

# Herpetofauna Biodiversity on United States Army Installations



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# Acknowledgements



- Natural Resources Legacy Program: Project Number 13-642; report available at: <http://www.denix.osd.mil>
- Office of the Assistant Chief of Staff Installation Management (OACSIM), Environmental Programs Division, Environmental Quality Branch
- Army and Army National Guard installation and Command natural resource personnel
- Partners in Amphibian and Reptile Conservation
- State Wildlife Agencies



# Purpose/Need of the Investigation

Purpose: to review, update and analyze amphibian and reptile (herpetofauna) species lists of Army and Army National Guard installations in the continental U.S. with Integrated Natural Resources Management Plans (INRMPs) as part of a overall DoD-wide comprehensive inventory.

Need: no Army-wide comprehensive inventory of the herpetofauna diversity has been conducted on Army properties; accurate and comprehensive biotic inventories are essential for effective management and conservation of natural resources.

Rainbow Snake



Green Sea Turtle



Barking Treefrog



# Methods-Inventory Development

1. A preliminary list of reptile and amphibian species was developed for each Army installation in the continental U.S. using data from field guides, VertNet, National Amphibian Atlas and other data sources.
2. Each preliminary species lists was then sent to a State wildlife agency biologist/herpetologist or a regional expert to verify that the species on the list could potentially occur on the installation based upon the known species distribution and habitat.

Marbled Salamander



Eastern Spadefoot



# Methods-Inventory Development

3. Each species list was then compared to the existing installation INRMP species list (if available) and survey/species inventory reports to identify those species that have been confirmed present on the installation.
4. Lastly, species lists were sent to the Army's Office of the Assistant Chief of Staff Installation Management for distribution to installation's natural resource personnel for review and validation before becoming final.

Northern Two-lined Salamander



Chris Petersen

Northern Cricket Frog



Seth Berry

# Confirmed and Potential Determination

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Each species/subspecies in the inventory received a determination of confirmed present or unconfirmed/potential.

- Confirmed: when there is literature (site-specific survey, inventory) or other documentation (INRMP, personal observation, photo voucher) endorsing that the species occurs on the installation.
- Potential/Unconfirmed: when the installation property is within the natural range of that species and the species has been documented in the same county as a particular military installation, but a specimen has not been confirmed within the boundaries of the installation.

# Analysis

Data summarized for all Army installations based on the categories below:

