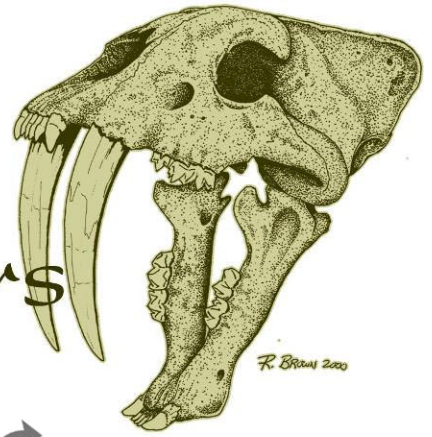


# NEWS

## Florida Fossil Hunters



Florida Prehistorical Museum, Inc.  
dba/ Florida Fossil Hunters  
Volume 31, Number 3

MAY/JUN 2021

### From Ye Olde President.....

I want to say hi to all FFH members and i hope all is well.

I would like to have all members to bring their new fossil finds to the FFH meeting May 15th. Lets see your fossil finds from the Yankee town fossil digs.

This Saturday I will be at Cranes Roost Park event in Altamonte Springs. I will be representing FFH with my personal fossil exhibits. So i won't be attending May's meeting and sorry for any inconvenience. Dave Dunaway said he will run the May's meeting and will display some of his personal collection at the meeting.

FFH will not have a meeting in the month of July. Working on getting Aiden to talk about fossils for June's meeting. Also I'm working with Dave Dunaway on a club summer FFH summer picnic at his house. Will send an email with date and time of the annual summer picnic.

FFH Field trip to Yankee town was a success and had lots of good specimens of Echinoids were found. We had 17 members show up some with their kids. Everyone enjoyed the Club fossil picnic with lots of food and cold drinks. FFH will try to setup another Field trip to Yankee Town.

Thank You  
Salvatore Sansone  
FFH President



### Coming Events

#### UPCOMING MEETINGS at the Orlando Science Center

**FFH meeting at OSC**  
Saturday, May 15th  
2 pm - Kids' program  
3 pm - Meeting

**FFH meeting at OSC**  
Saturday, June 19th  
2 pm - Kids' program  
3 pm - Meeting

**Save the Date 2021 Fossil Fair**  
Sat., Oct. 16, 9 am - 5 pm  
Sun., Oct. 17, 10am - 4 pm  
Sanford Civic Center

**More events listed on back page**  
For more info...

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[www.floridafossilhunters.com](http://www.floridafossilhunters.com)

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# MEETINGS & MORE

**Sat. May 15th Mtg 2:00pm - 5:00pm**

Orlando Science Center

## Kids' Fossil Blast

May & June Mtgs | 2-3pm

*Kids' Fossil Blast is an informal, hands-on experience aimed at kids ages 5 to 14.*

**Meetings are held at the Orlando Science Center.** Unless otherwise noted. Admission and parking is **FREE** to attending members. At the garage & ticket counter inform them you are there for the meeting.

Please check [floridafossilhunters.com](http://floridafossilhunters.com) close to scheduled events to verify plans due to COVID-19, event status may change dependent on facility closings.

Masks and social distancing are required at all FFH activities. Any member not wearing a mask will be asked to wear one or they will have to leave club activities.

# REGISTER/RENEW

**2021 Membership Dues**

Family \$25 | Individual \$20

<https://floridafossilhunters.com/membership>

# FOSSIL HUNTING PERMIT

If you wish to find vertebrate fossils on Florida State lands, including all navigable rivers, you will first need to obtain a very inexpensive permit! Visit this url for information on how to apply for a permit:

