

# Recovery and Curation of a Critically Important Late Miocene Fossil Deposit in North-Central Florida: A Rare Opportunity for Citizen Science and Public Education



Rachel E. Narducci, Richard C. Hulbert Jr., Jonathan I. Bloch, Bruce J. MacFadden, Jason R. Bourque, Arthur R. Poyer, Jeanette Pirlo, Natasha S. Vitek, Claudia A. Grant, Michael J. Ziegler  
 Florida Museum of Natural History, University of Florida, Gainesville, Florida 32611 rnarducci@flmnh.ufl.edu



Fig. 1 Montbrook Fossil Site during a typical field day.



Fig. 3 Cindy Lockner with her discovery of a swan tarsometatarsus.



Fig. 4 William Buhi upon discovery of the smilodontin felid and the specimen after preparation.



Fig. 5 Peter Roode holding his prepared finding of the borophagine canid dentary.



Fig. 6 Ryan Dye revealing the in-situ otter dentary and the specimen after preparation.



Fig. 7 MFS matrix sifting and fossil discovery activity.

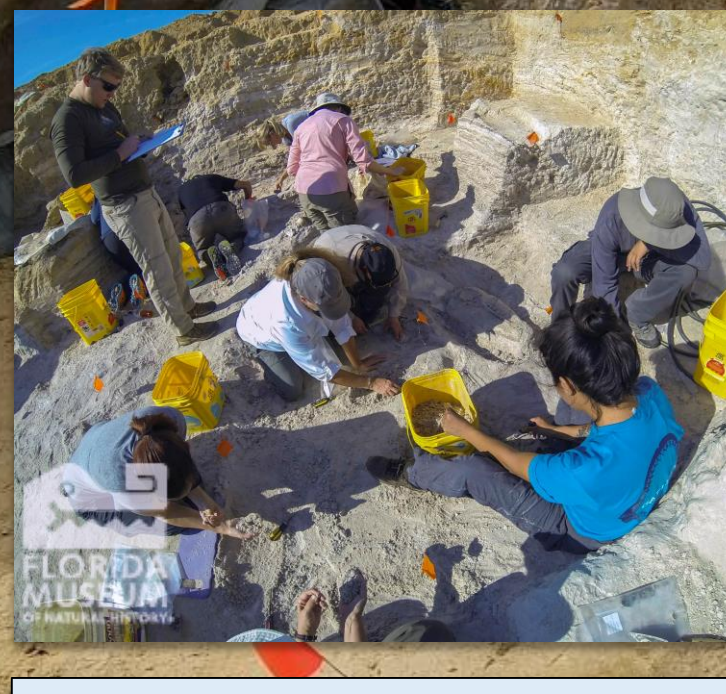


Fig. 8 K-12 educators excavating at MFS during a GABI-RET training event.

## Montbrook Fossil Site

### Significance

The Montbrook fossil site (MFS) was discovered in 2015 by private property owners in a shallow pit excavated as part of a sand-mining operation in Levy County, Florida. Since then, the Florida Museum of Natural History (FLMNH) has recovered about 60–75K identifiable vertebrate fossils from the MFS, making it **one of the largest vertebrate site collections in Florida**. Over 100 taxa are known and biochronology places it in the late Hemphillian, ca. 5 Ma. To date, the FLMNH has excavated at the MFS for 430 days. A typical daily field crew consists of 1–2 FLMNH personnel, 1–2 UF VP graduate students, and 8–15 public volunteers and UF under-graduates (Fig. 1).

MFS is the only late Hemphillian site along the Gulf Coastal Plain or SE Atlantic Coastal Plain to produce abundant fossils of freshwater fish and small rodents. MFS likely produces new species of turtles, fish, and birds with notably large sample sizes for 3 turtle taxa, alligator, and gomphothere.

