

A Critical Analysis of a Historic Size Record for the American Alligator

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Abstract - We critically evaluated a published historic account purported to be a new size record for *A. mississippiensis* (American Alligator). According to a newspaper article published in 1885, this large alligator was killed in Natchitoches, LA, and reportedly measured 823 cm (27 ft) in length and weighed 355.3 kg (783.5 lbs). We compared the reported values for total length (TL) and body mass (BM) with those predicted by a growth model describing the allometric relationship between these 2 variables. According to this model, an American Alligator with a TL of 823 cm would have a BM of 2534 kg; alternatively, an American Alligator weighing 355.3 kg would measure only 432 cm in length. Given these morphometric discrepancies, we are unable to accept this record. The largest credible size record for an American Alligator remains an individual measuring 450 cm in length and weighing 458 kg, harvested in Wilcox County, AL, in 2014.

The maximum body size of crocodylians is relevant from both an evolutionary and ecological perspective, and knowledge of upper asymptotic size is important when describing growth patterns and validating models of allometric relationships (Platt et al. 2009, Wilkinson et al. 2016, Woodward et al. 1995). *Alligator mississippiensis* Daudin (American Alligator, hereafter Alligator) is a moderate to large crocodylian found in the southeastern coastal plain of the US, ranging from coastal North Carolina, southwards into Florida, and westwards to eastern Texas (Elsey and Woodward 2010). Extraordinarily large Alligators have been reported since the period of early European settlement (Bartram 1791 [1928], du Ru 1934, Feiler 1962, Kellogg 1929, Le Page du Pratz 1774), although the legitimacy of most such records is questionable. Owing to the difficulty that even scientifically trained modern investigators experience in estimating the total length (TL) of large living crocodylians (Magnusson 1983, Schmidt 1944), historic size-records based solely on observation (e.g., Bartram 1791 [1928], Feiler 1962, Flack 1866) are generally not accepted (Britton et al. 2012). Other size records are purportedly based on actual measurements (Audubon 1827, Kellogg 1929, Le Page du Pratz 1774, McIlhenny 1935), although it is usually not stated how these large Alligators were measured, nor are these records accompanied by physical evidence or supporting morphological measurements (e.g., head or skull length, body mass) that would aid in confirming the reported body length (Woodward et al. 1995).

The most widely accepted size (TL) record for the American Alligator is 584 cm (19 ft, 2 in; Conant and Collins 1998, Ouchley 2013). This Alligator was reportedly killed by Edward A. McIlhenny (1935) in the marshes surrounding Vermilion Bay, LA, on 2 January 1890. McIlhenny (1935) used the detached barrel of his shotgun to make 3 repeated measurements along the dorsum, but neglected to report other morphological measurements, and no part of this Alligator was preserved, making validation of the record impossible (Woodward et al. 1995). If a similar claim were made today, the record would be unacceptable without additional corroborating evidence (Brunell et al. 2015, Ouchley 2013).

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Herein, we revisit and critically evaluate a published historic account that Brasseaux et al. (2004) contended represents a new Alligator size record. In a footnote describing the abundance and size of Alligators in Colonial-era Louisiana, Brasseaux et al. (2004) stated that a “twenty-seven foot [823 cm] monster” Alligator was killed by the residents of Natchitoches, LA, in 1885. According to the original source, a newspaper article published in the *New Iberia Enterprise* (19 August 1885; copy archived in Campbell Museum, Clemson University, Clemson, SC):

“That 27 feet [*sic*] alligator that weighed fresh 783 ½ lbs., and was killed by the joint efforts of all the inhabitants of Natchitoches, armed with guns and axes is still going the rounds, and the Review of that town offers to drop ½ lb. in weight by way of accommodation to doubting Thomases, but nary an inch will it yield of the 27 feet”.

