

# Dry Weather in Iowa

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## SUMMARY KEYWORDS

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## SPEAKERS

Justin Glisan, Speaker 3, Dennis Todey, Christa Hartsook, Joe Hannan

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- C** Christa Hartsook 00:15  
Hello, and welcome to the small farms podcast, a prediction of the small farms program at Iowa State University Extension and Outreach. Our podcast covers the opportunities and challenges associated with rural life.
- J** Joe Hannan 00:29  
I am Joe Hannon, commercial horticulture field specialist with Iowa State University Extension and Outreach and welcome to the small farms sustainability podcast. With me today is Dennis Todey director of the USDA Midwest climate hub and Justin Glisan state climatologist of Iowa at the Iowa Department of Ag and land stewardship. Dennis, Justin, thank you for joining me on the show today.
- D** Dennis Todey 00:52  
Great. Thanks for having us.
- J** Justin Glisan 00:54  
Great to be here. Thank you.
- J** Joe Hannan 00:56  
Yeah, I'm really looking forward to our discussion today as we talk about what's going on with our dry conditions, drought conditions that we have across a large part of central and western part of the state here with you guys today. So before we jump into that, though, Dennis, would you mind telling me a little bit about yourself and what you do at Midwest climate hub?

**D** Dennis Todey 01:18

Sure, happy to do that. I'm originally an Iowan so I'm happy to be back in the state and back in the state for years is the director of USDA Midwest climate hub. Previously I was the state climatologist and South Dakota, kind of Justin for for South Dakota. And what we do in the in the Midwest climate hub is work not only in Iowa, but an eight state region over most of the Corn Belt, dealing with ag and climate issues helping people deal with and adapting to changing climate issues, helping deal with shorter term and longer term issues related to climate. That's that's the shorter version, we could go on longer. But I think that gives a flavor of what we try to do.

**J** Joe Hannan 01:56

But you're not my local weatherman.

**D** Dennis Todey 01:58

I am not your local weatherman and especially when it's not raining, I do not want to be your local weather. Fair enough. And,

**J** Joe Hannan 02:04

Fair enough. And Justin, would you tell me a little bit about what you do at IDALS as our state climatologist?

**J** Justin Glisan 02:13

Sure so you can call me your local climatologist if you like I have there, there are multiple things that I do. So each day is something new and exciting. I see myself as the weather historian for the state, we have 148 years of records for the state of Iowa precipitation and temperature and 133 years of snowfall data. So we use this information to determine where we've been, where we're going. And where we are currently, one of the big things that I do is compile process, and quality control Iowa data along with the National Weather Service to make sure it's the most robust product that we have for our farmers and ag stakeholders. Then I do a lot of reports weekly and monthly climate summaries. And then during the growing season, I submit the weekly preliminary weather summary to USDA, NASS, that is appended to the crop report each Monday. And then there's a lot of other things that I do. But for time sake, we can just stick with that. One big thing that we do do though, is drought monitoring. And we'll get into that later, as you've mentioned, but getting those impact reports and then combining those with what we see on the ground and then submitting a recommendation to the US Drought Monitor each week.

**J** Joe Hannan 03:33

Okay, cool. I don't think I've ever heard you refer to yourself as the state weather historian that makes it just a different perspective on how you view your job.

**J** Justin Glisan 03:42  
Sure, sure. Yeah.

**J** Joe Hannan 03:43  
Okay, so diving right into things. We're looking at through a list the large portion of the central part of the state. It's dry. Looks like we're still on that D1-D2 drought. Now, obviously, this has a lot of impacts on crops and livestock. And we'll talk a little bit about that coming up here. But before we dive into that, can, one of you guys tell me or explain to me and the listeners what do we mean we're talking D0, D1, D2, D3 drought? What does it really mean?

