

Oreamnology with Dr. Julie Cunningham

Ologies Podcast

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Oh hey, it's your water bottle that does not fit in your car's cup holder, why? Why? Why? Alie Ward, it's another fresh episode. I have been wanting to do this one since I saw a mountain goat in Glacier National Park when I was 12, even though back then podcasts did not exist. But I started to google, 'who studies mountain goats up in Montana' and all roads led to this wildlife biologist, who works with the Montana Fish and Wildlife and Parks Department to monitor and study these artiodactyls, which are even-toed ungulates. Seeing one in the wild is like spotting a Pegasus. And so, if your job involves goat safaris for money, what kind of life do you even have? We're going to find out.

But first, thank you to everyone who supports the show at Patreon.com/Ologies, it costs a buck a month to join and then you can submit questions to the ologists before the interview. Thank you to everyone who is passing the show around to friends, and rating, and subscribing, that helps so much. Leaving reviews also helps, plus, I read them all. And as proof, thank you this week to Madash1213, who wrote this review:

This show satisfies my curiosity, even when I don't think I'm going to give a crap about a certain ology, I always end up caring.

Madash1213, start caring about goats, now.

Okay, oreamnology, this derives from the Greek for "lamb of the mountains," and I'm going to be honest, with one species of mountain goat in the world, in one genus, *Oreamnos*, there wasn't a better word for this ology. But also, oreamnology turns up in zero internet returns, no one apparently has ever used it. So, the word begins with this very episode. "What about caprology?" you ask, the study of goats. Well, caprology is already defined as the study of porn, or of feces, go figure. And also, mountain goats... are you ready for this? You're going to talk about this at every cocktail party you ever go to, they're not goats! They're not! We're going to get into it.

Plus, why are they so woolly, how to be romanced by a mountain goat if you too are a mountain goat, the physics of climbing up sheer cliff faces, how big can these fuckers get, what happens when you airlift a goat, volunteering in the name of goathood, the dangers of a goat hunt, eagle attacks, the finest goat robes ever worn, extinct species, the softest snoot in the animal kingdom, the most delicious hiking trails, and more, with biologist and oreamnologist, Julie Cunningham.

Julie: I'm Julie Cunningham. I use she/her/hers.

Aside: Y'all want to get right into it? Let's get right into it.

Julie: Oh sure, I got my undergraduate in wildlife biology at University of Montana, and then I got my master's degree in fish and wildlife management from Montana State University.

Alie: Did you specialize in goats at the time? Or how did you find your niche in mountain goats?

Julie: Well, it's interesting. I'm a broadcast management biologist, so even though I enjoy mountain goats tremendously and I have management responsibility for quite a wonderful, healthy population of mountain goats, I'm kind of a big game biologist. Most of my work is with ungulates in general. So, my master's work, it began... it's kind of a circuitous route, it began with studying elk and wolves but the wolf pack I was studying was eliminated after getting a little too much into livestock. So then, my master's shifted and I worked with bison. So, I have

definitely the background in ungulates, and I've always really enjoyed working with ungulates in general. So, I've sure been enjoying working as much as I can with mountain goats.

Alie: As a wildlife biologist who also works with game, what's it like for you to see populations go up and then go down and how they interface with human activity?

Julie: Oh my gosh, that's all part of the excitement and the enjoyment. We always say it's the science and the art of wildlife management. Speculating on why a population goes up or down, gathering the information and the data, and communicating with our publics about it, that's all part of the job. Wildlife populations are going to ebb and flow, and wildlife management has to be responsive to that with the number of licenses we issue.

Alie: Mm-hm. How are mountain goats doing right now?

Julie: Great question. In different parts of their range, they're doing very differently. I happen to be managing mountain goat populations that are not native, they were introduced. So now, they are Montana goats that come from Montana populations, but historically we don't think mountain goats existed in the mountain ranges where I manage goats.

The places where I'm managing goats on the whole, they're doing very well. We're sustaining reasonable harvest rates, great opportunities for people to come and view and enjoy mountain goats. Now, in places where mountain goats are native, they're not always doing great and that's kind of a big topic of conversation, communication, and research recently is, why is that?

Alie: Well, I had no idea that there were introduced mountain goat populations. Where were they introduced from and who introduced them?

Julie: Montana Fish Wildlife and Parks. If you ever get into a book called *Back from the Brink*, it's a big PBS episode, there's also a book called *Montana's Wildlife Legacy*, they have pictures. Goats were captured and put in rafts, they were put in airplanes, they were put in panniers on the sides of horses. Our predecessors, in the 1940s through 1960s in particular, were focused on wildlife restoration and part of what they did was just move these animals across the country.

[clip from *Back from the Brink* documentary]

Narrator: They were loaded into crude wooden crates on a two-wheel horse cart and taken to the nearest road for transfer to a pickup truck. Then they were hauled 300 miles and released at Sweet Grass Creek in the Crazy Mountains.

Montana FWP worker: And we never lost any in moving 'em, which is pretty remarkable.

Aside: That was from the 2007 PBS documentary, *Back from the Brink*. It's wild people, it's wild.

Alie: Oh wow. What happens if they are not native, but they've been put in that habitat? Do they thrive there? Does that mess up the rest of the ecology? Obviously, probably, people were making decisions differently in the '40s than we do now, 80 years later. Do you think that's a decision that they would have made today?

Julie: I think in Montana, we're pretty supportive of our introduced goat populations. We view them a little bit as a potential rescue herd or source herd, potentially, to restore places where they are struggling in our native herds.

Aside: That means if shit goes down with the endemic herds, they have the introduced herds on backup, kind of like a dugout of hairy, musky ungulates.

Julie: But you ask a great question and I'll tell you, different biologists in different jurisdictions across the Rocky Mountain West would answer your question differently. There are some places where folks are concerned that mountain goats could be challenging the habitat in some places or could be a potential source of disease for native bighorn sheep herds. Mountain goats and bighorn are related and they share the same respiratory pathogens, so there are some places you might hear about, like in Grand Teton National Park, where introduced goats are considered very differently than we do here in southwest Montana as our state wildlife management agency.

I'll tell you I've got, in the Madison range, bighorn sheep and mountain goats are coexisting and have been for quite some time and we have huntable populations. I don't have concerns about the alpine vegetation. We've been exploring that in the Bridger Mountains, there are some endangered plant species. I've even gotten to document a couple and send those sightings into our Montana Natural Heritage Program, which tracks these plants. But there's no indication that goats are causing any resource damage in any of the areas that I manage, nor is there any indication that they're a significant source of a spread of disease to our native sheep herds. So, it's great having healthy populations here. And in the future, we could potentially use these herds to help restore native herds where they're struggling.

Aside: Okay, so where are they struggling? According to a jaunty little 2017 paper titled, "Status of Montana's mountain goats: A synthesis of management data and field biologists' perspectives," native ranges have about 1,100 goats, which is only about a third or a quarter of goats they had in the 1950s. In British Columbia, First Nations, the Kitasoo Xai'xais, members have voluntarily stopped harvesting mountain goats to avoid endangering them. They're asking the provincial government to pump the breaks on the hunting tags for nonresidents.

But in some places, where the *Oreamnos* genus is introduced, they're thriving. Some say thriving a little too much, but more on that in a bit. Because first, let's back up. What even are they? What are these things?

Alie: What exactly is a mountain goat? From what I understand, it's not a goat, is that true?