The article seems to refer to an earlier report published in a Natchitoches newspaper, which we have been unable to locate. The Alligator described in the article (TL = 823 cm) is 239 cm longer than the specimen reportedly measured by McIlhenny (1935), almost twice as long as the largest credible Alligator record (Brunell et al. 2015), and moreover, is considerably larger than any known extant crocodylian that has been reliably measured (reviewed by Britton et al. 2012). Dubious records of crocodyles up to 1000 cm in length notwithstanding, the largest reliably measured crocodylians of any species are a 678-cm male *Crocodylus intermedius* Graves (Orinoco Crocodile) described by Alexander von Humboldt (Greer 1974) and a 600-cm male *Crocodylus porosus* Schneider (Estuarine Crocodile) examined by Britton et al. (2012). The former record is generally accepted by virtue of von Humboldt’s reputation as a meticulous scientific observer (Greer 1974, Schmidt 1944), and the latter record is accompanied by photographs and measurements of other morphometric attributes that validate the record (Britton et al. 2012).

Both TL and body mass (BM) of the large Alligator described by Brasseaux et al. (2004) were reported in the newspaper article; thus, we were able to evaluate this potential size-record using a growth model describing the allometric relationship between these 2 variables. According to Chabreck and Joanen (1979), TL (cm) predicts Alligator BM (kg) by the equation:

$$BM = 1.35 - 0.0378 (TL) + 4.6 \times 10^{-6} (TL)^3$$

This equation predicts that an Alligator with a TL of 823 cm (27 ft) would have a BM of 2534 kg (5575 lbs), which is 2178.7 kg heavier and approximately 7 times greater than the BM reported in the newspaper article. A comparison of the BM reported for large Alligators harvested in Florida and Alabama (Brunell et al. 2013, 2015) with corresponding values for

Table 1. Comparison of actual (measured) and predicted body mass (BM) of large American Alligators harvested in Florida and Alabama. Body-mass data from Brunell et al. (2013, 2015). BM predicted from total length (TL) by the equation $BM = 1.35 - 0.0378 (TL) + 4.6 \times 10^{-6} (TL)^3$ (Chabreck and Joanen 1979). Difference = BM (predicted) – BM (actual).

Location	TL (cm)	BM (kg)	Predicted (kg)	Difference (kg)
Florida	435.5	296.5	364.8	+68.8
	428.5	363.0	347.0	-15.9
	427.0	324.0	343.3	+19.3
	425.0	399.0	342.2	-56.7
	423.0	473.0	333.5	-139.4
Alabama	450.0	458.0	403.5	-54.2

BM predicted by the growth model of Chabreck and Joanen (1979) indicates discrepancies between actual and predicted values (Table 1), which is unsurprising given that BM can exhibit considerable variation even among animals of similar TL owing to the recent ingestion of large meals, reproductive status, and overall body condition (Platt et al. 2009, Webb and Messel 1979). However, in no case was the difference between the actual and predicted values as great as the difference between the BM predicted by the growth model and that reported in the newspaper article.

Alternatively, solving the equation using a value of 355.3 kg (783.5 lbs) for BM yields a TL of 432 cm (14.2 ft), or slightly more than half of the reported TL. Although uncommon, Alligators in this size range (TL > 400 cm) are occasionally taken during managed harvests in Alabama, Florida, Georgia, Louisiana, and Texas (Brunell et al. 2013, 2015; Joanen and McNease 1981; Woodward et al. 1995). In light of the large discrepancy between the reported and predicted values for TL and BM, we are unable to accept this Alligator size record without additional corroborative information. Furthermore, it should be noted that long-term growth studies indicate that Alligators exhibit determinate growth; males grow larger than females and attain maximum size (mean SVL = 182 cm) at an average age of 43 y (Wilkinson et al. 2016). Growth virtually ceases thereafter (Wilkinson et al. 2016) thus, it appears extremely unlikely that Alligators can attain extraordinarily large body sizes, except perhaps in the case of a growth-hormone disorder such as acromegaly (Woodward et al. 1995). To our knowledge, the largest credible size record for the American Alligator remains an individual measuring 450 cm in length and weighing 458 kg harvested during a public hunting season in Wilcox County, AL, 2014 (Brunell et al. 2015).

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