotalus lepidus	Rock rattlesnake					2 bodies	
Crotalus viridis	Prairie rattlesnake			15 sci. spec. 30 skins	36 stuffed/ trophies	40 trophies	5 skins 3 sci. spec. 30 trophies
Elaphe guttata	Cornsnake		539 small leather products		184 leather pieces		

Source: TRAFFIC analysis of USFWS LEMIS data.

had great disdain for “bad herpers.” All park rangers, agency biologists, and other enforcement personnel interviewed were aware of reptile collecting problems. Although the number of persons detained for collecting is low, most park rangers and biologists interviewed consider the threat of reptile poaching a serious issue that merits constant attention.

All hobbyists and collectors interviewed were completely aware of regulations and license requirements. In Texas and New Mexico, it is not difficult to find areas where collecting is legal. Most of the areas searched in New Mexico are on public lands (e.g., Bureau of Land Management, U.S. Forest Service, or New Mexico state lands) and therefore allow legal public access. Although some landowners

prohibit collecting on their property, other private and public-lands ranchers in New Mexico and Texas are anxious to have snake hunters enter their lands to collect rattlesnakes, in the hopes of eliminating the snakes.

ASSESSMENT OF THE IMPACTS OF COLLECTION AND TRADE

Owing to the lack of field studies and monitoring data on the trade in reptiles and amphibians, it is not possible to draw definite conclusions about the threats posed by collection and trade. General conclusions can be drawn, however, based on what is known about patterns of collecting and the biology of amphibians and reptiles from the CDE.

The severity to which populations of amphibians and reptiles are impacted by collecting depends on the geographic extent of collecting in relation to the distribution of the species (the geographic scale); the ability of local populations to sustain collecting (the species' life history); and the complex interactions between geography and life history, such as source-sink phenomena. Areas where reptiles are collected, e.g., roadsides or aquatic habitats, may be sinks where populations are continually diminished. Uncollected areas adjacent to sinks may serve as source populations, where dispersing individuals continually repopulate exploited populations.

Species with high reproductive rates that grow quickly to maturity are more likely to be able to sustain collecting than species with delayed onset of reproduction and low reproductive rates (Fitzgerald, 1994). The geographic distribution of species in combination with the scale and frequency of collecting may also influence the likelihood that populations may withstand collecting. Species that are widely distributed and collected in small parts of their range are more likely to sustain collecting than species that are restricted in distribution and intensively collected over large areas. Unpredictable activity patterns result in lower detectability and vulnerability of many snake species. Based on life history pattern, geographic extent of range, and detectability, it is likely that the vast majority of reptile and amphibian species found in the CDE are widely enough distributed that collecting will not lead to regional or global species extinction. Almost all amphibian and reptile collecting is done from roads or in accessible canyons. Enormous areas are on private land or so remote that collecting for trade is inefficient, and there are extensive areas of suitable and occupied habitat that are never collected.

Collecting and trade in the CDE probably should not be considered a threat to species that are relatively widely and continuously distributed, are small in size, and that possess a life history characterized by relatively short life span and high reproductive rate. Common side-blotched lizards *Uta stansburiana* fit this life-history strategy. They reproduce annually, have a life span of one or two years, and are generally abundant and conspicuous where they occur. Although common side-blotched lizards were the most collected species in Texas in 1998-99, it is doubtful that collecting this species for pet food or for pets would lead to measurable impacts on populations. Western diamond-backed rattlesnakes apparently can withstand long periods of collection (Fitzgerald and Painter, 2000), and although they are collected for commercial trade in New Mexico, Texas, and elsewhere, it is extremely unlikely that the several hundred Western diamondback rattlesnakes taken yearly from the Texas and New Mexico portions of the CDE could cause the endangerment or extinction of this widespread species. The species of garter snakes appearing in trade in Texas in 1999 are also common and wide-spread. It is also unlikely that collection of garter snakes, presumably for the pet trade, could cause the endangerment or extinction of these widespread species.

Considering that collecting is not likely to cause global or regional extinction of species of amphibians and reptiles in the CDE, it is probably more relevant to evaluate the impacts of collecting on local populations. The vast majority of park rangers, game wardens, and Texas Parks and Wildlife biologists interviewed for this report felt that collecting did depress local populations. Hobbyists on the other hand, were divided on this question. Field research would be required to answer this question quantitatively. In addition, the effects of collecting on populations would be different for different species.

Gila monsters *Heloderma suspectum*, turtles in general, and the prairie rattlesnake *Crotalus*

viridis are species that, based on natural history, may be locally vulnerable to over-collecting. Large congregations of prairie rattlesnakes can be found at den sites, and the systematic elimination of prairie rattlesnakes at dens each year could lead to local extirpations. Den hunting was the cause of local extirpation of timber rattlesnakes in the northern part of their range (Greene, 1997). Species with fragmented ranges, even if the geographical extent of the range is large, may be susceptible to local population extirpation, especially if the species are habitat specialists. The range of the massasauga *Sistrurus catenatus*, for example, is fragmented and the grasslands it inhabits are degraded throughout much of its former range (Greene, 1997). Massasauga populations are now widely separated and presumably much smaller than they were in the recent past. The vagaries of their geographical distribution have also led to evolved differences in litter size, diet, and habitat affinity in different parts of their range. Hence, for the massasauga, collecting in isolated habitat fragments may have large impacts, despite the large range of the entire species complex, because the potential for recolonization from source populations is much reduced. Another CDE species that may fit the pattern Greene (1997) described for the massasauga is the Western hog-nosed snake *Heterodon nasicus*.

Because of their vulnerability and the life-history characteristics of long-lived organisms, turtle populations may be eliminated from specific sites from over-collecting. Given the limited aquatic habitat in New Mexico in particular, specific river reaches (e.g., Black River and Delaware River) often leave turtles especially vulnerable to over-collecting during low water periods. With repeated and intensive trapping, collectors could easily cause significant population reductions in specific areas. Dixon (2000) cites an observation of the disappearance of Rio Grande cooters *Pseudemys gorzugi*, a CDE endemic species, from an area on the Rio Grande near Del Rio that presumably was the result of over-collecting, possibly to supply Asian food markets.

The seven most collected species from the CDE in Texas in 1998-99 accounted for 79% of all species collected, and apparently originated mostly in El Paso, Hudspeth, Lubbock, Hockley, and Garza Counties (Table 3, Table 4). It is impossible to evaluate quantitatively the impact of collecting on the populations that were exploited without detailed information on collecting effort, geographic extent of collecting, and demographic information on the exploited populations. However, the three amphibians—tiger salamander *Ambystoma tigrinum*, Couch's spadefoot *Scaphiopus couchii*, and green toad *Bufo debilis*—are common and widely distributed. The two lizards—common side-blotched lizard *Uta stansburiana* and marbled whiptail *Cnemidophorus tigris*—are also widespread and continuous in their distributions throughout much of the CDE. These five species generally share the characteristics discussed above that should allow them to withstand collecting, although there is not enough information to draw any conclusions. The yellow mud turtle *Kinosternon flavescens* and desert box turtle *Terrapene ornata luteola* were collected in large numbers. Yellow mud turtles are common and widespread, but are generally found when locally concentrated in ponds, stock tanks, and playas. It is reasonable to consider the possibility that local populations of yellow mud turtles could be impacted from removal of most of the individuals from ponds in an area. Desert box turtles are common and widespread, but have a low reproductive rate. It is reasonable that desert box turtle populations might be significantly changed by the systematic removal of adults.

Although there are data from only one year, the pattern of collecting in Texas indicates some generalities that are relevant to reptile and amphibian collecting throughout the region. First, few collectors account for the great majority of specimens collected. We are aware of only a few collectors in New Mexico who actively collect reptiles and amphibians for purposes of commercialization. Second, few species were collected in large numbers. The species that were collected in large numbers are widespread, small bodied, and, except for amphibians and turtles, are relatively short lived. A third generalization was that collecting was very patchy, with a small number of areas being intensively collected. In Texas, the same stretches of roads that have been popular with collectors for decades continue to produce specimens, and remain the principal areas used

by collectors. There are enormous expanses of habitat throughout the entire ecoregion that are not visited by collectors. Finally, based on the Texas database, turtles were collected in numbers large enough to raise concern. If turtle collecting were to continue at the same level and was restricted to a few sites, local populations could be reduced to the point of endangerment or local extinction. A similar argument could be made for prairie rattlesnakes, because of their vulnerability at dens.

RECOMMENDATIONS

Collection and Trade Monitoring:

1. To ensure that collection and trade of CDE amphibians and reptiles is sustainable, implementation of a legally binding monitoring system of take and trade in these groups is needed. Such a monitoring system must be based on the legal status of amphibians and reptiles and rules regulating their take. Such systems have been implemented in Texas and New Mexico and have provided valuable information on the trade of amphibians and reptiles in these states.

