

El Niño and December Herp Activities

Jason D. Gibson
Patrick Henry Community College
STEM Division
645 Patriot Avenue
Martinsville, Virginia 24112

Paul Sattler
Department of Biology
Liberty University
1971 University Blvd.
Lynchburg, Virginia 24502

Introduction

Weather plays a major factor in the life history of any species of reptile or amphibian. The weather helps species time various behaviors such as hibernation, estivation, and breeding cycles. Virginia's latitudinal position allows for four distinct seasonal weather patterns. These patterns of winter, spring, summer, and fall occur with regularity and allow species to fall into predictable patterns of behavior. However, some years have weather patterns that deviate from what is normally expected. During these unusual weather patterns new amphibian and reptile behaviors can be observed. One weather pattern that can disrupt normal behavior is the El Niño Southern Oscillation (ENSO) or simply El Niño. This weather cycle is created when the eastern and central equatorial Pacific Ocean, which is normally cold, warms (Trenberth, 1997). The warming of this water causes global weather pattern changes including warmer weather during the winter and more precipitation in the Southeast United States. El Niño events have been occurring since the beginning of the Holocene epoch (Moy et.al, 2002), so this is not a new weather phenomenon affecting reptiles and amphibians. With this being said though, the intensity and frequency of these events has increased significantly in the past three decades (Lee and McPhaden, 2010). This increase in frequency and intensity can disrupt normal patterns of behavior as will be outlined in this report. The 2015-2016 El Niño is considered to have been a very strong event, with significant warming of the surface waters of the eastern and central Pacific Ocean. This El Niño has been linked to the warm and wet December which Virginia experienced in 2015. The period of 7 December until 16 December had daytime high temperatures between 15.5°C and 21°C, with 12 December having a high of 25°C. Another warm period of temperatures between 15.5°C and 21°C daytime highs lasted from 22 December to 28 December, 27 December had a high of 25°C. During these warm and wet weeks, the authors surveyed areas known to have populations of amphibians and reptiles to see what affects this warm weather would have on amphibian and reptile behavior. This report is a summary of what we observed.

Annotated Species Accounts

Amphibians

Acris crepitans (Northern Cricket Frog)

One Northern Cricket frog was found on a wet path leading to a field planted with wildlife crops at White Oak Mountain Wildlife Management Area (abbreviated to WOM WMA for subsequent citations) (36°48'0.11"N, 79°19'43.70"W) in Pittsylvania County, Virginia on 27 December.



Northern Cricket Frog found at WOM WMA on 27 December 2015.

Anaxyrus americanus (Eastern American Toad)

On 27 December, a lone male American Toad was heard calling at Peaks View Park at 1830 h in Lynchburg, Virginia (37° 25' 06.7"N, 79° 13' 25.8"W). He was still calling at 0600 h on December 28.

Lithobates catesbeianus (American Bullfrog)

American Bullfrogs were observed basking on rocks surrounding two small man-made ponds at JG's home residence from 24 December to 27 December (36°41'32.08"N, 79°25'31.90"W). Two frogs were observed sitting on rocks on 25 December, five frogs were observed sitting on rocks at 2015 h on 25 December, and five frogs were observed sitting on rocks at 1800 h on 27 December.

Lithobates clamitans (Green Frog)

A juvenile Green Frog was observed on the bank of a small tributary to Ivy Creek at Peaks View Park in Lynchburg at about 1400 h (37° 25' 19.1"N, 79° 13' 25.6"W).. It hopped into a thicket of brush and disappeared, but was out on the bank in the same location 30 minutes later.

Pseudacris crucifer (Spring Peeper)

On 13 December, males were heard calling at two different ponds at WOM WMA (36°46'47.44"N, 79°19'54.64"W and 36°46'54.98"N, 79°19'24.48"W). Males were heard calling at 1330 h, air temperature was 20°C. On 24 December three spring peepers were heard calling from the forest and wetlands area at 1040 h at Angler's park (36°33'39.67"N, 79°21'28.00"W). Air temperature was 18°C and it was raining. On 24 December two male Spring Peepers were heard calling at 1150 h from the forest surrounding a pond at WOM WMA. On 25 December one male was heard calling at 1201 h at a wetlands site at Anglers Park. Air temperature was 21°C. One DOR (dead on road) frog was found on Northside Drive, a hard paved road which parallels the wetlands area. Another calling male was heard at

