

2018 Annual Report for Amphibian Monitoring at Jean Lafitte National Historical Park and Preserve

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Findings section was submitted to Research Permit and Reporting System on IRMA on 3/28/2019

PROJECT BACKGROUND

The Gulf Coast Network monitors amphibians in two sites in the Barataria Unit of Jean Lafitte National Historical Park and Preserve using coverboards and PVC pipes. Each pipe or board is checked during park visits that take place every other month. In addition to recording the amphibian species present and the number of each, the crew records environmental conditions on-site, including temperature in and around pipes or boards, relative humidity, barometric pressure, and water level in the nearest water body. Data on rainfall and temperature in the days prior to sampling are obtained from nearby weather stations. The network's two monitoring objectives for this project are (1) Determine species composition of the amphibian communities that use the monitored cover objects (PVC pipes or coverboards) at each site, and determine species richness for native and exotic species separately; and (2) Determine the frequency (yes/no detected) and relative abundance (counts per pipe or board) of the more commonly encountered amphibian species at each site, and determine trends over time.

Project planning began in 2008, and pilot sampling at the Education Center took place from 2011 to 2017. In 2017-2018, the project went through a series of revisions to produce the final protocol in late 2018. For a description of the pilot study and how sampling was changed from pilot to final design, see the GULN supplemental information document at <https://irma.nps.gov/DataStore/Reference/Profile/2243804>. For a complete description of the background, justification and methods for the final design, see the final protocol narrative at <https://irma.nps.gov/DataStore/Reference/Profile/2256511> and SOPs at <https://irma.nps.gov/DataStore/Reference/Profile/2255921>. The full list of project-related documents on IRMA is at <https://irma.nps.gov/DataStore/Reference/Profile/2192506>

FINDINGS

Set-up Activities Completed and Dates of Completion

The network transitioned from the pilot phase of amphibian monitoring to the final design between July and November 2017. Beginning in 2011, the network sampled for amphibians once per month, but in July 2017, the network switched to alternate month sampling, in anticipation of changes required by the final design. As such, there were monthly events up until and including July, no sampling events in August, and one event in September, and none in October. Fieldwork was completed by Billy Finney and other Gulf Coast Network staff.

On November 27, 2017, the last sampling event under the pilot design occurred at the Education Center. Immediately after sampling was completed, the new monitoring design was deployed at the

Education Center (ED) and the V-levee (LV), by J. Carson, W. Finney, other Gulf Coast Network staff and two park interns. The new coverboards and pipes were given a 2-month settling-in period, and on January 30, 2018, the first sampling event under the final design took place. The approximate locations and arrangements of the eight clusters per site (4 coverboards and 3 pairs of PVC pipes per cluster) are shown in Figures 1 and 2. Table 1 lists the locations of the water level loggers, air pressure logger and air temp/RH loggers installed during or shortly after the deployment visit.

