



Reptile & Amphibian Monitoring at the Naval Live Oaks Beaver Pond, Gulf Islands National Seashore

Data Summary, Monitoring Year 2012

Natural Resource Data Series NPS/GULN/NRDS—2013/554



ON THE COVER

Sampling aquatic amphibians at Naval Live Oaks Beaver Pond (Brown's Pond), Gulf Islands National Seashore, Photograph by: RL Woodman, Gulf Coast Inventory and Monitoring Network

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Introduction

The Gulf Coast Inventory and Monitoring Network (GULN) of the National Park Service started implementation of its reptile and amphibian monitoring protocol (GRAMP) at the Gulf Islands National Seashore (GUIS) Naval Live Oaks Beaver Pond site (NLO) in April of 2011. The GRAMP is a protocol developed by GULN in collaboration with Kurt Buhmann of the University of Georgia, Savannah River Ecological Laboratory to provide basic herpetological assemblage monitoring at selected sites on network parks based on peer-reviewed and widely used standard sampling methods supported by a unified data management and analysis system (Woodman, et al, 2013, in review). This annual report summarizes data collected at the GUIS-NLO Beaver Pond in Monitoring Year (MY) 2012, and includes a summary of the GRAMP, extracts of data collected, and a list of amphibians and reptiles, with count by species, detected in MY2012. The complete data table for MY2012 is provided in Appendix A.

The GULN is located in portions of six states, spanning from Brownsville, Texas, to Pensacola, Florida, and north to Nashville, Tennessee, with main offices located in Lafayette, Louisiana. The network includes eight National Park Service (NPS) units: Big Thicket National Preserve (BITH), Gulf Islands National Seashore (GUIS), Jean Lafitte National Historical Park and Preserve (JELA), Natchez Trace Parkway (NATR), Palo Alto Battlefield National Historical Park (PAAL), Padre Island National Seashore (PAIS), San Antonio Missions National Historical Park (SAAN), and Vicksburg National Military Park (VICK). The network is currently (2013) implementing the GRAMP on six parks (GUIS, JELA, NATR, PAAL, SAAN, and VICK), and is developing park projects on BITH and PAIS for anticipated start-up in FY2014.

GUIS is comprised of nearly 2,400 ha of emergent land divided between the Florida (GUIS-FL) and Mississippi (GUIS-MS) Districts. This land area is distributed over smaller and larger barrier islands and adjacent mainland areas. The Naval Live Oaks (NLO) area of the Florida District consists of ca 575 hectares lying along US Highway 98 directly east of Gulf Breeze, Florida (Figure 1). NLO habitats include remnant stands of Live Oak (*Quercus virginiana*), longleaf pine (*Pinus palustris*) and Tupelo (*Nyssa sp.*) representative of the coastal forests once typical of the northern Gulf coast extending west from Florida into east Texas, beach-front bluffs, and freshwater spring-fed ponds and associated wetlands. A key natural resource on the NLO is the Beaver Pond, a ca 4 hectare freshwater pond with associated wetlands habitat which is an example of coastal ponds once common throughout the coastal region (Figure 1). This pond constitutes an isolated breeding area for diverse herpetofauna, and is a key habitat feature for species whose biology includes aquatic larval stages and / or close association with freshwater habitat. The NLO area is noted as having the greatest overall diversity of amphibians and reptiles of any unit or area of the park (Mohrman and Qualls, 2008, Seigel and Doody, 1996), and is known to host populations of Gopher Tortoise (*Gopherus polyphemus*) and Eastern Diamondback Rattlesnake (*Crotalus adamanteus*), species of special concern to both regional conservationists and park management. The NLO Beaver Pond monitoring project targets the aquatic, arboreal, and terrestrial reptile and amphibian (herp) assemblage associated with this site.



Figure 1. Overview satellite photo of the GUIIS-NLO area. The Beaver Pond project area is marked with the red box outline. Note the urban development directly adjacent to the park boundary and to the Beaver Pond.

Amphibians were identified as a network high priority vital sign during initial vital signs selection performed in 2004. Amphibians were combined with reptiles when the GULN Monitoring Plan (Segura et al, 2007) was finalized, as it was broadly accepted that sampling for many amphibians is equally effective for coexisting reptiles. Amphibians and reptiles are ranked highly among potential vital signs for GULN because herps 1) are a diverse fauna associated with many habitats on all GULN parks, 2) specific species come under legal mandates related to state – level protected status, and 3), herps constitute a diverse set of potential indicators of local and regional changes in ecosystems, due to their widely demonstrated sensitivities to many anthropogenic system inputs and actions (pollutants and habitat disruption and fragmentation). In addition, herps have collectively become the subject of ever-growing conservationist and resource management concern given the increasing recognition of their widespread decline at scales ranging from the local to global.

Monitoring herps in parks will contribute to both park-level resource knowledge and improved management, and provide insight into habitat and ecosystem change. Monitoring is designed to provide data comparable to that obtained by other research and inventory efforts and will potentially contribute to regional and national datasets that further our understanding of population and community trends at many scales.

This annual report provides an overview of methodology and implementation of monthly sampling across the monitoring year. Results presented here are limited to descriptive summaries of the annual findings and data about observed species and abundance presented at a monthly sampling scale. Additional analyses and synthesis reports will be completed every 4 – 5 years beginning in 2015, to include assessment of potential trends in species count, changes in relative abundance, and changes

in measurable assemblage composition and structure. Faunal trends will be evaluated in the context of recorded environmental data and with consideration of noted events, such as rainfall and significant anthropogenic and other impacts to local resources.

Methods

Sampling Design

Herp monitoring at GUIS NLO utilizes terrestrial cover-board (CB), arboreal PVC-pipe (PVC), and aquatic funnel-trap (FT) fixed-point sampling methods coupled with environmental conditional monitoring. CB and PVC sampling devices are permanently installed in fixed arrays (clusters) distributed in the forest and bluff-scrub habitat adjacent to the south shore of the Beaver Pond (Figure 2). Five of 6 PVC arrays are collocated with CB arrays to simultaneously assess terrestrial and arboreal species within the selected sampling space. The sixth array, PVC Array F, is collocated with an FT cluster in the permanently inundated tupelo (*Nyssa* sp.) stand located at the eastern end of the site to sample that specific canopy and habitat. FT are deployed in the nearshore waters adjacent to the PVC / CB sampling clusters for ca 24-hour sampling periods during each scheduled sampling event to assess aquatic species and life stages. As FT are traps that confine animals, FT deployment is limited to 24-hour periods to limit risk to captive organisms. FT and associated sorting and specimen handling equipment are specific to GUIS-NLO and are never moved to or used on any other site or park.

