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KAILA: WELCOME TO VALLEY 101, A PODCAST FROM *THE ARIZONA REPUBLIC* AND *AZCENTRAL.COM* WHERE *WE ANSWER THE QUESTIONS YOU ASK ABOUT METRO PHOENIX*. I'm your host, Kaila White.

{PAUSE}

KAILA: We all share the night sky...but it's not the same night sky as 200 years ago. And all because of the creation of a light bulb. These days, some worry about the dark sky's future. Today we're answering this question.

QUESTION ASKER: *Does the Valley do anything regarding light pollution?*

KAILA: We'll look at the health impacts associated with light pollution. How a sector of Arizona's tourism could be threatened by this issue and what cities in Metro Phoenix are doing to combat the issue. Maritza, take it away.

Maritza VO:

In 1879, the light bulb was created. This new source of light, also known as artificial light, redesigned cities. As time went on outdoor lighting became more prevalent. By the 1950's light pollution started to be a concern.

Luke: *[00:03:37] light pollution itself is the inappropriate or excessive use of artificial light. [00:03:42][4.7]*

Today there are many advocates that are trying to ease this issue. Including Luke Edens Vice President of the International Dark Sky Association Phoenix Chapter. The IDA is a national organization based out of Tucson that combats light pollution globally and also gives recognition to dark sky communities.

(Cue music)

First, I'm gonna breakdown the four main components of light pollution so stay here with me. There is light glare. It's the excessive brightness that causes visual discomfort.

Luke: *[00:03:53] I look at light glare as imagined as you're driving and the headlights are shining in front of you. That glare produced by those lights is a pretty good example of light glare. [00:04:02][9.4]*

Then there's skyglow.

Luke: *[00:04:18] And basically it's the overhead brightening of the night sky in an inhabited areas, [00:04:22][4.6]*

And there's light trespass. For example if my backyard light shines into my neighbor's backyard. The last one is light clutter.

Luke: [00:05:01] all the different lights bouncing off the street lights and the building exterior lights create a basically a clutter that can't even to see far ahead is the best way to describe that. [00:05:12][11.5]

(outcue music)

Now that we have a basic understanding of light pollution. You might be thinking how can light be a problem? Light pollution can affect both humans and wildlife alike. The IDA Phoenix chapter president Christa Sadler told me how it affects our local ecosystems.

Christa: [00:07:29] A lot of us are familiar with our beloved saguaro and the number one pollinator of the saguaro is the bat. And as we all know, bats are nocturnal and they depend on natural darkness in order to find food on their own. [00:07:45][15.6]

So the bright lights disrupt the natural pattern of insects, which bats eat.

Christa: [00:08:21] And if the bat is disrupted, then we could potentially lose the main pollinator of our saguaro and eventually lose a huge population of saguaro.

Not only is Christa the chapter president but by day she is a park ranger at Tonto National Monument. She's passionate about Arizona's wildlife and ecosystem. The national park became an International Dark Sky Park over the summer in 2019.

This is actually how Christa got involved with the chapter.

Christa: [00:02:01] I became really interested in what I could do to help mitigate light pollution, not only at my park, but in the surrounding communities as well. [00:02:11][10.4]

I asked her what kind of differences she's seen with the changes they made at Tonto National Monument like changing the light bulbs to warmer lights.

Christa: [00:09:35] we've seen a significant decrease in insects attracted to those lights at night, and thus we're not seeing as many unnatural nocturnal guests, so to speak, around our facilities at night. [00:09:50][14.6]

(include transitional music)

And as I mentioned before, light pollution affects human health too. You'll often hear that your circadian rhythm is affected by this. Your circadian rhythm is kinda like your biological clock. That rhythm primarily responds to light and darkness in one's environment.

According to the National Institute of General Medical Sciences, it can influence sleep-wake cycles, hormone release, eating patterns and more.

Luke: [00:11:17] It's that artificial light that just keeps you going when your natural circadian rhythm usually would tell you it's dark, it's time to sleep. But when you surround yourself with artificial light or the blue light from your iPhone or your TV screens, it keeps you awake at night and distorts your sleeping patterns from that. And that's those are natural bodies need for darkness. [00:11:43][26.5]

This rhythm in our bodies affects our hormones like melatonin which tells us when to sleep. So if your body isn't producing the hormone you could have problems sleeping at night. And the effects of this could be profound.

Luke: [00:11:47] including a lot of studies are now on breast cancer. [00:11:49][2.3]

A study released in 2010 by the National Institute of Environmental Health Perspectives found links to light at night and an increased risk to breast cancer. In the study, they found that the growth of tumors slowed when one's blood is rich with melatonin. According to the researchers from the study they said quote, "it seems to be significant and if it is then that's something we can control."

(end cue music here)

Now that we know the health and wildlife affects light pollution has, what are cities in the Valley doing to reduce light at night?

Some cities are taking back their own night sky. Take for example Fountain Hills in north Metro Phoenix. In 2018, the community received the designation as a dark sky community from the IDA. Christa told me it's a lengthy process.

Christa: [00:14:43] On average, it takes about 1 to 3 years for the entire application process. And with that, for communities as a whole, it comes along with taking a lighting inventory of all city owned and publicly owned lights. [00:14:57][14.2]

The city of Cave Creek is also working towards a dark sky recognition. For larger, more densely populated areas like Phoenix, decreasing light pollution has been... a journey?