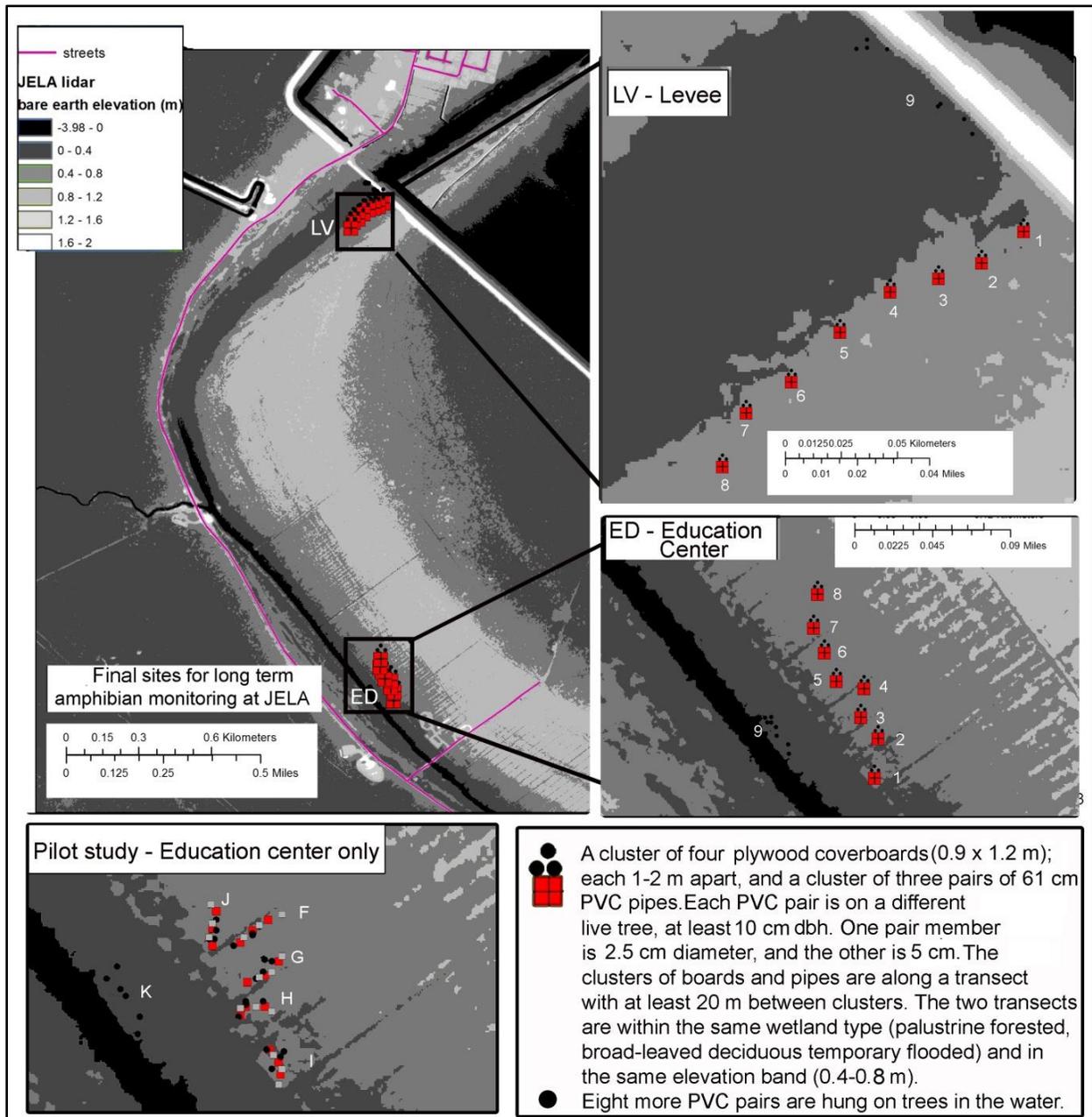


Figure 1. Approximate locations of PVC pipes and coverboards in two sites at the Barataria Preserve of JELA.