**D** Dennis Todey 04:17  
Sure. They're all started been Justin, you could either incorrect, everything that I say wrong. Okay? What what we're dealing with is is a product called the US Drought Monitor. It's been around about 20 years, it's a weekly product that tries to assess what's happening in the way of drought conditions around the country and tries to quantify them. So that you know, you say God's kind of dry well, how dry is it? What are the impacts that that's having, and those are classified on a scale from D0, which is abnormally dry, not technically drought, and then D1 moderate drought all the way to D4 exceptional drought. And each of those levels is associated with kind of an impact level. And then if you if you look at Say 100 years of records, what are the frequency of occurrence of these sorts of things? So,

**J** Justin Glisan 05:07  
so I think D4 is what the 99th percentile

**D** Dennis Todey 05:09  
or second percentile or whichever way you want to Yeah, yeah.

**i** 05:13  
Yeah, second. So out of those 100 years, the driest two years would kind of give you that percentile level for D4. And then it expands down into D3. And we can give you some more better clarification with some plots that will make sense once you listen to this. But yeah, speaking of those levels, Dennis, it depends on where you are, it depends on the time of season, it depends on what kind of soil type, you're planted in all kinds of different factors. So where we are, we have a D2 drought. And with that West Central Corridor and Iowa, we have seen D3 and D4 characteristics out there. Now that's very dependent on where you are again,

but for example, Ziering had its driest July on record. And the records for that collapse station, go back to 1904. So that really sets us up to see where the dryness is occurring, but also the moisture stress that we're seeing, depending on corn, soybeans, or our specialty crops, so that D0, that's where you're getting dry, that D1, you're starting to see a longer precipitation deficits stack up and you're starting to see the subsoil dry out. And then especially when you get into this time of year, we really start to use a lot of that subsoil moisture as the crop matures. And that's where you can see degradation happen fast.

**D** Dennis Todey 06:47

That's part of what we've had this year is that not only have we been dry, but we've had conditions we've had warmer than average temperatures, especially early June, we had very windy conditions, we've had some very dry atmospheric conditions. So crops have had to use more water to deal with that. So not only have dry soils from lack of rain, you have crops trying to use more of that water.

**J** Joe Hannan 07:10

So if I interpret that, right, if we had a little bit cooler temps, we didn't have quite the wind, or maybe had a little bit wetter spring, we might not be into this D1, D2 stage yet, because we still had plenty of water in reserve, in essence, so sure.

**J** Justin Glisan 07:29

So did I catch that right, Justin, that we've been deficit on precipitation for quite a while, but because we had such heavy fall in previous basically we had a lot of water in the reserves?

**i** 07:29

And that's a great point. Because you look at the setup moving into the growing season, we actually had the 12th wettest year on record in 2019. And then fall was actually the seventh wettest, so we had ample subsoil moisture getting into the growing season. And then we had that tremendous planting window in the middle of April. And we had timely rainfalls, and then about the middle of May is when the windy, dry, hot days started occurring. And those were for effectively 30 days. That's where you start to increase the amount of evapo transpiration given that no low level relative humidity or very little, those windy days, lots of incoming solar radiation. That's where we get into the flash drought. So we go back six months in our precipitation deficits in the driest part of the state, West Central Iowa, were anywhere from 8 to 12 inches. But given the remarkable amount of subsoil moisture getting into the growing season, we really didn't see that dryness really start to degrade fast. Until those conditions that can give us flash drought started to develop. And they really started to take hold at the end of June and into July.

**J** Justin Glisan 09:00

Yes. The reserves were here. Yes, absolutely.

res. The reserves were here. rep, absolutely.

**D** Dennis Todey 09:04

So it's kind of it's kind of like a checking account your check our checking account was full. But we haven't put very much into our checking account but have been using a lot out of our checking accounts so far this growing season.

**J** Joe Hannan 09:17

Wrong audience for farmers don't have full checking accounts.

**D** Dennis Todey 09:23

I apologize.

**J** Joe Hannan 09:26

We have a flash route that you mentioned here. I assume we didn't really see this coming. What environment are what weather conditions brought along this drought that we're experiencing right now? Or, or even going back further? What's going on that we're not receiving our normal rainfall now?

**J** Justin Glisan 09:46

Sure. We've been stuck in kind of a steady state atmosphere in which everything that looks like it's going to hit Iowa all these rain events that look like they're going to hit Iowa just kind of evaporate literally when once they get to the Nebraska Iowa border, and this goes back, we've seen this behavior before atmospherically, where you don't have low level humidity, where you don't have an availability of moisture in the system, all those transient systems that come through, especially in the warm season, those warm season thunderstorms that pop up. If you don't have any fuel to give to them, they will find it by themselves. And they take the path of least resistance. So they will find the moisture. And that's where we've seen those precipitation deficits stack up in West Central Iowa. And expanding, the hope is moving forward moving from the warm season for smaller scale thunderstorm behavior, to more large scale, low pressure, cold frontal systems, that we start to transition into those larger scale rain events.

