Transcript for Heat Webinar 1: Has it always been this hot in NJ?

0:03
OK, we're going to get started.

0:05
Good morning.

0:06
My name is Christine Shell.

0:08
I'm a program manager for the Commissioner's Office in the New Jersey Department of Environmental Protection, and I'll be your moderator for today's discussion on behalf of the New Jersey Interagency Council on Climate Resilience, or IAC for short, We would like to thank you for joining us today to learn more about the heat related weather trends in New Jersey and the impact that climate change is having on those trends.

0:32
The IAC was established by Governor Murphy through Executive Order 89 and consists of 26 state departments and agencies coordinating together at a state level to develop and implement short and long term actions to address and mitigate climate impacts on New Jersey's economy, communities, infrastructure, and natural resources.

0:54
Part of the IA CS mission is to educate New Jersey residents about and prepare them for the impacts of climate change and the actions needed to protect New Jerseyans.

1:04
This webinar is the first in a series designed to educate the public on extreme heat.

1:09
This webinar lays the groundwork for understanding warming weather patterns in New Jersey over time and the expectations for that trend moving forward.

1:18
To that end, we are fortunate to have a panel of four experts with a wealth of knowledge on New Jersey's meteorology and climatology.

1:26
I'm going to briefly introduce each one of the panelists, but please feel free to visit the events page on Heat Hub and Jay to view their full BIOS.

1:36
First up is Jen Brady.

1:38
Jen is a senior data analyst and research manager at Princeton based Climate Central, an organization that strives to provide factual information to help the public and policy makers make sound choices about climate change.

1:53
Gen.

1:53
leads their Climate Central's data-driven investigations into climate trends and impacts, including studies on climate related disasters, major power outages, and urban heat island effects across the US Next is Sarah Johnson.

2:09
Sarah is a warming coordinator, warning coordinator, meteorologist for the National Weather Services Mount Holly office.

2:18
The Mount Holly office is responsible for weather forecasting for all but the foremost northeastern counties in New Jersey.

2:26
Sarah is responsible for planning and implementing the Weather Forecast offices awareness efforts to educate the public to ensure that the the mitigation of death, injury, and property damage or loss caused by severe natural weather events in New Jersey.

2:44
Next.

2:45
Dave Robinson is a distinguished professor of geography at Rutgers University and New Jersey State climatologist.

2:52
Dave is a contributor to the Intergovernmental Panel on Climate Change and to the US National Climate Assessment through his research involving global snow cover.

3:03
Through the Office of the State Climatologist, the Rutgers New Jersey Weather Network gathers and analyzes real time weather data from 68 monitoring stations across the state to determine trends and better understand changes in New Jersey's weather over time.

3:22
Finally, Danzaro is the Chief Meteorologist for New Jersey One O 1.5 radio station as well as ten other Town Square Media New Jersey radio outlets.

3:34
In addition to his on air meteorology insights and informative blogs on New Jersey's weather, Dan has done research and programming work for both the Northeast Regional Climate Center and the New Jersey State Climate Office.

3:49
Thanks to each of you for joining us today.

3:53
Before we get to questions, I'll lay out some housekeeping items for the webinar.

3:58
As I do that though, we are going to push out an introduction poll question that we hope you all will participate in to give our panelists a better sense of the audience for today's webinar.

4:12
And now for the housekeeping.

4:14
This webinar is being recorded and that recording will get posted on the events page of Heathub NJA few days after the event.

4:22
Audience members are in listen only mode to cut down on background background noise during the discussion.

4:30
Today's format is interview style, with panelists fielding specific questions from the moderator followed by Q&A from the audience members.

4:39
If you have questions, please jot those down in the chat feature and we'll do our best to get to them in the Q&A section.

4:48
Do we have a results from the poll?

4:53
I don't know if we had that yet.

4:59
The poll we got shortly, Christine.

5:02
OK, perfect.

5:03
So with that, I'm going to get started with the questions.

5:08
So let's start broad.

5:09
Since we have a panel of both climatologists and meteorologists, can you explain to us the difference between weather and climate?

5:18
Dave, I'm going to come to you first.

5:20
OK, Thanks and thanks very much for the invitation and for everyone joining this morning.

5:27
From a climatological perspective, weather and climate is short term for weather meteorology, long term for climate.

5:36
But from that climatologist perspective, the the climate system driven by the Sun, including the atmosphere, hydrosphere, biosphere, lithosphere, and human activities, all serve as a foundation upon which day-to-day weather events occur.

5:56
Meteorologists may look at it in the opposite sense, but the fact is they're inexorably linked.

6:01
A good meteorologist needs to know climate, and a good climatologist needs to understand meteorology.

6:09
Wow, thanks.

6:11
Dan, do you have anything to add to that question?

6:14
Yeah, Dave is spot on about that.

6:15
Of course, my usual intro to compare weather and climate.

6:19
Of course you can't weather a tree, but you can climb it.

6:23
See broadcast meteorologist and dad of four.

6:26
I have to throw in the corny jokes because that's kind of my job.

6:30
But you know, Dave's comparison is really good Weather short term, climate long term.

6:34
As a broadcast meteorologist, I do focus a lot on the short term forecast, specifically looking at the next three to five days.

6:40
But that that climate, the climatology information informs that weather forecast, right?

6:47
We need to give context to that weather forecast.

6:49
So we know if we're talking about extremes or breaking records or if we're close to typical normal weather.

6:55
And especially when we have a storm in the forecast.

6:57
It's really helpful to know, is this truly historic or is this kind of the norm for weather?

7:03
So they really do work hand in hand very closely together.

7:07
Great.

7:08
Thank you.

