

Operational Guide

Reptile Care



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About the Authors

The mission of Kindred Spirits Reptile Sanctuary is to advocate compassionate care for reptiles through knowledge and action. Kindred Spirits is dedicated to providing quality information, tools, and resources that will help people make compassionate decisions and exercise humane actions toward reptiles.

Kindred Spirits operates a rehabilitation and permanent sanctuary for abandoned, neglected, or abused reptiles. In addition, Kindred Spirits supports existing reptile owners to help them provide the best possible care for their reptiles. Kindred Spirits also supports the animal welfare community through training programs and materials for shelter staff and animal control officers.

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Introduction

Caring for a reptile in a traditional animal shelter poses unique challenges. Shelter professionals want to do the right thing. They have the necessary motivation and desire, and they have good basic instincts, but they may not have the knowledge or skills needed to care for the variety of reptiles encountered.

Fortunately, others have some experience and have documented their efforts. Unfortunately, this information is often difficult to get, written for other audiences (e.g., breeders, guardians), and very time-consuming to understand. In the meantime, you have a reptile that needs care immediately.

This guide attempts to provide the minimum information necessary to accept and care for reptiles in a shelter on a short- to medium-term basis until a well-informed decision can be made regarding the long-term disposition of the animal. However, because reptiles have different sheltering needs from mammals, and because there are so many different types of reptiles available in the pet trade today, there is still a lot of general, as well as species-specific, information to review. Only then can you appropriately address the animal's health and basic needs.

Assumptions Made

Caring for wild animals in captivity is a very complex undertaking, and caring for ectothermic (cold-blooded) species is doubly so. **Reptiles do not make good pets.** Even people who believe it is

acceptable to have reptiles as pets are fairly united in their belief that reptiles require difficult care.

To define the scope of this guide, we made the following assumptions:

- Given that reptiles are still a growth area of the pet trade, the rate at which shelters receive reptiles will also increase.
- Because the majority of shelter resources and expertise will continue to focus on dogs and cats, shelters maintain limited resources or expertise to handle reptiles.

Therefore, this guide strives to:

- Prepare shelters for what they are most likely to handle
- Provide sufficient husbandry information to allow shelters to provide minimal safe and healthy conditions for humans and animals
- Provide information and tools to help shelters place animals into new homes, when appropriate

This guide, however, will not address:

- How to conduct inspections of reptile care in pet stores
- How guardians should care for reptiles in their homes

While some of the information in this guide may be useful in those situations, to meet either of those objectives would well require a degree of information and expertise beyond the intended scope of this guide.

The Basics

Wild Animals as Pets

Wild animals are, by their very nature, significantly different from domesticated animals. Even “tamed” or “socialized” wild animals maintain the instincts and reflex behaviors of the wild. This is critical when caring for wild animals in captivity for two reasons:

1. Wild animals are better off in the wild.
2. They fear humans.

Wild animals are always better off physically, emotionally, and behaviorally in their native environment. To provide the best possible care for them in captivity, the caregiver needs to be aware of and try to reproduce as many aspects of their native environment as possible. This includes everything from physical characteristics of their environment, such as diet, temperature, and space, to behavioral/social characteristics of their environment, such as visual and audio stimulants and interactions with other animals of their species, as well as other animals of different species. For example, while it might be acceptable to house a tropical bird in a cage in the lobby of your shelter, it is not acceptable to house a nocturnal snake in that same location.

Wild animals instinctively fear humans as their natural enemy. Even in the best possible captive environment, wild animals spend much of their life experiencing varying degrees of stress, depression, and fear. Truly integrating this perspective when caring for a captive wild animal will have far-reaching implications on how, when, and where the animal is cared for, as well as having significant impact on the quality of life.

In addition, tamed or socialized wild animals always present a risk of reverting to their survival instincts when afraid, sick, or injured. Sometimes this can lead to life-threatening situations for humans (e.g., with big cats or large constrictor snakes). Other times it may only lead to behavior deemed unpleasant or annoying for humans (e.g., a skunk releasing scent, a green iguana tail whipping). In any event, a wild animal’s natural behavior (resulting from its instinctive fear of humans) is likely to be interpreted by the animal’s guardian as unacceptable. This may result in the animal being relinquished to a shelter.

Reptiles as Pets

Reptiles are unlike other species of animals and require specialized knowledge and a unique perspective in order to care for them in captivity.

Reptiles are wild animals, even those born in captivity. Birthplace does not change its genetic/biological/natural state of being a wild animal. Whether the animal is a 100-pound constrictor snake capable of killing an adult human or a 10-gram gecko lizard that may die of a heart attack when picked up by a human, each is responding according to its native, wild instincts.

Reptiles are ectothermic. While reptiles are commonly referred to as cold-blooded, that is not an accurate representation of their biology. The proper term is ectothermic and means they are dependent on external sources of heat for maintaining biological functions.

This cannot be stressed enough as a top concern when trying to provide for the physical health of a reptile. Body temperature is critical to the daily metabolism of food, operation of organs,

and survival of the animal, but it is also the primary tool for treating illness or injury. Reptiles cannot create, maintain, or store their own body heat. They are 100-percent dependent on their environment to provide this source of life 24/7 year round.

It is impossible to overstate the importance of providing heat for reptiles. Without the appropriate amount of heat for the appropriate period of time each day, reptiles cannot metabolize their food. When they do not metabolize their food, it may rot inside of them, harden, and cause digestive blockage, or lead to anorexia or dehydration. Any or all of these conditions may cause illness or death.

Without the appropriate heat gradient (range of heat within their environment), they will not be able to thermoregulate (adjust their body temperature throughout the day to heat up or cool down as needed). This can lead to stress, distress, illness, overheating, or death.

When a reptile is sick or stressed (which should be assumed when an animal enters a shelter), always treat the condition raising the overall heat gradient, both day and night, by 10 degrees. In the case of illness or infection, this does for the reptile what having a fever does for a human. In the case of stress, it stimulates the metabolism, appetite, and other bodily functions to help keep the animal alive. When a reptile is not kept warm enough, its metabolism slows, which can lead to illness, and can eventually shut down, leading to death. This is a natural survival instinct in the wild that can prove deadly in captivity.

Virtually all reptiles available through the pet trade are not native to the geographic region where they are sold or acquired as

pets. This means that, almost to a certainty, the animals cannot survive in the natural environment where they are kept as pets without extra environmental support.

What to Expect

Sources of Animals

As with any species, the source of an animal entering a shelter can help predict the condition of the animal. Reptiles entering shelters come from three primary sources:

Guardian Relinquishments

These animals tend to come from relatively responsible guardians and are usually in fair condition. However, due to their unique care requirements, most reptiles in captivity have extremely shortened life spans, due to poor husbandry, and die while in the care of their guardians.

According to animal shelter sources, 60 percent of all wild animals kept as pets die within the first month of guardianship. Of the remainder, 20 percent die within the first year, and only 10 percent are still alive by the end of the second year.

The most common reptile kept as a pet is the green iguana. In the wild, it has a natural life span of up to 20 years, while in captivity up to 98 percent die in their first year. One third of captured green iguanas die within three months of capture.

Strays

Whether a pet reptile has become a stray intentionally (the guardian released it to the wild) or unintentionally (the animal got away from the guardian's control and confinement), it is highly probable the

animal is ill and in distress by the time it enters the shelter.

Confiscations

Occasionally reptiles are targets of confiscations, although it is more likely that another species is the target of the investigation, and officers unexpectedly find reptiles when an inspection or confiscation occurs. Either way, the animal will most likely be stressed by the time it enters the shelter.

Most Common Species

While a tremendous and ever-growing variety of species of reptiles are available through the pet trade, shelters generally see a very limited variety. This is due in part to the majority of pet reptiles dying in the care of their guardians. In addition, few guardians think of their local shelter as an option for relinquishment. A reptile guardian who no longer wants an animal will more commonly sell it, give it to a friend, give it to a local herpetological society or rescue organization, return it to where it was purchased, or release it to the wild.

The following are the most common species seen by shelters:

Lizards

- Green iguana (*Iguana iguana*), a.k.a. giant green iguana
- Bearded dragon (*Pogona vitticeps*)
- Savannah monitor (*Varanus exanthematicus*)

Snakes

- Boa constrictor (*Boa constrictor*), including rainbow boas, rosy boas, red-tailed boas
- Burmese python (*Python molurus bivittatus*)
- King snake (*Lampropeltis getula*)

- Corn snake (*Elaphe guttata*)

Turtles/Tortoises

- Box turtle (*Terrapene carolina*)
- Red-eared slider (*Chrysemys scripta elegans*)
- African sulcata tortoise (*Geochelone sulcata*)

The remainder of this document is species-generic; however, when necessary or appropriate to be species-specific, the focus is on these noted species.

Size

It is in the shelter's best interest to plan for the handling of larger reptiles rather than smaller. For all the reasons already discussed, smaller species (e.g., chameleons, geckos, anoles) and younger animals are more likely to die or find new homes before reaching a shelter. In general, don't assume that a small/medium aquarium set up in a corner can be used to house incoming reptiles. Because of the size and the specialized environment/habitat requirements of reptiles, set aside a fairly significant amount of space in an out-of-the-way place to house reptiles in customized habitats.

Physical Condition

It is rare that a reptile received by a shelter can be adopted out again without some medical care. In the best possible scenario (when a guardian is relinquishing a well-cared-for pet), the health problems may be relatively minor, such as dehydration or weight loss. In the more common scenario (when an animal has suffered from some degree of abuse or neglect), the health problems could include extreme emaciation, dehydration, metabolic bone disease and deformities, open wounds or burns, active internal or external parasite infestations, or untreated broken bones.

In any event, expect to spend time, effort, and possibly money for medical treatment and rehabilitation.

Behavioral Condition

With dogs and cats it is common for guardians to say their animal has fewer behavioral problems than the shelter's experts might determine; with reptiles, the opposite is often true. The most common reason given for guardian relinquishment of a reptile is that the animal is or has become "mean." Because all reptiles are wild animals, it is more likely that the animal is just acting naturally, but the guardian did not know what to expect or how to interpret or interact with the animal's behavior. Most experienced reptile caregivers will tell potential guardians to expect a certain amount of aggressive behavior and risk of injury, but, with enough patience and understanding, a safe relationship can usually be achieved.

On the other hand, assume that virtually all reptiles entering the shelter are not well socialized and are extremely stressed. So, be prepared to deal with a wild or aggressive animal. In addition, when assessing the behavioral condition and temperament of a reptile in anticipation of adopting it out to a new home, make an independent assessment (either by shelter staff or by an outside expert) rather than rely on the information provided.

General Reptile Biology

To fully understand the issues and ramifications of captive care for reptiles, it is important to have a basic understanding of some of the key differences and unique characteristics of reptilian biology relative to mammalian biology.

All Reptiles

Body Temperature

The term “cold-blooded” is often used to describe reptiles. The correct term, however, is ectothermic, meaning they get their body heat from external sources. To raise or lower its body temperature, a reptile moves about its environment to increase or decrease its exposure to heat sources (e.g., direct sunlight, warm rocks or sand, shady trees, cool caves). This process is called thermoregulation.

The body temperature of a reptile fluctuates within a relatively narrow preferred optimal temperature zone (POTZ) and may be warmer or cooler depending on the species, season, and time of day. For captive care, this means the reptile’s environment must offer a range of temperatures (called a temperature gradient) so that the animal can move around to thermoregulate. Without the proper POTZ, a reptile will not sustain its normal bodily functions, including appetite, digestion, and disease suppression.

Jacobson’s Organs

In addition to the five senses mammals have, reptiles have an additional set of sense organs, called the Jacobson’s organs, which are olfactory organs located toward the front of the top of the mouth of lizards and snakes. By tongue flicking or touching, a reptile takes samples of air into its Jacobson’s organs and uses these

samples to detect smells and identify the type and location of prey, sources of danger, familiar objects and creatures, and changes in its environment. Animals use tongue flicking and touching to explore unfamiliar things in their environment, or to reaffirm familiar things such as food, furnishings, and humans.

Ears

The physical appearance of a lizard’s and turtle’s ears is not the same as a mammal’s. Instead, these reptiles have a tympanic membrane on each side of its head that is covered with a thin, transparent skin that should shed as the rest of the animal’s skin sheds. The tympanic membrane may be flush with the surface of the head or may be slightly recessed to protect it from damage. Snakes have no ears at all.

Eyes

Some reptiles, such as snakes and some species of geckos, have no eyelids. For captive care of these animals, pay particular attention to providing appropriate water sources (i.e., quantity and delivery method) so that the eyes do not get dehydrated. Also, provide visual/privacy screens to minimize stress due to visual stimulation. As with the tympanic membrane, the eye is covered with a thin, transparent skin that should shed as the rest of the animal’s skin sheds.

Some reptile species, such as green iguanas and Chinese water dragons, have what is commonly referred to as a “third eye.” The correct term for this is a parietal eye. This eye appears in the middle of the top of the head. While the parietal eye does not detect images, it does sense light and heat and plays an essential role in the animal’s ability to properly thermoregulate. It also aids the animal’s

defensive mechanism by providing warning information about the possible presence of a predator. For example, one of the primary predators of green iguanas is a bird of prey. Therefore, when a green iguana's parietal eye senses a shadow overhead, the iguana knows to seek shelter. In captivity, this is why a green iguana will stress, run, or attack when a human tries to pick it up by grabbing its back. The human's hand coming over the back creates a shadow on the parietal eye that looks like a bird of prey to the iguana.

Nose

Reptiles do not have the typical facial appendage conventionally thought of as a nose, but they do have two nostrils called nares that serve fundamentally the same purpose. In general, any visible discharge coming from the nares of a reptile is probably a sign of illness and should be evaluated by a veterinarian immediately. An important exception to this, however, is that herbivorous lizards (e.g., green iguanas) regularly "sneeze" out excess salt. This is normal, necessary, and no cause for alarm.

Tongue

In addition to the use of their tongues to gather sensory information for the Jacobson's organs, some reptile (e.g., green iguanas, chameleons) tongues are sticky to aid in bringing food items into their mouths. This is important in a captive environment because reptiles with sticky tongues often inadvertently ingest foreign objects that can cause blockage, constipation, and death.

Vocalizations

Most reptiles do not have vocal cords and therefore cannot make any sounds. However, there are exceptions. For example, some geckos can make a fairly

loud "barking" sound. In general, any sounds made by reptiles may be interesting but should not be cause for alarm.

Shedding

All reptiles must shed their skin in order to grow. This process is called ecdysis. Some reptiles actually shed a small portion of their tongue and lips, which may cause their mouths to look dirty. Snakes normally shed their skin in one piece, most lizards shed in pieces, and turtles' skin tends to flake off. Some lizards, such as geckos and chameleons, eat their skin (possibly to reclaim potentially lost vitamins and nutrients or to leave no evidence of their presence to potential predators), but most do not.

When a reptile appears to be having difficulty shedding, it is an important sign of a potential health problem. A reptile's shedding skin should never be pulled off, but the shedding process can be aided by increasing all appropriate means of hydration and, if the problem persists, seeking a veterinarian's advice.

Lizards

Breath Holding

A common defensive behavior of many lizards is to inhale and hold as much air as possible. This enables it to appear as large, formidable, and inedible as possible to a potential enemy. Some species can hold their breath for what seems like an impossibly long time (reportedly up to two hours for green iguanas). While this is part of the lizard's natural defense mechanism and need not be cause for alarm, it should be recognized as a significant signal that the animal is extremely stressed or fearful, and the cause of the stress or fear should be identified and removed.

Tail Loss and Regrowth

Another defense mechanism for some lizards is their ability to lose their tails. Because many predators will grab a lizard by its tail, the ability to lose it allows the lizard to get away safely. Immediately after a tail is separated from the body of the lizard, the tail may continue to wiggle extensively for a few minutes. This is intended to distract the predator and allow the lizard to get away.

Some lizards are capable of regrowing their tail, but it may never be as long or as attractive as the original tail (e.g., on green iguanas, regenerated tails appear black and are often misshapen). This process is known as tail regeneration.

Femoral Pores

Most lizards have a row of femoral pores on the underside of each thigh that secrete a waxy substance used for marking territories. Femoral pores are present in both males and females, but are more pronounced in males. While this cannot be considered a completely reliable way to determine a lizard's sex, it is relatively safe to assume that if a lizard's femoral pores are protruding past the surface of the rest of its thigh, it is a male.

Color Changes

A lizard's body may change color for several reasons, including:

- To match its environment and thereby help it hide from predators
- To denote hormonal changes when the animal is in breeding season
- To indicate changes in body temperature

However, it may also indicate poor health.

Dewlap

Some lizards have a piece of skin, called a dewlap, which hangs down from their jaw

and throat. The lizard can extend the dewlap to make itself look larger to potential enemies or to provide a larger body area with which to collect heat.

Snakes

Ears

Snakes do not have ears. Instead, they use sight and smell, along with input from their Jacobson's organs and sense of movement.

Jaw Dislocation

A snake's jaws consist of four separate sections, two on top and two on bottom, which enable it to hold onto its prey and work it down its throat at the same time. In addition, a snake can dislocate its jaws to allow large prey to pass down its throat.

Turtles

Shell

The upper shell of a turtle is called the carapace, and the lower shell is called the plastron. A turtle's shell grows throughout its life, and the turtle will occasionally shed its top layer. When a turtle is kept in an unclean environment or is malnourished, unhealthy bacteria can get underneath layers of the shell and cause shell rot that, if left untreated, can cause irreparable shell damage.

Hibernation

Some turtles brumate (the reptilian version of hibernate). However, even for species that naturally brumate, poor health may make it difficult for a turtle to successfully come out of hibernation. Therefore, turtles should not be hibernated in a shelter environment.

Beak

All turtles have a hard shell-like structure over their jaw called a beak. Like nails, the beak grows throughout the lifetime of the animal. In general, if the animal is provided proper food, well-balanced nutrition, and a healthy environment, the beak will naturally maintain its health and shape. However, it is not uncommon in captivity for a turtle's beak to become deformed or overgrown, which can limit or even prevent it from eating. If needed, a veterinarian can trim or file a turtle's beak.

Factors Influencing General Reptile Health

Many factors, both external and internal, influence a reptile's physical health. As with mammals, metabolism plays a key part in maintaining and improving a reptile's health because it is directly related to the animal's ability to derive nutrients from food, fight off infection, heal from injuries, and keep its internal parasite load at bay. Unlike mammals, a reptile's metabolism is highly dependent on external factors. In addition, because the reptile pet trade consists entirely of animals from environments significantly different from where they are sold, maintaining a reptile's health in captivity is directly linked to the reptile's environment.

The following are the key external and internal factors that influence a reptile's health, and therefore are of most concern for shelter staff.

External Factors

Heat

To maintain a reptile's appropriate body temperature, two criteria must be met — source and heat gradient.

Source. The source of heat refers to whether the animal needs to receive heat from above its body (heliothermic) such as from the sun, or from below its body (thigmothermic) such as from rocks or sand. Each species of reptile is specifically adapted to receive heat in a particular way. If heat is presented in a different way, it may cause illness or injury. For example, green iguanas are tree dwellers meant to receive heat from the sun (heliothermic), and the skin on the bottom of their body is not well suited to sensing heat. In captivity, if a green iguana's only source of available heat is from below its body (e.g., a heat rock), it will lay on the rock as its only option for survival, but it will most certainly get insufficient heat to maintain its body temperature. The animal is also likely to get burned from the rock. Because it cannot sense heat well, it will not feel the burn or move off the rock, and the burn may become life threatening.