**D** Dennis Todey 10:48

It is very regional this year that Iowa is especially starting to Western Iowa is the worst and most of the Corn Belt area. Other states around us have had problem periods, but they have recovered and had rainfalls, and we just have not had much of that in Iowa period.

J

Joe Hannan 11:08

I guess that actually leads us pretty well and to segwaying, to talking a little bit about the impacts that you guys are seeing on crops and livestock, again, more targeted towards smaller farms and acreage is what are you guys hearing out there.

U

11:24

So where I look at in Dennis will say the same thing. When we start to get into those deeper categories D1, D2, D3 drought, that's when we start to look for hydrological impacts that I've seen on various fields scouting that I've done, our livestock ponds are starting to deplete. They're not filling up, they're obviously because we haven't had rainfall. But we've also had some impact reports out in western Iowa, have producers actually trucking in water for their livestock also weaning off calves faster than they normally would also supplementing their diets. So we are starting to see impacts in the livestock realm. Whereas when we get into D1, those D0 smaller categories. That's where we first start to see the agricultural impacts stack up pineapple corn, soybean leaves flipping things of that nature.

D

Dennis Todey 12:21

We've also seen grasses alfalfa, those who are probably the first ones that popped up this year in southwestern part of the state that people are getting around to second cuttings of alfalfa and grasses and pasture saying that they just weren't getting much out of it. We also are always looking for we get those kinds of reports from USDA and other locations. We're always looking for reports from other folks who deal with a wider variety of crops to hear what's going on with them. Because our conversation this morning Joe, I learned quite a bit about some different things happening from from on more of a specialty crop side that we know are out there, we just don't hear the details about it.

J

Joe Hannan 12:59

So I'll just take a little bit a minute here to poke a little bit about what I'm hearing on the specialty crop side pumpkins. So we started with pumpkins and even some of our late planted sunflowers for folks that are doing some flower festivals and pitcher opportunities and things and anybody that planted pumpkins late they're pumping water onto the field or if they don't pump water on can expect really low pumpkin weights which is an issue when you're selling by the pound talk to several our sunflower growers, anybody that planted late sunflowers to hit that October bloom timeframe. It's like the seeds quite a ways into the ground you know, an inch and a half to two inches down just to make sure we get into some moisture and even then without a little bit of shower rain to help them germinate was you're gonna be in trouble. Apples grapes, boy, we really need water right now to set fruit buds for next year, we're getting to the point where we need some water for apples to size up their crop and give us a nice big fruit we had plenty of reserved water early season for cell division. But now that the cells are divided, they got to take on water to expand and give us a big pump for one that I'm I'm struggling with myself and I think a lot of other folks are in this area is high tunnels and or even just putting irrigation out, out in the field. With it being so dry any irrigation and water that goes on in just that dry soil just pulls that water out of the root zone. And so now you're either having to flood out the high tunnel and put a ton of water on which is a pumping issue this after

eight to 10 weeks of very dry weather or you're putting on small doses of water every single day, which has its own issue because now you're starting to build up salts in the soil and you're gonna have to figure out a way to get them leached out at a later date outside not such a big deal and high tunnel. That's that's a problem looking forward into fall. You know, if you're on a well and you're in the strike zone, you probably really want to be taking caution on whether you're going to continue planting lettuce, peas basically those fall season harvest crops, if we're not going to get any water, you're gonna have to really be thinking about, do you have the irrigation capacity to 100% supply the water needs for that crop this year. So just things to be thinking about as we come into next couple of weeks. So that's kind of what I'm seeing on the Horde side of things. So now you want to maybe backtrack in and talk about where or how farmers can provide local input to you guys for whether it's drought or other types of data and info.

D

Dennis Todey 15:33

Sure. And again, you know, Justin talked about previously about we're trying to look for impacts. When we're looking at the US Drought Monitor we're looking at even on the wet side, when we have wet periods, we always like to hear impacts, because we were reporting on weather and climate and ag issues. But when it comes to the drought, it really helps us to gauge we know how dry it is, because we could we could get overall some assessment of precipitation and how much how short it is. Justin talked about some of those. But we really need to try to tie that to our is it being impacted? Are we being impacted producers being impacted by that locally. So you can you can send an email to Justin, you could send an email to me, you can report up through your local extension office and they can get back, get back to us. Because we have the capability of reporting to the US Drought Monitor author on a weekly basis of what we're seeing to help guide and what the conditions are looking like. So phone calls, we can even take phone calls, too.



