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Thank you, Tracy, very much. I want to thank Tracy and Naomi Kimbell who have been working on organizing and getting us together again. As Tracy said, this is the second in a series that we hope to continue. It's really exploratory -- opportunity to try to get together across the globe, really, with a number of different people from a couple of different countries, as well as the United States, and a conversation, really, about ecology and disability. The ecology really comes from some of our work in rural communities and realizing the study of disability and rural communities is really a study of community ecology. Really focusing on the environment. Our work has been influenced significantly by the World Health Organization international classification of function. We have been working diligently in a number of different ways, as others have, around the world, to develop measures of the environment, measures of participation, new methods for measuring those factors. And, new ways of even understanding disability, itself. Part of what has interested me I think, and in particular, in the last couple of years, has been a series of encounters and conversations with people from a broad range of disciplines that either are using methods that may apply in that way, or doing things that are addressing issues of the environment, as they may affect people with disabilities. Or even today, measuring and collecting data that might be able to include people with disabilities examining portions or elements of participation that are unique and different in many ways. We have been trying to organize and hope to continue to hold a series of small conversations with interested folks, really reaching across, as many disciplinary boundaries as we possibly can. Our first conversation included Paul Lukacs from wildlife biology, talking about methods of tracking organisms and wildlife. Trying to understand the relationship to their habitat and the ecology. At the same time, David Gray, having an opportunity to talk about some of the work he's doing using Internet technology and Google maps. Trying to get a handle on where people with disabilities go within communities and what they do when they are there in the kinds of environments they are encountering. In that process, as this past year, one of the folks I ran into at a conference in Missoula, a faculty mentor, Wayne Freimund, and I got talking with some folks around the conversation about protected areas or national parks in Africa. We were talking about how they track elephants and some of the wildlife biology. Wayne mentioned they were collecting data on parks visitors in the United States, to begin to try to get an understanding of the way that the engagement of individual visitors -- how that plays out. And, was wondering if there was a connection, potentially, to be made in understanding potential participants with disabilities. So, it is a great delight to have Wayne join us today, give us a view of what they are looking at within this kind of broad notion of engagement in wilderness and national parks. Helping us understand a little bit about how people's people with disabilities might be included in some of that are how we can help understand those issues. At the same time, today, Craig Ravesloot is going to talk about some of the research and development he has been leading in using ecological momentary assessment and measurement assistance to track the engagement of people with disabilities here in Missoula. So, absolutely thrilled the two of you guys are able to talk with us today and I hope the conversation unfolds in an interesting way. Having said that, I think Wayne, would love to have you go first and give

us an idea or notion of what parks management is and what you are trying to gain and understand the engagement of people in national parks.

Can everybody hear me okay?

Yes.

First, let me say thank you to Tom and Tracy, who have put all this together. And do see the PowerPoint? Everything worked so well, yesterday, Tracy.

Yes. Everything looks great. I'm keeping our line on mute for the presentation. We have multiple people in the room. I will most likely communicate with you in the presenter chat box.

Okay. I think that's going to work out okay. Sometimes I lose the screen here. First, let me say thanks to Tom and to Tracy for organizing this and the invitation to participate. I hope that some of what I can share with you all today has some relevance to the work you are doing. I have to admit I'm very selfish in this interaction because I really want to see the kinds of things that you are doing. I think we can adapt some of your technologies and data collection approaches to make a difference.

I'm going to talk how we've used technology over the years to help us understand national park visitors and I'm going to focus in on that data collection piece. For us, it's got two roles. One is to help us collect data efficiently. The other is to help us communicate and communicate with visitors and communicate with each other and community members. That's a big part of it for us. Let me give you a little background. I've been at the University of Montana for 20 years. I teach in a park tourism and recreation management program. These kinds of programs around the country are very involved with all aspects of civil society, including people with disabilities, and programs that are trying to better understand how to integrate nature into all of society.

