

Fossils In North Dakota

FIND is a newsletter dedicated to helping young readers (in age or spirit) express their love of fossils and paleontology, and to help them learn more about the world under their feet. Each issue will be broken up into sections including Feature Fossils, Travel Destinations, Reader Art, Ask Mr. Lizard, and more!

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<https://www.dmr.nd.gov/dmr/paleontology/fossils-north-dakota-find-newsletter>



Feature Fossil: *Amia*

Some of the smaller, but more common finds at our Medora fossil site, are fish. The two biggest fish we collect are gar, and bowfin – two ancient lineages of fish that are still alive today. The bowfin, from the genus *Amia*, are also called “mudfish” or “swamp trout,” in reference to their preferred habitats. Along with other fossils, bowfin help us put together the puzzle of what the Medora site looked like 55-60 million years ago during the Paleocene.

Bowfin are carnivores, eating fish, insects, and other invertebrates. There are plenty of suitable prey items found as fossils from the site – many smaller fish, clams, snails, and more. Their mouths were very effective for catching prey, with long teeth in the front to grab, and smaller teeth in the roof of the mouth and front of the throat for crushing and grinding. While not a huge fish, they were one of the largest in the ponded habitat we have uncovered, and could grow between 20-28” in length. They could use their gills to breathe in water, but also had a **swim bladder** they could gulp air into if their watery world became murky or muddy. Based on another fossil we find, the paper mussel, we know the water in Medora site was relatively still, possibly even drying up and becoming muddy – so gulping air could have allowed the bowfin to survive longer... until a crocodile or champsosaur came along for breakfast!

Below is a Frontal bone from an *Amia* – on the fish, it sits on the top of the head. In humans, the Frontal bone is what makes up your forehead, right over your eyes. The outside of the bone, shown at left, is covered in raised bumps. The inside of the bone, at right, has smooth grooves where it connects to other skull bones.



Fish bones are unique. In modern fish, bones can sometimes be **translucent** (able to see light through them), and fossilized bones can take on this same quality. The bones from the skull are fascinating in shape, as well as texture. The parts of the bone that face inside the body, and connect to other bones in joints and symphyses, are very smooth. The surface of the bone that faces out towards the water are often ornamented with ridges, grooves, and **tubercles** (knobby surfaces on a bone).

Amia are called “bowfin” because of their long **dorsal** fin (running along the back), stretching from the middle of the back all the way down to the tail (similar to snakehead fish). Their tail shows another primitive or ancestral trait – their vertebrae extend into the upper part of the tail (**heterocercal**), and the shape is rounded. Many other fish in lakes and streams today



Bowfin by Pixabay.com

have vertebrae that end just after the tail starts (**homocercal**) and have forked tails (like a Perch).

Bowfin are not only found at our Paleocene (55-60mya) Medora site. Their bones have also been found in the older Cretaceous (67mya) rocks across the state (south of Bismarck-Mandan, and in the southwestern corner of the State). Even in the much younger Oligocene (34mya) rocks of the Little Badlands, bowfin vertebrae have been recovered. That is a very hardy fish.



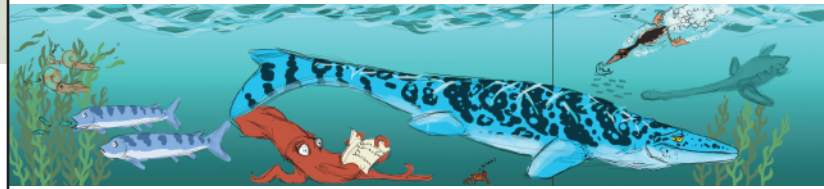
Above is an Operculum from an *Amia* - based on the Frontal from the previous page, can you tell if this surface would face outside or inside? An Operculum is part of the big bone that covers the gills of a fish.

Small Exhibits, Big Impact!

In FIND #36, we wrote about how the first mosasaur discovered in the Pembina Gorge was loaned, lost, found, and then rehoused at the Walhalla Public Library. In 2015 and the next few following years, we worked to uncover another mosasaur – this one new to science. Publication for the creature is currently ongoing, and we will make a big official announcement when it hits print. With the help of 3D scanning, computers, and printing, we'll be able to print off a reconstructed skull of the new mosasaur, and install it in the Walhalla Public Library – along with some other local fossil critters.

The Library is working with us, saving a corner

of their space for a new mural, and these fossil casts. Look for it this Fall, during Walhalla's 175th Anniversary celebrations.



We're working with a fantastic artist to help us design the inside mural. Above is just a sketch from us, to the artist, to help get our ideas across. The actual mural progress images so far have been stunning - but we'll have to keep it a secret for now!

Do you have a local library, school, or other publicly available space, that is interested in having a small fossil display? Contact us! Our paleontology program is looking for places in cities farther away from the museum hubs in Dickinson, Bismarck, and Valley City, so that local communities can enjoy and learn about the prehistory of North Dakota without having to travel hours away.

Public Fossil Digs 2023

It may only be March, but we are already getting prepared for our summer fossil digs. Registration was held in February, and pretty much every spot is gone. If you are interested in attending, but missed registration, you can add yourself to our wait list here:

<https://tinyurl.com/PaleoWaitList>

The wait list won't guarantee you a spot, but if something opens up, we will work our way down in order and contact those signed up. Remember: any participant under 18 years of age **MUST** be accompanied by a paying adult.

We are happy to announce we have brought back the Dickinson site this year! We did such a thorough job collecting over the surface in years past, that we needed to let the area "rest" so new fossils could erode out with wind, snow, rain, etc. The fossils found at this site are younger – about 32 million years old. This means they are too young for dinosaurs (so do not expect to find any *Tyrannosaurus* there). The area does have an abundance of mammals however, including many of the groups still alive today. They looked a little different though - horses and deer small enough they could walk under a table without ducking!