

Climate Change Podcast

September 26, 2019

Greg Husak

Welcome. And thank you for joining us for this special climate week podcast. I'm Greg Husak, your host. I'll ask our guests to introduce themselves.

Kenny Blumenfeld

2:45

Hi, I'm Kenny Blumenfeld. I'm a climatologist with the DNR state climatology office, and I do a lot of outreach on the science of climate change in Minnesota especially. Then I also manage network of weather stations that we use the monitor the climate around Minnesota.

Luigi Romolo

3:03

Hello, my name is Luigi Romolo. I am the Minnesota state climatologist with the Minnesota State climatology office. And my work centers around two areas of focus and those involved climate service and data management.

Greg Husak

3:20

And I'm sure people listening may well be familiar with your voices and hearing and seeing your comments about climate here in Minnesota over the years, but particularly as we, during this climate week, and looking forward as we talk about some of the specifics that are going on, maybe you can tell us a little bit more about what you do. You gave us a taste of that. But also the difference between climate and weather? Because I think that's a question that a lot of people get hung up on?

Luigi Romolo

3:51

Yeah, that's a great question. So that's a question that climatologists get almost every day. And so the best way to think about it as weather is the day-to-day variations of temperature and precipitation. And over a long period, approximately 30 years, if you average it, you get climatology. So if you have over 30 years of data at a particular location, then you could estimate or guesstimate what you might expect from the day-to-day variations and weather. So when you hear a forecaster say, the high today might be 74 but the normal is 72 to 74. The 74 is the weather the 72 is the climate.

Greg Husak

4:41

And Kenny, maybe you want to expand on that a little bit too as it relates to some of what we hear from people talking about, well, what do you mean, it's 15 degrees below zero today. How can how can this indicate—you know, people tend to get very specific

Kenny Blumenfeld

4:55

Well, so another handy—this is really convenient for us, because you no also weather is usually when we think of it meteorology is about tomorrow or next week. And climatology traditionally has been about the past. Now there's a whole branch of it that's focused on the future too, because of the changing climate that we want to try and get a scientific understanding of. But if we just think about the difference between forecasting weather over the next few days, or looking backwards and analyzing the climate, as Luigi described it, one of the real advantages is that you hear the joke Sometimes though, meteorologists are wrong, you know, half the time. And we're climatologists and we're just talking about what already happened. So we're right 100 of the time.

Greg Husak

5:42

You're in a more comfortable position that way. (laughing)

Kenny Blumenfeld

5:43

Yeah, one of the things that we try and focus on is that we're a scientific organization and science-based organization, and we are also committed to educating our users. And so one of the things that we try and help people realize which they can already into it, is that the climate of Minnesota is wild. It's highly variable can be hot, it can be cold, it can go from hot to cold in a relatively short amount of time. And that's always been true. And that's probably always going to be true. But at the same time, there are these systematic changes these trends in the temperatures that we've observed trends and precipitation that we've observed. And what that means is, we have now a statistical scientific basis for knowing that it's gotten better, or that it's gotten warmer. And even while that's happening, we still have the ups and the downs. So of course, we're still going to have that 15 below, even as our winters get warmer, it's just that maybe the frequency of those 15 below is going down, which we've actually seen. And, you know, maybe it doesn't get as far below zero as it used to. And that's also something we've seen. So, we still can get wild swings, and we're still going to get cold. And the fact that we're warming doesn't, doesn't disprove, doesn't mean that will never get cold again. And the fact that we get cold last week, doesn't mean that we're not warming.

Greg Husak

7:08

As we stretch out our thinking then and think more in terms of, you know, 30, 40, 50 years and beyond.—for each of you, what are one or two of the of the key statistics that that you cite when you look at how climate is changing more rapidly? In Minnesota?

Luigi Romolo

7:34

Yes. So I think what Kenny's talked about, with many of our media contacts that we've had throughout the year, the one of the biggest issues that we're seeing right now, is an increase in the extreme rainfall events that are occurring here in Minnesota, with a 20% increase in the

number of one inch rains, and 65% increase in the number of three inch rainfall events. And these have profound impacts on rural communities with farming practices, and they have profound impacts in urban communities that are witnessing and observing strains to their infrastructure system. And probably the biggest observed impact here in Minnesota, that that we've seen so far.

