Husbandry For Wild Turtles:

Steps to Successful Rehab

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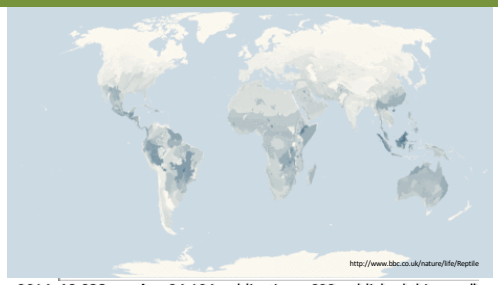
Overview

- **Species ID**
- **Components of Husbandry**
- **Rehab Set Ups**

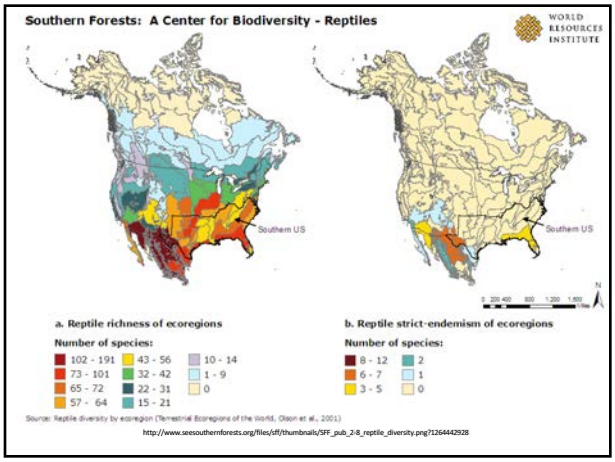
Reptile Diversity

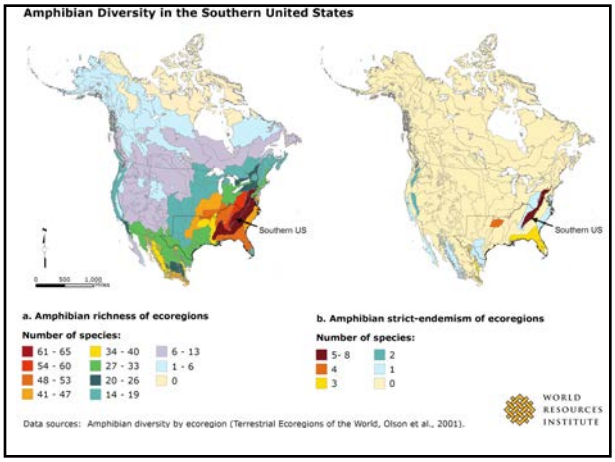
its Beautiful . . .



2014: **10,038 species**, 34,104 publications, 698 published this year."

2013: 9,831 species and 31,756 literature references, 386 published in 2013."
www.reptile-database.org





Common Florida Species

- Spotted Turtles
- Box Turtles
  - Eastern
  - Florida
  - Ornate
  - Gulf Coast
  - Three Toed
- Chicken Turtles
  - Eastern Chicken Turtle
  - Florida Chicken Turtle
- Diamondback Terrapins
  - Carolina
  - Eastern Florida
  - Ornate
  - Mangrove
- Barbour's Map Turtle
- Red-eared Slider
- Mud Turtles
  - Striped Mud Turtle
  - Eastern Mud Turtle

Common Species

- Musk Turtles
  - Loggerhead
  - Striped Necked Musk
  - Eastern Musk
- Florida Softshell Turtle
- Spiny Softshell Turtle
- Cooters
  - Florida
  - River Cooter
  - Suwannee Cooter
  - Peninsula Cooter
- Florida Red-bellied Turtle
- Yellow-bellied Slider
- Snapping Turtles
  - Common
  - Florida
  - Alligator Snapping Turtle
- Gopher Tortoise

Spotted Turtle
(*Clemmys gutatta*)

- Size: 3.5-4.5 inches, small
- Identifying features: yellow polka-dot carapace pattern
- Habitat: Semi-aquatic
- Diet: crustaceans, crayfish, worms, occasional duckweed

Eastern Box Turtles
(Terrapene carolina carolina)

- Size: 4-6 inches
- Identifying features:
  - High dome carapace
  - Radiating yellow lines through carapace
  - Yellow-Orange necks
- Habitat: woodlands, forests, near water
- Diet: omnivorous, berries, flowers

