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Public Comments Processing
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Dear Sir or Madame,

The Association of Reptile and Amphibian Veterinarians (ARAV) shares your concern on alien and invasive species and the effects that these species have on our habitat and native species. We have prepared a position paper on Invasive Species and have enclosed a copy which we hope may be of some help as the US Fish and Wildlife Service considers injurious wildlife species.

Sincerely,

Wilbur B. Amand, VMD

Invasive Species

ARAV Legislative/Animal Welfare Committee

April 17, 2008

- Invasive species have a negative impact on local wildlife, at times even causing extinction.
- Released captive or non-native species can introduce exotic diseases to wildlife.
- Owners must be very diligent to have enclosures/cages that prevent escape of reptile and amphibian pets.
- Your pet will be safer and healthier in captivity and not released to the wild.

The increased popularity of reptiles and amphibians has led to an increase in the numbers of these animals as pets, breeders, and exhibit and education animals. The selling and trading of wild-caught species, both imported and domestic, in conjunction with captive breeding, has made species that were once considered too exotic or expensive more readily available to the general public. Individuals and organizations involved in keeping and breeding reptiles and amphibians have an ethical obligation to provide at least the minimum standard of care for the species that they keep. Included in this standard is the provision of a secure environment that prevents escape and an obligation not to intentionally release unwanted animals into the wild. If the environment into which these animals escape or are released is conducive to their survival, they can establish feral populations that may compete with native wildlife, deplete natural resources, threaten agriculture, and endanger the health of people and other animals.

The National Invasive Species Council (NISC) was established on February 3, 1999 by Executive Order 13112.¹ According to this document, an *Invasive Species* is defined as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. An *Alien Species* is defined, with respect to a particular ecosystem, as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem. The National Invasive Species Management Plan (NISMP), which is updated biennially by the NISC, provides additional context for defining the term *Invasive Species*, and states that “many alien species are non-invasive and support human livelihoods or a preferred quality of life”.² It should be noted that hereafter *invasive species* in this document only refers to invasive herpetofaunae, as herpetofaunae are the primary focus of the Association of Reptile and Amphibian Veterinarians.

Invading alien species in the United States cause environmental damage and economic losses totaling to almost \$120 billion per year.³ As of 2004, approximately 50,000 invasive species were reported in the United States, and the number was expected to increase.³ Approximately 42% of the species listed as endangered or threatened are at risk due to invasive species.³ Although reptiles and amphibians are only a small part of the

invasive species problem, their impacts are well-noted. Florida has 52 species of herpetofauna documented that have established invasive populations.¹¹

The following is a synopsis of several reptiles and amphibians that are considered invasive, and their negative impacts:

Cane Toad (Giant Marine Toad, *Bufo marinus*)

Cane toads were intentionally introduced into Hawaii in 1935 to control sugarcane pests, and were inadvertently introduced into southern Florida in 1955.^{4,5} Native to Central and South America, these anurans are prolific breeders and are comparatively long-lived. They primarily prey on insects, but are documented to eat reptiles, other amphibians, small birds and mammals, carrion, and even dog and cat food.^{4,5} Because they prey on native fauna, they compete with indigenous species for food and may play a role in the decline of native species. *Bufo marinus* consume large numbers of honeybees, and negatively impact the beekeeping industry.⁵ Cane toads also produce an alkaloid secretion from their parotid glands (bufotoxin) that is highly toxic to potential predators, including pets and humans.^{4,5}

Brown Tree Snake (*Boiga irregularis*)

The brown tree snake is a rear-fanged colubrid that is indigenous to Indonesia and northern Australia. This snake was first introduced into Guam in the 1950's, possibly through imported cargo or military transports.^{6,7} It flourished on the island of Guam due to the abundance of prey and lack of natural predators.⁷ Brown tree snakes decimated the native forest bird population on Guam, causing or contributing to the significant declines or extinction of nine of the eleven species present when it was introduced, including the Guam rail and Micronesian kingfisher.⁷ They are also responsible for the decline of fruit bats on the island, which play an important role in pollination and seed dispersal.⁷ Brown tree snakes are an economic threat as well. They are responsible for frequent power outages caused by crawling onto high voltage power lines or into transformers.^{6,7} Because they are mildly venomous, they also pose a health risk to humans, pets, and livestock.⁷ Currently aggressive measures are underway to prevent this species from invading the Hawaiian islands.^{6,8}

Burmese Python (*Python molurus bivittatus*)

This subspecies of the Indian python is native to Southeast Asia. Recent reports document that feral populations of these large constrictors are established in the Everglades National Park and other parts of South Florida.^{9,10} In the Everglades, an already fragile ecosystem, this snake competes with the American alligator as a top predator.^{9,10} Their tendency to disperse long distances via waterways and their tolerance for a broad thermal range make them a tenacious invader that has the potential to spread as far north as Maryland. Their large size and ability to capture and consume large prey also makes them a threat to pets and humans.