16:35

So another observation network that we have across the state and across the United States and even Canada. It's a global effort, isn't it, Dennis, so the CoCoRaHS Community Collaborative rain, hail and snow network. And this is a civilian rain gauge network, a standardized rain gauge that holds 11 inches of water. And typically our observers report at 7am Each morning, the amount of rainfall snowfall liquid equivalent that they've had over the past 24 hours, in addition to zeros. So if you didn't get rainfall, you always report those zeros to get a consistent reporting record well within the CoCoRaHS mobile app, and on line at CoCoRaHS.org. You can submit impact reports as well. So when you're reporting your precipitation totals, you can also say well, out in the middle of the field, we have one inch cracks, we have corn leaves rolling we've noticed that the pastures are starting to burn all of those can help us match together the moisture variables along with the agricultural impacts that we're seeing.

D

Dennis Todey 17:44

And that's what Justin said is really important. His specific impacts, saying it's dry doesn't tell us an awful lot. It's dry. But here's the things that we are seeing, you know, lawns are completely brown, this crop is doing this really helps us assess what the conditions are like on

the ground.

**J** Justin Glisan 18:01

I mean, even saying that I haven't cut my lawn in a month that indicates something to us moisture, rot wise. So any of those anecdotal facts that can be given to us. We relay those along with our analyses for the US Drought Monitor author,

**J** Joe Hannan 18:17

and anybody can be a member and so submit impacts and stuff to that network.

**o** 18:21

Absolutely. The rain gauge is I believe, \$30. Now I do have a budget for rain gauges. So if we do have consistent people out there that want to report, they can get in contact with me and we can get them set up. This goes back to 2018 Dennis and I did drought beatings down in southeastern Iowa, where we had D3 drought around this time period. Typically, a county has one National Weather Service collapse station, and it's right in the middle of the county. Now that we're moving into more variable rainfall, higher intensity more frequently, but also hit or miss types of rainfall. Having these CoCoRaHS gauges out there allow us to get a better idea of the spacial variability or where the rainfall is actually occurring. So in those three counties, Lucas, Davis and Appanoose counties that were in D3 drought, for the longest period, we actually had anywhere from 30 to 45 CocoaRaHS gauges installed there installing quotes, but because farmers producers, just general everyday people knew and saw that there was a precipitation deficit down there. And that if we have the correct information, we can get that to federal and state stakeholders in terms of like CRP and crop indemnity insurance, all those different types of things.

**D** Dennis Todey 19:46

What I say is, you know, people who go to the coffee shop and argue about how much rainfall there was every day. Have them report to us.


**J** Joe Hannan 19:55

Exactly. The other day because it does make a difference, especially as it's coming When up to either state or federal and being able to open up as you said, Justin CRP ground for grazing or indemnity payments and things like it does actually matter.

**J** Justin Glisan 20:10

Absolutely.




 Joe Hannan 20:11

It's important. So. So it's great that farmers can provide input into all this, especially as we're putting together these impacts. One thing I want to know is, is it going to rain? And how can I keep seeing chances of rain? And then I don't get any excellent questions.

 20:29

So, you know, we're in a very unique timeframe right now. 2020 has been a tremendously up and down year, and it's always difficult to forecast, thunderstorm activity convection in summertime, because, you know, depends on where these systems pop up, and then propagate to and from. So we've seen, you know, the 75-80-90% shots of rainfall. And then we have these products, the seven day quantitative precipitation forecast, effectively the some of the the seven day totals that you would see on the news. Well, that's a map that's released each morning and updated in the afternoon is showing us anywhere from one to two inches of rainfall consistently over the last 45 days. Ever so often, especially in the drought region. Well, they've been bust, the forecast have just been pretty awful to be blunt. And it's not the weather service. It's not anybody's fault. It's just there's a function here of the amount of observations that are being inputted into the the forecast models. And with COVID-19. And the the lack of airline travel in especially March through May, we had anywhere from 50 to 75% reduction in the amount of observations that these aircraft take on a an hourly basis. And this is based on a study from the Geophysical Research Letters from the American Geophysical Union. When you don't have enough weather observations going into these forecast models, the forecasts cannot produce a robust product that we can be consistently saying that this is what's going to happen. And we've just seen over and over rain has not materialized where it has are where it needs to go. But it's also forming where it doesn't need to go. And that's where we've seen the wetter part of the state, eastern Iowa, where you have moisture available, you're more likely to force thunderstorms. And Dennis can add to that.


