

Dr. Titus: Welcome to Monumental Science and informal look at scientific research that has happened in and around Grand Staircase Escalante National Monument over the last twenty-five years. I'm Dr. Alan Titus. Paleontologists for the Bureau of Land Management Paria River District, and today, joining me in the studio is Dr. Joe Sertich, a noted expert on dinosaur ecology, biology, and systematics. Thanks for joining me today. Dr. Sertich.

Dr. Sertich: Yeah, thanks for having me. I'm excited to talk.

Dr. Titus: So yeah, I'm excited to have you on. We've been collaborating together for a number of years and looking forward to the opportunity to sort of pick your brain and retrospective, all of the wonderful work that you've been doing inside Grand Staircase.

I like to start these interviews with taking it a little personal and maybe have you recall what some of your best memories are about working in the monument, or if there's a particular place that you really enjoy working in or being in or find special at a personal level.

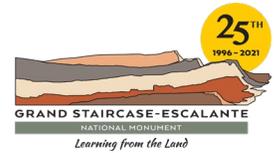
Dr. Sertich: Absolutely, yeah.

Dr. Titus: So just as an icebreaker, what's one of your outstanding memories from work and Grand Staircase? Is there a particular place that you enjoy or find special at a personal level to you?

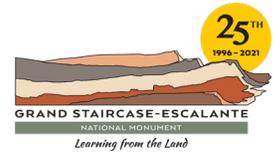
Dr. Sertich: Yeah, I love a Grand Staircase. My earliest memories go back seventeen, eighteen years now to the very first time I stepped foot in Grand Staircase, and I was just blown away by the scale and the size of the Badlands of the Kaiparowits Formation, and so heading out onto the middle of the Kaiparowits Plateau and dropping off of Horse Mountain into gigantic Badlands of the Kaiparowits just really blew my mind and ever since then I've been hooked.

Dr. Titus: That's great. Uhm. Well, let's get a little background on yourself, then tell us a little bit more about yourself. Maybe a short bio and then how you developed an interest in your research in Grand Staircase.

Dr. Sertich: Well, I'm currently the curator of dinosaurs with the Denver Museum. I've been here for the last ten years now, but before that I stepped foot in Grand Staircase as a first-year graduate student at the University of Utah Natural History Museum of Utah way back in 2004, and so ever since then I've been working collaboratively with scientists from all over the Rocky Mountain West who understand the dinosaur ecosystems of the Kaiparowits Plateau, and even through graduate school, I would go out every year with different teams.



- Dr. Sertich** Once I arrived at the Denver Museum, I really wanted to be a part of that project and continue that work and be a part of that big collaboration to uncover the mysteries of these dinosaur ecosystems.
- Dr. Titus:** Huh! Are there any particular research questions that you find more fascinating than others?
- Dr. Sertich:** Yeah, so the really cool thing about the Kaiparowits Plateau and the Kaiparowits Formation and the underlying Wahweap Formation is this amazing continuous record of dinosaur ecosystem change, and so the research I do follows along that broader theme of understanding dinosaur ecosystems as they change through time in response to things like sea level changes, climate changes, and tectonic changes. And there's no place better anywhere on Earth than the Kaiparowits Plateau and Grand Staircase-Escalante National Monument for tracking those changes.
- And that's because of the history of the rock deposition. There's amazing stacks of rocks that were filling these basins during the late Campanian into the middle Campanian, so between about eighty million years ago and seventy-four million years ago.
- You're stacking muds and sands at such a rate that you can literally follow dinosaur ecosystem change through time at a very fine scale, and that's what really excites me. That's what most of my research in my hypotheses are based upon, and it's a huge project and it requires lots and lots of collaboration, and it's going to take decades or really generations to really understand the rocks of Grand Staircase-Escalante National Monument.
- Dr. Titus:** Hmm, interesting. So how has the monument in particular been important to this work to you personally and also to the greater scientific community working in the Western Interior Basin?
- Dr. Sertich:** Yes, so we know the Monument was created twenty-five years ago and it really unlocked the door to this amazing resource, this amazing stack of rocks and associated fossils in a way that hadn't been done before. So, we've known that there were fossils on the Kaiparowits Plateau for decades but having the support and the resources that monument designation created really helped researchers like me and many other teams get in on the ground and start exploring these really remote, difficult to access Badlands. It's that support that has really been instrumental in all of the major discoveries that have happened over the last twenty, twenty-five years on Grand Staircase-Escalante National Monument. So, without monument status, I think that people would definitely be exploring these rocks, but it wouldn't be at the rate and a success level that we see today.



