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Greetings in, good evening, everyone, and welcome back to the Mark Fraley podcast.
Today is January 25, 2019, a beautiful sunny Friday afternoon here in Nashville.
Although it has been a little cold, the sunshine is very welcome after a couple weeks of rain and clouds.
The state of Tennessee operates 56 designated parks, state parks, and there are numerous additional areas that are called natural areas or historic areas or archaeological areas.
All managed by the state.
Visitors to these sites always want a map to show them where they are and what to expect when they visit.
The location of trails, the parking areas, the restrooms, etc.
The parks range in size from 20 to 30 acres all the way up to 20,000 acres or more.
The production of these maps has historically been a real headache for the state parks system and its management.
For one thing, as time goes by, the boundaries of the park's shift as the state acquires new land.
New facilities are developed, which need to be shown on the map.
New trails are made, new natural features are discovered, which need to be reflected on the map.
The task of keeping up with this in an organized way over 56 separate parks is a daunting and expensive.
You also want to have, from a graphics standpoint, a unified looking map product that you can be proud of.
Then there is a question of knowing how many to print to keep up with user demand.
And maps are also important for park managers to keep track of location of rare and endangered plants, animals, exotic plants, and sensitive areas that need of special protection.
As managers of the parks retire or move to new areas, we don't want to be required to start from scratch on what we know about each park.
And so today I sit down with Sonny Fleming, who is the geographic information systems coordinator for the Division of State Parks.
Sonny and I talk today about the management of geographic information generally, but also about two special projects involving mapping and the state park system, and how using modern technology and adding some real value to the visitor experience and management of our state parks.
And so I hope you will enjoy my interview with Sonny Fleming.
[BLANK_AUDIO]
- Sunny Fleming.
Welcome to the Mark Freli podcast.
- All right, thank you for having me.
- It's terrific to have you out here
on this beautiful winter day here in Nashville.
- Yes, absolutely.

Finally some sunshine, it's a little cold,
but we'll get through it.
- Sunny, I have not met you personally until today,
but I've been observing your work activity
as you can on Facebook.
I'm a Facebook snoop.
And I know that you're involved in geographic information
with different systems for the state park system.
- Yes, sir.
- Terrific, interesting job that you do.
- It's the best.
- I wanna talk about a couple particular projects
that you're doing, which I think are fascinating.
But before we do that, tell the audience a little bit
about yourself and where you're from and your background.
- Sure, so I was born and raised in Nashville,
actually just south of here in Franklin, Tennessee.
And my mother's side of the family has been in Tennessee
for a very long time.
And my ... - In Middle Tennessee?
- Not in Middle Tennessee, in Sweetwater area,
so it's been watered in 10 miles.
It's half way through. - Southeast Tennessee, sure.
- Yeah, halfway between Chattanooga and Knoxville.
- Right, right.
- That's the Sharp family.
And through history, just kind of like genealogical history
and all sorts of things.
I've kind of come circuitously to ecology and GIS
and mapping, it all comes together.
And my college career began at Austin P, actually.
And you interviewed in a previous podcast,
my major professor there, Dwayne Estes.
- Dwayne Estes, wonderful person.
- Yes, yeah.
- So from there?
- So you've got a botany and field biology background.
- Yeah, I actually started at Austin P as an art student.
- Oh my. - And then I just one day,
I think Dwayne actually caught me snooping around
the greenhouse.
And he was asked me if I was interested in botany.
And I said, "Okay, I didn't really know what that meant."
And he had scrawled my name on his white board.
You know, like I need to get in touch with that student.
And about a year later, I came back to him