1252 h at a beaver pond in Dan Daniel Memorial Park (36°34'29.89"N, 79°22'0.34"W). This individual was calling from the woods surrounding the beaver pond. On December 25 a small chorus of Peepers was calling from the wetland ditch behind softball diamond #3 at Peaks View Park (37° 25' 22.2"N, 79° 13' 21.7"W). On December 26, three males were observed calling at 1440 h from the forest adjacent to the wetlands at Anglers Park. On 27 December two males were observed calling at 1403 h and 1421 h from the woods surrounding a fishing pond at WOM WMA (36°46'54.98"N, 79°19'24.48"W). The air temperature was 23.8°C. On 27 December, two males were calling at 1443 h from the forest surrounding wetlands at WOM WMA (36°46'47.44"N, 79°19'54.64"W). The last observation for this species occurred on 31 December. A small chorus of 3-4 males was calling with overlapping calls at Peaks View Park in Lynchburg.



DOR Spring Peeper found on Northside Drive in Danville Virginia on 25 December 2015.

Pseudacris feriarum (Upland Chorus Frog)

On 13 December one male was heard calling at 1332 h from near a pond and wetlands area (36°46'46.34"N, 79°19'53.31"W) at WOM WMA. Air temperature was 20°C. On 24 December six males formed a chorus from a wetlands area in Anglers Park in Danville Virginia (36°33'40.41"N, 79°21'27.21"W). Males were heard calling at 1040 h with an air temperature of 18.3°C and rain. Two DOR frogs were found on the road adjacent to this site. A large chorus (continuous and overlapping calls) of Upland Chorus Frogs was heard at a swampy wetlands site in Dan Daniel Memorial Park (36°34'40.20"N, 79°22'32.71"W). These frogs were heard calling at 1106 h. On 25 December one chorus frog was heard calling at 1246 h from a beaver pond at Dan Daniel Memorial Park (36°34'29.41"N, 79°22'0.01"W). Air temperature was 21°C. Four DOR frogs were found on Northside Drive (36°33'41.51"N, 79°21'27.81"W), a road that parallels a wetlands site and hardwood forest at Anglers Park. On 26 December one male chorus frog was heard calling at 1452 from the hardwood forest adjacent to the wetlands at Anglers Park. The air temperature was 18°C and it was raining. On the same day several males were heard calling from a swampy wetlands area at Dan Daniel Memorial Park. On 27 December two males were heard calling at 1444 h and 1447 h respectively, near a wetlands at WOM WMA (36°46'42.27"N, 79°19'56.47"W). On that same date a large chorus of continuous overlapping calls heard in a field planted in wildlife crops at WOM WMA (36°48'2.14"N, 79°19'39.83"W). Upon closer investigation the males were calling from flooded tractor tire ruts in the middle of a sorghum field. Three males were hand captured and photographed. This chorus was heard at 1546 h with an air temperature of 23.8°C.



DOR and live Upland Chorus Frogs found at Anglers Park in the city of Danville and WOM WMA respectively.

Reptiles

Chrysemys picta (Eastern Painted Turtle)

Three Eastern Painted Turtles were observed sitting on logs in the shade at 1421 h in a fishing pond found at White Oak Mountain Wildlife Management Area (36°46'52.05"N, 79°19'23.20"W) on 13 December. One neonate painted turtle (25 mm plastron length, 27 mm carapace length) was found sitting beside a flooded pond at White Oak Mountain Wildlife Management Area (36°46'43.31"N, 79°19'55.78"W) on 24 December. Major flooding of the pond occurred the day before and it is thought that maybe this hatching was disturbed from its nest and came to the surface. On 27 December two adult painted turtles were observed sitting on logs in a fishing pond at 1403 h in WOM area (36°46'52.05"N, 79°19'23.20"W). The air temperature at the time of this observation was 23.8°C and skies were clear and sunny. Both Mitchell (1994) and Ernst and Lovich (2009) have observed basking turtles during all months but neither list any specific dates.



Neonate Eastern Painted Turtle found at WOM WMA on 24 December 2015.