Ornate

- High dome carapace with intense radiating lines on carapace

Florida Box

- Size: 6 inches
- Similar to Ornates but with facial stripes
- True 3 toed (hinds)

Three-Toed

- 6.5 inches
- Drab olive/brown carapace with radiating lines
- 3-4 toes on hindlimb

Gulf Coast

- Largest of them all 8 inches
- No unique shell color pattern, adults develop white/red spots on face and forelimbs

Red Eared Slider
(Trachemys scripta elegans)

- Size: Males: 5-6 in -- Females: 8-12 in
- Identifying features:
  - Classic red stripe behind the eye
  - Yellow and green linear pattern in skin
  - Smooth, streamline shell
- Habitat: Aquatic
- Diet: omnivorous

Eastern River Cooter
(Pseudemys c. concinna)

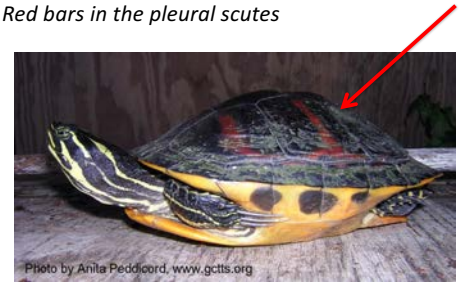
- Size: Big! 12-16 inches
- Identifying features:
  - Backward "C" on pleural scutes
  - Black circles on underside of marginal scutes
- Habitat: Aquatic
- Diet: Vegetation

Florida Cooter
(Pseudeys floridana)

- Size: 9-13 in
- Identifying features: no hairpin stripes on the head, U-shaped cusp in the upper jaw, plastron solid yellow
- Habitat: Aquatic
- Diet: opportunistic omnivores

Red Bellied Cooter

- *Pseudemys rubriventris*
  - *Red bars in the pleural scutes*



Chicken Turtles
(Deirochelys reticularia (chrysea)

- Size: 6-10 inches
- Identifying features: neck =length of plastron, plastron solid yellow, neck legs = yellow/orange stripes
- Habitat: Semi-Aquatic, quiet waters
- Diet: crustaceans, aquatic insects, tadpoles, fish, and plants

Diamondback Terrapin
(Malaclemys t. terrapin)

- Size: Ladies 7-9 in and males 4-5 in
- Identifying features:
  - Head- silver-grey with black dots
  - Yellow to tan beak
- Habitat:
  - Brackish water, along the shore
- Diet: Crustaceans, fish

Barbour's Map Turtle
(Graptemys barbouri)

- Size: 4.5 in-12 in
- Identifying features:
  - Carapace: vertebrae serrated spines!
  - Eye glam, Cross under the chin
- Habitat: Aquatic
- Diet: primarily aquatic snails and freshwater mussels,

Mud Turtles
(*Kinosternon subrubrum)*

- Size: Small- 4 inches
- Identifying features:
  - Long upper beak
  - Smooth tiny carapace
  - Double hinge in the plastron
- Habitat: stream-bottom walker
- Diet: crustaceans, crayfish, worms

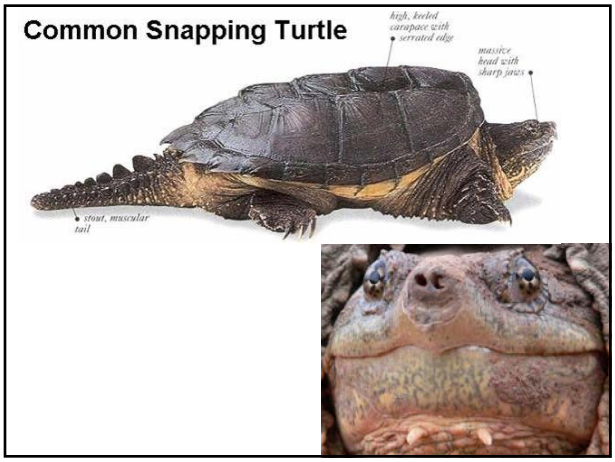
Mud Turtles

Musk Turtle or StinkPot
(Sternotherus odoratus)

- Size: 4 in
- Identifying features:
  - High dome, Olive Carapace
  - Single hinge in plastron
  - Whisker-like projections on the chin
  - Musk glands along the bridge- nasty mood!
- Habitat:
  - Bottom walker, low-level streams, nocturnal
- Diet: crustaceans, crayfish, worms

