Brains On (APM) | Brains On! Surviving the desert at Joshua Tree National Park
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Hello, hikers, campers, and explorers. You've reached the fabled land of Brains On.

CARTER WHATLEY: Welcome to our special series on America's national parks. Have a seat by the fire.

MOLLY BLOOM: All this week, we're looking at the science behind some of the prettiest places on the planet.

CARTER WHATLEY: From singing sands in Colorado to a home to wild horses in Maryland. Today, we're exploring Joshua Tree National Park in California.

MOLLY BLOOM: So get comfy, grab some marshmallows to roast, and let's do this.

CARTER WHATLEY: Keep listening.

[MUSIC PLAYING]

You're listening to Brains On. I'm your camp counselor-- I mean host, Molly Bloom.

CARTER WHATLEY: And I'm Carter Whatley.

MOLLY BLOOM: So when you hear the word dessert, what do you think of?

CARTER WHATLEY: I think of sand, snakes, lizards, and cactuses.

MOLLY BLOOM: Yeah, and not a lot of water. That's what I think of.

CARTER WHATLEY: Yeah.

MOLLY BLOOM: To find out what it's really like in the desert, we sent our intrepid California correspondent, Sanden Totten to Joshua Tree National Park to find out how plants and animals survive the hot, dry climate there.

CARTER WHATLEY: Welcome back, Sanden.

SANDEN TOTTEN: Hey, team.

CARTER WHATLEY: So the park is called Joshua Tree National Park. What exactly is a Joshua Tree anyway?

SANDEN TOTTEN: Well, it's this tall and skinny plant that has these thick branches that stick out like arms. And in fact, it got the name Joshua Tree because travelers to the area saw these plants and they thought, hey, that kind of looks like a man. Specifically, they thought it looked like the biblical figure Joshua reaching his hands up to the sky in prayer.

CARTER WHATLEY: Very cool.

SANDEN TOTTEN: Yeah. Yeah, they are cool. And to me, they kind of look like something Dr. Seuss would draw, kind of like the Truffula Tree from the Lorax books. It's got this sort of bushy trunk with these pompoms at the end of its branches, and it's brown but with green. And, well, it's a little tricky to explain. So I asked for some help. I ran into nine-year-old Anojen Munkter who was hiking with her family in the park. And I asked her to help me describe them.

ANOJEN: Odd-looking trees. They have green spikes on the top.

SANDEN TOTTEN: And what do the trunks look like?

ANOJEN: They sometimes kind of look fluffy, but when you touch it, it kind of feels spiky.

SANDEN TOTTEN: Is this is your first time to a desert?

ANOJEN: Yes.

SANDEN TOTTEN: What do you think so far?

ANOJEN: I thought a desert would be a little bit more drier. So I thought there wouldn't really be much trees.

SANDEN TOTTEN: But instead what are you finding?

ANOJEN: There's a lot more bushes and trees and birds and animals.

MOLLY BLOOM: Wow. That does not sound much like the desert that I was picturing.

SANDEN TOTTEN: Yeah, I used to feel the same way. I'd picture like mountains of sand, some dried bones, maybe a cactus, but the desert's actually really different from that. It's not a rainforest. There's still lots of open space and dry dirt, but if you hike into the park and you kind of sneak around and look for it, you could find areas with lots of shrubs, you'll see lizards and snakes and birds, and even in the spring, these coverings of bright flowers everywhere.

CARTER WHATLEY: But isn't it hot and dry there?

SANDEN TOTTEN: Yeah, well, so that part is true. It can go months and months without rain. And it can get up to 120 degrees in the summer in this park. In the winter, it can drop below freezing. So this is serious desert stuff, but the cool thing about this park is that the plants and the animals there have all adapted to survive these harsh conditions.

CARTER WHATLEY: Adapted? How?

SANDEN TOTTEN: Well, OK, so every plant and animal there has evolved or kind of changed over time to have special tricks they use to survive the desert. For instance, consider the desert tortoise.

CARTER WHATLEY: OK, I'm considering, very slowly considering.

SANDEN TOTTEN: The tortoises, they're native to Joshua Tree, and they live far from any body of water. And I spoke with Kristen Lalumiere. She's a Wildlife Biologist for the park. She says these tortoises, they get most of their water from plants.

KRISTEN LALUMIERE: So the cactus that they eat and the flowers and the grasses and all of that. And they can hold the water in their system up to a year. So they're literally walking canteens of the desert.

SANDEN TOTTEN: Where do they store it? Is it just in their tissue?

KRISTEN LALUMIERE: Tortoises will store in their bladder.