We look at, I think, a lot of the same kinds of questions that you guys do. We are guided by generally issues of quality of life. When you think about the role of outdoor recreation, tourism, nature protection, environmental education, they often times are viewed as these things enriching an individual, enriching a society and whatnot. So, that's really kind of where I think we have a lot of common ground to coalesce. We also spend a lot of our time thinking about how people benefit from these interactions with nature. There is lots of reasons for that. Personal growth and the altruistic ones. Organizations that are allocating resources and time toward provision of services always needs a way to understand the impacts of their work. We are very interested in how an outdoor experience influences a person, hopefully, in a positive and quality way. When I think about our land managers, they have an additional obligation to try to provide quality services to society. They have to be able to understand the impact of their decisions and that sort of thing, as well.

That's often how they will engage people like me. They have a plan that's going to occur and they need help understanding how society would be

affected by their decisions. So, we've involved ourselves with a lot of different national Park research over the years. Usually in a planning context, trying to think of a desired condition or reacting to some kind of a problem. My colleagues would probably refer to me as an early adopter of technological tools. We have these issues of communicating complex systems amongst one another and I was an early person in our field to jump into using computer mediated devices to help us deal with these things.

I'm going to take you through a little odyssey of that evolution and try to end in a place that will facilitate some conversation for us. So, we started out with basically using computer mediated imagery to both collect data and help communicate complex situations. I'll just show you that real quick at Arches National Park. Over time, we've tried to incorporate more sensory, multisensory kinds of things. There's quite a bit of research going on with soundscapes, for example. Or understanding night skies. Those things are really broadening the demands for technology, to improve that.

We also have a lot of interest in understanding where people are. Where they go, how fast they get there, what their experience is like when they are there and what their evaluative reflections are after having an experience. I'm going to take us through a series of studies that illustrate some of these things real quickly and spend the most time on this notion of tracking visitors, radio collaring people as my colleague, Paul Lukacs can radio collar Elks. We have the same kind of interest and understanding movement dynamics.

One of our issues in national parks is popularity. I would imagine most of you in this audience have been to a place where you think, wow, this is beautiful but so crowded. That's a problem visitors express to park managers very continuously. There is a long tradition of research to understand how to draw the line somewhere. When do we have too many people here? What happens, over time, people engage and adapt. They cope with the setting of how many people they actually interacted with when they had a negative experience. We used, early on, Photoshop. This is before there was a 1.0. This was a very, very first version of Photoshop to lay out a range of possible settings that people could see and then react to. It was a wonderful communication tool, plus, it gave us some very good data through which we could see qualitative differences in how people were evaluating settings in terms of the acceptability of the conditions that they would see or experience. This gave us a way to get everybody on the same page when I'm talking about 100 people versus 20 people, how acceptable that would be for people to run into. This seems like very rudimentary stuff now, but it was quite a breakthrough at the time. Until then, we were very much dealing with my imagination versus yours, versus somebody else. They could tell us things weren't right, but they had a very hard time telling us what wasn't right.

This removed that burden from the people we were collecting data from. These kinds of pictures were really helpful when we would talk to community members and people involved with economic relationships to parks, who might want more and more and more. Quickly, they could see there is a potential for overdoing it, economic exploitation, to where

even their customers would start to experience a poor kind of experience and not come back.

All right. That was useful for things like crowding, but also looking at restoration efforts, targeting different kinds of setting designs and that sort of thing. Here is a series of pictures at Zion National Park where we were looking at how people would make trade-offs for experience quality relative to access. People said, yes, we want the trails to be this nice. If, indeed, that means we don't get to go there or experience it the way we wanted to, we are willing to make that trade off. In this case, unfortunately, that was the original one.

The park, then, had good guidance to go back and make a difficult decision about access versus quality.

Okay. So, that was kind of our early beginnings, thinking about the world is a highly visual place. We know there is more to it than that and got a chance to start thinking about some multisensory ways of collecting data. Again, we will stay at a place in Zion National Park that is highly popular and a beautiful place. They had just put in a shuttle system to increase access for visitors, get them off of gridlock on the roads. That created a lot of demand into the canyons, which created crowding. It also creates kind of an echoing effect. In this case, we did a study where we compared the number of people that you would encounter from this crowding perspective, but also added how the sound quality would affect the visitors' acceptability ratings.

