

Minnesota Unraveled

Episode 204 - Beaver Tales: From Minnesota's Ice Age to Today

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Chantel Rodríguez:

I am in the middle of the Bell Museum in St. Paul, but I feel like I've stepped back in time. The year is 1917 and I am standing on the shore of Lake Itasca. Several beavers with their iconic scaly, paddle-shaped tails stand in front of me—frozen in the act of chomping down trees and building a dam. The lake sits in the background surrounded by a forest. This is just one of the museum's world-renowned wildlife dioramas.

As I continue to wander around the exhibit halls my eyes are drawn to something that looks like a huge rodent the size of a small black bear. But as I get closer I realize it is actually the giant beaver. An extinct, large mammal that lived during Minnesota's Ice Age. I can see the resemblance to today's beaver, except the tail looks narrower and it is enormous. The giant beaver could grow up to seven feet in length, stand around 5 feet tall, and weigh 200 lbs. I can't believe what I'm looking at. I had no idea this animal ever existed. I am lost in thought when I overhear another visitor say that the giant beaver was recently named Minnesota's State Fossil.

Museum Visitor:

That's our newest state fossil too!

Chantel Rodríguez:

Another thing I was totally unaware of!

I set out to learn more about why beavers have been important to Minnesota history since the Ice Age. **How have they shaped the landscape and human activities? And how did we get from the giant beaver to the smaller beaver we know today?**

Chantel Rodríguez:

Welcome to *Minnesota Unraveled*. I'm your host, Dr. Chantel Rodríguez.

To explore these questions, I reached out to a paleontologist, an environmental historian, and a traditional ecological knowledge specialist.

Nicole Dzenowski:

I am Nicole. I use she/they pronouns. I'm the paleontology lab manager at the Science Museum of Minnesota. Expertise is in paleo, but mostly sort of a lot of the hands-on part of it. I do have a background in geology and biology and paleo, but I do a lot of getting the stuff out of the ground and out of the rocks now.

Hayden Nelson:

My name is Hayden Nelson. I'm currently a Gale Scholar, research historian at the Minnesota Historical Society. I earned my undergraduate degree in history from the University of Wisconsin Eau Claire. Following my undergrad, I went to the University of Montana for my master's in history, and most recently earned my PhD in history from the University of Kansas, and I specialize in environmental and Indigenous history in the North American West.

Michael Waasegiizhig Price:

Hello, everyone's listening. My name is Michael Price Waasegiizhig. I am Ojibwe Anishinaabe. I am Bear Clan. I live in Wisconsin right now, but my family is from Wiikwemkong, First Nations at Manitoulin Island in Ontario, Canada. And today I work for an organization called the Great Lakes Indian Fish and Wildlife Commission. And I am happy to be with all of you here today.

Chantel Rodríguez: My historian's toolbox—with its reliance on human produced records—can only take me so far into the past. So I was excited to hear more about what a paleontologist like Nicole does and how they approach studying the giant beaver.

Nicole Dzenowski:

So paleontology is the study of ancient life. So sort of any ancient life. Generally speaking, we like to say that in order to be a fossil, which is what we're studying often, you need to be at least 10,000 years old, but that's sort of the only restriction or constraint and depending on what type of paleontology you do. The easiest way for me to explain, it's sort of explaining the paleontologists that we have at the Science Museum. So we've got our curator, who's the one who does a lot of the research and the choosing what sites we're going to go to and what we're going to be looking for or researching at the time. I am the lab manager, so I am one of the ones who again, helps gets the stuff out of the rock and then whenever we bring it back to the lab, I'm the one who cleans it all up, puts it back together, and then we have a collections manager and she's the one who takes care of everything and knows where it's all at. But that's just some of the few ways you can do paleo.

Chantel Rodríguez:

Paleontologists study the fossil record, or the collection of all fossils that provides a history of life on earth. Each fossil is like a photograph from the past.

Nicole Dzenowski:

The fossil record for Minnesota is argued between 2.1 and 1.9 billion years ago to about 10,000 years ago. So at least in the state, that's where the fossil record extends. It's going to be different for all locations, depending on what rocks are exposed, how old the place is, right? Because we've got things like islands and stuff like that that are pretty fresh, geologically speaking. But yeah, so generally though, the fossil record of earth extends at least I think past a little bit older than 3 billion years ago. So that's going to include all of the animals, well, all of the animals, all of the plants, all of the fungus that ever lived during that time period. And we do have fungus fossils and all of that stuff as well.

Chantel Rodríguez:

Where does the giant beaver enter into the story?

Nicole Dzenowski:

The giant beaver's fairly recent. The giant beaver showed up, I think it's about 1.9 million years ago, and it existed until about the end of our most recent ice age, which I think is dated to about, it's like 11.7, so it's like 11,700, but we say generally about 10,000 years ago.

Chantel Rodríguez:

And so how do you know that?

Nicole Dzenowski:

Oh, that's a solid question. Okay, so you can carbon date things; we say, I think it's about 50,000 years old if it's older than that, we're not really able to get data off of things older than that, that's going to be our radiometric dating. So we are going to have things like zircon crystals, which the way that they tend to be in things like sandstones in our sedimentary rocks, which we tend to get our fossils. In the zircon crystals, you have uranium and lead, and then we measure the ratios.

Chantel Rodríguez:

And do we have a sense for their home, what the landscape looked like for the giant beaver, especially if it's such a huge 1.9 million to 10,000 years ago? Do we have a sense for what that looked like and if it changed during that time?