and I said, "You know, I'm gonna give it my art scholarship
and switch to biology."
And I immediately failed all of my first semester classes
as a biology student and thought that I was going
to be terrible.
And he just really encouraged me.
And he found an internship at Arnold Air Force Base
as a biology intern.
And that took me over to that part of Tennessee.
And from there, I ended up actually at UTC,
but I was still working on some projects with Dwayne.
And, you know, we've just been friends ever since.
And yeah.
- Well, fantastic.
Growing up, what experiences did you have
that might have led you into that?
- Yeah, so like I said, I didn't know
that this was where I wanted to go at first.
And it just kind of came about naturally, pardon the pun.
- Yeah.
- And I think it was because I grew up
in a very wooded area of Tennessee.
It's kind of in the knobs of the central outer central basin.
And so I had a lot of woods to play in.
It was really my escape.
If my parents would punish me by making me stay indoors, right?
When most of my peers would be playing video games
and things like that, I just never had an interest in it.
So it was always a peripheral thing for me.
It was a place of escape and sanctuary.
- Fantastic.
- Yeah.
- Fantastic.
So when did you start working for State Parks?
- I started working for State Parks in 2013.
- Okay.
- And I actually started with division of natural areas
at that point.
- Okay.
- And I was part time and helping them do
some of their rare species monitoring
and then had the opportunity for this full-time job
as the GIS specialist a couple years later.
- All right, well, let's get in and talk about that
a little bit now.
GIS, geographic information systems.

- You got it.
- Tell us a little more about what that really means.
- Huh, well, what's in a name, right?
- So it's geographic information and the system though
is really, that can probably refer to a lot of things, I think.
So a system of, of course, information,
a system of software, but also systems
as in ecological systems or other systems.
I think a lot of people probably see it mostly
as the map making byproduct and it is.
- In record keeping.
- In record keeping and that's really the key aspect
of the records and data.
- Right, right.
You know, when I was working in parks and conservation,
we were just then coming into the computer age, right?
I mean, literally, the only computers
that we had access to were mainframe computers.
No, there were no laptops, you know?
And then the only laptops that we did have,
even before I left were for just word processing.
- Yeah.
- So, but today it's a whole different situation.
- Whole different ball game.
- Right, so just as a way of getting the audience interested
in knowing what you're doing,
I know that you're working on two particular projects.
One has to do with the actual maps of the parks.
- Yeah.
- All right, and I remember this was always a challenge
to keep good maps of the parks.
The visitors would want them.
- Yes.
- They're expensive to publish.
- Yes.
- And you don't want them to look raddy.
You want them to look like something.
- Right.
- So what are you doing?
- Wow, it's been an interesting journey with that.
I actually came into, you know,
let's just call it the standardization of these maps.
I kind of came into it as we had started going down
that rabbit hole, which is a good thing.
And then I got to adopt the project.
As you mentioned, you know, this is not historically

unprecedented necessarily.
And our state parks, each park has a friends group
and our friends groups are hugely supportive.
And they have always kind of filled the niche for us, right?
They would volunteer to make the maps for the park
and there's been some centralized efforts to do it,
but it's never really come together into this full project.
And we finally have been able to do that
with the help of a volunteer, Monty Lamb,
who has cloudhiking.net.
And he's an excellent cartographer.
And he's retired and he does this
and he's taught himself the software.
And so his collaboration with us
has produced 56 standardized state park maps.
And when I mean standardized, I mean,
we kind of use the same style of icons across all of them.
They all have the same color scheme.
- Typeface, that's right.
When you look at that map, you know that is a state parks map
and you will see that same style
across our entire state system.
And it's been a long journey and it's revealed a lot of things
about how we collect data and how we manage information
and why it matters because these are,
this is a very public facing product.
- Absolutely, the probably the most public facing.
- It's one of our most public facing products, absolutely.
I mean, you all have millions of visitors to your parks.
- Yes, yes, and that's increasing.
- Right, and you know, visitors rely on those maps
to get around where MI, what is there to do
in the park, et cetera.
- Yes.
- And so computers and internet and those sorts of modalities
offer opportunities for visitors as well.
- Yes.
- And so you've got a thing called Avenza Maps.
- Right.
- All right, so let me, Avenza, A-V-E-N-Z-A.
- Yes, and that's a third party software, actually,
but we're taking advantage of it.
- Okay.
- So you can download it to your smartphone.
It's an application.
- All right.