Julie: Correct. So, mountain goats are in the family *Bovidae*, they're in the subfamily *Caprinae*. Now, they're not in the same genus as domestic goats, they're in their own genus, which is *Oreamnos*. Domestic goats are in the genus *Capra*.

Alie: What exactly is that genus? Why are they kind of a separate genus? What's different about them than the goats we might see at, like, the petting zoo?

Julie: Okay, mountain goats evolved in North America whereas domestic goats are an Old World species, mountain goats are a New World species, so they're evolutionarily distant. There used to be another species of *Oreamnos* that existed in North America, but it went extinct in the Pleistocene extinctions I believe; the Ice Age. Its Latin name, *Oreamnos americanus*, it's an American mountain goat and it's existed here for... we would have to look it up, hundreds of thousands of years. So, there's quite a bit of evolution that's separated them.

Aside: Just a side note. So, the extinct ones are called Harrington's mountain goat, which vanished from their territory in the American southwest around 13,000 years ago. In the 1930s, there were some folks poking around the Smith Creek Cave in Nevada and they were like, "What the fuck is this long-faced goat skull?" Which is a question that was answered via

the 1937 bulletin titled, “A new mountain goat from the Quaternary of Smith Creek Cave, Nevada,” just a side note to this side note. So, this smaller, longer-snouted extinct mountain goat lived around the same time as a giant ground-dwelling sloth that used to roam parts of California that are now Walmarts and nail salons. But back to today’s mountain goats. Where are they?

So, they live west of the Continental Divide, which tends to follow the peaks of the Rocky Mountains and the Andes in South America. Truth be told, I’m going to confess to you, I always confused the Continental Divide with the Tropics of Capricorn and Cancer, but those are totally different kind of, global bellybands that have nothing to do with the Continental Divide. So, west of this great divide, these beautiful goaty beasts, romp up parts of Washington, and Oregon, and Montana, and up the Canadian Rockies into Alaska, naturally. But in 1947, we started dumping goats all kinds of places, kind of like ungulate confetti for sport hunting. So now, there are introduced populations in Colorado, Utah, Montana, and Washington. So, how do we know where they are now? Because there are Julies.

Alie: Can you tell me a little bit about what your field work is like? I understand that it might involve helicopters.

Julie: Yeah, absolutely. So, in general, I’m responsible for monitoring all the different ungulate populations in my jurisdiction. So, that includes mountain goats and bighorn sheep, it includes whitetail deer and mule deer, and pronghorn, and it includes elk. So, I’m always in the air trying to count and survey these species.

Mountain goats are particularly challenging; they use caves sometimes, they use cracks of rocks, they hide under trees, and they have the habit of staying at the highest of elevations. So, they don’t come down like elk will come down into a field and you’ll see 500 elk or 3,000 elk in a group; you’re not going to miss that, you can count that. But what goats do is they have a more solitary lifestyle, either by themselves or in small groups, and at these high elevations it makes them really difficult to survey and follow. So, we have an aircraft division, Fish Wildlife and Parks, and we definitely get after them with our great helicopter pilots.

Aside: Julie says that they use helicopters and also community science, just volunteer goat spotters, getting together a few times a year, meeting in the warmth of a summer morning with some binocs and some CamelBaks and then dispersing and doing ground-based counts for scientists... for oreamnologists.

Julie: And I interface with the Rocky Mountain Goat Alliance, who help me get fantastic volunteers together. We do some trainings about how to tell nannies from billies and then we coordinate. We all go out into different assigned areas on the same day at the same time and document how many mountain goats we see. I’ve had just phenomenal luck with that method helping us count and classify the number of goats we have, and that’s just the counting phase.

We also have a mountain goat research project going on right now and that’s been really adventurous. We’ve used mountain goat capture crew from a helicopter base where they use net guns in the winter, capture goats, and we put our collars on them and do disease testing work and things like that. And then we’ve also done what they call clover traps, box traps, essentially, where goats can come into the salt bait in the summer, and then we can capture them, collar them, and follow them that way. That summer fieldwork has been pretty exciting and led to some of the strangest encounters I’ve had in the field.

Alie: What happened?!

Julie: So, in one site, mountain goats are completely nocturnal. So, we'll be staked out at night at the trap sites so that you pull the string and drop the door and catch just the goat you want to, you're not recapturing a collared goat, you're not capturing a kid, or separating a kid from the nanny, and we can be immediately responsive. So, we're sitting out there in the dark all night. And what's interesting, we're being all quiet and still, but the Bridger Mountains have an enormous amount of human recreation. That's one of the things we're trying to study: how are these elusive mountain ungulates handling the pressures of human recreation?

So, what really got me was we're sitting at a clover trap at a site, there's no official trail to the site, but there's a pretty well-known unofficial trail, and there's a lake about three miles into the backcountry. Not super easy to get to either, it's quite steep getting in and out. We're sitting by the clover trap all quiet and ready for goats to come in. [*Shhh, be vewy vewy quiet.*] And I knew there were people recreating in the basin behind me but I didn't start realizing the volume of it until I started really taking notice.

The thing that made me take notice was a gentleman came into our camp and loudly said, "Hey! You guys seen a fat chihuahua in a sweater waddle through here? [*Alie laughs*] It got away and it's hiding in some rocks!" And so, he had a search party for this lost chihuahua. And then I started looking around, "How many people are in this basin?" And as I looked around, I saw two people rock climbing on one mountain face beside me, where I'd seen billies earlier that day; I saw two people with big film equipment and a boom up on the Bridger Ridge; I saw I think about two dozen hikers; there were two people operating drones; there were ten loose dogs, including that fat chihuahua running through the basin; there were six other parties camped; there were four people swimming naked in the lake; and one guy was camping with his housecat. [*Alie laughs*]

Alie: Oh no! [*laughs*] Oh my gosh, this is all at once?

Julie: The same day. So, we didn't get any mountain goats that day but as the recreation dispersed after the weekend, goats did return to the basin, and we were able to capture them. But what is fascinating is there are places where mountain goats can be quite distressed by that behavior, perhaps particularly drones. One of goats' major predators are golden eagles will take kids, they'll knock the kids off of cliffs, so goats are really attuned to predation risk from above. So, the drones concern me perhaps most of all of this. But of course, loose dogs can be a challenge too.

One of the things that amazes me is that in the same mountain range, you could get so close to a mountain goat you could touch it. Now, obviously we don't advise that. [*No, no. Don't touch.*] But the point is, they're very habituated in some areas, in other areas they can be quite disturbed and that's one of the things we're going to try to look at with our collars is, with that amount of recreation pressure, these goats don't have anywhere to go but up and there's people *all* over the up. So, where do the goats go and how do they handle this? We'll be looking closer at that.

Alie: Did you guys ever find the chihuahua?

Julie: We did. It came out. [*both laugh*] The chihuahua came out and was retrieved.

Alie: I was hoping it didn't find the salt lick in your clover trap.

Julie: No, we were watching. That's one of the reasons we monitor the trap, we wouldn't want the public to come upon a goat in a trap and nor would we want to capture somebody's chihuahua.

Alie: Did anything change with the pandemic? With more people just saying, "Fuck it, I'm going to go outside more," did that have any impact on goats? Was that actual observation or did I just make it up?