<http://www.flmnh.ufl.edu/vertpaleo/vpppermit.htm>

# SAVE THE DATE

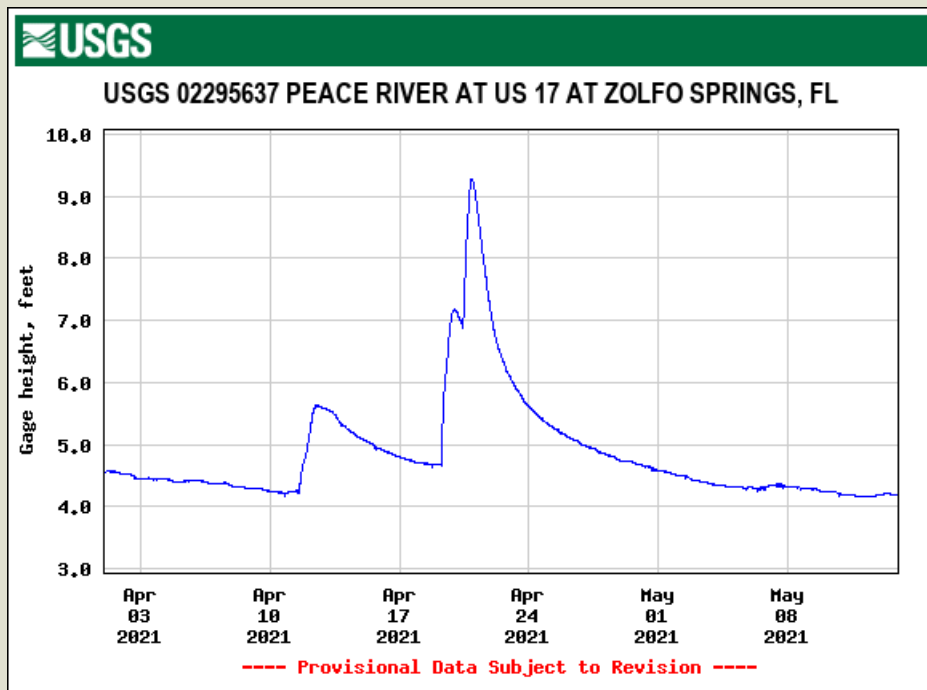
The Florida Fossil Hunters Fossil Fair is October 16 & 17, 2021.

Mark your calendars, volunteers are crucial for the success of the event and the club.

## PIECE ON THE PEACE

Water level from April 1st to May 13th

**Want the latest? Easy button available on the [floridafossilhunter.com](http://floridafossilhunter.com) website**



# Florida Fossil Hunters News



## Fearsome tyrannosaurs were social animals

April 2021 | *The fearsome tyrannosaur dinosaurs that ruled the northern hemisphere during the Late Cretaceous period (66-100 million years ago) may not have been solitary predators as popularly envisioned, but social carnivores similar to wolves, according to a new study.*

The finding, based on research at a unique fossil bone site inside Utah's Grand Staircase-Escalante National Monument containing the remains of several dinosaurs of the same species, was made by a team of scientists including Celina Suarez, University of Arkansas associate professor of geosciences.

"This supports our hypothesis that these tyrannosaurs died in this site and were all fossilized together; they all died together, and this information is key to our interpretation that the animals were likely gregarious in their behavior," Suarez said.

The research team also include scientists from the U.S. Bureau of Land Management, Denver Museum of Nature and Science, Colby College of Maine and James Cook University in Australia. The study examines a unique fossil bone site inside Grand Staircase-Escalante National Monument called the "Rainbows and Unicorns Quarry" that they say exceeded the expectations raised even from the site's lofty nickname.

In 2014, BLM paleontologist Alan Titus discovered the Rainbows and Unicorns Quarry site in Grand Staircase-Escalante National Monument and led the subsequent research on the site, which is the first tyrannosaur mass death site found in the southern United States. Researchers ran a battery of tests and analyses on the vestiges of the original site, now preserved as small rock fragments and fossils in their final resting place, and sandbar deposits from the ancient river.

