



Reptile & Amphibian Monitoring at Jean Lafitte National Historical Park and Preserve, Barataria Preserve

Data Summary, Monitoring Year 2012

Natural Resource Data Series NPS/GULN/NRDS—2013/553



ON THE COVER

The Green Tree frog, *Hyla cinerea*, at Jean Lafitte – Barataria Preserve, 2012
Photograph by: RL Woodman, Gulf Coast Inventory and Monitoring Network

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Contents

	Page
Figures.....	iv
Tables.....	iv
Appendices.....	iv
Acknowledgments.....	v
Introduction.....	1
Methods.....	4
Sampling Design	4
Sampling and Data Collection.....	5
Monitoring Schedule	6
Data Management.....	6
Results.....	7
The accumulation of species-detections over time:.....	10
Air temperature and percent-relative humidity recorded at JELA during MY2012:	12
Specific Conductivity measured at the FT sampling site on Bayou des Famille during MY2012:	12
Discussion.....	14
Literature Cited	16

Figures

	Page
Figure 1: JELA-Barataria Preserve as seen from aerial perspective.....	3
Figure 2: Sampling cluster and device distribution in the JELA sampling area.	5
Figure 3: Total counts of amphibians and reptiles observed at JELA over all methods by sampling month in MY2012.	8
Figure 4: Numbers of amphibian and reptile species observed in JELA in each sampling month in MY2012.....	10
Figure 5: Cumulative count of amphibian, reptile, and “all herps” species observed at JELA over MY2012.....	11
Figure 6. Daily mean air temperature and percent-relative humidity recorded at JELA Ed Center from AUG 01 2011 through AUG 26 2012.	12
Figure 7. Specific conductivity, in microsiemens, measured at the JELA FT sampling site (Array L) in MY2012.....	13

Tables

	Page
Table 1: JELA-Barataria Amphibians.....	7
Table 2: JELA-Barataria Reptiles.....	8
Table 3: Number of amphibian species seen at JELA in MY2012.....	9
Table 4: Number of reptile species seen at JELA in MY2012.	9
Table 5: Cumulative species-counts for amphibians, reptiles, and all herp species over MY2012.	10
Table 6: Amphibian and Reptile species observed at JELA in MY2012.	11

Appendices

	Page
Appendix A.....	17

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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) in the forested area of the Barataria Preserve adjacent to the Jean Lafitte National Historical Park and Preserve Barataria Preserve Education Center in April of 2011. The GRAMP is a protocol developed by GULN in collaboration with Kurt Buhlmann 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 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.

JELA – Barataria Preserve is comprised of 23,488 acres (approximately 9505 ha) of wet coastal forest (mixed-hardwoods, cypress (*Taxodium*), and tupelo (*Nyssa* sp.)) and adjacent flotant marsh, and represents a key example of these habitats and ecosystems found in the Mississippi River Delta. The forested and flotant marsh habitats are dissected by numerous historical canals and modified stream-channels (bayous). The project sampling area is located close to the Education Center located in the eastern, upper-elevation portion of the forested area of the Preserve adjacent to the Bayou des Familles, an example of the modified canals typical of the area (Figure 1). This project area was selected by the GULN monitoring program based on a combination of crew site accessibility (both cross-country travel difficulty and crew safety are key considerations), site security for permanently installed devices and monitoring instruments, and access to (subjectively) good and “typical” examples of key forested and aquatic habitats representative of the Preserve, coupled with expressed park management interest in having monitoring in the specific area. This project does not provide “park-wide” inference in monitoring, but focuses on a defined resource area to provide local condition and change assessment.

The selected project area provides relatively easy access to portions of the upper-elevation wet forest and permanent waters habitats considered typical of the Preserve. Most of the sampled land area features a canopy forest of diverse hardwoods, tupelo and cypress with moist, occasionally inundated

soils. The Bayou des Familles, is a slow-flowing permanent freshwater habitat which extends during seasonal and storm-driven flooding as sheet-flow to inundate the adjacent forest. The wet forest and adjacent Bayou aquatic area provide habitats for numerous amphibian and reptile species (herps). The JELA monitoring project targets the aquatic, arboreal, and terrestrial herp assemblage associated with this key habitat site.

Amphibians were identified as a network higher-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.



Figure 1: JELA-Barataria Preserve as seen from aerial perspective. The red box identifies the approximate location of the JELA monitoring project sampling site, adjacent to the Education Center.

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 coastal storms, rainfall and significant anthropogenic and other impacts to local resources.

Methods

Sampling Design

Herp monitoring at JELA 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 area adjacent to and extending along the Bayou des Famille edge (Figure 2). Five of the 6 PVC arrays are co-located with CB arrays to simultaneously assess terrestrial and arboreal species within the selected sampling space. The sixth, non-located PVC array, K, is placed within the permanently-inundated cypress-tupelo glade to sample that specific habitat. FT are deployed in the near-shore bayou waters adjacent to the boardwalk-trail (provides access to the bayou edge) and PVC Array K for circa 24-hour during each scheduled sampling event to assess aquatic species and stages. As FT are traps that confine animals, FT deployment is limited to 24-hour periods to limit risk of lethality to captive organisms. FT and all associated specimen-handling and sorting equipment used on JELA are specific to the park and are never taken to or used at any other site or park.