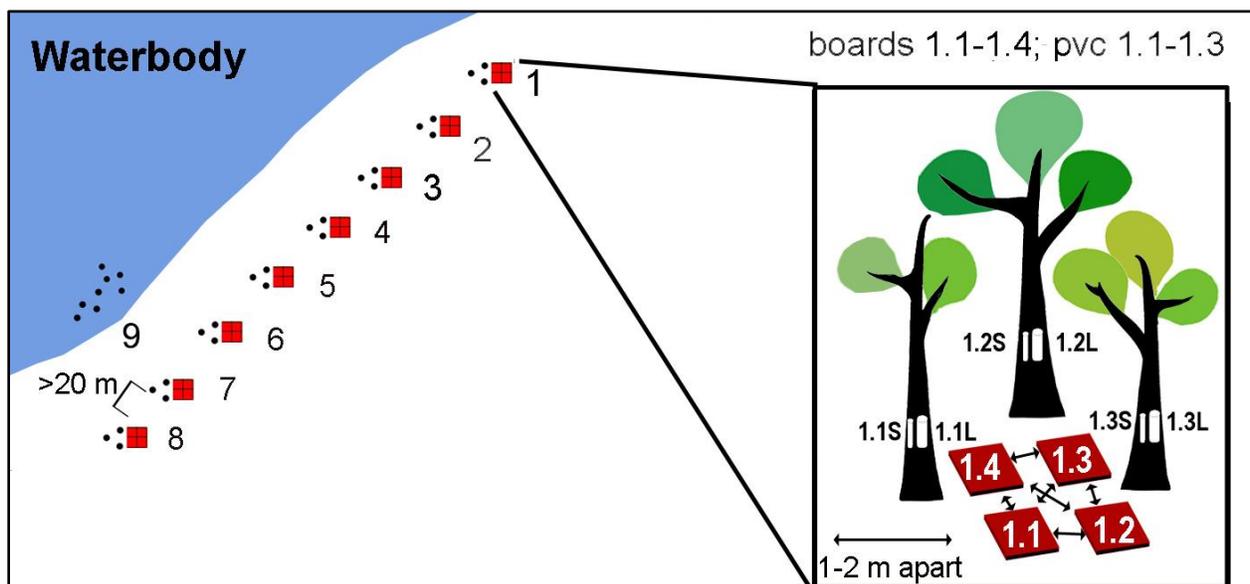


Figure 2. Approximate arrangement of PVC pipes and coverboards in clusters along a transect.

Table 1. Dates of installation and location of the loggers located at the Barataria Preserve, JELA.

Date installed	site	lat	long	type	location notes	installation notes
1/30/2018	LV	29.80498	-90.1138	temperature and relative humidity logger	on tree with pipe 2.2	B. Finney installed this logger on the first data collection event under the final design. The radiation shield was installed around the logger in Fall 2018 to improve data quality.
3/28/2018	LV	29.80558	-90.1139	water level logger	near pipe tree 9.4	B. Finney installed this logger on the first data collection event under the final design
3/15/2018	ED	29.78685	-90.1147	water level logger	on dock	B. Finney installed this logger on the water quality sampling trip for March 2018
Was there, but moved on 11/27/2017	ED	29.78725	-90.1137	temperature and relative humidity logger	on tree with pipe 4.2	The logger may have been moved a short distance on 11/27/2017. In fall 2018, the required radiation shield was added.
3/28/2018	ED	29.78725	-90.1137	Barometric pressure logger	on tree with pipe 4.2	B. Finney installed this logger on the water quality sampling trip for March 2018

Sampling Activities Completed and Dates of Completion

For all of 2018, sampling was conducted on alternate months, according to the final design of the recently published monitoring protocol. The Education center site (ED) and the Levee site (LV) each have 64 pipes and 32 boards eligible to be sampled on each visit, although some may be excluded for a visit due to incorrect placement of being submerged in water (for the boards).

- January event: crew leader B. Finney. Date: January 30, 2018. Both ED and LV were sampled in the same day. At the ED site, no pipes or boards were excluded, but at the LV site, 1 pipe and 10 boards were excluded. For the pipe checks, 11% at the ED site and 0% at the LV site were found with at least one amphibian inside. For the board checks, 13% at the ED site and 5% at the LV site were found with at least one amphibian underneath.
- March event: crew leader B. Finney. Date: March 27, 2018. Both ED and LV were sampled in the same day. At both the ED and the LV site, no pipes or boards were excluded. For the pipe checks, 13% at the ED site and 2% at the LV site were found with at least one amphibian inside. For the board checks, 13% at the ED site and 6% at the LV site were found with at least one amphibian underneath.
- May event: crew leader B. Finney. Date: May 29, 2018. Both ED and LV were sampled in the same day. At both the ED and the LV site, no pipes or boards were excluded. For the pipe checks, 0% at the ED site and 5% at the LV site were found with at least one amphibian inside. For the board checks, 3% at the ED site and 3% at the LV site were found with at least one amphibian underneath.
- July event: crew leader B. Finney. Date: July 24, 2018. Both ED and LV were sampled in the same day. Several pairs in pipe cluster 9 at LV site were not sampled because of a minor injury in the field (eye poked). Four ED pipes and 15 LV pipes were excluded, but zero boards were excluded from either site. For the pipe checks, 3% at the ED site and 2% at the LV site were found with at least one amphibian inside. For the board checks, 34% at the ED site and 9% at the LV site were found with at least one amphibian underneath.
- September event: crew leader B. Finney. Date: September 28, 2018. Both ED and LV were sampled in the same day. The surface temperature meter fell in the water at the end of ED site, so LV site has no surface temperature data. Three ED pipes and 2 LV pipes were excluded, but zero boards were excluded from either site. For the pipe checks, 0% at the ED site and 2% at the LV site were found with at least one amphibian inside. For the board checks, 88% at the ED site and 14% at the LV site were found with at least one amphibian underneath.
- November event: crew leader B. Finney. Dates: Nov 27-28, 2018. The ED site was sampled the first day, and the LV was sampled on the second day. At the ED site, 0 pipes and 1 board were excluded, and at the LV site, 12 pipes and 8 boards were excluded. For the pipe checks, 44% at the ED site and 35% at the LV site were found with at least one amphibian inside. For