Field Research:

2. It is not often feasible to census amphibian and reptile species directly because of the large geographic areas involved, the time and expense required to measure these populations, and the inherent difficulties in measuring amphibian and reptile populations with confidence. Instead, targeted research should be aimed at producing sufficient information about collecting amphibians and reptiles to guide management decisions.
3. Information is needed on the amount of suitable habitat available for species with relatively small distributions and that require very specific habitat types in relation to the amount of area where they are collected.
4. Research on source-sink phenomena in exploited amphibians and reptiles would be useful, and has yet to be conducted for any exploited amphibian or reptile. Information on source-sink dynamics of selected species may clarify whether populations are self-sustaining, or to what extent habitat corridors and large uncollected areas are needed to sustain populations on a regional basis.

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APPENDICES

APPENDIX 1
NORMA OFICIAL MEXICANA 059

Norma Oficial Mexicana 059 (Official Mexican Norm 059) (NOM-059-ECOL-2001) lists the species and subspecies of wild terrestrial and aquatic fauna, based on degree of threat to their survival, including: In Danger of Extinction (P), Threatened (A), Subject to Special Protection (Pr), and Probably Extinct in the Wild (E). It also indicates whether or not the species is endemic. NOM 059 applies to all activities involving specimens, parts, products, byproducts, and derivatives of listed species.