Kenny Blumenfeld

8:23

Yeah. One of the things that we get, and someone might ask, “Well, what's one inch of rainfall, who cares?” And it is true, an inch of rain in a day in and of itself is not a big deal. It will ruin your picnic. You won't play softball that night. In normal conditions, it's not that big a deal. But if you've been already wet, and I think what Luigi is kind of referring to, if you've already been wet, or you're in an environment like a city, you can probably explain it better than me why it's really hard to handle an inch of rain if it's already wet, or if there's nowhere for the water to go.

But especially if you get three inches of rain. And it's not like these are happening everywhere. It's just that they're becoming more common in general, so the increases that we've seen don't mean every place in Minnesota every day of every year is going to get bombarded by some massive rainfall event. It just means that the kinds of images you see of standing water, ponding water, submerged intersections, flooded basements, things like that—those are becoming more common. And not just because of more cameras to take pictures, but because they're actually more common.

Greg Husak

9:44

Well, it's certainly here in 2019. And again, trying to not just go by one snapshot, but the people that have been talking all year about the sustain high water conditions across much of the state and that your indications are that, that this will be a trend over the next 50 years that that is expected to continue and to increase.

Luigi Romolo

10:13

Yeah, so all the models are pointing in that direction. And so what we need to figure out is how to adapt to be able to essentially deliver this water efficiently through better infrastructure, better planned agricultural activity. And basically, adapt in the best way possible.

Greg Husak

In our floodplain planning, floodplain management planning,

Luigi Romolo

Correct.

Greg Husak

Urban Planning certainly comes into the mix very much.

Luigi Romolo

10:47

Absolutely. So anything that we can mitigate is going to help us or anything that we can do can help us mitigate those disasters down the road.

Kenny Blumenfeld

10:55

Yeah, it's actually kind of confusing sometimes, too, because we have a trend towards wetter conditions. But the kind of wetness that we've had in 2019, 18, 17, and 16, is above that trend line. Right. So one of the challenges of doing the work that we do is we have to try—audiences really want the information. We have to say what, yeah, this we're under this trend towards weather conditions. But that variation, the variability, that we also talked about—we're really high on that curve right now, too. So we have this trend. Plus, we have what must be this period of very high variable. Because we've never really seen anything like this. I mean, how many years, Luigi, are we talking? Year after year where we're breaking some kind of pretty significant precipitation record in the state. What's Rochester? As of late September already?

Luigi Romolo

11:56

Yeah, around 44 inches.

Kenny Blumenfeld

Already broke its all-time record.

Luigi Romolo

12:00

Yeah. And here in the metro we're on pace to break the record that was set just two years ago.

Kenny Blumenfeld

12:05

Right. And up in northwest Minnesota, we just—after almost a whole year where they were kind of lagging behind Northwest Minnesota and kind of looking at southern Minnesota thinking, “What's the big deal? It's not that wet.” Well, then they get five to seven inches of rain. And they know what everyone was talking about.

Greg Husak

12:21

Sure. And as you talk about these ups and downs, does this mean then that—in seeing these sustained high water levels and more extreme rainfall of the events—does that mean that we're not going to be experiencing drought in Minnesota?

Luigi Romolo

12:37

Yes, that's a great question. And so we have what's called inter-annual variability, which is the variation of our weather from year to year: wet year, dry year, wet year, wet year, dry year. And so forth. And it just goes on, and on and on. But we also have these long term climate trends, as Kenny was indicating. We're on a wetter trend right now. And we're projected to increase our amount of precipitation as we move forward in time. But drought is not dependent on—well, in this part of the world, it's not so much dependent on the long-term trends, but rather on the inter-annual variability. So no matter how wet we get, the soil can only hold so much water. And when it's holding all the water that it can we call that field capacity. So any surplus water is just going to run off into the streams and rivers or percolate down into groundwater and fill our groundwater reserves. And so really we're only ever about four to five weeks of dryness away from drought. And it's unlike other hazards, it doesn't have a season, it doesn't have a distinct start to it, it creeps up on you. And no matter how wet we get, droughts always going to be right around the corner. And an example is down in New Orleans they get about 60 inches of rainfall a year. And they still experienced drought.