So, we sat in this area with recording devices, highly sensitive sound sensors, got a good distribution of decibel level than created an quasi-experimental design in a lab that enabled us to get repetitions of different setting attributes that were including both sound levels and number of people in a picture. Hopefully, you can hear this. This is the sound of the Virgin River when there isn't anybody there. Very very peaceful. Beautiful. When the shuttle system was put in place and the cars were taken out, one of the first things people noticed was they could hear the river and they could hear the birds because the noise of the traffic wasn't in the way. But then, you have human sounds. [Sound of canyon and people talking]

So, in this case, when we looked at the data from it, we found out that the number of people in the setting wasn't nearly as important as their behavior and the sound of the people, the soundscape. When you look at this graph, you see -- whether it's natural sound -- a low volume of human sound and a high volume of human sound -- and, then the number of the people you would encounter at any given time. The third column is the acceptability ratings. A high number of people with natural sound was far more acceptable than a low number of people with even a low amount of human sound. That helps us understand the multisensory part of this, that we have to think about the entire ecology of the interaction that people are having with the natural environment.

Okay. I'm sure I'm getting close to my time, but I want to show one more example. It's a typical kind of problem that I get into where -- and this is the case in Yellowstone Park -- where the managers came to us and

said, we feel like there's an increasing level of demand for Slough Creek, which is a really nice part of Yellowstone. It kind of got found after the Wolf reintroduction occurred. It's a popular campground, a great place to fish. It felt, to them, like use levels were increasing but they didn't have good data on how the place was being used. It's a sensitive area so they thought there was proliferation of ecological impact from visitors that might be happening incrementally over time.

So, this is what Slough Creek looks like. It's a beautiful part of Northeast Yellowstone. These kinds of trails occur when people walk there informally. This is a trail you can see that's happening because of fly fishing, primarily right along the stream. We did a number of actions for them to monitor how use was happening on one was to find out how many people were there and for that we used infrared trail counters and we are still using improved versions of these in other parts like Glacier, right now. We needed to know how many people were there. We wanted a sense of who was there. Through basic observations, we were able to get use-type group size, estimate of age and whether they had special gear, like photography or fly fishing.

We wanted to know where they went, so we got them to carry GPS units with them so we could see how their routes were working out. We ended up with this kind of data. Let's see if this is going to work.

Tracy, something isn't... -- there we go. If you can see the movement of these data points, this would be a composite day, maybe 150 people going through the motion of what they did. We collected data through a whole summer. If we put a day's worth of it together, you can see how people used this area. This is the picture you saw here. We are working our way through the day. Now it's three hours, four hours from when the day had started. You can see how the pattern of use has worked its way through. We learned a lot just by seeing the patterns of the way things wear being used. From that, we're able to recommend to them that they had, basically, three zones of use. One type of visitor that just wanted to get up here and see the view and come back. There was another type of visitor that got going very early in the morning, and wanted to get deep in and fish and then come back. They spent all day up there. Then there were these folks kind of in the middle. We were able to say, first of all, the use in the meadow is very patterned. If you wanted to build some trails, you could minimize impacts you're worried about. Second, is that the people looking for solitude are getting it because they start early and they move fast and get up there. They tend to be males, over 45 years old, who are fly fishing. They're getting what they want. And down here, the people are also getting what they want. We revealed that the problems weren't nearly as bad as the staff thought it might be, and everybody was real grateful just to have some data to communicate reality. It took away a lot of fear. Then, we recommended a kind of zoning approach for them to think about it. I don't know if you can see these, but you've got a high use zone, and sort of an intensive use zone, where you're going to have to do some manipulation, and then you've got a group that sort of takes care of themselves beyond that.