Heat Gradient. The heat gradient, or preferred optimal temperature zone (POTZ), refers to the temperature range available in the animal's environment. Reptiles need to be able to adjust their body temperature throughout the day, and they do this by moving around their environment. Without the appropriate heat gradient available, the animal may never reach the heat level needed to metabolize food, or it may overheat and die.

Light

UVB Light. All diurnal (i.e., active during the day) reptiles require UVB light in order to adequately metabolize their food. In the wild, this need is met by exposure to direct sunlight. In captivity, this need must be met via artificial light sources (such as specialized light bulbs) that emit a specific range of UVB rays. Only fluorescent light bulbs specially designed for reptile

habitats will meet this need. No incandescent, plant, aquarium, or other fluorescent bulbs will do.

This tends to be one of the most complex, least understood, and most unmet needs of reptiles in captivity. Based on the most recent scientific data, the only way to ensure captive reptiles are getting adequate UVB light is to use a high-quality UVB light bulb that is less than six months old and less than 12 inches from the animal. If any of these criteria are not met, animal's health will suffer.

Although it may seem counterintuitive, in general, it is not recommended to expose reptiles in the shelter to natural daylight. Natural daylight is significantly stronger than artificial daylight and, as a result, can have unpredictable effects on animals accustomed to artificial (and sometimes no) daylight. Animals may become agitated, aggressive, fearful, or more prone to flee. In fact, it is common for reptiles to get away from their caregivers when taken outside, thereby becoming the "strays" that end up in a shelter.

Day/night cycle (photoperiod). Because each reptile species is specialized to survive in a very limited geographic area in the wild, their metabolic rates are highly in tune with the natural day/night light cycle (as well as seasonal light cycle) of their native geographic region. As with everything else related to their metabolism, too much or too little light can have significant health ramifications. The most common problem in captivity is that reptiles are exposed to light (as well as noise) too late during the day so they do not get the rest they need and are overly stressed. In general, in captivity it is safe to use a 12-hour light (usually 7 a.m. to 7 p.m.), 12-hour dark light cycle for all

reptiles. This is one more of many reasons reptiles should be housed in an out-of-the-way location in the shelter environment.

Humidity

Humidity serves two primary purposes for reptiles: it supplements internal hydration and aids in the shedding process.

While reptiles do not actually absorb water through their skin, a high water density in the air in their environment (humidity) results in water entering their systems through their mouths, and noses. Humidity is especially important for species from tropical or rainforest environments (e.g., green iguanas, boa constrictors, pythons). For example, green iguanas expect a high density of water in the air as well as frequent rain showers. As a result, it is very unnatural for them to drink water out of a bowl no matter how thirsty they are. In fact, the most common/natural way for an iguana to consume water is by licking water as it rolls off its face during a rain shower (in captivity, when they are misted).

It is very common for reptiles that enter shelters to have trouble shedding. This may appear as shed sticking to their body (i.e., does not come off easily), coming off in small bits and flakes rather than large or whole body pieces, or not coming off for so long that multiple layers build up, which can constrict blood flow to a part of the body. Generally, poor shedding is not a life-threatening condition. While this does not need to be a top priority health concern in the shelter, a bad shed should not be ignored. It is a very good indicator of overall health (especially hydration) and of prior care and husbandry conditions.

Stress

Stress plays a major part in the overall health and well-being of all reptiles. For reptiles in shelters, stress may be second only to heat as the most important factor contributing to overall health. While this is true for cats and dogs as well, the significance is magnified many times for reptiles because so much of their health depends on their physical environment. The following are the major contributors to stress that must be addressed when housing reptiles in a shelter:

Visual and audio stimuli. All sights, sounds, smells, and tastes are different from what a reptile would encounter in its natural environment. Even if an animal has been in captivity all of its life, it is certain to be exposed to sights and sounds in the shelter environment it has never encountered before (e.g., barking dogs, unfamiliar people). This unfamiliar sensory overload can create tremendous stress. Because the animal is not likely to stay in the shelter environment for a long time, it is more appropriate to try to limit these external sensory stimuli rather than familiarize the animal with them.

Privacy. Instinctively, reptiles have no familiarity with humans (or dogs, cats, or birds) and therefore are naturally uncomfortable in their company, even if that company is fairly removed or has limited interaction with the reptile. In addition, most reptiles are relatively inactive in the wild, spending much of their time resting or basking, and sick animals are even less active than healthy ones. It is, therefore, important to make sure reptiles have a high degree of privacy. Because they will often prioritize privacy (which they equate to safety) over other life-sustaining needs, such as heat or food, it is important to provide privacy in such a

way that an animal does not have to choose to meet one of its needs at the expense of others. For example, monitor lizards, snakes, and box turtles like to spend time in hide boxes where they are completely hidden from view. To meet their heat gradient needs, place appropriate hide boxes in both the warm and cool parts of their habitat. On the other hand, green iguanas and bearded dragons like to bask out in the open, so they will require a privacy screen around their entire habitat (e.g., a curtain around their housing).

Change. The natural environment for reptiles in the wild changes very little over time, so reptiles have evolved to not expect change. Therefore, change causes them extreme disorientation and stress. The two most harmful types of change are moving an animal from one habitat to another, or moving an animal's habitat from one location to another. If either of these types of moves is necessary, the more elements of an animal's environment that can be kept the same, the better off the animal will be.

Handling. There are many reasons handling causes an animal stress. For wild animals, all direct human interactions are inherently stressful, often perceived as life threatening. This can be mitigated with frequent interactions with individual humans, but any socialization is quickly lost when the frequency, individual, or environment changes.

The way reptiles relate to their physical environment varies greatly by species, and this has a direct relationship to how they do, or do not, like to be handled. For example, green iguanas are arboreal and so prefer to be handled in a way that makes the human as much like a tree as possible (e.g., the body is the trunk of the tree, the

arm is a limb extending up and away from the body, the “hands” and “feet” of the iguana are resting on the body or arm). Also, because green iguanas have a parietal eye that senses shadows as potential predators, they prefer to have their eye level above the handler’s. If a green iguana is held by its body below the handler’s eye level, it will be very uncomfortable, agitated, fearful, and generally overstressed.

External Parasites

Mites. While common, mites are not usually a major health problem for reptiles. However, if a mite infestation has been left untreated for a long period of time, it can result in permanent scarring and shed problems or, even worse, open wounds and possible infection. Shelter staff can directly treat mite infestations, but a veterinarian should examine any mite wounds.

Reptile mites are not transferable to other species (e.g., humans, dogs, cats, birds), and often may not spread between reptile species (e.g., snake mites are different from lizard mites).

Ticks. Ticks are much less common in reptiles than are mites. They can be removed similarly to how they are removed from cats and dogs, and the area should be treated with a topical antibacterial agent.

Internal Factors

Nutrition

As with all animals, a reptile’s basic nutritional health is one of the most important influencers on overall health. A reptile in good nutritional health will be better able to cope with the stress of captivity, change, and injury or illness.

Conversely, a reptile in poor nutritional health will be far more susceptible to any and all other threats to its physical and mental well-being. Therefore, it cannot be overstated how critical it is to maintain a good state of nutritional health for all reptiles in captivity.

Carefully assess the incoming animal’s nutritional health and immediately provide a high-quality, well-balanced diet. Also, determine the need for supplementary nutritional support, such as specialized diets, hand feeding, or vitamin supplementation (See Appendix B for hand-feeding slurry recipes).

Unfortunately, shelters can generally assume that all reptiles entering a shelter environment are nutritionally compromised to some extent, and many are well on the road to death due to emaciation or dehydration. The sad reality is that very few reptile guardians have the knowledge and resources to maintain their animals’ health, and animals coming from the pet trade are virtually guaranteed to be under- or malnourished. Adding to this situation is a reptile’s ability to lower its metabolism and thereby lower its caloric requirement. Reptiles can live a long time without food or water before dying. In fact, a reptile’s liver or kidney may fail due to starvation while its heart and lungs remain strong, and then the intake of food will cause death (actually, speed an inevitable death). Because most reptile guardians are not aware of this possibility and often miss the signs of starvation, it is common for reptiles that are already destined to die to be relinquished to shelters. Unfortunately, like so many aspects of reptile health, there is no absolute way to determine whether an emaciated animal will be able to recover.

Hydration

Hydration is a critical element of a reptile's physical health. There are two aspects of maintaining hydration in reptiles that differ from maintaining hydration in other animals.

Assessing Dehydration. Without a fair amount of reptile experience, it can be difficult to determine the degree of reptile dehydration. Probably the most obvious indicator of hydration (and the easiest to interpret) is the dryness of the animal's stool. While some reptiles naturally have moister stool than others, no animal's stool should be so dry that it easily breaks apart or causes the animal to strain when defecating.

Another common sign of dehydration is when the animal's eyeballs are sunken in their sockets. This is often accompanied by the skin over and around the eyes being black, brown, or gray. In general, given the probable state of reptiles entering shelters, it is better to assume all animals are dehydrated and need explicit rehydration efforts.

Reptile Hydration. The way each reptile species naturally maintains hydration is usually closely related to where and how it naturally exists in the wild. For example, leopard geckos drink dew drops from plants and rocks while boa constrictors put their heads into a pool or stream of water to drink. If water is not available in the right form in captivity, an animal may refuse to drink even if it is dying of dehydration. It is, therefore, critical to understand both the quantity and form of water needed for each particular species.

Internal Parasites

Virtually all reptiles carry some level of internal parasites. This is normal and, in

the wild, their natural level of internal "good bacteria" will balance the "bad bacteria"/parasites in order to maintain an overall level of good health.

Unfortunately, in captivity this natural balancing system is disturbed due to unhealthy breeding and habitat environments, other contributors to poor health, or untreated build-up of parasite loads. Therefore, while in a normal healthy environment it is acceptable to leave a reptile's internal parasites untreated, the general recommendation of reptile veterinarians is to treat all captive reptiles to completely eliminate internal parasites.

With the many types of reptile-specific parasites, some being more serious than others, it is critical to have a fecal analysis and treatment plan performed by an experienced reptile veterinarian.

Infection and Injury

It is very common for a reptile to retain an internal infection long after any external sign or cause can be seen. An internal infection can seriously compromise the animal's overall health and might become life threatening. For example, a reptile may suffer an injury such as a puncture wound. The external wound may appear to be healed but actually leave an internal infection that could result in any of the following:

- Organ failure due to the infection spreading to the internal organs
- Emaciation due to the growth of internal parasites enabled by an overall weakened immune system
- Structural deformity or functional disability due to the infection becoming established in another, more vulnerable, part of the body, such as an ankle or wrist

Because of the possibility and seriousness of complications due to internal infections, a reptile veterinarian should immediately evaluate any suspicion of internal infection.

Reptiles have an amazing ability to recover from injury with very little help, so reptile injuries such as broken bones or wounds are often treated with fairly straightforward supportive care, wound management, and a safe, healthy, low-stress recovery environment.

Sometimes the greatest risk resulting from injury is the risk of infection, so it is common to give reptiles with injuries antibiotics as a proactive preventive measure. In any event, a reptile veterinarian should assess all injuries as soon as possible.

Metabolic Bone Disease

Metabolic Bone Disease (MBD) is typified by the softening or swelling of the bones. Diagnostic signs of MBD include pliability in the lower jawbones, kinking of the tail or spine, hard swelling of the thighs or upper arms, and lack of rigidity in the leg bones. Extreme cases of MBD may exhibit as limb or body tremors, especially when the animal tries to move.

MBD is probably the most common and pervasive reptile-related disease. It cannot be reversed and may involve significant expense to treat. Consider it, therefore, a likely possibility for reptiles entering a shelter.

Insufficient or improper metabolizing of calcium causes MBD. Because the metabolizing of calcium can be a complicated process for reptiles, involving proper nutritional balances, quantity and quality of UVB light, and levels of heat,

simply supplementing the diet with calcium may not be sufficient to correct the problem and restore the animal to health. In addition, external signs of MBD may be due to a prior, inactive condition or a current active condition. The only way to determine any current or correctable problems due to MBD is to perform a reptile blood panel and, ideally, take x-rays to evaluate the animal's structural condition.

General Reptile Behavior

Lizards

Head Bobbing

Head bobbing is a major means of communication among lizards (and sometimes with humans!). When examined in detail, head bobbing behavior can be very complex and subtle. It is usually associated with dominant behavior and can be an early warning sign of aggression. In the shelter environment, interpret head bobbing as the animal's desire to be left alone. If it is not possible to leave the animal alone (e.g., the habitat needs to be cleaned), proceed with caution and don protective clothing (e.g., gloves) in case the animal attempts to bite.

Breath Holding

Like many of the other defensive behaviors, many lizards hold their breath to try to intimidate their enemy by making themselves look as big as possible. Some lizards can hold their breath for a very long time — in the case of green iguanas for up to two hours! While this is not a health concern for the lizard, it catches caregivers caught off guard to handle an animal that is holding its breath. When the animal quickly releases its breath and deflates its body, it can escape from the caregiver's hold.

Lateral Body Flattening, Raising Up on Legs, Tail Extension or Wagging, Exhaling Breath, Hissing, Lunging, Circling

Different species of lizards may exhibit one or more of these behaviors as a sign of dominance and/or preparation for combat. It is uncommon for lizards to exhibit these behaviors toward humans or when stressed, so it is unlikely they will occur or will represent a significant threat to

humans in a shelter environment. As with head bobbing, the best course of action is to leave the animal alone. If that is not possible, proceed with caution and don protective clothing in case the animal attempts to bite.

Mouth Opening

If the animal opens its mouth widely and then shuts it abruptly, it is most likely a yawn and is a normal lizard behavior. Other mouth opening may be part of a defensive or aggressive display. It may also be an attempt by the lizard to lower its body heat, or may be an indication of respiratory distress. Because the latter two interpretations are of significant importance to the animal's health, assume that an open mouth is indicating either overheating or respiratory distress.

In the case of overheating, the probable cause is that the animal's environment does not have a sufficient temperature gradient to allow it to thermoregulate. To correct this, move the animal to a larger habitat, lower the wattage of the heat light, add a hide box or provide shade so the animal can get out of the heat, or use a separate timer for the heat light and UVB light to shorten the heat light on/off cycle.

In the case of respiratory distress, the worst-case scenario is that the animal has pneumonia, possibly fairly advanced. Pneumonia is a very serious illness for reptiles and must be treated aggressively and immediately by a reptile veterinarian.

Sneezing

Some lizards, such as green iguanas, sneeze out excess salt from their systems. If the discharge of a lizard's sneeze is white crystal-like material, it is most likely salt, and the result of normal behavior. If the discharge of a sneeze contains mucous

or is discolored, or if moisture continues to drain from the nasal passages, it may be a sign of pneumonia, and the animal should be examined by a reptile veterinarian immediately.

Snout Rubbing, Pacing, Agitated Behavior

A lizard that has not adapted to its captive environment will display behaviors such as rubbing its nose against the side of its housing, pacing or running around its habitat, or other types of agitated behavior. Such behaviors should be taken seriously as signs of extreme stress. Snout rubbing, for example, can potentially cause permanent physical damage, disfigurement, or infection. The only way to remedy all such behaviors is to correct the environment until the animal stops the behavior.

Environmental remedies may include moving the animal to a larger habitat, providing more or more appropriate furnishings (e.g., hide boxes, basking branches, rocks), or providing more privacy and less sensory stimuli (e.g., a quieter place in the shelter, a solid visual barrier). Another common but often overlooked cause of snout rubbing and other signs of stress is the presence of mirrors or glass in the animal's habitat. Because reptiles never encounter these materials in the wild, they do not understand them and may try to get to the place beyond the glass or in the mirror. They may try so hard and for so long that they cause themselves permanent physical damage. Again, the only remedy is to remove or cover the offending item.

Tail Whipping

Some lizards, such as green iguanas and monitor lizards, use their tails as weapons to lash out at their enemies. This behavior

is common when they are cornered, frightened, or surprised. With surprisingly accurate aim, they can inflict severe damage or injury with their tails. A caregiver can handle this behavior by leaving the animal alone or by protecting himself by covering his face with his arm and controlling the tail when he must handle the animal.

Tongue Flicking and Tongue Licking

Tongue flicking and tongue licking are comparable to sniffing and tasting and allow lizards to collect and relay sensory data to the Jacobson's organs to evaluate their environment. Lizards also use these behaviors to reaffirm familiar objects, such as habitat furnishings and people. The speed of tongue flicking is often a good indicator of an animal's stress level — rapid flicking implies an unfamiliar environment and highly correlates to an animal's stress level.

Snakes

Drawing Back

When a snake draws itself away from a human, it is usually a sign of annoyance or fear. It is not usually a sign of aggression or a warning of a possible strike. If possible, the caregiver should leave the animal alone and provide more privacy within its habitat (e.g., hide boxes). If it is not possible to leave the animal alone, proceed slowly, gently, and with caution to minimize the animal's stress, fear, and annoyance.

Hissing

Hissing can be a warning sign of aggressive behavior. Interpret it as the snake's desire to be left alone. If it is not possible to leave the animal alone (e.g., the habitat needs to be cleaned), proceed

with caution and don protective clothing (e.g., gloves) in case the snake attempts to bite.

Mouth Opening

Unlike for lizards, mouth opening is not part of a normal defensive or aggressive display in snakes. It could possibly be an attempt by the snake to lower its body heat, but it is much more likely to be an indication of respiratory distress. Boa constrictors and pythons are particularly prone to pneumonia and are often kept in environments too cold for them, even by well-meaning guardians. In a shelter environment, assume that a snake exhibiting open mouth behavior needs to be examined by a reptile veterinarian.

If the snake opens its mouth widely, stretches one side of its mouth, or rubs its mouth on furnishings or its housing, it is most likely an attempt to realign its jaw (after dislocating to swallow prey) and is a normal behavior.

Sneezing

If the discharge from a snake's sneeze contains mucous or is discolored, or if moisture continues to drain from the snake's nasal passages, it may be a sign of pneumonia, and the animal should be examined by a reptile veterinarian immediately.

Tongue Flicking

Similarly with lizards, tongue flicking in snakes is comparable to sniffing and collecting and relaying sensory data to the Jacobson's organs to evaluate their environment. Snakes also use these behaviors to reaffirm familiar objects, such as habitat furnishings and people, and to navigate through their environment. Also similar to lizards, the speed of tongue flicking is often a good indicator of an

animal's stress level — rapid flicking implies an unfamiliar environment and highly correlates to an animal's stress level. In addition, rapid tongue flicking can indicate interest in a potential food item and should be considered a warning sign of a strike.

Turtles

Shell Banging, Pacing, Agitated Behavior

A turtle that is not comfortable in its captive environment may display behaviors such as banging its shell (actually its head) against its housing, pacing or running around its habitat, or displaying other types of agitated behavior. Take such behaviors seriously as signs of extreme stress. The only way to remedy such behaviors is to correct the environment until the animal ceases the behavior. Environmental remedies may include moving the animal to a larger habitat, providing more or more appropriate furnishings (e.g., hide boxes, rocks), or providing more privacy and less sensory stimuli (e.g., a quieter place in the shelter, a solid visual barrier).