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 6 3 x 4 US foot panels (3 galvanized steel roofing, 3 ¾ inch plywood) deployed in a linear arrangement with 5m minimum spacing between panels. Each collocated PVC cluster consists of 4 pairs of PVC pipes attached to trees located within its CB cluster area. The non-located PVC Array K consists of 6 pipe-pairs. Each PVC pair consists of one 1 inch x 2 foot pipe and 1 2 inch x 2 foot pipe. Initial CB and PVC array – start-points were selected by simple randomization among potential start-points located within the forested sampling area. Individual device locations are determined by natural spaces suitable for CB panels, and trees large enough – 15+cm dbh - to host pipe pairs. All CB and PVC locations are mapped onto the project GIS layers using GPS location data. FT are deployed in 5 nominally-linear clusters of 5 folding cloth-and-wire traps each at the start of each 2-day sampling event. FT clusters are deployed in available in-shore waters with minimal 5+m spacing between clusters and 2+m between traps within clusters. No baits, lures, added food or chemical attractants are used in any sampling method at the JELA-Barataria site.

Total sampling effort consists of 5 CB clusters (30 panels), 6 PVC clusters (5 x 4 pair, 1 x 6 pair, total 26 pipe pairs), and 5 FT clusters (25 FT traps). The spatial distribution and approximate locations of sampling devices are depicted in Figure 2.

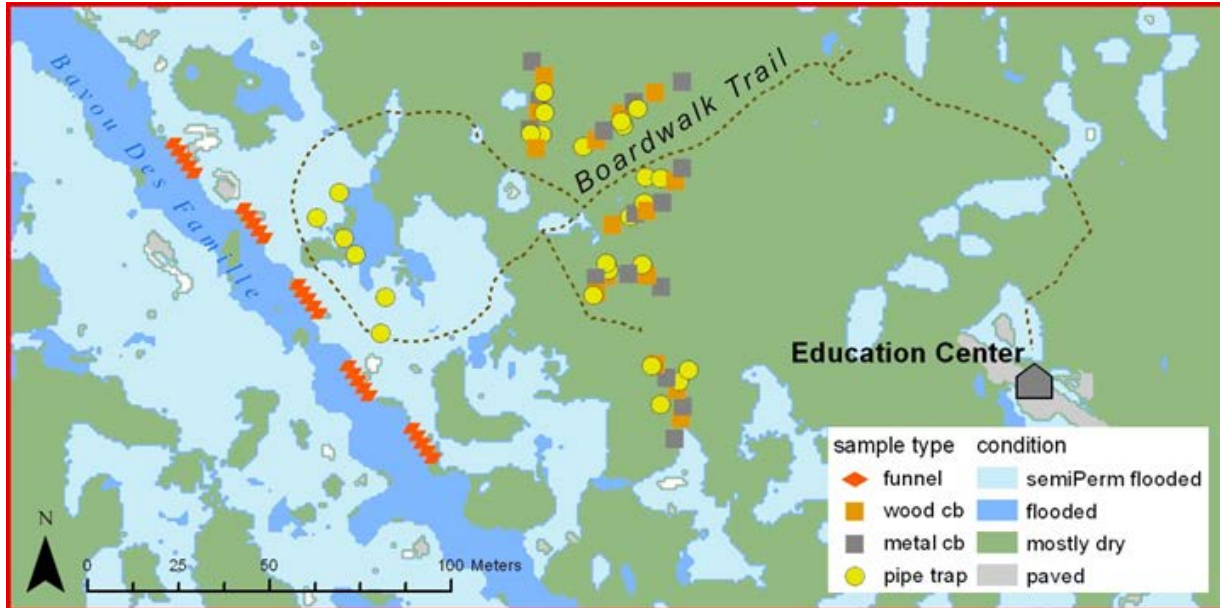


Figure 2: Sampling cluster and device distribution in the JELA sampling area. The permanent PVC and CB locations are mapped based on GPS coordinates for those devices. FT clusters are approximate locations and vary from event to event, depending on available open water for placement.

In addition to CB, PVC, and FT device-based 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 F and K 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 recorded in conjunction with FT sampling using a calibrated Oakton pH / Temp / Spec. 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 Cas Obs 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 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

JELA sites are sampled every month over each Monitoring Year (MY, defined as being from October 01 to September 30), for a total of 12 monthly sampling visits per MY. Each visit consists of 2 work-days: the park’s dedicated FT are deployed into the available FT sites about noon on Day 1. On Day 2, the sampling team sequentially samples CB and PVC clusters starting with a safety briefing at circa 0730 and typically completing CB and PVC sampling by 1030. Once PVC and CB sampling are complete, the field team samples FT clusters. FT are collected and packed for later cleaning and storage during the sampling process. FT sampling is typically completed by 1230 of Day 2. 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 the Data Table JELA-MY2012 attached 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 JELA 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 by sampling method. All summary data are presented in a per-sampling-event format with cumulative totals for the MY where appropriate.

Sampling at JELA-Barataria Ed. Center site yielded a total of 477 individuals (355 amphibians, 122 reptiles) representing 22 species (11 amphibians, 11 reptiles) from all methods in MY2012. Two hylid tree frogs, the Green Tree Frog (*Hyla cinerea*, 142) and the Squirrel Tree Frog (*H. squirella*, 52) accounted for 55% of all amphibian detections. The two most abundant reptiles were Green Anole (*Anolis carolinensis*, 83) and the Common Ground Skink (*Scincella lateralis*, 21), accounting for 85% of all reptiles observed.