7:10
My SEC, our second question is the average global temperature for has increased one to two 1.5 to 2°F since pre industrial era.

7:20
Why New Jersey's temperature has raised 3.5°F during that same.

7:25
These seem like small increases.

7:27
Why should people be concerned about a degree or two increase in these average temperatures?

7:33
Dave, I'm gonna go back to you.

7:34
Yeah.

7:35
You know, from a climatology perspective, 2 four degrees is huge.

7:40
We're talking about every hour of every day, 365 days a year, all average together.

7:48
And two degrees actually comes out to be quite a bit.

7:51
Three or four, obviously, even more.

7:54
You know, the last time New Jersey had ice 20,000 years ago, an ice sheet to its north northern part of the state.

8:03
There's some estimates that maybe temperatures in New Jersey on average were 10°F cooler than today.

8:10
So that put in perspective 3 or 4°.

8:14
It's in just the past century, and that's really quite a bit.

8:21
And it's more than just temperature itself associated with that.

8:25
You have more moisture in the atmosphere that can lead to more higher levels of humidity and discomfort, but also more precipitation, potentially stronger storms and and less ice skating.

8:41
Well, we wouldn't want to have that.

8:43
Skiing in New Jersey is one of our top tourist attractions, Correct.

8:51
I'm gonna go to the next question.

8:53
Why is New Jersey warming faster than the rest of the state?

9:00
Yeah, I'll, I'll, I'm sorry.

9:03
The rest of the Northeast in the US Sorry, Dave.

9:06
That was me screwing up the question.

9:08
That that's that that's OK.

9:10
It it's New Jersey.

9:11
It's coastal Mid-Atlantic, coastal Northeast.

9:16
They're warming more than other parts of the country with the exception of the desert Southwest and of course up in Alaska.

9:23
And we believe we don't have this all resolved, but we believe it's associated with our coastal location.

9:30
Our oceans are warming, they produce and there's more moisture in the atmosphere.

9:36
And with more moisture in the atmosphere, you're seeing your night time low temperatures rise at a more rapid rate than your daytime highs.

9:45

Now that's kind of a universal understanding, but particularly when you're in a coastal state, in coastal communities and and with that, you've got more of an elevated temperature.

9:58
So it's not just your daytime highs, it's your elevated night time lows because we've got warmer waters nearby, more moisture in the atmosphere.

10:07
And with that, it is more difficult to rid the atmosphere of heat, especially at night.

10:15
So we are currently sharing a graphic from Climate Central.

10:20
So Jen, I'm going to turn to you and see if you have something to add to that question about why we're warming faster.

10:27
Well, one thing I was just going to add that was more of an elaboration on when we are warming faster.

10:33
And, and, and Dave kind of alluded this to this is winters are our fastest warming season as well.

10:38
And so sometimes I think some people don't notice as much because, you know, not everyone's an ice skater.

10:43
So some people get excited about those warming winters.

10:45
But winters are our fastest warming of all our seasons as well.

10:49
So that's just something I wanted to make sure we keep in mind when we're thinking about heat because we do get really caught up in heat in the summer and in the winter, it's easy to forget that those elevated temperatures are just as dangerous and are contributing to this overall warming.

11:05
So that's would be basically my addition to this.

11:07
But yeah, as you can see, kind of what Dave was saying is, is the the higher temperatures along the coastal areas, except for the the Southwest that is burning up a bit is the trend across the country.

11:21
Great.

11:22
Thanks, Jen.

11:24
So New Jersey is also heavenly, heavily urbanized state with a lot of built infrastructure that absorbs and holds heat.

11:32
Why is the what is the effect of this locally?

11:35
And Jen, I'm going to go back to you.

11:38
Yeah.

11:38
So we looked at the urban heat island.

11:40
We've looked at it for a few years.

11:41
And the real reason we wanted to look at this is we know it adds heat, but it's also often confused with the climate change element.

11:50
And people say, oh, we're just getting hotter because we have more buildings and we have more roads.

11:54
But what the urban heat island is, is it's heat on top of the already elevating temperatures.

12:01
And So what you have to look at is those overall trends we looked at before and then say, OK, if I live in Newark, if I live in Atlantic City, in Trenton, I'm going to feel even higher temperatures because I'm going to have more on top.

12:12
This is a really kind of straightforward illustration of what makes things hotter.

12:17
And, and I think when I talk to people about this, it's pretty obvious.

12:20
It's, it's a, you know, it's just a matter of we tried to put some numbers on it for you, but more buildings, more cars, more transportation, more population density.

12:29
As people, we generate a lot of heat and then we can be cooled off by the plants and parks.

12:34
And like I said this, you see this throughout, you see pockets throughout New Jersey.

12:37
It's not just our big, big cities.

12:41
Great.

12:42
I'm going to stick with you.

12:44
Climate Central just released a report, We're going to drop a link to that in the chat, that calculated an urban heat index for every census block in 65 cities across the US, including Newark, NJ How are these cities and specific temperature impacts identified, and what do they tell us more broadly?

13:05
Yeah, the these were identified based on these factors.

13:08
Really.

13:08
You see on the screen here, we looked at what the land use is in these cities.

13:14
And based on what the land use is, you can add additional temperatures.

13:18
And Newark here, one thing you can see right away is the port is very hot, which is not surprising because there aren't a lot of trees or a lot of shade in the port.

13:26
But it does encroach into the city where people are living as well.

13:30
And so that's where you have more of the impacts because those folks are feeling much hotter temperatures on top of the already rising heat.

13:37
We see, like I said, similar patterns in some other cities.

13:40
We were only able to tackle a, a handful of cities, but we see similar patterns in, like I said, you know, Newark, Trenton.