- Dr. Titus:** Yeah, I think I would like to add that I also feel like coordination without the same level of coordination that we that we see because of having somebody on the ground in the monument to sort of be a nexus for everybody that's working out there. But that's shameless self promotion.
- Dr. Sertich:** Yeah, I think it could be considered the best collaborative project anywhere in the U.S. because of that physical coordination.
- Dr. Titus:** Well thank you.
- Dr. Sertich:** Getting people working together – kind of like a big symphony, and so we're all working on the same types of projects together.
- Dr. Titus:** Yeah, I've just seen in so many instances where different institutions working in the same region can be really competitive with each other. I think we've been able to avoid a lot of that in the Kaiparowits, which has been really good.
- Um, so would you care to reflect on what you see as the role for national monuments more in general like, more generically to research.
- Dr. Sertich:** So as a scientist, I see national monuments as an amazing scientific repository, protecting all of these natural resources, whether it is biological or ecological or going deep into the rocks and looking at geological or paleontological resources. These are repositories of information that are protected, are available for study, and are really important for inspiring the next generation of scientists, whether they're biologists, anthropologists, or paleontologist like me.
- Dr. Titus:** I know from personal experience in working with you, that your crews and you personally have faced some incredible logistical, emotional, and physical challenges as you've been working in the monument because of its remote, rugged nature, limited access, extreme climate, and things like that. Do you have any personal stories or reflections or maybe things that stand out in your mind as challenges that you've had to face and overcome over the years?
- Dr. Sertich:** Yeah, so I can that working in Grand Staircase is among the most difficult places I've ever worked in my career, and I've worked in places like remote Madagascar, where you have to drive days and days to get to the fossil outcrops, or places like Antarctica, where it takes amazing logistical coordination to get out and look at these rocks.
- But there's nowhere more difficult I've worked than the Kaiparowits Plateau, and that's because it is so remote, there are so few roads, access can be so difficult that we have to basically live off whatever Mother Nature gives us.



Dr. Sertich: So, anytime it rains we can be trapped either away from the outcrop or on the outcrop. You have to be really careful with how we get our food and our water out to those spaces that were working, and there are so many instances of us getting trapped with a truck breaking down, we had one of our really big field vans breakdown way, way back in the monument. Basically, the entire steering rod exploded, flew off, the whole thing dug into the earth and essentially shut down that road.

Dr. Titus: I remember that well. Yeah, I remember that well.

Dr. Sertich: And so those types of things are routine, and for a lot of scientists that's a pain in the neck. You know you don't want to go out there and deal with that, but the fossils and the story that they tell is worth the effort, in my opinion.

Dr. Titus: Yeah, and the remote nature of a lot of the country, and the sites that were working, has also as mandated the use of air support because even pack animals aren't practical for getting the heavy supplies hundred-pound bags of plaster, and four-hundred-pound barrels of water, and stuff like that – to get a camp that you can work out of. Yeah, I know it is, it is an incredible challenge and hats off to you and everybody else who's been able to make that work.

So, over the years, what would you count as among the most exciting discoveries that you've ever made?