"We realized right away this site could potentially be used to test the social tyrannosaur idea. Unfortunately, the site's ancient history is complicated," Titus said. "With bones appearing to have been exhumed and reburied by the action of a river, the original context within which they lay has been destroyed. However, all has not been lost." As the details of the site's history emerged, the research team concluded that the tyrannosaurs died together

during a seasonal flooding event that washed their carcasses into a lake, where they sat, largely undisturbed until the river later churned its way through the bone bed.

"We used a truly multidisciplinary approach (physical and chemical evidence) to piece the history of the site together, with the end-result being that the tyrannosaurs died together during a seasonal flooding event," said Suarez.

"The new Utah site adds to the growing body of evidence showing that tyrannosaurs were complex, large predators capable of social behaviors common in many of their living relatives, the birds," said project contributor, Joe Sertich, curator of dinosaurs at the Denver Museum of Nature & Science. "This discovery should be the tipping point for reconsidering how these top carnivores behaved and hunted across the northern hemisphere during the Cretaceous."

Based on findings at a site in Alberta, Canada, with over 12 individuals, the idea that tyrannosaurs were social with complex hunting strategies was first formulated by Philip Currie over 20 years ago. This idea has been widely debated, with many scientists doubting the giant killing machines had the brainpower to organize into anything more complex than what is observed in modern crocodiles. Because the Canadian site appeared to be an isolated case, skeptics claimed it represented unusual circumstances that did not reflect normal tyrannosaur behavior. Discovery of a second tyrannosaur mass death site in Montana again raised the possibility of social tyrannosaurs, but this site was still not widely accepted by the scientific community as evidence for social behavior. The researcher's findings at the Unicorns and Rainbows Quarry provides even more compelling evidence that tyrannosaurs may have habitually lived in groups.

For complete article, visit: <https://www.sciencedaily.com/releases/2021/04/210420121419.htm>

Source: University of Arkansas |

Image credit: © Orlando Florin Rosu / [stock.adobe.com](https://www.stock.adobe.com)

# Florida Fossil Hunters News

# How many T. rexes were there? Billions

*How many Tyrannosaurus rexes roamed North America during the Cretaceous period?*

That's a question Charles Marshall pestered his paleontologist colleagues with for years until he finally teamed up with his students to find an answer.



What the team found, to be published this week in the journal *Science*, is that about 20,000 adult T. rexes probably lived at any one time, give or take a factor of 10, which is in the ballpark of what most of his colleagues guessed.

What few paleontologists had fully grasped, he said, including himself, is that this means that some 2.5 billion lived and died over the approximately 2 1/2 million years the dinosaur walked the earth.

Until now, no one has been able to compute population numbers for long-extinct animals, and George Gaylord Simpson, one of the most influential paleontologists of the last century, felt that it couldn't be done.

Marshall, director of the University of California Museum of Paleontology, the Philip Sandford Boone Chair in Paleontology and a UC Berkeley professor of integrative biology and of earth and planetary science, was also surprised that such a calculation was possible.

"The project just started off as a lark, in a way," he said. "When I hold a fossil in my hand, I can't help wondering at the improbability that this very beast was alive millions of years ago, and here I am holding part of its skeleton -- it seems so improbable. The question just kept popping into my head, 'Just how improbable is it? Is it one in a thousand, one in a million, one in a billion?' And then I began to realize that maybe we can actually estimate how many were alive, and thus, that I could answer that question."

Marshall is quick to point out that the uncertainties in the estimates are large. While the population of T. rexes was most likely 20,000 adults at any give time, the 95% confidence range -- the population range

within which there's a 95% chance that the real number lies -- is from 1,300 to 328,000 individuals. Thus, the total number of individuals that existed over the lifetime of the species could have been anywhere from 140 million to 42 billion.

"As Simpson observed, it is very hard to make quantitative estimates with the fossil record," he said. "In our study, we focused in developing robust constraints on the variables we needed to make our calculations, rather than on focusing on making best estimates, per se."

He and his team then used Monte Carlo computer simulation to determine how the uncertainties in the data translated into uncertainties in the results.