13:47
And it's interesting because if you look at the New Jersey map and if you go to our site, there's a national map and it it looks at everything, the whole country, you can kind of see where the cities are.

13:57
They kind of pop out on the map because they're they're brighter.

14:00
And that's even for the smaller cities I'm in here in Princeton, which everyone thinks of as lovely and green, but it's warmer in downtown Princeton than it is in the surrounding area.

14:11
Great.

14:12
Yeah.

14:12
You kind of touched on my next answer, but, and it's a little bit of a, A, a facetious question, but as a New Jersey resident, so if I don't live in Newark, NJ, does that mean I'm not impacted by the urban heat island?

14:26
Definitely not.

14:27
And that's part of the the reason we really like this kind of land use approach because it reminds people that you can create these urban heat islands anywhere you are.

14:37
If anybody who's on the call is in suburban New Jersey and you've gone to kind of your local strip mall where there are just a lot of highways and a lot of parking lots and buildings and no trees, you'll feel it's a lot higher maybe than when you're at your local park.

14:50
That's an, that's a heat island effect.

14:52
That's what that is.

14:53
So it can happen anywhere.

14:55
It's just more concentrated in urban areas because all the factors are there and they all contribute to bringing the temperature up even more.

15:06
But I, I do think it's important to know that the warming we're seeing globally, the warming we're seeing New Jersey is based on station observations that are, and these stations are not all located in urban areas and that urban factor's taken into account.

15:24
So sometimes people misconstrue the, the overall global warming with the urban heat island warming.

15:31
And they're both very important.

15:34
And Jen mentioned that underlying the urban heat island warming is the overall global warming.

15:42
Great.

15:43
Thanks, Dave.

15:45
I'm going to shift over to Sarah.

15:49
And so the how does the National Weather Service determine when to send out heat alerts to the public and how is that information disseminated to them?

16:00
Yeah.

16:00
So when it comes to our watch and warning program, which, you know, covers a wide variety of hazards, we're not just talking about heaps, but you also have probably all heard about winter storm watches or tornado warnings and things like that.

16:17
And so when it comes to where we put criteria for these watches and warnings, we're trying to always trying to walk a fine line to make sure that we warn people about the most hazardous, the most

severe stuff without over warning people to the point that they start ignoring watches and weather watches and warnings.

16:37
And with when it comes to heat, that is especially challenging because heat doesn't affect everybody in the same way.

16:45
You know, we've already talked about the urban heat island.

16:50
There can be different populations have more vulnerability to heat illnesses than others.

16:57
Depending on what your activities are for the day can can change your can change your vulnerability to heat illnesses.

17:05
So when it comes to heat, it's especially challenging.

17:08
What we've done is we, we set a, a kind of basic guidelines of heat index values, which would, which would trigger a heat advisory or excessive heat warning, which excessive heat watch just means conditions are favorable.

17:25
We issue it with a longer lead time.

17:27
When we get to excessive heat being imminent, we might issue a heat advisory, which means it's going to be hot.

17:36
But if you take precautions, it may not, you know, may may not be incredibly bad except for maybe sensitive groups.

17:45
And then excessive heat warning means it's going to be impactful for a big portion of the general population.

17:53
So, so we have some basic heat index thresholds which would trigger a heat advisory or a heat excessive heat warning depending on what we're looking at.

18:04
But we also as forecasters then consider some other factors.

18:09
So a prime example was our first excessive heat event that we had back in June, where it wasn't necessarily getting to quite the thresholds that we would normally think about when we think about heat index values, but it was going to be the first one of the season when we had a relatively cooler.

18:29
Going into it.

18:30
So when it comes to heat, there's an acclimation factor, which back in June, none of us had really gotten acclimated to the heat yet if you had been staying in this area.

18:41
So it was going to be a shock to the system.

18:42
It was going to be a very long duration event.

18:46
That first one was, you know, we were looking at excessive heat for five, even seven days depending on where you were.

18:55
And as Dave kind of alluded to earlier, there was also going to be a factor where the temperatures at night, we're not going to be dropping off very much temperatures at the minimum temperatures overnight.

19:09
At night, we're only going to be in the 70s.

19:11
And that leads to a compounding effect that our bodies don't have a chance to recover if it doesn't get cool at night, especially for people that live in areas where they don't have air conditioning and things like that.

19:23
So we have some basic guidelines for heat advisories and excessive heat warnings, but we also are always looking at some compounding factors that may convince us to that, that may convince us to maybe issue when we're not quite meeting criteria where maybe a degree or two in the heat index below what our typical thresholds are.

19:47
So that's something we're always looking at.

19:50

And as far as how those get disseminated, we sit when any of our watches and warnings get sent out through a wide variety of.

20:01
Sources.

20:02
We have weather radio that you can listen to.

20:05
We also have commercial TV and commercial radio like Dan and other broadcasters will then be amplifying watches and warnings.

20:15
Any trusted weather source is going to be showing it on, on, on websites on, like I said, commercial.

20:26
Commercial means commercial TV and commercial radio.

20:30
So there's a wide variety of of ways that people can receive watches and warnings.

20:36
Yeah.

20:36
I was going to ask, Dan, do you do you follow closely and then send out, you know, is that getting broadcast out on, on the major media?

20:46
Seems like it is, yeah, 100%.

20:49
I think the, the advisories usually make a good headline.

20:53
I think they make people's ears perk up a little bit when we've got excessive heat warning or any kind of warning for that matter.

21:00
And then, you know, we have something to talk about where we can teach them what that is, what that means, what action steps you should take.

21:06
So having that consistent messaging across the weather enterprise, I, I think is really important.

21:13
Great.

21:14
Thanks.