Dr. Sertich: Well, I've been a part of many different discoveries over the last seventeen years now. But I think the ones that stand out are the big bone beds and we've made a couple of really exciting bone-bed discoveries over the last several years. One of them was a site that we called 'Uncle Charlie's bonebed,' that was discovered by one of our scientists Uncle - Uncle Charlie.

He stumbled into a big sandstone ledge that had a couple of turtles poking out and a couple other random chunks of bone, and after several seasons of digging, we were able to collect – I think it's six gigantic-tortoise-like turtles called *Basilemys*. Many of them have eggs inside, so they were congregating on this sandbar, probably to lay their eggs.

There were several duck-billed dinosaurs encased in skin, so adult and juvenile duck-billed dinosaurs, and one of the coolest is a huge skull of a new type of *Chasmosaur* dinosaur that was wedged into a big pile of logs and flipped upside down, and after – I think it took us about six years to get it excavated and then finally get it lifted out. It was one of the heaviest jackets ever pulled from the monument. The body block was about six thousand pounds.

Dr. Titus: Geez!



Dr. Sertich: And all that together is a particularly amazing single snapshot in time in the monument, and that's what's really unique about these bonebeds.

I know Alan, you've got a similar bonebed with Tyrannosaur dinosaurs, and turtles, and crocodiles – and these are unique, once-in-a-lifetime snapshots back into the Cretaceous seventy-six million years ago.

Dr. Titus: So how did you finally get that six-thousand-pound block out of the back country?

Dr. Sertich: *Laughs aloud.* Well again, we had to use helicopters and so it was finding the right size and size of helicopter, availability was a big issue, and now that there's so many wildfires in the West, it's hard to wrangle a helicopter. So, it took about three or four years of talking to the helicopter company, getting them to agree to donate their time, and we are really fortunate, and that this particular company was able to donate a big K-Max helicopter – so a big heavy-duty-lifter and it made short work of that giant dinosaur block, so six-thousand pounds flew out of there like nothing. Those fifteen minutes of helicopter work took almost four years of time to arrange and organize.

Dr. Titus: And wasn't cheap!

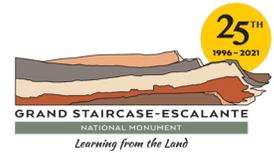
Dr. Sertich: It wasn't cheap! Even with their donation, those helicopters do cost a lot.

Dr. Titus: So how do you? What's your take on how these extremely important but rare events like these multi-taxic bonebeds form? What kinds of special circumstances do you need to form a fossil deposit like that?

Dr. Sertich: Well, there's some emerging evidence now that these are multi-tiered events where you have a sorted kill event, where a group of animals, dinosaurs, and other things that were living on the landscape were killed and brought together, buried, and then by some sort of exhumation – so another event, another flood for example basically exhumes these beds, these previous bonebeds and redeposits them in these big sandstone channels, and so you get these amazing double events that are linked to the seasonality, the heavy rains that probably occurred during the Cretaceous, and the fact that this is such a dynamic landscape where the basin, the floor of the basin is dropping out, tons of sediment is coming into the, into the system, you have huge uplands and mountains off to the West, and so it is ripe for these big events to both kill dinosaurs and re-exhume and re-bury them into deposits that we can discover and excavate.