- And.
- So you go to the iTunes App Store.
- Yep.
- And you search for Avenza Maps.
- Yep.
- All right, then what do you do?
- All right, so once you have the application downloaded,
we publish our park maps to what's called their store.
And it is a store, so we sell these digital maps
for 99 cents. - Right.
- And of course that costs a split
between the third party applicant and ourselves.
So we don't see all of that, but that does go to a fund.
Just, and that's a small fund for us to keep up our GIS,
basically.
- And the beauty of this map is that it takes advantage
of the technology of your phone.
So there's a GPS on your phone that's--
- Global positioning satellite feature.
- Yeah, absolutely.
- You have to have that function turned on though.
- You do.
- Right, 'cause sometimes you might not have it turned on.
- Right.
- And privacy purposes.
- Yeah, so in your settings you would need
to enable your location settings for this app.
- All right.
- And it works independently of your cell phone coverage,
so if you're in a park that doesn't have
a very good cell service, which most of ours don't,
you can still see where you're at on the map
because of your GPS.
- All right.
So, let's go through that again.
'Cause my wife and I tried this out this past weekend,
at Radner Lake. - Uh-oh.
- At Radner Lake.
- It was successful.
- Oh, it worked seamlessly.
- Oh, that's so exciting.
So, when we were here at the house,
we got on the Avenza website and bought a map
of Radner Lake State Park, 99 cents, no big deal.
So, when we were at Radner Lake, as you say,
you do not have ordinarily cell service at Radner Lake.

I'm on AT&T, my wife is on another service
and she does get service in the park
for some reason or another, but I do not.
- Yeah.
- So, we were able to open up the map.
So, you don't have to be online, so to speak,
or in a network, or anything like that,
to open up the map, 'cause it's resident on your phone.
- Yes.
- Right.
- And as we walked around the park,
the little blue dot on the map followed us around.
- I love it.
I love it when things in theory actually work in practice.
- Right.
And so, the park map itself is not just featureless,
similar words, it's just not the boundaries.
- Right.
- So, tell us what the features are
on the park map to ordinarily.
- So, ordinarily, of course, we want kind of your basic
topography.
So, you have an idea of what you're getting yourself into.
We have the trails, we have roads, but we also have,
you know, the things, your amenities.
What are you going to see there?
And that's, you know, at Radner, of course,
we've got the visitor center and the nature,
the nature center.
So, those items will be on the map,
but also, you know, on some of our other parks
that we'll have overlooks or waterfalls,
items that our guests go to a lot of times,
we'll put those on the map as well.
- So, you can tell by the lines on the map,
how steep the terrain is.
- Yes.
- All right.
Are the maps usually identified in terms of elevation?
Or is there usually an elevation number?
- Yeah, absolutely.
So, we treat these contours just like you might
on a standard USGS map.
And depending on the scale is, you know,
not all of the maps are going to be at the same scale.
And so, some may be at 20 foot contours,

which means 20 feet between the first reference elevation
and the second reference elevation.
So, it does differ park to park, but yeah.
- I guess it's one thing to do a map
of a 20,000 acre park like Fall Creek.
- Yes.
- And be able to accommodate the parameters of your iPhone
or whatever versus 700 acres or 900 acres
at Radner Lake.
- Yeah, and you bring up a good point, right?
So, we had to put out our 56 park maps.
And we just had to, we had to make them.
We had to have one for each park.
And we focused first and foremost actually
on the print version.
And so, the ones that you can download on the phone,
they're great and they're working.
But I think if we, I think ideally,
there would be two different products for each park,
one for print and one for the phone.
- Okay.
- 'Cause, you know, insets, things like that
might actually get in the way where you might be walking.
And so, it's all, it's really interesting stuff.
We've learned a lot in this product.
- Well, one of the cool features of this product as well,
as you are meandering in the park,
if you're on a trail or wherever you are,
you can take a picture with your phone.
- Yes.
- And the application will put a little dot there on the map,
which you call a pin on the map.
- Yeah.
- It would be a better way to put it
to demarcate that location where you took the picture.
- Yes.
- And then after your experience in the park
for a couple of hours, you can go back.
- You can make your own map.
- And say, okay, I took a picture of this particular flower.
- Yeah.
- It was at that latitude and longitude.
- Yes.
- Absolutely.
- And it's funny because before we started building out
a little more streamlined aspects of this,