Julie: Well, I won't be able to really say it's because of the pandemic or not. But one thing in Bozeman we certainly did notice during the pandemic spikes in our real estate as folks learned this was an attractive place where they could have a lot of space and a lot of recreation and work online. The remote working definitely increased interest in moving to places like Bozeman for all these great outdoor amenities that we have. And I'll say, I did do two years of mountain goat following, trapping, counting, and it just seems recreation is going up, and up, and up. It's great, folks are getting out and enjoying their public lands and wildlife resources, but yeah, there's ways that we do it sustainably. Fortunately, I can tell you right now, the mountain goat herd in the Bridgers, despite all the chihuahuas, and drones, and dogs, they're doing well.

Alie: Well, I was going to ask, with the helicopter counts and with their hyperawareness of predation from above, do you ever use drones to count them or is that just too close to an eagle? But if you're in a helicopter, you've got more space from them?

Julie: Oh yeah, the drones, we're learning more about how to use them in wildlife surveys in the agency. Currently, I haven't been using drones for any surveying inventory effort. Goats do respond to our helicopter by... they'll run away, or they'll get into the trees or cracks. But we only survey them about every two years with the helicopter, and like I said, our wildlife pilots are just phenomenal. We watch and make sure that nothing goes off any cliffs or gets hurt, we're not pushing them, nor are we harassing them. We get a count, get in and out, so they're disturbed for a very short period of time. We're very cognizant of animal behavior when we fly.

I've got an enormous wilderness area, the Lee Metcalf Wilderness area and Spanish Peaks Wilderness area. We fly over to get these counts of so much spatial area, it would be not really appropriate for drone surveys in some of these areas, but the helicopter makes a great platform to observe these critters

Aside: So, I googled Lee Metcalf Wilderness, and just outside Missoula lie a quarter million acres of alpine beauty; no buildings or roads but also the highest population density of grizzly bears in the 48 states. An image search of Lee Metcalf Wilderness just returns JPEGs that look like a desk calendar. Everything is beautiful.

So, let's say that you wanted to have a birds-eye view and just like, pop into a chopper with a date for like an hour, that would set you back several thousand dollars. So, for a better return on your investment, you could just dedicate your life's work to mountain goat ecology.

Alie: You know, you were mentioning that sometimes they are living in caves or in other crevices. What is a mountain goat's home like? Do they live in small herds at all? Or you said they're pretty solitary.

Julie: Yeah, they will live, anything from one, even a nanny can be found by herself but usually nannies will hang out with related nannies, other nannies and kids, young billies, one- or two-year-old billies might hang with a herd. [*He lives with his mother.*] I have counted a herd myself that was 82 animals strong which is an *enormous* herd for mountain goats, but

more often than not you'll find billies will hang in a small group, three or five guys hanging together, they stay separate from the nannies and kids often until mating season comes around.

But their home, they are amazing, they stay up at the rockiest, highest elevations you'll find, and they'll often stay there through wintertime. What you'll often find is you'll get these windswept slopes and they'll be up there eating the lichen and any little grass and forbs that are sticking through the snow. Sometimes they can come down into tree cover, so we're learning a little bit more about that but obviously they're harder to see when they're in those trees.

Alie: And why doesn't their fur change color in the summer or the winter?

Julie: I don't know why it doesn't change color. Color changing has been observed in things like ermine or snowshoe hares. What I do see is there's an enormous change in the thickness of their fur, and I talk about that with the hunters that pursue the goats. Come November, which is a very difficult time to go out in the mountains and get a goat because the snow that one has to contend with to get up there, November goats are so thick, and furry, and shaggy. Whereas summer goats are much more sleek. So, they definitely have a winter coat and a summer coat and they're very different.

Aside: Just a side note. So, that wardrobe change is called seasonal coat color, SCC, molting, and really only 21 species that we know of do this. I thought there were tons more but only like, 21 including the arctic fox, some weasels and hares, and the Siberian hamster which made me realize that yes, out in the wild, there are hamsters and I like that.

But what causes them to color change? Well, they say that the duration of sunlight, not the temperature, is the main driver. Well, with more heat on Earth and less snow, there's a camouflage mismatch that puts these animals at risk and they're showing up in all white, well after Labor Day, into the winter, when there should be snow. But because of increasing temperatures, the landscape is still set in an autumn palette of ochres and browns, which is a *faux pas* on our part and that can cost these color-changing animals their lives.

But either way, goats, they don't change color. Scientists behind a 2020 goat coat molt study collected some dated tourist photos from nearly 70 years back, up until now and they're analyzing how thick their coats were compared to now, like painstaking ecological progress pics cobbled together from people's vacation snapshots. And given that the goats wear their heavier coats October through April, the paper threw a little summer shade, noting that, "Some professional photographers expressed preference for photographing goats in winter months, when the animals are 'more photogenic.'" And I could just feel the eye roll of the biologist typing that. Oh, speaking of feeling...

Alie: Is it soft?

Julie: Very soft.

Alie: It is?!

Julie: [laughs] Yeah.

Alie: You get to pet them, probably, while you're collaring them, right?

Julie: Well, I try not to take too much time, you know, but one thing I've done is collected fur off of the bushes as the goats shed. So, I've quite some yarn balls in my garage. [laughs]

Alie: That's amazing, have you ever knitted anything with it?

Julie: No, I don't know how to do anything like that, I'm not very crafty. [*Alie laughs*] But it's phenomenal to be able to handle and touch these animals. But when we do capture work, we try to have as much respect for the animals as possible. One of our wildlife veterinarians used to tell me when we capture, they said, "It's such an instinct for people to want to pet the animal. But petting calms down your dog, not a wild animal. When you touch it, it doesn't like it, it doesn't calm them down." We really try to minimize handling, but of course, it is fun to observe how the different ungulates feel.

Aside: If you want to admire mountain goat textiles, and I suggest you do, look up Teri Rofkar, who is a member of the Tlingit tribe of southeast Alaska. And in a 2014 paper, "Managing and Harvesting Mountain Goats for Traditional Purposes by Indigenous User Groups" for a Symposium of The Wild Sheep and Goat Council, Teri wrote:

Our clan has been known for its weaving skills for thousands of years and I work toward continuing that legacy. The Tlingit tribe has traditionally used mountain goat wool in our weaving.

One robe might take her 900 hours to weave. And Teri explained:

It took me 17.5 years to gather enough wool to weave one robe, using every wool collection method... There is natural science and biology needed to harvest the mountain goat wool.

She also wrote that her tribe had access to just three hunting permits per year and that they carried numerous restrictions. And she concluded:

I would like to encourage agencies and individuals to work together to create sustainable relationships with the animals in their respective homes. Relationship, by definition, is not preservation. Therefore, maintaining a sustainable relationship can describe a different management methodology than natural resource management. This small change can make the difference between a purely economical equation and more holistic environmental decision. We all know relationships can be complicated.

Anyway, her woven mountain goat robes are gorgeous, they're creamy white and thick and heavy with geometric accents and long, dark tassels that swing from the shoulder blades. One of her robes even has a large, woven design of a mountain goat DNA double helix. And Teri received an honorary doctorate from the University of Alaska in 2015 at the age of 59 years old. A year later, her local Alaskan newspaper reported that, "Tlingit weaver, Teri Rofkar, walked into the forest in the early morning hours of December 2, 2016, from cancer. She was 60." But her knotted weaving tied the past to the future, and if you get a chance to see some of her robes, you will appreciate a mountain goat all the more.

