The North Dakota State Fossil Collection 20 Years: A Retrospective

by Jeff J. Person

Deep within the bowels of the Heritage Center in Bismarck is a room with great riches. It contains items of staggering age and scientific value. This room contains the North Dakota State Fossil Collection. From giant swimming lizards to "trumpeting" mastodons, from specimens mounted on pins to those needing forklifts to move, the North Dakota State Fossil Collection contains a wealth and variety of specimens (fig. 1). It has been twenty years since the State Fossil Collection was created in 1989 and it has grown in leaps and bounds since then.

Figure 1. Two fossils in the North Dakota State Fossil Collection of drastically different size. *Edmontosaurus* rear leg and mouse-sized mammal tooth (inset).

North Dakota Geological Survey (NDGS) geologists have been collecting fossils during the course of their fieldwork since the inception of the survey in 1895. Those specimens were typically incorporated into the University of North Dakota geology department collection. Prior to 1981, the only fossil collections in North Dakota were teaching and research collections at the universities, made by faculty, students, and amateur collectors. In 1981 Dr. John Hoganson was hired by the NDGS and started what is now referred to as the Fossil Resource Management Program, beginning in earnest the recovery of fossils by the survey. Although not yet officially the "State Fossil Collection," between 1981 and 1989 North Dakota's fossil collection grew to a small accumulation (a few hundred specimens) of fossil vertebrates, invertebrates, and plants. When the main office of the Geological Survey was moved from Grand Forks to Bismarck in 1989, this small collection only required a few cabinets for storage space.

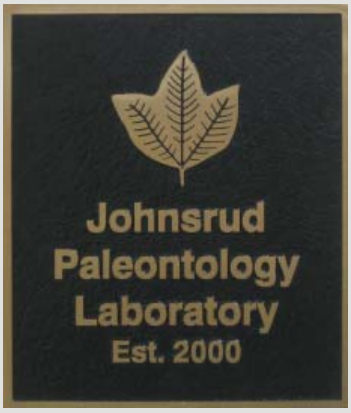
In 1987 a Memorandum of Agreement (MOA) was signed with the United States Forest Service (USFS) regarding the management of fossil resources on Forest Service land. This agreement was the first of its kind between the USFS and any state regarding fossil resources. Similar agreements with the Bureau of Land Management (BLM) and Army Corps of Engineers were signed a few years later (Hoganson, 1995).

In 1989 the state legislature enacted a new chapter in the North Dakota Century Code (NDCC 54-17.3), which passed responsibility for paleontological resources from the State Historical Board to the North Dakota Industrial Commission. They also passed NDCC 54-17.4, which created the North Dakota State Fossil Collection and directed the NDGS to operate and maintain a public repository for North Dakota fossils (Hoganson, 1990). Through these two pieces of legislation, the ND State Fossil Collection was officially born, and the NDGS paleontology program firmly established. With the passing of this legislation in 1989, and with the MOAs between federal agencies like the USFS and the BLM, the "environment" for collecting fossils in North Dakota was fundamentally changed. These regulations require that any entity wanting to work on state and federal lands in North Dakota must have a permit to collect vertebrate fossils (Hoganson, 1994, 1995). Up to this point, fossil collections made on North Dakota state land were typically made by universities or museums and the specimens shipped off to their respective institutions (the Manitoba Museum of Man and Nature in Winnipeg, for example).

Figure 2. This room was the first space in the Heritage Center to house the NDGS fossil collections and lab. It was used between 1991 and 2000.

With the establishment of a state fossil collection, and the NDGS designated as the state repository, all fossils collected in North Dakota had a "home" to go to that would be cared for by the state. Although now official, the collection was growing rapidly and new accommodations would need to be found.

Two years later, in 1991, a MOA was signed with the State Historical Society and the burgeoning fossil collection was moved to a small room in the Heritage Center basement (Hoganson, 1991) (fig. 2). In 1993 two donations of fossils significantly expanded the collection holdings (Hoganson, 1993). A collection (several hundred specimens) of rocks and fossils was donated by the Melvin "Mel" Anderson family of Bismarck, and a large collection (several thousand specimens) of fossils and minerals was donated by the Blossomae Campbell family, also of Bismarck. By 1993 the NDGS fossil collecting program was beginning to pick up speed and momentum, and with the addition of these donated fossils, the collection quickly outgrew these limited, first accommodations.



In 2000, the Johnsrud family of Trenton, ND made a generous donation of leaf fossils and funds, and the fossil collection was moved down the hall to a larger storage room directly under the Heritage Center auditorium. A ceremony was held in May of 2000 designating this new lab/collection storage space the "Johnsrud Paleontology Lab" (figs. 3 and 4). The summer of 2000 was also the beginning of the NDGS Public Fossil Dig program, a program that has added, and continues to add, large numbers of fossils to the state collection (Hoganson, 2009a). Survey paleontologists lead scientifically run digs that the public can participate in (fig. 5). These include activities such as prospecting for, and excavating fossils as well as recording all of the relevant field data associated with the fossils.

These public fossil digs have added substantially to the fossil collection and continue to be very popular with the public. Mosasaur and shark fossils, and the remains of a very large squid were collected at the Pembina Gorge site in Cavalier County, *Triceratops* fossils have been collected in the southwest corner of the state near Marmarth, and we are currently very excited about a Paleocene site near Medora which is producing remains of crocodiles, champsosaurs, turtles, fishes and very small mammal teeth. These fossils, all collected during public fossil digs, have increased the importance of the State Fossil Collection and have helped us to better understand the prehistoric life of North Dakota.