Another example is the Chaco culture in another park we worked at where they were interested in maintaining access to these highly sensitive

ruins. And, the way Chaco works, there's a road that comes in and the two most popular sets of ruins are this one called Pueblo Bonito and this one called Chetro Ketl. There's a parking lot that regulates the amount of access that occurs to these places. The conventional wisdom was that when a parking lot was full, everybody was going to go to Pueblo Bonito at the same time and create a problem with crowding and access. So, we GPS-ed people again to see how they actually do use it. What we found, here's the parking lot, is that an awful lot of people went counterclockwise instead of the way staff thought it was happening. Our impression of reality was different than the real world. In fact, they took 12 distinctive routes to get to this place. They were never there at the same time. The crowding wasn't occurring. The only times that it was really crowded was when the park staff would bring in an interpretive group of 30 or 40 people at a time. Again, being able to track where people go and how they use the place gives us a lot of information.

My last one I will quickly talk about is that Glacier National Park where we're working on a management plan associated with the road. The Going to the Sun Road is being transformed from something that looked like this to something that looks like this and brought back into compliance with safety and everything else. In the process, we put in a shuttle system to make it more accessible, which is great. It gets some cars off the road and it makes it available for people that don't like to drive. These shuttles are accessible to people with disabilities. It really is a nice feature. However, it's changed the use patterns on a number of the trails that are connected to the road. So, we put up a bunch of infrared trail counters to find out how many people were where and how that varies by time. We also put counters on the road. So now, I can predict if I know the green lines here are the number of cars going on the road, the yellow lines are when they get to the center of the park at Logan Pass. The blue lines are how many people are on one of the key trails, the Highline Trail. You can see a very nice pattern in these distributions. It's extremely easy to model. If we know how many cars are going up the road, we can predict quite accurately how many people will be on the trail throughout the day.

Then, we're able to ask people the quality of their experience relative to crowding, how pristine the area is, what kind of non-natural sounds are occurring--Airplane flights, encountering wildlife, experiencing solitude and then equate that back to the number of people or the trouble with parking that they might have had as they get going.

So, that's an example of a series of different kinds of approaches we've used to collect data electronically in different ways to better communicate and understand patterns of use by people. We've used different tools as they become available. Right now, the kinds of app based products enable a much more Real-time in situ -- into data collection process and we've been able to do in the past. We don't really need absolute real-time and we seldom have good cell coverage. But for the visitors, or anybody, regarding facilities, access, driving ability, all that stuff, if they could collect and give us data while they are actually having the experience, it would be super valuable. We found over the years that data is really helpful because all of us fall into the trap of whatever our basic mental model is about the way places are being used. And almost every time we've done one of these studies, we've been

quite surprised by something. There is either more use going on, or the patterns of use are quite different than everybody expected, including the scientists. So, I'm looking forward to the next presentation because I really hope that we can start to learn from you how to better use some of these technologies and we would very much like to be able to better integrate people with disabilities and their situations into this kind of data collection. That's been a really strong theme of research within the whole park and recreation and the leisure studies field. So, I think there is hopefully a lot of common ground. With that, I will conclude.

[Laughter]

That was interesting.

Wayne, I can't tell you how just wonderful I found your presentation. I hope we can continue this conversation. I would start off with a really quick question. There is so many observations that, to me, link. Could you talk about the importance of the use of data in management and having a receptive audience or setting or system to be addressing and how information fits within the management structure?