21:15
So Speaking of warmer days, we often hear of terms like relative humidity and the heat index.

21:24
How does humidity factor into a warming climate?

21:26
And is it more important to look at the maximum temperature or the heat index when deciding when to take action?

21:34
So I'm going to start with you.

21:37
Yeah.

21:37
So when it comes to to humidity and that gets factored into to both heat index as well as there's some some other other ways to describe heat that are are being developed like the wet bulb globe temperature as well as something called heat risk, which is still experimental.

22:00
But what we are trying to convey with with these when we're factoring in the the humidity is not just the heat, but then the heat's effect on a human body and and also some animals too.

22:15
But our main way to stay cool is through sweat.

22:19
And we sweat, the sweat evaporates, which gives us a little, cools us down a little bit.

22:25
As you might imagine, when it's very humid outside, the sweat can't evaporate as efficiently.

22:32
And so our main way to stay cool, our body's main way to stay cool is far less efficient when it's very humid outside, which is unfortunately something we have seen multiple times this summer.

22:45
So, so that's why when we are talking about excessive heat, at least in our area, we are often times

trying to communicate the heat index and trying to emphasize that more than the Max temperature because that is a big factor.

23:02
Now if you are traveling and you are in, we talked about, you know, the southwestern US and, and places that are more arid climate in those areas, you may want to focus more on the Max temperature.

23:15
It really depends on where you are or what climate you're in prior to working in this office, I've been in this office for over 10 years.

23:24
Prior to that, I was in the office in Amarillo, TX.

23:27
And a lot of times there the climate is so dry that the heat index actually ends up being a degree or two lower than the the air temperature.

23:36
But if it, the air temperature is still, you know, 110° as it can be out there, it's excessively hot no matter what the humidity is.

23:44
So it really depends on where you are.

23:46
But for our region, most of the time when we're talking about excessive heat, our biggest concern is the heat with the humidity.

23:54
So we're trying to communicate that in heat index or some other means that is communicating the the combined effect of humidity with the heat.

24:05
Great.

24:05
I'm going to come to Dan in a second, but your answer gave me a pause for another question.

24:12
New Jersey is split into two National Weather Service offices.

24:17
I mean, how do you coordinate with our New York partners for that Northeastern section?

24:23
How did, how did they differ or are they same?

24:26
It makes it seem like we have two different climates in New Jersey.

24:31
We work very closely with the with all of our surrounding offices, including the office that is responsible for Northeastern New Jersey.

24:40
We are constantly chatting with them constantly in communication, especially when we're talking about having heat headlines out via advisories or warnings or watches, whatever the case may be.

24:52
But going back to when I talked about those specific thresholds of, of heat index values that we're looking at, those are based on climatology, how frequently we see heat index values of certain levels depending on the individual climates.

25:08
And we do have a lot of climates across the across the state.

25:12
So there are some, some differences, but we, we, but we are coordinating with that very closely.

25:19
And it all relates back to the acclimation factor I was talking about.

25:24
And how common is it to have a heat index value of 100°F.

25:30
That could be a totally different number say for you know, Sussex, Sussex County, New Jersey compared to Cape May County.

25:39
So those are some things that we do look at.

25:44
Great.

25:44
Thanks.

25:45
I think I've had this argument with Dave in the past.

25:48
It's just like, well, how could New Jersey have different climates?

25:52
You know, it seems like such a small state that if we're in a heat wave, the whole state would be in a heat wave.

25:58
But Dave has corrected me.

26:00
Correct, Dave?

26:02
Yeah.

26:02
Well, it's all.

26:03
It's actually hit 90° at our High Point Monument station three times this summer and we had gone five years without getting up to 90°.

26:13
So that gives you an idea.

26:15
Other places were over 9030 days.

26:18
Just one example of how it really does vary quite a bit in this maritime state with a little bit of elevation and a little bit of latitude and even factors we've already talked about as well.

26:36
Yeah, I'm gonna now circle back to you on the humidity factors and heat index.

26:41
How how are you communicating that type of information to the public?

26:47
Yeah, exactly as Sarah said.

26:48
I mean, you've got temperature, you've got heat index.

26:51
You also have dew point, which is measure of moisture in the atmosphere.

26:55
A lot of broadcasters like to call it the muggy meter, and they show a cool little graphic that shows you what dew points correspond to how things feel.

27:03
Dew point is the point at which the temperature has to drop for 100% humidity to get condensation to actually happen.

27:11
Relative humidity.

27:12
I don't ever use on air because relative humidity is temperature dependent.

27:18
So you know, if you ever hear somebody say it's, oh, it's 95° and 100% humidity here in New Jersey, they're lying.

27:26
As the temperature goes up, the humidity goes down unless we have a whole lot of moisture in place, which doesn't happen.

27:32
So that's that's the one that we kind of don't use.

27:35
But getting back to heat index, I mean, it's in the name, right?

27:37
It's a heat index.

27:39
It's an indicator.

27:40
It's it's it, it takes complicated information, the temperature and the humidity to spit out something that's useful in terms of the human health impacts that that Sarah mentioned.

27:50
I think one of the biggest disservices that the broadcast industry is totally guilty of is calling the heat index the feels like temperature.

27:59
You know, it's I, I guess it's a, a useful comparison.

28:02
It's a way to communicate it, but that does not tell the whole story.

28:05
It's also known as the apparent temperature.

28:08
And again, it factors in that human health.

28:10
Again, that's the trigger for the advisories and the warnings and for when we can call it dangerous extreme heat.

28:17
So, you know, for, for your average New Jersey and we like temperature because it's, it's a number.

28:21
We can see it's on the thermometer.