the board checks, 77% at the ED site and 38% at the LV site were found with at least one amphibian underneath.

Results for Amphibian Detections

Since the first sampling event under the new monitoring design in January 2018, 329 individual amphibians have been found in the Barataria Preserve (Table 2). Of those, 274 individuals were found at the Education Center (ED) site. Amphibians at the ED site used the coverboards more often than they used the PVC pipes, with 199 individuals found under boards and 75 individuals found in pipes. However, the main amphibian species using coverboards (at 142 individuals) was the invasive greenhouse frog, *Eleutherodactylus planirostris*. The remaining 57 individuals found under coverboards belonged to six native species, primarily the narrowmouth toad (*Gastrophryne carolinensis*, n=28) and the Gulf Coast toad (*Incilius nebulifer*, n=23). The PVC pipes, in contrast, provided cover to just four native treefrog species: green treefrog (*Hyla cinerea*, n=44), bird-voiced treefrog (*Hyla avivoca*, n=27), Grey treefrog (*Hyla chrysoscelis*, n=1) and squirrel treefrog (*Hyla squirella*, n=3).

At the Levee site (LV), a total of 55 individuals were found using monitored cover objects (Table 2). A narrow majority of individuals at that site were found in PVC pipes (35), mainly belonging to the bird-voiced treefrog, *Hyla avivoca* (20). Under the coverboards at this site, there were 11 individuals of the invasive greenhouse frog and four individuals each of the native narrowmouth toad and bronze frog (*Lithobates clamitans*). There was also one leopard frog (*Lithobates sphenoccephalus*) beneath a board at that site.

There were some temporal patterns in detections over the six sampling events at each site in 2018. In the PVC pipes, detections were at their highest on the Nov. 2018 event (Figure 3), which is consistent with previous findings that several of these treefrog species use PVC pipes most often in the winter. This does not explain the intermediate detection rates in January and March of 2018, however, when PVC pipes were also expected to be used frequently. For coverboards, there was also an increase in occupancy in the late summer and fall, and this pattern was strongest for the greenhouse frog at the Education center (Figure 4).

While the crew was travelling between clusters, some additional amphibian species were seen or heard in 2018. These were the northern cricket frog (*Acris blanchardi*; July and Sept 2018), pig frog (*Lithobates grylio*, July 2018), and spring peeper (*Pseudacris crucifer*, July and Sept 2018). Several additional species from the pilot study or the earlier inventories have not yet been seen since the new design was implemented (Table 3), but it is expected that these species will be found again. Because sampling events are now alternate months, annual reports are based on relatively little data, and the network provides more comprehensive reports every-other-year.