Yes. That the reason they call [Laughter], so I am very grateful about this. Certainly our federal land managers, and at the state and local levels, as well, they function in a scientific management paradigm. They really have to be able to justify their decisions in the context of an environmental impact and take alternative approaches for decision-making. Especially if those decisions are going to adversely affect one sector of society or another. We often find ourselves in a situation where we can't perfectly harmonize things. We do have to preference one value over another and, so, science is one way they can come into that with a more objective way to look at the situation. They are super grateful. Not every place is as progressive as, for example, Glacier National Park, to include social science. But, it's a language that people understand pretty well and for the most part, they're super grateful when we can come in and give them decisions. Information that will help them with their decisions. The other interesting thing that I've found, is that within the management ranks, we have very wide opinions about what you should do. I was in a call yesterday with a set of colleagues from Yellowstone Park, for example. They are really struggling with how they can better communicate safety messages about bears. They have tragic things happen relative to people and bears sometimes there. One side of the argument is saying we need to show a lot of force and shock and awe these people so they will understand the risks and they will behave better. The other side of the equation, they are in a good mood and happy, they are on vacation. If you come in with that approach, they're not going to understand what you're talking about and they're probably going to write you off. So, they were having that kind of a debate. At first, the scientists in the group sided with the heavy-handed approach, and then they did research and found out there were other ways that would strategically work better and help improve the experience for folks. That data is what tipped that scientific mind back toward the other approach. So you can see just the struggle within is very value driven and any time you can have objective data; it's super helpful.

If there are other questions from the attendees today for Wayne, we will take a couple of more minutes, specifically, to his presentation. After both presenters today, we will have a good chunk of time to have a broader discussion. Before we move on to Craig's presentation, is there anyone who would like to ask a question to Wayne?

Please remember to unmute your line if you do have a question or type it into the text chat box.

Hi Tracy, this is Billy Altom. Awesome presentation, Wayne. Really enjoyed that. One of the things that crossed my mind and watching it, is as a person who uses a wheelchair, and as Tom has talked about a lot in measuring how communities -- how people get about and move around in a community, I thought that would be an awesome study to see how people move in a community and that way you can judge what you are doing. Where you put your accessible features, how to start your plan, as opposed to starting at the wrong end working your way in. This way, you work your way in and out. I wanted to make that comment. I thought it was a great presentation and I would love to be one of the participants at some point, in seeing how things and folks move about.

Thanks, Billy. That's a great observation. If you look at a place like Glacier, or even Yellowstone for that manner, so much of where people go is a legacy of decisions that were made a long time ago and the infrastructure was developed. These planning moments are a chance to say, is our infrastructure in the right place? Are people going where they go because that's where we funnel them? Or, would they prefer something different. I think tracking activity and movement would be great, but to be able to do that and collect evaluative data at the same time from somebody like you, for example. Okay. This is where I could go. Where I wanted to get to was here, and start to see those gaps would be super informative, I think.

It's getting so easy. I bet you have a smartphone Billy and you could turn on your GPS and follow you around for a few days. [Laughter]  
Thanks, Billy, for your question. I think this is a good question and a good Segway into Craig's presentation. Thank you so much, Wayne. I'm sure there will be more questions directed your way near the end of the seminar today. So, Craig?

Wayne, thank you very much. I appreciated that talk quite a lot and was debating between asking to change my major and a new career path or some kind of joint work ahead of us.

I want to talk about work we've been doing at the Rural Institute over the past three years, now. Describe how we've used similar kinds of methods and give an overview of where we are at with that. We are in the final year of the project, which is a no-cost extension from the agency that funded the project and we are heavy into analysis, even as we speak. The names on the screen, and there are others, what a dream team of people that came together and quite a collaborative effort from the data collection to the programming and analysis. This was quite an effort and quite a team. I want to call out to these guys and to NIDRR for the funding.