Snapping Turtle
(Chelydra s. serpentina)

- Size: 14 in -16 in
- Identifying features:
  - Looks like a dinosaur
  - Spiked tail, long limbs, neck and tail, small shell
- Habitat: mud and wetlands
- Diet: carnivorous



Alligator Snappers
(Macrochelys temminckii)

- Size: 31-39" (70-80 kg)
- Identifying features: Spikes everywhere
- Habitat: deep rivers, swamps
- Diet: eating frogs, snakes, snails, worms, clams, crayfish, insects and aquatic plants

Spiny Soft Shelled Turtle
(Apalone s. spinifera)

- Size: Ladies-16 in, males - 8 in
- Identifying features:
  - Snout like a snorkel!
  - Very flat, leathery, soft shell
  - Streamline, tan shell in color with open black circles
- Habitat: Aquatic
- Diet: crustaceans, crayfish, worms, occasional duckweed

Gopher Tortoise
(Gopherus polymerus)

VULNERABLE
VU

- Size: 9-11 in
- Identifying features: strong legs, dome carapace, serious face
- Habitat: sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammock, pine-mixed hardwoods, and coastal dunes
- Diet: wiregrass, broadleaf grasses, and legumes, prickly pear cactus, blackberries, paw-paws, and other seasonal fruits

Turtle Species
(Latin Name)

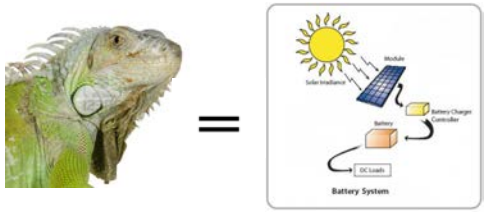
- Size:
- Identifying features:
- Habitat:
- Diet:

Moving on . . .

Components Of Husbandry

- Temperature Parameters
- Light Cycle & Spectrum
- Humidity Parameters
- Substrate
- Containment
- Diet
- Enrichment

Why Temperature Is So Important?



- **Reptiles are Solar Batteries**
- Poikilotherms ≠cold blooded
- Metabolic energy demands: 1/10th that of mammals
- Metabolism, immune function, digestion, normal appetite, normal activity

Temperature

- "Thermoregulation is controlled by the pre-optic nucleus of the hypothalamus in the brain."- O'Malley

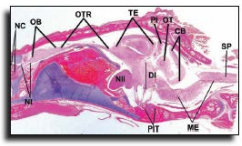
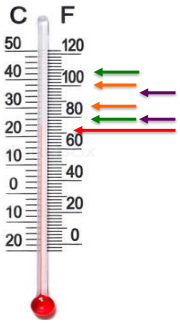


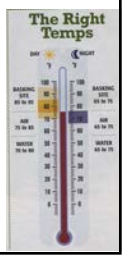
Figure 1.302 Green iguana, Iguana iguana. Iguanidae. Subgross sagittal section of the head. The following structures are noted: cerebellum (CE), diencephalon (DI), medulla (ME), nasal cavity (NC), olfactory bulb (OB), olfactory nerve (NI), olfactory tract (OTR), optic nerve (NII), optic tectum (OT), pineal gland (PI), pituitary gland (PIT), telencephalon (TE), and spinal cord (SP). H&E stain.

Jacobson. Infectious Disease and Pathology of Reptiles. 2007

Who Needs What Temp Range?

- ALL species-specific, find out @ chelonia.org





Heat Options

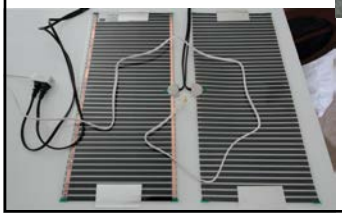
- Bulbs
  - Infrared: red
  - Mercury Vapor
  - Ceramic
  - Radiating Panels
- Heating Mats/Pads:
  - attach to outside of cage
- NEVER heat rocks!