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, Cas Obs = Casual Observations) by sampling month in MY2012.

Note that all following tables and figures show two (2) SEP-12 sampling events; the planned-for August sampling event was delayed until 06 September due to impacts in late August from Hurricane Isaac. The planned-for September event occurred on schedule on 26 Sep, 2012.

Table 1: JELA-Barataria Amphibians:

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	SEP06 2012	SEP26 2012	Total By Method
CB	5	2	3	7	5	5	4	0	4	14	0	24	73
PVC	24	18	23	41	32	10	9	7	3	0	11	9	187
FT	7	4	6	1	3	8	16	16	2	4	4	17	88
Cas Obs	0	0	1	0	1	0	1	2	1	0	0	1	7
Total n by Event	36	24	33	49	41	23	30	25	10	18	15	51	355

Table 2: JELA-Barataria Reptiles:

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	SEP06 2012	SEP26 2012	Total By Method
CB	3	3	3	8	4	2	3	0	3	1	0	1	31
PVC	9	4	35	17	6	0	4	1	3	0	1	0	80
FT	0	0	0	0	0	0	1	0	0	0	0	0	1
Cas Obs	1	1	0	0	1	0	0	0	3	0	1	2	10
Total n by Event	13	9	38	25	11	2	8	1	9	1	2	3	122

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.

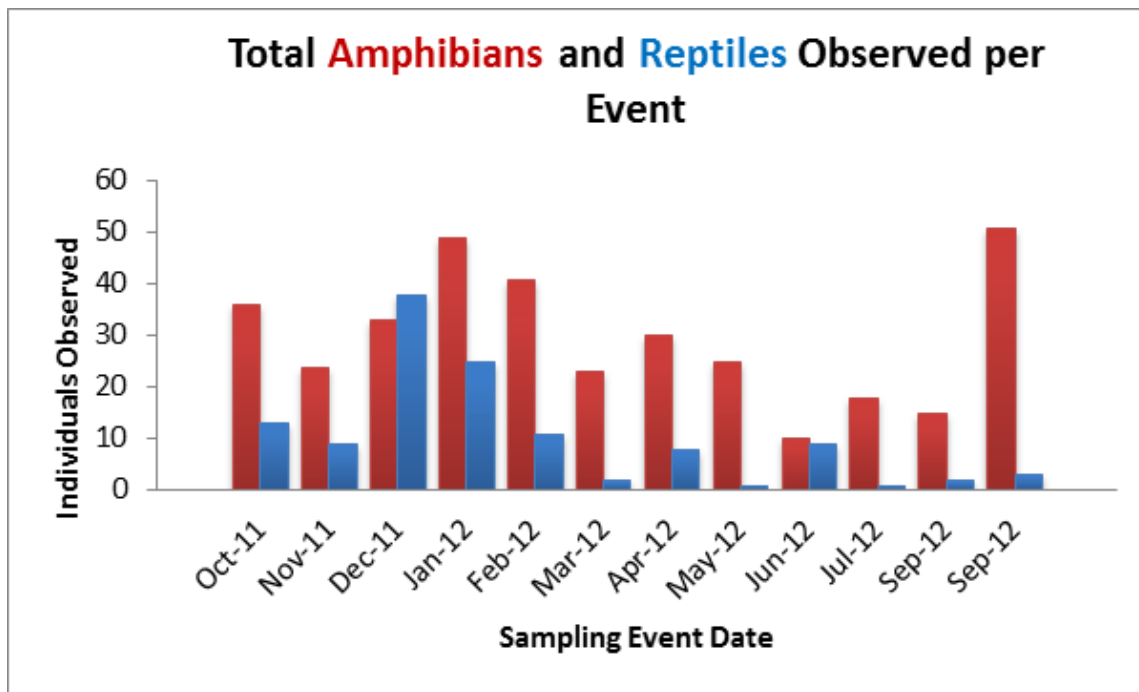


Figure 3: Total counts of amphibians and reptiles observed at JELA over all methods by sampling month in MY2012. The large amphibian count observed in the Sept 26 2012 sampling event reflects detection of a large cohort of exotic Greenhouse Frog (*Eleutherodactylus planirostris*) in CB clusters in the sampling area. This marks the first detection of this species on the JELA Barataria Preserve. Note that the first Sep-12 event was the delayed Aug-12 event.

Numbers of amphibian and reptile species observed at JELA 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, 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 (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 species observed by method over the year. The yellow block reports the total of unique species observed by all methods during the MY.

Table 3: Number of amphibian species seen at JELA in MY2012.

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	SEP06 2012	SEP26 2012	Total Spp.
CB	2	2	2	2	2	2	2	0	1	2	0	2	6
PVC	2	2	2	3	3	2	2	1	1	0	2	1	3
FT	2	2	2	1	2	2	2	3	2	1	1	1	4
Cas Obs	0	0	1	0	1	0	1	2	1	0	0	1	5
Total species by Event	6	6	5	6	8	6	6	5	5	4	3	5	11

Table 4: Number of reptile species seen at JELA in MY2012.