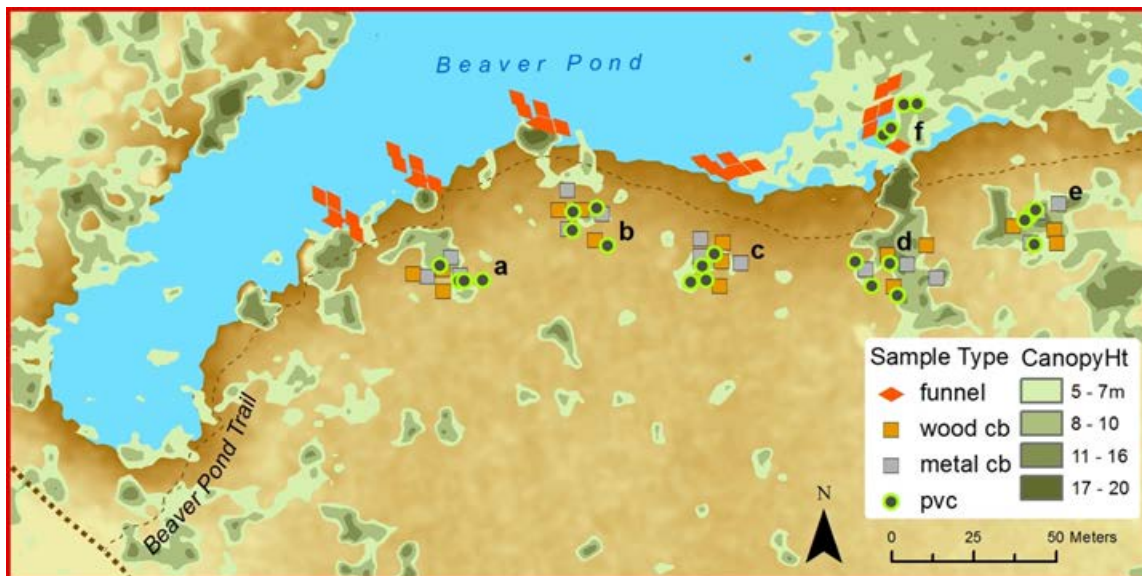


Figure 2. Map of the GUIS-NLO Beaver Pond sampling area showing the three primary habitat areas and sampling clusters. CB and PVC are distributed in 4 dry higher elevation forested area clusters (A – E). FT are deployed in 5 clusters (red diamonds) – 4 in nearshore waters adjacent to CB A – D, and 1 cluster (F) collocated with PVC in the sunken Tupelo stand (elevated canopy area east side of the pond). CB and PVC locations are mapped into the GIS layer; locations of FT are approximate and are dependent on available waters.

The spatial distribution of CB, PVC, and FT constitute a fixed multiple-array sampling design where each cluster is statistically independent of and does not share possible specimens with any other cluster. Each CB cluster consists of six 3 x 4 US foot panels (three galvanized steel roofing, three ¾ inch plywood) deployed in a loose grid with 5m minimum spacing between panels. Each PVC cluster consists of four pairs of PVC pipes attached to trees located within its designated cluster area. Each PVC pair consists of one 1 inch x 2 foot pipe and one 2 inch x 2

foot pipe. CB and PVC clusters are loosely distributed around center points within distinct clusters of trees located along the pond shoreline. Individual device locations are determined by natural microhabitat and site availability (spaces suitable for CB panels, trees large enough – 15+cm dbh - to host pipe pairs). All CB and PVC locations are mapped onto the project GIS layers using GPS data. FT are deployed in five clusters of five folding cloth-and-wire traps at the start of each 2-day sampling event. FT clusters are deployed in available waters with minimal spacing between clusters of 5+m, and 2+m between traps within clusters. No baits, lures, added food or chemical attractants are used in any sampling at GUI5-NLO.

Total sampling effort consists of 5 CB clusters (30 panels), 6 PVC clusters (24 pipe-pairs), and 5 FT clusters (25 FT traps). The spatial distribution and proximal locations of GUI5-NLO sampling devices are depicted in Figure 2.

In addition to CB, PVC, and FT sampling, field crew record all individuals seen outside of sampling devices during sampling activities. These encounters are logged as “casual observations” (Cas. Obs.) and contribute to composite data on species-richness and species specific population descriptive parameters, such as mean size and sex-ratio estimation in the population, but are not considered in analyses utilizing device as a factor.

Two data loggers (HoBo Pro V2, by Onset, Inc.) are collocated with PVC pipe-pairs in Array A and F to provide long term air temperature and relative humidity monitoring at 10-minute intervals throughout the monitoring year. Water temperature and specific conductivity (microsiemens) are taken in conjunction with FT sampling using a calibrated Oakton pH/Temp/Specific Conductivity meter to provide aquatic environmental correlate data.

Sampling and Data Collection

Sampling emphasizes consistent collection of detailed, high quality data on all encountered specimens to provide a reliable dataset for assessing assemblage composition and structure. CB, PVC, FT, and Casual Observations all yield hand specimens and photographic records.

All field crew are led by experienced field biologists with detailed familiarity with the taxonomy of regional herp fauna. Performance of sampling events follows the methodology and procedures prescribed for each sampling method (CB, PVC, FT) in GRAMP protocol SOP (Woodman, et al 2013, in review). All specimens are hand collected where possible for detailed assessment. Data include location, time, species ID (when possible), body length and sex (when possible), and count, when multiple individuals of a type are observed but not all are handled and assessed. Specimen information is recorded on paper field data sheets during sampling. Photographs are taken of collected specimens to support post-sampling taxonomic ID review. Specimens are handled with appropriate prophylaxis and technique as adapted from the ASIH Guidelines (Beaupre 2004) and specified in the GRAMP. All collected specimens are immediately released following processing at the collection point or site. Non-collected individuals (venomous snakes are never handled, other individuals may escape or avoid capture) are photo-documented during sampling procedures, and images provide confirmation of “no-catch” encounters for data records.