Julie: I'll tell you the softest thing I've ever touched is the nose of a moose though.

Alie: Ohh, WHAT?!

Julie: Moose noses are enormously soft and squishy.

Alie: Whaaat? When did you get to touch a moose nose? [*Julie laughs*]

Julie: Most often a harvested moose. Unfortunately also, moose die of an enormous number of diseases but they have got the squishiest noses. There's so much cartilage in there because of how they forage and their specializations. But the squishiest, softest thing is a moose's nose. Any student that ever works for me will laugh about this if they listen to this podcast, because they'll be like, "Oh yeah, I remember Julie telling me, 'Grab that moose nose, you need to squish that.'"

Alie: We've finally found, what is the most boop-able animal, the most boop-able nose. [Julie laughs] It's a moose! A wildlife biologist got us the skinny. ["Boop!"]

Speaking of foraging, you mentioned mountain goats in November, what are they eating in November? Especially in Montana where it snows so much! How are they finding food during those times of the year?

Julie: Yeah, we've got windy mountain peaks and it blows the snow off of them and so yeah, all those little grasses, forbs, lichens that poke through, they'll be finding things to forage on. They're incredible.

Alie: And when you do get to get up close and personal: stinky? ["Stinky!"] What's the stinky level?

Julie: I'm not a good one to ask about that. There's a term "noseblind." [Alie laughs] I've had to necropsy some really stinky things in my life. You can smell them though, goats, sheep, elk, they all have... I think it's a very pleasant kind of barnyard odor, nothing unpleasant at all.

Aside: Ask the internet about the smell and several websites will serve up the same copy-pasted fact by, "Bucks stink with a strong musky odor which comes from the scent glands on their head and their urine, which they spray on their face, beards, front legs, and chest." Intrigued, I fact-checked this via a 1964 *Journal of Mammalogy* paper titled, "On the Rutting Behavior of the Mountain Goat," and was treated to the oreamnological account that, "Males showed dirt patches on the rump as well as soiled trousers and belly. The soiled males emit, to human noses, an offensive odor." Also, if you ever need an adjective that means goaty, you can say hircine; it means goaty. So, if you stunk your own belly in trousers for love, that's hircine fashion. What about their shoes?

Alie: Okay, obviously huge questions people ask you must be, how are they stuck to the side of a mountain face in windy conditions? How are their hooves doing it?

Julie: Yeah, their hooves are great. They've got these hard edges, but soft pads, and it helps them balance. Just like, if you guys ever rock climb and you put on your special climbing shoes, it's kind of like goats have that on their hooves. That's the other thing, it's fun that you mention that because when I take students out with me at hunter check stations, if we ever have a hunter-harvested goat, just like I said with me moose, I'm like, "Squish the moose's nose." If a goat comes through, I'm like, "You guys have got to look at these goat hooves," because they are really uniquely adapted for that kind of mountain life and to be able to hang on those cliff edges.

Alie: How does one small move not send them off the mountain face? I've seen goats and they're not light animals, they must weigh like 100 and some pounds, right?

Julie: Yeah, yeah.

Aside: For trivia fiends, the average weight of a mountain goat is between 150 and 300 pounds. But one heavenly chonk tipped the scales at 385, that's 174 kilos of just pure cliffside stink.

Alie: So, how are they not just having a wrong move and gravity takes them right off?

Julie: You know what's fun is, I think they learn a lot when they're kids. Mama mountain goat stays below her kid a lot of the time when they're in precarious terrain. The kid is learning and practicing and if it falls, mom's body is there to catch it.

Alie: Wow!

Julie: I've definitely observed... You'll get a kick out of this. We drugged a nanny, put a collar on her. She had a yearling with her and a kid. So, sometimes yearlings will stay with their mom, so a yearling is one-and-a-half year old, and the kids of course were just born that spring. So, it's kind of like big brother and little brother here. When we released the mom, the little kid ran up to her, "Maaa, maaa" and made this little bah-ing noise, it was adorable. Mom was recovering, she just got done with getting a collar on. It was a mild sedation, she's on her feet, she's drinking water from a snowbank, she's pretty groggy, still getting her feet under her. We're watching, she's licking this water. The yearling was harassing the kid and the mom had to go kind of poke the yearling with her horns a little bit to get him to knock it off. Goats do social order, dominance, whatnot.

But what I watched also was that as the herd moved off, there were places where the kid struggled. The yearling had no problem just like any show-off big brother he's like, "Yeah, look at me!" And he's jumping. But when the kid struggled and bleated for mom, mom went back, got the kid, showed him a way around. And so, I think that when you ask about how do they do it, I think that there's definitely some learning. Obviously, there's an evolution with the hooves and things like that, but I think there's some experiential learning as well; both social learning from mom and big brother, and the practice that they get bouncing around those mountains. The Goat Alliance calls them little mountain marshmallows, the kids.

Alie: Oh my gosh, how cuuuute.

Julie: Yeah, the kids are kind of adorable.

Alie: And you know, how pointy are the hooves? I picture them like stiletto heels in order to just like, wedge into crevices. But how big is a mountain goat hoof?

Julie: They're actually pretty big and pretty round. You can tell the difference... An elk or a deer hoof has got a sharp point at the top and mountain goats are a little more rectangular, blocky, they're more blocky than you'd think. It's just those hard edges around the sides that they can use to really grab onto.

Aside: Okay. So, first off, remember that these are artiodactyls, these are even-toed ungulates. So, a mountain goat hoof is really kind of a cloven situation, like a pair of tongs that can spread apart to get more traction. The hoof tips are pointy, the toe pads are textured for kind of a rubbery grip, and then the dewclaws, behind those two front toes also help grip surfaces. So, the whole square shebang is kind of like an arcade claw machine, but more reliable in life-threatening situations.

How are they scaling straight up cliffs? For years, the answer was like, "No one even knows!" Until a few scientists watched a hiker's two-minute YouTube footage taken in the Canadian Rockies and analyzed the goatshit out of it. They wrote a whole paper in 2016 titled, "A descriptive analysis of the climbing mechanics of a mountain goat," and showed that the hind limbs pushed the goat up, and then their incredibly ripped shoulders do superhuman pull-ups, up the cliffs. But the secret sauce is a strong neck that locks their elbows, that shifts the center of mass. So, a thick neck gets that job done, let a goat be your fitspo. Let's stop photoshopping our trapezius muscles from bikini photos, okay? We need those. Oh also, mountain goats can jump almost 12 feet at a time, and they do all of this nude, wearing pee as a cologne, or literally raising kids up a cliff.

Alie: Do they have any issues going too high in elevation where the air is too thin? Because I've tried to jog in the mountains, and it did not go well. *[Julie laughs]* How are they doing it?

Julie: I'm sure they must be really evolved for that. I mean, Montana elevations aren't what you'll find in some places like Alaska or Colorado; we don't have the 14-ers. But here, we've got 12,000-foot peaks and they seem to navigate them with aplomb.

Alie: Mm-hm. What about the harvest season? What time of the year is that open and what are sustainable hunting practices?

Julie: Yeah, so as a wildlife biologist, I work really hard to count, survey, and inventory the mountain goat populations that I manage and have a defensible amount of licenses available. So, what that means is there's published sustainable harvest rates, and in some places, in native herds, the best science indicates that you want it 3% or less.