Sampling Method	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	SEP06 2012	SEP26 2012	Total Spp.
CB	1	2	2	3	4	1	1	0	1	1	0	1	7
PVC	1	1	1	1	1	0	1	1	2	0	1	0	2
FT	0	0	0	0	0	0	1	0	0	0	0	0	1
Cas Obs	1	2	0	0	1	0	0	0	3	0	1	2	7
Total species by Event	2	4	3	3	6	1	3	1	6	1	2	3	11

Amphibian species-count exceeded that of reptiles in 11 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, aquatic turtles and many aquatic / semi-aquatic snakes are not typically detected in FT sampling and are thus under-represented in this project.

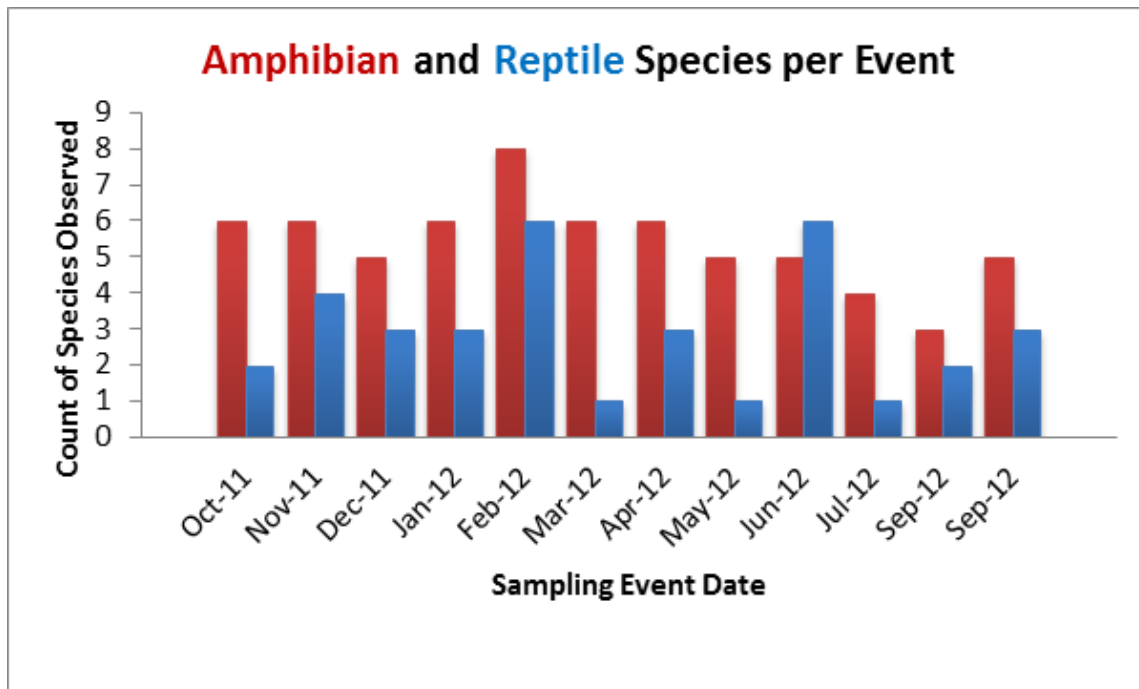


Figure 4: Numbers of amphibian and reptile species observed in JELA in each sampling month in MY2012. Many amphibian species occurred in most sampling events, whereas most reptile species occur in only one or 2 events in the year. Note that the first Sep-12 event was the delayed Aug-12 event.

The accumulation of species-detections over time:

Both amphibian and reptile species-accumulation continued over the MY (Table 5, and visualized in Figure 5), suggesting that hypothetical maximum species-detection for the methods being used has not been attained, and that additional species may be anticipated with continued monitoring over time.

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

Sampling Group	OCT 2011	NOV 2011	DEC 2011	JAN 2012	FEB 2012	MAR 2012	APR 2012	MAY 2012	JUN 2012	JUL 2012	SEP06 2012	SEP26 2012
Amphibians	6	8	8	9	9	9	9	9	10	10	10	11
Reptiles	2	4	5	5	7	7	8	8	10	10	11	11
Cum of all Herp Species	9	12	13	14	16	16	17	17	20	21	21	22