Kenny Blumenfeld

14:15

Yeah. Would you say—I mean, one of the things that we talked about with temperature, and I assume it's we should assume it's true with precipitation, is that, if we're getting warmer, we're still going to get cold sometimes. And what we're seeing with the cold is, yeah, it's not as extreme and not as frequent as it used to be. But we still get cold. The late winter of 2019—wow, that was a real winter. And we expect that for climate to logically that wasn't surprising. But I think if you get too used to this notion that it's only going to be warm winters for the rest of, you know, for eternity now, then you will be really surprised by that. And I think the same is true for drought. We are certainly, I mean, we're on this pretty massive wet trend. But it would be, it would actually be irresponsible for us to assume that we wouldn't, we wouldn't get drought.

Luigi Romolo

15:13

Yeah, correct. So the thing that drives drought is the two meat and potato variables in meteorology: it's temperature and precipitation. And we're experiencing a warming trend and we're experiencing a wetter trend. So if temperature was going up and precip was going down, then then the issue of drought would probably be a larger issue. But because precip is going up

and temperature is going up as well, we don't know what's going to happen, we have no clear view of how drought is going to be affected by climate change. And that's a scary thought.

Greg Husak

15:49

But I want to want to ask a question about that. But also something related to this whole measure of all these data that you're working with here. We held it, Twitter Town Hall at the DNR this week on climate change. And we were hearing a lot of talk about “a point of no return.” And along with that question, and whether we reach that, in some respects. It should be apparent to anybody listening here, I think, that you're not pushing an agenda. You're citing scientific data, you're saying citing statistics and hard data here, and this is the world in which you work. But along with a question about a point of no return—what do you say, Kenny and Luigi, when you go out? And I know you do lots of presentations around the state during the year, what do you say to people who deny the the notion of, of human driven climate change?

Kenny Blumenfeld

16:51

Can we take these one at a time?

Greg Husak

16:53

Let's break it down. Yes.

Kenny Blumenfeld

16:56

You know, whenever I'm out talking, we get that kind of “point of no return” question. And it becomes—I don't want to use too big a word, but it becomes an existential at some point. Where we are asking, “Well, what do we mean: no return? From what into what? What is it that? Is there some sort of idealistic climate point that we think we want to go back to?” And so yeah, the question, as I think Luigi pointed out during that town hall is, you know, it kind of depends on what you're looking at. For some things, it's going to be hard to get them back, when you look at the rate of ice cover loss, for example, in the Arctic, it's going to be really hard to change that because the quality of ice is changed. And it's going to take hundreds of years to sort of redo that. There are other things where we do have time. And actually Minnesota, for as dire as some of our climate signals are, we're actually sitting relatively pretty compared to some of our neighbors. I mean, think of California. So I guess I'll let Luigi respond to the kind of point of no return question before we talk about this other piece.

Luigi Romolo

18:20

And again, whenever Kenny or I or Pete go out and give a talk, we always get great questions like these. And some scientists are sometimes afraid to say “I don't know.” And I've always been a proponent of it's okay and important to say I don't know, when you don't know. And because we don't know when that cliff is coming, that that point of no return, it's critical that we act now we act quickly for the benefit of mitigating future impacts.

Greg Husak

18:59

Speaking of that, we're going to have some information in just a moment about some of the things that the DNR is doing, and has been doing, in a very active sense in that regard. But Kenny, again, coming back to the question of what you say to those who deny the notion of human driven climate change?

Kenny Blumenfeld

19:16

I mean, you know, they come at it from a number of different angles. And we're a scientific, science-based organization; we're trained scientists and it's not like we conduct all of the research—we are kind of distilling for various audiences, our job is to distill the science. Frequently, the best way to do that is to read the larger assessments that have been done and then look at the peer-reviewed research that supports it. And then, when you don't have any answers for a particular question, use the best available data and analysis. We can always fall back on the fact that we're scientists and we would say “this is what science shows”—if you've got another idea that comes from another framework of seeing the world, OK, but our job is to report on the science.

That's one piece and, honestly, sometimes, it's more combative than what's needed. Because a lot of times, you know, we're not—we aren't political appointees. And a lot of times what happens is people come into this discussion—because it is a political discussion for so many people—and we're actually just talking about facts that are totally apolitical. They're not political at all. And a lot of times it's helped for me to talk to some people in areas where we're not really talking about “climate change”—and I put up quotes around that. We're just talking about what we've observed with changes in the weather, and what you may have observed as farmers, as people who work outside, or as just citizens of the state.