Mexican Reptiles

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Abronia bogerti	Pr	endemic
Abronia chiszari	Pr	endemic
Abronia deppei	Pr	endemic
Abronia fuscolabialis	Pr	endemic
Abronia graminea	Pr	endemic
Abronia kalaina	Pr	endemic
Abronia lythrochila	Pr	endemic
Abronia matudai	Pr	not endemic
Abronia mitchelli	Pr	endemic
Abronia mixteca	Pr	endemic
Abronia oaxacae	Pr	endemic
Abronia ochoterenai	Pr	endemic
Abronia ornelasi	Pr	endemic
Abronia reidi	Pr	endemic
Abronia taeniata	Pr	endemic
Anelytropsis papillosus	Pr	endemic
Anniella geronimensis	Pr	endemic
Anniella pulchra	Pr	not endemic
Anolis adleri	Pr	endemic
Anolis anisolepis	Pr	endemic
Anolis baccatus	Pr	endemic
Anolis barkeri	Pr	endemic
Anolis biporcatus biporcatus	Pr	not endemic
Anolis cumingi	Pr	endemic
Anolis cuprinus	Pr	endemic
Anolis cymbops	Pr	endemic
Anolis duellmani	Pr	endemic
Anolis dunni	Pr	endemic
Anolis forbesi	Pr	endemic
Anolis gadovi	Pr	endemic
Anolis isthmicus	Pr	endemic
Anolis liogaster	Pr	endemic
Anolis macrinii	Pr	endemic
Anolis matudai	Pr	endemic
Anolis megapholidotus	Pr	endemic
Anolis microlepidotus	Pr	endemic
Anolis milleri	Pr	endemic
Anolis naufragus	Pr	endemic
Anolis omiltemanus	Pr	endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Anolis parvicirculatus	Pr	endemic
Anolis pentaprion	Pr	not endemic
Anolis polyrhachis	Pr	endemic
Anolis pygmaeus	Pr	endemic
Anolis schiedei	Pr	endemic
Anolis simmonsi	Pr	endemic
Anolis subocularis	Pr	endemic
Anolis taylori	Pr	endemic
Anolis utowanae	Pr	endemic
Aristelliger georgeensis	Pr	not endemic
Barisia imbricata	Pr	endemic
Barisia levicollis	Pr	endemic
Barisia rudicollis	Pr	endemic
Bipes biporus	Pr	endemic
Bipes canaliculatus	Pr	endemic
Bipes tridactylus	Pr	endemic
Callisaurus draconoides	A	not endemic
Celestus enneagrammus	Pr	endemic
Celestus rozellae	Pr	not endemic
Cnemidophorus alpinus	Pr	endemic
Cnemidophorus bacatus	Pr	endemic
Cnemidophorus calidipes	Pr	endemic
Cnemidophorus canus	A	endemic
Cnemidophorus catalinensis	Pr	endemic
Cnemidophorus celeripes	Pr	endemic
Cnemidophorus ceralbensis	Pr	endemic
Cnemidophorus communis	Pr	endemic
Cnemidophorus estebanensis	Pr	endemic
Cnemidophorus hyperythrus beldingi	A	endemic
Cnemidophorus hyperythrus caeruleus	A	endemic
Cnemidophorus hyperythrus danheimae	A	endemic
Cnemidophorus hyperythrus espiritensis	A	endemic
Cnemidophorus hyperythrus pictus	A	endemic
Cnemidophorus hyperythrus schmidti	Pr	endemic
Cnemidophorus labialis	Pr	endemic
Cnemidophorus lineattissimus	Pr	endemic
Cnemidophorus martyris	Pr	endemic
Cnemidophorus maximus	Pr	endemic
Cnemidophorus mexicanus	Pr	endemic
Cnemidophorus neomexicanus	Pr	not endemic
Cnemidophorus parvisocius	Pr	endemic
Cnemidophorus rodecki	Pr	endemic
Coleonyx brevis	Pr	not endemic
Coleonyx elegans	A	not endemic
Coleonyx reticulatus	Pr	not endemic
Coleonyx variegatus	Pr	not endemic
Cophosaurus texanus	A	not endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Corytophanes cristatus	Pr	not endemic
Corytophanes hernandezi	Pr	not endemic
Corytophanes percarinatus	Pr	not endemic
Crotaphytus collaris	A	not endemic
Crotaphytus reticulatus	A	not endemic
Ctenosaura acanthura	Pr	endemic
Ctenosaura clarki	A	endemic
Ctenosaura defensor	A	endemic
Ctenosaura hemilopha	Pr	endemic
Ctenosaura pectinata	A	endemic
Ctenosaura quinquecarinatus	A	not endemic
Ctenosaura similis	A	not endemic
Legaría kingi	Pr	not endemic
Legaría multicarinata	Pr	not endemic
Legaría parva	Pr	endemic
Legaría paucicarinata	Pr	endemic
Eumeces altamirani	Pr	endemic
Eumeces colimensis	Pr	endemic
Eumeces copei	Pr	endemic
Eumeces dugesi	Pr	endemic
Eumeces gilberti	Pr	not endemic
Eumeces lagunensis	A	endemic
Eumeces lynxe	Pr	endemic
Eumeces multilineatus	Pr	endemic
Eumeces multivirgatus	Pr	not endemic
Eumeces ochoterenae	Pr	endemic
Eumeces parviauriculatus	Pr	endemic
Gambelia wislizenii	Pr	not endemic
Gehyra mutilata	Pr	not endemic
Gerrhonotus liocephalus	Pr	not endemic
Gerrhonotus lugoi	A	endemic
Gonatodes albogularis	Pr	not endemic
Gymnophthalmus speciosus	Pr	not endemic
Heloderma horridum	A	not endemic
Heloderma suspectum	A	not endemic
Holbrookia lacerate	Pr	not endemic
Iguana iguana	Pr	not endemic
Laemanctus longipes	Pr	not endemic
Laemanctus serratus	Pr	not endemic
Lepidophyma alvarezi	A	endemic
Lepidophyma chicoasensis	Pr	endemic
Lepidophyma dontomasi	Pr	endemic
Lepidophyma flavimaculatum	Pr	not endemic
Lepidophyma gaigeae	Pr	endemic
Lepidophyma lipetzi	Pr	endemic
Lepidophyma micropholis	Pr	endemic
Lepidophyma occulor	Pr	endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Lepidophyma pajapanensis	Pr	endemic
Lepidophyma radula	Pr	endemic
Lepidophyma sawini	Pr	not endemic
Lepidophyma smithi	Pr	not endemic
Lepidophyma sylvaticum	Pr	endemic
Lepidophyma tarascae	Pr	endemic
Lepidophyma tuxtlae	Pr	endemic
Mesaspis antauges	Pr	endemic
Mesaspis gadovi	Pr	endemic
Mesaspis juarezi	Pr	endemic
Mesaspis moreleti	Pr	not endemic
Mesaspis viridiflava	Pr	endemic
Ophisaurus ceroni	Pr	endemic
Ophisaurus incomptus	Pr	endemic
Petrosaurus mearnsi	Pr	not endemic
Petrosaurus thalassinus	Pr	endemic
Phrynosoma asio	Pr	endemic
Phrynosoma branconnieri	Pr	endemic
Phrynosoma cerroense	A	endemic
Phrynosoma cornutum	A	not endemic
Phrynosoma ditmarsi	A	endemic
Phrynosoma mcallii	A	not endemic
Phrynosoma orbiculare	A	endemic
Phrynosoma taurus	A	endemic
Phyllodactylus angelensis	Pr	endemic
Phyllodactylus apricus	Pr	endemic
Phyllodactylus bordai	Pr	endemic
Phyllodactylus bugastrolepis	Pr	endemic
Phyllodactylus davisi	A	endemic
Phyllodactylus delcampoi	Pr	endemic
Phyllodactylus duellmani	Pr	endemic
Phyllodactylus homolepidurus	Pr	endemic
Phyllodactylus muralis	Pr	endemic
Phyllodactylus nocticolus	Pr	not endemic
Phyllodactylus partidus	Pr	endemic
Phyllodactylus paucituberculatus	Pr	endemic
Phyllodactylus santacruzensis	Pr	endemic
Phyllodactylus tinklei	Pr	endemic
Phyllodactylus unctus	Pr	endemic
Phyllodactylus xanti	Pr	endemic
Sauromalus ater	A	endemic
Sauromalus australis	A	endemic
Sauromalus hispidus	A	endemic
Sauromalus klauberi	P	endemic
Sauromalus obesus	A	not endemic
Sauromalus slevini	A	endemic
Sauromalus varius	A	endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Sceloporus adleri	Pr	endemic
Sceloporus angustus	Pr	endemic
Sceloporus asper	Pr	endemic
Sceloporus cozumelae	Pr	endemic
Sceloporus cryptus	Pr	endemic
Sceloporus exsul	Pr	endemic
Sceloporus graciosus	Pr	not endemic
Sceloporus grammicus	Pr	not endemic
Sceloporus grandaevus	Pr	endemic
Sceloporus hunsakeri	Pr	endemic
Sceloporus insignis	Pr	endemic
Sceloporus licki	Pr	endemic
Sceloporus lineatulus	Pr	endemic
Sceloporus macdougalli	Pr	endemic
Sceloporus maculosus	Pr	endemic
Sceloporus megalepidurus	Pr	endemic
Sceloporus ornatus	Pr	endemic
Sceloporus rufidorsum	Pr	endemic
Sceloporus salvini	Pr	endemic
Sceloporus serrifer prezygus	Pr	endemic
Sceloporus stejnegeri	Pr	endemic
Sceloporus subpictus	Pr	endemic
Sceloporus tanneri	Pr	endemic
Sceloporus zosteromus	Pr	endemic
Scincella gemmingeri forbesorum	Pr	endemic
Scincella lateralis	Pr	not endemic
Scincella silvicola	Pr	endemic
Sphaerodactylus argus	Pr	not endemic
Sphaerodactylus glaucus	Pr	not endemic
Thecadactylus rapicaudus	Pr	not endemic
Uma exsul	Pr	endemic
Uma notata	A	not endemic
Uma paraphygas	P	endemic
Urosaurus irregularis	A	endemic
Urosaurus lahtelai	A	endemic
Urosaurus nigricaudus	A	endemic
Uta antique	Pr	endemic
Uta concinna	A	endemic
Uta mannophora	A	endemic
Uta nolascensis	A	endemic
Uta palmeri	A	endemic
Uta squamata	Pr	endemic
Uta stansburiana martinensis	A	endemic
Uta stansburiana Stellata	A	endemic
Xantusia bolsonae	A	endemic
Xantusia sanchezi	P	endemic
Xenosaurus grandis	Pr	not endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Xenosaurus newmanorum	Pr	endemic
Xenosaurus platyceps	Pr	endemic
Adelophis copei	Pr	endemic
Adelophis foxi	Pr	endemic
Adelphicos latifasciatus	Pr	endemic
Adelphicos nigrilatus	Pr	endemic
Adelphicos quadrivirgatus sargi	Pr	not endemic
Agkistrodon bilineatus bilineatus	Pr	not endemic
Agkistrodon bilineatus taylori	A	not endemic
Atropoides nummifer	A	not endemic
Atropoides olmec	A	endemic
Boa constrictor	A	not endemic
Bothriechis aurifer	A	not endemic
Bothriechis bicolor	A	not endemic
Bothriechis rowleyi	Pr	endemic
Cerrophidion barbouri	Pr	endemic
Cerrophidion tzotzilorum	Pr	endemic
Chersodromus liebmanni	Pr	endemic
Chersodromus rubriventris	Pr	endemic
Chilomeniscus cinctus	Pr	not endemic
Chilomeniscus punctatissimus	Pr	endemic
Chilomeniscus savagei	Pr	not endemic
Chilomeniscus stramineus	Pr	endemic
Coluber constrictor	A	not endemic
Conopsis biserialis	A	endemic
Crotalus aquillus	Pr	endemic
Crotalus atrox	Pr	not endemic
Crotalus basiliscus	Pr	endemic
Crotalus catalinensis	A	endemic
Crotalus cerastes	Pr	not endemic
Crotalus durissus	Pr	not endemic
Crotalus enyo	A	endemic
Crotalus exsul	A	endemic
Crotalus intermedius	A	endemic
Crotalus lannomi	A	endemic
Crotalus lepidus	Pr	not endemic
Crotalus mitchelli	Pr	not endemic
Crotalus molossus	Pr	not endemic
Crotalus polystictus	Pr	endemic
Crotalus pricei	Pr	not endemic
Crotalus pusillus	A	endemic
Crotalus ruber	Pr	not endemic
Crotalus scutulatus	Pr	not endemic
Crotalus stejnegeri	A	endemic
Crotalus tigris	Pr	not endemic
Crotalus tortugensis	Pr	endemic
Crotalus transversus	P	endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Crotalus viridis	Pr	not endemic
Crotalus willardi	Pr	not endemic
Cryophis hallbergi	A	endemic
Dipsas brevifacies	Pr	not endemic
Dipsas elegans	Pr	endemic
Dipsas gaigeae	Pr	endemic
Elaphe phaescens	Pr	endemic
Enulius oligostichus	Pr	endemic
Eridiphas slevini	A	endemic
Exiliboa placata	Pr	endemic
Ficimia ramirezi	Pr	endemic
Ficimia ruspator	Pr	endemic
Geagras redimitus	Pr	endemic
Geophis anocularis	Pr	endemic
Geophis bicolor	Pr	endemic
Geophis blanchardi	Pr	endemic
Geophis cancellatus	Pr	not endemic
Geophis chalybeus	Pr	endemic
Geophis dubius	Pr	not endemic
Geophis duellmani	Pr	endemic
Geophis incomptus	Pr	endemic
Geophis isthmicus	Pr	endemic
Geophis laticinctus	Pr	endemic
Geophis laticollaris	Pr	not endemic
Geophis latifrontalis	Pr	endemic
Geophis maculiferus	Pr	endemic
Geophis mutitorques	Pr	endemic
Geophis nasalis	Pr	not endemic
Geophis nigrocinctus	Pr	endemic
Geophis omiltemanus	Pr	endemic
Geophis petersi	Pr	endemic
Geophis pyburni	Pr	endemic
Geophis ussatus	Pr	endemic
Geophis sallaei	Pr	endemic
Geophis sieboldi	Pr	endemic
Geophis tarascae	Pr	endemic
Gyalopion quadrangulare	Pr	endemic
Heterodon nasicus	Pr	not endemic
Hypsiglena torquata	Pr	not endemic
Imantodes cenchoa	Pr	not endemic
Imantodes gemmistratus	Pr	not endemic
Imantodes tenuissimus	Pr	endemic
Lampropeltis alterna	A	not endemic
Lampropeltis getula	A	not endemic
Lampropeltis mexicana	A	endemic
Lampropeltis pyromelana	A	not endemic
Lampropeltis ruthveni	A	endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Lampropeltis triangulum	A	not endemic
Lampropeltis zonata herrerai	A	endemic
Leptodeira annulata	Pr	not endemic
Leptodeira maculata	Pr	endemic
Leptophis ahaetulla	A	not endemic
Leptophis diplotropis	A	endemic
Leptophis mexicanus	A	not endemic
Leptophis modestus	Pr	not endemic
Leptotyphlops bressoni	Pr	Endemic
Lichanura trivirgata	A	not endemic
Loxocemus bicolor	Pr	not endemic
Masticophis anthonyi	A	Endemic
Masticophis aurigulus	A	Endemic
Masticophis flagellum	A	not endemic
Masticophis lateralis barbouri	A	Endemic
Masticophis mentovarius varilosus	A	Endemic
Micruroides euryxanthus	A	not endemic
Micrurus bogerti	Pr	Endemic
Micrurus browni	Pr	not endemic
Micrurus diastema affinis	Pr	Endemic
Micrurus distans	Pr	endemic
Micrurus elegans	Pr	not endemic
Micrurus ephippifer	Pr	endemic
Micrurus fulvius	Pr	not endemic
Micrurus laticollaris	Pr	endemic
Micrurus limbatus	Pr	endemic
Micrurus nebularis	Pr	endemic
Micrurus nigrocinctus zunilensis	Pr	endemic
Micrurus proximans	Pr	endemic
Nerodia erythrogaster	A	not endemic
Nerodia melanogaster	A	endemic
Ophryacus undulates	Pr	endemic
Phyllorhynchus browni	Pr	not endemic
Pituophis deppei	A	endemic
Pliocercus andrewsi	A	endemic
Pliocercus bicolor	A	endemic
Porthidium dunni	A	endemic
Porthidium hespere	Pr	endemic
Porthidium melanurum	Pr	endemic
Porthidium nasutum	Pr	not endemic
Porthidium yucatanicum	Pr	endemic
Pseudoleptodeira latifasciata	Pr	endemic
Pseudoleptodeira uribei	Pr	endemic
Rhadinaea bogertorum	Pr	endemic
Rhadinaea cuneata	Pr	endemic
Rhadinaea forbesi	Pr	endemic
Rhadinaea hempsteadae	Pr	not endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Rhadinaea hesperia baileyi	Pr	endemic
Rhadinaea marcellae	Pr	endemic
Rhadinaea mcdougalli	Pr	endemic
Rhadinaea Montana	Pr	endemic
Rhadinaea myersi	Pr	endemic
Rhadinaea omiltemana	Pr	endemic
Rhadinaea quinquelineata	Pr	endemic
Rhadinaea schistose	Pr	endemic
Rhadinophanes monticola	Pr	endemic
Salvadora bairdi	Pr	endemic
Salvadora intermedia	Pr	endemic
Salvadora lemniscata	Pr	endemic
Salvadora mexicana	Pr	endemic
Sibon annulifera	Pr	endemic
Sibon philippi	Pr	endemic
Sibon Sartorii macdougalli	Pr	endemic
Sibon zweifeli	R	endemic
Sistrurus catenatus	Pr	not endemic
Sistrurus ravus	Pr	endemic
Sonora aemula	Pr	endemic
Symphimus leucostomus	Pr	endemic
Symphimus mayae	Pr	endemic
Tantalophis discolor	A	endemic
Tantilla atriceps	A	not endemic
Tantilla briggsi	A	endemic
Tantilla cascadae	A	endemic
Tantilla calamarina	Pr	endemic
Tantilla coronadoi	Pr	endemic
Tantilla cuniculator	Pr	endemic
Tantilla deppei	A	endemic
Tantilla flavilineata	A	endemic
Tantilla gracilis	Pr	not endemic
Tantilla miniata	Pr	endemic
Tantilla morgani	Pr	endemic
Tantilla oaxacae	Pr	endemic
Tantilla shawi	Pr	endemic
Tantilla slavensi	Pr	endemic
Tantilla striata	Pr	endemic
Tantilla tayrae	Pr	endemic
Tantillita brevissima	Pr	not endemic
Tantillita lintoni	Pr	not endemic
Thamnophis chrysocephalus	A	endemic
Thamnophis cyrtopsis	A	not endemic
Thamnophis digueti	A	endemic
Thamnophis elegans	A	not endemic
Thamnophis eques	A	not endemic
Thamnophis exsul	A	endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Thamnophis godmani	A	endemic
Thamnophis hammondi	A	not endemic
Thamnophis marcianus	A	not endemic
Thamnophis mendax	A	endemic
Thamnophis nigronucaulis	Pr	not endemic
Thamnophis proximus	A	not endemic
Thamnophis scalaris	A	endemic
Thamnophis scaliger	A	endemic
Thamnophis sirtalis	Pr	not endemic
Thamnophis sumichrasti	A	endemic
Thamnophis vicinus	Pr	not endemic
Trimorphodon biscutatus vilkinsoni	Pr	not endemic
Ungaliophis continentalis	Pr	not endemic
Apalone ater	Pr	endemic
Apalone spinifera	Pr	not endemic
Caretta caretta	P	not endemic
Chelonia agassizi	P	not endemic
Chelonia mydas	P	not endemic
Chelydra serpentine	Pr	not endemic
Chrysemys picta	Pr	not endemic
Claudius ngustatus	P	not endemic
Dermatemys mawii	P	not endemic
Dermochelys coriacea	P	not endemic
Eretmochelys imbricata	P	not endemic
Gopherus agassizi	A	not endemic
Gopherus berlandieri	A	not endemic
Gopherus flavomarginatus	P	endemic
Kinosternon acutum	Pr	not endemic
Kinosternon alamosae	Pr	endemic
Kinosternon herrerai	Pr	endemic
Kinosternon hirtipes	Pr	not endemic
Kinosternon integrum	Pr	endemic
Kinosternon leucostomum	Pr	not endemic
Kinosternon oaxacae	Pr	endemic
Kinosternon scorpioides	Pr	not endemic
Lepidochelys kempi	P	not endemic
Lepidochelys livacea	P	not endemic
Pseudemys gorzugi	Pr	not endemic
Rhinoclemmys areolata	A	not endemic
Rhinoclemmys pulcherrima	A	not endemic
Rhinoclemmys rubida	Pr	endemic
Staurotypus salvini	Pr	not endemic
Staurotypus triporcatus	Pr	not endemic
Terrapene carolina	Pr	not endemic
Terrapene coahuila	Pr	endemic
Terrapene nelsoni	Pr	endemic
Terrapene ornata	Pr	not endemic