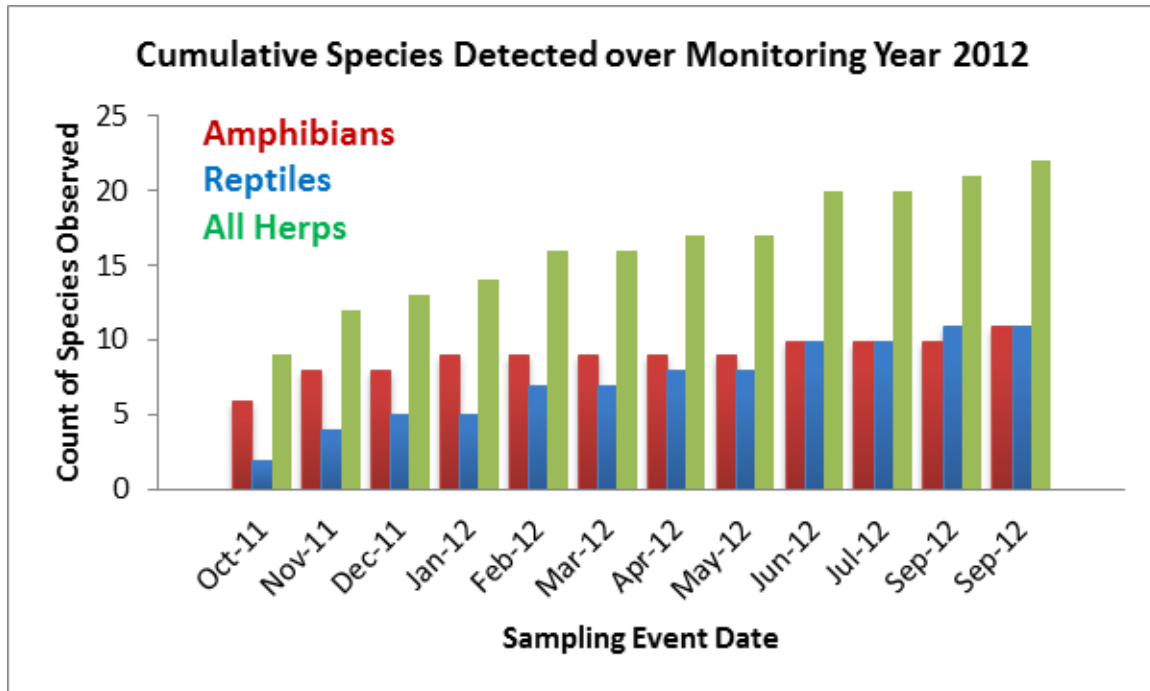


Figure 5: Cumulative count of amphibian, reptile, and “all herps” species observed at JELA over MY2012. Notably, “new species” continued to be detected throughout the year. Note that the first Sep-12 event was the delayed Aug-12 event.

The 22 amphibian and reptile species detected in JELA-Barataria 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.

Table 6: Amphibian and Reptile species observed at JELA in MY2012.

Amphibians			Reptiles		
Scientific Name:	Common Name:		Scientific Name:	Common Name:	
<i>Acris crepitans</i>	Northern Cricket Frog	26	<i>Agkistrodon contortrix</i>	Copperhead	1
<i>Eleutherodactylus planirostris</i>	Greenhouse Frog	19	<i>Anolis carolinensis</i>	Green Anole	83
<i>Eurycea quadridigitata</i>	Dwarf salamander	1	<i>Coluber constrictor</i>	Black-masked Racer	5
<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouth Toad	36	<i>Elaphe obsoleta</i>	Texas Rat Snake	3
<i>Hyla avivoca</i>	Bird-voiced Tree frog	3	<i>Eumeces fasciatus</i>	Five-lined Skink	2
<i>Hyla cinerea</i>	Green Tree frog	142	<i>Eumeces laticeps</i>	Broad-head Skink	2
<i>Hyla squirella</i>	Squirrel Tree frog	52	<i>Farancia abacura</i>	Mud Snake	1
<i>Incilius nebulifer</i>	Coastal Plain Toad	11	<i>Nerodia fasciata</i>	Southern Water-snake	2
<i>Lithobates clamitans</i>	Bronze Frog	48	<i>Regina rigida</i>	Glossy Crawfish Snake	1
<i>Lithobates sphenoccephala</i>	Southern Leopard-frog	1	<i>Scincella lateralis</i>	Ground Skink	21
<i>Notophthalmus viridescens</i>	Central Newt	16	<i>Thamnophis proximus</i>	Western Ribbon-snake	1

Air temperature and percent-relative humidity recorded at JELA 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-value traces over the MY2012 period in Figure 6 below. Note that these data traces include data for approximately 65 days prior to start of MY2012 sampling (Oct 27, 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 (correlation analysis) of possible relationships between environmental conditions and faunal parameters is an anticipated element in long-term trend analysis to be performed from 2015 on.