Well, I have introduced herds which have grown exponentially, which are monumentally successful in some ways, their populations are growing; they can sustain a higher harvest rate. I'll maintain a 4-7% harvest rate on observed goats. Now, like we talked about earlier, goats are difficult *to* observe, so we know there's always more goats out there than I'm observing, that's a given. What we don't know is how *many* more goats are out there than I'm observing. But if I use my minimum observed count and set my harvest rates from that, I can guarantee that that is a sustainable rate. Part of that, of course, is keeping on top of these populations and surveying them as often as I can. So, that's how I come up with a harvest rate.

Aside: So, in introduced areas, populations are A) Higher than they ever would be naturally, because any goats there is more than zero goats, according to my math. And in those introduced areas, they're doing pretty well... too well, some might argue. So, Washington state wildlife ecologists have been bleating and pleading to have the introduced species removed from the Olympic Peninsula and taken to their endemic ranges farther up north, for years.

And then, in 2010, in Olympic National Park outside of Seattle, a mountain goat charged at a group of tourists and a 63-year-old hiker defended them but was gored in the thigh. The goat stood on top of the man as he bled out, and he died. His family sued because this goat was infamous for being aggressive. The locals called him Klahhane Billy, for his home ridge that he lived on. And years later, people still talk about this goat. There was a 2015 *Seattle Met* article by James Ross Gardner who wrote, I'm just going to read this verbatim:

Klahhane Billy was a big, mean son of a bitch. Three hundred seventy pounds, bigger than two men, he liked to skulk along Switchback Trail in Olympic National Park and chase hikers with his horns – two boulder-sized crescent razors – a wild animal unafraid of humans.

So, more on that goat in a bit.

But in 2018, Washington wildlife biologists got the green light and the parks' introduced mountain goats started getting netted, sedated, blindfolded, and dropped off farther north where they would naturally be. I'm sure they took the blindfold off when they were like, "Here you go." Nearly 300 of them have been relocated north, 16 went to zoos, and a few dozen died in transit. The goal was to be goat-less by this fall and any that they couldn't catch in their relocation efforts, the ecologists said, should be culled, i.e., just picked off by some skilled hunters.

Julie: The next question is, we do have either sex tags in Montana because there's not a high degree of sexual dimorphism in goats. There are nuances in the structure of the horn and the body that can help a hunter detect whether it's a billy or a nanny, and there's an increasing body of data to help inform and educate and get hunters to practice this. The Rocky

Mountain Goat Alliance produced a fantastic educational video to help hunters select and, over time, hunters are choosing to take more billies, which is great.

Nannies, takes a long time to get a nanny to a reproductive age, and then she'll only have one kid a year, if that, maybe one every other year. And they only live to about 14. So, if you compare that to an elk, which can start having calves at age 2, mountain goats have a delayed first reproduction and they don't live as long as an elk. So, the number of females in a harvest matters a lot. One billy can breed many, many, many nannies. So, there's surplus males, you can call the males surplus males, that the population will be fine if more billies are targeted than those reproductive females. So, that's how we do harvest rates.

And so, how we do the timing of hunt is we allow hunting from September through November to give the hunter the chance to go out and enjoy kind of a late Montana summer and hunt at 10,000 feet before the snows come. Or a hunter can keep hunting all the way through November and get one that's going to get that thick winter coat. So, it's a nice long hunting season, it's oriented to be after the point where the kid depends on the nanny. Now, there may be some decreased survival of a kid who loses its mom in September but the kid's got a pretty good chance; it's not reliant on milk anymore and it's probably part of a herd, one of those small family groups or herds, so it may still have some ability to survive. So, we've really oriented it pretty specifically that way, that hunting season will be at a time when it's cooler, a hunter can get the meat and hide out intact to make sure they use the whole animal, and the kid is most likely going to be able to survive.

There are some places in Montana where it is illegal to harvest a nanny out of a group with kids in it. The reason that that rule is there is to promote that kid survival and help protect populations in places where they're struggling a little bit and keep that sustainable harvest on the landscape. There are some places where there are actually nanny-only licenses, we have one of those in the state. And the purpose of that is to keep the population at a healthy level so that if they get to too high a level... we've had disease-related die-off events, and we don't want that to happen. So, in order to drop a population, we might *want* the females to be harvested.

Alie: Oh wow.

Julie: So, there's lots of little nuances to mountain goat management using hunting.

Alie: That must be so fascinating for you every year to get the numbers and to see, "Okay, how have things changed this year, what direction are they going?"

Julie: Absolutely. And you know one of my favorite parts of my job is working with mountain goat and bighorn sheep hunters because these are kind of once-in-a-lifetime licenses. If you draw a license, you don't get to put in again for 7 years. Some people have put in 15, 20, 30 years in order to get the opportunity to hunt one of these amazing animals, so by the time they get this license they are so excited, and they want to know everything. They go scouting, and they call me and tell me stories like, "While I was up there, I saw this or that," and I get so much great information from these hunters. I almost get to live vicariously every year through their stories and adventures of their hunts.

Our chief pilot has this great little saying. He flew in Alaska for a lot of years and he's a diehard hunter, his name is Joe, and Joe has this great saying. He says, "Sheep go where men don't go. Goats go where sheep don't go." [*Alie laughs*] I love that because goats just go to these incredible places. I've had hunters have to get ice-climbing friends. They all just get

beautiful pictures and beautiful stories, and they come in with their mountain goat just so happy, and it's fun to be a small part of that process.

Alie: Have you ever hunted a goat?

Julie: I have not.

Alie: Ohhh! Although, I guess you are kind of live tracking them which is kind of the thrill of the hunt anyway.

Julie: Absolutely. I tell ya, I am a hunter, I've been a hunter my whole adult life. I hunt deer, and elk, and antelope every year. I put in for moose and bighorn. One of the reasons, there's maybe a couple reasons I don't put in for mountain goats. One of them, I took quite a fall in my youth chasing mountain goats and bounced a few times off of a mountain face. *[Alie gasps]* And you know, I really like being in mountain goat country and watching them from down below.

Alie: Yeah. Oh man, I didn't realize... So, it can be dangerous.

Julie: Yeah, there's been some stories of some hunters taking falls or outfitters taking falls pursuing mountain goats; they live in steep, steep, rugged terrain.

Aside: So, sheep go where humans don't, and goats go where sheep don't, and hunters try to go where the sheep and the humans don't, to where the goats are. My point is, it's dangerous.

The sustainable management, or rather the relationship with mountain goats, is important because the nannies typically just have one bébé, not twins like cervids, like elk and deer do.

Alie: You know, for people who maybe live in the city, or who are vegetarian, or who can't imagine hunting, I've had some cervidologists on to talk about deer hunting and a lot of conservationists actually do hunt, which is kind of a little bit of a surprise to some people. Can you explain at all, what the appeal is for say, hunting a mountain goat, for people who are just like, "What? I don't get it."

Julie: Oh, I'd be so happy to talk about that. Number one, we've talked so long now, even in this podcast, about how to be careful with hunting regulations to ensure the sustainability of harvest. And I think one thing I tell folks in cities, they might not know this, everything I'm telling you about, the money comes from hunter dollars. The Pittman and Robertson Act of 1937 has a tax on firearms and hunter license dollars that come to the state. It goes right back to the conservation of wildlife species. It goes right into all this work I've told you I've gotten to do, to help make sure mountain goats stay on this mountain.