A lot of times if we just describe the same things we've been talking about—but we're not pushing this as “climate change” or “this is your fault”, this is just what we have observed—long and more precipitation. A lot of times people in the audience say, “Well, yeah, I've seen that.” They haven't such long growing seasons, going into October, the way they've seen now and then it sort of opens them up to ask the question: So what is it that you're talking about? And then we can discuss that we're talking about the science of climate change. And that's very different from the policy directives that might come out of it.

That's just the experience that I've had is that if you, if you kind of lead with the evidence and the facts and make it a little bit about the stories that people might experience, they can relate to it pretty well.

Greg Husak

21:52

Yeah. And I think anybody can really accept that perspective and approaching it that way. Appreciate that.

We've got a number of good examples on the DNR website, from DNR employees and others around the state, on some of the impacts that they've been noticing in their daily lives, their professional lives, and their recreation. You can go to mmdnr.gov/ClimateChange to access some of those stories from Minnesota and since some other really helpful information.

In a minute, I'm going to talk a little bit because I have some questions for you about approaching freezing temperatures and getting into the cold season now and overall what we mean when we talk about winter getting warmer and some of those things. So think about that for a moment as I just highlight some of the things the DNR has been doing to deal with climate change.

They've been doing a lot, and it's something the agency takes very seriously. So 10 years ago, in 2009, we formed the department-wide climate team known CREST and asked them to help us create operational principles around climate change. One of the first things they did was develop a climate change handbook for the DNR. We should also mention the DNR has been actively involved in climate adaptation and mitigation on all the land that we administer around this state.

In terms of mitigation, we proactively manage lands capture in store carbon and minimize greenhouse gases. In forests, this means planting and seeding thousands of acres every year to accelerate reforestation after a harvest or a natural disturbance. We're also planning different species of trees that will do better in these changing conditions. We also adjust Conservation Focus Areas to incorporate more grass and cover crops.

On adaptation, we proactively manage invasive species and enact policies to minimize climate change impacts on ecosystems—for example, implementing an ash forest diversification project to prepare for emerald ash borer infestations. We're adapting to the more frequent flooding by redesigning culverts to accommodate higher flows and connect rivers to their floodplains. And we're working with partners all over the state, and in other states as well—government agencies, local governments, all kinds of groups that are involved on this issue and engaged in urban planning, rural planning, flood management plan, and all the different things that we've been to talking about today.

Those are just a few examples. And there are many more—you can get a downloadable PDF Fact Sheet if you'd like to go to that same web location: again, mndnr.gov/ClimateChange.

So as we move towards this winter season now, the way I see it put here, the length of the frost pre-season is increasing over time, and is expected to continue to increase through the century. So as we transition now from a focus on water to a little more focus on temperature: What would you say are the big picture things for people to know as far as how winter weather is being affected?

Luigi Romolo

25:23

Yes, so there are a few things that we can comment on right away. And you brought up the issue of a frost-free season. Frost-free season refers to the length of time between the final frost in the spring to the first frost in the fall. And we've noticed that that period of time has increased roughly about one week across the state a little bit higher, and some parts of the states a little bit lower and others.

Greg Husak

Over what period of time are we we talking about for that change?

Kenny Blumenfeld

26:01

Back to like the end of the 19th Century.

Luigi Romolo

26:06

Like 1895.

Greg Husak

So roughly a week's difference in that period of time?

Luigi Romolo

Right. Exactly. So this could have profound impacts on our winter recreation and tourism industry. People take winter seriously here in Minnesota. I lived for a number of years in Louisiana where they didn't have snow and they would actually relish if they just got a dusting of snow. People here make a living in the winter, whether it's through ice fishing or cross country skiing, or just going out and enjoying the winter cabins. The amount of time that we have with winter is important to us and so these observations are being taken seriously.

Greg Husak

Any any key figures you'd cite or just things you're hearing commonly from people as you're out talking with people around the state?

Kenny Blumenfeld

27:05

I mean, you know, we could focus on the statistics. But a lot of times they're hard for people to understand. So we say, "Oh, winters been warming over the long term a half a degree Fahrenheit

per decade.” What does that really mean for people? Well, we can then translate that into some of the observations that we've gotten from people on the ground who aren't necessarily using thermometers to tell us what they've seen.