Heating the Water

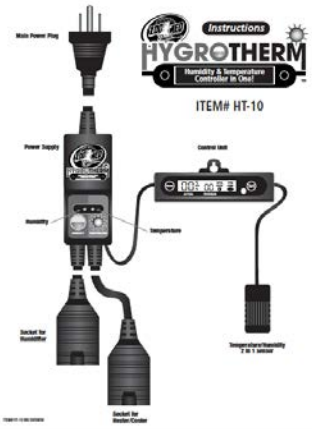
- Aquarium Heaters
  - Come in all sizes!
- Tank near the window/ radiator
- Overhead fixtures- be careful

Advanced Heating Options

- Radiating Panels
- Heating Mats/Tape

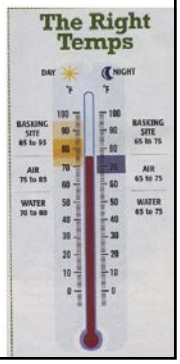


Controlling Heat

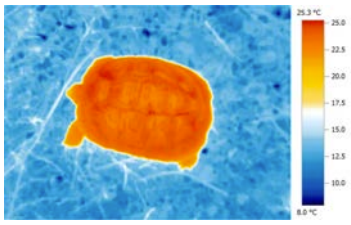


Thermometers

- Thermometers
  - Minimum of 2
  - One under basking site
  - One on opposite side of tank
  - Digitals are helpful
- IR gun or Thermal Camera
- Water:
  - Aquarium thermometer



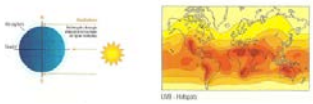
How Well is my hear source working?



Water Temp & Quality

Light Cycles & Spectrum

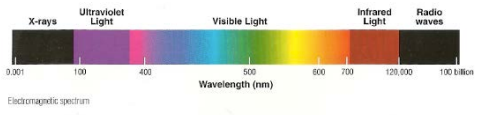
- 2 factors
  - Exposure to ambient light
    - Breeding, Thermoregulatory behavior, Metabolic Temperature Cues for Seasons
  - Exposure to UVB spectrum
    - Calcium absorption and healthy bones!



Exoterra Reptile Lighting Guide

Light Cycle & Spectrum

- UVB
  - Conversion of pre-Vitamin D3
  - Basking turtles have a NEED this.
  - CANNOT use VitD2 found in plants!
  - **UBV Spectrum: 290-320nm**



Spectrum Options

Light Fixtures

What are the UVB bulbs really doing?

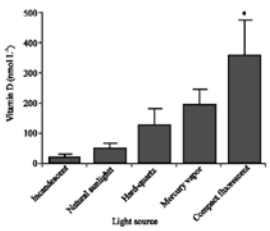


Fig. 1:
Serum vitamin D concentration and type of light exposure.

Serum Vitamin D Levels and Skeletal and General Development of Young Bearded Dragon Lizards (*Pogona vitticeps*), *underDifferent Conditions of UV-B Radiation Exposure.* Journal of Animal and Veterinary Advances, 2011.10: 2; 229-234.DOI: 10.3923/javaa.2011.229.234

Spectrum Pros & Cons

- Mercury Vapor:
  - Pros: Heat +Visible light + UVB radiation,
  - Cons: High energy use and drastic UVB instability
- Fluorescent (Including Compact fluors):
  - Pros: Superior UVB emittance, cause higher Vit D3 production?
  - Cons: Will not produce much heat
- Incandescent:
  - Visible Light only UVA, NO UVB
  - Some good for heat (infrareds- bulbs that are colored glass, no coated improve heat conduction)

Humidity

*"The ability to **reduce** these minute **water loss**es is now considered **important for** long-term health and possibly for **reduction of** the likelihood for **kidney disease**."*

–Rossi: Mader.2006

Humidity Parameters

Hydroregulation:
Modification to preserve water

- Scales
- Kidney physiology
- Cloacal and Colonic modifications
- Salt Glands

Humidity & Water for Land Goers

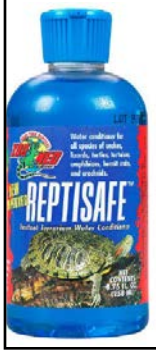
- Humidity
  - Small Humidifiers near the cage
    - In the bathroom for 15-20 minutes during shower
  - Avoid using substrates for moisture alone
  - Do not sacrifice ventilation for humidity
- Water Sources
  - Small shoebox/ shallow water bowl
  - Large Water Basins

Substrates

- Particulates
  - Natural: organic soil, coconut earth
  - Artificial: Carefresh, old clothes, towels
- Turf
  - Carpet
  - Newspaper, Butcher Paper
- Cage Accessories/Hide
  - Terra Cotta pots, leaves, cardboard box