Monitoring Schedule

GUIS-NLO sites are sampled every month over each Monitoring Year (MY, defined as being from October 01 to September 30), for a total of 12 sampling visits per MY. Each visit consists of 2 work days: on Day 1, the FT are deployed into the available sites. FT deployment typically occurs circa noon of Day 1. On Day 2, the sampling team sequentially samples CB and PVC clusters starting from the west end of the sampling area at circa 0730 and typically completing CB and PVC sampling by 1000. The field team then samples FT clusters from east to west. FT are collected and packed for later cleaning and storage during the sampling process. The array sampling order is held constant over all visits to avoid random variation in yield which could result from time of day effects. All CB and PVC sampling are completed as early in a day as possible so as to reduce impacts on yield from increasing air and ground temperatures.

Data Management

Data are recorded in the field on standard GULN paper field data sheets. Field crew submit completed data sheets to the GULN Data Manager and the GULN GRAMP Project Leader for review and verification of taxonomic information. All data are entered into the GRAMP database following procedures specified in SOP 5 Data Entry of the GRAMP protocol (Woodman, et al, 2013, in review). Project data are managed following procedures and standards specified in the GULN Data Management Plan (Granger, 2007). Data are extracted from this database for analysis and reporting. The complete Monitoring Year 2012 faunal data are provided in Appendix A of this report. Data are also made available by going to the GULN Amphibian & Reptile Monitoring Project in the NPS Integrated Resource Management Applications (IRMA) portal at: <https://irma.nps.gov/App/Reference/Profile/2192506>.

Results

The complete GUIS Project dataset is provided in Appendix A of this report. This Project Data Table lists observation date, sampling location, sampling method, common and scientific name, and body length and sex (if determined) for each individual recorded. Key aspects of this dataset are summarized in the following tables and graphs. All summary data are presented in a per-sampling-event format with cumulative totals for the MY where appropriate.

Sampling at NLO-Beaver Pond yielded a total of 23 herp species (12 amphibians, 11 reptiles) from all methods in MY 2012. A total of 352 individuals (272 amphibians, 80 reptiles) were recorded in this period. The two most abundant amphibians were Southern Cricket Frog (*Acris gryllus*, 135) and the exotic Greenhouse Frog (*Eleutherodactylus planirostris*, 37), accounting for 63% of all amphibians observed over the year. The two most abundant reptiles were Green Anole (*Anolis carolinensis*, 34) and the Common Ground Skink (*Scincella lateralis*, 14), accounting for 60% of all reptiles observed over the year.

Tables 1 and 2 present the summary counts of individual amphibians and reptiles, respectively, observed by sampling method (CB = cover-boards, PVC = PVC-pipes, FT = funnel-traps, and Cas Obs = Casual Observations) by sampling month in MY2012.

Table 1: GUIS-NLO Amphibians:

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	AUG 2012	SEP 2012	Total By Method
CB	1	3	0	3	6	4	2	0	1	2	12	9	43
PVC	8	3	3	1	7	3	1	3	0	0	2	16	47
FT	0	1	1	1	6	10	10	5	6	1	2	7	50
Cas Obs	0	4	10	6	20	0	4	0	1	2	8	77	132
Total n by Event	9	11	14	11	39	17	17	8	8	5	24	109	272

Table 2: GUIIS-NLO Reptiles:

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	AUG 2012	SEP 2012	Total By Method
CB	0	3	1	2	4	4	6	4	0	5	3	0	32
PVC	11	2	0	0	6	3	2	2	1	1	1	0	29
FT	0	0	1	0	0	0	0	0	0	0	0	0	1
Cas Obs	0	3	0	0	0	2	1	1	3	1	5	2	18
Total n by Event	11	8	2	2	10	9	9	7	4	7	9	2	80

∞ The total numbers of individual reptiles and amphibians observed across all methods vary among sampling events, with amphibians showing both greater apparent variation between events and substantially greater peak abundance than do reptiles (Figure 3).

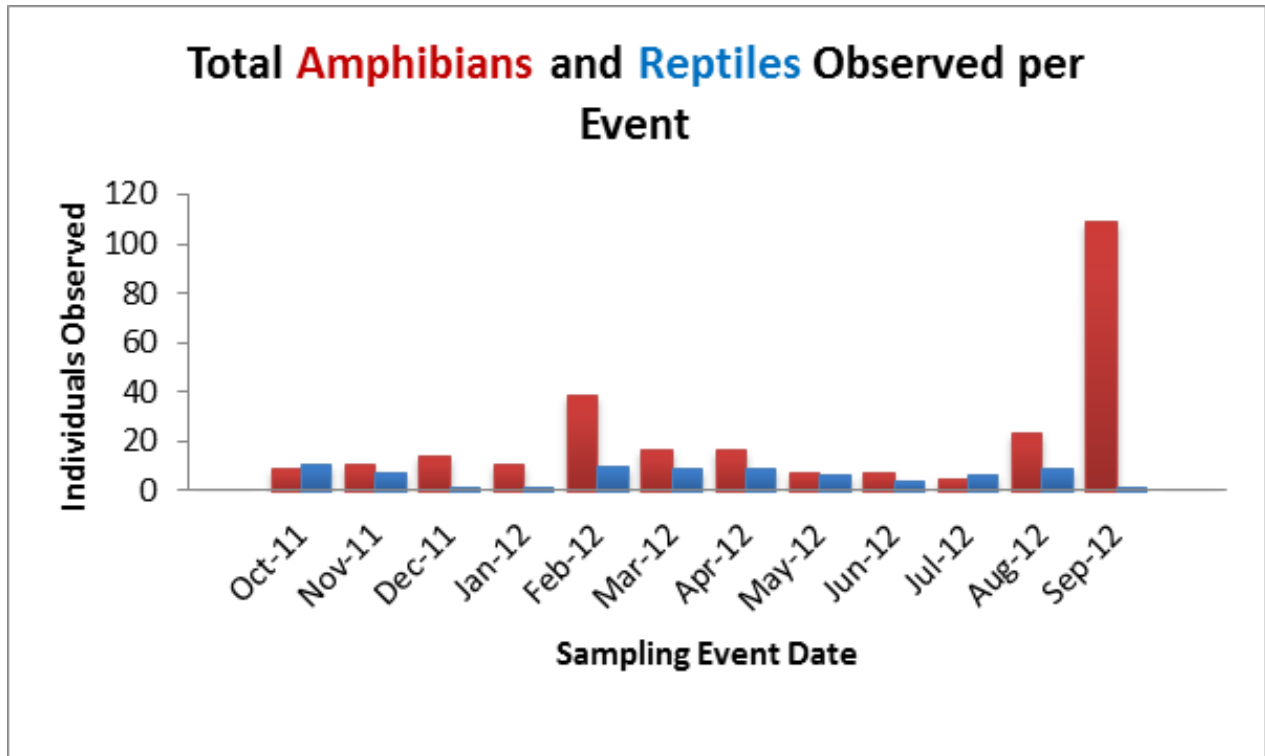


Figure 3: Total counts of amphibians and reptiles observed at GUIIS-NLO over all methods by sampling month in MY2012. The large amphibian count observed in the Sept 2012 sampling event reflects the detection of numerous Cricket Frogs (*Acris gryllus*) in “casual observations” made in the sampling area.