What I want to do today is give a brief background for what it is we're trying to accomplish. Give you a sense of the methods that we used to collect the data and again go through some preliminary results from the project. Give a sampling of the kinds of things we are looking at. Everything is preliminary at this point. We're still trying to unpack and get to some final results on these things and get some things published. It's taken a little while to get to this point for reasons I think you'll understand as we go along. By way of background, folks in the disability arena probably have some familiarity with international classification of function of the World Health Organization in 2001. They published a heuristic that was intended to show that impairments of the body functions and structures are going to be related to some kind of health condition, disorder, disease process. Potentially, it would have an impact on people's activities and participation. The personal factors and environmental factors will influence all of that. Here's this model that seems to have arrows pointing everywhere suggesting that it is clearly a dynamic model. What we are going to do is look at impairments as they've been defined by questions in the American Community Survey. To that, one of the purposes of our project was to look at how pain stacks up with regard to participation. We wanted to tease out in this model, some of the influences that may be due to impairments, pain, environmental factors with the outcome, the eye on the prize being participation. By way of background, Seekins and colleagues published a nice, systematic review on participation. And that, suggested a typology for talking about our measures of participation and suggested three different types. The first a static measure, which is essentially a retrospective recall of a set of behaviors with limited information about the context of those behaviors. Just kind of what do people do. They suggested that maybe there's an interactive model, as well. You get recall of behavior and the environmental conditions where it occurred, and then finally a dynamic measure, where you can measure the interaction of behavior and environments in real time in some way. Those static measures tend to be a snapshot of participation using recall, often using computer-assisted testing or paper and pencil surveys, a snapshot of what happened in your recent past. The dynamic measures are going to use direct observation or in the case of what we did, electronic diaries to collect data in real-time to understand what people's experiences are and when they are in place. Moving to the methods, I will show you how we got to the group that I have some results for today. We began to randomly select 10,000 households in five ZIP Codes in the Missoula Valley and we sent all those 10,000 households, which represented approximately 22,000 people according to the U.S. Census data -- we sent them all letter and a postcard that said if someone in her household can answer yes to any of these disability screener questions, and that person would be willing to complete a survey, we'll send you a survey. All they had to do is drop a postcard in the mail. If it comes back, we send them a survey. The disability screeners, there are six. Hearing, or are you deaf or have serious difficulty hearing, visual, blind or have serious difficulty seeing, cognitive because of physical, mental or emotional condition. Do you have serious difficulty concentrating, remembering, or making decisions. Difficulty remembering, making decisions, Talking, difficulty walking or climbing stairs, dressing our bathing. Finally, errands, or as the Census likes to call this independent living, which we don't like to

call it that. But because of a physical, mental or emotional condition, do you have difficulty doing errands alone? So those are the questions people can answer Yes to. . We sent out just over 600 postcards and 525 of those people returned the survey. The last question on the survey was whether or not they would be interested in participating in another project and we were able to contact and collect data from 116 people between the ages of 18 to 65. This represented about one third of the people who completed the survey. The survey, itself, since we sent to general population and you start to cut that back the expected percentage of people that would have impairments in the Missoula Valley, which is around 13% and then you start to work towards return rates, it's a return rate somewhere short of 20% of the eligible population we were able to survey. And then again, the EMA group was somewhat smaller than that.

By way of demographics, 116 people 18 to 65, were on average 52 years old, predominantly female, white, about half were married. There's a nice distribution across income. We've got about one quarter with high school, GED, a third with college, one quarter with bachelor's degree and then just short of 10% with higher degree than bachelors. About a quarter lived alone, 50% make in between \$20 to \$30,000 annually for the family. 20% with income more than \$50,000. 60% were not employed. 14% approximately were part-time and 27% were full-time employees. 44% of our sample were drawing Social Security, these are fairly close to our longitudinal survey data and I've looked at that in comparison to Census data for the area and we are not far off, including all of these demographics. It looks like a nice representative sample of these, demographically, for people with impairments. In terms of these 116 people, the impairments they checked are going to sum to more than 116 because people could check more than one impairment. Average pain was collected differently. We had 19 folks with hearing impairments. 10 with visual, 50 are cognitive, 82 with walking, dressing and bathing was 39, and then 61 had an average pain that was above four on a zero to ten scale. That's fairly close to the mean. That's what we defined as the group that were limited by pain in some way.

The asterisks, the numbers for hearing and visual are there because that's low subgroup analysis to help us remember that when we get to later results, anything on those groups will be underpowered and unstable. For the EMA data collection, itself, we brought people into groups of approximately 20 folks in each group and gave them 90 minute training of how to use the device in response to the prompts. We produced a very nice training manual that had screenshots that people could look at. They actually had training devices that people could use to practice putting in entries. We went through what each of the prompts meant to help them get an understanding of the different questions being asked and what was intended. He could put a lot more information in a training manual about what a particular prompt meant on the screen of any device. I will show you that in a minute.