Aside: So yes, surprise! Some conservationists hunt out of concern for the ecosystem, out of a love of the outdoors. And because in many states, the revenue for hunting tags goes back into conservation programs. Others just find that hunting sits better for them for ethical reasons.

Alie: It is interesting to think also of the way that we consume animals and that having an animal live its life in the wild as it should and then, say, meeting a certain fate with a hunter and then being eaten and appreciated, versus an animal that's been bred and maybe lived in conditions that are really awful for the entirety of its life. Maybe the difference in terms of the animal's welfare when you're hunting versus when you're maybe getting your meat from factory farming and things like that. So, I think it's interesting how many conservationists who are really connected to their fieldwork too, and biologists will look at which populations are healthy and then hunt from there. I think it's so interesting.

Oh, and can I ask you a couple questions from listeners who wrote in?

Julie: Absolutely.

Alie: They had great questions. Oh also, we always donate to a charity of your choosing, so it's the Rocky Mountain Goat Alliance, right?

Julie: Well, you asked for a goat-related conservation organization, and I would like to just put in a quick second to say the RMGA have helped me for almost 8, 9 years now to help get counts, to help me set responsible hunting licenses. The Goat Alliance take it really seriously, the conservation aspect of wildlife management and hunting, so they're a 501(c)(3) that's all about mountain goats.

Alie: Perfect!

Aside: So yes, that donation goes to the Rocky Mountain Goat Alliance who help so much in the community science aspect of the goat counts that keep their populations thriving in native range and managed in non-native ranges, all while they educate the public. To join their community science goat counts next summer, you can head to GoatAlliance.org. And a donation to them was made possible by sponsors of *Ologies*.

[Ad Break]

Okay, folks at Patreon.com/Ologies, you sent in quality questions. Patrons, y'all are the Greatest Of All Time.

Alie: Questions from listeners. Taylor Paschall wrote in and said: I heard on a hike that you only really see females. Where do the males live? If you're on a hike, will you really only see females, or are you seeing packs of billies too?

Julie: Oh, I'll see the billies too, yeah.

Alie: Ahhh! Okay, so that's flimflam we busted.

Julie: Busted.

Alie: Busted. Okay awesome. Several people, Allison Denny, Paul Smith among them asked: [music swells] Do you like the band, The Mountain Goats? [clip of "No Children" by the Mountain Goats: I am drowning/ There is no sign of land/ You are coming down with me/ Hand in unlovable hand]

Julie: I've never heard of a band called The Mountain Goats.

Alie: WHAAAT?!

Julie: But I have to look this up.

Alie: Oh my god, [Julie laughs] Julie!

Julie: I don't get out much.

Alie: They're a pretty big band, so maybe The Mountain Goats, if you're listening to this, next time they tour through Bozeman, you've got to go see them.

Aside: PS, you may know The Mountain Goats from decades of just being a cool-ass band. Or perhaps you just became acquainted with them in 2021 when their song "No Children" went viral on TikTok to people choreographing their cats to it. But "No Children" has been a favorite song of *Ologies* editor and side husband, Jarrett, for years and years. Little fun fact, we broke up a few times before we got back together and got married and this was one of those like, tear out your heart, throw it down a garbage disposal, kinds of songs. It's so good. As I researched this episode, Jarrett was watching a video of a live performance of "No

Children” and he was weeping at his computer. So, when it comes to our love for The Mountain Goats, we are not sheepish. Oh!

Julie: I will tell you though, if you google the term “Goat Sheep Goat,” there is an educational video by Banff National Park, to tell people the difference between sheep and mountain goats, which they do in the form of a polka [*Alie laughs*] and it’s phenomenal.

Alie: I will look that up and I will treat the audience to a snippet of that. [*clip from “Goat Sheep Goat” polka: My coat is long and thick and light and helps to keep me warm, my hooves are black, my nose is black, and black my eyes and horns. Sheep and goats. Yeah! Goats and sheep...*] That sounds amazing.

Mo Casey wants to know: Are they playful? For some reason, they give me the impression that they like to party. Is that true?

Julie: I’ve seen a little bit of that [*Alie laughs*] yeah, yeah kids bouncing around. A friend of mine is a backcountry snowboarder, he sent me a video. He said it was a billy with whirling disease, it was a billy just rollicking around in a snow field, [*Alie “awws”*] feeling its oats, I suppose. So, I think when they have the energy, they’re really fun to watch. I could watch them all day long.

Alie: And people do, right? They grab binoculars and they just kind of hang out and look at cliffsides?

Julie: I’ll tell you, I sure do. I know my husband and son were out on hike and my husband is like, “Which hike was that?” And I was like, “It’s the one I got up when I was mountain goats,” and he was like, “You do that on *every* hike.” [*both laugh*]

Alie: When are you *not* going to look for mountain goats? I mean, come on.

Julie: Yeah, yeah exactly.

Alie: It’s so exciting to see one in the wild. I remember... One reason I was so excited to do this episode is because I went to Glacier as a kid and saw a mountain goat and it felt, like, mythical. It was like seeing a unicorn, it was so exciting.

Julie: Cool. [*“Cool story.”*]

Alie: And let’s see. Several people, Michael Swords, Emma Rose, Buhbrie all wanted to know, in Emma’s words: Why do goats scream like that? And Buhbrie wanted to know: Why do they sound like Will Ferrell when they yell? [*Julie laughs*] Do you ever hear...?

Julie: I’ll tell you, mountain goats are way more quiet than their domestic goat cousins. [*shrill, prolonged scream of a goat that sounds like a human*]

Alie: Ahh, okay.

Julie: I mean, I have spent a lot of time around mountain goats and I’ve heard the kids make that little bleating noise, the little, “Mehhh,” sometimes when they’re communicating and they’re not under any pressure it sounds more like a beep, kind of like, [*higher pitched, nasal voice*] “Beep, beep,” and just these cute little noises. I’ve heard them grunt and snort. But no, they’re not very vocal.

Alie: Augh. Okay, good to know! What about fighting? Joe Mueller wanted to know: How common is it for them to get stuck while smashing their skulls together? Or do billies do that? Is that a sheep thing?

Julie: That's a sheep thing; sheep are the head smashers. And it is interesting, they're being studied to how they don't get concussions. We've had people from universities call us and ask for skulls that they could have so that they could analyze how they can sustain that kind of abuse, you know. When you think about football players getting traumatic brain injuries, how come bighorn don't? Because they're the head-to-head smashers.

What you have to watch out for in mountain goats, if they drop their heads, they'll hook you from the side. So, goats have stabber horns. So, if you'd imagine, sheep are the war hammers and goats are the swordsmen. If you see one ever lower its head and shake, take its head at you like that, it'll come at you from the side more. But they can get poked, they can get injured. We've only had one collared animal die yet, and it was related to an injury, I can't tell you from what, but she did have a puncture wound in her side. I don't know if she took a fall or if she was stabbed. So yeah, they definitely can sustain injuries. Those horns are sharp.

Alie: Well, I have a very small world story for you, but we did an episode about that particular researcher who studies headbutting in sheep.

Aside: This was the January 2022 Bovine Neuropathology, headbutting episode with Dr. Nicole Ackermans.

Julie: Oh, no way!

Alie: Yes. I got a concussion in... I fell down a flight of stairs at Christmas, got a concussion, did an episode about concussions, and then did a follow-up about concussions in sheep. And Dr. Niki Ackermans is the one who studies that. I interviewed her.