Pseudemys concinna (Eastern River Cooter)

On 13 December one adult Eastern River Cooter was observed basking in the shade on a log at 1429 h. This turtle was observed in a fishing pond at WOM WMA (36°46'52.63"N, 79°19'24.62"W). Three turtles were observed basking on a rock in the middle of the Dan River (36°35'16.80"N, 79°23'2.71"W) at 0857 h on 16 December. On 27 December one turtle was observed basking on a log at 1415 h at the same site as the first observation in this account. The air temperature was 23.8°C. The reported activity season for Virginia is March to November (Mitchell, 1994). An early record of 25 January has been recorded for the Dan River (Gibson and Gibson, 2002). This turtle appears to be active every month of the year in the Dan River.



Eastern River Cooters found at WOM WMA and in the Dan River in the City of Danville.

Storeria dekayi dekayi (Northern Brownsnake)

One Northern Brownsnake (21 cm total length, 16.2 cm SVL) was found DOR on Northside Drive in Danville Virginia (36°33'43.24"N, 79°21'30.55"W) on 24 December. This site is located adjacent to a wetland mitigation pond found in Angler's Park, a city park used for recreation. The road sits between the wetlands area and a hardwood forest. Mitchell (1994) indicates that this snake can be found in every month of the year but he gives no specific dates for December.



Northern Brownsnake for DOR on Northside Drive in the City of Danville on 24 December 2015.

Discussion

Our effort to document the effects of unusual effects of weather on herp activity is not the first. Briggs (1994) reported the effects a blizzard had on amphibians in northern Virginia in 1993. This blizzard occurred during the strong El Niño of 1992-1993. Bulmer and Cherok (1998) reported on unusual activity in *Pantherophis alleghaniensis* and *Pseudacris crucifer* during the strong El Niño of 1997-1998. Gibson, Ware, and Cramer (2008) reported on the weak El Niño of 2006-2007. They reported unusual herp activity for four anurans, two salamanders, and one turtle species. The El Niño of 2015 is different from previously reported accounts because instead of a warm early January as reported by Bulmer and Cherok (1998) and Gibson et.al (2008), the warming trend came in the month of December. In addition to full papers on El Niño events, there are many published field notes recording early activity records for various species during these events. A few examples include Pague (1983) reporting on an early observations of *Scaphiopus holbrookii* in February of 1983, Hunley (1998) reporting on *Thamnophis sirtalis sirtalis* activity in January 1998, and Olson (2007) reporting on *Bufo fowleri* early activity in 2007. Mitchell (1994) in the Reptiles of Virginia unfortunately does not give specific dates for early and late activity and reproduction records. We speculate that many of these records, which he based mainly on museum records, probably occurred during El Niño years.

This weather phenomenon may be a threat to certain species but may be beneficial to others. The intervals of occurrence are currently unpredictable but range from every two to seven years. El Niño specifically and climate warming in general has been linked with the extinction of *Bufo periglenes* (Golden Toad) and *Atelopus varius* (Harlequin Frog) in the montane forests of Costa Rica (Wake and Vredenburg, 2008). El Niño impacts the montane cloud forests with dry and warm weather which together dry up breeding ponds. According to Wake and Vredenburg (2008) species in the tropics seem to be more susceptible to these changing weather patterns because of small home ranges. Temperate species, with large home ranges seem less impacted. Pollio (2007) linked failed reproduction in *Pseudacris feriarum* with

droughts and blizzards but did not include El Niño weather events in her published summary for this species. In this report we demonstrate frogs being crushed on roads and failed egg laying in December 2015. The energy expenditure moving to breeding sites and calling during December with failing to reproduce must negatively impact stored energy reserves. Males and maybe females moving to breeding areas and having to cross roads more than once can increase mortality. Gibson et. al. (2008) showed the negative impacts of El Niño related weather on *Pseudacris feriarum*. Those authors documented egg laying in early January with subsequent freezing of eggs after the warm period subsided. Thus, El Niño could negatively impact short lived species by disrupting successful breeding and allowing for increased mortality events. This is especially true for *Pseudacris feriarum* because it uses temporary pools of water that are often shallow and may subsequently freeze to the bottom of the pool. An argument could be made though that El Niño related warmer and wetter weather could benefit species such as *Ambystoma jeffersonianum* and *Ambystoma opacum*. These are long lived species that could breed in fall or winter. When vernal pools fill up early and warm weather allows early reproduction, more reproductive success may occur in an El Niño year since these predaceous larvae would have a size advantage the following spring. Perhaps the late breeding observation of *Lithobates sphenoccephalus* reported by Roble (2003) could also be tied to El Niño related precipitation. A successful fall breeding event would give this species an advantage over other competitors.

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