28:23
But I, I agree with Sarah that in terms of, you know, looking at the human health impact of heat, the heat index is really important there too.

28:35
Great.

28:35
I'm going to stick with you.

28:37
So New Jersey has had, I guess I'm going to say three heat waves this summer when temperatures were above 90° for more three or more days.

28:48
Climate experts tell us that we are going to expect more of these in the future.

28:54
How are the temperatures able to ramp up so high so quickly day after day?

28:58
And what is that overall impact of us constantly having heat stress to our health, our infrastructure and our environment?

29:06
Yeah.

29:06
So counting heat waves, the, the, that measure that statistic, you know, is a little dubious as, as Dave said, we can look at, for instance, the number of 90° days that we've had in a given season.

29:20
And Dave already stole my statistic because I, I just looked it up for something else this morning.

29:24
Newark Airport, traditionally one of the hottest weather stations in the state, has had 31, 90 plus degree days so far this year.

29:32
That is above average.

29:33
It is nowhere near the record which was 5490° days in 2010.

29:39
That's, that's hot.

29:40
So we're, we're above average this year.

29:42
But as we've talked about in a couple different places here, you know, don't sleep on the impact of those really warm low temperatures.

29:51
Dave mentioned it in terms of the coastal impacts during a heat wave when it's just day after day of heat, you know, especially those urban and coastal areas, sometimes they don't get below 80°.

30:01
That's disgusting.

30:03
And everything needs that reset point.

30:06
You know, not only humans, but infrastructure.

30:09
We need to give the air conditioners and the electricity a grid, a break down to animals and plants that are around there.

30:16
They like to get a break from the heat too.

30:18
So when you get those low temperatures around 80°, that's already a warm start to your next hot day.

30:25
You know that air conditioner can only cool down your house about 20°, give or take.

30:29
That's the that's the benchmark.

30:31
So if you're starting at 80, you're on your way to the 90s.

30:34
It may or may not even be comfortable.

30:37
You know when when you have that day after day of of just pounding heat, both daytime and night time.

30:45
Great.

30:46
So I honestly think this conversation happened before we came online.

30:50
But so the term heat wave is a is a term of art used by the media.

30:55
It's not an official determination by the National Weather Service.

31:00
So Sarah, how did that term, if it does at all, kind of link in in a meaningful way with the National Weather Services warnings?

31:11
Yeah.

31:11
So the, the term it, it is an official term, but it's in the, in the national definition, it's, it's a lot more nebulous.

31:22
It just, it's the, the official definition is on the national scales, a period of abnormally and uncomfortably hot and unusually humid weather, typically lasting two or more days.

31:35
So you can see it doesn't have any thresholds, You know, most commonly around here, the, the thresholds that are discussed are the 90° temperatures for at least three, three days or more.

31:48
So it doesn't have those, those specific thresholds when you look at it on a national scale.

31:52
And so that's why we kind of hesitate to we, we don't declare heat waves because and what exactly is abnormally and uncomfortably hot varies quite a bit.

32:07
It varies from location to location.

32:10
It varies as we've talked about too, even just within the the same year.

32:14
So you know, 91° in early August, maybe not that unusual or too uncomfortable, whereas 91° at the end of May when it's been relatively cool leading up to it is an entirely different impact.

32:34
And so that's why we don't do that.

32:35
But we do talk about when we have had excessive heat impacts and, and looking at that.

32:43
And as has been mentioned before by Dan and and Dave, it has already, we have already had quite a bit of excessive heat impacts already this summer.

32:55
Some, some impacts too that I wasn't even fully aware of.

32:58
I mean, we had in, in some of our previous excessive heat episodes, we had impacts also to, to train transportation, which is something that I hadn't heard as much about in previous summers, not just the.

33:14
And then certainly our, our biggest concern and our, our main focus is on human impacts, which unfortunately we have had too many of those.

33:22
But other other impacts we've been hearing about this summer that that are quite unusual and not ones that we have frequently heard about in the past.

33:34
If if you want a sobering statistic for how hot it's been in recent summers, looking back at July's to eighteen 95130 July's, eight of the 10 warmest July's going back 130 years have all been since 2010.

33:53
So are we acclimating to hot summers?

33:58
I don't exactly think so.

34:00
But the fact is we've had far more than our share from the past of warm summers, warm Julys, whatever you might, warm years, for that matter, just in the last 10 to 20 years.

34:15
And I just wanted to add as well, 'cause Sarah made me think of this when she was talking about trains, though we're not talking about rainfall today, the warm temperatures are also contributing to some of these heavy rainfalls as well.

34:26
And so that's a whole other thing we can talk about.

34:30
But this excessive heat is also allowing the air to hold more water.

34:34
And we're having impacts from the heat in ways we don't even think about it with the precipitation.

34:39
Well, that was a perfect tee up to my next question.

34:42
Thank you, Jen.

34:44
Will New Jersey's rising temperatures bring other weather related impacts such as drought or worsening storms that New Jersey residents need to be prepared for?

34:54
Dave.

34:55
Yeah, what I'm about to say.

34:58

Some people think it's a cop out by climatologists, but we expect instances of more drought and more excessive precipitation with climate change.

35:08
So they think, Oh well, we'll cover everything.

35:10
But when you think about it, as Jen said, with a warmer atmosphere, more moisture in the atmosphere, and if a trigger comes along, you can get excessive rainfall in very short order.

35:22
However, if that trigger doesn't appear, you've got hotter temperatures drying things out and you can get yourself into a short term flash drought only to be alleviated by a trigger coming along to get that moisture out of the atmosphere.

35:40
So that's what we're, we believe we're already experiencing.

35:44
The data are showing this, but the future perhaps holding even more of these swings, these more rapid swings between flash drought and flash flood for that matter.