SANDEN TOTTEN: So the tortoise keeps it in their bladder?

KRISTEN LALUMIERE: Yeah, they can keep it in their bladder and they can-- yep, they can store it that way. So that's one of the reasons that we tell people, if you see a tortoise, don't pick it up, because they can become scared, and they can void, meaning they'll basically pee. And then if there's no food around or if there's no plants around for them to eat and replenish that water, it can potentially be fatal.

SANDEN TOTTEN: So they hold their pee for a long time as part of their stra--

KRISTEN LALUMIERE: For a long time, exactly. Next time you have to go to the bathroom, just think of that. They'll excrete different things from their body, but the water, they can actually maintain.

SANDEN TOTTEN: Wow!

KRISTEN LALUMIERE: Mm-hmm. It's a really amazing adaptation.

SANDEN TOTTEN: Kristin told me the desert tortoise also digs a hole and sleeps in it during the cold winter months. When mammals do that, it's called hibernation, but when a reptile or an amphibian does it, it's called brumation.

MOLLY BLOOM: When I try to do it, it's called being lazy because it's cold.

[SANDEN LAUGHS]

CARTER WHATLEY: So, Sanden, what are some other adaptations plants and animals have to survive the desert?

SANDEN TOTTEN: Well, wildlife expert Kristen Lalumiere was very excited to tell me about bats.

KRISTEN LALUMIERE: I'm very much a bat person. I love bats. And I think they are highly misunderstood and misrepresented.

SANDEN TOTTEN: She says some bats in the park have a special relationship to certain cacti that are also highly-adapted for the hot, hot desert.

KRISTEN LALUMIERE: There are some cactus flowers that only open at night, because what happens during the day? It's really hot, especially in the summertime. And so what happens then is you can get really dehydrated and lose a lot of moisture and water that way.

SANDEN TOTTEN: So these cactus, to adapt, they only open at night?

KRISTEN LALUMIERE: Exactly. So that they can maintain that moisture so they can grow more.

SANDEN TOTTEN: So she told me some bats in the park, they actually like to eat the nectar from these cacti. And so they'll fly around at night and dip into these cactus flowers that only open after dark. And the bats actually help spread pollen from these flowers by kind of accidentally picking it up maybe on their fur as they're digging around in there. And then when they fly to another flower, they can move some of that pollen over. And that helps fertilize the plant so it can grow more. And the bats are getting dinner.

MOLLY BLOOM: So it's a win-win?

SANDEN TOTTEN: Oh, yeah, a total win-win. And get this, Kristen told me some bats in the park, they eat scorpions.

CARTER WHATLEY: Whoa!

SANDEN TOTTEN: Right? I know. I want to see that fight, bat versus scorpion. These bats, the cool thing about them is they have such super hearing that they can actually hunt by listening for the sound of a scorpion's tiny legs walking on the sand. They can hear that, and then they swoop down and snatch it up for a snack.

CARTER WHATLEY: No wonder Kristen likes bats. That's so cool!

MOLLY BLOOM: Speaking of super hearing, I think we should pause here for a listening test of our own. Are you ready? It's the--

GIRL: Mystery sound.

MOLLY BLOOM: Here it is.

Do you have any guesses?

CARTER WHATLEY: Kind of sounds like a penguin.

MOLLY BLOOM: Oh! A penguin, I like that. We'll be back with the answer right after this.

[MUSIC PLAYING]

CARTER WHATLEY: Do you have a mystery sound you'd like to share with us?

MOLLY BLOOM: A question you want answered on the show?

CARTER WHATLEY: Or maybe you just want to send us a drawing or a high five?

MOLLY BLOOM: Email us any time. We're at brainson@m-- as in Minnesota-- pr.org.

CARTER WHATLEY: Or you can find our mailing address at our website, brainson.org.

MOLLY BLOOM: And if you're a fan of the show, please consider leaving a review in iTunes.

CARTER WHATLEY: It really helps other kids and families find out about the show.

MOLLY BLOOM: Now's the time in the show when we send high fives to all the kids who fill this show with their creativity and energy. Here's the most recent group to be added to the Brains Honor Roll.

[LISTING HONOR ROLL]

CARTER WHATLEY: You're listening to Brains On from MPR News in Southern California Public Radio. I'm Carter Whatley.

MOLLY BLOOM: And I'm Molly Bloom. Today, we're talking about Joshua Tree National Park in California with Sanden Totten.

SANDEN TOTTEN: Hey.

CARTER WHATLEY: So, Sanden, you said tortoises get water from eating plants, but where are the plants getting it from? And what about the bats and the lizards and snakes and all the other animals you mentioned?