Numbers of amphibian and reptile species observed at GUIIS-NLO in MY2012:

Tables 3 and 4 present the counts of amphibian and reptile species, respectively, observed by sampling method (CB = cover-boards, PVC = PVC-pipes, FT = funnel-traps, and Cas Obs = Casual Observations) by sampling month in MY2012. It should be noted that some species were observed in more than 1 sampling method in some events; individuals are seen in different sampling methods because they occur there (e.g. both CB and casual observation yield the same toad species), or they are detected in different developmental stages by different methods (adult tree frogs in PVC, tadpoles in FT). The total count column presents the counts of all species observed by method over the year. The yellow block reports the total count of unique species observed by all methods during the MY.

Table 3: Number of amphibian species seen at GUI5-NLO in MY2012.

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	AUG 2012	SEP 2012	Total Spp.
CB	1	2	0	1	1	1	2	0	1	1	3	1	5
PVC	3	2	2	1	3	2	1	1	0	0	2	2	3
FT	0	1	1	1	3	3	2	2	3	1	1	2	6
Cas Obs	0	1	1	1	1	0	1	0	1	2	4	2	5
Total species by Event	4	6	4	4	6	6	5	3	5	3	7	7	11

Table 4: Number of reptile species seen at GUI5-NLO in MY2012.

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	AUG 2012	SEP 2012	Total Spp.
CB	0	1	0	2	2	2	1	3	0	3	2	0	5
PVC	1	1	1	0	1	1	1	1	1	1	1	0	1
FT	0	0	1	0	0	0	0	0	0	0	0	0	1
Cas Obs	0	1	0	0	1	2	1	1	3	1	4	2	9
Total species by Event	1	3	2	2	3	4	3	5	3	5	5	2	11

Amphibian species count exceeded that of reptiles in 10 of 12 sampling events (Figure 4). This outcome reflects, in part, the varied seasonality and possibly low overall abundance of some species, together with the limited efficiency of available sampling methods. Notably, turtles – a common taxa group at the Beaver Pond – are not formally detected, as FT sampling will not generally collect aquatic turtles.

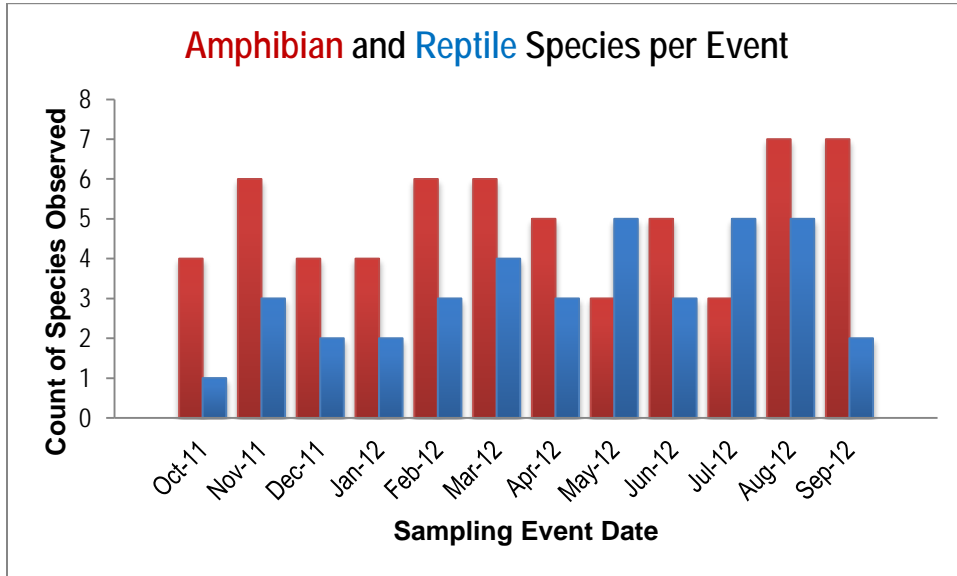


Figure 4: Numbers of amphibian and reptile species observed in GUIIS-NLO in each sampling month in MY2012. Most amphibian species occurred in most sampling events, whereas many reptile species occur in only one or 2 events in the year.

The accumulation of species detections over time:

Accumulation of “new” reptile detections plateaued as of June, 2012. Amphibian species-detections continued to accumulate over the monitoring year (Table 5, and visualized in Figure 5), suggesting that the hypothetical maximum number of amphibian species likely to be detected by the sampling methods being used had not been attained within this MY.

Table 5: Cumulative species counts for amphibians, reptiles, and all herp species over MY2012. The highlighted counts in the SEP 2012 event are the cumulative totals for MY2012.

Taxon	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Group	2011	2011	2011	2012	2012	2012	2012	2012	2012	2012	2012	2012
Amphibians	4	8	8	9	9	9	9	9	9	9	10	11
Reptiles	1	3	4	5	5	7	9	9	11	11	11	11
Cum of all Herp Species	5	11	12	14	14	16	18	18	20	20	21	22