35:57
Jen, did you have anything to add to that?

36:03
No, I, I think that's really like Dave said.

36:06
And then I think the other thing is when the flash, when the rain comes after the drought, sometimes you're talking about land that cannot absorb that water.

36:15
And so there's there's kind of consequences there.

36:17
I heard someone in a seminar say something like it's pouring water on a table.

36:21
So you know, then you have additional impacts because your land is not capable of taking up that water, right.

36:31
And then I think, I think, Jen, you alluded to this at the very beginning for my last question.

36:36

But while we are focused on rising temperatures in the summer due to their immediate health impacts, New Jersey is warming in all of its seasons, not just summer.

36:47
So what are the ramifications of warmer winters?

36:51
And how will warming trends impact our transitional seasons, assuming we still have those of spring and fall?

36:58
Dan, I'm going to start with you.

37:00
Yeah, I actually jotted down the Quinn, the quote from Jen that the winter is the fastest warming season, knowing this question was coming.

37:08
I mean, look at the last five winters, right?

37:11
Three of them have been pretty much duds for at least the southern half of the state.

37:16
And that does have a big impact.

37:18
We were making fun of the whole ice skating and skiing thing earlier.

37:21
But yeah, winter time tourism is a big deal for various parts of the state, especially in the the mountains to the northwest.

37:29
And so that becomes affected if we don't have as much snow or as many storms for for natural snow making.

37:36
The other thing that comes to mind with a low snow winter is hydrology and stream flow.

37:42
It gets completely changed when you don't have snow and ice, all that water locked up for a nice spring melt up to the Northwest.

37:51
We didn't have that this year.

37:53
And you know, that can that can contribute to agricultural concerns and and other drought related concerns.

38:00
Those are the two big ones.

38:02
The other thing is, you know, getting back to that climate change discussion, again, it's all about extremes.

38:07
Let's not forget that, that, you know, our understanding of where things are going is that we get more frequent bigger winter storms as well.

38:15
So this this pendulum also swings in both directions in terms of the, the winter time.

38:21
You get seasons that are that are, you know, rainy with very little snow, but then you get one big storm and that gives you an entire season's worth of snow in one shot, which we've also seen a couple times in the last few seasons.

38:36
Dave, I know you have something to add.

38:39
Well, one thing to add on the temperature side.

38:42
Well, first of all, New Jersey isn't getting less snowy for the very reason Dan just suggested that we're getting our storms.

38:50
When it rains, it pours.

38:51
Well, when it snows, it really dumps on there and it may not stay around as long.

38:57
But thinking more about temperature, I mentioned casualty ice skating before, but you have to remember with warmer winter temperatures that permits invasive species, plants, bugs, you name it, to winter over more successfully in New Jersey.

39:14

And that can lead to trouble come spring and summer with infestations, southern pine beetle and other invasive species that could affect humans and other animals.

39:27
So we have to think of though, you know, everybody thinks our fuel bill's going to be lower in the winter with a warmer winter.

39:33
But careful what you wish for and I'll ask add one last factor is there are actually we think of summer is when you you know, you have your farms are going, but there's a lot of fruit trees in particular that actually need cold winters to fruit and to properly produce.

39:49
And so we could see some truck crops that are traditionally grown in New Jersey not as able to grow because they don't have enough cold hours during the winter.

39:59
And we're already seeing people transitioning to maybe a crop that's traditionally grown in a Southern state and moving into New Jersey because we're not getting enough cold in the winter to allow those plants to produce fruit.

40:11
Great.

40:14
Well, those are all of our questions.

40:17
But as you can imagine, the audience members have dropped a number of questions for the panelists in the chat during the discussion.

40:24
And while we have staff fielding some of those questions through the chat function, we're now going to go to the panelists to answer some of the questions for the last 10 to 15 minutes of the call.

40:35
So I'm going to, I'm going to let you guys pick who answers these questions.

40:40
The first questions is, are there studies specific to New Jersey that illustrate how the two to three degrees in increased temperature and then therefore micro urban heat island effect impacts vulnerable populations?

40:55
I guess that's you, Jen.

40:59
I haven't seen some groups.

41:01
For example, NOAA has done some really extensive work kind of looking neighborhood to neighborhood.

41:07
So I haven't seen any particular with New Jersey, but I think we're seeing the same thing everywhere across the country is, is that there are vulnerable groups that are being disproportionately impacted by urban heat islands.

41:20
Fortunately, a lot of cities now are are paying attention and saying how can we alleviate some of that?

41:25
But it's a pretty universal problem and and you find it in most of the cities we looked at.

41:30
We did work with some folks at Columbia who looked at traditionally red line neighborhoods and most of those areas had higher temperatures.

41:38
Today there there are some studies and pending studies for New Jersey communities, including by Christine, your group at NJDP, but also at Rutgers, some studies in Camden this summer.

41:51
And Elizabeth, there's an interest in some studies in in in Newark as well.

41:57
And then there's the folks looking at health impacts of the heat and it's not just the heat, sometimes it's air pollution as well, but there are there are some epidemiologists looking at those impacts of human health on and heat not just in New Jersey as you alluded to, but also specifically in New Jersey.

42:25
Great.

42:26
The next question from the from the audiences, do any of the panelists find the cooler ocean temperatures this summer season due to upwelling making it hard make it hard to discuss the impacts of climate change to a broader audience in New Jersey?

42:42
But Dan, you should take that one.

42:46

My understanding of this upwelling issue is limited, but it has been a big problem at the Jersey Shore this summer with some ocean temperatures crashing into the 50s and 60s of the beaches.

42:58
So you get people going to the beach thinking it's nice and warm.