The greatest uncertainty in these numbers, Marshall said, centers around questions about the exact nature of the dinosaur's ecology, including how warm-blooded T. rex was. The study relies on data published by John Damuth of UC Santa Barbara that relates body mass to population density for living animals, a relationship known as Damuth's Law. While the relationship is strong, he said, ecological differences result in large variations in population densities for animals with the same physiology and ecological niche. For example, jaguars and hyenas are about the same size, but hyenas are found in their habitat at a density 50 times greater than the density of jaguars in their habitat.

"Our calculations depend on this relationship for living animals between their body mass and their population density, but the uncertainty in the relationship spans about two orders of magnitude," Marshall said. "Surprisingly, then, the uncertainty in our estimates is

dominated by this ecological variability and not from the uncertainty in the paleontological data we used."

As part of the calculations, Marshall chose to treat *T. rex* as a predator with energy requirements halfway between those of a lion and a Komodo dragon, the largest lizard on Earth.

The issue of *T. rex*'s place in the ecosystem led Marshall and his team to ignore juvenile *T. rex*es, which are underrepresented in the fossil record and may, in fact, have lived apart from adults and pursued different prey. As *T. rex* crossed into maturity, its jaws became stronger by an order of magnitude, enabling it to crush bone. This suggests that juveniles and adults ate different prey and were almost like different predator species.

This possibility is supported by a recent study, led by evolutionary biologist Felicia Smith of the University of New Mexico, which hypothesized that the absence of medium-size predators alongside the massive predatory *T. rex* during the late Cretaceous was because juvenile *T. rex* filled that ecological niche.

### What the fossils tell us

The UC Berkeley scientists mined the scientific literature and the expertise of colleagues for data they used to estimate that the likely age at sexual maturity of a *T. rex* was 15.5 years; its maximum lifespan was probably into its late 20s; and its average body mass as an adult - its so-called ecological body mass, -- was about 5,200 kilograms, or 5.2 tons. They also used data on how quickly *T. rex*es grew over their life span: They had a growth spurt around sexual maturity and could grow to weigh about 7,000 kilograms, or 7 tons.

From these estimates, they also calculated that each generation lasted about 19 years, and that the average population density was about one dinosaur for every 100 square kilometers.

Then, estimating that the total geographic range of *T. rex* was about 2.3 million square kilometers, and that the species survived for roughly 2 1/2 million years, they calculated a standing population size of 20,000. Over a total of about 127,000 generations that the species lived, that translates to about 2.5 billion individuals overall.

With such a large number of post-juvenile dinosaurs over the history of the species, not to mention the juveniles that were presumably more numerous, where did all those bones go? What proportion of these individuals have been discovered by paleontologists? To date, fewer than 100 *T. rex* individuals have been found, many represented by a single fossilized bone.

"There are about 32 relatively well-preserved, post-juvenile *T. rex*es in public museums today," he said. "Of all the post-juvenile adults that ever lived, this means we have about one in 80 million of them."

"If we restrict our analysis of the fossil recovery rate to where *T. rex* fossils are most common, a portion of the famous Hell Creek Formation in Montana, we estimate we have recovered about one in 16,000 of the *T. rex*es that lived in that region over that time interval that the rocks were deposited," he added. "We were surprised by this number; this fossil record has a much higher representation of the living than I first guessed. It could be as good as one in a 1,000, if hardly any lived there, or it could be as low as one in a quarter million, given the uncertainties in the estimated population densities of the beast."

Marshall expects his colleagues will quibble with many, if not most, of the numbers, but he believes that his calculational framework for estimating extinct populations will stand and be useful for estimating populations of other fossilized creatures.

"In some ways, this has been a paleontological exercise in how much we can know, and how we go about knowing it," he said. "It's surprising how much we actually know about these dinosaurs and, from that, how much more we can compute. Our knowledge of *T. rex* has expanded so greatly in the past few decades thanks to more fossils, more ways of analyzing them and better ways of integrating information over the multiple fossils known."