Withdrawing Into Shell

As most people know, turtles will pull themselves deep into their shells when they are afraid or stressed. However, many people do not realize how quickly and how far a turtle can dart its head out to bite and how long and hard the bite can be. While it is unlikely a turtle bite will cause permanent damage, it can cause significant pain, and it is possible the human will damage the turtle's beak in an overzealous attempt to get the turtle to release its grip.

Handling

This section focuses exclusively on handling reptiles to control their movement (e.g., before or after transport, for examination or treatment) and to minimize the risk of injury to humans and reptiles. It does not discuss how to handle reptiles for socialization or enjoyment.

The most common problems that may occur when trying to handle reptiles are that the reptile bites the human, the human drops the reptile, or the human causes physical injury to the reptile. If a reptile is dropped, the greatest risk is that it will get away and then hide or get lost or injured. To minimize the risk of escape, the best practice is either to move the reptile housing into an “escape-proof” room before opening it or to “escape-proof” the room the lizard is in. An escape-proof space should be as empty as possible, with all holes, cracks, and crevices tightly and completely blocked (e.g., stuffed with towels, taped closed, covered with a board). No opening is too small or too inaccessible for a reptile to find and use to get away.

When preparing to handle any reptile, wear gloves to protect against injury while allowing good hand and finger coordination.

When removing a reptile from its housing, the first goal is to get control of the head. If the reptile is active and alert, the caregiver should cover its head (as much of its body as possible) with a towel, use one hand to gain control of its head, use the other hand to gain control of its body, and remove it from its housing. If the reptile is not active and alert (e.g., does not move as the caregiver reaches in), reach toward its jaw and gain control of its head. After gaining control of the head, use the

other hand to gain control of its body and remove it from its housing. In general, using a firm supportive grasp to control the entire body will be more successful and less stressful than using a tight hold or excessive pulling or squeezing.

Lizards

Be prepared to provide support for the lizard’s body as well as all of its limbs. Lack of this support may cause the animal extreme discomfort and stress, which will cause it to try desperately to get away and make it much more difficult to handle. It is not necessary to provide support for a lizard’s tail, but be aware of the tail at all times. Depending on the species, guard against injuring or being injured by the lizard’s tail.

In no circumstance restrain a lizard by its limbs or tail. Doing so may cause serious injury to the animal and failed restraint.



Another difficult aspect of holding lizards is that more pressure is not always a good thing. For example, day geckos are “designed” to lose their top two layers of skin if necessary to get away from predators, so if holding a day gecko too tightly, the caregiver may be left with a handful of skin. The gecko, on the other hand, will be long gone with an open

wound exposed to infection. Another example is that green iguanas are amazingly able to compress and spin their bodies. Even if the caregiver has a tight hold on a green iguana's body, the iguana can almost instantaneously exhale its breath, compress and spin its body, and push off and through the caregiver's hands. Also, while some lizards always move in a forward direction, some (like monitor lizards) are great at backing up and out of one's grasp.

Probably the best place to apply a firm hold to restrain a lizard is at its shoulders and/or hips. Those areas tend to be the strongest, and therefore can withstand more pressure without sustaining damage. Many lizards have sharp toenails. If possible, trim the nails prior to extensive handling. Protective clothing should be worn to prevent scratches to exposed skin.

To handle a small lizard, the animal should be grasped firmly but gently behind the head, near the angle of the jaws, and then quickly supported under the body with the other hand. While it is sometimes possible to hold a small lizard with one hand, it is generally not recommended because small lizards are amazingly good at slipping through a human's fingers, running away, and finding places to hide. In general, it is not worth the risk of escape and better to hold the animal with two hands.

While it is difficult to provide a single technique for handling medium or large lizards that works for all species, the following provides a good general guideline:

- Gain control of the animal's head by holding it with one hand firmly behind its jaw joints.

- Move the other hand under the animal's torso, starting at the mid/waist point of the animal and moving it forward until the hand is under the animal's chin, its body is positioned along and supported by the forearm, and its front and back legs are straddled over the hand/arm. If possible or necessary, the hands or body should be used to hold the lizard's arms or legs against its body. In extreme cases, veterinary tape can be used to secure the animal's arms and legs against its body, or even to tape its mouth closed.
- Hold the animal in a "football" position, with its head pointed away from his body and its tail held firmly between the caregiver's arm and body. This hold should allow the caregiver to move the animal safely and securely and enable others to examine it as needed. Never reach over the top of a lizard's head or body when the lizard is not restrained.

If a lizard gets away while out of its housing, the best way to recapture it is to cover its head (and body if possible) with a towel, then proceed with the instructions for handling provided.

When attempting to examine or treat a specific part of a lizard's body, one person should hold the lizard as described to control the head and support the body while a second person performs the treatment or examination. If additional control or restraint is necessary during an exam/treatment, a towel can be wrapped around the part of the body not being treated, making sure at all times to maintain firm control of the animal's head.

When returning a lizard to its housing, the animal's entire body should be placed in the housing with its head pointed away from the caregiver and the door. Then the head and body should be quickly released at the same time, then the caregiver should remove his hand and close the housing door.

Snakes

Be prepared to provide support for all of the snake's body weight. Lack of this support will cause the animal extreme stress, which will make it writhe and much more difficult to handle.

To handle a small snake, the snake should be grasped firmly but gently behind the head, near the angle of the jaws, and the body should be supported with the other hand, arm, or body.

At least two people are needed to handle a medium or large snake, and up to five people may be needed for a large snake. Even if the snake seems tame or weak, it should be handled as if it were strong and healthy. One person should be designated exclusively to control the head of the snake (as with a small snake, this would mean grasping the snake firmly but gently behind the jaw joints). Another person (or multiple people) should support the snake's body weight.

When removing a snake from its housing, reach toward the snake's throat and forward to the jaw to gain control of the head. After gaining control of the head, gently lift the snake out, providing additional support for its body weight as needed. In general, the less pulling and squeezing, the less the snake will fight to get away. Whenever possible, the snake's natural body movements should be supported rather than prevented.

When attempting to examine or treat a specific part of a snake's body, one person (not the person holding the snake's head) should hold the snake's body just above and just below the area to be examined/treated. Firm pressure should be applied (although not squeezing or risking injury to the animal) and, if the snake pulls or pushes away, an equal but opposite pressure should be applied. This is a good way to try to "neutralize" the snake's movements.

When returning a snake to its housing, the caregiver should maintain control of the head until the rest of the body is released. Keeping control of the head, the caregiver should move the head into a position ready to be released, lay a towel or pillowcase over the head and his or her hand, and then quickly remove the hand and close the housing door.

Turtles

To minimize the risk of shell damage, the best practice is to ensure the turtle is handled over a well-padded surface. In addition, the caregiver should be prepared to use two hands to hold the turtle securely. Turtles are amazingly good at pushing to get away.

Turtles should always be held horizontal, level, and right side up unless another position is necessary for examination or treatment. While turtles can survive in other positions (e.g., upside down) it causes them extreme stress and can result in physical injury, illness, or even death. In no event should a caregiver reach across or over a turtle's head when the turtle is not restrained. Turtles can stick their heads out very quickly to bite.

When moving a turtle in or out of its housing, grasp both sides of its shell at the

same time and gently lift the turtle. Keep fingers and arms out of reach of the turtle's beak. **Never pick up a turtle by its tail, arms, or legs.**

When attempting to examine or treat a turtle, the animal should be gently moved into the position that allows for the best view of the area to be examined or treated, retaining firm control of the shell with two hands at all times. The turtle can be expected to pull its head and arms in, and may try to bite or even defecate on the caregiver.

To examine a turtle's arm or leg, grasp the appropriate limb's hand or foot, and then firmly but gently pull the limb out and hold it. As an extra safety precaution, use a lightweight cloth to cover the turtle's head and prevent it from biting during examination. To examine a turtle's head, the generally recommended technique is to apply inward pressure to its tail. Once the head starts to come out, quickly grasp the turtle's neck just past the jaw joints to hold the head out.

Risks to Humans

Salmonella

The most recognized reptilian zoonosis is salmonella. Although reptiles usually do not show signs of disease from salmonella, roughly 90 percent of reptiles harbor the condition. Because of the way salmonella is shed from carrier animals, it is not possible to determine with complete certainty that an animal is not a carrier (i.e., it is always possible to get a false negative test result). Also, treatment aimed at eliminating salmonella from reptiles often fails and may lead to the development of treatment-resistant strains of the disease. As a result, most reptile veterinarians do not test for or treat it.

The best practice in the shelter environment is to assume all reptiles carry salmonella and practice operating procedures to avoid the disease at all times. Appendix C contains a salmonella handout developed by the Association of Reptiles and Amphibian Veterinarians in collaboration with the Centers for Disease Control and Prevention.

The following provides information to prevent the spread of salmonella to humans.

What To Do

- Wear gloves and face protection (e.g., goggles, masks) while cleaning reptile enclosures or changing water containers.
- Wash hands, including fingernails, with hot water and antibacterial soap after handling any reptile, enclosure, or furnishings.
- Frequently disinfect reptile enclosures and furnishings.
- Disinfect shelter common areas or equipment after direct contact with

a reptile or reptile caging, accessories, or water.

- House reptiles away from any food preparation or medical treatment areas.

What Not To Do

- Do not allow children under five years of age, older adults, pregnant women, or immuno-suppressed individuals to come in contact with reptiles, caging, or accessories.
- Do not clean reptile enclosures or furnishings where food is prepared, medical procedures are conducted, or other animals are present. Also, do not discharge water from reptile enclosures in these same areas.

Wounds

How to Avoid Wounds

Reptiles, like most wild animals, are aggressive toward humans as a defensive behavior, rarely as an offensive behavior. Given that, the best way to avoid wounds is to minimize the animal's feelings of defensiveness. Some ways to do this include:

- Minimizing sensory disturbances (e.g., loud or sudden noises, a lot of movement) in the environment where the animal is being handled. If possible, the animal's habitat should be moved to a quiet setting before taking the animal out, the traffic in the area should be limited, or a visual screen (e.g., sheet) should be put up between the animal and the rest of the facility.
- Minimizing the sense of physical threat the animal perceives. The caregiver should move slowly, talk quietly, and handle firmly but gently.

- Observing the animal's body language (e.g., breathing rate, posture, dilation of eyes) to identify signs of stress or defensiveness before they get too far advanced.
- Ensuring staff handling reptiles is comfortable doing so. Again, like most wild animals, reptiles are very perceptive of a human's fear toward them and are more likely to be aggressive toward someone exhibiting signs of fear.
- Never underestimating the speed or strength at which a reptile can attack or the distance it can cover to reach its target. A large iguana can leap several feet from a dead standstill.
- Placing something between the animal's mouth, teeth, or tail and the human's flesh. This can be accomplished by wearing long pants, a long sleeved shirt or jacket, or gloves. It can also be accomplished by using a towel to hold or cover the animal. Covering the animal's head with a towel (or bag in the case of a snake) is effective but should only be done for brief periods of time because it will quickly and significantly increase the animal's stress level, which will in turn increase the animal's defensive reactions.

When approaching a large reptile, it is always a good idea to have a towel ready to use as a shield or cover. If an animal charges, lunges, or strikes, use the towel as a barrier and try to get the animal to bite the towel. The animal will try to disengage from the towel, allowing the caregiver time to safely contain and control the animal.

How to Treat Wounds

If a reptile bites a human, the first priority is to get the animal to release its hold. It is very important for the person to remain as calm and still as possible and to get the animal to release its hold voluntarily. Pulling away or trying to pry an animal loose will only cause the animal to clamp down even harder, make the injury to the human worse, and possibly also cause injury to the animal (e.g., lost teeth, broken jaw or neck).

If remaining calm and still does not lead the animal to release its hold, or if the injury to the human is too severe to be able to wait, hold a cloth soaked in alcohol or ammonia under the animal's nose. Be careful not to get any alcohol or ammonia in the animal's mouth.

Bites and scratches from reptiles can be treated similarly to those received from cats and dogs. If the wound is bleeding, apply pressure until the bleeding stops. If the wound is severe, seek treatment from a physician. If not severe, clean the wound with soap and water, then flush it with a general antiseptic cleaner such as Betadyne™ or hydrogen peroxide. Apply a triple antibiotic ointment such as Neosporin™, then bandage it. Frequently repeat this process until the wound closes.

Shelter Husbandry

Intake

The first decision a shelter must make after receiving a reptile is whether to try to find a new home for the animal or to euthanize it. In making this determination, consider two key factors:

1. **The physical and/or behavioral rehabilitation needs of the animal.** As discussed, assume all reptiles entering a shelter need some amount of rehabilitation. Based on the type and severity of the pre-existing problems of the animal, euthanasia may be the most humane alternative for the animal to relieve its suffering.
2. **The resources and expertise available.** While the traditional objective of shelters is to place as many animals into new homes as possible, the difficulties and special nature of reptiles as pets may lead to a decision to euthanize an animal, which seems counter to the shelter's philosophy. Given the time, effort, and specialized expertise required to rehabilitate reptiles as well as the difficulty and risks involved in trying to find well-suited adoptive homes, euthanasia may be the most humane alternative to avoid potential on-going neglect or suffering.

We encourage shelters unable to care for a reptile to contact local herpetological societies, reptile rescue groups, or reptile/amphibian veterinarians as an alternative to an immediate euthanasia decision. Appendix I contains a referral list.

This section addresses only the first point, the initial assessment of the physical and/or behavioral rehabilitation needs of the animal. Each shelter must address the second point for itself. See Appendix D for a sample reptile intake and physical assessment form.

Physical Assessment – Permanent/Chronic Conditions

Physical Deformities or Limitations

Physical deformities or limitations in reptiles cannot be corrected or “undone” by nature, nurture, or medical intervention. It is, therefore, important to assess if the physical deformity or limitation will severely impact the animal's ability to function, care for itself, or live safely in a captive environment. Also, will it just get worse with time?

Missing or Dysfunctional Body Parts

Many parts of a reptile's body, such as their fingers, toes, limbs, tails, eyes, ears, and dewlap, may be damaged in captivity due to injury, accident, improper housing, or poor nutrition. When this condition is inactive it may be uncomfortable for the reptile, but it is rarely, if ever, a significant health or quality of life issue in captivity. For example, when a green iguana does not have sufficient metabolized calcium in its system, the tendons that run down each finger and toe to each knuckle and nail may become detached from the knuckle or nail. This results in the iguana losing the ability to use that finger or toe to hold onto things. Because iguanas are arboreal animals, they depend heavily on using all of their fingers and toes to safely and comfortably move around their environment. When they lose the use of their fingers or toes due to insufficient metabolized calcium, they may be less comfortable and more at risk of falling

from otherwise safe perches, but this can be easily compensated for in a well-designed captive environment.

Deformed or Twisted Body Structure

It is common for various parts of a reptile's body, such as its spine, tail, mouth, or shell, to become deformed in captivity. This is most often due to nutritional deficiencies (e.g., turtle shell deformities) but could also be due to injury (e.g., snake with a broken back) or poor husbandry (e.g., lizard with deformed fingers).

Depending on the severity of the deformity, this may represent a significant limitation for the animal that would be difficult or impossible to compensate for by a typical reptile guardian. For example, a common symptom of metabolic bone disease in green iguanas is swollen and/or soft jawbones. In extreme cases, this may inhibit the animal's ability to eat on its own. While the animal may be handfed successfully, expecting a typical reptile guardian to do this on a long-term reliable basis is probably not reasonable.

It is also not uncommon for such structural problems to get worse as the animal gets larger and older, thereby requiring extraordinary care or medical expenses, or leading to unavoidable suffering for the animal. For example, lizards and snakes with twisted or broken backbones (possibly due to metabolic bone disease or injury) may become less able to move, eat, or defecate on their own as they grow and the spinal injury continues to affect their muscle and nerve control. While guardians and veterinarians may be able to treat these conditions with extensive effort and expense, the long-term suffering of the animal may be unavoidable.

Illness

It is possible for reptiles to be suffering from chronic, often terminal illness, such as pneumonia, liver or kidney disease, cancer, or inclusion body disease in snakes. Unfortunately, there are very few external symptoms of these illnesses, so it is virtually impossible to diagnose without getting the assistance of a reptile veterinarian and incurring the expense of additional diagnostics (e.g., blood work, x-rays). While it would be nice to know if an animal was suffering from such an illness before adopting it out, this may be impractical for a shelter. This is just one of many reasons we highly recommended that reptile adopters take their animal to a reptile veterinarian as soon as possible for a basic health check and baseline tests.

Physical Assessment – Temporary/Acute Conditions

Active Injuries

Reptiles are susceptible to the same sorts of injuries as mammals, often with similar methods of treatment. Some of the most common injuries in reptiles a shelter is likely to see include broken bones, wounds, abscesses, and burns. Except in the most extreme cases (e.g., wounds affecting organs, third-degree burns), most injuries can be successfully treated and need not be cause for euthanasia.

That said, reptiles may take longer on average than mammals to heal from injuries due to their slower metabolism, stress, and longer antibiotic protocol periods. This healing time and process can occur in a new adoptive home or may need to take place at the shelter or veterinary hospital, and this requirement should be factored into the decision of whether to adopt out or euthanize an injured reptile.

Illness/General Health Condition

Active acute illnesses and poor general health are probably the most difficult yet most important conditions to assess in animals received at shelters because they are the most common and because they will benefit the most from fast and effective treatment by shelter staff. The following describes some of the most common illnesses and general health problems seen in captive reptiles.

Malnutrition/Dehydration. Shelters should assume all reptiles they receive are suffering to some degree from malnutrition and dehydration. However, it is not uncommon to receive reptiles in such a state that it is too late to help them.

The most obvious signs of this condition are extremely pronounced dorsal (back) pelvis and tailbones, or no observable muscle in the legs or arms. Another common symptom of an animal that has reached a point when it cannot be helped is the animal consuming food or water but being unable to defecate (this usually indicates the animal's liver or kidney has already shut down). Poor skin elasticity, sunken eyes, extreme lethargy, poor or mottled skin color, bloating, and lack of muscular strength often accompany this extreme degree of malnutrition and/or dehydration.

With extreme cases of malnutrition and dehydration, the road to recovery, if possible at all, is long and hard for both the animal and caregiver, and euthanasia is often the most humane alternative.

Respiratory Disease. Respiratory disease is very common in captive reptiles and, unfortunately, is often fatal. It is both difficult to diagnose because wild animals are very good at hiding the symptoms and

difficult to treat because it is challenging to get medication to the source of the infection (e.g., the lungs).

Symptoms, once observable, usually start with difficulty breathing (rapid, shallow breathing or open-mouthed breathing), which is often accompanied by lethargy and a pale inner mouth. Another early symptom is runny nasal discharge, especially if it is mucoid or yellowish in color. (Note: this should not be confused with normal sneezing/salt discharge in green iguanas.) Some animals, such as boas and pythons, may actually cough, sneeze, and discharge phlegm in extreme cases.