Nicole Dzenowski:

Yeah, so generally, that was the time that we had our most recent glaciation periods in Minnesota particularly. So the landscape didn't change too much. There were a lot of glaciation periods where the glaciers would come out and then they would recede back north or up north. So there were changes with that. But generally speaking, it was sort of this swampy lakey environment. It would be fairly cool. It was between five and 10 degrees colder on average, but generally speaking too, it was a fairly wet environment as well. So I would say temperate is not a bad way to say it, but the problem is too is they extended all the way up into the Yukon territory, but they did fairly well, from what I understand in the cold when it started to get more arid, warm-up and drier, that's when they didn't do so well.

Chantel Rodríguez:

So we have a sense for what they look like. We have a sense for the landscape and climate, what does the rest of the population look like? In other words, what other animals are living alongside the giant beaver at the time?

Nicole Dzenowski:

So there were a lot of the megafauna that we know. Usually in the same sort of fossil quarries or areas, they're finding things like mammoths. There are also evidence of giant ground sloths, which we do have one record of in Minnesota. And then also particularly in a site very close to us in the Twin Cities that I'm thinking of where we found a giant beaver in the '30s. We were finding things like modern beavers were living alongside our giant beavers, so the beavers we know today. We also have evidence of things like raccoons, things like reindeer; there were turtles, amphibians. So it was not too different than what we would expect to see.

Chantel Rodríguez:

Now that I had a better understanding of the giant beaver's world, I wanted to know more about paleontologists' main form of evidence—the fossil. How does an organism's remains turn into a fossil? It turns out the process of fossilization is like a long marathon. It takes thousands to millions of years for a fossil to be made.

Nicole Dzenowski:

The very first thing that you need is for something to be buried. And usually it's a waterway, usually it's a river. So the animal will die, and then it'll kind of get caught up in an area in the river, and then it's buried super quickly whether or not there's a flood event or if it's just sort of natural sedimentation that happens, because there are things, a lot of times they do have time to decompose before they get buried, but once they get buried, there's not

going to be any sinking, but there is going to be, throughout geologic time, continual sedimentation or sediments being deposited down on top of that.

So they will eventually turn into rock through lithification is the process. And a lot of times, usually what that is, is that's going to be things like ground water that is running through the sediment that has certain minerals that are in solution that will then act as a cement and kind of cement those sediments together and turn that into rock. And usually that'll happen around the organism or around the bones.

When we think about fossilization in general, it is the same sort of process; you'll just get minerals deposited inside the bone. And then throughout time, that's what helps it fossilize. You continuously get things deposited on top of it, sediment deposited on top of that. And then hopefully eventually, depending on how long ago this happened, you're either going to get uplift in the land, which then allows erosion to be the dominant process that will eventually erode down to the layer where you will find that fossil. Or you can have things like the iron mine where we have they're mining stuff, bringing it up from the ground and then depositing it there for us to go through.

Chantel Rodríguez:

Fossil evidence of giant beavers has been found all over Minnesota. Several were found in the Twin Cities metro area, including one partial skeleton in Hidden Falls Park in St. Paul. Other individual bones or fragments of giant beavers were found in Minneapolis and near the cities of Wells and Blaine, to name a few.

How common is it for a paleontologist to find fully intact fossils, like all the pieces? Or is it more so you're just really lucky if that happens?

Nicole Dzenowski:

Yes. When it comes to vertebrates or all of our animals with backbones, with bones, super, super rare. So yeah, if you do find that you're really, really lucky. And even then, a lot of times whenever you see the beautifully preserved fossils where it's like a whole thing is intact. Even then you're still probably missing a small percentage of it.

Chantel Rodríguez:

That makes a lot of sense. And so then as a paleontologist, you do face the challenge of, well, I don't have all the bones to make the full. So how do you deal with that challenge?

Nicole Dzenowski:

A number of ways. So one of the ways that we do it is by eventually finding enough pieces of different individuals or at different quarries or fossil sites. So an example of that is when you go to the Science Museum, the very first dinosaur that was brought to Minnesota is our triceratops. And that is actually a composite of eight specimens, mainly two, but it is a total of eight, and that's really, really common to do. And another thing is it's super, super common to do modern comparisons. So we're lucky that there's a lot of modern analogs to the animals that we're looking up. Right now, I'm putting back together an elk, so it's still the same sort of elk that we have today, but it was found in Minnesota. But I'm using one of our modern elk skulls to compare to get a better idea.

Chantel Rodríguez:

If modern comparisons are one way that paleontologists study Ice Age fauna, what can we learn from placing the modern beaver alongside the giant beaver?

Modern beavers have chisel-shaped teeth about 1-inch long. Their teeth are orange due to the iron in the enamel. This iron makes their teeth strong enough to gnaw through wood. It takes them only 15 minutes to chew through a six-inch tree. A single beaver can chew down hundreds of trees each year. But the giant beaver had teeth that were bigger and broader, around 6 inches long. I asked Nicole how paleontologists go about determining the giant beaver's diet from a fossil.

Nicole Dzenowski:

There are some studies looking at chemical signatures in the bone collagen in some fossil beavers, giant beavers, and they found that they weren't actually eating wood at all. And that most of the chemical signatures correlated or were similar to modern aquatic plants today. So things like are semi-aquatic, like submerged and just right around the edges of rivers and lakes, it showed that they were mostly eating that sort of thing.

So the theory now is that they were living and existing very similar to muskrats today.

Chantel Rodríguez:

The muskrat is the cousin of the modern beaver and much smaller in size. It measures about 20 inches in length, including its 9-inch tail. An adult weighs between 2 and 5 pounds. Like its cousin, the muskrat eats plants and builds its home in the water. Back to Nicole.

Nicole Dzenowski:

So they weren't ecosystem engineers in the same way that our modern beavers are. They weren't changing the landscape in the same way, but they were eating these aquatic plants that would essentially make more space for other animals and be really beneficial to the environment at that time. So I think... I like to say that they were just kind of swimming around chilling, living their lives, eating aquatic plants and potentially doing things like digging in the mud and denning the way that muskrats do. But I don't think that we have solid evidence of that either.