 Dennis Todey 22:34

And there's another part, just a basic climatology to is that thunderstorms by their nature tend to be spotty, or especially this time of year, that you we always know that you sometimes you get rain and you don't get rain and wetter years, that's not an issue, you missed this one, okay, in a day or two, you're probably going to get that one and this dryer period, if you missed the one, you missed it and you may not have it another shot again for a week or two. So those differences show up quite badly. And we've seen that in spades this year that even in that dryer at Western Iowa, we've you know, we've had a couple of storms that have come through at different times. But unfortunately, even with some of those, we decided, Oh, we're gonna bring wind and hail along with that. So you know, some of your folks may have had some hail damage or wind damage, along with the rainfall that they needed. So it was an unfortunate added piece to this.

 23:29

Yeah, and severe weather has been spotty, especially in June and into July. I believe we only had one tornado report it and that was in northern Kossuth County. But with lack of severe


weather reports that goes hand in hand with the lack of thunderstorm activity that we've seen across the broad section of the state. We've had some wind and hail damage in eastern Iowa and even in central Iowa. But where you don't have thunderstorms, you're not going to have severe weather, but you're not going to get rainfall. So Dennis hits it right on the head with the spotty nature of these thunderstorms. In wetter years, if you miss it, you'll be fine because you've got plenty of moisture available where I harken back to is 2018. And that D3 drought region going back five years precipitation deficits of anywhere from 10 to 15 inches, three months after peak of drought August 21 2018. That part of the state was anywhere from 200 to 300% above average. So went from a really dry summer into the third wettest fall on record. So things can flip fast. And that's what we've been seeing recently.

 Joe Hannan 24:34

Yeah. It's great not getting severe weather and not having to deal with a lot of disease pressure and hail and all that other stuff that took me out of production last year. But I also have very good friends in eastern Iowa that Yeah, they got rain. They also don't necessarily have a crop. So

 Justin Glisan 24:54

right, right. And when you get those windy events with that pea sized hail it's like machine gun fire are on the crop.

 Joe Hannan 25:01

Yeah. Or even though 60-70 mile an hour winds or I think the doesn't that station at one remote dad was 62 mile an hour winds on a grafted apple tree don't

 Justin Glisan 25:12

fare well. Yes, yes. And it's challenging.

 Joe Hannan 25:15

So I guess just one final question for you guys. What is it going to take to break up or get through this drought and actually get some moisture here? And is it fair to ask when we could expect that to happen? Or is that a little bit too much?

 25:32

No, I think it's a fair question. And, you know, we're moving as I mentioned, we're moving from warm season, what we call mesoscale, or smaller scale activity thunderstorms, and then transitioning through the shoulder seasons involved into wintertime. That's where we start to get the larger scale, low pressure systems, those cold fronts that move through that give us

those gentle soaking rainfalls, you don't get two inches in an hour that if you're on hard soil, it just runs off anyway. So we climate illogically. We are transitioning from different atmospheric dynamics. Another thing is, the tropics are starting to heat up again, more tropical behavior. When you have more tropical behavior on both sides of the basins Pacific and Atlantic, you start to see the mid latitudes where we live, once they make landfall, they'll bring moisture and their own energetics to the mid latitudes that can also help impact the larger scale circulation, because we do treat the atmosphere as a pendulum. And you do have to have it swing from one behavior to the next to really break out of a drought for a period of extended wetness.