Appendix 1
Norma Oficial Mexicana 059 *(continued)*

SPECIES/SUBSPECIES	Category	ENDEMIC/NOT ENDEMIC
Trachemys scripta	Pr	not endemic
Caiman crocodiles	Pr	not endemic
Crocodylus acutus	Pr	not endemic
Crocodylus moreletii	Pr	not endemic

APPENDIX 2

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN NEW MEXICO

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 35 CAPTIVE WILDLIFE USES
PART 10 PROTECTION FOR AMPHIBIANS AND REPTILES

19.35.10.1 ISSUING AGENCY: New Mexico Department of Game and Fish.
[19.35.10.1 NMAC - N, 10-31-01]

19.35.10.2 SCOPE: To prohibit, permit and regulate commercial collecting of free-ranging, native amphibians and reptiles.
[19.35.10.2 NMAC - N, 10-31-01]

19.35.10.3 STATUTORY AUTHORITY: 17-1-14, 17-2-4.1, and 17-3-1 NMSA 1978 provide that the New Mexico State Game Commission has the authority to establish rules and regulations that it may deem necessary to carry out the purpose of Chapter 17 NMSA 1978.
[19.35.10.3 NMAC - N, 10-31-01]

19.35.10.4 DURATION: Permanent.
[19.35.10.4 NMAC - N, 10-31-01]

19.35.10.5 EFFECTIVE DATE: October 31, 2001.
[19.35.10.5 NMAC - N, 10-31-01]

19.35.10.6 OBJECTIVE: Establish procedures and requirements for the take of free-ranging, native amphibians and reptiles for commercial purposes.
[19.35.10.6 NMAC - N, 10-31-01]

19.35.10.7 DEFINITIONS:

A. "Free Ranging, Native Amphibians and Reptiles" are those species and subspecies of amphibians and reptiles naturally occurring in New Mexico.

B. "Commercial purpose" shall mean for the purpose of sale, barter, or profit. For this regulation, any person in possession of the annual bag limit or more than the annual bag limit of wild-caught amphibians and reptiles shall be deemed to possess these individuals for commercial purposes. In addition, any person in possession of more than 50 individuals with unlimited take, shall be deemed to possess these individuals for commercial purposes.

C. "Take" shall mean the act of seizing, capturing, trapping, killing of free-ranging, native amphibians and reptiles.

D. "Annual bag limit" shall mean the allowed number of individual, wild-caught amphibians and reptiles taken in a license year by a licensed collector.

E. "Fish Bait" shall mean the aquatic larval stage of the tiger salamander, Ambystoma tigrinum, used for baiting fish.

F. "Lizard races" shall mean the organized, competitive racing of any lizard not listed as threatened or endangered.

G. "Rattlesnake Roundup" shall mean an organized public event where the purpose is to display, buy, sell, and trade rattlesnakes of the genus Crotalus.

H. "Captive-bred" shall mean amphibians and reptiles that are hatched or born in captivity as a result of captive breeding.

[19.35.10.7 NMAC - N, 10-31-01]

APPENDIX 2

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN NEW MEXICO *(continued)*

19.35.10.8 TAKE:

A. It is unlawful for any person to take free-ranging, native amphibians and reptiles in New Mexico for commercial purposes without purchasing and having in possession a valid commercial collecting permit. In addition, nonresidents must purchase and also have in their possession a nonresident hunting license listed in Section 17-3-13 NMSA 1978 required by law for the year in which the taking is done.

B. It is unlawful to take all free-ranging, native amphibians and reptiles species that are Federal or State listed as threatened or endangered.

C. Exceptions:

(1) When there is an emergency situation involving an immediate threat to human life or private property, rattlesnakes may be captured, removed, or destroyed without a permit.

(2) No permit is necessary for take of free-ranging, native amphibians and reptiles for the purpose of rattlesnake roundups, fish bait, or lizard races. A commercial collecting permit is required when these species are taken for a commercial purpose.

(3) All other species of snake (other than rattlesnakes) collected and displayed for rattlesnake roundups shall not be bought, sold, or traded unless the person collecting such snakes is in possession of a commercial take permit.

(4) Amphibians and reptiles held in captivity prior to July 1, 2001 and their progeny are not subject to these regulations.

[19.35.10.8 NMAC - N, 10-31-01]

19.35.10.9 METHODS OF LEGAL TAKE: Only the following methods shall be used for the legal, commercial take of free-ranging, native amphibians and reptiles.