### Acknowledgments:

Supported by NSF EAR 1645530 (JIB, BJM, D. Steadman, RCH), NSF DBI 1756306 (JIB,

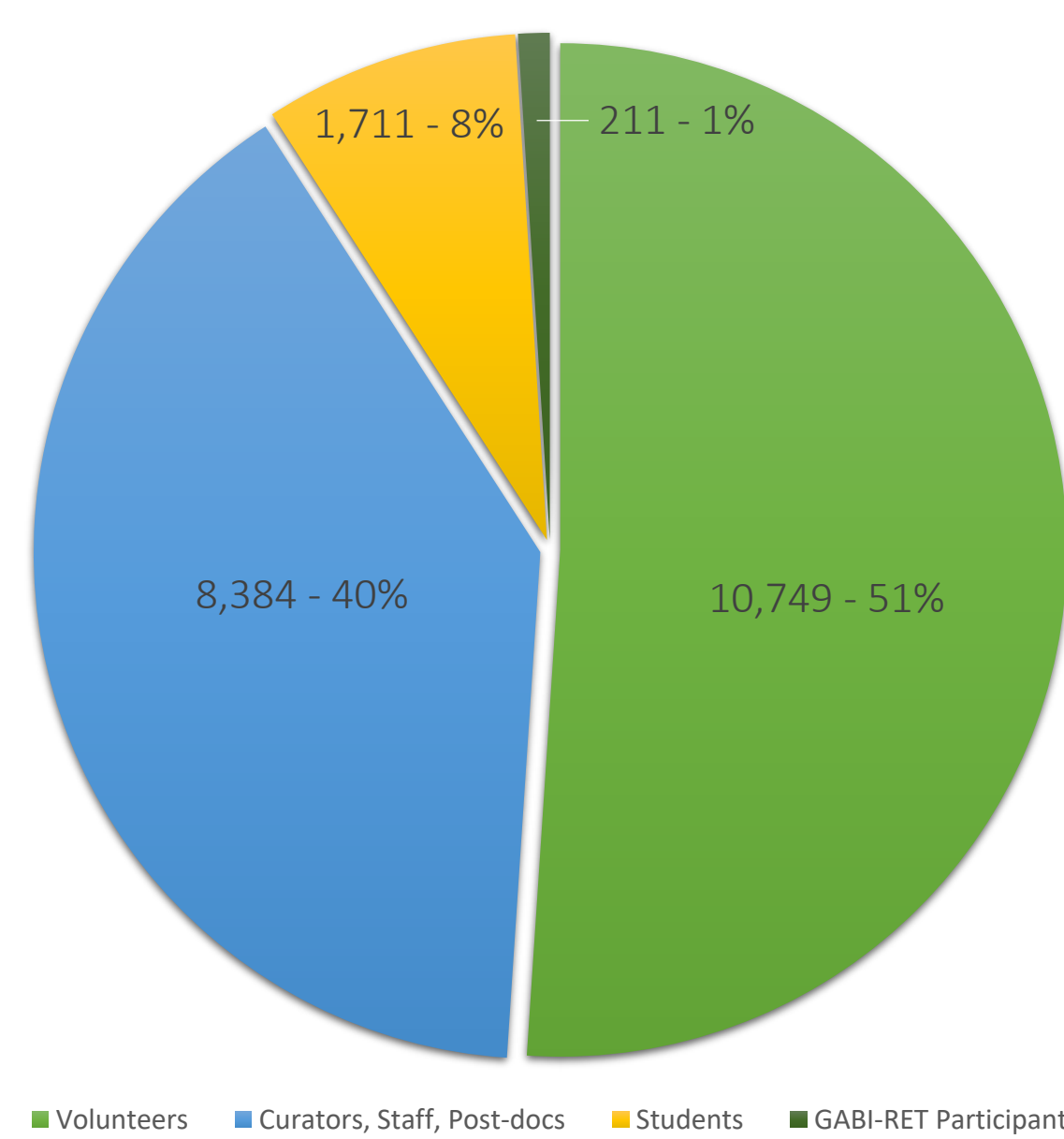


BJM, D. Steadman, RCH, Blackburn), and a grant from The Felburn Foundation (JIB). We thank the Hodge family (left) for their commitment to Montbrook.