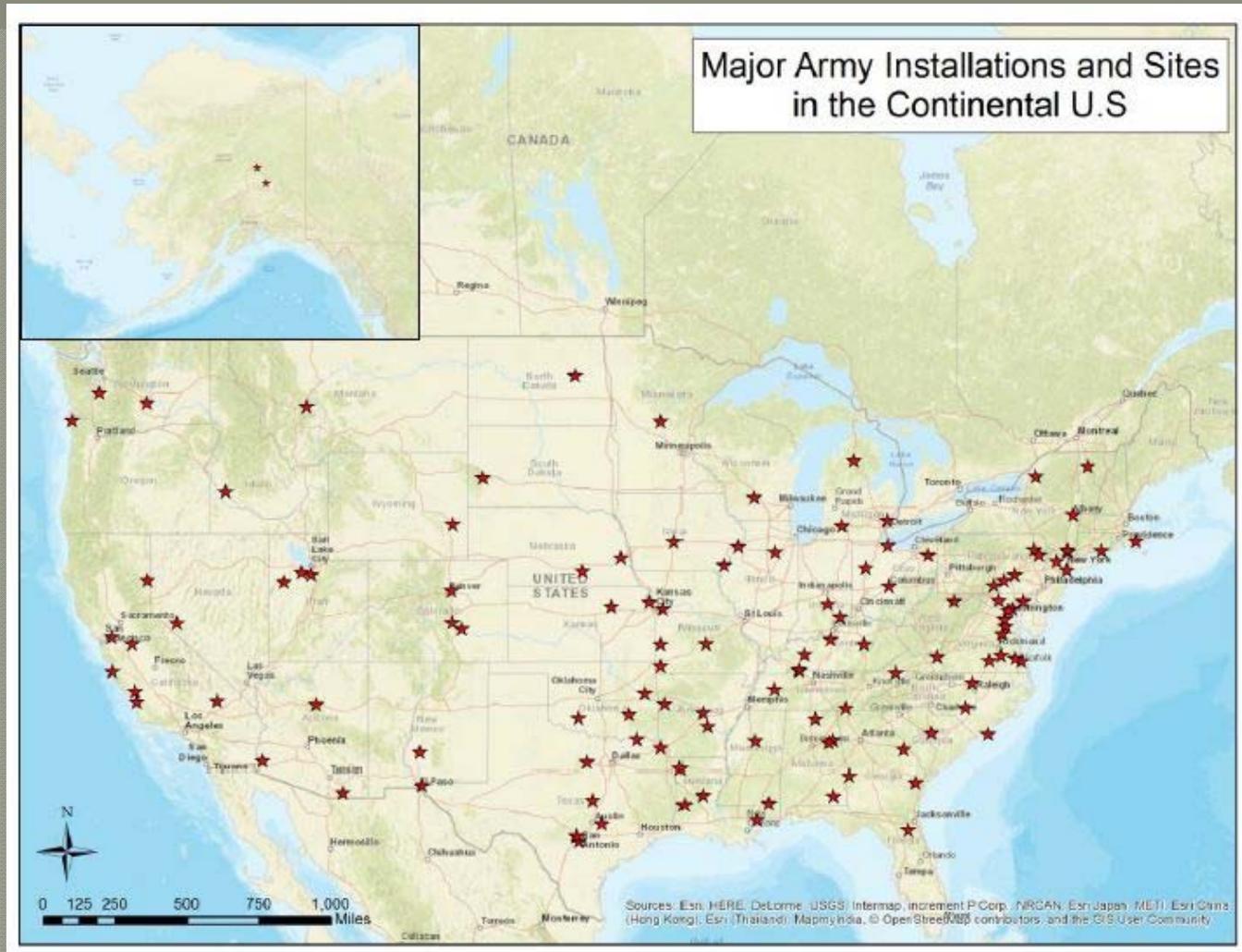
- Confirmed and Potential Determination
- Federal Status
- State Status
- NatureServe (G1-G3)
- Non-native Species
- Venomous Species



Paul Block

# Results- Army Installations

Herpetofauna species lists were updated and analyzed for 152 Army and Army National Guard installations