Any reptile suspected of having respiratory disease must be seen by a reptile veterinarian immediately. Intervention must be swift and extreme if there is hope for recovery.

Metabolic Bone Disease (MBD). MBD may be an inactive, chronic condition, as discussed. However, it may also be an active, acute condition that requires immediate treatment. Common observable symptoms of active MBD include soft, pliable bones (e.g., soft jaws) or swollen limbs or joints (e.g., swollen thigh bone or knuckles). Lightly palpating the animal's skeleton can often identify potential areas of active MBD. Depending on the extent of the MBD, treatment could be as simple and noninvasive as nutritional supplements, or may require a more complex combination of nutritional remedies as well as medications.

Extremely active MBD is often exhibited through tremors of the animal's limbs or entire body. In such cases, immediate veterinary intervention is required, or

euthanasia should be chosen in the best interest of the animal.

Vitamin/Mineral Deficiencies. While vitamin and mineral deficiencies are common and serious for captive reptiles (e.g., Vitamin A deficiency in turtles), they rarely are life threatening or require veterinary intervention. Unless there is a specific cause of concern, the best practice is to immediately put all reptiles on a natural, healthy diet with appropriate vitamin and mineral supplements and to educate potential adopters so they do the same. Getting and keeping reptiles on a healthy, well-balanced diet is usually all that is needed to correct any past problems.

Skin/Shell Disease. Skin and shell disease is a common and often serious problem, especially for captive reptiles. Turtles and tortoises are particularly susceptible to shell rot, and snakes are susceptible to blister disease, both of which are caused by harmful bacteria from their environment (usually dirty water or substrate) getting under the outer layers of their shell or skin and then growing and destroying the inner layers of their shell or skin.

If left untreated, this infection may continue to invade and destroy the body and can even be fatal in the most extreme cases. However, it is usually relatively easy to treat with antibiotics and a corrected environment, and most species can repair the damage to their shell or skin once the infection is eliminated. While skin and shell diseases may require a reptile veterinarian to diagnose and treat, they do not usually require the animal be euthanized.

Behavioral Assessment

Because all reptiles entering a shelter environment will be extremely stressed and possibly ill, it will be virtually impossible to assess the true temperament of the animal at the time of intake. Also, depending on the expertise and empathy of the new caregiver(s), it is possible to modify virtually all reptile behavior problems so the animal can live safely with humans. Therefore, behavior problems identified at the time of animal intake should rarely be a reason to euthanize an animal.

That said, consider euthanasia in these situations:

Aggression

If the animal actively lunges at and attempts to bite humans, even when unprovoked or is not hungry, euthanasia may be necessary. In general, it is unnatural for a wild animal to attack a human if unprovoked and well fed. Therefore, if an attack response has been conditioned into the animal by previous human interactions, the animal becomes even less predictable and more dangerous than in its natural state. This is an important consideration to factor into the initial intake evaluation.

For example, if a green iguana (an herbivore that does not hunt prey) actively lunges at and tries to bite humans, there is a good chance the animal has been mistreated or for some other reason has developed a deep distrust and fear of humans. This is a very difficult behavioral attitude to rehabilitate.

Similarly, if a boa constrictor or python strikes any time someone walks by its enclosure without even taking the time to “sense” whether the movement represents

prey, it is likely the animal has not been well socialized or well fed and correlates all movement with food. This can be very dangerous as the animal gets bigger and can represent a serious risk of injury or even death to humans or other animals in the household.

Stress/Nervousness

If the animal is so severely stressed that it inflicts severe physical harm to itself, euthanasia may be appropriate. Again, this is a situation that can be overcome with significant time and effort from an experienced caregiver, but is probably beyond the ability of the average reptile adopter.

A common example of this is an animal (e.g., green iguana, Chinese water dragon, boa constrictor) that becomes so severely stressed at being in an enclosure that it causes repeated physical injury to itself by trying to get out of its housing (e.g., rubs its snout on the glass or screen constantly creating an open, infected wound on itself and causing permanent structural damage).

Quarantine

Quarantined animals should be housed in a separate area or preferably in a separate location from other reptiles in the shelter. If multiple reptiles are being quarantined at the same time and different locations are not possible, the minimum quarantine environment should consist of separate housing for each animal with physical barriers between enclosures.

Ideally, each reptile should be quarantined for one to two months before being housed with other reptiles. Quarantine enclosures should be as simple as possible — while meeting all the basic environmental needs of the species being quarantined (e.g., size, temperature, furnishings) — to facilitate

thorough and frequent cleaning. The substrate for quarantine housing should be newspaper, paper towels, or butcher block paper.

Any materials or equipment used to transport the animal to the shelter should be discarded or sanitized. Shelter staff should always wear gloves when cleaning quarantine housing, and gloves should be discarded after each individual habitat is cleaned.

Complete a fecal analysis (both a smear and a float) immediately upon arrival of a new reptile. This is critical to assess the animal's health as well as to determine the risk of spreading disease to other reptiles. If multiple reptiles are being housed in close proximity, and one animal shows signs of illness, that animal should be quarantined immediately.

Euthanasia

It has been well documented in medical journals that reptiles feel pain. It is also true that, because of their unique biology and metabolism, reptiles require different euthanasia techniques from those used on mammals. Therefore, this section provides information shelter staff can use to ensure reptile euthanasia is performed with the same degree of compassion as is practiced for mammals.

Euthanasia techniques should result in rapid loss of consciousness followed by cardiac or respiratory arrest and the ultimate loss of brain function. Sodium pentobarbital best fits these criteria and, when used properly, is the best possible method of euthanasia currently available.

Sodium pentobarbital can be administered intracardiac (IC) on an anesthetized animal, intravenous (IV), or

intraabdominal, specifically intracoelomic (ICe). The best administration method varies depending on the particular anatomical features of the species (e.g., ease of accessing a vein). For reptiles, the American Humane Association recommends IC administration on anesthetized animals as the first option. For IC or IV administration, 170 mg/kg (or 78 mg/pound) of body weight should be used. A secondary choice is an ICe administration, with no pre-anesthesia, of 515 mg/kg (3x dose). Pre-euthanasia anesthesia should be administered by an intramuscular (IM) injection of Telazol (4.5 mg/kg) or PreMix (1 ml/10 pounds). An experienced reptile veterinarian or certified euthanasia technician is recommended to perform this procedure. Time to effect may vary. **Barbiturates other than sodium pentobarbital can cause pain on injection and are therefore not recommended.**

For additional information on euthanasia, see the American Humane Association's Euthanasia Operational Guide.

Two other methods of euthanasia (inhalants and carbon dioxide) are considered to be acceptable, but are more difficult to administer and regulate. Many reptiles are capable of holding their breath for very long periods of time. Because of this ability to tolerate anoxia (oxygen deprivation), induction of anesthesia and time to loss of consciousness may be greatly prolonged when inhalants or carbon dioxide are used. These techniques are more effective in species less capable of holding their breath.

Although these last two methods of euthanasia are considered acceptable, they are not preferred, and whenever possible, a veterinarian with appropriate training and expertise for the species involved should be consulted to ensure proper procedures for the species are used.

General Care and Husbandry

The details of how to care for each unique species of reptile can be very different and require careful study. The most efficient and effective way to care for reptiles well in captivity, without having to become a reptile expert, is to understand the general elements of captive reptile care, and the categories within each element, and then be able to map each of these categories as appropriate to an individual species.

For example, having a basic knowledge of husbandry categories and knowing that a green iguana is a diurnal, arboreal herbivore from a rainforest climate allows the caregiver to meet the iguana's basic husbandry needs in captivity. Similarly, knowing that a boa constrictor is a nocturnal, terrestrial, rainforest carnivore enables the caregiver to meet the basic husbandry needs for a boa constrictor in captivity.

The following sections describe the major categories within each element of reptile husbandry, and Appendix E provides more specific information for many common species found in the pet trade and possibly in shelters.

Active Period

Diurnal

The term diurnal is used to describe species that are active during the day (e.g., green iguanas, bearded dragons). While each species' specific period of activity may vary based on native region, time of year, or hunting/feeding cycle in general, it is reasonable in captivity to assume all diurnal animals should have a 12-hour period of light each day. More than 12 hours of light will disrupt the animal's sleep/rest requirements and could result in stress and/or health problems. Less than 12

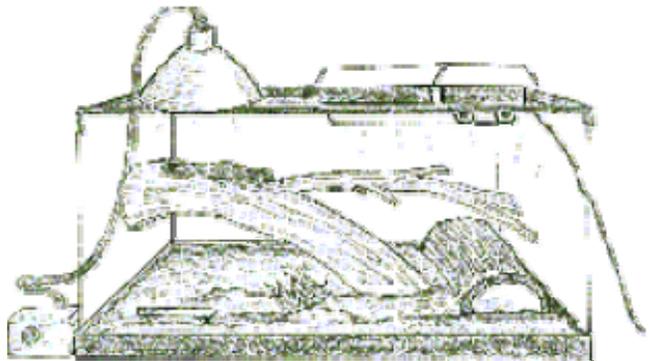
hours of light could depress the animal's metabolism rate and thereby decrease its drive to eat and/or digest food.

All diurnal animals require UVB light in order to metabolize their food. This is one of the most critical husbandry elements for reptiles in captivity and cannot be overemphasized. See the section "General Reptile Biology, External Factors" for additional information.

Nocturnal

The term nocturnal is used to describe species that are active at night (e.g., boa constrictor, python snakes, leopard geckos). Because daytime is a time of rest for nocturnal species, it is important that they are housed in a place with relatively low activity and that they are disturbed as little as possible during the day. It is also crucial that the housing for a nocturnal animal contain at least one (preferably more) hiding place where the animal can get completely out of sight and light. Nocturnal species do not require any UVB light.

Habitat



Terrestrial

The term terrestrial is used to describe species that live primarily on land (e.g., bearded dragons, tortoises). The term is also used to describe species that live

primarily on rocks and in crevices. Because these species spend the majority of their time living on land, their physical characteristics are highly adapted to living in a particular physical environment. While their physique may be well suited to climbing and clinging to rocks, they are usually not well suited to climbing or balancing on branches. Also, terrestrial species can be very strong and aggressive diggers. This is important when making sure they cannot escape from their housing. It is also important when making sure the furnishings inside their housing are safe. For example, rocks for a terrestrial animal should not be stacked on top of one another or on top of loose substrate (e.g., dirt) because the animal might dig under it and cause the rock to fall on the animal and injure it. Most terrestrial species prefer to bask under a basking light while lying on a rock or wide branch or piece of wood. To cool off, most terrestrial species like to hide in a shady place (e.g., hide box, cave) or burrow into the substrate.

It is also possible for a species to live primarily under or burrowing into the ground and to come up only occasionally for food or to bask (e.g., corn snakes, skinks). Such species are often referred to as fossorial.

Arboreal

The term arboreal is used to describe species that live primarily in trees (e.g., green iguanas, day geckos) and can also be used to describe species that live primarily in shrubs, bushes, or lower parts of trees (e.g., water dragons, anoles). As with terrestrial species, the physical characteristics of arboreal species are highly adapted to their environment and therefore not well adapted to nonarboreal environments. For example, the limbs,

fingers and toes, body shape, and tail of a green iguana are specially adapted for holding onto, moving between, and balancing on tree limbs. When a green iguana is forced to live on the ground it will become highly stressed, may have trouble moving, and/or be susceptible to injury.

Arboreal species are specially adapted to process heat from above their bodies not below (e.g., from the sun while they bask on the limb of a tree). This is why it is very common for green iguanas, monitor lizards, and arboreal snakes to get burns (often life threatening) on the underside of their bodies when provided with heat from a hot rock or heating pad rather than an overhead basking light.

The housing for an arboreal animal should include at least one, if not more, branches for basking. The branch should be at least as wide as the animal's body and should have enough texture so the animal can easily hold on to it. In addition, position the highest end of one branch under the basking light, which should allow for the animal to safely lie on it without getting burned by the light.

It is also possible for a species to be semi-arboreal, which means it prefers to spend some time in trees and some time on the ground, usually moving between the two throughout each day (e.g., water monitors).

Aquatic

The term aquatic is used to describe species that live primarily in water (e.g., red eared sliders). In a shelter environment, the most common types of aquatic species are aquatic turtles. In addition to their physical characteristics being adapted to living in water

(e.g., webbed feet), their metabolisms are also highly specialized to living in water, and they often will not eat out of water. While they can survive out of water for a limited time, the standard housing for an aquatic species must be a water environment.

In general, aquatic reptiles are not as sensitive to water temperature and heat as fish. They can usually live acceptably in cool to room temperature water that is kept reasonably clean (e.g., water looks clear to the naked eye) of harmful bacteria (e.g., fecal matter).

Even though they spend the majority of their time in the water, aquatic reptiles must be able to get completely out of the water for some amount of time each day to dry out and warm up. This means an aquatic reptile water tank must include a rock pile or basking platform and a basking light over this dry area.

It is also possible for a species to be semi-aquatic, which means it prefers to spend some time in the water and some time on the land, usually moving between the two throughout each day. Such species should have greater access to solid surfaces than would normally be provided for an aquatic species.

Climate

Hot and Dry

Species that live in hot and dry climates are generally the most straightforward to care for in captivity. A good rule for a hot and dry habitat is to keep the temperature range from 85 to 100 degrees Fahrenheit with one or more hiding areas where the animal can cool off. A shallow bowl of fresh water should always be available but may never be used (or seen to be used) by the animal.

There are many types of microclimates that better describe native environments for particular species. For example, the desert type of hot and dry climate means the terrain is probably populated with sand, rocks, and minimal vegetation, while the savannah type of hot and dry climate will have fewer rocks and more grass in which the animal will live.

While the details of the microclimate are important for the long-term care of reptiles in captivity, they generally are not critical to the health and well-being of an animal being cared for short-term in a shelter.

Hot and Wet

Species that live in hot and wet climates are generally the most difficult to care for in captivity. The amount of moisture these animals need and the way moisture is delivered and used is highly specialized and often difficult to replicate well in captivity. A good rule for a hot and wet habitat is to keep the temperature range from 80 to 95 degrees Fahrenheit with at least one hiding area, where the animal can cool off.

For moisture, the humidity should range between 60 and 80 percent and a pan of fresh clean water large enough for the animal to fit its entire body should be maintained. Many species will defecate in their water. While in some ways this makes habitat cleaning easier, it also means staff need to be vigilant about replacing water whenever it is dirty. To maintain high humidity, the entire enclosure should be misted multiple times throughout the day. Also, placing the basking light over the water pan and/or a damp towel can help create and maintain humidity in the environment.

The most common microclimates in the hot and wet climate category are rainforest (also known as tropical) and woodland. The heat and humidity requirements for woodland habitats are somewhat lower than for rainforest habitats, but otherwise are essentially similar.

Nutritional Needs

Herbivore

Herbivores eat only plants or plant material. Strict herbivores are often some of the most difficult species to care for in captivity because they require a variety of food items to provide a balanced diet, vegetation from their native region are not available locally, and their dietary needs are not well known or understood. In addition, some herbivores, such as green iguanas, have highly specialized digestive systems that cannot handle animal protein, thus feeding them animal protein can result in severe health problems and early death.

A specialized type of herbivore is a folivore, or leaf eater. While an herbivore might eat leaves, grasses, fruit, vegetables, and flowers, a folivore will eat only (or primarily) leaves.

Because of the complex nutritional needs and digestive systems of herbivores, it is difficult to describe a generic herbivore diet that works for all species.

Commercially prepared diets, if available, are often nutritionally incomplete or inadequate and cannot be used as the primary source of food for reptiles in captivity. It is important to research the specific food items appropriate for each herbivorous species, and to provide fresh food in the appropriate quantity and variety.

Carnivore

Carnivores are meat eaters. In the wild, this usually means the animal kills its own prey, although some scavenger-type species may eat the leftover prey of other animals. In captivity, carnivores that are used to live prey may not eat pre-killed prey without a transition or training process. This can be a particular problem in shelters when dealing with snakes or aquatic turtles with unknown histories (e.g., strays). In general, it is better to initially try to feed pre-killed prey, and only switch to live prey if the animal refuses to eat.

A specialized type of carnivore is an insectivore, or insect eater. While some carnivores may eat insects and some insectivores may eat other animals such as small mammals, the fat, protein, vitamin, and mineral needs of these species are very specialized to their preferred diet, so it is important to match their prey to their nutritional needs.

Omnivore

An omnivore eats both plant material and meat. Unfortunately this does not mean it is any easier to feed an omnivore than it is to feed any other species. Each omnivorous species thrives on a variety and mix of food items, so, as with herbivores and carnivores, research the specific dietary requirements for each species in the shelter.

A specialized type of omnivore is a fructivore, or fruit eater. Fructivores are usually insectivores that require a **higher fat content in their diet**, which is met in the wild by consuming fruit. Most geckos are fructivores.

Water Source



Mist

Misting is a primary source of water for most species of hot and wet climates. In the wild, green iguanas live in trees in the rainforests of Central and South America where there is usually a short, heavy rainfall each day. As a result, green iguanas do not seek water or put their heads down to drink from a pool of water. Instead they get their water from their food, or put their heads up and let the rain fall over their faces and into their mouths. In captivity, a green iguana can become seriously dehydrated no matter how much water is in bowls in their habitat. When misted, an iguana will often raise its head and lick the water from its face.

Chinese water dragons from the rainforests of Southeast Asia are actually very good drinkers and swimmers but often will not drink or swim unless stimulated by simulated rainfall.



Drip

Some species, such as geckos and chameleons, are highly specialized to get water from their food or from licking water from leaves, rocks, and their own bodies. These species may not like to have their bodies misted, but need their environment misted regularly to create pools of water from which they can then drink.

Some species (e.g., day geckos) that get their water from licking water drops are from hot and wet climates. However, others, such as leopard geckos and banded geckos, may be from hot and dry climates and get their water from morning dew.

Drink

Some species will voluntarily put their heads into a bowl of water and drink. These species are usually capable of finding the source of water on their own and often do not like to have their bodies misted, so simply having a bowl of fresh water available is sufficient. In all cases, water bowls should not be so high as to make it difficult for the animal to access the water or to risk falling in and not being able to get out. Species that will drink from water bowls include monitor lizards, snakes, and box turtles.

Natural Temperament

Private

Some species, like green iguanas and ball pythons, are private by nature. Other ways of describing these animals include shy, needing a lot of personal space, loners, and introverts. In general, these animals are less stressed (and therefore healthier) in habitats with many hiding places and visual screens to block both others seeing in and them seeing out. Housing for animals with private temperaments should be covered on at least three sides, preferably more, and should be in a quiet, low-traffic area of the shelter.

Curious

Some species of reptiles, like bearded dragons, are highly curious. Other ways of describing these animals are playful and active. In general, these animals enjoy more sensory stimulation than other reptiles, so having a habitat with a variety of levels, views, and furnishings is desirable.

It is usually acceptable to have the housing for curious species in a more active part of the shelter. However, this can be a difficult thing to judge and can have a major

influence on the animal's overall stress level and health. In general, it is better to keep all reptile housing in less active areas of the shelter.

Nervous ☹️

Nervous animals, such as day geckos and chameleons, are the most prone to health problems due to stress. Some species can actually have a heart attack and die simply due to the stress of being picked up. Unfortunately, most of these animals will not make it to a shelter.