A. Field collection, including the use of hand-held flashlights or spotlights, provided the collector is not in possession of a firearm or other implement whereby any big game animal or domestic animal could be killed.

B. Collection from road surfaces.

C. Lizard nooses, snake grabbers, and snake hooks.

D. Seines, cast nets, and dip nets.

[19.35.10.9 NMAC - N, 10-31-01]

19.35.10.10 ANNUAL BAG LIMITS:

A. A list of native, free-ranging amphibians and reptiles known to occur in the state of New Mexico wherein take is allowed, with the annual bag limit for each, shall be established and maintained by the Director of New Mexico Department of Game and Fish (Director's Amphibian and Reptile List).

B. It shall be unlawful to exceed the annual bag limit of any species of amphibian or reptile listed on the Director's Amphibian and Reptile List for the current license year.

[19.35.10.10 NMAC - N, 10-31-01]

APPENDIX 2

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN NEW MEXICO *(continued)*

19.35.10.11 PERMIT:

A. Commercial Collecting Permit: This permit is herein established and required to be purchased and in the possession of any person prior to their attempt to take any amphibian or reptile for commercial purposes.

B. Availability and expiration: Commercial Collecting Permits will be available for purchase through the New Mexico Department of Game and Fish. Commercial Collecting Permits are valid only during the current license year for which they were purchased. License years run from April 1 through March 31 of the following calendar year. All commercial Collecting Permits expire on March 31 of each year.

C. Nonresidents are required to purchase and have in their possession a nonresident hunting license listed in Section 17-3-13 NMSA 1978 required by law for the year in which the taking is done, in addition to the Commercial Collecting Permit.

D. FEE: Each person must pay $50.00 to receive a Commercial Collecting Permit.

[19.35.10.11 NMAC - N, 10-31-01]

19.35.10.12 Year-End Reports: Each person who purchases a Commercial Collecting Permit is required to file a year-end report on a standardized form approved by the New Mexico Department of Game and Fish.

[19.35.10.12 NMAC - N, 10-31-01]

Summary of other relevant nongame laws in New Mexico

Sections pertinent to trade in CDE reptiles are in boldface.

Jurisdiction: State jurisdiction over nongame species is afforded through various statutes, as follows:

17-2-3: Defines game by listing the species or groups.

17-2-13: Defines protected birds by listing the species or groups.

17-5-5 Defines and protects birds of prey in the orders Falconiformes and Strigiformes, except that bald and golden eagles are excluded (the bald eagle is included by regulation under 17-2-28).

17-5-6 Protects horned toads [lizards] from willful killing, sale, and exportation.

17-5-7 Authorizes the Department of Game and Fish to restrict the taking of rabbits to protect humans from bubonic plague.

17-5-8 Authorizes the listing as threatened or endangered of any qualifying species of mammal, bird, reptile, amphibian, fish, mollusk, or crustacean in New Mexico, with protection, research, and management also authorized.

17-5-9 Protects nongame animals or birds from being taken by nonresidents without a license.

17-5-10 Authorizes the Department of Game and Fish to issue scientific collecting permits to take game, birds, or fishes mentioned in Chapter 17.

17-5-11 Requires a permit from the Department of Game and Fish for the importation into New Mexico of live animals, birds, and fishes.

17-5-12 Protects nonpredatory furbearing animals from harvest by persons 14 and older without a license.

APPENDIX 2

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN NEW MEXICO *(continued)*

Programs: **The only specific unit within the Department of Game and Fish that is charged with the management of nongame animals per se is the Endangered Species Program in the Conservation Services Division.** This program was established on 1 July 1974 by the passage of the Wildlife Conservation Act (17-2-37 through 17-2-46). Conservation Services Division, along with Division of Wildlife, Fisheries Division, Law Enforcement, and Public Affairs, administers numerous other programs that involve major nongame components.

Funding: Funding from nongame activities in the department comes from multiple sources: The Endangered Species Program is supported by the New Mexico General Fund, with the majority of that appropriation being matched against federal aid programs. The chief source of federal aid for the program is from the Pittman-Robertson Act that provides for the study and management of nongame birds and mammals. A lesser amount is provided from the Dingell-Johnson Act, which allows for the general study and management of nongame fishes in association with game species. Finally, other program funds are obtained through the federal Endangered Species Act funding authorized in Section 6.

Nongame species benefit from various programs in the Department based on Pittman-Robertson Act/Dingell-Johnson Act funding. Matching state funds for these projects come from several sources, including license fees and the Share With Wildlife state income tax checkoff program. The department also spends some 100% state funds on projects for nongame species, both from license-fee and tax-checkoff sources.

The Share With Wildlife Program was instituted in 1981, with the passage of income tax checkoff for wildlife (17-2-23). That law allows persons who are entitled to receive a refund on their New Mexico state income tax to donate all or a portion of it to the Department of Game and Fish. These funds are used both as matching shares in federal aid projects and as 100% state outlays.

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS

Nongame regulations for Texas:
Source http://www.tpwd.state.tx.us/nature/wild/nongamregs.htm

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PERMITS FOR THE COLLECTION AND SALE OF NONGAME WILDLIFE

§65.325.Applicability.

A. Except as provided in subsection (b) of this section, this subchapter applies to the nongame wildlife listed in §65.331 of this title (relating to Affected Species), living or dead, including parts of nongame wildlife and captive-bred nongame wildlife.

B. This subchapter does not apply to:

1. dead mountain lions, bobcats, or coyotes;
2. fish;
3. the purchase, possession, or sale of processed products;
4. teachers at accredited primary or secondary educational institutions, provided that the nongame wildlife is possessed solely for educational purposes and is not sold or transferred to another person for the purpose of sale;
5. persons or establishments selling nongame wildlife for and ready for immediate consumption in individual portion servings, and which are subject to limited sales or use tax; or
6. persons 16 years of age or younger, provided the person is not engaged in a commercial activity involving nongame wildlife;
7. aquatic products possessed under a valid bait dealer's license; or
8. albinos of any species of nongame

§65.326. Definitions. The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise. All other words and terms shall have the meanings assigned by the Parks and Wildlife Code or regulatory definitions adopted under the authority of Parks and Wildlife Code.

1. Captive-bred — Any wildlife born in captivity from parents held in captivity.
2. Commercial activity — The sale, offer for sale, exchange, or barter of nongame wildlife.
3. Possession — actual care, custody, or control of nongame wildlife.
4. Resale — Any transaction or activity in which a person purchases nongame wildlife or otherwise acquires nongame wildlife for a consideration and subsequently transfers or delivers the same nongame wildlife to any person in exchange for compensation or remuneration of any kind.
5. Processed product —
    a. nongame wildlife or parts of nongame wildlife that have been treated or prepared, by means other than refrigeration or freezing, to prevent decomposition; or
    b. parts of nongame wildlife that do not require treatment or preparation to prevent decomposition.

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS *(continued)*

§65.327. Permit Required.

A. Except as provided in this section or in §65.325 of this title (relating to Applicability), no person in this state may possess nongame wildlife for commercial purposes, or possess more than ten specimens of a single subspecies of nongame wildlife or more than 25 specimens of nongame wildlife in the aggregate, unless that person possesses a valid commercial collection permit or a valid nongame dealer permit issued by the department.

B. No person in this state may resell nongame wildlife unless that person possesses a valid nongame dealer permit by the department.

C. No person may sell nongame wildlife unless that person possesses a valid commercial nongame collection permit.

D. No person may, for the purpose of sale, transport or ship nongame wildlife out of this state, or cause such transport or shipment, unless that person possesses an applicable, valid nongame permit issued by the department.

E. Except as provided by subsection (f) of this section, a permit required by this subchapter shall be possessed on the person of the permittee during any activity governed by this subchapter; however, an employee of the holder of a nongame dealer's permit may engage in commercial activity or the resale of nongame wildlife at a permanent place of business operated by the permittee, provided that:

1. the employer's permit is maintained at the place of business during all activities governed by this subchapter; and
2. the place of business has been identified on the application required by §65.329 of this title (relating to Permit Application).
    a. In the event that the holder of a nongame dealer's permit conducts activities at a place in addition to a permanent place of business, that person shall possess on their person a legible photocopy of a valid nongame dealer's permit during all such activities.
    b. This subchapter does not relieve any person of the obligation to possess an appropriate hunting license for any activity involving the take of nongame wildlife.

§65.329. Permit Application.

1. An applicant for a dealer's permit under this subchapter shall submit to the department a completed application on a form supplied by the department, accompanied by the nonrefundable fee specified in Chapter 53 of this title (relating to Finance).
2. The department reserves the right to refuse permit issuance to any person finally convicted of any violation of Parks and Wildlife Code during the five-year period immediately prior to an application for a permit under this subchapter. This paragraph does not apply to convictions under Parks and Wildlife Code, Chapter 31.
3. The department shall not issue a permit to any person who has not complied with the applicable requirements of §65.330 of this title (relating to Reporting Requirements).
4. Permits shall be issued to named individuals only, resident or nonresident as applicable, and shall not be issued in the name of any firm, organization, or institution.