Chantel Rodríguez:

So I'm interested, coming from a historian, I know where to go. I'm going to go to various archives or libraries to find the records that I need or go speak with community to do oral histories. How do you know where to go to find fossils? Is there a certain kind of rock that you're looking for? How do you figure out where to find your evidence?

Nicole Dzenowski:

So there has to be a lot of things in order for there to be potential for fossils there. So one of the first things we're looking for is just are there rocks of that age that are exposed? It's a little bit easier with our *castoroides* because ice age stuff can be a lot more common defined in rivers, especially in the Midwest, especially in Minnesota. But generally speaking, we need to have rocks of that particular age. They need to be exposed, so they need to be on the surface, which is nice that we have had periods of glaciation. Well, that's actually not quite true when it comes to the giant beaver, but when it comes to some rocks. So as long as those rocks are the right age are exposed, and then we look at particular environments.

So we're looking for sedimentary rocks in the right deposition environment. Usually that's going to be things like rivers, lakes, swamps, and that's because they're low lying. And so deposition is going to be the dominant process. And with the water there too, it's always kind of pumping out or putting out sediment. So the likelihood of something being buried is significantly higher in those environments, and that's the most important thing in order for you to find fossils or for something to get preserved.

Chantel Rodríguez:

How do you know that there's something underneath and where to dig? Or do you just have to find it exposed, or do you use some sort of equipment like sonar/radar to try and find something and then you dig to go find it? I'm not just curious about that approach, that paleontologists use.

Nicole Dzenowski:

So what we do is anytime we're trying to find a fossil, we start by prospecting, which is where we will pick the area we want to look for, and then we'll start just walking and staring at the ground,

And then we'll be looking for bone. If we happen to find bone, a lot of times what is happening is that bone is probably weathering from higher up. So we try and see if we can follow it uphill and find out where it's coming out of. If we can, then we will start digging ever so slightly. And if there is more, that's whenever we say, okay, we might need to do some excavation here. There is no equipment, no machinery that really can help you. We actually need to find evidence that it is there before we start doing any digging.

Chantel Rodríguez:

Giant beavers lived in the land we now call Minnesota until about 10,000 years ago. This is when humans are said to have first inhabited the land.

Do giant beavers coexist at all with humans? Is there a little bit of overlap there?

Nicole Dzenowski:

Yeah, so we don't have any fossil evidence of hunting or anything like that, but we do have evidence of artifacts being found next to giant beaver fossils. And there are a number of stories or Indigenous oral histories that do involve giant beavers as well, which is really cool.

Chantel Rodríguez:

Because of cultural protocols, not all Native stories are meant to be shared with a broader audience. But my guest Michael did confirm that giant beaver stories exist within his Native community.

Michael Waasegiizhig Price:

I do know that there are stories in our culture about the giant beavers. I don't necessarily think that our people lived that far back, that they'd seen them walking around, but I know they probably found the bones and the fossils of these giant beavers. And we do have stories that beavers actually built the Great Lakes. And there's another story about the beaver actually reversing the direction of a river in Ontario. And I need to inquire more and more about these stories. I mean, I've heard about them. I want to go to Ontario and meet some of the storytellers who know those stories, because I've learned over the years that Indigenous stories always contain some type of science, some type of physical phenomena. They're not totally just a fairytale. They're stories that

contain knowledge that our people needed and maybe even need today. So I'm really fascinated by some of these stories about how the beavers built the Great Lakes.

Chantel Rodríguez:

The giant beaver and the modern beaver shared a common ancestor about 20 million years ago. They evolved along different paths and co-existed until the giant beaver's extinction. We don't know exactly what led to their demise. But scientists have some pretty good ideas. The warming climate led to the wetland drying up. And with the wetland gone, the giant beaver lost its shelter and main food source.

But the modern beaver was better equipped to survive the changing landscape because it could build dams and create its own habitats. It preferred to eat the soft inner wood of trees or tender saplings rather than a diet of aquatic plants like the giant beaver.

I spoke with environmental historian Hayden Nelson to learn more about the modern beaver and its impact on more recent Minnesota history starting in the 1600s.

Hayden Nelson:

So the beaver, it's a pretty cute, furry animal. A full grown beaver is about 60 pounds or so, although the heaviest beaver I've found recorded in Wisconsin at least, I think weighed somewhere around 120 pounds. And that was, I think, trapped in the early 20th century. But beavers are amphibious creatures. They can maneuver on land and in the water, and in fact, they're quite awkward on land. They have short little legs, they kind of waddle about, they're not well adapted to land, but in water, they are quite well adapted. They have webbed feet, which helps them swim quite fast, actually. And their tail actually acts as sort of a rudder. And so they are sort of polar opposites in that they're very awkward on land and very agile in the water.

Chantel Rodríguez:

These furry critters are ecosystem engineers. Their two main constructions are dams and lodges. Beaver engineers use mud, stones, sticks, grass, and wood to build dams in streams and rivers. These dams stop or significantly slow water flow. This has many effects, including the creation of ponds. Beaver-made wetlands are a productive habitat for many species like mammals, amphibians, fish, and birds. The wetlands support the growth of woody plants that beavers eat.

Hayden Nelson:

It provides more drinking water for animals such as deer and moose and elk. It slows the velocity of a stream if it's on a stream or a river, which can sort of suspend that sediment in the water and allow it to settle to the bottom.

Beaver dams also raised water levels so that it increased the flooded acreage for the cultivation of wild rice as well.

Chantel Rodríguez:

The beaver is known as Cápa in Dakota and Amik in Ojibwe. Native people have their own culturally specific relationships to the animal. Michael explained to me how Amik fits into the Anishinaabe's kinship model.