Aside: Y'all Dr. Ackermans had submitted a question via Patreon for this goat episode!

Alie: She actually wrote in. Niki wrote in to say: I once called a mountain goat person in search of some mountain goat brains for my headbutting project, as one does, only to be informed that they're not actually goats and they don't headbutt either! I was very ashamed that day on my lack of mountain goat knowledge. *[Julie laughs]* So, that is directly from the source. *[Alie laughs]*

Julie: That is fantastic. That is such a small world story, how fun.

Alie: I know! So, we have a whole episode about what exactly happens to their neurons.

Aside: Now, if you like surviving head injuries, you're going to love those two concussion episodes, including the Neuropathology one for humans from January 2022, and I'll link those in the show notes.

Now, with all this talk about head injury, let's chat goat safety. Patron Caylie Evans asked: Are hikers a danger to them? Which was echoed by Elena Horne, who identifies as a resident of the Canadian Rockies who is tired of seeing tourists feed "the little deer." And first-time question-asker Allie Brown, Jess Loeffler, and Ashley Bray all had safety on the brain too. And luckily, Julie has the following safety bulletin.

Julie: I've been part of a science panel where we've talked about this from scientists from the Olympics, folks from Glacier Park, Mark Biel, the biologist up there. We all talked about how to encourage humans to be safe around goats when they get habituated or tolerant of people; there's a little nuance there, biologically, between habituated and tolerant. One of the things we learned is, obviously, for people to please give goats space. Right now, it's really trending on the internet, that kind of mocking tourists who get too close to bison or pat bison and they endanger themselves.

Aside: So, to prevent Instagram-induced tourist fatalities, the US National Park Service just launched a campaign in July featuring the slogan, “Don’t pet the fluffy cows.”

Julie: With goats, again, just like that; give space, yield the high country, make way for the goats. If a goat approaches you and you feel threatened, definitely tell a Fish and Game person when you come out, a Fish Wildlife and Parks biologist or whatever state you’re in.

But also, make noise or throw stones, but do *not* poke a goat with your ski pole. Given we were talking about how they like to joust and stab, [*“Yikes!”*] if you try to poke one, they might view that as an invitation to spar and poke back. So, one of our recommendations from a group of us who talked about this was, if you ever feel threatened, you can throw stones and be loud. But obviously, the first step is just yield to the goats, give them their space.

Alie: Right. That’s actually a great thing because Ale Guerrero, who is a first-time question-asker, wanted to know that many a hiker and climber friend have told them that goats lick pee to get their necessary salt content and that mountain goats in certain areas, popular peaks in the Pacific Northwest, have come to associate humans with the pee and have started to chase or wait for them at the tops of climbs and peaks. Is this true?

Julie: Yes, I’ve heard it straight from the biologists who worked in those kinds of environments. Yup.

Alie: No way! So, they’re waiting for a human to pee so that they can lick the salt?

Julie: Yeah. They’re very salt motivated, yeah.

Alie: Wow!

Aside: Okay, so remember that homicidal ungulate we talked about earlier? He was likely habituated to human-derived salts on the trails. And for his actual crimes against humanity, billy the one-time kid, was quickly apprehended by authorities and served the penalty of death via euthanasia. They tried to figure out what was going on with him afterward and a necropsy revealed no major health issues, but he was in a rut, which in goats isn’t like he’s laying around feeling bummed with his routine, it means he was violently horny. [*“Who can relate? Woo!”*]

Alie: Imogen Lovell wants to know, first-time question-asker: I have read that mountain goats will fight all kinds of predators including grizzly bears. Do they fight? Do they try to fight the eagles that pick them off of cliffs? Do they fight grizzlies?

Julie: I haven’t seen anything with bears like that. Remember where they live; the first thing a goat is going to do is run up a mountainside and most things aren’t going to follow it. Now, mountain lions might, for example, in particular. And I know of one case where wolves have gotten into goats. Again, they’re a little hard to observe so a lot of these studies might be a little anecdotal that I can tell you about.

With eagles, I know what they do is the kids go beneath the nannies and the nanny will use her horns and try to fend off the eagle and keep the kid safe with her body. Eagles will really try to go for the kids, they’re a little more manageable, once they grow full body size, the eagles don’t get them quite as badly.

But I can say, and I’m glad you brought this up because we’ve had a few dogs get gored in the Bridger Mountains where I work. Folks in Bozeman, we love our dogs, and we love having dogs off-leash. If a dog is harassing a kid, yeah, the mom is going to come and take care of that situation, and she’s equipped with these great horns with which to do that. So, the other

thing I should have said earlier about human safety around goats is, keep your dogs on leashes if goats are around or at least under your control because if your dog goes after a goat or its kid, you know, they will fight that dog. They'll try to get away obviously, if they can, and if they can't, they might gore your dog.

Alie: What about staring at you.? Emmalee Jones wants to know: I read that one of the seduction techniques of a male mountain goat is – *checks notes* – staring. Is that true?

Julie: *[laughs]* I have no idea. I don't know how to answer that one. *[laughs]*

Alie: I guess if you ever see a billy just staring at you, you know... yikes, that one's horny.

Aside: How does one seduce a fellow goat? Let's dip back into the field observations from the 1964 gem, "On the Rutting Behavior of the Mountain Goat." It says:

[slow, seductive, saxophone music plays]

Males in the company of a female were usually quite inactive. They stood for long periods of time, fed very little, and went now and again into bouts of courtship.

[music stops] Okay, so they acted casual at first, early in the season, until in the chill of late autumn, they lose their cool. And the paper continues:

[music starts again]

By the end of November, the males were in a very excited state, their courtships were hasty and somewhat rough. On reaching the female, the male licks her flank, or attempts to lick below her tail.

[music stops] Okay.

[music starts again]

He may also raise a front leg and tap the female on the flank or between the haunches. Meanwhile, his tongue flickers in his half open mouth.

[music stops] So, things heat up. The paper continues:

[music starts again]

During intense courtship, at the height of the rut, males approach females rapidly from the rear and deliver a hard kick with the front leg between or along the female's haunches. Some kicks were hard enough to push the female forward, there was little of that careful tapping with the leg that was observed in the pre-rut.

[music stops] Okay, so if she's into it, it says:

[music starts again]

Sometimes, females respond to a courtship approach by squatting and urinating. The male then frequently nuzzles the urine and performs a lip curl wherein the upper lip is pulled back sharply.

These are the field notes that only a true oreamnologist can make. On that note.

Alie: What about, any depictions of mountain goats in pop culture or movies that you feel get it right, or really wrong?

Julie: Oh, one of my biggest pet peeves with almost any ungulate portrayed in any movie, is they always, in animated movies, they give ungulates upper teeth when most of them have hard palettes, the artiodactyls at least. Horses have upper teeth, but deer don't, elk don't, goats

don't, sheep don't, they have a hard palette up there, llamas have a hard palette. They don't have upper incisors. They have upper cheek teeth like their molars and premolars, but they don't have upper incisors, they have a hard palette. So, in all these movies where the animal is smiling or talking in any animated movie, I think they always need a biological consultant to let them know the basic things, *[Alie laughs]* including they don't have upper teeth.

Alie: What about the beards? Are the beards accurate?