43:01
You stick a toe in and it just freezes off.

43:04
It ties into the hot temperatures.

43:05
Actually you get one of the ingredients for for these really hot days, these heat waves is a strong SW or westerly breeze, which overtakes the sea breeze.

43:16
That's the reason the the beach is usually get cooler than inland areas in the summertime is you get a sea breeze circulation that forms that brings in cooler marine air.

43:26
But if the land breeze is too strong, that doesn't happen.

43:30
And that land breeze actually sheds the top layer of the ocean and blows it away.

43:34
That nice warm water that we love to bathe in and you get upwelling, you get that chilly water from the deep coming to the beaches.

43:42
And that's that's why we had the issue at the shore.

43:45
In terms of whether it's a communication issue for, for climate change, I mean, my initial response to that would be #1 climate change of the global issue.

43:55
It's not just on the Jersey beaches #2 would be the explanation I just gave you that it ties into those hotter temperatures as well.

44:04
And #3 you know, just just look at what we have now.

44:07
It's nice and warm.

44:08
We had a we had a remnant tropical cyclone come through that stirred things up.

44:12
And we're back in the 70s now.

44:13
So it was just a, a short term thing that that seems to have resolved itself.

44:19
Yeah.

44:19
But you know, but that's the irony.

44:21
Our hotter atmospheric summers have colder surf surf temperatures now with the winds coming in from the northwest the last couple days and all.

44:31
You don't get that up welling and you know, you can go in the water and it's nice and comfortable.

44:37
You come out, the air is cool and dry and you're shivering.

44:41
You just can't win in New Jersey.

44:44
We, we are from our perspective, it's we, we have created a a infographic about this upwelling because we do get a lot of questions about it and we have had to share that a couple of times this year because we have gotten a couple of questions about it.

45:03
And yeah, but exactly what Dan mentioned it's it's all tied into that favorable flow for getting hot weather is also just happens to be the favorable flow for for upwelling.

45:17
Now I haven't gotten any specific questions about the challenge with communicating climate change with upwelling.

45:25
I have had a few questions of people asking me as as I'm sure many of you all know we have right now the seasonal outlook for hurricane and tropical activity in Atlantic is for above normal for the season.

45:40
And one of the factors is the really warm water in the Atlantic basin.

45:44
And so I get a lot of I have had had to have to field a few questions about how, why are we talking about warm water in the Atlantic basin or tropical development when it's so cold off the New Jersey coast.

45:58
Well, again, upwelling is a very localized issue and especially when we're talking about tropical development, we're talking about what is the water temperature where we are seeing tropical systems develop.

46:10
And there the the water temperatures in, in the tropical and subtropical Atlantic is still quite warm in some areas near record warmth.

46:20
So it's a very important when you're looking at global warming or a lot of these other things that we're looking at a bigger picture than just what is happening in our backyard.

46:32
Thanks, Sarah.

46:34
And if you could share that graphic with us, we can share that out.

46:38
That might be helpful.

46:39
Thank you.

46:41
The next question I think goes to you, Sarah.

46:45
Has the National Weather Service started using other platforms like Blue Sky for their social media alerts and engagements?

46:53
Many are abandoning X Twitter platform and missing the vital alerts and information.

47:01
Yeah, at this point, no, we are our, our social media channels that we've been able to maintain have been Facebook and XI know that's the national level.

47:13
They, they investigate each any before we go into a social media platform, they have to be investigated for make sure it's, it's, it's a stable and secure platform for us to to venture on.

47:27
So, so no, unfortunately we're not on any platforms other than Facebook and X, but I'm sure that's something we'll be looking at in the future.

47:38
And again, there's a lot of different ways that you can receive, receive our our information either through going through other trusted sources, commercial radio, commercial TV like Dan or going through websites, our website for National Weather services, weather.gov.

47:57
And you can get a lot of the same information through those through those platforms as well as the social media channels.

48:07
Thanks, Sarah.

48:09
The next question, I guess for any of you, is there a record keeping of how often or how long the heat indexes have been in the dangerous and extreme dangerous categories compared to prior years?

48:24
None that I'm aware of.

48:27
It's an index rather than an observation.

48:30
So one would have to go into the database of humidity and, and temperature and, and, and calculate that.

48:39
But it's a great idea.

48:41
I'm, you know, I'm not knocking that idea at all.

48:44
It's something we should probably do in the state climate office to take a look at that.

48:48
So thank you for that question.

48:51
It's not a part of the official climate record of the climate records that we keep.

48:56
However, there is we do have one program where we can look at hourly observations that come from some of the automated observation stations around the the state, typically at at airports.

49:11
And so we can calculate it based on hourly observations.

49:14
But as Dave mentioned, it's not not a part of an official climate record.

49:19
But yes, that is something something certainly the a good idea and maybe something, something to explore for future reference.

49:28
Great, thanks.

49:29
The next question, climate change is a multi faceted issue.

49:34
What is the biggest take home message you would like us to communicate to high school students in New Jersey?

49:42
That's a great question.

49:48
I, I think the general understanding spoken as a professor, a general understanding of what's going on, because once we gain that general understanding, whether you're in high school or other parts of your life, then we can begin to have a more sophisticated, more detailed discussion of how to deal with it through mitigative and adaptive approaches.

50:13
But without that understanding and those high school students, it's a great time to get it.

50:19
I, I think it's going to be difficult to have that dialogue.

50:23
And the other thing I I say to my students is that this is something you're going to be dealing with as adults, as you live in a coastal state, if you remain in New Jersey, if you live in urban areas and so on and so forth.

50:39
So it behooves for you to understand it again, understand it more because you're going to be the one at the, the, the clicking the, the voting machines on efforts that are associated with climate change in the future.