Michael Waasegiizhig Price:

Well, according to our traditional stories, going all the way back to the Creation story, we believe in a cultural context that we have kinship with all living things. We call the animals, our non-human relatives, sometimes we call them more than human relatives. In a lot of our teachings, we believe that the animals have been here longer than humans, so therefore they have a longer tenure, they have more wisdom, and they have more knowledge about the landscape than we do. And it would be in our best interest if we could learn from the animals rather than try to manage them. I think there's a lot to be learned from not only the beaver but other species as well. But that's part of our cultural philosophy, is seeing, recognizing our kinship with our non-human relatives. And then we go forward with our science and our management from there.

In the language we call beaver, Amik. And in linguistics, Amik is a contraction. It's two words that are put together, which is "amo" is to eat something that is inanimate and "mitig," which is a tree. So when you take amo and mitig and put 'em together, you get Amik, the one who eats the trees, and that's our name for the beaver. And we say the very affectionately, we believe the beaver's been on the earth longer than we have.

Chantel Rodríguez:

Across the Atlantic, Europeans took a commercial approach to the beaver population. Beaver hats, hand muffs, and collars were fashionable across Europe starting in the mid-1500s. Beaver fur was prized because it was thick, warm, and waterproof. When the European beaver population declined due to overhunting, traders eyed North America as a source for beaver pelts.

The modern beaver lived all over North America with population estimates numbering between 100 and 400 million. But this dramatically changed with the arrival of the European fur trade in the 1600s.

From the 1600s to the mid-1800s, beaver and other animal pelts moved from the interior of North America to Europe via the Great Lakes fur trade. In the land that is now Minnesota, the fur trade involved traders setting up posts near Native communities. Native people exchanged beaver pelts for manufactured goods like glass beads and brass kettles. To fetch the highest price for a pelt, beavers had to be hunted in the right season. Here's Hayden.

Hayden Nelson:

Beavers achieve their prime coats in the winter. Like most mammals, they grow sort of a luxuriant winter coat. But as the fur trade sort of wore on, hunters and trappers weren't just taking beavers in the winter. They were taking them basically at all points of the year if they could find them, because they could always find a market to sell even subprime beaver pelts. And so that of course, accelerated the demise of beavers.

Chantel Rodríguez: Native men could efficiently trap beavers because they understood the animal's behavior and way of life.

Hayden Nelson:

So beaver presence is actually pretty easy to identify because you have these gnawed off stumps of trees. You have either a dam that you can see or a lodge that you can see. And so they're not that hard to find. And again, they're more nimble and agile underwater. Typically nocturnal, they do most of their work on land at night, and they spend most of their days in their lodges or inaccessible by water.

There's a number of different ways that a Native man, because the Native men were the ones often doing the trapping, would hunt a beaver. So sometimes they actually use dogs, and the dogs would be particularly used if a beaver was living in a burrow along the lake or riverbank, the dog could kind of root it out and the Native person, the Native hunter, could either spear the beaver or club it to death. Another method was, especially in the earlier part of the fur trade, was breaking the beaver dam and sort of draining the water in the pond or lake or whatever was dammed – riverway if it was on a river – and draining that, and basically sort of leaving the beaver high and dry. And again, beavers are not that nimble on land, and so the Native hunter could then either spear it or club it. Sort of later in the fur trade, especially getting into the 18th

century more, you also have iron and steel traps starting to become used more.

Guns wouldn't really be used so much in hunting, beaver. The last thing you want to do is blow a hole in a prime beaver, and have that hole be in their fur because that would sort of ruin it.

Chantel Rodríguez:

But how does an environmental historian like Hayden learn this information about beavers? They don't exactly leave behind written journals.

Hayden Nelson:

Yeah, I mean, I wish beavers would leave behind some sort of journal entry or record like that. So as someone who does environmental and Indigenous history, a lot of the records from this period, the Fur trade era are from Europeans. And as an environmental and Indigenous historian, we have to sort of read against the grain of these sources and try to find mentions that provide some sort of insight into either Native people that the fur traders are communicating with or interacting with, mentions of the environment that they're going through. One example, for instance, is Daniel Greysolon, Sieur du Lhut in early 1680s when he was traveling through northern Wisconsin, he was traveling on the Brule River, which is about a 40 mile stretch of river in northern Wisconsin. And he mentioned that in that journey, he broke through about a hundred beaver dams because he had to in order to travel up river. And so you look for sort of snippets in these European sources that you can then put in conversation with other either European sources or Indigenous oral histories or things like that and try to piece together a sort of view into this historical environment that no longer exists.

Chantel Rodríguez:

And would you say amongst the European sources, is there a most common source where beavers show up, whether it be a newspaper or a journal or what have you?

Hayden Nelson:

Yeah, so I look at a lot of Fur trader records for trader journals that they keep or kept while traveling through the region, or maybe they wrote sort of a recollection at a later date of their experiences in the fur trade. You also have missionary records like the Jesuit relations. Those are pretty good sources for looking at the missionaries, interacting with the Native peoples that they're living among. And obviously the fur trade has by that point, become the

dominant economic force for those Native peoples that they're living among. And so you can glean some things from those as well.

And then also obviously the officials, the fur trade officials living at various posts like Michilimackinac writing about the overview of the fur trade that they're seeing as a post official. So you get a good blend in doing that. You get this top down perspective from these post officials like Antoine de la Mothe Cadillac, and then you also get sort of a bottom up perspective of the actual fur traders themselves, the people going into either going into the Western Great Lakes or into the interior and either living with Native people or interacting much more closely with them to procure the furs.