# Results

## Confirmed and Potential Species

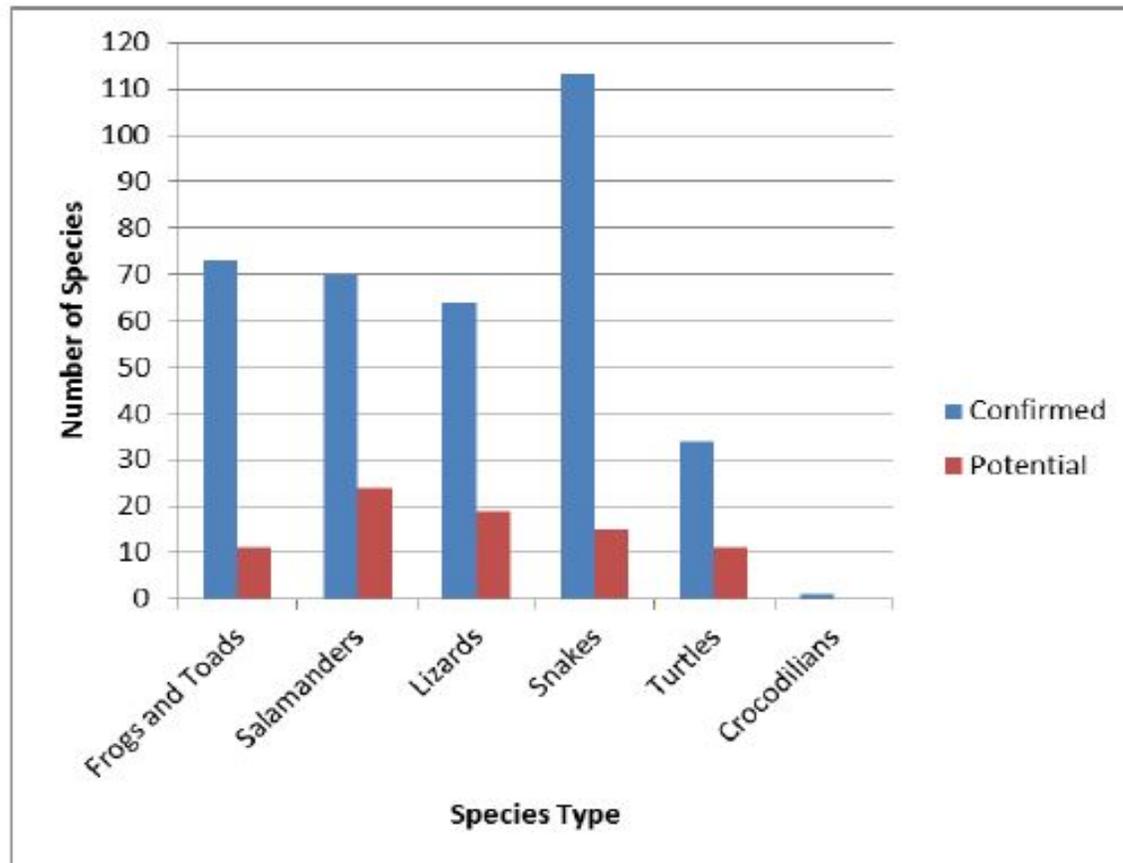
Species Type	Number of Species Confirmed	Number of Species Potential
Frogs and Toads	73	11
Salamanders	70	24
Lizards	64	19
Snakes	113	15
Turtles	34	11
Crocodiles/ Alligators	1	0
<b>Total</b>	<b>355</b>	<b>80</b>

Army installations have 355 species confirmed present and an additional 80 species with the potential to be present.