Substrates

Substrate- Water



Filtration & Water Changes

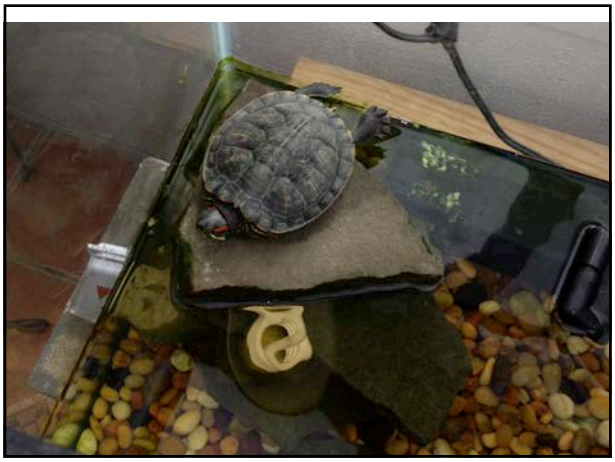
- Use filters for long term patients
  - (removes particles, does not purify the water)
- Perform ½ volume water changes every 2 weeks
- Use spring water, rain water, avoid tap water
  - Leave tap water out for 24h for chlorine to evaporate
  - Better Even: Treat it with ReptiSafe

Terrestrial Turtle Set Up

Box Turtle Example

Temporary Aquatic Set Up

Tortoises



Diet

- Whole food items (vegetation, insects, fish)
- Recovery diets
  - Mazuri Reptile & Amphibian Gel: https://www.youtube.com/watch?v=BV8FgQJ7Acg
  - Fruits (papaya, berries- bright colors)
  - Organic greens/baby food/fruit purees
  - Steam hay/grasses (with fruit juice)

Vegetable Options

Dandelion Greens

•Good calcium source (Ca:P is 1.3:0.4)
•Good source for Vitamin A: 2712 IU ☺
•Good for Vitamin C: 20mg per cup
•86% water, 18% Protein, 11% fiber,5% fat , Carbs 61%

Romaine Lettuce

•Good calcium, Ca:**P** (1.1:0.4)
•Great source of Vitamin A 5837IU and Vitamin C 24mg
•Protein 36%, fiber 11%,
•94% water, 7% fat, Carbs 50%

Collard Greens

•Calcium (1.0: 0.1)
•Vit. A 2400IU
•Vit. C 12.7 mg
•Water 96%
•Protein 0.88g
•Fiber 1.3g
•Carbs 2.05g

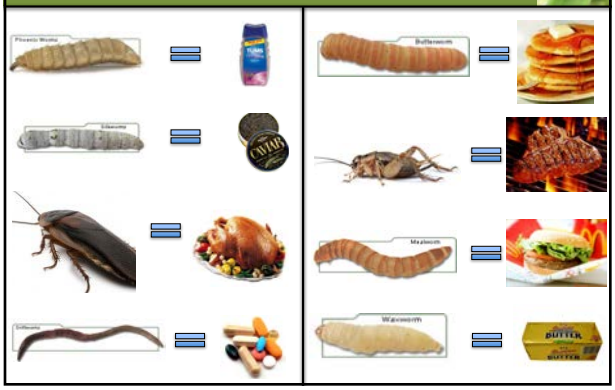
Mustard Greens

•Good calcium, Ca:P is 1:0.3
•Great for Vitamin A 5880 IU
•Great for Vitamin C 39.2mg
•Water 93%, protein ,
• Fiber 1.8g, Carbs 2.74g
•Supplement with Lite table salt

Red Leaf Lettuce

Calcium 9mg
Vit. A 2098IU
Vit. C 1mg
Water 92%
Protein 0.37g
Fiber 0.3g
Carbs 0.63g

Insect Visual Guide



Nourish Your Prey

- Insect care
  - Well-hydrated
  - Well nourished
  - Feed calcium rich diet before offering to insectivore at least 24 hrs prior (not more than 9% total calcium)
  - Can be kept at home/bred at home

Aquatic Diet






Last Note: Enrichment

- Evidence in literature for reptiles: important
- Exposure to outdoors is best
- Hides, Large PVC tubes, tennis balls, wiffle balls, brush toys, scent enrichment, exercise/exploration

That's a LOT to remember!

- Let's take a break!
- Any Questions ?