

Field Herpetology Final Guide

- Questions with more complexity will be worth more points
- Incorrect spelling is OK as long as the name is recognizable (*by the instructor's discretion*)
- **Common names will not be accepted**

Structure

Part 1: Short answer questions

Part 2: Specimen identification questions

Part 3: Frog call identification questions

Topics

- Field notebooks
 - Type we're using
 - How it's setup
 - Importance of keeping a field notebook
- Animal handling
 - How to hold...
 - Frogs (small and large)
 - Salamanders (small and large)
 - Turtles (small and large)
 - Snakes
 - How to pick up a snake safely
 - Signs of stress in amphibians and reptiles
 - Reactions to expect
 - Reactions not unexpected, and subsequent actions you should take
 - Why is it important to wash your hands?
 - Habitat restoration
 - How to return habitat to its natural state
 - Importance of returning animals to their original location
- Three major groups of amphibians
 - What unites them into a single group?
 - Scientific name of the major groups
- Be able to identify amphibians with their **scientific name** after reading physical descriptions
 - For amphibians with new genera names, I'll accept either the old genus or new genus name
- Be able to compare similarities and differences between similar species

- When breeding timing details are given, be able to predict what amphibians you would find in a given time of year
- When sexing information is given, be able to differentiate between males and females of that species
- Which frogs are mostly aquatic? Which are mostly terrestrial?
- Which salamanders are mostly aquatic? Which are mostly terrestrial?
- Why is there a debate about whether the mudpuppy is a true CT species?
- When egg laying information is given, be able to predict which species laid them based on their location.
- What is the most endangered amphibian in CT?
- Four major groups of reptiles
 - What unites them into a single group?
 - Scientific name of the major groups of reptiles
- Be able to identify reptiles with their **scientific name** after reading physical descriptions
 - For reptiles with new genera names, I'll accept either the old genus or new genus name
- Be able to compare similarities and differences between similar species
- When juvenile morphology is given, be able to predict if an individual is a juvenile or an adult.
- When sexing information is given, be able to differentiate between males and females of that species
- Be able to name the different parts of a turtle shell.
- Which turtles are mostly aquatic? Which are mostly terrestrial?
- Which snakes are mostly aquatic? Which are mostly terrestrial?
- What kind of habitat does CT's only lizard prefer?
- Know the snake diet specialists (e.g. hognose specializing on frogs and toads, etc.)
- Know the hognose and ringneck snake defensive behaviors
- Know the differences between the two CT venomous snakes
- What is CT's most endangered reptile?
- Four key factors to understanding which species occupy a habitat
- Aquatic habitats
 - Know how fast water flows in that habitat
 - Know depth of water in that habitat
 - Know oxygen content of water in that habitat
 - Know seasonal variability of the habitat
 - Frozen solid or only surface freezing?
 - Does it dry up in the summer?
 - Know fish predation risk in that habitat for certain species
- Terrestrial habitats
 - Know how well the habitat retains moisture
 - Know availability of cover objects
 - Know degree of tree canopy cover
- What is an edge habitat? What can cause edge habitats?

- Know which herpetological catching technique is appropriate for...
 - Estimating the biodiversity of an area
 - Finding rare species
 - Catching fast lizards
 - Handling large/venomous snakes
 - Finding turtles
 - Catching small aquatic animals
- Be able to describe how to execute each herpetological catching technique
- Know the appropriate size measurement technique for each species
- Be able to write a plan to collect and process a given species for particular data (e.g. write a plan to collect many turtles, measure their size, and collect DNA)
- Understand which tissue collection method is appropriate for which species
- Why aren't amphibians and reptiles a true clade?
- Generally, know relative relationships
 - Examples...
 - Are Ambystoma salamanders more closely related to newts or red-backed salamanders?
 - Are turtles more closely related to lizards and snakes or to crocodiles?
 - Are ring-necked snakes more closely related to garter snakes or to black racers?
 - Which CT salamanders are members of the lungless clade Plethodontidae?
 - Which CT frogs are members of Ranidae (the "true frogs")?
 - Which CT frogs are members of Bufonidae (the "true toads")?
 - Which CT frog is a member of a very early branch of frogs?
 - Which CT species are members of Natricinae (the "true water snakes")?
- What is the name of the group of snakes that copperheads and timber rattle snakes belong to?
- What group of turtles do most CT turtles belong to?
 - Which species are not part of this group?
- What is physiology?
- What is an ectotherm?
- How do changes in temperature affect animal function in amphibians?
- Know where to expect an amphibian given an outside temperature
- Know the different amphibian overwintering strategies
- What are the advantages and disadvantages of amphibian skin in relation to water retention and loss?
- How do amphibians drink?
- Compare and contrast water regulation strategies of a toad and a frog (e.g. *B. americanus* and *R. clamitans*)
- What are the four amphibian ontogenies seen in CT?
 - How do they differ in terms of the number of steps each takes?
 - Know what species employ each ontogeny
- Compare and contrast regeneration abilities in salamanders and frogs