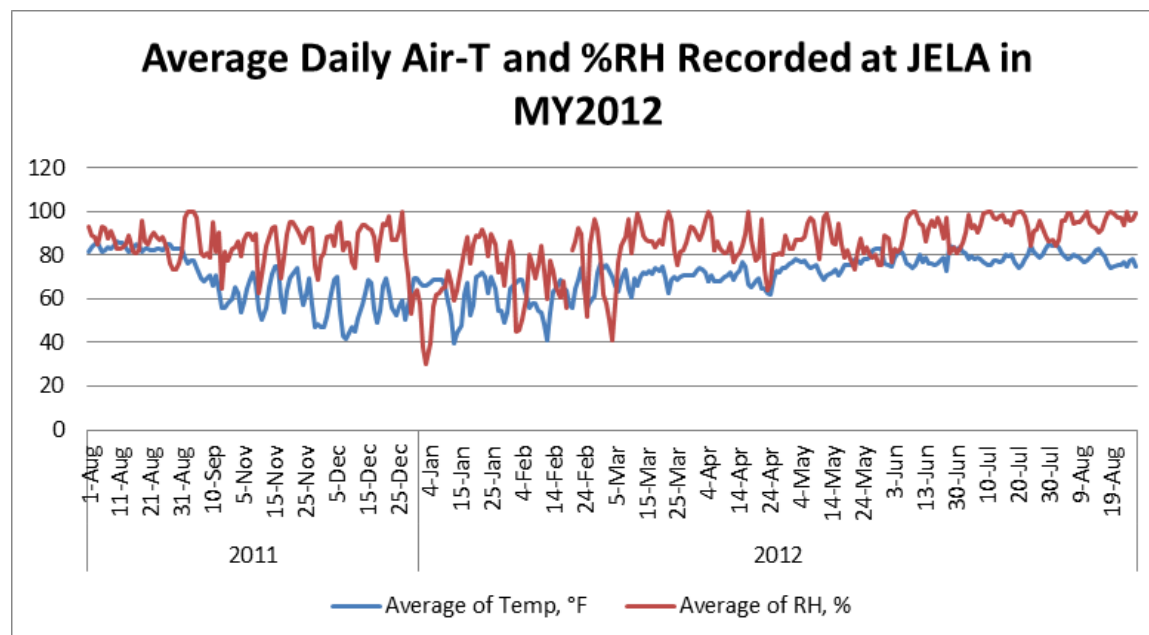


Figure 6. Daily mean air temperature and percent-relative humidity recorded at JELA Ed Center from AUG 01 2011 through AUG 26 2012.

Specific Conductivity measured at the FT sampling site on Bayou des Famille during MY2012:

Specific conductivity, recorded in microsiemens, was measured within the FT sampling site (Array L) during most sampling events to provide information on the relative salinity of Bayou des Famille as an environmental correlate to faunal data. Detected specific conductivity ranged from 330 to 1058 microSiemens over the MY (Figure 7).

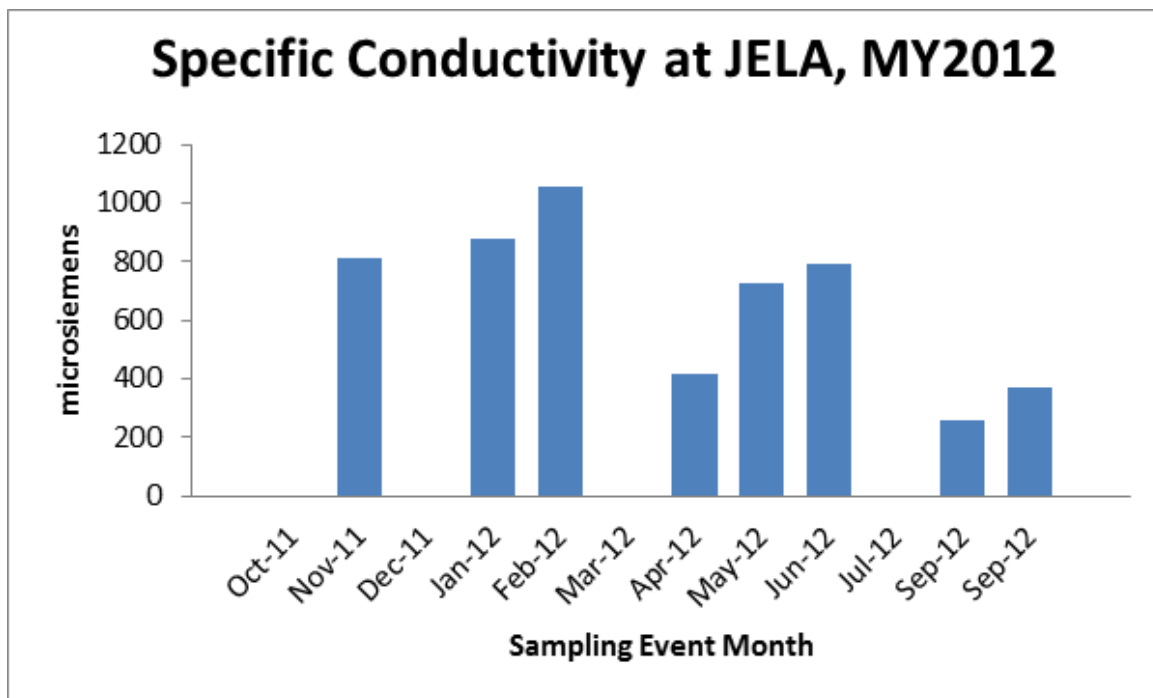


Figure 7. Specific conductivity, in microsiemens, measured at the JELA FT sampling site (Array L) in MY2012. Missing bars indicate months in which measurement was not calibrated or was otherwise not available.

Discussion

The 22 herp species (11 amphibians, 11 reptiles) detected during MY 2012 represent 46 percent of the 48 species (16 amphibians, 32 reptiles) reported as being present or likely-present on JELA-Barataria Preserve in the most recent herp inventory (Anderson and Seigel, 2003). It should be noted that many species reported in this inventory, including alligators, larger aquatic turtles, and snakes primarily associated with aquatic habitats, 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 1995) 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.). In addition, sampling effort is limited in scope and range, and larger snake species may be relatively rare and thus unlikely to be encountered in smaller sampling efforts; from these factors, 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 observed in the greater New Orleans metro area near to the Preserve for many years, and was indicated in past inventories as being directly outside the Preserve boundaries (Anderson and Seigel, 2003), but was never detected in any developmental (2008 – 2010) or full-implementation project sampling on the Preserve prior to September 2012. Notably, *E. planirostris* has subsequently been observed in the JELA sampling area in every sampling visit performed since first documented. This continued detection supports that *E. planirostris* is now established in at least the sampling area on the Preserve, and may indicate some larger expansion of the species is occurring within the Preserve. All detected reptiles are considered expected and typical of the region and habitats. No obvious pathologies or abnormalities were noted in any species.