Amphibian Species = 143  
Reptile Species = 212

## Results

### Percent of Confirmed Species by Species Type



**There are more snakes species on Army properties than any other herpetofauna species type (113 species)**

# Results

## Most Common Species Confirmed Present

Frog/Toad: American Bullfrog

Salamander: Spotted Salamander

Lizard: Common Five-lined Skink

Snake: Common Gartersnake

Turtle: Snapping Turtle

Crocodylian: American Alligator



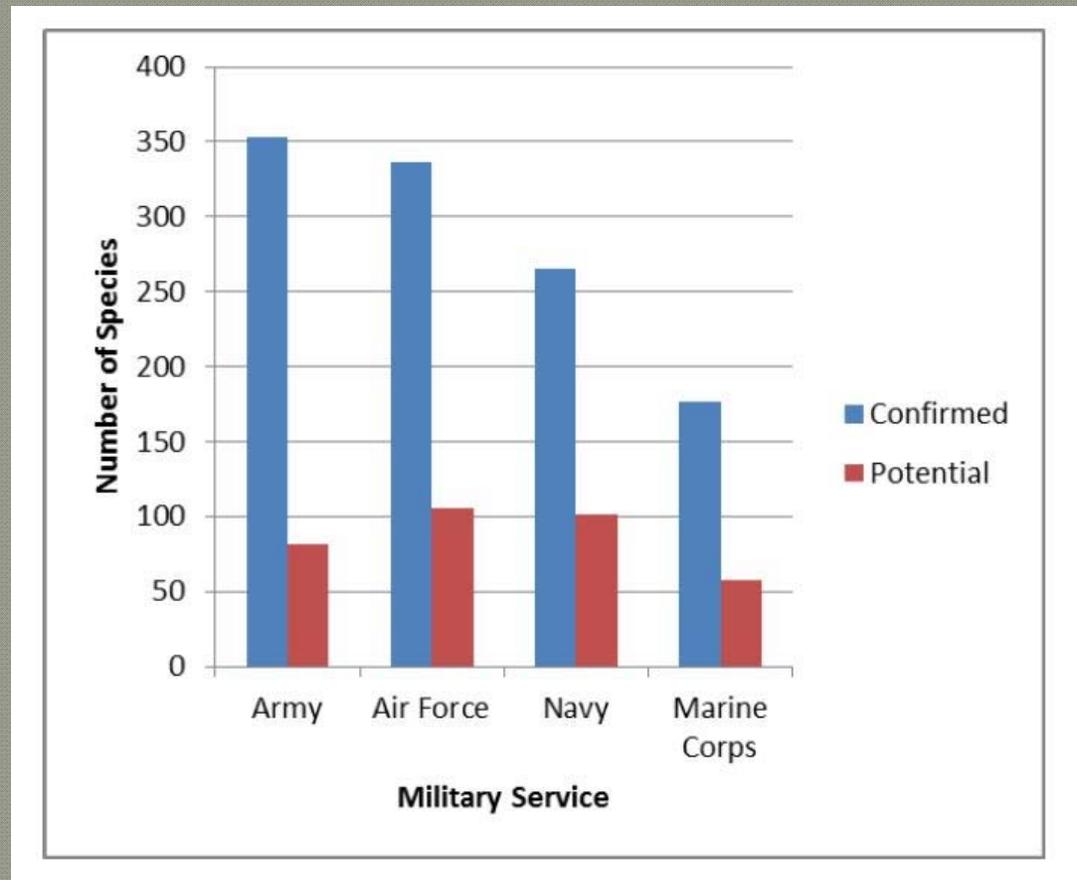
# Comparison to Continental United States Biodiversity

The herpetofauna species confirmed present on the 152 Army installations evaluated in this analysis represent 55 percent of the total native biodiversity of all herpetofauna species documented in the continental United States!



# Results-Comparison to Air Force, Navy and Marine Corps Herpetofauna Biodiversity

Army installations have more confirmed species (355) than each of the other DoD Services



# Results- Army Installations

<b>Installation Name</b>	<b>State</b>	<b>No. of Confirmed Species</b>
Fort Stewart	Georgia	100
Camp Shelby Joint Forces Training Center	Mississippi	86
Fort Bragg	North Carolina	81
Fort Gordon	Georgia	76
Fort Benning	Alabama/Georgia	74
McCrary Training Center	South Carolina	72
Fort Polk	Louisiana	68
Fort Leonard Wood	Missouri	62
Tullahoma Training Site	Tennessee	60

# Results

## Confirmed Species - Federally Listed

- There are 2 federally endangered species confirmed present on Army installations: Arroyo Toad; Sonoran Tiger Salamander

**Arroyo Toad**



**Sonoran Tiger Salamander**



- There are 12 federally threatened species confirmed on Army installations:
  - Snakes: Black Pinesnake; Louisiana Pinesnake; Eastern Indigo Snake; Eastern Massasauga; Mexican Gartersnake
  - Turtles: Bog Turtle; Desert Tortoise; Gopher Tortoise
  - Frogs/Toads: California Red-legged Frog; Oregon Spotted Frog
  - Salamanders: California Tiger Salamander; Frosted Flatwoods Salamander

# Results

## Confirmed Species - Federally Listed

- Two confirmed candidate species: Striped Newt and Gopher Tortoise
- The eastern population of the Gopher Tortoise occurs on five Army installations (Camp Blanding Joint Training Center, Fort Benning, Fort Gordon, Fort Rucker, Fort Stewart)

Gopher  
Tortoise



Caitlin Snyder

## Results

### Confirmed Species – State Listed

- 29 species of amphibians and reptiles are confirmed present on Army installations in states where they are listed as endangered or threatened (11 snakes; 10 turtles; 4 frogs/toads; 2 salamanders; 1 crocodilians; 1 lizard).
- Fort Stewart has the greatest number of state-listed threatened and endangered herpetofauna species (5 species).
- The Texas Horned Lizard is the most common state-listed species confirmed present on Army sites and is found on six installations in Texas (Camp Bowie, Camp Mabry, Camp Maxey, Fort Bliss, Fort Hood)