On initial inspection, nervous animals may look similar to curious animals (e.g., alert, quick actions). However, a big difference is that nervous animals will usually freeze in place while being watched, and then dart to a hiding place as soon as they feel it is safe. Nervous animals will only eat and bask if they feel totally safe, so it is not uncommon for nervous animals to quickly become emaciated or dehydrated when they are in new or stressful environments. Like species with private temperaments, the habitat for nervous species should have many hiding spaces and visual screens, and be in a very quiet part of the shelter.

Aggressive ☹️

Some species, like monitor lizards, are aggressive by nature. Unfortunately, it is not uncommon to have aggressive species entering shelters because they have a higher likelihood of being relinquished by guardians or released into the wild by guardians and then brought to the shelter as strays. Obviously, species with aggressive temperaments should be treated with even more caution than other reptiles. In addition, sensory stimulation should be kept to a minimum for these animals.

Housing

This section will describe the general requirements for housing reptiles in captivity, as well as some of the specific operational requirements for housing reptiles in shelter environments.

Appendix F provides a list of basic shelter equipment and supplies required for reptile care, along with specific descriptions of the minimum setup requirements for various types of habitats and climates.

Appendix G provides a list of recommended products and manufacturers for reptile-related products.

Construction

Reptile enclosures in shelter environments should be safe, secure, and capable of maintaining the appropriate climate within the enclosure.

Safe

Risk of Illness/Toxicity. Potentially toxic materials for reptiles include cedar wood or wood stains, cleaning agents, metal, and paint. It is also possible for some reptile parasites to live off a host animal (e.g., in porous material formerly contaminated by a host animal) for many months. As a result, no unsealed wood or nongalvanized metal enclosures should be used to house reptiles.

Risk of Injury. Reptiles are amazingly good at getting nails, tails, and teeth caught in the most unlikely of places. Also, while they are very good at learning their way around new environments, they never learn about materials or situations that would not occur in their native environment. That means, for example, they never learn they can not walk or push their way through glass, that metal mesh material will injure their skin, that the red light bulb that provides warmth will also burn their skin, or that the animal reflected

back to them in the mirror in their enclosure will not attack them.

As a result, do not use metal mesh, mirrors, or any other reflecting material or sharp objects in reptile enclosures. Ideally, glass enclosures should also be avoided, but this is often impractical because glass aquariums are readily available and custom-made reptile enclosures are not. If a glass aquarium is used as a reptile enclosure, at least three sides of the glass should be covered with some sort of visual screen (e.g., newspaper, paper bags, sheets), much the same way a background on a fish tank would be applied, to give the animal privacy and discourage it from rubbing or digging at the glass. Attractive backgrounds such as treescapes and natural colors enhance the environment for the reptile and may also increase the animal's appeal to potential adopters.

Secure

Reptiles are infamously great escape artists and are significantly more clever and stronger than most people realize. It is unfortunately common for caregivers to underestimate a reptile's ability to get out of its enclosure and be very difficult, if not impossible, to find. All reptile enclosures must be entirely escape-proof and lockable. Simply placing rocks on top of a screen top of an aquarium is asking for disaster.

When escape-proofing a reptile enclosure, remember all reptiles, even turtles, are much more agile than imagined and are able to climb, reach, and balance in ways one might find hard to believe. Some lizards (e.g., monitor lizards), snakes, and turtles are also tremendously strong and persistent about pushing or pulling on the slightest point of weakness they may find in their enclosure (e.g., the door hinge). In

addition, snakes and lizards can flatten and contort their bodies to get through spaces like cracks between doors and walls.

The most secure enclosure is one where all joints are sealed and where all openings are locked and have strong secure hinges.

Climate Maintenance

It is a virtual certainty that all reptiles received by shelters will need to be housed in a climate that is different from the shelter itself, whether this is due to the need for increased heat, humidity, or both. The best way to maintain the climate within the reptile enclosure is to have as many sides as possible of the enclosure be solid (e.g., glass, fiberglass, melamine), and to have as little variation between the climate inside and outside the enclosure (e.g., drafts, air conditioning). For this reason, and for security reasons, using cat or dog kennels with open grate fronts is not a good option for housing reptiles.

Basic Electrical Equipment

Heating Equipment

Heat Source. The ideal primary source of heat for virtually all reptile species is an overhead red heat bulb placed over one end of the animal's housing. Having the heat source come from overhead most closely simulates the natural way reptiles receive heat and therefore is best suited to their metabolism needs and least likely to cause burns or other health problems. The red light enables the heat source to stay on all night without disturbing the animal's rest. Placing the light at one end of the enclosure creates a heat gradient allowing the animal to move to thermoregulate. Ceramic heat emitters are also a good choice. Like a red heat light, these heaters provide no light so they can be left on at night. These heaters screw into a standard

light socket and, while initially more expensive than a red heat light, will last longer.

When placing a heat light or ceramic heat emitter over one end of the reptile's housing, it is important to check the temperature carefully to make sure the bulb is not too high (i.e., not enough heat reaches housing) or too low (i.e., inside housing is too hot, and animal can not cool off).

If the heat gradient is sufficient both day and night, there is no need to use a timer with the heat source. It will be more efficient and less prone to error to leave the heat source on all the time. However, if the internal temperature of the animal's housing does not get sufficiently low enough for it to cool off at night, the heat source may need to be set to turn off on a timer.

Thermostats. Place two thermostats in each reptile housing unit, one at each end, to monitor the heat gradient.

Light Equipment

UVB Light. UVB light can be provided only by using a special reptile UVB fluorescent light bulb. The fluorescent light fixture can be an aquarium or shop light-type fixture, should run the full length of the housing, should be within 12 to 18 inches of the animal, and must not have any glass or plastic covering the bulb.

Timer. The UVB light fixture should be connected to a timer and set for 12 hours on and 12 hours off, seven days a week.

Humidity Source

For species with high humidity needs (e.g., green iguanas), an electrically powered

source of humidity is highly recommended to increase the likelihood that the animal's humidity needs are met. Probably the easiest way to set up a humidity source is to submerge a simple aquarium pump into a deep pan of water (e.g., cat litter pan) inside the animal's housing. It should be easy to remove and clean, because it is very common for reptiles to defecate in their water pans. It should also be set up to ensure that the animal cannot get caught in or injured by the electrical equipment.

Substrate

The most important characteristic of the substrate is that it is easy to replace or disinfect. While how the substrate looks and feels to humans and the animal are important considerations in a long-term captive environment, they need not be a consideration in the shelter environment.

For their sanitary qualities, ease of use, and low cost, the recommended choices for substrates in a shelter environment include newspaper, butcher-block paper, paper towels, or paper bags.

Avoid these substrate materials:

- Rocks, gravel, litter, pebbles, corncob, wood chips, and wood shavings. All can potentially be ingested by the animal and cause digestive obstruction.
- Astroturf, artificial grass, indoor/outdoor carpet, and reptile carpet/flooring. All are very difficult to sanitize.
- Dirt, sand, potting soil, peat moss, and sphagnum moss. All are very hard to keep sanitary, are highly prone to breeding bacteria or parasites, may cause external skin disease, and may cause internal impaction if ingested.

Furnishings

As with substrate, the aesthetics of a reptile's habitat furnishings are important in their long-term environment but not in the shelter environment. Habitat furnishings in a shelter environment should most importantly provide natural and low stress ways for the animal to thermoregulate, eat, drink, and rest. The section on General Care and Husbandry describes the general categories of reptile habitats. The following can be used to determine how to achieve these natural, low-stress habitats in a shelter environment for those general categories.

Thermoregulate

Arboreal animals need branches or shelves that allow them to climb to their desired basking spot. The branches or shelves should be approximately as wide as the animal's torso and, in general, should be more horizontally sloped than vertically sloped (i.e., the animal should not have to exert a lot of effort to hold on to the branch or shelf while basking).

Arboreal animals also need a way to cool down and get away from the heat source. This is best accomplished by providing a variety of alternatives, such as:

- One or more hide boxes for privacy, at least one of which at the opposite end of the enclosure from the basking light
- A long enough basking branch or shelf so the animal can move along it to get farther in or out of the heat
- Plants/foilage that the animal can hide in or under to get out of the direct rays of the basking light

Terrestrial animals need logs, branches, or large rocks (natural rocks, not hot rocks) on the ground that allow them to spread out and bask under the heat source. In

general, rocks or logs should not be stacked on top of each other due to the risk of them falling on the animal.

Terrestrial animals also need a way to cool down and get away from the heat source. This is best accomplished by providing them with a variety of hiding places, caves, or hollow logs that let them get into a private, shady place and out of the direct rays of the basking light.

Aquatic animals need a dry, flat, stationary platform under the heat source onto which they can climb to bask. The water should be high enough to enable the animal to get out of the water and onto the basking platform on its own, but not so high that the water covers the entire basking platform. It is important for the animal to be able to get completely out of the water to dry out at least part of every day.

Food Bowls

Size

Food bowls deep enough to keep the food in while allowing the animal to get easy access to all food items (e.g., tortoises or small lizards may not be able to access food in bowls with tall sides).

It is highly recommended that live prey items (e.g., insects) be placed in food bowls rather than allowed to roam loose in the animal's enclosure. Placing live prey in a bowl increases the likelihood the animal will catch the prey, makes it easier to monitor the quantity of food eaten by the animal, and also makes it easier to clean uneaten prey items from the enclosure.

Location

Place food bowls away from the basking light (so vegetables do not dry out and

prey items do not die). Place them to allow easy access by the animal and for it to eat in relative privacy (e.g., not be close to the front of a glass enclosure). Place them in approximately the same location at each feeding.

Material

Whenever possible, use ceramic bowls for feeding reptiles, especially carnivores, because ceramic is the least likely material to retain potential harmful bacteria and the most likely to keep live prey items from escaping.

Water Bowls & Pans

Mist

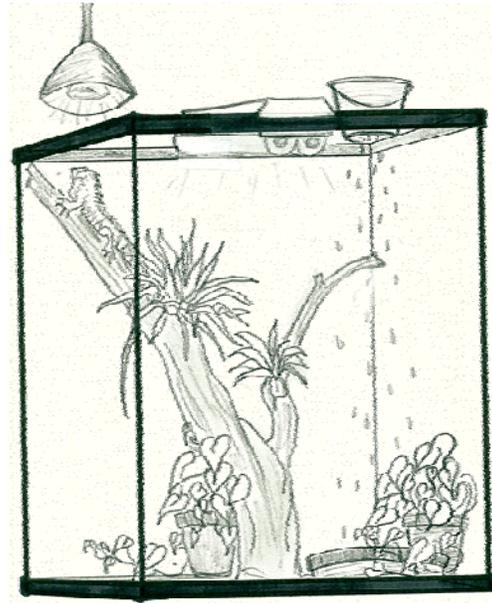
For species that are mist drinkers, there is no option but to mist their environment thoroughly at least once a day. Depending on the particular species and general health condition of the animal, it may be necessary to mist more thoroughly and more often.

Most mist-drinking species will start to drink a while after the misting has begun. Therefore, misting should not stop just because the animal has not started drinking. Sometimes the animal needs time to get its drinking behavior stimulated to overcome any fear or nervousness.

Mist all of the enclosure walls, as well as all of the furnishings (e.g., logs, rocks, foliage). This helps increase the overall humidity of the enclosure, and many mist drinkers also lick water from walls, leaves, or pools of water on rocks or logs. Do not mist food bowls, and do not mist the enclosure so much that standing water pools on the bottom of the enclosure.

Drip

Ideally, species that are drip drinkers are supplied with a constant drip source in their enclosure. This is most easily done by setting a plastic container of water up high in, or on top of, the enclosure and poking a small hole in the bottom of the container that enables single drops to fall into a water bowl/pan and visually stimulate the animal to drink.



If it is not possible to create such a “drip system,” frequent enclosure misting that leaves drops of water on all enclosed surfaces is the next best option.

Drink

Species that drink water must have clean water available at all times. Most reptiles drink a relatively small quantity of water, so the water container can be fairly small. It is important that it is easy for the animal to get its mouth in the water while keeping its body securely on the ground, or the animal may not drink even if water is available. For example, if a box turtle needs to perch unstably on the edge of a water pan to drink, it will probably forego

the water rather than risk falling. Therefore, use shallow water containers.

Many species will defecate in their water bowls, so it is important to remove dirty water as soon as possible, disinfect the water bowl each time it is refilled, and make sure fresh water is available at all times.

Cleaning

Daily

All fecal matter should be removed from enclosures daily. For most species, and when the animal is healthy, this is often simply a matter of picking up and discarding the solid waste material. However, for some species, such as green iguanas and monitor lizards, cleaning up after defecations can be much more onerous and time-consuming. Also, some species, such as snakes, may not defecate daily, so daily cleaning may not be necessary.

Weekly

All reptile habitats should be deep cleaned and disinfected weekly. This means the animal needs to be temporarily moved to another enclosure, all furnishings need to be disinfected, the substrate needs to be replaced, and the inside of the enclosure needs to be cleaned and disinfected. Staff should be particularly careful to rinse all furnishings and the enclosure well because many cleaners and disinfectants are toxic to reptiles, even in very small doses. See Appendix G for a list of recommended products for cleaning, disinfecting, and sanitizing.

Multi-Animal Housing

While it is sometimes possible to house multiple reptiles together in captivity, it is by no means easy or certain of being safe

or healthy for the animals, even in the best of conditions. So, we do not recommended housing multiple reptiles together in a shelter environment. Even if the animals are the same species or have lived together in the past, there is too much uncertainty and risk (e.g., parasites, temperament, stress) to make it a safe choice.

Location in Shelter

The best location for reptile housing in a shelter environment:

- Low-traffic area to minimize stress due to human activity
- Away from other animal containment areas to minimize stress due to other animal sounds, smells, and sights
- Away from windows and doors to minimize climate changes due to drafts or sunlight

Medical Care

Record Keeping

It is important to keep good records of the medical condition and care of reptiles while they are in the shelter. Because a reptile's health is not often obvious and is closely related to their environment, it is important to pass along detailed care information to a new adopter. Doing this can have a long-term effect on the health and care of the animal.

In general, reptile care records include ongoing care information (e.g., how much and what kind of food provided, how much and what kind of food eaten, defecation information, habitat temperature) as well as special procedures (e.g., habitat maintenance or changes, medical procedures). See Appendix H for a sample reptile care record sheet.

Maintenance of Physical Appearance

Shedding

All reptiles regularly shed the top layer of their skin or scales throughout their lifetime. The proper term for this process is ecdysis. The way an animal sheds its skin and the frequency of shedding can vary greatly among species. With healthy animals there is usually no need for human intervention, and damage can occur if shedding is not done properly. In general, staff should not expect to help reptiles shed.

On the other hand, problems with the shedding process can be a useful indicator of other health problems (e.g., mites, dehydration). Such problems may manifest as skin flaking in very small pieces, skin taking a very long time to completely shed from the entire body, shed skin that is hard

or brittle, or skin that is retained around the mouth, eyes, hands, feet, or tail. A reptile veterinarian should see animals with shed problems.

Trimming Nails and Beaks

The finger and toenails of reptiles, as well as the beaks of turtles, grow similar to those of mammals and birds, and can be trimmed in the same manner. However, because nail and beak trimming often requires getting close and personal with some of the most dangerous parts of an animal, only a highly experienced reptile handler or reptile veterinarian should attempt these procedures. Unless the nails or beak are presenting a problem for the animal's overall health and safety (e.g., overgrown beak blocks eating, long sharp nails are dangerous to animal or human), it may not be necessary to trim them.

Baseline Medical Procedures

As discussed, it is often difficult to assess the true state of a reptile's health solely by external examination and observation. Therefore, it is critical to perform baseline medical procedures to assess the current state of the animal's health and to treat problems or inform potential adopters of existing conditions. Following are the most useful health assessment tools for reptiles.

Physical Examination

While a reptile veterinarian would ideally perform this, at a minimum it must be performed by trained shelter staff. As for mammals, a physical exam will include checking for obvious signs of active or passive injury (e.g., wounds, bone damage) or disease (e.g., abscesses, swelling, eye or nasal discharge), in addition to weighing and measuring the animal. Unlike a mammal's physical exam, it does not include taking the

animal's temperature because this is not applicable to ectothermic species.

Conducting a reptile physical exam requires a certain degree of expertise to assess things like color and skin condition, alertness and stress level, degree of dehydration and emaciation, and skeletal palpation. Even more importantly, reptile-specific expertise is necessary to determine the course of action required based on the results of the physical exam. See Appendix D for a sample reptile intake and physical assessment form.

Fecal Analysis

Unfortunately, unlike with dogs and cats, it is not possible to proactively and effectively treat reptiles for internal parasites without first performing a fecal analysis. Fortunately, a fecal analysis is the easiest and least expensive diagnostic test performed for reptiles, and the results (type and level of parasite load) are critical to both the short- and long-term health of the animal, so it is highly recommended that a fecal analysis be performed on all reptiles entering the shelter. There are two types of fecal tests, a fecal float and a fecal smear, that should be performed to cover all potential types of internal parasites.

Treatment for internal parasites is via oral medications. While it may take up to two weeks to complete a full treatment of medications, after which the animal will need to be retested to determine whether the parasites are completely eliminated, administration of the medication is fairly simple and straightforward so it may be transferred easily to a new adopter, if an animal is adopted before the treatment is completed.

Blood Analysis

Blood analysis is an extremely valuable diagnostic tool for assessing reptiles because it provides information about internal organ functions, nutritional health, potential presence of infection, and much more. This is especially critical because so many reptiles entering shelters come in with little or no information about their past diet, husbandry, or medical conditions.

While this is a slightly more expensive procedure and requires a reptile veterinarian to draw the blood and assess the results, the information is invaluable to the care provided both in the shelter and by a new adopter. If it is not possible to perform this test in the shelter, it is highly recommended that the new adopter have the test performed as soon as possible.

X-ray

The most common reasons to have a reptile x-rayed are to check for current or past skeletal damage, determine if the animal is gravid, or determine if the animal may have ingested any foreign objects (e.g., rocks, wood chips) that could block its digestion. These tend to be fairly specialized conditions not common to all reptiles, so an x-ray need not be performed unless there is a reason to believe one of these conditions is present.

Adoptions

Reptiles do not make good pets. Even people who believe it is acceptable to have reptiles as pets are fairly united in their belief that reptiles require difficult care. They require extremely high levels of commitment and resources, are more work and more expensive than anticipated, often suffer terribly due to poor husbandry, and are not appropriate for the “casual” reptile guardian. Almost without exception, the promoters of reptiles as pets are individuals or organizations that stand to profit from the increase in pet reptiles.

That said, once a reptile has entered a shelter and has been determined to be physically and behaviorally healthy, there is usually no option for disposition of the animal other than adoption or euthanasia. Permanent sanctuaries are usually unavailable, and most zoos will not accept reptiles from the private sector. The American Zoo and Aquarium Association advises zoos to refuse exotic animals from people who are unable or unwilling to care for them.

While each shelter and jurisdiction needs to make its own decisions and policies concerning when and how to make the decision of adopting out or euthanizing an animal, the goal of this section is to provide information and tools for when adoption is determined to be the right choice.