Over the last 20 years, the State Fossil Collection has grown exponentially and now contains approximately 6,100 cataloged specimens (with more being added all the time) and 3,800 fossil localities. The collection contains plant, invertebrate and vertebrate fossils, and also a large rock and mineral collection.

After nearly 10 years in the Johnsrud Paleontology Laboratory under the auditorium, it has become obvious that we have again outgrown our space. In 2009 the state legislators saw the need to expand the Heritage Center and signed a bill allocating funds to put a new addition on the current building. Over the years the collection has moved from Grand Forks to Bismarck and then within Bismarck it has moved twice. With each move the storage space for collections has nearly tripled in size (fig. 6). When the expansion of the Heritage Center is complete, the State Fossil Collection will be moved once more into a brand new area specifically designed for collections. With the addition of compaction technology, the collection should not need to be moved to a larger space for many years. It is not uncommon for fossil collections to be moved in this manner as they grow. Both universities I have been a part of during my career have moved in this manner. The South Dakota School of Mines and Technology collections are currently stored on the stage of an old gymnasium, and next to an empty swimming pool, but will be moving into a

Figure 3. Current collection space under the auditorium in the Heritage Center. This room was first occupied by the NDGS in 2000 and will be used until the rooms in the expansion area are ready.

Figure 4. Current lab space under the auditorium in the Heritage Center.

brand new building soon. The University of Oklahoma collections were once stored in old, leaky barns and stables, and some parts were stored under the football stadium (Mares, 2001)!

Although the state collection is very young (some of the older collections in the United States have been around for more than 100 years) we have a very important representation of Cretaceous, Paleocene, and Oligocene fossils not found in many other museums across the country. It is something we are trying to expand on during every field season. This important and ever-growing collection of invertebrates, vertebrates, and plants is reflected in our current exhibits and will be expanded in upcoming exhibits at the Heritage Center.

Exhibits

The first permanent exhibit of a fossil vertebrate at the Heritage Center, completed in 1992, was the skeleton of the Highgate Mastodon. This exhibit was followed by many others over the years, not only in the Bismarck Heritage Center, but in museums all across North Dakota. To date we have more than 23 exhibits of North Dakota fossils across the state (Hoganson, 2005). From Watford City to Wahpeton and from Bowman to Pembina, small museums are telling the story of North Dakota's geologic and biologic past. Most recently we completed the Corridor of Time at the Heritage Center (Hoganson, 2009b) and added a *Triceratops* exhibit to the Bismarck Airport (Hoganson, 2009c). We are currently working on putting the dino-mummy called "Dakota" back on exhibit after its trip to Japan (fig. 7), and preliminary work has begun on exhibits that will go into the Geologic Time Gallery in the Heritage Center expansion, which we hope to open in 2014.

Looking to the future

Major work has begun to bring the growing fossil collection up to date. We are switching to a simplified numbering system for both fossils and localities. We have also switched to more powerful database management software and new data is being entered on a regular schedule. The program, called Specify, will allow us to perform more powerful searches of the data, give us better security and help us to keep better track of specimens. As the collection grows, data tracking becomes more and more important. It is easy to keep track of a few dozen specimens, but when you need to keep tabs on several thousand it becomes an entirely different task. After more data has been reevaluated and additional data entered, we will be moving a restricted dataset to a searchable web site for access by paleontologists across the country and world. When more

Figure 5. Members of the 2002 Public Fossil Dig excavating a *Triceratops* skeleton near Marmarth, ND.

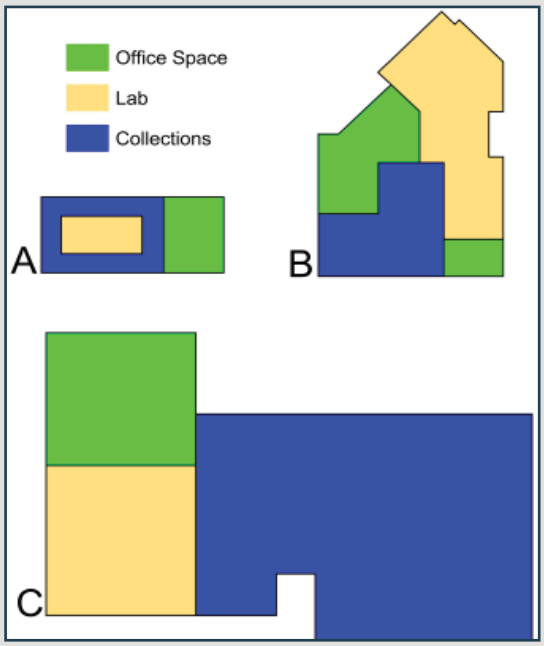


Figure 6. Size comparison between Heritage Center lab and collection spaces. A) Lab and collection space used between 1991 and 2000. B) Lab and collection space used between 2000 and 2014 (exact date of move is unknown at this time). C) Lab and collection space in Heritage Center expansion plan. All images are at the same scale.

paleontologists know what we have in our holdings, collections usage will increase. Providing collection availability to research scientists and developing exhibits for public enjoyment and education are important reasons for developing the ND State Fossil Collection. It is therefore extremely important for the collection to continue to grow and for knowledge of, and about its fossils to spread.

Many improvements have been made since the "birth" of the State Fossil Collection in 1989. Over the next 20 years we hope to make many more improvements and to expand our understanding of the prehistoric life of North Dakota.

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Figure 7. Survey technicians removing rock from the preserved skin of the Hadrosaur named "Dakota". From upper left clockwise: Amanda Person, Amy Sakariassen, and Marron Bingle-Davis.