Species accumulation continued throughout monitoring year 2012. 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 both amphibian and reptile species continued to accumulate throughout MY2012, this hypothetical maximum detected species-count was not apparently attained, and it may be reasonable to anticipate that some additional species will be added to the detection list with continued monitoring.

The recorded air-T and %RH indicated no extreme variation or apparent departures from anticipated pattern and ranges in MY2012. This data-track does not record the weather events of Hurricane Isaac, which impacted coastal Louisiana in late August of 2012. Hurricanes may not substantially alter the local temperature and humidity regimes that prevail in the typically hot and humid coastal summer, yet exact enormous changes in wind and rainfall conditions. The lack of substantial changes in faunal detections (other than the subsequent detection of the exotic Greenhouse Frog in SEP 2012) suggests that this coastal storm may have had little direct impact on the local herp assemblages. The

appearance of Greenhouse Frogs in JELA cannot be clearly attributed to Hurricane Isaac; the cause for this apparent outbreak remains unknown at this time.

The specific conductivity range observed in Bayou des Famille in MY2012 did not indicate any substantial salt-water intrusion had occurred in MY201. Aquatic amphibians and larval stages are generally 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 the bayou in MY2012.

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Appendix A

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

Date	Species	Common Name	Number Observed	Trap Type
10/27/2011	<i>Acris crepitans</i>	Northern Cricket Frog	4	MT
10/27/2011	<i>Anolis carolinensis</i>	Green Anole	9	PVC
10/27/2011	<i>Anolis carolinensis</i>	Green Anole	1	COBS
10/27/2011	<i>Eurycea quadridigitata</i>	Dwarf salamander	1	CB
10/27/2011	<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouth Toad	4	CB
10/27/2011	<i>Hyla cinerea</i>	Green Tree frog	23	PVC
10/27/2011	<i>Hyla squirella</i>	Squirrel Tree frog	1	PVC
10/27/2011	<i>Lithobates clamitans</i>	Bronze Frog	3	MT
10/27/2011	<i>Scincella lateralis</i>	Ground Skink	3	CB
11/22/2011	<i>Anolis carolinensis</i>	Green Anole	4	PVC
11/22/2011	<i>Elaphe obsoleta</i>	Texas Rat Snake	1	COBS
11/22/2011	<i>Eumeces laticeps</i>	Broad-head Skink	1	CB
11/22/2011	<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouth Toad	1	CB
11/22/2011	<i>Hyla cinerea</i>	Green Tree frog	16	PVC
11/22/2011	<i>Hyla squirella</i>	Squirrel Tree frog	2	PVC
11/22/2011	<i>Incilius nebulifer</i>	Coastal Plain Toad	1	CB
11/22/2011	<i>Lithobates clamitans</i>	Bronze Frog	3	MT
11/22/2011	<i>Notophthalmus viridescens</i>	Central Newt	1	MT
11/22/2011	<i>Scincella lateralis</i>	Ground Skink	2	CB
11/22/2011	<i>Scincella lateralis</i>	Ground Skink	1	COBS
12/28/2011	<i>Acris crepitans</i>	Northern Cricket Frog	1	COBS
12/28/2011	<i>Anolis carolinensis</i>	Green Anole	35	PVC
12/28/2011	<i>Eumeces fasciatus</i>	Five-lined Skink	1	CB
12/28/2011	<i>Hyla cinerea</i>	Green Tree frog	22	PVC
12/28/2011	<i>Hyla cinerea</i>	Green Tree frog	2	CB
12/28/2011	<i>Hyla squirella</i>	Squirrel Tree frog	1	PVC
12/28/2011	<i>Incilius nebulifer</i>	Coastal Plain Toad	1	CB
12/28/2011	<i>Lithobates clamitans</i>	Bronze Frog	5	MT
12/28/2011	<i>Notophthalmus viridescens</i>	Central Newt	1	MT
12/28/2011	<i>Scincella lateralis</i>	Ground Skink	2	CB
1/26/2012	<i>Anolis carolinensis</i>	Green Anole	17	PVC
1/26/2012	<i>Anolis carolinensis</i>	Green Anole	3	CB
1/26/2012	<i>Eumeces laticeps</i>	Broad-head Skink	1	CB
1/26/2012	<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouth Toad	5	CB
1/26/2012	<i>Hyla avivoca</i>	Bird-voiced Tree frog	1	PVC