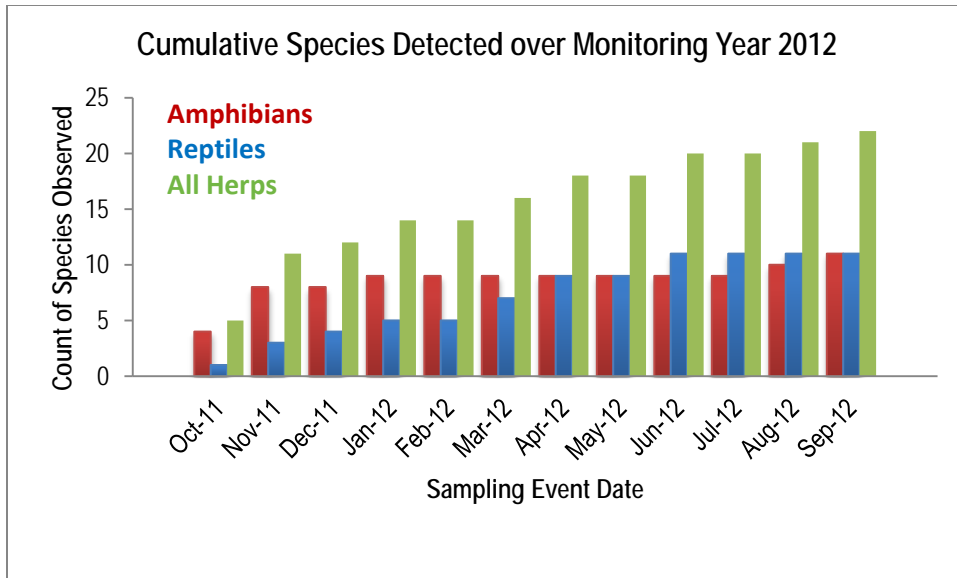


Figure 5: Cumulative count of amphibian, reptile, and “all herps” species observed at GUI5-NLO over MY2012. Notably, “new” amphibians continued to be detected throughout the year.

The 23 amphibian and reptile species detected in NLO-Beaver Pond sampling in MY2012 are listed in Table 6 below. The numbers are the total count observed for each species over all sampling methods in the MY.

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Table 6: Amphibian and Reptile species observed at GUI5-NLO in MY2012. “**Anaxyrus sp.*” denotes a very small juvenile toad encountered during the Sept sampling event considered most likely to be the Oak Toad, *A. quercicus*, but species ID could not be confirmed. Alternatively, this individual could be *A. terrestris*, also known from sampling at GUI5 in MY2012.

Amphibians			Reptiles		
Scientific Name:	Common Name:		Scientific Name:	Common Name:	
<i>Acris gryllus</i>	Southern Cricket Frog	135	<i>Anolis carolinensis</i>	Green Anole	34
<i>Anaxyrus quercicus</i>	Oak Toad	3	<i>Apalone spinifera</i>	Spiny Soft-shell Turtle	1
* <i>Anaxyrus sp.</i>	*toad	1	<i>Cnemidophorus sexlineatus</i>	Six-lined Race-runner	2
<i>Anaxyrus terrestris</i>	Southern Toad	4	<i>Coluber constrictor</i>	Eastern Racer	3
<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	37	<i>Elaphe gutatta</i>	Corn Snake	1
<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouth Toad	2	<i>Eumeces laticeps</i>	Broad-head Skink	12
<i>Hyla cinerea</i>	Green Treefrog	6	<i>Masticophis flagellum</i>	Eastern Coachwhip	3
<i>Hyla femoralis</i>	Pine-woods Treefrog	23	<i>Sceloporus undulatus</i>	Eastern Fence-lizard	6
<i>Hyla squirella</i>	Squirrel Treefrog	22	<i>Scincella lateralis</i>	Ground Skink	14
<i>Lithobates catesbeianus</i>	American Bullfrog	4	<i>Tantilla coronata</i>	Southeastern Crown Snake	2
<i>Lithobates clamitans</i>	Green Frog	7	<i>Terrapene carolinensis</i>	Common Box-turtle	1
<i>Lithobates sphenoccephalus</i>	Southern Leopard-frog	17			

Air temperature and percent-relative humidity recorded at GUIS-NLO during MY2012:

Air temperature and %-RH were recorded at 10-minute intervals using HoBo data loggers throughout MY2012 to provide an environmental condition covariate to faunal data. Air-T and %-RH are presented as data traces over the MY2012 period in Figure 6 below. Note that these data traces include data for approximately 45 days prior to start of MY2012 sampling (Oct 20, 2011), in recognition that potential impacts from changing air-T and %-RH may take several weeks to affect faunal behavior and manifest in detection rates. Formal assessment of possible relationships between environmental conditions and faunal parameters is an anticipated element in long term trend analysis to be performed from 2015 on.