A few years ago, we started getting calls—kind of distress calls and it was a bit alarming—from resort owners and people who are representing or are writing about outdoor recreation in Minnesota, especially northern Minnesota which had been hit really hard. People who own resorts, their big time is the summer but they get a sort of second season in the winter, and in the winter it's about ice fishing. And you get people who want to go fishing on your Lake, then they will book cabins in advance. And if they book a cabin in advance, they might even need some help getting an ice house out onto the lake. Maybe they'll rent one, maybe they'll rent a snowmobile, maybe they'll buy refreshments too. And when they become uncertain if there's going to be ice, they cancel their reservations and nobody's going up to these places—because you can't hang out by the beach! So there's no ice, now people aren't going up.

Because of the frequency of those warmer winters and the less dependable ice season we were starting to see effects of that from some of the cabin industry resorts and whatnot. But then we've also heard from people who operate ski hills. They really need not just dependable snow—because of course they can make their own snow—but to make their own snow they need a range of temperatures that's ideal for making snow. And if the temperature is above the highest part of that range, they can't do much with it. And so there's been a lot of concern.

People have seen that they've cancelled kind of major events in the region—the Birkebeiner, some of the some of the dog sled races, some of the local cross country ski races like the Twin Cities Loppet being cancelled, even winter carnivals being cancelled because we don't have the conditions.

So, we can we can tie that to numbers, the half a degree increase in winter temperature over the last 127 years, half a degree increase per decade. But what it really means is shorter winters, as Luigi mentioned, less ice on the lakes, or at least a lower frequency or shorter ice-over season.

And then, somewhat puzzlingly, even though we've actually had the same amount of snow or even more snow during that time, the warmer conditions have really prevented us from realizing a real bountiful snowpack for much of that season. So we can sort of tie it together numerically and also anecdotally.

Greg Husak

We're moving toward the end of our time here, and we'll move towards some closing thoughts, wondering how people can learn more. And certainly the resources like the DNR website provide some good basic information. But I don't know if either of you have other sources, other than yourselves, that you would recommend to people? No?

Well, you both worked on the development of an online data tool that people can access to find out more specifics about what's happening and some of the trends that are happening in different parts of the state. Maybe that's something that you might want to reference.

Kenny Blumenfeld

30:52

Yeah, so we have an online climate data/climate trends tool—it's really one of many. This was kind of a large project. People can click on any part of the state and can get the trends. Or maybe it's no trend—they can see what's happened over time for temperature, precipitation and some combined metrics for either an entire year, year by year, or for a subset of months within a year or just that growing season, or just winter. If they're in watersheds or counties, they can do it from a number of choices. We don't have a real simple URL for that—

Greg Husak

But you can just go to mndnr.gov/Climate Change and you'll find you'll find those resources and that tool there.

Kenny Blumenfeld

Now for deeper dive—we have a lot of friends and colleagues who really like to dive deep. Luigi and his predecessor made some great tools that are kind of a station-by-station basis. You want to describe some of those?

Luigi Romolo

Yeah, sure. So a lot of these are map-based tools that allow users to click on a station, a location, whether it's Rochester or Albert Lea or Minneapolis or up north near Fargo or Grand Forks and observe trends and precipitation or temperature. We have tools that show the year-to-date precipitation for different stations across the state. We have tools that show temperature, precipitation, monthly anomalies. We had a really long trend of warm temperatures, warm monthly temperatures, here in the metro. What was it Kenny? Was it 20 months in a row?

Kenny Blumenfeld

Yes, 20 months.

Luigi Romolo

And it ended the month after I started as a climatologist. See, I cursed it. But so, lovely tools that that were started by Jim Zambello and continued on with Greg Spode. I've tried to hold up the tradition and Kenny's done a great job with his climate trends tool. So we're very proud of all of those.

Greg Husak

Well, we certainly greatly appreciate your expertise—not just your time here, but on an ongoing basis. It's meant so much to the DNR to have the State Climatology Office here as part of our Ecological and Water Resources Division.

Thank you, Dr. Kenny Blumenfeld and Dr. Luigi Romolo for providing your expertise and your perspectives here on this podcast.

You've been listening to a conversation about climate change featuring experts from the Minnesota Department of Natural Resources. Thank you for joining us for this podcast. I'm Greg Husak.