- How do changes in temperature affect animal function in reptiles?
- Know where to expect a reptile given an outside temperature
- How do reptiles regulate their body temperature?
- What physiological processes would require a snake to bask for long periods of time?
- Know the different reptilian overwintering strategies
- What are the reptilian water regulation strategies most important for CT reptiles?
- What are the advantages and disadvantages of reptilian skin in relation to water retention and loss?
- How do reptiles drink?
- Compare and contrast different methods of excreting nitrogenous waste used by reptiles
- Be able to draw the relationship between temperature and sex for turtles
- Know the three snake birthing strategies, which snakes use which strategies, and possible adaptive significance of different strategies
- Be familiar with various institutions that act as natural history collections
- What kinds of biological materials do natural history collections accept?
- What are the three most important pieces of data that need to be included with samples submitted to natural history collections?
- What is the term for the specimen used to describe an entire species in a formal scientific paper?
- Be able to describe the value of natural history collections
 - In terms of studies that can be done with the biological materials
 - In terms of the public viewing biological material on display (*a la* natural history museums)
 - In terms of preserving information about extinct species
- What kinds of challenges do natural history museums face when keeping biological material properly stored?
- What is locomotion?
- Describe the position of the limbs in salamanders, crocodiles, and lizards
- What is gait?
- Be able to identify the type of gait used by particular species
- How are walking / short hopping frogs morphologically different from their jumping relatives?
- How is turtle walking different from typical herp walking?
- What adaptations do frogs possess that allow them to jump long distances?
- Be able to describe the four type of snake locomotion
- Compare and contrast swimming in tadpoles and salamander larvae
- Describe how “frog-kicking” and “turtle paddling” are similar to terrestrial locomotion for these species
- Know the two main types of feeding, and the species that use these types
- What kind of feeding is suction feeding classified as?
- What species uses suction feeding?
- How does suction feeding work?
- Know the strategies snakes use to eat their prey

- How does copperhead venom work?
- How does timber rattlesnake venom work?
- Why is the Plethodontid salamander feeding strategy still very effective in cold temperatures?
- Know why amphibians and reptiles do not qualify as “eusocial” or semi-social animals
- What is the function of the frog call?
- What sex of frog primarily calls?
- Be able to describe the mating strategies of...
 - Spring peepers
 - Bullfrogs
 - American toads
- Compare and contrast frog nuptial pads and salamander sexual excrescences
- Compare and contrast frog copulation postures with the red-spotted new copulation posture
- Why do male frogs mount female frogs? (Think external versus internal fertilization)
 - What is this copulation position called in frogs?
- Be able to identify the family of frogs that lays a particular kind of egg
 - Egg string versus clumps of eggs
- Be able to differentiate between...
 - Bufonid tadpoles, bullfrog tadpoles, and all the other ranid frog tadpoles (you won't be asked the difference between wood frog and green frog tadpoles, for example)
- Compare and contrast the various salamander copulation postures with one another
- Compare and contrast *Ambystomidae* salamander spermatophore deposition with *Plethodontidae* spermatophore deposition
- Be able to draw a diagram of terrestrial *Plethodon* tail-walking (who is on top? On the bottom?)
 - What are some common behaviors of the male *Plethodon* salamander during tail-walking?
- Compare and contrast salamander egg depositions sites between Connecticut salamanders
- Which two CT turtles exhibit male-male competition?
- Where do turtles typically create egg nests?
- Be able to describe various behaviors and mating strategies that lizards employ, in a general sense
- Be able to describe lizard and snake copulation posture
- Which CT squamates exhibit male-male competition?
- Compare and contrast lizard and snake sperm packet delivery with salamander spermatophore delivery
- Be able to describe time of mating and mating strategies for those CT snakes mentioned specifically in lecture
 - Which snake species exhibit scramble competition, where many males scramble to mate with a single female soon after emergence in the spring?

- Describe how timber rattlesnakes establish dominance between males
- What are some of the biggest challenges when attempting to conserve a particular species?
- Compare and contrast species protection as the level of...
 - International governance
 - Federal governance
 - State governance
 - Non-governmental organizations
- Be able to describe how the different levels of government and conservation agencies / groups act to protect species. What is the role of each agency or group?
- Be able to describe, and give specific examples of, ways species become imperiled (e.g. the indigo snake as a victim of resource loss and collateral damage)
- Be able to describe different solutions, the challenges associated with these solutions, and examples of potential solutions, to species imperilment
- Compare and contrast the two known species of Chytrid fungus that infect amphibians
 - What kind of amphibians do each infect?
- What is the technical term for a chytrid fungus infection?
- Describe how frogs endemic to tropical cloud forests are particularly vulnerable to chytrid fungus infections
- Be able to describe the current status of chytrid fungal infections in CT, in regard to the status of both Bd and Bsal