The framework, which the researchers have made available as computer code, also lays the foundation for estimating how many species paleontologists might have missed when excavating for fossils, he said.

"With these numbers, we can start to estimate how many short-lived, geographically specialized species we might be missing in the fossil record," he said. "This may be a way of beginning to quantify what we don't know."

<https://www.sciencedaily.com/releases/2021/04/210415142623.htm>

Date: April 15, 2021

Source: University of California - Berkeley  
Tyrannosaurs illustration (stock image).

Credit: © allvision / stock.adobe.com

# Florida Fossil Hunters News

# Analysis of famous fossil helps unlock when humans and apes diverged

April 20, 2021

*A long-awaited, high-tech analysis of the upper body of famed fossil "Little Foot" opens a window to a pivotal period when human ancestors diverged from apes, new USC research shows.*



Little Foot's shoulder assembly proved key to interpreting an early branch of the human evolutionary tree. Scientists at the Keck School of Medicine of USC focused on its so-called pectoral girdle, which includes collarbones, shoulder blades and joints.

Although other parts of Little Foot, especially its legs, show humanlike traits for upright walking, the shoulder components are clearly apelike, supporting arms surprisingly well suited for suspending from branches or shimmying up and down trees rather than throwing a projectile or dangling astride the torso like humans.

"Little Foot is the Rosetta stone for early human ancestors," he said. "When we compare the shoulder assembly with living humans and apes, it shows that Little Foot's shoulder was probably a good model of the shoulder of the common ancestor of humans and other African apes like chimpanzees and gorillas."

The Little Foot fossil is a rare specimen because it's a near-complete skeleton of an Australopithecus individual much older than most other human ancestors. The creature, probably an old female, stood about 4ft tall with long legs suitable for bipedal motion when it lived some 3.67 million years ago. Called "Little Foot" because the first bones recovered consisted of a few small foot bones, the remains were discovered in a cave in South Africa in the 1990s. Researchers have spent years excavating it from its rock encasement and subjecting it to high-tech analysis.

The USC-led research team zeroed in on the shoulder assemblies because Little Foot provides the oldest and most intact example of this anatomy ever found. Those bones provide telltale clues of how an animal moves. In human evolution, he said, these parts had to change form before our ancestors could live life free of trees, walk the open savannah and use their arms for functions other than supporting the weight of the individual.

The scientists compared the creature's shoulder parts to apes, hominins and humans. Little Foot was a creature adapted to living in trees because the pecto-

ral girdle suggests a creature that climbed trees, hung below branches and used its hands overhead to support its weight.

For example, the scapula, or shoulder blade, has a big, high ridge to attach heavy muscles similar to gorillas and chimpanzees. The shoulder joint, where the humerus connects, sits at an oblique angle, useful for stabilizing the body and lessening tensile loads on shoulder ligaments when an ape hangs beneath branches. The shoulder also has a sturdy, apelike reinforcing structure, the ventral bar. And the collarbone has a distinctive S-shaped curve commonly found in apes.

Those conclusions mean that the structural similarities in the shoulder between humans and African apes are much more recent, and persisted much longer, than has been proposed, Carlson said.

"We see incontrovertible evidence in Little Foot that the arm of our ancestors at 3.67 million years ago was still being used to bear substantial weight during arboreal movements in trees for climbing or hanging beneath branches," he said. "In fact, based on comparisons with living humans and apes, we propose that the shoulder morphology and function of Little Foot is a good model for that of the common ancestor of humans and chimpanzees 7 million to 8 million years ago."

The scientists were able to achieve remarkably clear images of the fossils. That's because the bones, painstakingly excavated for many years, are in good condition and uniquely complete. The scientists examined them using micro-CT scans, which can detect minute features on the surface of an object, peer deep inside a bone, measure the density of an object and generate a 3D model without harming the fossil.