## Community Contributions

Over 670 citizen scientists have worked at the site and contributed ~12,000 person-hours. Most live within a 50-mile radius of the site, but about 10% traveled over 100 miles to take part in this opportunity. 5 have contributed over 300 hours at the field site, not including the time they've dedicated to preparation and curation of fossils in the lab and collection. An additional 11 volunteers contributed over 200 hours to the excavation. Over half of the specimens catalogued from MFS were collected by volunteers (Fig. 2).

Fig. 2 # of assigned catalogue numbers



Many of the scientifically most valuable fossils from the MFS were discovered by citizen scientists, including bones of an early swan (Fig. 3), skull of a smilodontin felid (Fig. 4), and dentaries of a borophagine canid (Fig. 5) and an otter (Fig. 6).

### Learn More:

MFS Blog: [www.floridamuseum.ufl.edu/montbrook/](http://www.floridamuseum.ufl.edu/montbrook/)  
 MFS Description: [www.floridamuseum.ufl.edu/florida-vertebrate-fossils/sites/mont](http://www.floridamuseum.ufl.edu/florida-vertebrate-fossils/sites/mont)



## Education and Outreach

### Exhibits & Events



To bring the MFS specimens back to their roots and broaden representation of museum goers in a rural community, a 'pop-up' exhibit was held at Levy County's most attended event, the 30th Annual Peanut Festival (Oct. 6, 2018), in Williston, the closest town to the MFS. Over 1,052 visitors actively engaged with the exhibit, not including the fossil dig activity (Fig. 7).

- Students and volunteers prepared Montbrook fossils in a public lab as part of the **FLMNH 100-year Anniversary Exhibition** in Nov. 2017.



A public two-year exhibit on the MFS highlighting volunteer discoveries opened at the FLMNH during the summer of 2018.

- MFS matrix sifting and fossil discovery activity at the **Viva Museum!** event, to broaden representation of Spanish speaking museum goers.
- Fossil turtle shells and isolated elements from MFS were used for activities at an FLMNH hosted **Girl Scout** event.

## Students

22 5th grade students from East Marion Elementary toured MFS and collected fossils.



- Over 10 high school students, who wish to pursue a career in paleontology, have volunteered at the site along with one or both of their parents, gaining hands-on experience in real field work.
- Employed 3 high-school aged students to help facilitate site operations through local nonprofit organizations which specialize in helping individuals gain employment experience and live independently.
- MFS matrix sifting and fossil discovery activity was conducted with students at a **juvenile correction center**.
- Groups of students from St. Olaf College, Minnesota, Eastern Tennessee State University, and William Penn University, Iowa, excavated at MFS.
- 26 UF students excavated at MFS during the Spring '17 and '18 semesters as part of the **Florida Vertebrate Paleontology course**. Content from their experiences were uploaded to the MFS blog.
- Two UF graduate students are currently working on a **Master's thesis** and a **PhD dissertation** on the microstratigraphy and gomphotheres of MFS, respectively.

### K-12 Educators

- Training for over 50 K-12 educators associated with the Great American Biotic Interchange – Research Experience for Teachers (GABI-RET) project and for the 2016 Montbrook for Teachers, iDigFossils Year 3 (Fig. 8).

## Fossil Clubs



- Florida Paleontological Society** – Annual meeting field trip at MFS.
- Many members of **Tampa Bay Fossil Club**, **South Florida Fossil Club**, and **Florida Fossil Hunters** partake in the excavation at MFS.
- Gainesville Youth Fossil Club** members from two local chapters conduct yearly field trips to MFS.

### Recruitment

- The **public blog**, 'Montbrook Fossil Dig', nested within the FLMNH website is used as a platform to recruit new participants, house the volunteer application, digging schedule, and faunal list, communicate updates, and provide information for donors.



- FLMNH and FOSSIL Project websites and social media platforms, including **Twitter**, **Facebook**, and **Instagram**, were also utilized to recruit new participants and to provide updates linked from the blog.
- Local news** outlets have and continue to publish articles on the MFS. **Public talks** were presented at surrounding community events and fossil fairs.
- A **private Facebook group** is used to communicate, share images of new fossil discoveries (some uploaded minutes after they are found), and provide updates from the VP collection and prep lab.