Reptiles are also detected and recorded during routine monitoring by the Gulf Coast Network, even though they are not the target organisms of the monitoring protocol. During 2018, the following reptile species were recorded, either as casual observations, in PVC pipes (green anoles only) or under coverboards: Green Anole (*Anolis carolinensis*), Ground Skink (*Scincella lateralis*), Five-lined or broad-headed Skink (*Plestiodon* sp.), Copperhead (*Agkistrodon contortrix*), Black-masked Racer

(*Coluber constrictor*), Western Ribbon Snake (*Thamnophis proximus*), Plain-bellied Water Snake (*Nerodia erythrogaster*), Glossy crayfish snake (*Liodytes rigida*; was *Regina rigida*), Brown snake (*Storeria dekayi*), and Banded watersnake (*Nerodia fasciata*). The two records of the glossy crayfish snake for this year (January and September 2018) are only the second and third ever during GULN sampling, with the first record in September 2017.

Table 2. Number of individuals of each amphibian species recorded at the two sites at the Barataria preserve between January and November 2018. Sampling occurred every other month, using up to 128 pipes and 64 coverboards.

GULN means of detection	Species name	Total Education Center (ED) Site	Total for Levee (LV) Site
pipe	<i>Hyla avivoca</i>	27	20
pipe	<i>Hyla chrysoscelis</i>	1	3
pipe	<i>Hyla cinerea</i>	44	6
pipe	<i>Hyla squirella</i>	3	6
coverboard	<i>Eleutherodactylus planirostris</i>	142	11
coverboard	<i>Eurycea paludicola</i> (was <i>quadridigitata</i>)	3	0
coverboard	<i>Gastrophryne carolinensis</i>	28	4
coverboard	<i>Incilius nebulifer</i>	23	0
coverboard	<i>Lithobates clamitans</i>	2	4
coverboard	<i>Lithobates sphenoccephalus</i>	0	1
coverboard	<i>Notophthalmus viridescens</i>	1	0

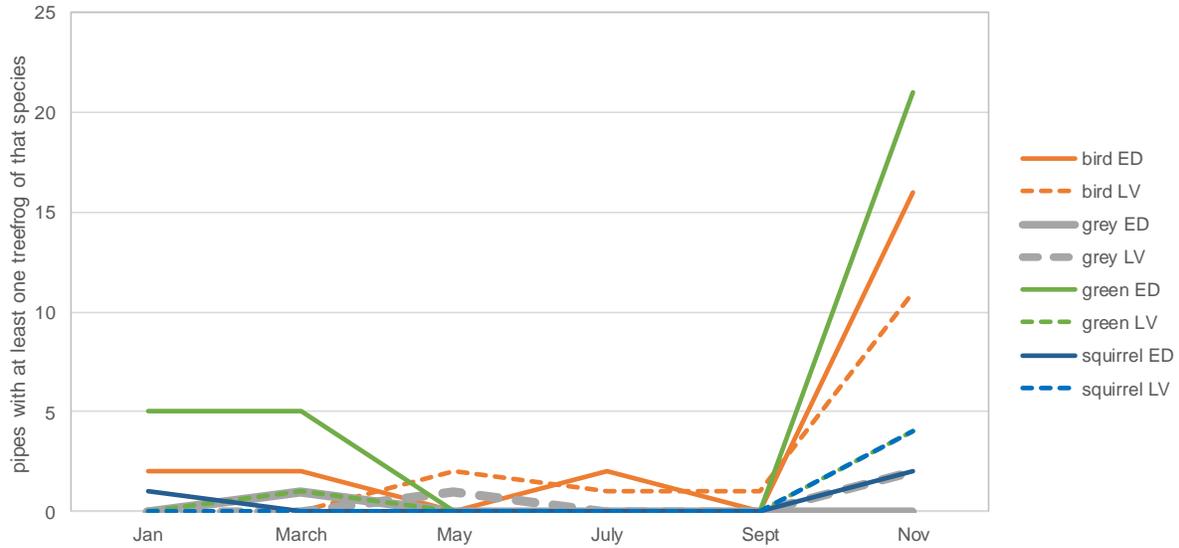


Figure 3. Treefrog detections in PVC pipes at Barataria Preserve during GULN sampling for 2018. Detections from the Education Center (ED) are solid lines, and those from the Levee (LV) site are dotted lines. In the legend, bird=*Hyla avivoca*, grey=*Hyla chrysoscelis*, green=*Hyla cinerea*, and squirrel=*Hyla squirella*.