In 2007, the city of Phoenix started looking into changing out street lights to LED lights.

Briianna: [00:00:22] My name is Brianna Velez, the assistant street transportation director. [00:00:24][2.8]

Briiana: [00:10:06] when we first started this, the cost of L.E.D. was enormous. And so when we looked at what we were paying for our current street light fixture versus an LED, it was really cost prohibitive. [00:10:16][10.1]

But with time the technology got cheaper. This change became more attainable. By 2016, things started to really ramp up for the department.

Briianna: [00:01:09] So the city embarked on an effort to do a L.E.D. conversion of approximately 100000 lights. [00:01:16][7.0]

Originally, the main intention for this project was to save energy consumption and cost. It wasn't until later, they realized there was more of an impact these lights could make in Phoenix.

Briianna: [00:05:09] that then came out was light pollution and how can we help the environment? And so we were able to tackle that as well [00:05:15][6.2]

The department searched for community input. One way they found it was by doing an online survey for people to choose between a 4000 kelvin, that white blue light or 3000 kelvin a more warmer light. Kelvin is the measurement of light. They received feedback from all types of people in the community.

Briianna: [00:03:29] We had people who lived near some of their preserves in the mountains and wanted to make sure that there wasn't a lot of light pollution. They didn't have a lot of lighting in that area. They wanted to make they liked the warmer light [00:03:42][12.7]

And so the city of Phoenix changed their standard of 4000 kelvin to 2700.

Briianna has been working on this project for 13 years. And on January 14th this year they finished the project.

Briianna: [00:10:42] It was really exciting. You know you know, there were a lot of people that were really happy with this project. And so

we're just looking forward to other opportunities and things we can do utilizing technology in our department. [00:10:54][11.9]

Christa told me glad to see Phoenix move in the right direction but she said there's more that can be done. Even with those changes Phoenix doesn't qualify as a dark sky.

It doesn't help that there is no countywide ordinance to counteract light pollution. Every city in Maricopa county is in charge of their own outdoor lighting ordinances. Oversight might come from a different department depending on where you live.

(cue spacey/science music/nature)

Decreasing light pollution might be difficult. But it benefits not just our health and ecosystems. It also benefits our economy. Looking up at the night sky in Arizona you might be able to point out Orion's belt or the big dipper. Astronomy is a big deal in Arizona with observatories in the North and South of Arizona. But people travel to Arizona just to marvel at our sky.

Joshua: [00:00:10] my name is Josh Coddington and I am the communications director and PIO for the Arizona Office of Tourism. [00:00:15][5.2]

Joshua: [00:01:07] So astro tourism in Arizona involves coming here to really appreciate our amazing night skies that we have that are visible from many locations across the state. [00:01:21][14.2]

Astro tourism is a multimillion dollar industry that impacts our entire state.

Joshua: [00:03:03] we have 16 dark sky places in Arizona. [00:03:07][4.4]

This includes the Grand Canyon. Just last year, it was certified as a dark sky park. The largest in the country.

Joshua: [00:06:06] But one of the great things that astro tourism really does is it gives us a whole nother time to utilize our state parks, which is at night. And I think people traditionally don't think of visiting a state park at night. [00:06:19][12.8]

But if you really want to do some stargazing, you need to get out of Metro Phoenix. Fountain Hills is one place you can go to see the stars. Josh gave me a sneak peek to what the community will soon be adding.

Joshua: [00:08:06] And they're also working on building the first international Dark Sky Discovery Center, which is an observatory, a

planetarium and a place with interactive exhibits that should be opening, I believe, in twenty twenty one. [00:08:22][16.1]

There is no official date for the opening of the center. However, according to earlier reports by the republic, the center could have an impact on science education in the surrounding area.

According to Josh, Arizona is a leader in astro tourism and dark sky communities.

Joshua: [00:11:02] And as more and more communities are seen seeing the value of this, it's great because it gives us something to promote. In addition to the other wonderful things in Arizona, and it really shows that Arizona is a leader in this field. [00:11:18][15.4]

Christa with the IDA Phoenix Chapter spoke a lot about the heritage of the night sky and fears that future generations could lose its beauty.

Christa: [00:28:17] I think that we need to do something because, again, that connection is something that is felt all across the globe and we could be doing something about it. [00:28:25][7.7]

{Show music cue}

Kaila: So to recap, light pollution affects our daily life in multiple ways, wildlife, and our tourism sectors. Wow. Maritza, is there something people can do to help light pollution?

Maritza: Yeah. So here's what Christa had to say about that.

Christa: [00:21:36] And one thing that we always try and tell people that being a having a dark sky doesn't necessarily mean having a dark ground. So ask yourself, do you need the light to begin with? And if you need the light, what can you do to make sure that it's pointing where it needs to be? So add those shields. Make sure that the light is in a proper color temperature if you don't need the light for very long at a timer on it at a motion sensor. And if you don't need it, turn it off. [00:22:02][26.3]

Maritza: They also let me know that if anyone who has more questions or wants to know more about the IDA they are opening to chatting with anyone who is interested.

Kaila: (insert response)

Well, that's it for today.

If you have more questions about how metro Phoenix is changing, submit them to us at valley101.azcentral.com. And if you're a new listener, remember you can go back and listen to old episodes. Let us know what you think by leaving us a rating or review on your podcast-listening app. As always, thank you for listening to Valley 101, a podcast from *The Arizona Republic* and azcentral.com. See you next week.