The devices were programmed to prompt people with two-hour s between 9:00 a.m. and 9:00 p.m. They got about six prompts a day and we ran the study for 14 consecutive days. The device, itself, prompted people to complete the survey with 25 items if they completed all of the items. However, there's some treed structure within devices, typically people would be

reporting on something less than that, those are 18 to 20 items if they didn't go through every possible tree structure. We also have the devices program so we can collect geographic coordinates every five minutes between the hours of 9:00 AM and 9:00 p.m. Those are primarily reflected by the GPS receiver on the device. However, the programmer put in an alternative strategy such that the GPS lock could not be obtained, the device would go out and look for a Wi-Fi. The Wi-Fi access point, believe it or not, all the Wi-Fi access points also had geographic coordinates associated with them, thanks to Google. We were able to get a secondary data source for where people were. For people who completed all eighty-four surveys, all of the data completely, they would have done 14 times the six prompts per day, or 84 surveys, total.

Couple of screenshots from the device. We're using a Samsung Galaxy. This is not a plug for them. They don't make these anymore, much to my chagrin. They asked questions like, where are you? I will show you more questions in a minute. These are radio buttons. Presuming people could only be in one place at one time, a popular radio button and on the left it is syndicated with their home. A question about pain would be a slider. The person can tap on the ribbon anywhere or they can put their finger on the rectangle and drag it across and the number above the green and gray bar changes based on what they indicate. So, they are using zero to 10 scale, to tell us the pain their experiencing right now. Another option for if we wanted to know about multiple choices, one of the questions that we look at is What are the environmental conditions you've experienced since the last prompt, they can go through and select a checkbox section of any of those that they experience.

I'm not going to show you all of these. But the questions I will talk a little bit about today are where are you, what type of activity are you engaged in? Who is with you? People rate of the level of physical exertion, a zero to 10 scale based on work out of exercise physiology that shows if you put the right stems with these ratings you get a pretty decent correlation to people's heart rates. A ten is maximum exertion and the zero is complete resting. How much pain are you experiencing right now, again using that typical scaling that you see in a clinical setting where Zero means no pain and 10 is the worst pain you can imagine. In terms of the environmental features that we asked about, these were derived largely from the ICF and some of the folks that put that together. We asked which features bother you since the last prompt. The typical answer was none or they could suggest they had problems with accessibility. We laid out what accessibility was for people in the training manual, like lack of curb cuts, appropriate signs, allergens, things like pollen, animals, anything that might cause an allergic reaction. Air-quality or smell, smoke, pollution, perfume, climate or weather like outside temperature and rain or snow, crowds, darkness, lights, bright lights, flashing lights, noisy or loud environments, background noise . People's attitudes. Negative attitudes. Friends, family, service provider attitudes, discrimination. Room temperature too hot or cold, traffic or parking, such as congestion or not finding a parking space. Car troubles, lack of a ride, bus problems, transportation.

Let me show you a few of the preliminary results we've been looking at in a few different areas and the way we look at this data. Again, to give you a sampling of some of the things we imagine we could do with this kind of data. Starting with environmental conditions and then I want to talk about predicting time at home, Locations and activities associated with pain and finally show you work that's been done looking at time geography.

This graph shows the median % of periods people indicated they had problems. It's a very interesting distribution if you look across all people. We have some individuals in the study who've never had problems. They never indicated an environmental problem bothering them in the course of the study. We have a very flat distribution with a spike on the end where we have a group of people who indicated there were problems in nearly all of their response periods. This graph shows breaking that down, then, just between differences in the median number of problems people indicated over all 84 time periods and breaking it up by whether they had different impairments. The green bar is yes, an individual had a hearing impairment and the orange bar is no, they did not.