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS *(continued)*

§65.330. Record and Reporting Requirements.

A. A person possessing a commercial collection permit shall:

1. maintain and possess upon their person during any collection activities a daily collection log indicating the date, location, and number of specimens of each species collected and/or possessed during the period of validity of the permit, which shall be presented upon the request of a department employee acting within the official scope of their duties; and
2. complete and submit to the department an annual report, accompanied by the permittee's collection log, by the 15th of September of each year.

a. A person possessing a nongame dealer permit shall:

1) maintain a current daily record of all purchases and sales, which shall be presented upon the request of a department employee acting within the official scope of their duties;

2) maintain a collection log, invoice, or receipt identifying the source or origin of each specimen of nongame wildlife in possession, which shall be presented upon request to an employee of the department acting within the official scope of their duties; and

3) complete and submit to the department an annual report by the 15th of September of each year.

a) All records required by this section shall be retained and kept available for inspection for a period of one year following the period of validity of the permit under which they are required to be kept.

§65.331. Affected Species. The following species are subject to the provisions of this subchapter.

Authors' Note: *The following list of species is taken directly from TPWD nongame regulations on the TPWD website. There are some taxonomic redundancies and one turtle species, Pseudemys gorzugi, does not appear on the list.*

FROGS AND TOADS (See our Key for ID)

Cope's gray treefrog (*Hyla chrysoscelis*)
Canyon treefrog (*Hyla arenicolor*)
Gray treefrog (*Hyla versicolor*)
Green treefrog (*Hyla cinerea*)
Squirrel treefrog (*Hyla squirella*)
Couch's spadefoot (*Scaphiopus couchi*)
Plains spadefoot (*Scaphiopus [=Spea] bombifrons*)
Northern cricket frog (*Acris crepitans crepitans*)
Blanchard's cricket frog (*Acris crepitans blanchardi*)
Coastal cricket frog (*Acris crepitans paludicola*)
Great plains toad (*Bufo cognatus*)
Eastern green toad (*Bufo debilis debili*s)
Western green toad (*Bufo debilis insidior*)

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS *(continued)*

Red-spotted toad (*Bufo punctatus*)
Texas toad (*Bufo speciosus*)
Gulf Coast toad (*Bufo valliceps valliceps*)
Southwestern Woodhouse's toad (*Bufo woodhousii australis*)
East Texas Toad (*Bufo woodhousii velatus*)
Woodhouse's toad (*Bufo woodhousii woodhousii*)
Bull frog (*Rana catesbeiana*)
Southern leopard frog (*Rana sphenocephala*)
Bronze frog (*Rana clamitans clamatans*)
Pig frog (*Rana grylio*)

SALAMANDERS (See our Key for ID)

Barred tiger salamander (*Ambystoma tigrinum mavortium*)
Eastern tiger salamander (*Ambystoma tigrinum tigrinum*)
Marbled salamander (*Ambystoma opacum*)
Mole salamander (*Ambystoma talpoideum*)
Spotted salamander (*Ambystoma maculatum*)

TURTLES

Desert (Western) box turtle (*Terrapene ornata luteola*)
Ornate box turtle (*Terrapene ornata ornata*)
Three-toed (Eastern) box turtle (*Terrapene carolina triunguis*)
Cagle's map turtle (*Graptemys caglei*)
Mississippi map turtle (*Graptemys pseuogeographica kohnii*)
Ouachita map turtle (*Graptemys pseudogeographica ouachitensis*)
Sabine map turtle (*Graptemys pseudogeographica sabinensis*)
Texas map turtle (*Graptemys versa*)
Yellow mud turtle (*Kinosternon flavescens flavescens*)
Mississippi (Eastern) mud turtle (*Kinosternon subrubrum hippocrepi*s)
Western chicken turtle (*Deirochelys reticularia miaria*)
Red-eared slider (*Trachemys scripta elegans*)
Midland smooth softshell turtle (*Apalone muticus muticus*)
Texas spiny softshell (*Apalone spiniferus emoryi*)
Guadalupe spiny softshell (*Apalone spiniferus guadalupensis*)
Western spiny softshell (*Apalone spiniferus hartwegi*)
Pallid spiny softshell (*Apalone spiniferus pallidus*)
Metter's river cooter (*Pseudemys concinna metteri*)
Texas river cooter (*Pseudemys texana*)
Western painted turtle (*Chrysemys picta belli*)
Southern painted turtle (*Chrysemys picta dorsalis*)
Common snapping turtle (*Chelydra serpentina serpentina*)
Texas diamondback terrapin (*Malaclemys terrapin littoralis*)

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS *(continued)*

LIZARDS

Texas alligator lizard (*Gerrhonotus liocephalus infernalis*)
Western slender glass lizard (*Ophisaurus attenuatus attenuatus*)
Green anole (*Anolis carolinensis*)
Texas banded gecko (*Coleonyx brevis*)
Southwestern earless lizard (*Cophosaurus texanus scitulus*)
Texas earless lizard (*Cophosaurus texanus scitulus*)
Eastern collared lizard (*Crotaphytus collaris collaris*)
Chihuahuan collared lizard (*Crotaphytus collaris fuscus*)
Crevice spiny lizard (*Sceloporus poinsetti poinsetti*)
Texas spiny lizard (*Sceloporus olivaceus*)
Twin-spotted (Desert) spiny lizard (*Sceloporus magister bimaculosus*)
Northern (Eastern) fence lizard (*Sceloporus undulatus hyacinthinus*)
Northern prairie lizard (*Sceloporus undulatus garmani*)
Southern Prairie lizard (*Sceloporus undulatus consobrinus*)
Big Bend canyon lizard (*Sceloporus merriami annulatus*)
Presidio canyon lizard (*Sceloporus merriami longipunctatus*)
Merriam's canyon lizard (*Sceloporus merriami merriami*)
Longnose leopard lizard (*Gambelia wislizenii wislizenii*)
Eastern tree lizard (*Urosaurus ornatus ornatus*)
Big Bend tree lizard (*Urosaurus ornatus schmidti*)
Desert side-blotched lizard (*Uta stansburiana stejnegeri*)
Roundtail horned lizard (*Phrynosoma modestum*)
Broadhead skink (*Eumeces laticeps*)
Great plains skink (*Eumeces obsoletus*)
Ground skink (*Scincella lateralis*)
Gray-checkered whiptail (*Cnemidophorus dixoni*)
Chihuahuan spotted whiptail (*Cnemidophorus exsanguis*)
Texas spotted whiptail (*Cnemidophorus gularis gularis*)
Plateau spotted whiptail (*Cnemidophorus gularis septemvittatus*)
Trans-Pecos striped whiptail (*Cnemidophorus inornatus heptagrammus*)
Laredo striped whiptail (*Cnemidophorus laredoensis*)
Marbled whiptail (*Cnemidophorus marmoratus*)
New Mexico whiptail (*Cnemidophorus neomexicanus*)
Colorado checkered whiptail (*Cnemidophorus tesselatus*)
Desert grassland whiptail (*Cnemidophorus uniparens*)
Six-lined racerunner (*Cnemidophorus sexlineatus sexlinieatus*)
Prairie-lined racerunner (*Cnemidophorus sexlineatus viridis*)

SNAKES

Baird's rat snake (*Elaphe bairdi*)
Texas rat snake (*Elaphe obsoleta lindheimeri*)

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS *(continued)*

Trans-Pecos rat snake (*Bogertophis subocularis*)
Great Plains rat snake (*Elaphe guttata emoryi*)
Rough green snake (*Opheodrys aestivus*)
Rough earth snake (*Virginia striatula*)
Western smooth earth snake (*Virginia valeriae elegans*)
Ground snake (*Sonora semiannulata*)
Yellowbelly water snake (*Nerodia erythrogaster flavigaster*)
Gray-banded kingsnake (*Lampropeltis alterna*)
Louisiana milk snake (*Lampropeltis triangulum amaura*)
Mexican milk snake (*Lampropeltis triangulum annulata*)
New Mexico milk snake (*Lampropeltis triangulum celaenops*)
Central Plains milk snake (*Lampropeltis triangulum gentilis*)
Speckled kingsnake (*Lampropeltis getulus holbrooki*)
Desert kingsnake (*Lampropeltis getulus splendida*)
Bullsnake (*Pituophis melanoleucus sayi*)
Texas longnose snake (*Rhinocheilus lecontei tessallatus*)
Eastern coachwhip (*Masticophis flagellum flagellum*)
Western coachwhip (*Masticophis flagellum testaceus*)
Central Texas whipsnake (*Masticophis taeniatus girardi*)
Desert Striped whipsnake (*Masticophis taeniatus taeniatus*)
Eastern garter snake (*Thamnophis sirtalis sirtalis*)
Texas garter snake (*Thamnophis sirtalis annectans*)
New Mexico garter snake (*Thamnophis sirtalis dorsalis*)
Plains garter snake (*Thamnophis radix haydenii*)
Checkered garter snake (*Thamnophis marcianus marcianus*)
Eastern blackneck garter snake (*Thamnophis cyrtopsis ocellatus*)
Western blackneck garter snake (*Thamnophis cyrtopsis cyrtopsis*)
Western ribbon snake (*Thamnophis proximus proximus*)
Redstripe ribbon snake (*Thamnophis proximus rubrilineatus*)
Gulf Coast ribbon snake (*Thamnophis proximus orarius*)
Arid land ribbon snake (*Thamnophis proximus diabolicus*)
Mississippi ringneck snake (*Diadophis punctatus stictogenys*)
Prairie ringneck snake (*Diadophis punctatus arnyi*)
Regal ringneck snake (*Diadophis punctatus regalis*)
Kansas glossy snake (*Arizona elegans elegans*)
Texas glossy snake (*Arizona elegans arenicola*)
Painted desert glossy snake (*Arizona elegans philipi*)
Plains (western) hognose snake (*Heterodon nasicus nasicus*)
Dusty hognose snake (*Heterodon nasicus gloydi*)
Mexican hognose snake (*Heterodon nasicus kennerlyi*)
Eastern hognose snake (*Heterodon platirhinos*)