Finding Potential Adopters

For reptiles already in captivity, shelters have an ethical obligation and practical responsibility to provide the best possible care and quality of life for them for the remainder of their lives. It is not practical, legal, or safe to return reptiles from the pet trade to their native environment. Therefore, the following is a prioritized

list of possible options for adoptive guardians.

Professional reptile caregiver (zoo, sanctuary). Unfortunately, as stated, these types of facilities are usually unavailable.

Experienced hobbyist. Caution should be taken to validate a hobbyist’s claim of expertise and to not overburden existing reptile caregivers (many of whom are well-intentioned rescuers with unrealistic views of their limited resources) and therefore create a situation of abuse, neglect, or future abandonment.

Committed and qualified adult. Potential adopters should be carefully screened to ensure they have the commitment, time, and financial resources to learn about and care for this unique animal for the remainder of its life. Shelters should be prepared to provide ongoing support to the adopter (or a referral to another support resource such as a local herpetological society or reptile veterinarian) to help ensure the animal is well cared for and able to stay in that home.

Potential adopters that should not be considered reptile caregivers include children, young adults, adults with more curiosity than commitment and resources, individual “rescuers” (experienced or not) who may have more desire than ability to care for another animal, and potential breeders.

Adoption Guidelines

Philosophies regarding the adoption of reptiles vary tremendously from shelter to shelter, and even from staff member to staff member. In cases where shelters elect to place a reptile for adoption, guidelines should be established to assist staff in

carrying out its stewardship function. It is important these guidelines be consistent and reflect the shelter's philosophy, the demographics of the region, community sentiments and conscience, and the welfare of the animal.

An exception can be made or an exceptional caregiver can be found for almost every guideline, so adoption counselors should remain flexible and make decisions in the best interest of the animal. Any exception to the guidelines should have the approval of a supervisor or someone in authority, and spontaneous decisions should never be allowed.

Reptiles and the Law

In some jurisdictions in the United States, reptile ownership is restricted, and many efforts are being made on the state and national levels to change legislation and regulations regarding the ownership of reptiles and the reptile trade. As a result, many states, cities, counties, and municipalities ban some, if not all, ownership of reptiles and exotic pets. For example, it is illegal to own alligators, crocodiles, or venomous reptiles in most jurisdictions. Some jurisdictions may also ban constrictor snakes, green iguanas, or any reptile over five feet.

Lawmakers are starting to recognize that reptiles are wild animals that may pose a serious health or safety threat to humans. They are also starting to recognize that: reptiles require more resources and expertise than most pet guardians are able to provide; there are virtually no animal welfare resources available to handle unwanted pet reptiles; and reptiles should not be pets.

For these reasons, shelters need to be aware of the current legislation affecting reptile pet ownership.

Potential Adopter Interview Questions

Remembering it is a shelter's ethical obligation and responsibility to place healthy, temperamentally sound animals in homes where they will receive the best possible care and quality of life for the remainder of their lives, a good adoption interview or assessment is a must. The best consultation is an informal one-on-one, interactive session between the adoption counselor and the prospective adopter, and should include the completion and discussion of a written application or adoption questionnaire. The written form will also serve as documentation if the person is denied the adoption and questions the denial.

While many of the questions asked a potential dog or cat adopter are also applicable in reptile adoptions, it is recommended that a separate adoption questionnaire be developed specifically for reptile adoptions. The following questions are provided as guidelines only. These questions are intended to help assess a potential adopter's motivation, current level of reptile expertise, appropriateness of environment and resources available to support a reptile in the household, ability to care for the reptile throughout its lifetime, and areas where additional education may be needed.

Pet Care Experience

- Do you currently have, or have you ever had, a reptile as a pet?
- If so, what kind(s)? How long did/have you had them? Describe their environment and care routine. Describe any health problems and

what you did to address them. Specifically, have you ever taken them to a veterinarian or treated them for parasites?

- Tell me what you know about reptile-related salmonella. Specifically, which reptiles carry it, how do you treat reptiles for it, how do you minimize risk of transmission to humans, and what are symptoms in humans? (Shelters should be prepared to provide salmonella information to all reptile adopters regardless of their response. See Appendix C.)
- How did/do you learn about how to care for the animal?
- If you no longer have the reptile(s), what happened to them? If it died or was relinquished, describe the circumstances.
- Why do you want a reptile as a pet now? Why this particular species?
- How many and what type of pets do you currently have in your household?

Family and Lifestyle

- Do you rent or own your home? If you rent, are you allowed to have reptiles?
- Do you anticipate moving at any time in the future? If so, what do you anticipate doing with any reptiles in your household?
- How many adults and children are in your household? What are the ages of the children? Do any members of the household have suppressed immune systems? If there are children in the household, what will their interaction be with the reptile? Do you anticipate adding any family members in the future (e.g., spouse, child, parents)?

- Are all family members in favor of getting this reptile? If not, how are you planning to handle this? Are any family members afraid of reptiles? If so, how are you planning to handle this?
- Who will be the primary caregiver for the reptile? If the primary caregiver will be a minor, are the parents in the household ready, willing, and able to provide care for the animal after the minor has left the household?

Care and Husbandry

- Where will the reptile's enclosure be located in your home? Describe the surrounding environment and traffic patterns. Describe the size and construction of the enclosure you are planning to use. What is the maximum amount of space you anticipate being able to make available for this reptile as it grows and when it reaches full size?
- What is the risk of power failures at your home? How will you provide heat for your reptile in the event of a power failure?
- Describe the type of food you are planning to feed the reptile.
- Describe the length and frequency of time you plan to spend interacting with the animal. What sort of activities do you think this will entail?
- Have you already identified a reptile veterinarian in your area?

Husbandry Advice for Adopters

Recommended Do's

Veterinary Care

Reptile guardians should think about veterinary care for their reptiles as they do

for their other pets. They should be prepared to invest in preventive veterinary care as well as any care necessary to handle illnesses or injuries that can happen in even the most careful of homes. Probably the most important preventative measure, and one that is highly recommended, is for all reptile guardians to take new animals to a qualified reptile veterinarian for an initial wellness/assessment examination. This is particularly important when the animal is being adopted from a shelter where the animal's prior history is not well known. The initial examination should include at least a physical exam by the veterinarian. Based on the results of the exam, the recommendations of the veterinarian, and the financial resources of the caregiver, additional baseline wellness assessment options may include blood work, x-rays, and a fecal examination.

Investing in an initial exam is critical to understanding the current condition of the animal and for establishing a baseline against which to assess changes in the animal's health in the future. It also enables the caregiver to establish a relationship with the veterinarian which can be very beneficial to helping the caregiver understand the animal's current and future needs. Finally, it allows the veterinarian to establish a relationship with the animal that will be beneficial when trying to assess changes in the animal's condition in the future.

Spay/Neuter

For the vast majority of reptile species, spaying and neutering is not an issue unless there is a medical problem that necessitates the procedure. However, green iguanas are an exception to this rule. It is highly recommended all green iguanas be fixed as soon as medically safe.

The most common causes of death for adult female green iguanas are problems related to egg production. A mature female reptile produces eggs even if they are not fertilized. The process of egg production is hard on a reptile's body. Stress and unnatural conditions make the yearly breeding period extremely stressful and risk the health and life of adult female iguanas — all of which can be completely eliminated by having the animal spayed.

One of the most common reasons for adult male iguanas to be relinquished by current guardians (and for being unadoptable to new guardians) is aggression. While a major factor in the degree to which an animal is aggressive or docile is the way it has been treated or socialized, testosterone is also a major contributing factor for adult male green iguanas. Although no studies have scientifically demonstrated that altering a male iguana will significantly change its temperament, experience has overwhelmingly shown that neutering a male iguana will almost certainly lower his aggressive/dominant behavior toward both humans and other iguanas, especially during breeding season.

In addition, the earlier the animal is neutered, the more significant the impact on its behavior (i.e., the sooner a male is neutered the more likely he will be to limit his dominant behavior throughout his lifetime, and the sooner a female is spayed the less harm is done to her overall health due to egg production). Therefore, for the overall health, safety, and well-being of both humans and animals, it is highly recommended that green iguanas be altered as young as possible. Most experienced reptile veterinarians will perform this procedure when the animal weighs at least three pounds and is otherwise in good health.

Socialization

In general, when it comes to socializing reptiles, it is better to spend less time with them on a more frequent basis. Long periods of interaction may be desirable from the human perspective but is usually stressful from the reptile perspective. On the other hand, no matter how well socialized a reptile is, lack of constant behavior reinforcement will soon cause virtually all animals to regress to their more wild and antisocial behavior.

Record Keeping

It is a good idea for all reptile guardians to establish and maintain a habit of record keeping of their animal's ongoing husbandry and behavior starting the day they bring the animal home. Because reptiles often take a long time to exhibit signs of illness and because so much of a reptile's health is tied to its environment, a thorough and complete record of the animal's care and habits is a critical tool in preventing and diagnosing health problems. Basic information that should be recorded includes:

- Date and description of enclosure/habitat changes (e.g., changes to substrate, furnishings, heat or light equipment)
- Periodic (e.g., daily, weekly) recordings of enclosure humidity and temperature, quantity and type of food provided, quantity and type of food consumed, frequency and abnormal appearance of defecations
- Description of abnormal behavior and anything that might be happening in or around the animal's environment at the time

Ongoing Education

Any reptile guardian who is truly committed to providing quality care to his animal throughout its lifetime must also commit to ongoing education. While firsthand learning and observation are essential to establishing a good understanding of an individual animal, secondhand learning (e.g., reading) is essential to understand the broader issues that apply to the overall species. In addition, because information about caring for reptiles in captivity is often hard to find, confusing, conflicting, and constantly changing, dedicated guardians must constantly seek out the latest information from multiple sources. See Appendix I for recommended reference sources.

Vacation Planning

Many reptile guardians mistakenly think they can leave a reptile unattended while they are away on vacation. No matter how short the vacation, it is never acceptable to leave any animal, including reptiles, without some provision for daily care. Reptiles, like all animals, need fresh food and water daily. In addition, it is essential to monitor their environment to make sure all of their habitat needs (especially heat and light) are met. Because most pet caregivers are unfamiliar with (and often afraid of) reptiles, vacation care planning should be considered well in advance of the vacation.

Emergency Planning

It is important for caregivers to plan for how to provide for their reptile in case of an emergency. It is unrealistic to expect traditional human or animal welfare agencies to be able to help. Minimum emergency planning should include how to get the animal out of the home quickly and safely, and where to take the animal so it

can be re-established in an appropriate habitat.

Recommended Don'ts

Free Roaming

It is never a good idea to let a reptile roam unrestricted in a human home. It is unsafe for the animal due to potential accidents and injury, lack of appropriate climate/environment (e.g., heat, humidity), and the risk of losing the animal. It is also unsafe for humans because of the risk of disease (salmonella) or injury when trying to return the animal to its enclosure.

Public Outings

It is never a good idea to take a reptile out in public without it being contained in a carrier. No matter how socialized an animal seems in its home environment, almost certainly it will behave differently away from familiar surroundings (maybe more aggressive, maybe more scared, maybe more depressed). It is also impossible to control all aspects of an animal's environment when out in public, so the chance of having inappropriate heat, light, exercise, or sensory stimulation is virtually guaranteed.

Another concern in taking reptiles out in public is the potential risk of injury or illness to humans. Because reptiles are such a rare sight, a reptile on a public outing is certain to attract a lot of attention from people and in ways that are not safe for the animal or the human. Reptile guardians must be fully aware of their moral and legal responsibilities for any accident, injury, or illness caused by their animal.

Given that there should be no need to take a reptile out in public, it is highly recommended that reptiles be left safely at

home unless transport is required for care of the animal.

Bark or Rock Substrates

In general, bark or rock enclosure substrates should be avoided. While these materials can be appropriate for some species, they are more often inappropriate, can cause severe impaction problems if ingested, and make it difficult to maintain a high humidity or bacteria free environment. Therefore, the general recommendation is to use alternative, less risky substrate materials.

Hot Rocks

Hot rocks are never recommended as a source of heat for any reptile species. Even the best brands have trouble maintaining specific temperatures and are prone to electrical problems. More often than not, they are either too hot or too cold for the animal's needs. In addition, they are ineffective at heating any aspect of the environment other than their own surface (i.e., will not change the air temperature in the enclosure). They also provide heat in an unnatural manner that is inadequate for the animal's need or can cause severe thermal burns and even death. It is always better to try to provide heat in a natural manner via an overhead heat source (like the sun) and, for terrestrial species, with dirt or rocks under the overhead heat source to provide heat from below the body.

Overfeeding

While shelters will rarely need to be concerned about obesity or overfeeding of the animals they receive, overfeeding is a serious problem for reptiles in captivity. Like with cats and dogs, it is often the case that well-meaning guardians will provide more food than necessary, or food higher in fat than the animal needs. Complicating

this for reptiles is that it is often hard to replicate in captivity their natural food items or nutritional intake, and it is virtually certain that captive reptiles do not get the quantity or quality of exercise they get in their native environment. The result is the guardian must be particularly vigilant against causing obesity in captive reptiles.

Inter-Species Relationships

In general, it is better to keep reptiles physically separated and protected from other species (e.g., cats, dogs, birds), ideally with buffers to minimize sensory disturbances (i.e., visual barriers, sound buffers). Even with well-behaved animals, accidents can happen or natural instincts can take over and an animal can get hurt or traumatized before the guardian is able to intervene. If a guardian chooses to let their reptile interact with other species, in no event should the animals be left unattended.

Spinach and Broccoli

For herbivores and omnivores, avoid spinach and broccoli. Because of the complex way these animals' metabolisms work, spinach and broccoli can be catalysts for severe internal or skeletal problems that, once done, cannot be undone. Like so many other aspects of reptile care, spinach and broccoli can be safe for certain species and in certain quantities. However, getting the details of just how much is safe for any particular species or animal is difficult at best. Unfortunately, because spinach and broccoli are readily available and familiar to most reptile caregivers, reptiles are often overfed and the signs of problems are missed until the damage is already done. Given that there are always alternative vegetables that do not carry the

risk of doing harm, it is recommended to completely avoid spinach and broccoli.

Animal Protein

Animal protein should never be fed to herbivores (in particular, green iguanas). Herbivores have very specialized digestive systems optimized to process vegetable protein. When those animals are fed animal protein, it overtaxes their systems, generates unhealthy and hard to process waste materials, and provides unbalanced or inappropriate forms of proteins, vitamins, and minerals. The health problems that can result are vast and varied, with the most common being early death from liver or kidney failure.

Live Prey

For snakes that eat rodents or birds, it is highly recommended that animals be fed pre-killed prey. This is beneficial for the snake and the guardian, as well as for the prey. It is less stressful for all parties, has less risk of either the prey animal or the snake being injured, provides the same nutritional value as live prey, and makes food acquisition and storing easier for the guardian. While it can often be a difficult and frustrating process to switch an animal from eating live prey to eating pre-killed prey, given enough time, patience, and training, it is almost always possible and worth the effort in the long run.

Note on Appendixes

Shelters are hereby given permission by the American Humane Association to photocopy the handouts on the following pages for use in their shelters.

Appendix A: Glossary

aquatic. An animal that lives in, on, or near the water

arboreal. An animal that lives in or climbs trees.

bask. To warm the body and absorb UVB rays by laying in sunlight or beneath a source of radiant heat and UVB rays.

beak. The hard outer covering of a turtle's jaws.

brumate. The reptilian equivalent of mammalian hibernation.

carapace. The top shell of a turtle.

carnivore. An animal that eats only flesh/meat.

dewlap. A skin-covered flattened flap-like organ connected to the skin of a lizard's lower jaw and chin.

disinfect. To treat a non-living object in such a way as to kill or inhibit the growth of microorganisms (mainly bacteria).

diurnal. An animal that is active during the day.

ecdysis. The process of shedding the top layer of skin.

ectothermic. When body temperature is regulated by the environmental temperature rather than by heat produced internally.

femoral pores. Pores that run along the inner thigh of the hind legs of most lizards.

folivore. An animal that eats only leaves.

fossorial. An animal that lives under or burrows into the ground.

gravid. The reptilian equivalent of mammalian pregnancy.

habitat. The environment in which an animal lives. Includes specification of temperature gradient, humidity, light, substrate, furnishings, privacy/hiding space needs, exercise/movement space needs, and social groupings. Does not include nutritional or hydration needs.

heat gradient. The temperature range that must be available to a reptile in order to maintain health. Also referred to as the Preferred Optimal Temperature Zone (POTZ).

heliothermic. An animal that thermoregulates by basking in the sun.

herbivore. An animal that eats only plants and plant products.

hibernation. A period of winter dormancy. When used literally, refers only to mammals.

hide box. Habitat furniture, such as a hollowed out log, that provides a place for an animal to hide from sight or get out of the heat.

hot rock. A commercial product, usually made of ceramic or cement-type material, with an embedded heating coil that heats up when plugged in.

insectivore. An animal that eats only insects.

Jacobson's organs. An additional set of sense organs located in the roof of a reptile's mouth that analyzes scent molecules collected from the environment.

lethargy. Having a low activity level, not responding to surroundings or external stimuli.

MBD. Metabolic bone disease. A softening or swelling of bones caused by insufficient or improper metabolizing of calcium.

nares. The reptilian equivalent of nostrils.

nocturnal. An animal that is active at night.

omnivore. An animal that eats a combination of insects, flesh/meat, and/or plants.

parietal eye. An additional visual organ ("eye") located in the top middle of some lizards' heads that detects light and dark and senses heat.

photoperiod. The daily/seasonal variable hours of daylight.

plastron. The bottom shell of a turtle.

POTZ. Preferred Optimal Temperature Zone. Temperature range that must be available to a reptile in order to maintain health. Also referred to as the heat gradient.

semi-aquatic. An animal that lives in water but also goes out on land.

semi-arboreal. An animal that lives in trees but goes down to land.

shell rot. Bacterial or fungal infection of a turtle or tortoise's shell that causes the shell to become soft or erode.

slurry. A soft, finely ground, nearly liquid form of nutrition.

snout. The reptilian equivalent of a nose.

substrate. The bedding or floor covering used in an animal's housing.

terrestrial. An animal that lives on land.

thermoregulate. To regulate body temperature by moving to a warmer or cooler environment.

thigmothermic. An animal that thermoregulates by being in contact with a preheated surface (e.g., rock or road surface).

UVB light. Ultraviolet B light rays produced naturally by the sun and critical to the metabolism of calcium by reptiles.

Appendix B: Hand-Feeding Slurries

Basic Herbivore

To be used as basic nutritional and hydration supplement for herbivorous species.

- 1 part organic baby food - peas
- 1 part organic baby food - beans
- 1 part organic baby food - carrots
- 1 part organic baby food - squash
- 1 part calcium supplement (See Appendix G for recommendations.)
- ½ part iron supplement (See Appendix G for recommendations.)
- 2 parts powdered alfalfa pellets
- 6 parts electrolyte/hydration supplement (See Appendix G for recommendations.)

Herbivore Protein

To be used as special nutritional and hydration supplement for extremely emaciated herbivorous species.