<https://www.sciencedaily.com/releases/2021/04/210420092921.htm>

Human evolution concept illustration (stock image).  
Credit: © adrenalinapura / stock.adobe.com  
Source: University of Southern California

## Florida Fossil Hunters News

# Florida Fossil Hunters

is a fun and educational group whose goal is to further our understanding of the prehistory of Florida. We encourage family participation and welcome explorers of all ages.

Membership options are listed to the right.

Meetings are usually held on the third Saturday of the month but may vary with club activities. Check the website for the date and location of the next meeting or call one of the officers.

## Officers:

President	Salvatore Sansone	(321) 278-9294
Vice President 1	Steve Sharpe	(352) 552-2296
Vice President 2	Paul Hardin	
Secretary		
Treasurer	David Dunaway	(407) 786-8844

## Chairs:

Field Trips	<b>OPEN</b>	
Fossil Fair	Valerie First	(407) 699-9274
Fossil Auctions	Dave Dunaway	(407) 786-8844
Fossil Bucks	Dave Dunaway	(407) 786-8844
Fossil Lotto	Ed Metrin	(407) 321-7462
Membership	Ken Sellers	
Newsletter		
	Elise Cronin-Hurley	info@elisech.com
Photography	John Heinsen	(407) 291-7672
Facebook	Salvatore Sansone	
	Ken Sellers &	Paul Hardin
Webmaster	Elise Cronin-Hurley	info@elisech.com

## Board of Directors:

Marge Fantozi	
Valerie First	
Paul Hardin	
Cindy Lockner	
Ed Metrin	(407) 321-7462
Ken Sellers	

# Membership Application

**MAIL in this form or Register ONLINE at [www.floridafossilhunters.com/membership](http://www.floridafossilhunters.com/membership)**

Names: \_\_\_\_\_

Associate Members: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

e-mail: \_\_\_\_\_

\_\_\_\_ New \_\_\_\_ Renewal

Please list any interests, experience, talents or just plain enthusiasm, which you would like to offer to the club:

\_\_\_\_\_  
\_\_\_\_\_

Family membership: \$25  
Individual membership: \$20

## Please make your checks payable to:

Florida Fossil Hunters  
Post Office Box 540404  
Orlando, Florida 32854-0404

*Associate members are people in the same household, included at no extra charge, 2 adult votes per household with Family Membership.*

Membership year runs from January to December.

## Newsletter Policy

Articles must be submitted by the first of the month to be included in that month's newsletter. These can be mailed to the above Post Office Box or e-mailed to: info@floridafossilhunters.com. Articles can be sent as text in the e-mail or in Microsoft Word files (.doc or .docx).

*Please note in subject of email 'FFH News: [article or info]*

**Florida Prehistorical Museum, Inc.  
dba/ Florida Fossil Hunters**

# Florida Fossil Hunters News

# Florida Fossil Hunters Mark Your Calendar

## 2021 FFH Schedule

January 16th  
February 20th: field trip  
March 20th  
April 10th : field trip  
April 17th  
May 15th  
June 19th  
July no meeting  
August 21st  
September 18th  
October: Fossil Fair  
November 13th  
December no meeting  
(Holiday Party - date tba)

Mtgs held at the OSC  
Orlando Science Center,  
unless otherwise noted.

**Next Mtg: May 15th**

**Mtg: June 19th**

**Mark Your Calendars  
for the 2021 Fossil Fair  
October 16 & 17**

Join Our Facebook group, Search:

[Florida Fossil Hunters](#)

facebook

See inside for more information on

Visit us online at [www.floridafossilhunters.com](http://www.floridafossilhunters.com)

Email [info@floridafossilhunters.com](mailto:info@floridafossilhunters.com) to share articles, comments and how to receive the newsletters by email.

## Florida Fossil Hunters

Post Office Box 540404

Orlando, Florida 32854-0404



Florida Fossil Hunters News