APPENDIX 3

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN TEXAS *(continued)*

Mountain patchnose snake (*Salvadora grahamiae grahamiae*)
Texas patchnose snake (*Salvadora grahamiae lineata*)
Big Bend patchnose snake (*Salvadora deserticola*)
Texas coral snake (*Micrurus fulvius tenere*)
Southern copperhead (*Agkistrodon contortrix contortrix*)
Broad-banded copperhead (*Agkistrodon contortrix laticinctus*)
Trans-Pecos copperhead (*Agkistrodon contortrix pictigaster*)
Western cottonmouth (*Agkistrodon piscivorus leucostoma*)
Western diamondback rattlesnake (*Crotalus atrox*)
Prairie rattlesnake (*Crotalus viridis viridis*)
Mottled rock rattlesnake (*Crotalus lepidus lepidus*)
Banded rock rattlesnake (*Crotalus lepidus klauberi*)
Northern blacktail rattlesnake (*Crotalus molossus molossus*)
Western massasauga (*Sistrurus catenatus tergeminus*)
Desert massasauga (*Sistrurus catenatus edwardsii*)
Pygmy rattlesnake (*Sistrurus miliarius*)

APPENDIX 4

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN ARIZONA

Regulations for collecting and possession of amphibians and reptiles in Arizona (Arizona Game and Fish Department)

COMMISSION ORDER 41: AMPHIBIANS

OPEN SEASON DATES **NOTES** **OPEN AREAS** **LEGAL AMPHIBIANS**

A. January 1 through December 31, 2001.
Notes 1, 3, 6, and 7.
Open statewide except areas closed in Note 7.
All amphibians are legal, except those named in Subsections B, C, D, E, and F.
BAG AND POSSESSION LIMIT: Ten (10) per year or in possession per species live or dead.

B. January 1 through December 31, 2001.
Notes 1, 3, 6, and 7.
Open statewide, except areas closed in Note 7.
Legal amphibians include: *Bufo cognatus* (Great Plains toad), *B. punctatus* (red-spotted toad), *Scaphiopus couchii* (Couch's spadefoot), and *Spea multiplicata* (New Mexico spadefoot).
BAG AND POSSESSION LIMIT: Ten (10) per day or in possession per species live or dead.

C. January 1 through December 31, 2001.
Notes 1, 3, 5, 6, and 7.
Open statewide, except areas closed in Notes 5 and 7.
Legal amphibians include: *Ambystoma tigrinum* (waterdog or tiger salamander).
BAG AND POSSESSION LIMIT: Unlimited live or dead.

D. January 1 through December 31, 2001.
Notes 1, 2, 3, 6, and 7.
Legal amphibians include: *Rana catesbeiana* (bullfrog).
Open statewide, except areas closed in Note 7, including Havasu, Bill Williams River, Cibola, and Imperial national wildlife refuges (as permitted by refuge regulations; posted areas closed).
BAG AND POSSESSION LIMIT: Unlimited dead; see Note 2.

E. January 1 through December 31, 2001.
Notes 1, 3, 6 and 7.
Legal amphibians include: All species in the genus *Xenopus* (clawed frogs) and *Bufo marinus* (giant toad).
Open statewide, except areas closed in Note 7.
BAG AND POSSESSION LIMIT: Unlimited dead.

F. There is no open season on *Rana tarahumarae* (Tarahumara frog), *Rana blairi* (plains leopard frog), *Rana chiricahuensis* (Chiricahua leopard frog), *Rana pipiens* (northern leopard frog), *Rana yavapaiensis* (lowland leopard frog), *Rana onca* (relict leopard frog), and *Rana subaquavocalis* (Ramsey Canyon leopard frog). See Note 4.

NOTES

1. A fishing or combination license is required for take of amphibians. Amphibians may be taken day or night per to R12-4-313.

APPENDIX 4

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN ARIZONA *(continued)*

2. The possession limit for live bullfrogs legally held prior to closure of live bag limits (January 1, 1996, in Mohave, La Paz, and Yuma counties, or January 1, 1988, in all other counties) is 12 per person.
3. The Fort Huachuca Military Reservation controls access to the taking of aquatic wildlife on its installation.
4. The possession limit for native species of leopard frogs legally held prior to January 1, 1993, when season closure went into effect, is 10 per species per person.
5. No waterdogs or salamanders may be taken in that portion of Santa Cruz County lying east and south of State Highway 82 or that portion of Cochise County lying west of the San Pedro River and south of State Highway 82.
6. Wildlife areas are open or closed in accordance with Commission Order 1 and R12-4-802. Wildlife Area Restrictions (see **Arizona Hunting Regulations**).
7. Amphibians may not be taken at any time (or during periods specified) within the following areas:
   (1). Posted boundaries of State or Federal hatcheries.
   (2). Posted boundary of the Region I regional headquarters in Pinetop.
   (3). The Colorado River one-half mile upstream and one-half mile downstream from its confluence with the Little Colorado River.
   (4). That portion of the Little Colorado River lying within the Grand Canyon National Park.
   (5). Lee Valley Creek above Lee Valley Lake.
   (6). Gap Creek between Honeymoon Cabin and its confluence with the Verde River.
   (7). Mineral Creek in Apache County upstream of the Apache-Sitgreaves National Forest Boundary.
   (8). Posted areas immediately above the dams at Upper Lake Mary, Alamo Lake, and Lake Mead.
   (9). Posted areas immediately below Davis, Hoover, Glen Canyon, Waddell (Lake Pleasant), Roosevelt, Horse Mesa, and Mormon Flat dams.
   (10). Posted, Spawning Pond Number 1 and Spawning Pond Number 2 located along the Salinity Canal north of Yuma.
   (11). The Luna Lake Wildlife Area from April 1 through July 31.
   (12). Posted portions of Alamo Lake.
   (13). Posted portions of the Tonto Arm of Roosevelt Lake from January 1 through February 15 and from November 15 through December 31.
   (14). Posted portions of Mittry Lake from November 15 through February 15 annually.
   (15). Posted portions of Becker Lake are closed to all public entry from April 1 through July 31, and December 15 through June 15 annually.
   (16). Posted portions of Lake Mead.
   (17). Posted portions of Powers Butte Wildlife Area are closed to entry for the purpose of taking wildlife.
   (18). Posted portions of Bog Hole Wildlife Area.

APPENDIX 4

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN ARIZONA *(continued)*

(19). Posted portions of Lake Havasu.

(20). Posted portions of Cienega Creek in Pima County.

(21). Aravaipa Creek in Pinal and Graham counties.

(22). Sycamore Creek in Santa Cruz County.

Arizona Game and Fish Department

COMMISSION ORDER 43: REPTILES

OPEN SEASON DATES	NOTES	OPEN AREAS	LEGAL REPTILES

A. January 1 through December 31, 2001.
Notes 1, 2, 5, 6, and 7.
Statewide, except areas closed in Notes 5, 6, and 7.
All reptiles, except those named in Subsections B, C, D, E, F, and G.
BAG AND POSSESSION LIMIT: Four (4) per year or in possession of each species live or dead.

B. January 1 through December 31, 2001.
Notes 1, 2, 5, and 6.
Statewide, except areas closed in Notes 5 and 6.
Legal reptiles include Crotalus atrox (western diamondback rattlesnake) and *C. scutulatus* (Mojave rattlesnake).
BAG AND POSSESSION LIMIT: Four (4) per day or in possession of each species live or dead.

C. January 1 through December 31, 2001.
Notes 1, 2, 5, and 6.
Statewide, except areas closed in Notes 5 and 6.
Legal reptiles include *Lichanura trivirgata* (rosy boa), *Senticolis triaspis* (green rat snake), *Lampropeltis pyromelana* (Sonoran Mountain kingsnake), and *Lampropeltis triangulum* (milk snake).
BAG AND POSSESSION LIMIT: Two (2) per year or four (4) in possession of each species live or dead.