Chantel Rodríguez:

When French traders arrived at the Great Lakes in the 1600s, they found Native exchange networks and customs in place. Trading on Native terms was the only way for them to succeed. An important Native protocol that traders followed was the Ojibwe practice of reciprocity, which led to the exchange of gifts during the fur trade. Gift-giving created social bonds of mutual obligation. It turned foreigners into allies or kin.

Native people had knowledge of the land, the beaver, and the best tools and techniques for hunting and transportation. And they were very efficient in the work of hunting and trading. For example, in the first half of the 1700s, Native traders sold nearly 3 million beaver pelts to the Hudson Bay Company. Here's Michael.

Michael Waasegiizhig Price:

The beaver were almost exterminated out of Europe, and that's when explorers started coming over into Canada, the English, the French, and the Dutch, and they began to make alliances with the Indigenous peoples because the Indigenous peoples knew the landscape. And the one thing that we had that they absolutely needed was the birchbark canoe. We built a lightweight canoe, which was light enough to be able to carry on your shoulders, but it was durable enough to carry a huge payload, say a thousand pounds of beaver pelts. And that birchbark canoe could do that. And the lightness of that canoe enabled them to portage from one water system, river system to another.

They were master builders and everything about a birchbark canoe comes right from the forest even so much as the wooden pegs that hold the frame together, we were building those. We were serving as guides to all these fur traders. We served as guides with the Hudson Bay Company, which was the big trade company out of Great Britain. But also too, we had Native people

that were guiding for the Northwest Company. But there was a lot of conflict along the way. Our trade relationships with these different entities didn't always work out best for us.

Chantel Rodríguez:

Native men were not the only ones involved in the fur trade. Native women played vital roles as well. During the early fur trade, kinship was at the heart of the exchange system. Marriage created bonds of obligation and trade alliances. A French trader could become kin by marrying a Native woman. Through marriage, his wife's family and extended family gained access to the fur trade. Success in the fur trade depended on these kinship practices. But Native women also contributed in other ways.

Hayden Nelson:

Men were the ones who primarily did the hunting. They would also do processing of the pelts, but so too would women; women would help process the pelts. But I think more importantly for women during the fur trade, Native women, they sort of served as the glue that held the operation together. They helped repair birchbark canoes. They gathered and provided a lot of the food that the fur trade ran on. And you can actually think of the fur trade as a sort of food trade too, because these voyageurs are coming into Native lands. They're not bringing a lot of food with them on these canoes that they have. And so Native women are vital for that.

Chantel Rodríguez:

Hunting is not the only thing Native Americans did, they also processed and prepared the pelts to be traded.

Hayden Nelson:

So that would include skinning the animal, skinning the beaver, removing its organs and whatnot, and basically preparing it for transportation to Montreal. And that included drying, the pelt Native people would actually also wear these pelts because the oils from our bodies would actually make the fur softer. And those pelts were actually the most valuable in the fur trade because they had been sort of worn, and they're not like prickly or—

Chantel Rodríguez:

Stiff?

Hayden Nelson:

Stiff, and they're sort of softer because of being worn. And then those furs, those pelts would be packed into packs, bundles that weighed 90 pounds.

And that sort of gets into the difficult work of transporting these furs and being a voyager and the numerous portages going through Minnesota's lake country up north paddling, maybe a mile on a pond, and then coming across a portage and having to carry your canoe and your 90 pound packs several hundred feet.

Chantel Rodríguez:

Transportation of pelts to Montreal began following the spring thaw. There, the pelts were loaded onto ships bound for western Europe where they were processed, fashioned into hats and other fur clothing, and re-exported across Eurasia and the Atlantic to the Americas.

By the 1820s, changing fashions lowered the demand for furs. At the same time, the beaver population was in severe decline due to overhunting. The fur trade ended in Minnesota by the 1850s. Beavers, once numbering in the hundreds of millions in North America, had declined to an estimated 100,000.

Hayden Nelson:

By the turn of the 20th century, in Minnesota at least, there were probably less than 5,000 beavers. The naturalist Ernest Thompson Seton in 1926 estimated that Minnesota had about 2,200 beavers remaining.

Chantel Rodríguez:

Beavers began to recover from near extinction for several reasons. Minnesota and Wisconsin put bounties on wolves in the mid 1800s. They were seen as a problem for settlement and the development of agriculture in the region. They also preyed on beavers. With the significant decline in wolves, beavers had one less predator to worry about. Additionally, there were efforts to reintroduce beavers. For example, in 1901 three beavers from Ontario were introduced to Itasca State Park. By 1917 the beaver population had grown significantly. This is depicted in the diorama at the Bell Museum mentioned at the top of the episode.

As populations rebounded, Native people were left to process their relationship with their relative the beaver. Michael shares with me his relationship with Amik from an Anishinaabe perspective.

Michael Waasegiizhig Price:

I believe that because we were a part of the extermination of the beaver, that it costed us dearly as a spiritual people. It costed us almost our identities as Anishinaabe people. And I don't think that we've done much to, in a cultural standpoint, to fix or maybe to heal that relationship. We still cling onto these

old ideas; “Aw the beavers a nuisance. They cut down trees and they clog up the culverts, and they do a lot of negative stuff.” I don't believe that we've always thought like that. And that's why I felt this heartfelt move to, we need to go out and relearn our traditional relationship with Amik the beaver, and we have to learn to start seeing the beaver as our four-legged relative that does a job that we probably need to know more about. And we know very little. We only know about the inconveniences to our human lifestyle. But the beaver does a whole lot more than that, brings a whole lot more to the table than just that. So that's kind of been my mandate, is to go back and relearn that relationship and to understand my connection to Amik better.

I mean, I think there's been various storytellers throughout the last fifty or a hundred years who had a story about beaver, but we've never collectively sat down and made a decision that we need to repair our relationship with Amik and we need to learn what Amik does for, not only us, but also the landscape as well. So that started, it's picking up momentum now. We're also reclaiming those old stories and those old traditions about the four leggeds being our non-human relatives. So that's becoming more and more prevalent as our culture and our language revitalizes.