- 1 part organic baby food - peas
- 1 part organic baby food - beans
- 2 parts Karo syrup
- 1 part calcium supplement (See Appendix G for recommendations.)
- ½ part iron supplement (See Appendix G for recommendations.)
- 4 parts electrolyte/hydration supplement (See Appendix G for recommendations.)

Basic Carnivore

To be used as basic nutritional and hydration supplement for carnivorous species.

- 6 parts organic baby food - chicken or turkey (not beef or ham)
- 1 part calcium supplement (See Appendix G for recommendations.)
- ½ part iron supplement (See Appendix G for recommendations.)
- 6 parts electrolyte/hydration supplement (See Appendix G for recommendations.)

Carnivore Protein

To be used as special nutritional and hydration supplement for extremely emaciated carnivorous species.

- 2 parts organic baby food - chicken or turkey (not beef or ham)
- 2 parts Karo syrup
- 1 part calcium supplement (See Appendix G for recommendations.)
- ½ part iron supplement (See Appendix G for recommendations.)
- 4 parts electrolyte/hydration supplement (See Appendix G for recommendations.)

Appendix C: Salmonella Information

Salmonella Bacteria and Reptiles

Most, if not all, reptiles carry *Salmonella* bacteria in their intestinal tract and intermittently or continuously shed these bacteria in their feces. *Salmonella* bacteria usually do not cause any illness in reptiles, but can cause serious illness in people.

Salmonella bacteria are easily spread from reptiles to humans. Humans may become infected when they touch objects, including food items that have been in contact with the stool of reptiles, and then touch their mouths. For example, infants have become infected after drinking from bottles of infant formula that became contaminated during preparation. Individuals who prepared the formula had not washed their hands after touching a reptile or because reptiles were allowed to walk on kitchen counters. For *Salmonella* bacteria to spread from reptiles to humans, the bacteria must be ingested. Therefore, simply touching or holding a reptile will not result in spread of bacteria unless something contaminated with reptiles feces or the reptile itself is placed in the mouth.

Most *Salmonella* infections in humans result in a mild, self-limiting illness characterized by diarrhea, fever, and abdominal cramps. However, the infection can spread to the bloodstream, bone marrow, or nervous system, leading to severe and sometimes fatal illness. Such severe infections are more likely to occur in infants and in individuals whose immune system is compromised (e.g., bone marrow transplant recipients, persons with diabetes mellitus, persons infected with HIV, chemotherapy patients).

Unfortunately, *Salmonella* bacteria cannot be eliminated from the intestinal tract of reptiles. Administration of antibiotics to eliminate these bacteria has been unsuccessful and may result in emergence of *Salmonella* bacteria that are resistant to antibiotics. Attempts to raise or identify reptiles that do not carry *Salmonella* bacteria have also been unsuccessful; therefore, it is not recommended to conduct a bacterial culture of stool samples to identify reptiles that are not carrying the *Salmonella* bacteria.

Fortunately, the spread of *Salmonella* bacteria from reptiles to humans can be easily prevented by following these routine precautions:

- Always wash your hands with hot, soapy water after handling reptiles, reptile cages and equipment, and the stool of reptiles.
- Do not give reptiles access to the kitchen, dining room, or any other area where food is prepared. Do not give reptiles access to bathroom sinks and tubs or to any area where infants are bathed. Do not allow reptiles to roam free. Instead, caged or limit them to safe parts of the house.
- Always wash your hands after coming into contact with any area where reptiles are allowed.
- Do not eat, drink, or smoke while handling reptiles, reptile cages, or reptile equipment.

- Do not kiss reptiles or share food or drink with them.
- Do not bath reptiles or clean wash reptile cages, dishes, or aquariums in or near the kitchen sink, kitchen counters, bathroom sinks, or bathtubs. Instead use plastic basins or tubs for bathing or swimming reptiles.
- Dispose of wastewater and fecal material in the toilet instead of the bathtub or household sink.

The Centers for Disease Control and Prevention recommends that children less than five years of age avoid all contact with reptiles and that households with children less than one year of age not own reptiles. The Association of Reptilian and Amphibian Veterinarians encourages reptile guardians with young children to discuss steps to minimize risks associated with owning reptiles with their veterinarian and their physician. Children should be supervised when handling reptiles to ensure that they do not place their hands or objects that a reptile has contacted in their mouths. Reptiles should not be kept in childcare centers. Immunocompromised persons should avoid contact with reptiles.

The guardian should follow the instructions from the reptile's veterinarian concerning proper diet and environment for the reptile. Healthy reptiles living in proper environments are less likely to shed *Salmonella* bacteria.

Information in this handout is not meant to discourage reptile guardianship. With a few exceptions (e.g., infants, immunocompromised individuals), most people have a low risk of acquiring *Salmonella* bacteria from reptiles, but following simple precautions can reduce this risk even further. Reptiles can be safely kept as pets, but reptile guardians should be aware of the methods for reducing their risk of acquiring *Salmonella* bacteria from their reptiles.

This handout was developed by the Association of Reptilian and Amphibian Veterinarians in collaboration with the Centers for Disease Control and Prevention and is intended for informational purposes only; please seek advice from your physician and your reptile's veterinarian if questions or problems occur.

**Appendix D:
Reptile Intake and Physical Assessment Form**

Animal ID# _____

Animal's Name _____ Date received _____

Intake form completed by _____ Date completed _____

Source Guardian Release Good Samaritan Veterinarian Animal Control
Contact Name _____

Contact Phone _____ E-mail _____

If guardian release, how long owned? _____

Previous guardian
history _____

Other _____

Species Lizard Snake Turtle Subspecies _____

Size Body _____ inches feet Tail _____ inches feet

Weight _____ kg g lb Sex male female unknown

Age _____ mo yr actual approximate

To be completed with input from Source

Brief guardianship and care history of animal _____

Description of previous known medical conditions _____

Description of previous known vet care _____

Veterinarian name _____ Clinic name _____

May we have access to former vet records for this animal? yes no

Diet/Nutritional History

Ever fed? animal protein vegetable protein vitamin supplements live rodents

Describe _____

On average, defecates every _____ day(s).

Favorite food(s)

General description of diet routine (e.g., frequency and quantities of feeding, types of food in a standard “meal”)

Brief Description of Previous Habitat

Size _____ Location in home _____
Construction materials _____

Substrate materials

Lighting

Heating

Average day temp _____ Average night temp _____ Average humidity _____

Brief Description of Previous Socialization

Frequency of exercise outside of habitat

Likes adults kids dogs cats others of same species
Dislikes adults kids dogs cats others of same species

To be completed by Shelter Staff

Visual Assessment of Condition of Animal

Overall Appearance	Excellent	Good	OK	Poor	Very Poor	Notes
Color						
Hydration						
Weight						
Structure						
Alertness						
Stress level						
Mobility/Motor Skills						

Specific Features	O K	Inactive Damage	Active Damage	Notes
Eyes				
Mouth/Nares/Snout				
Ears				
Dewlap				
Fingers/Toes				
Arms/Legs				
Vent				
Spines				
Tail				
Body/Skin/Shell				
Other				

Observations	Yes	No	If yes, describe.
Mites?			
Other identifying characteristics?			

Antisocial/Aggressive behaviors exhibited

- holding breath/posturing tail whipping/nipping/biting lunging other

Initial Intake Instructions

Special Habitat Requirements

- extra heating extra humidity extra privacy screen extra water
 in-house hospitalization other/more info _____

Immediate Medical Attention Needed

- initial vet exam x-rays blood work fecal analysis mite treatment
 wound management _____
 bath as often as _____

- special diet in addition to standard diet instead of standard diet
 ringers pedialyte calcium supplement
 herbivore slurry herbivore protein slurry carnivore slurry
 carnivore protein slurry

- other _____
 other _____

- Who can handle** veterinary staff kennel staff any staff qualified volunteer

Notes For Shelter Staff

Visual Assessment

Overall Appearance

- **Color.** Brightness of color, consistency of color, patches of discoloration (burns, wound or mite scars).
- **Hydration.** Degree to which eyes are sunken in sockets, elasticity of skin, moistness/dryness of urates and stool, problems during or infrequent defecation, urgency with which animal consumes water when offered.
- **Weight.** Degree to which skeleton is visible through skin (especially hip bones, tail bone, and thigh bones), looseness of skin on body, muscle atrophy.
- **Structure.** Deformities, lack of symmetry, lack of functionality, missing digits or limbs, swelling bones (especially jaw, knuckles, or thighs).
- **Alertness.** Body position, eye movement, dilation, and brightness.
- **Stress level.** Activity level and purpose (especially if potentially causing damage to self or humans), respiratory rate.
- **Mobility/Motor Skills.** Ability to support weight, move naturally (e.g., climb, burrow, run, slither), tremors or spasms, lack of muscle coordination.

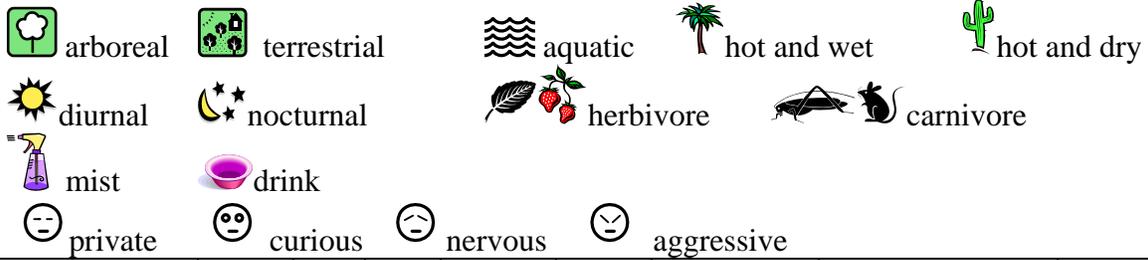
Specific Features

- **Eyes.** Swelling, damage, cloudiness, brightness, ability to follow movement, discharge.
- **Mouth/Nares/Snout.** Internal color, damage (internal or external), discharge, thick or hard mucous or caseous pus buildup (especially in mouth), strength/weakness.
- **Ears.** Damage, discharge.
- **Dewlap.** Damage.
- **Fingers/Toes.** Swelling, damage, missing/dead digits, deformities, lack of functionality, missing nails.
- **Arms/Legs.** Swelling, damage, missing limbs, deformities, lack of functionality, range of motion, strength/weakness.
- **Vent.** Swelling, damage, waste residue, signs of irritation, exposed internal organs (e.g., prolapse), odor.
- **Spines.** Damage, missing.
- **Tail.** Swelling, damage, missing/dead segments, deformities, lack of functionality, signs of regrowth.
- **Body/Skin/Shell.** Swelling, damage, deformities (especially spine), shedding problems, redness/signs of skin/shell (infection), soft/flexible shell.

Special Habitat Requirements

- **Extra heating.** Desirable in virtually all circumstances. Required when signs of active infection (swelling, discharge, redness of skin/shell) or potential internal illness or metabolism problems (lack of alertness, mobility, strength, or appetite).
- **Extra humidity.** Desirable in virtually all circumstances for species requiring a “hot and wet” climate. Required when signs of dehydration.
- **Extra privacy screen.** Desirable in virtually all circumstances. Required when stress or alertness level is high or when signs of active illness (see “extra heating” above).
- **Extra water.** Desirable in virtually all circumstances for species requiring a “hot and wet” climate. Required when signs of dehydration.
- **In-house hospitalization.** Required when frequent observation is required or while medical treatment (medications, wound management) is ongoing.

Appendix E: Reptile Species Reference Table



Common Name Scientific Name	Habitat	Climate	Active Period	Day Temp, Humidity	Night Temp	Furniture	Nutritional Needs	Water Source	Temperament
Lizards									
Bearded dragon Pogona vitticeps				85-90 with bask- ing up to 100	70- 75	Large low branches, hide box, water pan	 Insects, dark leafy greens, mixed vegetables		
Chinese water dragon Physignathus cocincinus	 			85 -90	75- 80	Plants/foli age, branches, large water containers	 Insects, dark leafy greens, mixed vegetables	 	
Cuban anole, knight anole Anolis equestris				75 -85 with baskin g up to 90; 50 - 80% hum- idity	60- 65	Plants/foli age, branches, water containers	 Insects		

Common Name Scientific Name	Habitat	Climate	Active Period	Day Temp, Humidity	Night Temp	Furniture	Nutritional Needs	Water Source	Temperament
Golden gecko Gekko ulikovski				75 - 85; no bask- ing	65- 75	Branches (horiz. & vertical), plants/foli- age, logs, bark, lots of visual barriers	 Small insects (no mealworms), non-citrus fruit		
Green ameiva Ameiva ameiva				80 -85 with bask- ing; moder- ate hum- idity	70- 75	Lots of hiding places, hollow logs, branches for climbing	 Insects		
Green anole Anolis carolinensis				75 -85 with bask- ing up to 90; 50 - 80% hum- idity	60- 65	Branches, plants/foli- age, vines, water container	 Small soft- bodied insects		
Green basilisk Basiliscus plumifrons				85 -90	75- 80	Plants/foli- age, branches, large water containers	 Crickets, mealworms, mixed vegetables		 

Common Name Scientific Name	Habitat	Climate	Active Period	Day Temp, Humidity	Night Temp	Furniture	Nutritional Needs	Water Source	Temperament
Green iguana Iguana iguana				85 -95 with baskin g up to 100	75- 80	Lots of branches, hide box, large water container, foliage for visual screen	 Collard greens, mustard greens, peas, beans, squash, carrots		
House gecko Hemidactylus frenatus				82 - 90; 70- 90% hum- idity	70- 75	Bark, rocks, hiding places	 Small insects (no mealworms), non-citrus fruit		
Leopard gecko Eublepharis macularius				80 -85 with baskin g up to 95	70- 75	Large low branches, hide box, water pan	 Small insects (no mealworms), non-citrus fruit		
Madagascar day gecko Phelsuma madagascarien-sis				80--90 with bask- ing up to 95; 50- 85% hum- idity	70- 75	Branches (horiz.& vertical), plants/foli age, logs, bark, lots of visual barriers	 Small insects (no mealworms), non-citrus fruit		 
Savannah monitor Varanus exanthematic-us				85 -90 with bask- ing up to 95	75- 80	Large low branches, hide box, lots of visual screens, water pan	 Insects, eggs, chicken, pinkies		 
Snakes									

Common Name Scientific Name	Habitat	Climate	Active Period	Day Temp, Humidity	Night Temp	Furniture	Nutritional Needs	Water Source	Temperament
Ball python Python regius				80 -85 with bask- ing up to 95	70- 80	Hide box, lots of visual screens, water pan	 Rodents		 
Boa constrictor Boa constrictor				80 -90 with bask- ing up to 95	70- 80	Large low branches, hide box, water pan	 Rodents		
Burmese python Python molurus bivittatus				80 -85 with bask- ing up to 95	70- 80	Large low branches, hide box, water pan	 Rodents		
Corn snake Elaphe guttata				75 -85 with bask- ing up to 95	70- 75	Hide box(es), lots of visual screens, water pan	 Rodents		
Garter snake Thamnophis sirtalis				75 -80 with bask- ing up to 90	65- 75	Hide box(es), lots of visual screens, water pan	 Fish		
King snake Lampropeltis getula				75 -85 with bask- ing up to 95	70- 75	Hide box(es), lots of visual screens, water pan	 Rodents		
Turtles									

Common Name Scientific Name	Habitat	Climate	Active Period	Day Temp, Humidity	Night Temp	Furniture	Nutritional Needs	Water Source	Temperament
African sulcata Geochelone sulcata				80 -85 with bask- ing up to 95	70- 75	Hide box(es), space to roam	 Alfalfa or timothy hay, squash, cabbage, dark leafy greens		
Box turtle Terrapene carolina				75 -85 with bask- ing up to 90; 60 - 80% humid ity	70- 75	Hide box(es), lots of visual screens, water pan	 Insects, some vegetables, fruit, berries		
Red-eared slider Chrysemys scripta elegans				80 -85 wat-er temp with bask- ing up to 90	70- 75	Basking platforms	 Fish, turtle pellets		

Appendix F: Equipment, Supplies, and Setup Descriptions

Equipment

- 2 - 150W heat bulbs and fixtures
- 1 - 4-inch UVB light bulb that is less than 6 months old
- 1 – 2 x 2 foot “under tank” heating pad
- 1 - timer
- 1 - power strip
- 2 - thermostats
- 1 - humidistat
- Aquarium filter and heater capable of handling a 30- to 50-gallon aquarium
- 2 x 2 x 2 foot glass aquarium capable of holding water, with “visual screen” for at least three sides (e.g., curtain, cardboard)
- 5 x 3 x 3 foot nonporous, solid-sided housing structure capable of standing horizontally or vertically
- Habitat furnishings for arboreal and for terrestrial setups
- Water and food bowls
- Hand-feeding syringes
- Nail clippers (cat/bird nail clippers will work)

Supplies

- Disinfectant (Nolvasan, Bleach)
- Mite treatment (Provent-a-Mite)
- Disposable latex gloves
- Tums™
- Iron supplement

Minimum Enclosure Setups

- Arboreal or Terrestrial Habitats, All Climates
- Substrate

Recommend newspaper (bad for absorbency, good for safety), or towels (good for absorbency, risk of getting toes caught in loops). Avoid anything that can be ingested (e.g., sand, gravel, wood chips).

Light

Require a UVB fluorescent light. Use a timer so the light is on from 7 a.m. to 7 p.m. daily. The UVB fluorescent light bulb must be less than six months old, placed within 12 inches of the animal, cover the full length of the enclosure, and not have any solid material (e.g., plastic or glass cover) between the bulb and the animal.

Heat

- **Require** a basking light with red heat light or a ceramic heat emitter (good for 24-hour use). If possible, a solid metal dome should be used on the light fixture to keep as much heat radiating into enclosure as possible.
- **Require** two thermostats, one at each end of the enclosure.
- **Optional** heat from under tank heater for terrestrial species. If using an under tank heater, it should only cover half of the enclosure area.
- **Avoid** heat rocks. These are never a safe or efficient option for any species.

Furnishings

- **Require** a basking area under basking light. For arboreal species, a tree limb should be used; for terrestrial species, a rock or a log.
- **Require** a hiding area that is as big as, but not much bigger than, the animal. Logs, boxes, flowerpots, etc., can be used.
- **Require** a water pan, shallow enough for the animal to easily get in and out of.
- **Require** visual screen from outside world (e.g., world beyond enclosure). Can use paper bags, sheets, towels, etc., to cover enclosure windows/openings.

Additional basking areas and hiding areas will add variety and lower stress for the animal. Avoid stacking furnishings (e.g., rocks, logs) that the animal might knock over and injure itself.

Hot and Wet Climates

The following is required for hot and wet climates in addition to the requirements described above.

Humidity

- **Require** a water bowl under basking light.
- **Require** a humidity gauge.
- **Additional** humidity sources include running water (e.g., fountain, water bowl with aquarium pump), a wet towel hung under a basking light, and frequent misting of the enclosure.

Aquatic Habitat

Substrate

- **Require** a water area deep and large enough for the animal to swim around.
- **Recommend** using an aquarium filter to help keep the water clean and to minimize labor requirements.