D. January 1 through December 31, 2001.
Notes 5 and 6.
Statewide, except closed in areas 1, 2, 5, and 6.
Legal reptiles include: *Sceloporus undulatus* (prairie/plateau lizards), *Tantilla hobartsmithi* (southwestern blackheaded snake), and all species in the genera: *Callisaurus* (zebratail lizards), *Cnemidophorus* (whiptails), *Coleonyx* (banded geckos), *Cophosaurus* (greater earless lizards), *Holbrookia* (lesser earless lizards), *Urosaurus* (tree lizards), *Uta* (side-blotched lizards), *Hypsiglena* (night snakes), *Leptotyphlops* (blind snakes), and *Sonora* (ground snakes).
BAG AND POSSESSION LIMIT: Twenty (20) per day or in possession in the aggregate live or dead.

APPENDIX 4

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN ARIZONA *(continued)*

E. January 1 through December 31, 2001.
Notes 1, 5, 6, 8, and 9.
Statewide, except areas closed in Notes 5, 6, and 9.
Legal reptiles include *Apalone spinifera* (spiny softshell), *Trachemys scripta* (slider), and all species of the family *Chelydridae* (snapping turtles).
BAG AND POSSESSION LIMIT: Unlimited dead.

F. There is no open season on *Phrynosoma mcallii* (flat-tail horned lizard), *Heloderma suspectum* (Gila monster), *Crotalus lepidus* (rock rattlesnake), *Crotalus pricei* (twin-spotted rattlesnake), *Crotalus willardi* (ridgenose rattlesnake), *Sistrurus catenatus* (massasauga), and *Gopherus agassizii* (desert tortoise); see Notes 3 and 4.

NOTES:

1. A hunting or combination license is required for take of reptiles other than softshell turtles. Reptiles may be taken day or night. See R12-4-304 for restrictions on the use of artificial light. By law, softshell turtles are considered aquatic wildlife and a fishing or combination license is required for take. Methods of take are prescribed at R12-4-313(E).
2. Per R12-4-404, progeny of lawfully held reptiles other than desert tortoises may, for twelve months from date of hatching or birth, be held in captivity in excess of the stated limits. Before or upon reaching twelve months of age, such progeny must be disposed of by gift to another person or as directed by the Department.
3. Per R12-4-407.1, desert tortoises legally held prior to April 28, 1989, may be possessed, transported and propagated. Possession limit is one desert tortoise per person. Progeny of lawfully held desert tortoises may, for twenty-four months from date of hatching, be held in captivity in excess of the stated limit. Before or upon reaching twenty-four months of age, such progeny must be disposed of by gift to another person or as directed by the Department.
4. The possession limit for massasaugas legally held prior to January 1, 1989, when season closure went into effect, is four (4) per person. See Note 2.
5. The Fort Huachuca Military Reservation, the Yuma Proving Ground, and Camp Navajo control access to hunting on their installations.
6. Wildlife areas are open or closed in accordance with Commission Order 1 and R12-4-802. Wildlife Area Restrictions (see **Arizona Hunting Regulations**).
7. Chuckwallas (genus *Sauromalus*) may not be taken within the boundaries of Phoenix South Mountain Park.
8. The Fort Huachuca Military Reservation controls access to the taking of aquatic wildlife on its installation.
9. Softshell turtles may not be taken at any time (or during periods specified) within the following areas:
   (1) Posted boundaries of State or Federal hatcheries.
   (2) Posted boundary of the Region I regional headquarters in Pinetop.
   (3) The Colorado River one-half mile upstream and one-half mile downstream from its confluence with the Little Colorado River.

APPENDIX 4

LAWS REGARDING COLLECTING AMPHIBIANS AND REPTILES IN ARIZONA *(continued)*

(4) That portion of the Little Colorado River lying within the Grand Canyon National Park.

(5) Lee Valley Creek above Lee Valley Lake.

(6) Gap Creek between Honeymoon Cabin and its confluence with the Verde River.

(7) Mineral Creek in Apache County upstream of the Apache-Sitgreaves National Forest Boundary.

(8) Posted areas immediately above the dams at Upper Lake Mary, Alamo Lake, and Lake Mead.

(9) Posted areas immediately below Davis, Hoover, Glen Canyon, Waddell (Lake Pleasant), Roosevelt, Horse Mesa, and Mormon Flat dams.

(10) Posted, Spawning Pond Number 1 and Spawning Pond Number 2 located along the Salinity Canal north of Yuma.

(11) The Luna Lake Wildlife Area from April 1 through July 31.

(12) Posted portions of Alamo Lake.

(13) Posted portions of the Tonto Arm of Roosevelt Lake from January 1 through February 15 and from November 15 through December 31.

(14) Posted portions of Mittry Lake from November 15 through February 15 annually.

(15) Posted portions of Becker Lake are closed to all public entry from April 1 through July 31, and December 15 through June 15 annually.

(16) Posted portions of Lake Mead.

(17) Posted portions of Powers Butte Wildlife Area are closed to entry for the purpose of taking wildlife.

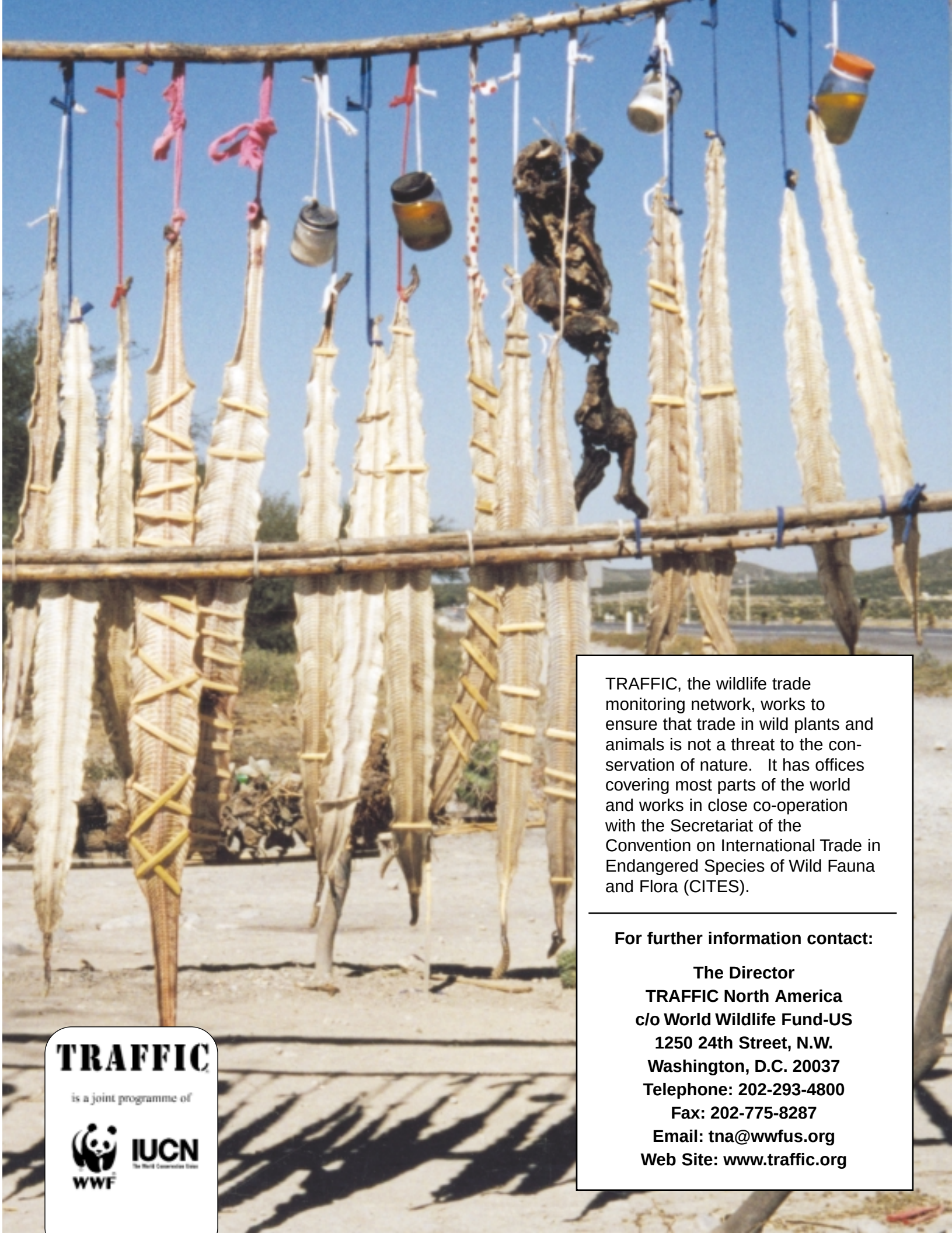
(18) Posted portions of Bog Hole Wildlife Area.

(19) Posted portions of Lake Havasu.

(20) Posted portions of Cienega Creek in Pima County.

(21) Aravaipa Creek in Pinal and Graham counties.

(22) Sycamore Creek in Santa Cruz County.



TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. It has offices covering most parts of the world and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

For further information contact:

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