SANDEN TOTTEN: This is a very good point. All plants, all animals, they need water just like you and me. So you're totally right to ask about this. There are occasional rains in the desert. Some of the plants and animals can kind of wait for those to happen, but Joshua Tree National Park is also home to these kind of hidden pools of water. Each one is called an oasis. And these happen because there are cracks in the Earth where water from far below can seep up to the surface.

So I, naturally, wanted to see one of these because they sound super cool. And Wildlife expert Kristen Lalumiere took me to 1 in the park. And it was kind of like a puddle about the size of a kiddie pool. OK, so we're at the oasis right now. And I'm standing in front of a little puddle of water. You can hear it right here.

[WATER SPLASHING]

It's like an inch deep and sprouts are growing up out of it. And right next to it is this big, big palm tree. And all along its trunk, it's got this thick skirt of old, dried palm fronds. So this is the skirt that the palm tree has. It feels like dried grass. It's kind of hard and crackly. So that's thick. There's a lot of cover there. A lot of animals could be living in this tree.

KRISTEN LALUMIERE: So actually, animals will live up in these skirts. So there is a specific bat that is known to roost up in the skirt of these trees.

SANDEN TOTTEN: Ah, so we might be looking at some bat homes right now?

KRISTEN LALUMIERE: We could definitely be looking at some bat homes right now.

SANDEN TOTTEN: Hello, bats!

KRISTEN LALUMIERE: They tend not to answer back too much. But we also know that in these trees, so-- it's almost like condominiums. Several different species of animals can be using the same tree. So bats and mice can probably live together. They're not really competing for the same foods. And you do have other birds such as loggerhead shrikes and ravens that will predate or eat other animals. So it's a lot of hiding and camouflage and being sneaky, kind of like stealthy.

MOLLY BLOOM: Wow, that's really cool. There's an entire food chain in just one tree?

SANDEN TOTTEN: I know, right? In the desert, where there's water, there's action. The water helps the trees grow. The small animals drink the water and live in the trees, maybe eat some of its seeds. The larger animals, like the mountain lions or coyotes or owls, they come by to both drink the water and then eat the smaller animals. It's the circle of life all in this one tiny oasis.

CARTER WHATLEY: Surviving all that just to get a drink? Remind me not to take my tap water for granted.

SANDEN TOTTEN: Yeah, totally. And since there are so few spots like this oasis and so few things to eat in general in the desert, the animals that are there, they have to get really cunning to get what they need. For instance, when Kristen and I were talking, we saw one animal kind of walk in front of our path.

Whoa, that's a roadrunner?

KRISTEN LALUMIERE: Mm-hmm, who just pooped.

SANDEN TOTTEN: He did just poop. Well, it kind of does look like the cartoon. He's got a mohawk and this like blue tail.

KRISTEN LALUMIERE: The tail that goes up and down. So this is a roadrunner that we're looking at right in front of us. And they're native here to the desert.

CARTER WHATLEY: Wait, a roadrunner? Like the blue bird that Wile E. Coyote always tries to catch?

MOLLY BLOOM: The one that runs super fast and goes, meep meep?

SANDEN TOTTEN: Yeah. Yeah, just like that roadrunner from the cartoons. In real life, they are fast. They are not blue. They're brown is kind of white spots. They still look really cool. And this one didn't say meep meep once the entire time we watched it.

MOLLY BLOOM: Uh. That's disappointing.

SANDEN TOTTEN: I'm just thinking that might not be true. And Kristen told me the roadrunner, contrary to what we see in the cartoons, is actually a hunter itself. In fact, based on what she told me, I'd be more worried for the coyote than the roadrunner. Listen to this.

KRISTEN LALUMIERE: These guys can actually be carnivorous. Two roadrunners can actually work together to take down a rattlesnake. One can stand in front of this rattlesnake and distract it, while the other one comes up behind and grabs it behind the head and takes it down that way. Another cool adaptation that these guys will do, they can do mimicry, whereas if there is a group of doves or quail, actually, the quail can be on the ground eating seeds and the roadrunner can actually move in there, fluff himself up so he kind of looks like a quail, move in, and then that's when he can strike and take down one of the quail as a meal.

SANDEN TOTTEN: So they're kind of vicious hunters it sounds like, the things you're describing.

KRISTEN LALUMIERE: Yeah. No, living in the desert is not easy, but living anywhere really. So these guys have really adapted to desert life.