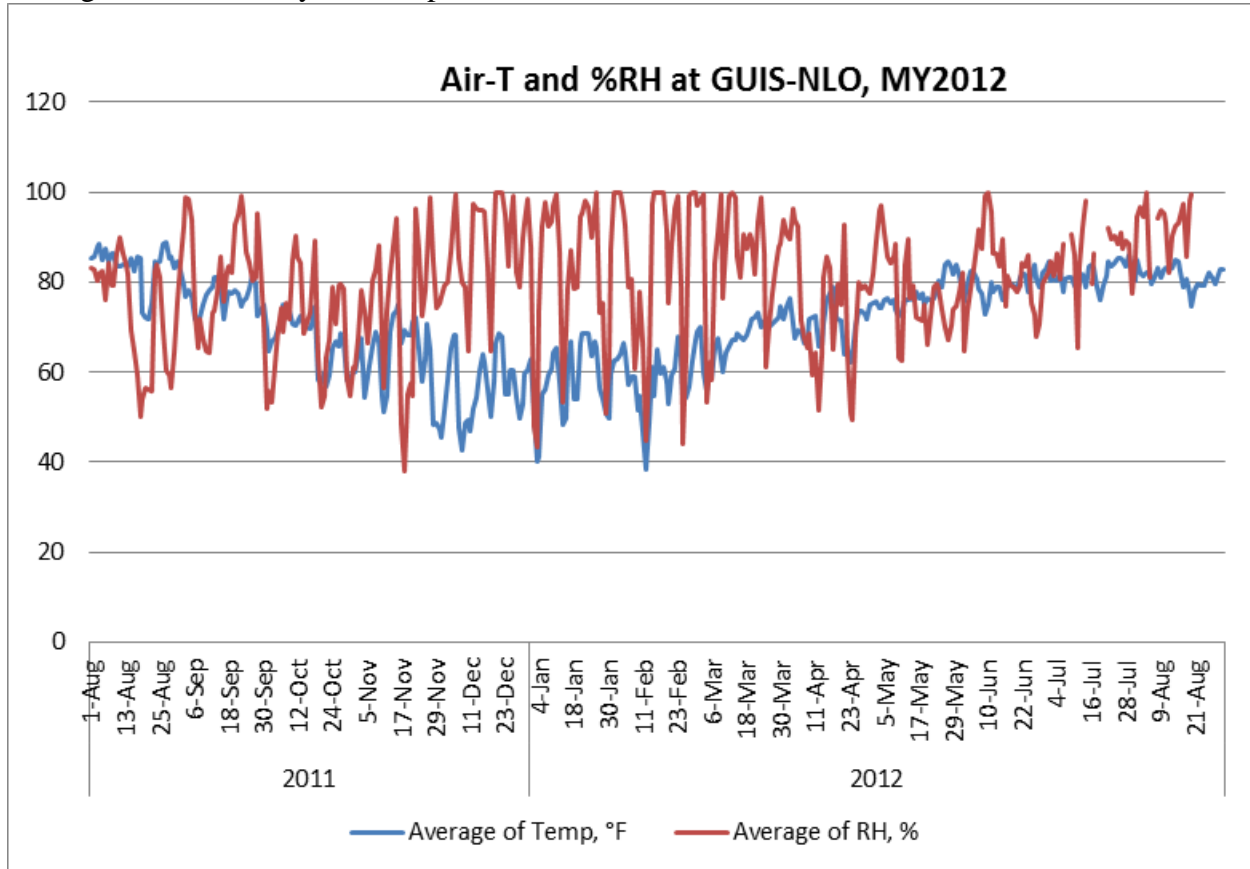
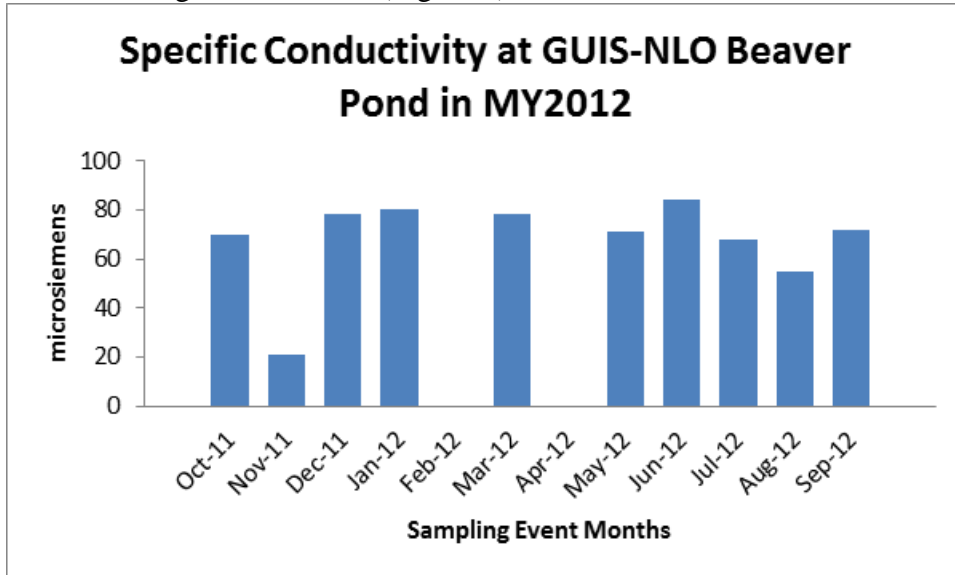


Figure 6. Daily mean air temperature and percent-relative humidity recorded at GUIS-NLO Beaver Pond from AUG 01 2011 through AUG 21 2012. The %RH record is truncated AUG 15 2012 owing to HoBo sensor failure.

Specific Conductivity measured at the FT sampling site at GUIS-NLO Beaver Pond during MY2012:

Specific conductivity, recorded in microsiemens, was measured in conjunction with FT sampling to provide information on the relative salinity of Beaver Pond waters as an environmental correlate to faunal data. Detected specific conductivity ranged from 18 to 130 microsiemens over the MY: the observed range indicates that NLO Beaver Pond exhibited extremely low salt content throughout MY2012 (Figure 7).



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Figure 7. Specific conductivity, in microsiemens, measured at GUIS-NLO Beaver Pond in MY2012. Missing bars indicate months in which measurement was not calibrated or was otherwise not available.

Discussion

The 22 herp species (11 amphibians, 11 reptiles) detected during MY 2012 represent 51 percent of the 43 species (14 amphibians, 29 reptiles) reported as being present or likely-present on GUIIS in the most recent herp inventories (Mohrman and Qualls, 2008, Seigel and Doody, 1996). It should be noted that many species reported in GUIIS inventories, including all sea turtles, larger aquatic turtles, alligators, and any species reported for other GUIIS areas but not known from NLO, are unlikely to be detected in this specific monitoring effort. In addition, it is broadly recognized in herp monitoring and research (Graeter, et al 2010, Heyer, et al 1994) that many herp species are notably habitat-specific and no sampling method is uniformly effective for all species even within its habitat range (i.e., CB panels sample terrestrial fauna, but are very unlikely to detect box turtles nor equally detect all snakes, lizards, and salamanders in the area); from which, we accept that some species may be present and active in the sampling area but unlikely to be seen in our effort.

Of the amphibians detected, all except the exotic Greenhouse Frog, *E. planirostris*, are considered expected and typical in the region and habitats. *E. planirostris* has been reported by GUIIS staff as being frequently observed in the area of the park Visitor Center (located in the NLO south of Highway 98) for several years, but first appeared in the Beaver Pond sampling in NOV 2011; it has consistently appeared in every sampling visit since that time. This may indicate local expansion of the species within the NLO area. All detected reptiles are considered expected and typical of the region and habitats. No detected species were identified as being new to the park. No obvious pathologies or abnormalities were noted in any species.

Total species accumulation continued throughout the project MY. Detected species count is expected to level off with time, as the methods in use and available effort attain their maximum likely detection of species in the sampled area. As amphibian species continued to accumulate throughout MY2012, this hypothetical maximum detected species count was not attained, and it may be reasonable to anticipate that additional species will be added to the GUIIS monitoring detection list into the future.

The recorded air-T and %RH indicated no extreme variation or apparent departures from anticipated pattern and ranges in MY2012. This would suggest that faunal detections recorded in MY2012 did not reflect any strong impacts from unusual weather events.

The specific conductivity range observed at the GUIIS-NLO Beaver Pond in MY2012 indicated that pond waters exhibited substantially low conductivity, and no saltwater intrusion events were detected in any sampling month in MY2012. Aquatic amphibians and larval stages are considered to be susceptible to increased salinity, and most species common to the southeastern USA are restricted to freshwater habitats for successful reproduction and larval development (Jensen, et al, 2008). Salinity levels, as indicated by specific conductivity, did not likely exert strong influences on the abundance of amphibians detected in Beaver Pond in MY2012.