Chantel Rodríguez: The fur trade impacted far more than Native people's relationship to the beaver. It also changed their traditional ways of life.

Michael Waasegiizhig Price:

It devastated, I think a lot of the tribal communities, the nations that we had become so adapted to, we ended up losing our traditional ways of life. We can no longer hunt like we used to anymore because we were dependent upon trade goods.

We lost a lot of our traditional hunting skills. We lost a lot of our Indigenous knowledge about who we were as a people. And the thing that affects us even today is we lost our Indigenous languages. We lost our ability to speak not only in our own language, but people back then were fluent in many different Indigenous languages. And now, today, in 2025, we're part of a language revitalization movement where we're bringing back our Indigenous languages, but they almost went into extinction.

Chantel Rodríguez:

When Native hunters exchanged pelts for manufactured goods, they often did so on credit. As the price of these goods went up, hunters had to provide more and more pelts. Native Americans had no choice but to compete for market game. Each year they took on more trade debt to survive and prepare for the next hunting season.

Michael Waasegiizhig Price:

So basically, we were fighting for money, we were fighting for sustenance, survival. So it became a changing time in our life because we went from a society where we harvested food, shared food, and we acted as a community to now people accumulating wealth. And that forever changed us as Indigenous people.

Chantel Rodríguez:

Ojibwe and Dakota nations were forced to make painful decisions to sign land cession treaties in 1837. The United States committed to annual cash, goods, and services payments for the millions of acres of land they acquired from Ojibwe and Dakota nations. Ojibwe also retained land use rights for hunting, fishing, and gathering. The US did not fulfill their obligations and allowed traders to settle Native debts by seizing annual payments. Additional land cession treaties were signed in the decades that followed. To this day, Dakota, Ojibwe, and other Tribal Nations continue to petition the US to honor the treaties.

The protection of Ojibwe land use rights is where Michael's work comes in with the Great Lakes Indian Fish and Wildlife Commission, also known as GLIFWC. Their mission is to protect the treaty rights of all Tribal nations in the treaty-ceded territories.

Michael Waasegiizhig Price:

We work with 11 federally recognized tribes that are part of the GLIFWC Consortium, and most of the treaty territory is Northeastern Minnesota, the top one third of the state of Wisconsin, and then into the Upper Peninsula of Michigan. So we have a huge area that we work in, and I've worked on different projects with the different tribes in these areas.

But the leaders who negotiated those treaties said that, yes, we will cede these millions of acres to you, but we want our future unborn generations to have the right to hunt, to fish and to gather on these lands that we're ceding to you.

And those provisions were negotiated and they actually got written into the treaties. And so Native people got to keep their subsistence rights in this region. However, okay, that treaty was signed in 1842, and then Wisconsin became a state in 1848. The state governments did not recognize those treaties that were signed with the federal government. So almost a hundred years went by where Native people were told they did not have the rights to hunt, fish, and gather on these lands. And it wasn't until the 1970s, until two

young boys from or two young men from Lac Courte Oreilles challenged those treaty rights. And a federal judge in 1984 said, yes, we will recognize your treaty rights to hunt, fish, to gather, but we want to ensure that you're going to manage your natural resources just like the state of Wisconsin would.

Chantel Rodríguez:

His ancestors' decisions to protect land use rights in the treaties is grounded in the seventh-generation principle, where every decision you make considers seven generations into the future.

Michael Waasegiizhig Price:

Well, today, the people that are alive today, we were their seventh generation. They were looking out for us all the way back in the mid 1800s. And so now we have almost a spiritual obligation to protect these rights and to protect what they negotiated for in our abilities to hunt and fish and gather on these ceded territories. And when I say ceded territories, that does not include the reservations. The reservations are in fact federally recognized Tribal lands. The ceded territories are the lands that were ceded to the United States and became public lands, private lands, state lands, et cetera.

Chantel Rodríguez:

Michael has worked in the biological services division at GLIFWC since 2020. One of his goals is to bring traditional ecological knowledge into the organization's work.

Michael Waasegiizhig Price:

So I have a master's degree in forestry, an undergraduate degree in biology. So I'm educated in western science, but for the last 25, I'd say maybe almost 30 years, I've been on this path to discover the Indigenous ways of knowing, Indigenous ways of thinking. And for our people, it'd be more like the Anishinaabe understandings of the earth. And there's not really a degree program in that. There's not really any credentials in that. It's just me going out and building these reputations with knowledge keepers, with elders, with storytellers. And over the period of a couple decades, I began to just barely learn what it's like to see the world through an Indigenous lens. And then when I take that viewpoint and I combine it with my Western science lens, I think it makes me better articulate on issues like in resource management or in wildlife management, where I can see both the scientific aspect and also the traditional Anishinaabe perspective.

Chantel Rodríguez: Both Michael and his colleagues at GLIFWIC are applying this knowledge in the work they do with various animal relatives like the beaver.

Michael Waasegiizhig Price:

And it consists of hydrologists, wildlife biologists, myself as a traditional ecological knowledge specialist, many of us from different disciplines have gotten together and we meet and to talk about our relationship, our kinship with the beaver. And we use words like kinship and relationship, which are not real common words in scientific circles, but we have a very unique cadre of scientists here at GLIFWC who look at their work through the lens of Anishinaabe people. So the beavers are relative, not just a critter on the landscape.