**Texas Horned Lizard-  
Threatened in Texas**

# Results

## Confirmed Species – NatureServe

- 36 species/subspecies of amphibians and reptiles confirmed present on Army properties that have a NatureServe status of G1-G3: 9 snakes, 8 salamanders, 7 frogs/toads, 6 lizards, and 6 turtles
  - Number of G1/T1-Critically Imperiled species: 1
  - Number of G2/T2-Imperiled species: 12
  - Number of G3/T3-Vulnerable species: 23
- Fort Stewart has the greatest number of confirmed NatureServe species (eight species). Fort Hunter Liggett and Camp Benning also have a high number of NatureServe species compared to all Army installations (seven and six species respectively).

Southern-hog-nosed Snake



Eastern Indigo Snake



Bog Turtle



Frosted Flatwoods Salamander



# Results

## Non-native Species

- Only eight confirmed non-native herpetofauna species have been documented on Army installations within the continental United States
  - Brown Anole, Greenhouse Frog, Mediterranean Gecko, American Bullfrog, Red-Eared Slider, Rio Grande Chirping Frog, Western Tiger Salamander, Yellow-bellied Slider
- The American Bullfrog, Red-eared Slider, and the Mediterranean Gecko are the most common non-native species on Army installations

Mediterranean Gecko



American Bullfrog



Red-eared Slider



# Results

## Venomous Snakes

- 21 species of venomous snakes have been confirmed on Army installations within the U.S.: 2 species in the genus *Agkistrodon* (copperhead and cottonmouth); 2 species in the genus *Micrurus* (coralsnake); 1 species in the genus *Micruroides* (sonoran coralsnakes); 14 species in the genus *Crotalus*; 2 in the genus *Sistrurus* (rattlesnakes).
- Fort Huachuca located in Arizona has the greatest number of confirmed venomous snakes (seven species) as compared to all Army and Army National Guard installations. Fort Benning and Fort Stewart (both located in the southeastern U.S.), have the second greatest diversity of venomous snakes (six species each).

Eastern Coral Snake



Timber Rattlesnake



Eastern Diamond-backed  
Rattlesnake



# Results

## Venomous Species

- The Ridge-nosed Rattlesnake and Twin-spotted Rattlesnake confirmed present at Fort Huachuca are the only known locations for these two snake species on all DoD lands.
- The Copperhead is confirmed present at more Army and Army National Guard installations (44) than all other venomous snake species.

Ridge-nosed Rattlesnake



Twin-spotted Rattlesnake



Copperhead Snake





# Conclusions

- The U.S. Army has an extensive diversity of amphibian and reptile species on its properties:
  - 355 confirmed species and 80 unconfirmed/potential species
  - 16 herpetofauna species listed as federally endangered, threatened, or candidate by the USFWS are confirmed present on Army installations.
  - 29 species of amphibians and reptiles are confirmed present on Army installations in states where they are listed as state endangered or threatened.
  - 36 species/subspecies of reptiles and amphibians confirmed present on Army installations have a NatureServe status of G1/T1–G3/T3.

Pickerel Frog



Long-tailed Salamander



Massasauga



# Conclusions

- 8 non-native species are confirmed present on Army properties
  - American Bullfrog, Red-eared Slider, and the Mediterranean Gecko are the most common
- 21 species of venomous snakes are confirmed on Army installations
  - Fort Huachuca located in Arizona has the greatest number of confirmed venomous snake
- Army installations support 55 percent of the total native biodiversity in the continental U.S.
- Army installations have more confirmed herpetofauna species than each of the other DoD Services

# Summary Recommendations

- Maintain and periodically update installation herpetofauna species lists.
- Program for and conduct general herpetofauna surveys and monitoring every five to seven years as part of your overall faunal planning level surveys.
- Address the need for monitoring and control of non-native herpetofauna in installation INRMPs.
- Aggressively pursue educational outreach opportunities, especially for injurious species. Educational posters, pamphlets, and brochures are recommended.



Paul Block

# Questions?

American Alligator