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Appendix

GUIIS-NLO Project Data. The following table presents all faunal observation data recorded at the GUIIS-NLO sampling area in Monitoring Year 2012.

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
10/20/2011	Amphibian	Anaxyrus quercicus	Oak Toad	1	42	CB	Adult
10/20/2011	Reptile	Anolis carolinensis	Green Anole	2	50	PVC	Adult
10/20/2011	Reptile	Anolis carolinensis	Green Anole	9	55	PVC	Adult
10/20/2011	Amphibian	Hyla cinerea	Green Treefrog	2	49	PVC	Adult
10/20/2011	Amphibian	Hyla femoralis	Pine Woods Treefrog	3	33	PVC	Adult
10/20/2011	Amphibian	Hyla squirella	Squirrel Treefrog	3	32	PVC	Adult
11/16/2011	Amphibian	Eleutherodactylus planirostris	Greenhouse Frog	2	25	CB	Adult
11/16/2011	Amphibian	Gastrophryne carolinensis	Eastern Narrow-mouthed Toad	1	30	CB	Adult
11/16/2011	Reptile	Scincella lateralis	Ground Skink	3	34	CB	Adult
11/16/2011	Reptile	Anolis carolinensis	Green Anole	2	58	PVC	Adult
11/16/2011	Amphibian	Hyla femoralis	Pine Woods Treefrog	1	34	PVC	Adult
11/16/2011	Amphibian	Hyla squirella	Squirrel Treefrog	2	32	PVC	Adult
11/16/2011	Amphibian	Acris gryllus	Southern Cricket Frog	4		COBS	Adult
11/16/2011	Reptile	Sceloporus undulatus	Eastern Fence Lizard	3		COBS	Adult
11/16/2011	Amphibian	Lithobates sphenoccephalus	Southern Leopard Frog	1	32	MT	Tadpole
12/14/2011	Reptile	Anolis carolinensis	Green Anole	1	62	PVC	Adult
12/14/2011	Amphibian	Hyla femoralis	Pine Woods Treefrog	2	29	PVC	Adult
12/14/2011	Amphibian	Hyla squirella	Squirrel Treefrog	1	32	PVC	Adult

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
12/14/2011	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	10		COBS	Adult
12/14/2011	Amphibian	<i>Lithobates sphenoccephalus</i>	Southern Leopard Frog	1	37	MT	Tadpole
12/14/2011	Reptile	<i>Apalone spinifera</i>	Spiny Softshell turtle	1		MT	Adult
1/12/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	3	15	CB	Adult
1/12/2012	Reptile	<i>Scincella lateralis</i>	Ground Skink	1	36	CB	Adult
1/12/2012	Reptile	<i>Tantilla coronata</i>	Southeastern Crowned Snake	1	97	CB	Adult
1/12/2012	Amphibian	<i>Hyla cinerea</i>	Green Treefrog	1	52	PVC	Adult
1/12/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	6		COBS	Adult
1/12/2012	Amphibian	<i>Lithobates clamitans</i>	Green Frog	1	64	MT	Tadpole
2/16/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	1	20	CB	Adult
2/16/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	5	18	CB	Adult
2/16/2012	Reptile	<i>Scincella lateralis</i>	Ground Skink	3	38	CB	Adult
2/16/2012	Reptile	<i>Tantilla coronata</i>	Southeastern Crowned Snake	1	91	CB	Adult
2/16/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	3	47	PVC	Adult
2/16/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	3	64	PVC	Adult
2/16/2012	Amphibian	<i>Hyla cinerea</i>	Green Treefrog	1	53	PVC	Adult
2/16/2012	Amphibian	<i>Hyla femoralis</i>	Pine Woods Treefrog	4	31	PVC	Adult
2/16/2012	Amphibian	<i>Hyla squirella</i>	Squirrel Treefrog	2	31	PVC	Adult
2/16/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	20		COBS	Adult
2/16/2012	Amphibian	<i>Lithobates clamitans</i>	Green Frog	3	44	MT	Tadpole

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
2/16/2012	Amphibian	<i>Hyla cinerea</i>	Green Treefrog	2	36	MT	Tadpole
2/16/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	1	22	MT	Tadpole
3/21/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	4	18	CB	Adult
3/21/2012	Reptile	<i>Masticophis flagellum</i>	Coachwhip	1	1120	CB	Adult
3/21/2012	Reptile	<i>Scincella lateralis</i>	Ground Skink	1		CB	Adult
3/21/2012	Reptile	<i>Scincella lateralis</i>	Ground Skink	2	39	CB	Adult
3/21/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1	52	PVC	Adult
3/21/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1	0	PVC	Adult
3/21/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1	40	PVC	Adult
3/21/2012	Amphibian	<i>Hyla femoralis</i>	Pine Woods Treefrog	2	34	PVC	Adult
3/21/2012	Amphibian	<i>Hyla squirella</i>	Squirrel Treefrog	1	35	PVC	Adult
3/21/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1		COBS	Adult
3/21/2012	Reptile	<i>Elaphe guttata</i>	Corn Snake	1		COBS	Adult
3/21/2012	Amphibian	<i>Lithobates clamitans</i>	Green Frog	2	29	MT	Tadpole
3/21/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	3	20	MT	Adult
3/21/2012	Amphibian	<i>Lithobates sphenoccephalus</i>	Southern Leopard Frog	2	81	MT	Metamorph 2
3/21/2012	Amphibian	<i>Lithobates sphenoccephalus</i>	Southern Leopard Frog	3	38	MT	Tadpole
4/18/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	1	24	CB	Adult
4/18/2012	Reptile	<i>Eumeces laticeps</i>	Broad-headed Skink	2	74	CB	Adult
4/18/2012	Reptile	<i>Eumeces laticeps</i>	Broad-headed Skink	3	103	CB	Adult
4/18/2012	Reptile	<i>Eumeces</i> sp.		1		CB	Adult
4/18/2012	Amphibian	<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouthed Toad	1	24	CB	Adult
4/18/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1	47	PVC	Adult