A long time ago, had a wolf management plan where we talked about management of the wolves in the ceded territory. We didn't like that term management because it was very hierarchical. It was very top-down. So we said, let's call it the Wolf Stewardship plan. But when we got to thinking about stewardship, that still is top-down hierarchical. It's just like management with a heart, but it's still top-down and it doesn't reflect our traditional teaching. So now our plan is called the Wolf Relationship plan. What is our relationship with Ma'iingan the Wolf? So we're very slowly starting to change the words to use words that are more appropriate, because in my belief, words are everything. Any word you select, can be very loaded with all kinds of assumptions in history. So right now we call it the Wolf relationship plan, and probably we're going to have a Amik relationship plan as well.

Chantel Rodríguez:

I asked Michael how he feels about the relationship between western science and traditional ecological knowledge.

Michael Waasegiizhig Price:

So there was a scholar back in the nineties, his name was Vine Deloria Jr. And I read most of his books, and Vine said in one of his books that it's really fascinating when Indigenous knowledge and science agrees. He said, it's even more fascinating when they contradict. And so, me, I've been looking for those areas where they agree and also with special attention to those areas where they contradict.

Chantel Rodríguez: One of those contradictions exists in how communities are approaching beaver populations in the region.

Michael Waasegiizhig Price:

An issue that we have going on right now is that there's kind of talk in the state among different communities that beavers are a detriment to wild rice;

that beavers build dams and they can flood wild rice fields and they're destroying the one resource that we consider sacred.

I went back and did, I pulled out my scientific side, I went back out and reviewed the literature, and I didn't find any scientific studies that said that beaver dams are a detriment. Most of the information I found was speculative, but it wasn't based upon data, wasn't based upon facts. And so I began to inquire about what were our teachings about the beaver from a traditional Anishinaabe perspective. And I wanted to basically take these two bodies of knowledge and compare and contrast them and to see why we believe what we do and is there something missing from the picture, some understanding? And what I'm finding out is that there may have been a few cases where a beaver dam has flooded out a rice field, but there's more and more observations to suggest that beavers actually build habitat for wild rice.

And if you understand wild rice, wild rice needs one and a half to three feet of water to really, really for optimal growth. And beavers are experts at building these marshlands and they can actually elevate the water. Yes, there may be a case where a beaver dam may flood out a rice bed, but we just don't have any data to show that scientifically. And unfortunately, a lot of our traditional knowledge is very fragmented because of colonization, because of indoctrination and assimilation. But we're slowly but surely reclaiming those stories and that knowledge.

Chantel Rodríguez:

Michael's research on beavers and wild rice is in its early stages. But it is already receiving some positive attention.

Michael Waasegiizhig Price:

I've done a few presentations on it, and it's really captured people's attention that we're looking at the beavers as a potential benefit on the landscape. A lot of people say that the beavers are nature's engineers, and I totally believe that. I believe they're hydrologists in the strictest term. But we need to spend some time getting reacquainted with the beaver and actually consider, well, okay, now we kind of think we know what the detriments are now, what are the benefits? And I've initiated that process here at GLIFWC, and I think the University of Minnesota is following along. I think a couple of other organizations too are like, hey, that's a good idea. Let's see how Beaver benefits the landscape, rather than just constantly looking at Beaver as a nuisance.

Chantel Rodríguez:

While the modern beaver played a big role in Minnesota's fur trade history, its distant relative the giant beaver has recently gained attention for its importance to Minnesota's Ice Age.

The campaign to make the giant beaver Minnesota's State Fossil dates back to at least 1988. It did not receive support because the species name—*Castoroides ohioensis*—is connected to the state of Ohio. The campaign was revived in 2021. Here's Nicole.

Nicole Dzenowski:

We put out a list of eight fossils that were common in Minnesota and put it out to the state for a vote. This list of eight did not include the giant beaver because I think they were pretty scarred from past experiences. But we did have quite a number of people write in the giant beaver.

So we had that initial vote, and then a bunch of people wrote in. So then we set with this list of nine fossils from the state of Minnesota, and we had over 11,000 folks in the state vote. And a huge number of 'em just hands down the winner was the giant beaver.

Chantel Rodríguez:

The Science Museum of Minnesota was considering nine total fossils for a popular vote on what should be the state fossil. The winner would be put forth in the official political process for consideration by the state legislature.

Chantel Rodríguez:

So what were some of the other fossils? I know you already mentioned two of them, but it's the mammoth and the bison.

Nicole Dzenowski:

The bison—

Chantel Rodríguez:

Yeah. What were some of the other ones?

Nicole Dzenowski:

So we had *Terminonaris*. *Terminonaris* is a Cretaceous age, so it's about a hundred million years old. And it is a marine croc. We only have the snout of it that has been found in Minnesota, but it was found in the iron range, in the iron mines. So the spoil piles, it's the only reason that we have any evidence, a lot of animals during the time of the dinosaurs in Minnesota, and we also had

a shark, I believe it's the crow shark. We had a brachiopod, which is a shelled organism. They look very much like bivalves, but they're not actually closely related to bivalves. They're still around today, but not in the same numbers. But it was one that was only found in Minnesota. And then the stromatolite, which was a lot of folks know is like Mary Ellen Jasper, but the banded iron formations are stromatolites. And that one was probably the most contentious because I think that one too is known and loved in the Iron Range area because it is where a lot of our iron comes from.

Chantel Rodríguez:

giant beaver supporters did a lot of outreach to get the large rodent selected. A team from the Science Museum consulted with the Native community.

Nicole Dzenowski:

So they would go in and speak to the different groups and to get an understanding of how they felt about the giant beaver being the state fossil, because we had a lot of resistance getting it passed for the first few years. And that was one of the arguments is like, okay, well how do the Indigenous communities here feel about that? Is that something that they want, something that they feel is important? And they did. They liked the idea of it.

Chantel Rodríguez:

Nicole and her paleontology colleagues also did a number of outreach activities to promote the giant beaver.