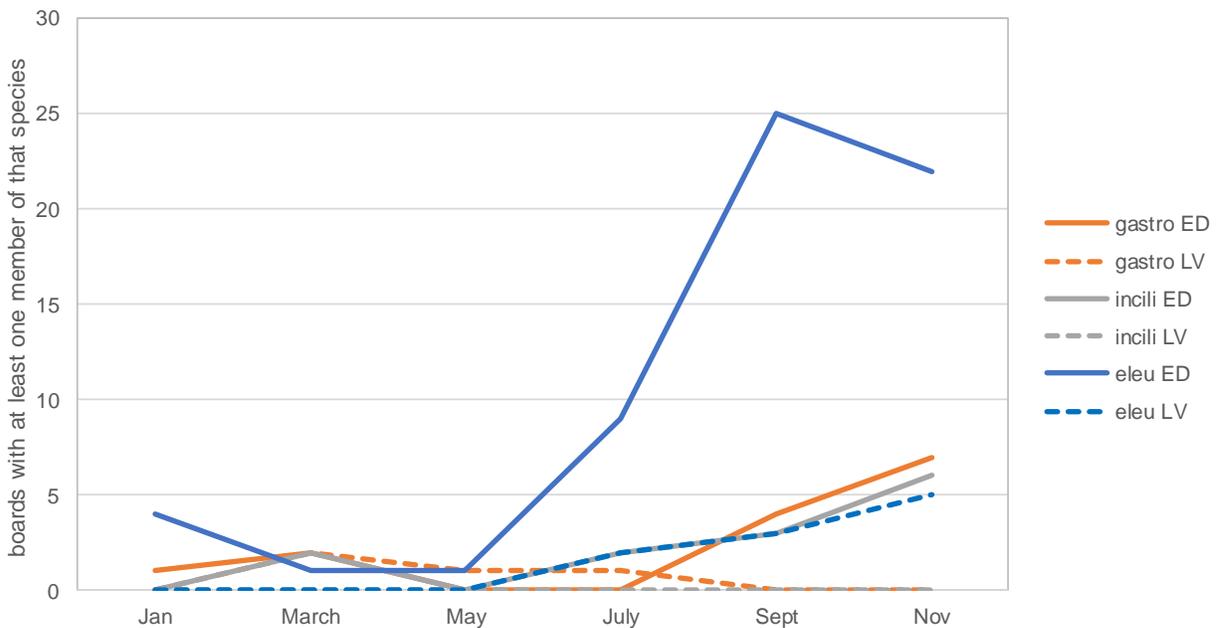


Figure 4. Amphibian detections under coverboards at Barataria Preserve during GULN sampling for 2018. Only the three most common species are shown: gastro=*Gasrophryne carolinensis*, incili=*Incilius nebulifer*, and eleu=*Eleutherodactylus planirostris*.

Table 3. Amphibians on the species checklist for Barataria Preserve that were not documented under coverboards or inside pipes during fieldwork from January to November 2018. In the second column in the table, 'None' means that the species was not detected by the GULN, but it was recorded during previous inventory work on the park. Casual observations of species during fieldwork are also recorded.

Species name	GULN means of detection	Last time seen outside of new design sampling
<i>Ambystoma texanum</i>	none	2001-2002 inventory
<i>Amphiuma tridactylum</i>	Minnow trap	05/09/2008
<i>Siren intermedia</i>	Minnow trap	12/21/2016
<i>Pseudacris fouquettei</i>	none	1988 inventory
<i>Lithobates catesbeianus</i>	minnow trap	4/24/2014, with more recent casual observation on 6/27/2017
<i>Lithobates grylio</i>	minnow trap	9/17/2015
<i>Desmognathus valentinei</i>	none	None, but predicted to be there by inventories