SANDEN TOTTEN: If there's one thing I learned from talking with Kristen and in having adventures in the desert, it's that when there are so few things to eat and drink, plants and animals have to get very extreme to survive. In fact, even the cacti with their spikes and their needles, some researchers told me that they're basically just putting on extreme defense to keep other things from eating them to death.

And there are some plants too that have really waxy coatings on their leaves, and that's to help keep the moisture in so when they do get water, they don't lose it real fast to the hot heat. So basically, surviving in the desert is possible, but it's a big challenge. And some scientists are worried that it may get even harder for plants and animals real soon.

CARTER WHATLEY: What do you mean get even harder?

SANDEN TOTTEN: Well, so the people at Joshua Tree National Park, for instance, they're worried about climate change. Now, this is the idea that the planet is getting warmer because of pollution humans are pumping into the atmosphere. And it'll have different effects around the world, but in the desert, some scientists think it'll mean longer periods of drought, times when it's very hot and there's very little water. In fact, California is in a years-long drought right now. And Kristen Lalumiere says it's already affecting plants and animals in Joshua Tree.

KRISTEN LALUMIERE: We're already seeing that plants aren't blooming as much as they were in the past, but we're also seeing a drop in animal numbers in some of the different species. Now, the thing about desert animals, you would think that, oh, they're adapted to no water. Well, they are for, say, about a year or two they're pretty good. But then once you go beyond year three or four, that's when the numbers are really going to start being impacted, that's when you're going to start seeing a decline in certain animals and populations.

SANDEN TOTTEN: Now, scientists, they're always cautioning. We can't say for sure that California's current drought is caused by climate change or it's just part of California's natural cycles of wet and dry periods. But some of the scientists I've spoken to think that these kind of long dry spells will be more common if climate change continues. And that means some plants and some animals could have a lot of trouble kind of adapting fast to this new future.

MOLLY BLOOM: Is there anything we can do about that?

SANDEN TOTTEN: Well, the folks at the Park Service have already begun monitoring the park's plants and animals, and they're even studying the famous mighty Joshua Tree to see if it is having trouble adapting to the dry weather that's been happening lately. And if they do find problems, they'll look for ways to help the plants and animals adapt as best they can. I was told that one of the main goals of the Park Service is to protect special places like Joshua Tree National Park.

So no matter what happens, you can bet there are going to be a lot of smart, talented people working on this problem.

MOLLY BLOOM: Well, thank you so much, Sanden, for going to Joshua Tree and bringing us this awesome report.

CARTER WHATLEY: Yeah, this sounds like a cool place.

SANDEN TOTTEN: Yeah, totally, my pleasure. And I love this park. So I hope everyone listening adds it to their list of places to go someday. But if you do, come watch out for roadrunners. They're apparently vicious.

MOLLY BLOOM: We will. Now for something slightly less vicious, let's go back to that mystery sound. Here it is again. Do you have any new guesses after hearing it again?

CARTER WHATLEY: It sounds like some kind of bird banging around or still kind of like a penguin.

MOLLY BLOOM: Yeah, I agree. It does sound like a bird. I thought a chicken. But the answer is that it's actually a fox.

CARTER WHATLEY: Oh, wow!

[MUSIC PLAYING]

MONIQUE NAVARRO: Hi. My name is Monique Navarro. I'm the Education Coordinator at Channel Islands National Park in California. So Channel Islands National Park is known for the island fox. It is found nowhere else on Earth. It lives on six of the largest Channel Islands. Park scientists figured out in 1999 that the population had dropped dramatically by 90% on two of the islands, San Miguel Island and Santa Rosa Island. There were only 15 island foxes.

They immediately had to protect them and begin captive breeding, which is something that had never been done before. Approximately 225 pups were born in captivity. This is the fastest recovery of any mammal in the history of Endangered Species Act. It took half as long as we thought. So right now on San Miguel Island, there are about 700, on Santa Rosa Island, 1,200, and over 2000 on Santa Cruz Island.

[MUSIC PLAYING]

MOLLY BLOOM: You can check out the rest of our series on the national parks at our website, brainson.org, or wherever you usually listen.

CARTER WHATLEY: Brains On is produced by Marc Sanchez, Sanden Totten and Molly Bloom.

MOLLY BLOOM: Many thanks to Leslie Whatley, Lauren Dee, and Corey Schreppel.

CARTER WHATLEY: You can see photos from Joshua Tree on our Instagram.

MOLLY BLOOM: Or at Brains_On.

CARTER WHATLEY: And that's our Twitter handle too.

MOLLY BLOOM: You can also keep up with us on Facebook or by subscribing to our newsletter. You can do that at brainson.org.

CARTER WHATLEY: Thanks for listening.