Nicole Dzenowski:

We ended up going to a Bemidji hockey game because I think they're mascot's the beavers. Any mascot that had, we went to a brewery in St. Cloud, Beaver Island, anyone we could collaborate with that was willing to have us, we were there. And we ended up, this past year, I believe it was Bad Weather, released Epic beaver. So we had a beer that was released in hopes to help as well. Oh, the Bell Museum has helped us a ton. We'd done events with them every year would help us out.

Chantel Rodríguez:

And so why do you think people were so attracted to the giant beaver?

Nicole Dzenowski:

That's a good question. That's a hard question. So some of the examples that we had, so some of the ones that we had up for a vote were things like bison and the mammoth. And they're not uncommon across North America in

particular. There are multiple, I think, states that have those as their state fossils. The giant beaver, no one has as it's State Fossil. And then also another thing is we mentioned since they lived up until about 10,000 years ago, they were interacting with the people in Minnesota. So there was that human aspect to it as well. That on top of, personally I think it's because it's so cute. That's part of the reason. I mean, that's why I'm just so behind it. I think it's also really interesting and helpful when it is something that looks very similar to what we know today. You can relate to it really, really well. And speaking on the cute thing, one of the things is that it's the largest rodent to ever live in North America that we have any evidence of. So it's super fascinating in that aspect. And I like to compare it to our version of a Capybara, which everyone knows and loves deeply.

Chantel Rodríguez:

Each of my guests approach studying the past and learning about beavers from different perspectives—environmental history, traditional ecological knowledge, and paleontology. I asked them to reflect on the importance of their expertise and how it might shed light on the role of the beaver in Minnesota history.

Nicole Dzenowski:

We are not taught a lot of earth history. We're not taught a lot about how things looked in the past, at least in the aspect of deep time. And I think that having a state fossil is a really good way to try and get people interested in the fossil record, in the geologic history of their state. Because I mean, you kind of walk around and we all have an idea of what our state looks like. We know what Minnesota looks like, and it's wonderful and it's beautiful, and it's also typical. It's what we see every day. So having a state fossil and being able to pull people in with “look at this really interesting giant beaver that used to live here,” it's like a doorway, a gateway into getting people excited about just the state. Not now, just now, but for the past one to two million years at the very least.

Hayden Nelson:

in a pretty profound way, Native peoples had been hunting and trapping beavers before the onset of the fur trade, but this was done not for commercial sale. They hunted beavers, they trapped beavers. Often times of need in terms of food, like food scarcity, if they see beaver, they'd hunt it. Beaver tails have historically been delicacies among the Ojibwe and other Native peoples of the Western Great Lakes. And the beavers were also importantly used in ceremonial practices as well. The fur trade sort of changed that. It made beavers commercially valuable.

It in that sense, drew Minnesota into a sort of global economy around beavers. Beavers from Minnesota would be shipped to Montreal and then to either furriers in Paris or London, and then distributed potentially even around the world. And so that rupture that the fur trade caused was, in a lot of ways, the first commercial activity in what we know as Minnesota today.

Michael Waasegiizhig Price:

As somebody who's trained in science, I've come to think that science is the most evolved level of knowledge and that we should always rely upon science to answer our questions and to solve our needs. But the one thing I've learned over all these several decades, science tells us about what something is made of and how something operates. But science does not tell us about our relationship with the beaver, with the wolf, with the wild rice. Science can tell us when something is wrong or when some ecosystem is out of balance, but it can't tell us how to have kinship with the natural world. And this is where Indigenous knowledge comes in when we start talking about these relationships. Now that we know what's going on with this ecosystem, what do we do about it? Well, science doesn't tell us what to do. Science just says, here's the problem, here's the solution.

I would like for people to be open to different ways of knowing, different ways of seeing the environment, to seeing a problem. Indigenous peoples, they, especially my ancestors, Anishinaabe people, they had knowledge that got them through the harshest of winters without any heat or heating or any type of modern conveniences. But they had the knowledge to get themselves through those harshest of climates and to be able to not only survive, but to thrive in an area just based upon the resources in the area, they learned how to conserve. They learned how to promote what we call today's stewardship. Science is one way of knowing, and it's a valid way. But I think science alone is an incomplete picture, and that we desperately need a new paradigm for the world that we're entering.

If we want to save the world that we have – what's left of it – we've got to change our paradigm about our relationship and our kinship with the natural world.

Chantel Rodríguez:

Stepping away from the giant beaver on display at the Bell Museum, I make my way back to the beaver diorama. I'm still trying to wrap my mind around the fact that the giant beaver existed nearly 2 million years ago. It makes the fur trade era feel not so

far away. Speaking with my guests I learned how important it is for historians to expand their toolbox. Paleontology and traditional ecological knowledge provide valuable insights to the lives of the giant beaver and the modern beaver.

Bringing together all of these areas of expertise helped me to realize that Minnesota has a deep connection to the beaver—from the ice age to the present. The modern beaver has played an oversized role in Minnesota history because of its prized pelt. By comparison, the giant beaver has received less attention. And the physical characteristics it shares with muskrats and modern beavers makes it all the more relatable to us in the present. As the newly minted State Fossil, the giant beaver has become a symbol of Minnesota's natural history.

You've been listening to Minnesota Unraveled: pulling on the threads of Minnesota history. I'm your host Dr. Chantel Rodríguez.

Special thanks to Rita Walaszek Arndt for her help with this episode.

You can find more information on this episode, including transcripts, bibliographic resources and MNopedia articles at our website mnhs.org/unraveled

Minnesota Unraveled is produced by the Minnesota Historical Society in partnership with Rose Productions. Our research team is Ari Fields, Alex Magnolia, Hayden Nelson and me, Chantel Rodriguez. Our production team is Brett Baldwin and Meghan Buttner, with recording, sound design and editing by Chris Heagle and Zack Rose.

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