we were using Avenza Maps in that particular feature
to get data collected from our Rangers.
'Cause they love it.
It's so easy.
- Tell me more, what kind of data would you be collecting
from your Rangers?
- Oh gosh, so things that you probably won't see on a map.
Like recycle bins.
And you know, so some of those physical assets
that were interested in from an asset management standpoint,
but that we would probably never put on a public map, right?
And so that's the kind of stuff that we ask
from our Rangers all the time.
Like, hey, can you send me the information for this
or the location for that?
- Go out and take a picture of.
- Yeah, take a picture of.
Put a pin down.
You can export it out and email it.
And that's a great feature for them.
- Fantastic.
And back in the day, you would have to take your GPS.
You would have to, you know, take that point,
bring it back to the office, plug it into your computer,
export it, save the file, email it.
You know, and we already ask our Rangers to do so much.
That's just ridiculous.
- Yeah, we used to have to go out there
with actual physical maps.
- And mark it.
- And actually, estimate is this where we are?
- Right, yeah.
- Because we couldn't, we had no ability
to know, exactly the latitude and longitude.
Well, it's a fantastic development.
So friends, if you are traveling to a Tennessee State Park,
be sure to, in advance of your trip.
- Yes.
- Download this application of Enza Maps.
- Yes.
- And get the map of the park you're going to.
It'll make your experience at the park much, much more better.
- It really does.
- It's so fun and it, I think it empowers people
to explore areas more, you know?
- So related to this is the,

the constant struggle that State Parks has
to actually know what the resources are,
the resources are that they are trying to manage.
- Right.
- Tell us more.
- So, this is really my pulpit, you know?
- Go for it.
- We have an excellent and rich and long history
at our State Parks and a lot of that knowledge
is institutional knowledge that our managers carry with them
and that some of our longer standing rangers have
in their heads.
But we lose that knowledge when we have this turnover.
And so collecting data is my big pulpit.
We got to collect data, we've got to get this information.
And there's two aspects to this.
There's kind of the boring asset management side of it,
like the recycle bins and things.
But then there's a side of it that speaks to me
from an ecological level and a biological level.
And that's including an inventory
of our biological resources there.
And I believe the project you're referring to
is the INaturalist project.
- Yeah, I want to hear about that.
- Yes, it is not just me, I want to say that first.
This was something I've been interested in,
but it was really prompted when a ranger approached me
and said, "How do we do this?"
And so that, I was like, all right, I'm going to do it.
We're going to set it up and do it.
So it's been a grassroots effort at the park
driven by some of our rangers and myself.
- So it involves the professional staff at the park
using this tool.
- Yes, hopefully.
- But then hopefully, citizen scientists
who are trying to cooperate.
- Absolutely.
- All right, so how, if a person is involved
in a nature study on a recreational basis.
- Yes.
- How can they participate in this?
Tell us about it.
- So the beauty of this is that I think people
are already participating and they may not even know it.

They just need to take an additional step
to really participate.
And what I mean by that is how many times
do we take our silly smartphones out there
and we see some crazy mushroom
and we take a photo of it and we post it on Facebook, right?
We do this all the time and we have no idea what it is.
- Or a particular bird you've not seen before.
- All sorts of stuff.
So this project with INaturalist,
INaturalist is another app that can be downloaded.
And you can just--
- And it's free.
- And it's free, yeah.
And you can upload your photo to INaturalist.
And it's just like social media.
So instead of posting it to Facebook,
you're really posting it to a bunch of biologists
and other amateurs.
And then everyone can kind of idea it
and come to an agreement, right?
That's what this is.
And so we started this project actually.
It's the 2019 Bioblets and it started on January 1st
and it's gonna go to December 31st of 2019.
And just in the few weeks it's been open.
We've already got 260 observations as of a couple hours ago.
And that's in winter.
- Got you.
- So this is very powerful stuff.
- So you're encouraging citizens who visit the parks
to take pictures of what they see at the park.
- Oh yes.
- Particularly if it's a unique feature.
- Absolutely.
- And post it to INaturalist.
Now how will INaturalist know to use it with your project?
- Ha, so this is where the GIS comes in.
- Right, okay.
- So since we have the park boundaries,
you know, as our shapefiles for the maps,
I used those and uploaded them to INaturalist.
And so that creates what's called a geofence.
And a geofence is really just an area, right?
So maybe a neighborhood or a parcel,
but these are our parks.