Julie: They can have some pretty nice beards, sometimes they're a little bit overexaggerated but I can forgive that. *[Alie laughs]* But yeah, they've got some pretty gorgeous hair.

Alie: Do only billies have beards or do nannies have beards?

Julie: They have fur under their jaw. I haven't paid much attention to the difference between a billy's and nanny's underfur. What you do see is the billies get these big glands behind their horns, they get huge and swollen, those can be kind of a neat feature. Both do have glands, but the billies can get huge, big ol' pads back there.

Alie: What are those for?

Julie: Scent. Scent dispersion.

Alie: Reallllly? Oh, so that's like their musk gland?

Julie: Something like that, I think.

Alie: What about the worst thing about billy goats? I always ask this. Something's got to suck about your job, about goats, about the work? And I will ask your favorite, don't worry.

Julie: Gosh, I can't think of anything that sucks about mountain goats, they're pretty great. I guess, sometimes I get worried about falling when I chase them *[laughs]* because I've done that before, so I don't really want to do that again, it kind of hurts.

Alie: I would say that falling off of a cliff is a legit downfall from every way you look at it, every way. So, that obviously is a risk, what about your favorite thing about your job or about mountain goats?

Julie: Yeah, it's a privilege to get to be out and around this species. They take me to beautiful places whether it's getting to observe some really rare high-elevation plant life. I got to see a wolverine this spring because of mountain goats.

Alie: *[gasps]* What?

Julie: Yeah, I was hiking in to show our technician this basin where we're going to do goat work and I was going to be checking on whether we could bring a trap in or not, if the snows were too deep, and we saw a wolverine! It was great! Goats take you to amazing places and I've gotten to meet amazing people. The kind of people who pursue mountain goats are fantastic outdoors people and getting to share those experiences and stories, getting to go to the places goats take you is such a joy and a privilege whether it's in a helicopter over these wilderness areas at the break of dawn, and seeing these animals grazing on a 12,000-foot peak. I mean, what a privilege. I counted probably 400 goats just this summer and it just blows me away that I get to do that for work. It's some of my favorite stuff about my job.

Alie: And you get to be an oreamnologist.

Julie: I'm going to start coining that term, love it.

Alie: I think you should, I think it's official. Thank you so, so much for doing this.

Julie: Thank you, Alie.

There are tons of links in the show notes including to some other episodes that we talked about, those are up at AlieWard.com/Ologies/Oreamnology, which is also linked in the show notes.

Follow us @Ologies on [Twitter](#) and [Instagram](#), you can follow me [@AlieWard](#) on [both](#). *Ologies* T-shirts, and stickers, and hats, and other things to put on your bodies are available at OlogiesMerch.com. Thank you, Susan Hale for managing that and doing so, so much more. Noel Dilworth handles the scheduling. Erin Talbert admins the *Ologies* Podcast [Facebook group](#) with assists from Boni Dutch and Shannon Feltus from the comedy podcast, *You Are That*.

Emily White of The Wordary manages our professional transcripts, Caleb Patton bleeps episodes and both are available for free at AlieWard.com/Ologies/Extras. *Smologies* episodes are free, G-rated, shorter versions of classics, those are up at AlieWard.com/Smologies or look for them in our feed. Those are edited by Mindjam Media's Zeke Rodrigues Thomas and Mercedes Maitland with assist from Steven Ray Morris. Kelly Dwyer updates the website and Nick Thorburn wrote the theme music. Episodes are edited by the one, Jarrett Sleeper who is as sentimental as he is hunky, lucky for me. And when he heard my aside about The Mountain Goats he started crying again. I love him so much. 12 out of 10, would accidentally break up with because I was too afraid of getting hurt until we were both like, "What are we doing? Let's just get married." And now, it's great.

If you stick around, I tell you a secret, and this week it's that since my dad passed away, I've been trying to cheer myself up by doing things that I've put off for years that are fun, like going to Disneyland for the day. My favorite ride is Big Thunder Mountain Railroad, I have memories of going on that with my dad. Actually, it was my first roller coaster when I was like 5. And my favorite part is always this goat at the top of the mountain, and I was just thinking, is that a mountain goat?

I looked it up, I learned two things. Number 1) there are signs on the ride saying that the goat is an invasive species from human colonization, low key love that detail. And 2) In looking up what species this animatronic goat is supposed to be, it's not a mountain goat. But I learned that if you keep your eyes trained on Billy the Goat, as you pass, it I guess tricks your inner ear and then the G forces of the roller coaster feel much greater. I have not done this, but report back if you do. Also, ask like a doctor first because it sounds medically kind of sketch.

Also, this is coming out on a Wednesday instead of a Tuesday so thanks for the patience. My dad's birthday was Monday, September 5th and just got a little case of the blues, so this is coming out a day late. Anyway... Okay, berbye.

Transcribed by Aveline Malek at TheWordary.com

Links to things we discussed:

A donation was made to the [Rocky Mountain Goat Alliance](#)

[Julie Cunningham's bio](#)

[One hundred and one mountain goats! Herd population reaches new heights in Henry's Mountains](#)

[Back From The Brink: Montana's Wildlife Legacy Part 2](#)

[Status of Montana's mountain goats: A synthesis of management data \(1960–2015\) and field biologists' perspectives](#)

[Effects Of Mountain Goats On Soils, Plant Communities, And Select Species In Olympic National Park – 1983 paper](#)

1937 Chester Stock paper titled: ["A new mountain goat from the Quaternary of Smith Creek Cave, Nevada"](#)

[Pics of Nevada's Smith Creek Cave](#)

[Function and underlying mechanisms of seasonal colour moulting in mammals and birds: what keeps them changing in a warming world?](#)

[Mountain Goat Management Plan/EIS](#)

[Using community photography to investigate phenology: A case study of coat moult in the mountain goat \(*Oreamnos americanus*\) with missing data](#)

[The Coast Salish Knitters and the Cowichan Sweater: An Event of National Historic Significance](#)
[Hiker was fatally injured by mountain goat in Olympic National Park](#)

Headline: [Klahhane Billy, the goat who gored a hiker then stood over his body as he fatally bled](#)
"Goat Sheep Goat" polka by Banff National Park

[Managing and Harvesting Mountain Goats for Traditional Purposes by Indigenous User Groups](#)
[Terri Rofkar in a mountain goat robe](#)

Video on mountain goat robe weaver [Teri Rofkar](#), coupled with metal music

[Teri Rofkar's obituary](#)

[Indigenous peoples as sentinels of change in human-wildlife relationships: Conservation status of mountain goats in Kitasoo Xai'xais territory and beyond](#)

[Culturally prized mountain goats may be vanishing from Indigenous land in Canada](#)

Doug Chadwick's book, [The Beast the Color of Winter](#)

Geist, V. (1964). [On the Rutting Behavior of the Mountain Goat](#). Journal of Mammalogy

[A descriptive analysis of the climbing mechanics of a mountain goat \(*Oreamnos americanus*\)](#)

[The Goats Who Stare at Men](#), an account of Klahhane Billy

[Olympic National Park mountain goat goring case sparks court discussion](#)

[Pronunciation Guide For Indigenous Communities In Bc](#)

[Final helicopter removals of mountain goats underway in the Olympics](#)

["Mountain goat climbing a hill in Canada" YouTube video](#)

[Montana helicopter tour prices](#)

[Goat away, they were told. 100 mountain goats survive flight to Cascades](#)