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
4/18/2012	Reptile	Anolis carolinensis	Green Anole	1	61	PVC	Adult
4/18/2012	Amphibian	Hyla femoralis	Pine Woods Treefrog	1	25	PVC	Adult
4/18/2012	Amphibian	Acris gryllus	Southern Cricket Frog	4		COBS	Adult
4/18/2012	Reptile	Coluber constrictor	Racer	1		COBS	Adult
4/18/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1	21	MT	Adult
4/18/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1	30	MT	Metamorph 2
4/18/2012	Amphibian	Acris gryllus	Southern Cricket Frog	3	19	MT	Tadpole
4/18/2012	Amphibian	Lithobates sphenoccephalus	Southern Leopard Frog	1	57	MT	Metamorph 2
4/18/2012	Amphibian	Lithobates sphenoccephalus	Southern Leopard Frog	4	42	MT	Tadpole
5/24/2012	Reptile	Coluber constrictor	Racer	1	550	CB	Adult
5/24/2012	Reptile	Masticophis flagellum	Coachwhip	1	920	CB	Adult
5/24/2012	Reptile	Scincella lateralis	Ground Skink	2	41	CB	Adult
5/24/2012	Reptile	Anolis carolinensis	Green Anole	1	63	PVC	Adult
5/24/2012	Reptile	Anolis carolinensis	Green Anole	1	0	PVC	Adult
5/24/2012	Amphibian	Hyla femoralis	Pine Woods Treefrog	3	30	PVC	Adult
5/24/2012	Reptile	Eumeces laticeps	Broad-headed Skink	1		COBS	Adult
5/24/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1	11	MT	Metamorph 2
5/24/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1	10	MT	Metamorph 4
5/24/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1	10	MT	Tadpole
5/24/2012	Amphibian	Lithobates sphenoccephalus	Southern Leopard Frog	2	19	MT	Tadpole

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
6/20/2012	Amphibian	Eleutherodactylus planirostris	Greenhouse Frog	1	24	CB	Adult
6/20/2012	Reptile	Anolis carolinensis	Green Anole	1	54	PVC	Adult
6/20/2012	Amphibian	Hyla femoralis	Pine Woods Treefrog	1		COBS	Adult
6/20/2012	Reptile	Anolis carolinensis	Green Anole	1		COBS	Adult
6/20/2012	Reptile	Cnemidophorus sexlineatus	Six-lined Racerunner	1		COBS	Adult
6/20/2012	Reptile	Terrapene carolina	Common Box Turtle	1		COBS	Adult
6/20/2012	Amphibian	Lithobates clamitans	Green Frog	1	49	MT	Adult
6/20/2012	Amphibian	Acris gryllus	Southern Cricket Frog	4	17	MT	Adult
6/20/2012	Amphibian	Lithobates sphenoccephalus	Southern Leopard Frog	1	70	MT	Tadpole
7/18/2012	Reptile	Coluber constrictor	Racer	1	750	CB	Adult
7/18/2012	Amphibian	Eleutherodactylus planirostris	Greenhouse Frog	2	27	CB	Adult
7/18/2012	Reptile	Eumeces laticeps	Broad-headed Skink	3		CB	Adult
7/18/2012	Reptile	Masticophis flagellum	Coachwhip	1	1110	CB	Adult
7/18/2012	Reptile	Anolis carolinensis	Green Anole	1	55	PVC	Adult
7/18/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1		COBS	Adult
7/18/2012	Amphibian	Lithobates sphenoccephalus	Southern Leopard Frog	1		COBS	Adult
7/18/2012	Reptile	Sceloporus undulatus	Eastern Fence Lizard	1		COBS	Adult
7/18/2012	Amphibian	Acris gryllus	Southern Cricket Frog	1	6	MT	Tadpole

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
8/22/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	1	20	CB	Adult
8/22/2012	Amphibian	<i>Anaxyrus terrestris</i>	Southern Toad	2	34	CB	Adult
8/22/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	9	23	CB	Adult
8/22/2012	Reptile	<i>Eumeces</i> sp.		2		CB	Adult
8/22/2012	Reptile	<i>Scincella lateralis</i>	Ground Skink	1	42	CB	Adult
8/22/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1	52	PVC	Adult
8/22/2012	Amphibian	<i>Hyla femoralis</i>	Pine Woods Treefrog	1	21	PVC	Adult
8/22/2012	Amphibian	<i>Hyla squirella</i>	Squirrel Treefrog	1	19	PVC	Adult
8/22/2012	Amphibian	<i>Hyla squirella</i>	Squirrel Treefrog	1	18	PVC	Adult
8/22/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	2		COBS	Adult
8/22/2012	Amphibian	<i>Anaxyrus quercicus</i>	Oak Toad	2		COBS	Adult
8/22/2012	Amphibian	<i>Anaxyrus terrestris</i>	Southern Toad	3		COBS	Adult
8/22/2012	Amphibian	<i>Lithobates sphenoccephalus</i>	Southern Leopard Frog	1		COBS	Adult
8/22/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1		COBS	Adult
8/22/2012	Reptile	<i>Cnemidophorus sexlineatus</i>	Six-lined Racerunner	1		COBS	Adult
8/22/2012	Reptile	<i>Eumeces</i> sp.		1		COBS	Adult
8/22/2012	Reptile	<i>Sceloporus undulatus</i>	Eastern Fence Lizard	2		COBS	Adult

Start Date	Category	Species	Common Name(s)	Number Observed	Avg. SVL (mm)	Trap Type	Life Stage
8/22/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	2		MT	Tadpole
9/19/2012	Amphibian	<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	9	21	CB	Adult
9/19/2012	Amphibian	<i>Hyla femoralis</i>	Pine Woods Treefrog	5	21	PVC	Adult
9/19/2012	Amphibian	<i>Hyla squirella</i>	Squirrel Treefrog	11	24	PVC	Adult
9/19/2012		<i>incilius</i> spp.		12		COBS	Adult
9/19/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	65		COBS	Adult
9/19/2012	Reptile	<i>Anolis carolinensis</i>	Green Anole	1		COBS	Adult
9/19/2012	Reptile	<i>Scincella lateralis</i>	Ground Skink	1		COBS	Adult
9/19/2012	Amphibian	<i>Lithobates catesbeianus</i>	American Bullfrog	3		MT	Metamorph 2
9/19/2012	Amphibian	<i>Lithobates catesbeianus</i>	American Bullfrog	1	72	MT	Tadpole
9/19/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	2		MT	Metamorph 2
9/19/2012	Amphibian	<i>Acris gryllus</i>	Southern Cricket Frog	1		MT	Tadpole