- Dr. Titus:** Yeah, and they're not very common. I mean what, we probably got less than a dozen of these. I'm just spit-ballin' here. They're not super common, but when you do find them, they are literally like Rosetta Stones. They unveil so much knowledge about the ecosystem that we don't normally see in a sort of standard, run-of-the-mill site, huh?
- Dr. Sertich:** Yeah, they give you your rare taxa. So that's where we find some of our rarest dinosaurs, dinosaurs like *Akainacephalus*, a really cool tail-clubbed *Ankylosaur* dinosaur came from one of these deposits. Some of our best Ornithomimid, ostrich-style dinosaur material comes from these deposits, and even your site Alan, probably has probably the best *Deinosuchus* crocodile ever, ever discovered anywhere in the North American west and that's a crocodile that's known from Montana all the way down to Texas.
- Dr. Titus:** Yeah, I'm pretty certain that may be the best one ever found, in terms of overall completeness.
- Dr. Sertich:** Not only is it rare in terms of the amount of bones but also grabbing the really rare dinosaurs on the landscape and preserving them for us.
- Dr. Titus:** Yeah, in an exceptional state.
- Dr. Sertich:** Yeah, beautiful bones.
- Dr. Titus:** So, you've had some experience with soft-tissue preservation at some of these sites too. I think 'Uncle Charlies' the turtles had some skin, right?
- Dr. Sertich:** Yes, yes – there's skin on both the Hadrosaurs and the turtles at that site.
- Dr. Titus:** Amazing! And again, do you think this is unique to the Kaiparowits or is this sort of preservation seen widely throughout the Western Interior?
- Dr. Sertich:** They do see this preservation in many of the different Western Interior formations, it's not uncommon to get patches of skin – the Lance Creek formation and the Hell Creek formation do have their examples of what they call mummified dinosaurs, but the frequency that it occurs in the Kaiparowits formation is unlike any of those other, those other rock units.
- Dr. Titus:** Interesting!
- Dr. Sertich:** Almost anytime you find an articulated-hadrosaur skeleton, you should expect to find skin and sometimes extensive quantities of skin around that skeleton.

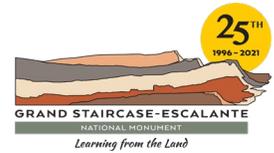


- Dr. Titus:** Yeah, huh! I know it's always so exciting for me when you pull off that block of sandstone and see all those little pebbly, little bumps and say 'oh my gosh, I have soft-tissue preservation here,' yeah.
- Dr. Sertich:** Yeah, you're actually looking at a dinosaur. You're actually.
- Dr. Titus:** Yeah, I know.
- Dr. Sertich:** You're actually looking at both the skin and the outside of a dinosaur. You can imagine the colors and the patterns on that.
- Dr. Titus:** Yeah, like it just laid down and died there for you. So, what would you say, after seventeen years of research in and around Grand Staircase, would be your take-home message from all the work that you've done?
- Dr. Sertich:** Well, even after seventeen years of going out with huge teams for two months or three months of the year, all this remote field work, I feel like we're just scratching the surface. I still feel that there's so much more to be done, going back into areas where you feel like you've found everything, we still find new fossils and huge fossils and amazing fossils. So, I think the take home message for me is that this is more than just a career. These fossils are going to keep coming out of Grand Staircase for the next several centuries. There's just so much to be found. It really underscores the importance of protecting these places and protecting the resources that are still in the ground waiting for the next generation of paleontologists.
- Dr. Titus:** Yeah, I would second that. Well, I think we've covered most of the topics that I had off the top of my head, but are there any other thoughts you'd like to add? Any reflections or personal anecdotes?
- Dr. Sertich:** I still think we're in this amazing, Grand Staircase-dinosaur renaissance and you know, there's been a huge flurry of new dinosaurs named over the last decade or so, but I think the second wave is coming. Just based on the material that all of our collaborators have found is going to be really mind-blowing and there's so many new dinosaurs that are sitting in our lab or sitting in the lab down in Kanab or sitting in the lab up at the Natural History Museum of Utah – that it's really going to change the way we think about the late Cretaceous.
- Dr. Titus:** Yeah, my guesstimate is that we're going to double the number of new species named from the monument, when everything that we have currently sitting in our labs finally gets described and published. I mean it's quite exceptional what's still left to be published, isn't it?
- Dr. Sertich:** Yeah, it's just a mountain of bones.



Monumental Science

Episode 3 Transcript



Dr. Titus: Yeah. Many, many more careers and I've only got five more years so I gotta' get busy. Wow! Well, I think that brings us close to the end of our time together. I want to thank Dr. Sertich for joining us and also thank our listeners for joining us. Thank you, goodbye.