And it recognizes the metadata from the photo.
Again, from your location services from your GPS.
- All right.
- So it'll say, oh, this is--
- It'll recognize the logitune latitude.
- Yes.
- Okay, okay.
And, and the time, right?
So we're doing this within a year.
So if you post it outside of that year,
you're not gonna include it in our bio-blitz.
- Okay, all right.
- Has your bio-blitz so far?
And you said you have 200 observations.
Has it revealed anything fascinating or interesting or?
- You know, in winter, it's a little bit slow.
So people are seeing a lot of,
from a plant side of things,
you're seeing a lot of the evergreen ferns
and evergreen trees and items like that.
A lot of deer.
So far, we haven't had any big surprises yet,
but we've had a really wet winter.
- Okay.
- And so we've seen a lot of cool mushrooms so far,
which I know almost nothing about, but they're fascinating.
- Are you interested in people taking
pictures of cultural features as well?
- So I naturalist is not recognized cultural features.
- Okay, all right.
- We are definitely interested in that,
but I think we're gonna have to come up
with another solution.
- Another way to do that.
Well, that's a whole different dimension though.
- It really is, yeah.
'Cause parks is loaded with old buildings and historical
- Preserve and protect and perpetuity.
- That's right.
So that is really fascinating.
So we have two different projects that you're doing.
- Yes.
- And that the citizens can and should get involved in.
So the first is the park maps,
but then the I naturalist.
- Yes.

- And you're calling it a bio blitz.
- Okay.
- Which is not my term.
I did not coin that, so.
- Well, whoever did it, that's kind of a clever term.
- It really is.
- So let's hope that people can get out there
and use those phones and post it.
It doesn't cost you anything, too.
- It doesn't cost anything at all.
And, you know, I think too.
I started thinking about using this platform
because kids who are out in our parks,
their parents are always struggling
to get them to pay attention.
And I think that instead of kind of pushing against
some of this technology,
let's embrace it and focus that use.
And it's been successful with kids.
- You know, not every thing that you see
on the landscape as you go around a park,
is a positive feature.
- Right.
- So walking around redner,
you might see private hedge.
- Yes.
- Or something of that nature.
Are you interested in people posting
that sort of thing?
- Absolutely.
I think it's very valuable to actually know
where we're seeing higher concentrations
of invasive species.
And that's where, you know, if this really takes off,
we might actually be able to utilize
some of this information,
not only for protecting resources,
but managing space.
- To manage, you know, where do we need to focus
a little attention exactly?
- Data-driven decision making.
- Right.
All right, so those are the two projects
that you've got that are really on the front burner.
- Yes.
- But I know that geographic information systems