D

Dennis Todey 26:39

So what we can say at this point, based on the outlooks that we're seeing, Justin, I have kind of been beating our heads around a little bit the last few days because of some inconsistency and what the outlooks are saying, but after hashing out what it seems like is fairly likely that we continue to stay warmer than average through August and on into the fall. So trying to push things along. That looks like it's going to be okay to try to reach maturity of different things. But also bad because it's going to continue to try to use more water that we don't have available. We'd like to be able to say that we're going to get rainfalls coming soon. I think they're going to continue their spotty nature. And you may get lucky and get one but we don't see a big shifts coming soon. That's going to be correcting the drought situation. Unfortunately, you know, as we get into the fall, I would expect we will see some more widespread recovery. But that still looks like it could be weeks off.

J

Joe Hannan 27:35

So talking to livestock producers talking to specialty crop producers. At this point, they should really be looking at prioritizing what gets water where and when not expecting to just come out of this and the next couple of weeks.

J

Justin Glisan 27:48

Absolutely, yes. And that's where you know, Dennis spoke very well about the outlooks and then they haven't been behaving especially the monthlies versus the short term outlooks, you can use those short term outlooks, I tell our farmers and our stakeholders that those short term outlooks that are issued each day after 2pm. Those are snapshots in time, but if you follow the trends, they can start to hint at where we're moving to. And again, Dennis mentioned that we're seeing elevated probabilities of warmth continuing through, effectively, the middle of August. But we're also seeing, at least in the updated products, today, short term six to 10 day outlook has an elevated wet signal across much of the Midwest, including Iowa, and then you go to the eight to 14 day outlook. So into the middle of August, and there's a slight elevated signal for drier than normal conditions. So again, those outlooks are not very fulsome in their guidance. But combined with those seven day outlooks, those are the best things that farmers can use to give them an idea of what needs water, what gets water, and then plants down the line.


D

Dennis Todey 29:07


And I, you know, Joe, I think you're right about trying to assess what their water situation I mean, if you have a good water supply that looks like it's going to be stable, then maybe you can continue to go ahead with that. But people you know, if you use your well down frequently, like I've heard about, that's not going to replenish itself very quickly. Because even if we get a couple of inches of rainfall, like you mentioned earlier that the soils are going to take these up, so we're not going to get a lot of runoff and well recharge. So being conservative, even though you need to get a crop and want to get a crop you didn't really want to think ahead about what is the likelihood of me getting it how much water am I going to have to use and looking at those, those 610-814 Day outlooks about. Is there a wet trade coming that could give me some help?

 29:56

Yep. And those were the same outlooks that the farmers used in the, in the spring to get planted, they saw a window evolving in which they could get out into the fields. And it was, as I mentioned, tremendous activity that they they got rolling and they got planted fast. So those outlooks do give us some sort of guidance.

 Joe Hannan 30:19

Justin, Dennis, anything else you want to talk about today? Before we wrap up?

 Dennis Todey 30:24

I think we hit the main topic. You know, Justin releases information to media we do an outlook least once a month, if not twice a month through the Midwest climate hub, people can find that on our website. I think you're going to share the website with them, or you just search Midwest climate hub. And you'll find us

 30:42

and the climatology Bureau's website and it has all kinds of outlooks it has soil moisture, soil temperature, monthly seasonal outlooks, and then historical reports. climatological maps. So you know, Dennis, and I know exactly where to look for the products that we need. And Dennis puts out a great two pager quarterly. That's, I think it's one of the better products that I've seen. And it really succinctly highlights, agricultural impacts, but also has the outlook products and additional information. So those are quarterly, right Dennis

 Dennis Todey 31:18

At least monthly, if not bi monthly. Yeah. There's the quarterly the quarterly reports from NOAA that we do. Yeah. Yeah. Yeah. And Justin and his whole staff had been working really hard with the climatology bureau.



31:31

Yeah, that's the funny thing. The climatology Bureau is Bureau of one so



Joe Hannan 31:38

Denis and Justin, thanks for coming on the show today. This has been very informative. I appreciate both of you taking time to come on and and have a chat. I also want to give a huge shout out to Krista Hartsock and Olivia Hanlon at the ISU small farms sustainability program. Gentlemen, thank you very much for joining me today.



Justin Glisan 31:56

Thank you.



Dennis Todey 31:57

Thank you. Glad to be here.



Joe Hannan 31:59

All right. And one final note to everyone. I'm always looking for guest host shoot me a note, you know, whether you're an avid listener or really really about anybody just you never know what we come up with topics. So love to have you if you're interested in joining on the podcast. Thanks, everybody.



Speaker 3 32:15

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