African Clawed Frog (*Xenopus laevis*)

These frogs were originally imported in the 1950's for their use in human pregnancy tests and other scientific research. They subsequently became popular in the pet trade.¹² Due to their diverse diet, high reproductive rate, long life span, habitat adaptability, affinity for disturbed or artificial habitats, defense mechanisms and disease resistance, these amphibians have been able to establish stable populations in Southern California and the southwestern United States.¹²

Green Iguana (*Iguana iguana*)

Green iguanas are native to Central and South America and the Caribbean. Due to their popularity in the pet trade and their low price, they are commonly purchased by individuals who know little about the species. Many owners fail to sufficiently research key information including iguana adult size, behavior, or husbandry, and they are inadequately prepared to care for iguanas once they become large or aggressive.^{10,13} Due to escape or intentional release, feral populations are now established in South Florida, Texas, and Hawaii.^{13,14} In some locales they compete with other herbivores for forage, damage ornamental foliage, and dig burrows that undermine structures and seawalls.^{13,14} Because they are frequently encountered by people and pets, they have the potential to inflict injury and or transmit disease. Salmonellosis is of particular concern.¹⁴

Nile Monitor (*Varanus niloticus*)

Nile monitors are large varanid lizards native to Africa. Due to escape or intentional release, feral populations are established in Southwestern Florida and Puerto Rico.^{15,16} These lizards are voracious carnivores that eat a wide variety of vertebrate and invertebrate prey, including the eggs of several managed and imperiled species including alligators, sea turtles, gopher tortoises, and burrowing owls.^{15,16} Such predation has a negative impact on these native species. Nile monitors are also strong, aggressive, well-toothed lizards that have been implicated in human trauma and pet injuries and deaths.¹⁶

Red-Eared Slider Turtle (*Trachemys scripta elegans*)

Although this species is indigenous to the southeastern United States, they have now spread throughout the continental U.S. and into Mexico, and several other countries boast invasive populations of these turtles.¹⁷ They are reported to be the second most common species of turtle in Taiwan.¹⁷ They were sold extensively as hatchlings in "dime stores" and flea markets throughout the U.S. in the 1940's to 1960's, and even though the law now prohibits the sale of red-eared sliders under four inches in carapace length, they remain readily available.¹⁷ Since they are often purchased on impulse by persons who are uneducated about their care, they are commonly released into local waterways, where they establish breeding populations and compete with indigenous wildlife.¹⁷ Their resilient nature, omnivorous diet, tolerance of brackish water, and ability to hibernate during the winter have allowed them to adapt to a variety of climates.¹⁷

Many other species of herpetofauna have established invasive populations in the United States. These include the poison dart frog (*Dendrobates auratus*) and Jackson's chameleon (*Chamaeleo jacksonii*) in Hawaii; Coquí frog (*Eleutherodactylus coqui*) and greenhouse frog (*Eleutherodactylus planirostris*) in Hawaii, Louisiana, and south Florida; Cuban tree frog (*Osteopilus septentrionalis*) and Curly-tailed lizard (*Leiocephalus carinatus*) in south Florida, and the North American bullfrog (*Rana castesbeiana*) was introduced into trout streams throughout the continental U.S.^{18,19,20,21} Several other species of lizards have established populations in Hawaii, Florida, and the gulf coast states, including multiple species of anoles, agamas, ameivas, basilisks, chameleons, curlytail lizards, geckos, skinks, spinytail lizards, spinytail iguanas, and whiptails.^{11,15,20} Other invasive snake species include boa constrictors (*Boa constrictor*), African rock pythons (*Python sebae*), Brahminy blind snakes (*Ramphotyphlops braminus*), and reticulated pythons (*Python reticulatus*).^{10,11,15,20} At least once crocodilian, the spectacled Caiman alligators (*Caiman crocodilus*) has also become established outside of its natural range.^{10,11,15}

To prevent captive reptiles and amphibians from becoming invasive species, it is important to house them in secure enclosures that prevent escape, and to not intentionally release unwanted animals into the wild. The release of a captive-bred animal or an indigenous animal that has been captive for a prolonged time period may inadvertently introduce exotic diseases into wild populations. An outbreak of *Mycoplasma agassizii* in desert tortoises (*Gopherus agassizii*) in the Mojave desert contributed significantly to population declines in the late 1980's and early 1990's.²² It is thought that the organism may have been introduced into this population from captive animals that were released.²²

Enclosures should be examined carefully prior to housing an animal. What may be suitable for one species may not be secure for another. Animals of similar size and shape may differ in their escape behavior. Housing aspects that should be taken into account include secure lids, doors, and access ports for lights, cords, heating elements, etc. Consider if screens can be torn by a claw, tooth, or spine or if glass panels may be broken by the animal. Check for failure of cage components due to rust, corrosion, erosion, rot, decay or melting (from a heat source). Precipitous placement of an enclosure is a common risk. The ability of the animal to climb, swim, dig, or chew; and the ability of the animal to move or upturn its enclosure should be assessed. Enclosures should be reassessed periodically for escape risk. Residents may damage their enclosure or outgrow it and need a more secure space.

If an individual or organization owns a reptile or amphibian that they no longer want or that they cannot maintain, it should not be intentionally released. Some zoos and educational facilities (state parks, nature centers, etc.) will take in unwanted herpetofauna for education, exhibit, or breeding. Many local animal shelters, humane societies, or other animal rescue organizations will accept reptiles and amphibians. Many species of herpetofauna have a monetary value and, depending on local regulatory statutes, may be sold or traded to individuals, breeders, pet stores, or at trade shows. However, ownership of animals that are considered invasive species may be illegal to keep in certain states without a license. If the animal has a medical problem that the owner

cannot afford to treat, or if it has a chronic medical condition that discourages adoption or placement, then euthanasia by a qualified reptile veterinarian may be the most humane option. Euthanasia may also be considered for an animal that is especially aggressive or prone to cause significant human injury. Often reptile and amphibian veterinarians and herpetological clubs and societies will assist individuals in placing unwanted animals. Herpetological societies, rescue groups, and pet fostering organizations can be found at the following websites:

<http://www.anapsid.org/societies/>
<http://www.reptileinfo.com/Resources.aspx?ID=9>
<http://www.rescuenetwork.org/>
<http://www.geocities.com/Petsburgh/Farm/2607/adopt.html>
<http://www.greenpeople.org/humanesociety.htm>
http://www.google.com/Top/Recreation/Pets/Reptiles_and_Amphibians/Rescues_and_Shelters/

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