is about, you're doing more than that.
- Oh, yes.
- So tell us more, what else is going on?
- Oh, wow.
So that's, we've got a lot going on.
- Right, all right.
- But one of the big initiatives that we're pushing
for 2019 and beyond is,
it's got a kind of a silly name,
but we're calling it Smart Parks.
And what we're looking to do is create better platforms
for data collection for our Rangers.
And this really comes from two major needs
and the first need and all the Rangers laugh
when I say this 'cause they're so sick of me saying it.
But it's reduced redundant inquiries from central office, right?
So here we are in our crystal palace, right, downtown.
And we always ask these Rangers for information.
And we ask them to do a lot.
They are commissioned officers,
but we also expect them to work with the public
and to be biologists and to clean the bathrooms.
I mean, they are more than just commissioned officers.
And it kills me to have to ask them a question
that maybe someone on the 10th floor has already asked them.
- Right.
- And my goal in my career,
not just this year is to make that easier
across state government.
- Gotcha.
- And we need to all be on the same page.
And so we're using GIS.
- To share information around.
- Absolutely.
- One of the things you and I talked about a little bit
before we got on the air was the whole boundary issue
of the state parks now.
Historically, many of our early parks
started when the federal government granted a particular piece
of property to the state of Tennessee.
- Yeah.
- And the surveys, the land surveys that were done
of Fall Creek and Standing Stone
and some of these properties were grossly accurate
but not really very accurate.
- Right.

- And are we doing anything to update
the actual boundary maps of the parks?
- Yes, absolutely.
So we are currently going through all of our deed records
and we are looking at the actual needs and bounds
and we are typing them in.
And so we're doing that.
But we also are getting a surveyor out there,
you know, on a case by case basis.
- To verify the particular time.
- To verify things.
And it's a really interesting project.
It's extremely tedious and it's gonna take a long time.
But we've definitely improved our park boundaries
and some of our parks, you know, we focus on a park
before we move on to another one.
So we've gotten through maybe five of 56.
- So are you working on the big parks first or what?
- No, not really.
We started going alphabetically, you know,
we kind of started there.
But then through the map making process for the GOPDS,
we realized that, ooh, you know, this park needs
a lot of attention and so then we focused there.
So it's just been a really piecemeal in that way.
- So as you know, the state's always acquiring new properties.
- Yes.
- And incorporate the incorporating new property
into the maps mapping programs is another aspect.
- We've streamlined this process a little bit.
And what I mean by that is now we get CAD data,
which is digital and it's very accurate.
And so-- - Computer-aided drafting data.
- Yeah, something to do with engineers, silly folk.
(laughing)
Yeah, but I can consume that same data in my GIS.
And so we're adding those boundaries in.
And so I would say anything in the past seven,
10, even 12 years is gonna be much more accurate.
But of course, the further back you go in time,
the less accurate those boundaries are
and the more difficult they are to hunt down.
- Yeah, you would think that when the state
would acquire something now there'd be a survey done
before the acquisition was made.
- Yes.

- And today those surveys are done electronically.
- Yeah, we get the CAD and we pull that in.
And we've got it set up.
So we actually serve our boundaries online to the public.
We serve our boundaries right now and our trails.
So if you use GIS, you can pull those into your software.
And we've got it down to that every Wednesday,
that data set gets updated.
- Wow.
- Yeah.
(laughing)
- And that sounds like you're using
mainframe technology to do.
- Yeah, we've definitely had our IT group involved
with scripting that over and pushing those updates
from our database to kind of the larger state database
than to the--
- Wow.
- Yeah.
- Wow, that's amazing.
- It was a process, so.
- Well, Sony, this is fascinating.
Anything else that's on the horizon as far as
the GIS program is concerned.
I know that MTSU, one of my guests in the past
was Zeta Law.
- Oh, I love Zeta.
- Yeah.
- And I know that she handles that program up there
at MTSU is kind of a statewide coordinator of GIS programs.
- Yeah.
- Is the state parks participating in that?
- Oh, man.
That's a loaded question.
We've definitely spoken to some universities in the past.
And I think our program at the time was too young
to really understand what role we could play.
And we were also maybe too young for the universities
to kind of understand what role we could play,
but we've definitely entertained the idea
of involving them somehow either in data collection
or other projects, but we're still exploring it
and we're gonna see where it goes.
- Okay, okay.
Well, Sony, it's been a terrific pleasure
to have you as a guest today.

- Thank you very much.
- I wish you the best of luck with what you're doing and maybe you'll come back and give us an update on how things are going.
- Oh, I would love to.
I'll talk all day.
- Thanks so much.
- Thank you.