Light

- **Require** a basking light with red heat light or a ceramic heat emitter (good for 24-hour use). If possible, solid metal dome should be used on the light fixture to keep as much heat radiating into enclosure as possible.

- **Recommend** a UVB fluorescent light. Use a timer so that light is on from 7 a.m. to 7 p.m. daily. The UVB fluorescent light bulb must be less than six months old, placed within 12 inches of the animal, cover the full length of the enclosure, and not have any solid material (e.g., plastic or glass cover) between the bulb and the animal.
- **Optional** an aquarium water heater. The water need not be warm, but should not be ice cold.

Furnishings

- **Require** a basking platform under basking light. The basking platform must be easily reached by the animal, but still be completely out of the water.
- **Require** a visual screen from outside world (e.g., world beyond enclosure). Paper bags, sheets, towels, etc., can be used to cover the enclosure windows/openings.
- **Recommend** fake plants or floating logs in water to enable a turtle to hide from sight.
- **Additional** basking areas and hiding areas will add variety and lower stress for the animal.
- **Avoid** stacking furnishings (e.g., rocks, logs) that the animal might knock over and injure itself.

Appendix G: Recommended Products and Manufacturers

Light and Heat Sources

UVB light bulbs, red heat lights, ceramic heat emitters, heating pads

- Energy Savers Unlimited, Inc., Carson, CA 90746, www.esuweb.com
- Kane heat mats, Kane Manufacturing, P.O. Box 774, Des Moines, IA 50303, 515-262-3001, www.kanemfg.com
- Zoo Med Labs, Inc., 3100 McMillan Road, San Luis Obispo, CA 93401, 800-542-9988, www.zoomed.com

Commercial Foods

Iguana

- Kaytee Iguana Food, 521 Clay Street, Box 230, Chilton, WI 53014, www.kaytee.com
- Walkabout Farms, PO Box 625, Pembroke, VA 24136, 540-626-3081, www.herpnutrition.com
- ZooMed All Natural Iguana Food
- Aquatic Turtle
- Wardley® Reptile TEN Floating Food Sticks, The Wardley Corporation, a division of Hartz Mountain Corporation

Prey Foods

Insects (live)

- Timberline, 800-423-2248, www.timberlinefisheries.com
- Rainbow Mealworms & Crickets, 800-777-9676, www.rainbowmealworms.com

Rodents (pre-killed)

- Mazuri, 800-227-8941, www.mazuri.com
- Sand Valley Farms, 888-811-MICE, www.pythons.com/sv/

Vitamins/Nutritional Supplements

- Hydration/Electrolyte Supplement
- Pedialyte® Oral Electrolyte Maintenance Solution (unflavored), Abbott Laboratories, Abbott Park, IL
- Gatorade® (fruit flavored), 1-800-88-GATOR, Stokely-Van Camp, Inc., www.gatorade.com

Multivitamin

- Rep-Cal Herptivite™ Multivitamin, 1-800-406-6446, www.repcal.com

Calcium

- Rep-Cal Calcium (Phosphorus free, no Vitamin D3), 1-800-406-6446, www.repcal.com
- HerpCare Calcium Supplement™, Mardel Laboratories, Inc., 1655 West 240th Street, Harbor City, CA 90710, 310-326-2720.
- Powdered Tums™ tablets

Iron

- Lixotinic®, Pfizer
- Powdered iron pills
- Cleaning Products

Cleaners

- All purpose anti-bacteria soap
- Disinfectants
- Household bleach diluted 4 ounces to a gallon of water. Bleach is used only for deep cleaning and disinfection of habitat supplies. A rinse should occur following cleaning. Bleach should also be used when washing towels and other linens. It is a good idea to do a bleach rinse prior to setting up a new habitat as well.
- Nolvasan™ (chlorhexidine diacetate) diluted 3 ounces to a gallon of water or any other basic quaternary antiseptic product. Proper dilution methods for the product should be used. For Nolvasan, the American Humane Association recommends a dilution rate of 3 ounces to a gallon of water. This should be used during the daily cleaning process for cages, flooring etc.

Germicides

- Roccal® - D Plus, Fort Dodge. Roccal is a germicide commonly used in veterinary offices. This should only be used in extreme cases when parasites are obvious and jeopardizing the health of the animal. A veterinarian should be consulted to make that determination. The major concern when using Roccal with reptiles is that the residue can be toxic. A very thorough rinse is necessary.
- External Parasite Treatments
- Provent-a-Mite™, ProProducts™, www.pro-products.com, 845-628-8960

Products that should never be used for the care of reptiles:

- Hot rocks
- Spray-on vitamin supplements
- Spray-on skin conditioners
- Over-the-counter/retail medical treatment products
- Turtle wax
- Leashes or collars
- Cedar wood chips
- Ammonia
- 100% bleach
- Kitty litter

Appendix H: Reptile Care Record Sheet

Animal ID# _____ Date received _____
 Animal Name _____ Species _____

Nutrition Requirements

Types of food _____
 Quantity of food AM _____ PM _____
 Water mist bowl pan

Habitat Requirements

Daytime Temp _____ Humidity _____ Nighttime Temp _____
 Substrate _____ Furnishings _____

Progress Notes

Date	Time	Activity	Detailed Description/Notes
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
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		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	
		<input type="checkbox"/> feeding <input type="checkbox"/> defecation <input type="checkbox"/> medications <input type="checkbox"/> habitat cleaning <input type="checkbox"/> habitat change <input type="checkbox"/> other	

Appendix I: Recommended Reference Sources

Books

Green Iguana, The Ultimate Owners Manual, James W. Hatfield III, Dunthorpe Press, ISBN: 1-883463-48-3, www.iguana.com

Iguanas for Dummies, Melissa Kaplan, ISBN: 0764552600

The Herpetological Library Series, Advanced Vivarium Systems, 1-800-982-9410, www.avsbook.com

A Complete Pet Owner's Manual, reptile series, Barron's Educational Series, Inc., ISBN prefix: 0-8120, 800-645-3476

Tortoise Trust Guide to Tortoises & Turtles, A. C. Highfield, Carapace Press, ISBN: 1-873943-01-6

Reptiles as Pets: An Examination of the Trade in Live Reptiles in the United States, Humane Society of the United States, www.hsus.org/forms/reptile_book.html

Magazines & Newsletters

Reptile & Amphibian Hobbyist magazine, T.F.H. Publications, 211 W. Sylvania Avenue, Neptune City, NJ 07753, 732-988-8400

Reptiles magazine, P.O. Box 58700, Boulder, CO 80322, 800-365-4421

Iguana Iguana newsletter, www.iguana-news.com, ignews@aol.com, P.O. Box 814, Malibu, CA 90265

Websites

Association of Reptile and Amphibian Veterinarians, www.arav.org

Melissa Kaplan's Herp Information Collection, www.nfds.net/~bmyers/melissk/

The Green Iguana Society, www.greenigsociety.org

The Tortoise Trust, www.tortoisetrust.org

California Turtle and Tortoise Club, www.tortoise.org

Green Iguana Care

Facts About Your Green Iguana

- Life Span:** 10 to 15 years average.
- Size:** Adult green iguanas can reach 6 feet in total length and weigh as much as 18 to 20 pounds.
- Maturity:** Iguanas reach maturity at about 18 months.
Female iguanas may develop and lay eggs (without the presence of a male). Female iguanas may be spayed to reduce the chances of egg binding (which can often lead to death).
Male iguanas may become aggressive and territorial at maturity. Male iguanas can be neutered. This may (in some cases) reduce the tendency toward aggression.
- Diet:** Green iguanas are herbivores. This means they eat vegetable matter.
- Habitat:** Iguanas need warm temperatures, high humidity, unfiltered UVB lighting, direct sunlight, and a high-calcium balanced diet. Iguanas are arboreal (tree dwelling) animals, and prefer a habitat where they can climb.
- Handling:** Considerable time must be spent to tame young iguanas. Male iguanas can often become aggressive during breeding season. Iguanas are diurnal, which means they are active during the day.

Feeding Your Green Iguana

Your iguana is an herbivore. In the wild they eat leaves and flowers with some fruit. So, it is important to feed your iguana a similar diet. An ideal iguana diet is a mixture of dark leafy greens such as collard, mustard, turnip, and dandelion greens. Green beans, peas, and a wide variety of squash should be included. Make sure to chop or shred the food to an appropriate size for your iguana. Their teeth are not designed for heavy chewing, and this will make the food more digestible. Fruits such as strawberries, papayas, mangoes, raspberries, melons, and figs can be given, but in a more limited amount. Alfalfa is a nutritious additive, and pellets or powder can be added quite easily.

Many owners make up a “salad” of mixed greens, legumes, shredded squash, alfalfa powder, and a small amount of fruit. This can be made up in advance and stored for a couple of days. It can also be frozen in meal-sized portions. If frozen, these meals should be defrosted, and an iguana vitamin supplement should be added. Variety is helpful in having a healthy iguana, so vary the mixture regularly, but introduce new foods gradually so your finicky iguana will not turn away from his dinner. Iguanas should not be fed rhubarb. Rhubarb is considered to be toxic to iguanas. You should also avoid dog or cat food, insects, mice, or dairy products. Foods that can be fed in limited amounts include: spinach, broccoli, lettuces, corn, brussel sprouts, grapes, and onions.

Fresh drinking water should always be provided for your iguana. Drinking water should be changed daily.

Housing Your Green Iguana

Your iguana’s habitat should be big enough for your iguana to move about freely, and large enough to anticipate growth. Typically, this means a very large enclosure, as iguanas can reach up to six feet in length. They will outgrow a small enclosure. Iguanas like to climb, so adequate branches, shelves, and elevated areas should be provided.

Your iguana is cold blooded and needs to be able to move in and out of warm and cool areas. This is called “thermoregulation.” In order for your iguana to thermo regulate, the habitat must have a “cool side” and a “basking side.” Basking areas should include platforms where your iguana can soak up warmth. “Hot Rocks” should NOT be used with iguanas as they can cause serious burns. Make sure you have thermometers positioned properly within the habitat to monitor temperatures in various locations. Iguanas thrive in environments with a high humidity level. They can be provided with large containers of water in which to swim. Iguanas tend to frequently defecate in their water. Line the cage with proper substrate (linoleum or newspaper).

Habitats, including food and water bowls and substrate should be cleaned regularly and water changed daily to reduce bacteria.

Temperature, Humidity, and Lighting Requirements for Your Green Iguana

Daytime: Your iguana’s cage should be warmer during the day than at night. The “cool side” of the habitat should be between 85 and 90 degrees, with a warmer basking area between 95 and 100 degrees. If the temperature is too cool, your iguana will not be able to digest his food properly.

Unfiltered, UVB fluorescent lighting must be on for approximately 10 to 12 hours during the day. Direct sunlight is also appropriate.

Nighttime: No white lights should be used at night. Give your iguana a chance to experience normal darkness. However, a ceramic heating element can be used to provide heat without light. The “cool side” of the habitat should be between 75 and 80 degrees.

Humidity: Iguanas need a very humid environment. You can achieve a high level of humidity by misting with water several times each day.

Salmonellosis

Most, if not all, reptiles carry Salmonella bacteria in their intestinal tract and intermittently or continuously shed these bacteria in their feces. Salmonella bacteria usually do not cause any illness in reptiles, but can cause serious illness in people. Unfortunately, Salmonella bacteria cannot be eliminated from the intestinal tract of reptiles.

Salmonella bacteria are easily spread from reptiles to humans. Humans may become infected when they place objects that have been in contact with the stool of reptiles, including their hands, in their mouths. For example, infants have become infected after drinking from bottles of infant formula that became contaminated during preparation. Individuals who prepared the formula had not washed their hands after touching a reptile or reptiles were allowed to walk on kitchen counters.

This information is excerpted from a handout that was developed by the Association of Reptilian and Amphibian Veterinarians in collaboration with the Centers for Disease Control and Prevention and is intended for informational purposes only; please seek advice from your physician and your reptile's veterinarian if questions or problems occur.

RESPONSIBLE OWNERSHIP BEGINS WITH THE TRIP HOME!

Remember to take your new reptile directly home today. If you have supplies to purchase, check with adoption staff to see if you can come back later to pick up your pet. This will ensure that the animal encounters the least amount of stress. Have your habitat completely set up beforehand, and allow your new iguana to have plenty of time to adjust to his new surroundings.

Three-Toed Box Turtle Care

Facts About Your Box Turtle

- Life Span:** 30 to 40 years average.
- Size:** Adult three-toed box turtles can reach 5 inches in diameter.
- Diet:** Box turtles are terrestrial omnivores. This means they live on the ground and normally eat both plant and animal matter.
- Habitat:** Box turtles need warm temperatures and high humidity. They are somewhat private and need hide boxes and screens to reduce stress.
- Handling:** These are not pets to be “handled.” They are shy and somewhat difficult to tame. Box turtles are diurnal, which means they are active during the day.

Feeding Your Box Turtle

Box turtles need a balanced diet of both plant and animal matter. A good rule of thumb for feeding box turtles is about 60 percent plant matter and 40 percent animal matter. Diet suggestions include: earthworms, mealworms, crickets, waxworms, and even reduced-fat dog foods. Fruits and vegetables can include mushrooms, leafy greens, berries, and bananas in moderation. Thawed, mixed, frozen vegetables, cauliflower, and squash should be cut to an appropriate size for your turtle. Calcium is important for proper shell growth. Live foods may be fed calcium rich foods, or dusted with calcium and vitamin D3 powder supplement, prior to introduction to your turtle. Canned land turtle food is also available, but should always be supplemented with fresh and live foods.

Fresh drinking water should always be provided for your box turtle. A shallow water dish is recommended to allow your box turtle to soak without the risk of drowning. Make sure the dish is low enough for the turtle to easily enter and exit. Drinking water should be changed daily.

Housing Your Box Turtle

Ideally, your box turtle would live outdoors in a shaded, heavily forested or planted area. Outdoor pens should have damp moss, compost, or leaf litter substrate, which should be deep enough for burrowing. Access to a shallow bathing pond is crucial. If kept indoors, individual turtles can be housed in a 30 to 40 gallon terrarium. Humid substrates such as moss or leaf-litter must be used and should be deep enough to allow the turtle to burrow. Provide plenty of screens and hide boxes to reduce stress. Your three-toed box turtle may hibernate if healthy and provided with appropriate conditions.

If kept outdoors, your box turtle may hunt for live prey. This can provide excellent stimulation for your turtle. Caution should be taken to avoid garden insecticides or “slug bait” anywhere near box turtles.

Habitats, including food and water bowls and substrate, should be cleaned regularly and water changed daily to reduce bacteria.

Temperature, Humidity, and Lighting Requirements for Your Box Turtle

- Lighting:** Box turtles do not like bright light, but do require a relatively constant temperature. Shaded UV lighting can be provided for 8 to 10 hours per day. Using a timer will help eliminate stress from too much light.

Temperature: Temperature should be approximately 80 degrees. A low-heat spotlight can be used for basking, but temperatures should not exceed 85 degrees. Basking lamps can be problematic for box turtles. An under-tank heater is preferable to provide a constant background heat. Ideal weather for a three-toed box turtle is warm and overcast.

Humidity: Box turtles need a very humid environment. You can achieve a high level of humidity by misting with water several times each day and using a high moisture substrate. Shallow soaking bowls will increase humidity levels, while providing a necessary bathing area for your turtle.

Salmonellosis

Most, if not all, reptiles carry *Salmonella* bacteria in their intestinal tract and intermittently or continuously shed these bacteria in their feces. *Salmonella* bacteria usually do not cause any illness in reptiles, but can cause serious illness in people. Unfortunately, *Salmonella* bacteria cannot be eliminated from the intestinal tract of reptiles.

Salmonella bacteria are easily spread from reptiles to humans. Humans may become infected when they place objects that have been in contact with the stool of reptiles, including their hands, in their mouths. For example, infants have become infected after drinking from bottles of infant formula that became contaminated during preparation. Individuals who prepared the formula had not washed their hands after touching a reptile or reptiles were allowed to walk on kitchen counters.

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Bearded Dragon Care

Facts About Your Bearded Dragon

- Life Span: 10 years average.
- Size: Adult bearded dragons can reach 23 inches in total length.
- Diet: Bearded dragons are terrestrial omnivores. This means they live on the ground and normally eat both plant and animal matter.
- Habitat: Bearded dragons need warm temperatures and relatively dry, desert terrariums.
- Handling: Bearded dragons are very mellow and can be tamed more easily than some lizards. Children should always be supervised when handling lizards. Bearded dragons are diurnal, which means they are active during the day.

Feeding Your Bearded Dragon

Bearded dragons need a balanced diet of both plant and animal matter. Juvenile dragons should be offered more protein than adults. Plant protein should consist of dark leafy greens such as collard greens and mustard greens, and chopped or grated vegetables such as zucchini, lima beans, squash, peas, and beans. Fruits including mangos, strawberries, bananas, and tomatoes can also be offered, but in more limited amounts than vegetables. Fruits should only make up about one-fourth of the total vegetable diet. Make sure to chop or shred the food to an appropriate size for your dragon. Alfalfa is a nutritious additive, and pellets or powder can be added quite easily.

Animal proteins should consist of appropriate-sized mealworms and crickets. Live foods may be fed calcium rich foods, or dusted with calcium and vitamin D3 powder supplement, prior to introduction to your dragon. Pelleted bearded dragon diets are available and can be made available at all times on a “free feed” basis.

Fresh drinking water should always be provided for your bearded dragon. Drinking water should be changed daily.

Housing Your Bearded Dragon

Your bearded dragon can be kept in a 40- or 50-gallon aquarium. While you could start initially with a smaller aquarium, your dragon will grow to full length within the first two years. A screen lid is necessary for adequate ventilation. And under-tank heater should be used to create a warm environment throughout.

Your bearded dragon is cold blooded and needs to be able to move in and out of warm and cool areas. This is called “thermoregulation.” In order for your dragon to thermo regulate, the habitat must have a “cool side” and a “basking side.” Basking areas should include platforms where your dragon can soak up warmth. “Hot Rocks” should NOT be used, as they can cause serious burns. Make sure you have thermometers positioned properly within your habitat to monitor temperatures in various locations.

Two to three inches of sand substrate is ideal to allow for natural burrowing. Reptile bedding or granite or limestone sands may also be used.

Habitats, including food and water bowls and substrate, should be cleaned regularly and water changed daily to reduce bacteria.

Temperature, Humidity, and Lighting Requirements for Your Bearded Dragon

Lighting: Bearded dragons require 8 to 10 hours of ultraviolet light. Using a timer will help eliminate stress from too much light. A full spectrum UVB lamp is necessary to help your dragon absorb calcium and vitamin D3. The bulbs should be changed yearly. Exposure to natural sunlight periodically is also recommended.

Temperature: Your bearded dragon's cage should be warmer during the day than at night. The "cool side" of the habitat should be around room temperature, and can fall as low as 60 degrees at night. The "warm side" of the habitat should have a localized basking area. Adult bearded dragons prefer 85 to 95 degrees, while juveniles and hatchlings prefer warmer temperatures between 95 and 105 degrees. Be careful to monitor the temperatures closely. More than one thermometer is recommended.

Humidity: Bearded dragons need approximately 35 percent humidity. Younger dragons can be misted daily.

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