Date	Species	Common Name	Number Observed	Trap Type
1/26/2012	Hyla cinerea	Green Tree frog	30	PVC
1/26/2012	Hyla squirella	Squirrel Tree frog	10	PVC
1/26/2012	Incilius Nebulifer	Coastal Plain Toad	2	CB
1/26/2012	Lithobates clamitans	Bronze Frog	1	MT
1/26/2012	Scincella lateralis	Ground Skink	4	CB
2/29/2012	Acris crepitans	Northern Cricket Frog	1	COBS
2/29/2012	Agkistrodon contortrix	Copperhead	1	CB
2/29/2012	Anolis carolinensis	Green Anole	6	PVC
2/29/2012	Coluber constrictor	Black-masked Racer	1	COBS
2/29/2012	Elaphe obsoleta	Texas Rat Snake	1	CB
2/29/2012	Eumeces fasciatus	Five-lined Skink	1	CB
2/29/2012	Gastrophryne carolinensis	Eastern Narrow-mouth Toad	2	CB
2/29/2012	Hyla avivoca	Bird-voiced Tree frog	1	PVC
2/29/2012	Hyla cinerea	Green Tree frog	28	PVC
2/29/2012	Hyla squirella	Squirrel Tree frog	3	PVC
2/29/2012	Incilius nebulifer	Coastal Plain Toad	3	CB
2/29/2012	Lithobates clamitans	Bronze Frog	1	MT
2/29/2012	Notophthalmus viridescens	Central Newt	2	MT
2/29/2012	Scincella lateralis	Ground Skink	1	CB
3/28/2012	Gastrophryne carolinensis	Eastern Narrow-mouth Toad	4	CB
3/28/2012	Hyla cinerea	Green Tree frog	8	PVC
3/28/2012	Hyla squirella	Squirrel Tree frog	2	PVC
3/28/2012	Incilius nebulifer	Coastal Plain Toad	1	CB
3/28/2012	Lithobates clamitans	Bronze Frog	1	MT
3/28/2012	Notophthalmus viridescens	Central Newt	7	MT
3/28/2012	Scincella lateralis	Ground Skink	2	CB
4/25/2012	Acris crepitans	Northern Cricket Frog	10	MT
4/25/2012	Anolis carolinensis	Green Anole	4	PVC
4/25/2012	Gastrophryne carolinensis	Eastern Narrow-mouth Toad	2	CB
4/25/2012	Hyla avivoca	Bird-voiced Tree frog	1	COBS
4/25/2012	Hyla cinerea	Green Tree frog	4	PVC
4/25/2012	Hyla cinerea	Green Tree frog	6	MT
4/25/2012	Hyla squirella	Squirrel Tree frog	5	PVC
4/25/2012	Incilius nebulifer	Coastal Plain Toad	2	CB
4/25/2012	Regina rigida	Glossy Crawfish Snake	1	MT
4/25/2012	Scincella lateralis	Ground Skink	3	CB
5/30/2012	Acris crepitans	Northern Cricket Frog	1	COBS
5/30/2012	Anolis carolinensis	Green Anole	1	PVC
5/30/2012	Hyla cinerea	Green Tree frog	1	MT
5/30/2012	Hyla squirella	Squirrel Tree frog	7	PVC

Date	Species	Common Name	Number Observed	Trap Type
5/30/2012	Lithobates clamitans	Bronze Frog	11	MT
5/30/2012	Lithobates clamitans	Bronze Frog	1	COBS
5/30/2012	Notophthalmus viridescens	Central Newt	4	MT
5/30/2012	Scincella lateralis	Ground Skink	2	CB
6/27/2012	Anolis carolinensis	Green Anole	2	PVC
6/27/2012	Coluber constrictor	Black-masked Racer	1	CB
6/27/2012	Coluber constrictor	Black-masked Racer	2	CB
6/27/2012	Elaphe obsoleta	Texas Rat Snake	1	PVC
6/27/2012	Gastrophryne carolinensis	Eastern Narrow-mouth Toad	4	CB
6/27/2012	Hyla squirella	Squirrel Tree frog	3	PVC
6/27/2012	Lithobates clamitans	Bronze Frog	1	MT
6/27/2012	Lithobates sphenoccephala	Southern Leopard-frog	1	COBS
6/27/2012	Nerodia fasciata	Southern Water-snake	1	COBS
6/27/2012	Notophthalmus viridescens	Central Newt	1	MT
6/27/2012	Scincella lateralis	Ground Skink	1	COBS
6/27/2012	Thamnophis proximus	Western Ribbon-snake	1	COBS
7/24/2012	Acris crepitans	Northern Cricket Frog	5	CB
7/24/2012	Gastrophryne carolinensis	Eastern Narrow-mouth Toad	9	CB
7/24/2012	Incilius nebulifer	Coastal Plain Toad	2	CB
7/24/2012	Lithobates clamitans	Bronze Frog	4	MT
7/24/2012	Scincella lateralis	Ground Skink	1	CB
9/6/2012	Acris crepitans	Northern Cricket Frog	4	MT
9/6/2012	Anolis carolinensis	Green Anole	1	PVC
9/6/2012	Farancia abacura	Mud Snake	1	COBS
9/6/2012	Hyla cinerea	Green Tree frog	2	PVC
9/6/2012	Hyla squirella	Squirrel Tree frog	9	PVC
9/26/2012	Coluber constrictor	Black-masked Racer	1	COBS
9/26/2012	Eleutherodactylus planirostris	Greenhouse Frog	19	CB
9/26/2012	Gastrophryne carolinensis	Eastern Narrow-mouth Toad	5	CB
9/26/2012	Hyla squirella	Squirrel Tree frog	9	PVC
9/26/2012	Incilius nebulifer	Coastal Plain Toad	1	COBS
9/26/2012	Lithobates clamitans	Bronze Frog	17	MT
9/26/2012	Nerodia fasciata	Southern Water-snake	1	COBS
9/26/2012	Scincella lateralis	Ground Skink	1	CB