50:57
Thanks.

50:57
Anybody else want to speak to our youth?

51:02
Well, I mean, much of my audience quite honestly has a high school education.

51:06
So I'm going to, I'm going to take this from the tact of speaking to my listeners.

51:11
And, and the way that I generally talk about climate change, don't just call it global warming.

51:16
It goes way beyond that in terms of the potential impacts.

51:20
We talked about how it's all about extremes.

51:23
The wet get wetter, the dry get drier, the hot get hotter, the cold get colder.

51:28
You know, it's, it's, it's a challenge when we have a massive winter storm or a, a, a big infusion of the polar vortex causing a cold snap in the winter or a, a drought, to relate that directly to, you know, our understanding of climate change.

51:44
But it all plays into it.

51:46
You can't necessarily blame one single event and say, oh, this is climate change.

51:51
Without climate change, this wouldn't have happened.

51:53
But but again, it's, it's a matter of statistics, It's a matter of trends.

51:57
We're going to see this more frequently.

51:59
And we already have, as Dave said, look at the climate record of the last decade and a half in terms of those warmest July's that the the signs are there and it goes beyond just heat waves.

52:13
Great.

52:14
Thank you.

52:16
Jen, I think this one goes to you, given what you're sharing, what the importance of green space and overburden communities to mitigate the heat island effect, how do you feel about impervious cover?

52:29
What are we doing about that?

52:31
What's where do we be doing it at?

52:33
Yeah, I mean that's part of the issue is, you know, those kind of hard surfaces and and I don't think I mentioned and you know is that they've talked about night time temperatures.

52:44
Those hard surfaces also absorb the heat and often re release it at night, which keeps the night time temperatures high.

52:50
So that's part of the equation is the impervious surfaces.

52:53
Often a good thing is, is you know surfaces that do absorb the water well like area around trees, area around grass also cool the space.

53:04
And so there's a lot of kind of Co benefit there with those green spaces.

53:10
But when you are talking about solid pavement there, there's a lot of impacts beyond just the heat that it's generating.

53:20
General question for all of you.

53:23
When the tropical system meets the cold water temperature in the Atlantic, like the ones that New Jersey, impacts the strength of the storms and makes them less powerful.

53:34
I don't know if I'm reading that correctly.

53:37
I guess they're just asking about whether the cold water is making the storm less powerful as opposed to more powerful.

53:44
I'm paraphrasing, yeah.

53:47
When we talking ocean temperatures here in cooler, remember we're only talking right at the surf level.

53:52
Offshore, the waters are warm and an example of that was Sandy.

53:59
Sandy occurred at the end of October after period of excessive warmth, very warm ocean temperatures.

54:06
And there were studies done Monday morning, quarterbacking, if you will, that looked at that storm with normal sea surface temperatures for late October and the sea surface temperatures, the above normal ones that were observed, observed the storm would have taken the same odd path, but it would have been a weaker storm if sea surface temperatures have been close to normal.

54:31
So that was what worries me about the future with tropical storms in New Jersey is that they're likely to be traveling up the coast in warmer waters, thus being able to sustain their strength longer.

54:46
It's not as if storms are going to start forming off the Jersey coast, but they may be sustained longer coming towards New Jersey.

54:54
And that's one of my big worries for the future.

54:57

And to add too to what Dave said, when we're talking about the strength of a of a tropical system, be it how it's classified tropical storm versus hurricane or once it's a hurricane, what its category is, keep in mind we're only describing with those terms.

55:15
We're only describing what the sustained wind speed is of that system.

55:19
And that's only one of five hazards that you can get with a tropical system.

55:25
So that's not describing the heavy rain flash flood threat.

55:29
That's not describing the dangerous surf threat, not describing the tornado threat.

55:36
Storm surge is somewhat tied into the wind speeds, but it's also tied into a number of other factors like this forward motion of the storm, where you are relative to the storm, that kind of thing.

55:47
But keep in mind when you're talking about weakening systems or even strengthening systems, you're only describing one of the five hazards that a tropical system can bring.

55:58
So that's something else to keep in mind.

56:01
Christine, can I make an overarching point before we end?

56:04
I realized we haven't said that heat is actually the biggest weather killer in the US And that's not really based on the best statistics because if someone has, you know, heat impacts and they go to the doctor, someone might write up it was a heart attack or something else.

56:20
So those numbers are probably even higher than what we've seen.

56:23
So I just want to emphasize because we talked about these spectacular events like tornadoes and hurricanes, we think of lots of human consequences, but actually heat is what is really killing people around the country.

56:36
And so just kind of keep that in mind as as one of the biggest impacts that we're seeing.

56:42
Great, great.

56:43
Great way to end the comments.

56:45
Thank you, Jen.

56:47
That's all the time we have for the discussion.

56:49
On behalf of the IAC Member States and agencies departments, I would like to thank all of our panelists for sharing their knowledge with us today.

56:57
We hope the audience walks away with a better understanding of how and why New Jersey is warming faster than the global average and what the warming trend means for New Jersey residents going forward.

57:08
As I mentioned before, the recording of this webinar will be posted shortly on the events page of Heat Hub NJ.

57:15
We encourage you to visit Heat Hub NJ often as we regularly update it and add new material to the site as it becomes available.

57:23
The 2nd webinar in this HEAT series, focused on the physical and mental impacts of extreme heat will happen as part of the state's Climate Week events at the end of December, September.

57:33
We will send out an e-mail to those who have registered for this event when the date for the second one is available.

57:41
Please visit Heat Hub and Jay For more information on the upcoming webinars.

57:46
Thank you again for joining us today and have a great afternoon.