While it looks like a significant difference, we have a very low end there. And you see looking across, is that in general, if we look at the overall number of environmental problems people reported with different kinds of impairments, they are actually fairly close. The only real significant difference in this using the median test is the cognitive area, where people who have cognitive impairments -- which again, remember, have difficulty with decision-making our memory because of physical or emotional problems -- indicating far more significant problems over the time 84 time periods than people who did not have a physical or cognitive problems. The other thing I should mention, is that these groups are not clean. That is, the person could say I don't have a hearing impairment, but they might have another impairment. These are not exactly oblique groups we are looking at. If we break that down a little bit further, we can begin to look at the basic hypothesis and a lot of the work we do, which is do we see the kinds of statistically significant differences in the kinds of problems people indicate they have in their environment based on the impairment they reported in our longitudinal survey. Across the top, we've got the hearing, visual cognitive, walking, dressing, bathing, errands. We have the pain greater than four and I added whether or not people used equipment, partly because of what was in the walking impairment group. On the left-hand side are some of the different environmental conditions, those a little more interesting to put on a single screen. Looking at the salmon colored boxes, it's showing where there are statistically significant differences, and if the hearing group is indicating a greater problem with access, they get a GT, then if they show less problem with access, then it would be less than just to show the direction of the significant difference. The red boxes show what we might have hypothesized. So that we might think that a person who has a walking impairment has more problems with accessing transportation. They're red because they are not statistically significant. In fact, these are contrary where we are not seeing any difference on the kinds of environmental problems people are reporting when they report having a walking impairment. This shows clearly that the cognitive group is having significantly greater problems, the number of different environmental

conditions if the group indicated they have cognitive impairments, than those who did not indicate such.

This gives us a sense of at least for these 116 people, over this two-week period, where some of those differences are. A little surprising. Not exactly clear what the cognitive group means. It could mean this is a hypothesis suggested by Steve Kay. It could be a sensitivity to environment based on your answer to that question. That could be more to the memory component of the cognitive question, such that people have more difficulties with memory, which might impact the degree to which they are able to alter their behavior based on environmental conditions, meaning you would repeat the same mistakes over again. Clearly, an area worth looking at more.

Then, we wanted to look at predicting time at home as the beginning place for understanding the effects of these variables might be on participation. We thought this would be the easiest to look at this. It's just the starting place of this. We start with how do we know people are at home, and then if we asked them and then we correlated that to the GPS coordinates that were collected by the receiver on the unit. So, the GPS sensitivity was set at 30 meters so we could get a pretty consistent lock with that and then Diep Dao used that information to create a hundred meter buffer around people's homes, and then we could code whether or not they were going out was based on the GPS. The coordinates themselves. Those correlated very highly. .92 or .93, something like that, with whether or not people said they were at home. So we have a pretty good indication they are there.

Then we begin to construct logistic regression equations to look at the effects of different variables on whether or not people are at home, but more than that, to look at not just contemporaneously but to look at lag effects of conditions in particular, and what we come down to are pain and exertion on whether or not people are going to be at home. One of the interesting features of the pain data is that if you look at within subject standard deviation, there is a one unit variability within subjects of pain that is one standard deviation for that person. A one unit increase represents a one unit standard deviation for them. If we see that increasing pain, then there's an 8% increase in likelihood that they will be home at some point in the future. With this particular analysis, the odds ratio on pain is adjusted for all of the variables that are listed below, including age, gender, race, education, employment, equipment use, time of day, weekday, impairment, pain intensity that's contemporaneously at home.

So there is a pretty strong relationship between people experiencing pain six or eight hours before and being home six or eight hours later. We also found something similar for exertion between four and eight hours later if we see a one unit increase in that exertion score, there's a 5% increase in the likelihood that they are home. Bryce did some really nice work with this. Bryce Ward is an economist with us from the Bureau of economic research and he suggested people go home for lots of reasons. What if we looked at people going home to rest? This particular analysis is not quite as well developed yet. These odds ratios are adjusted for the six lags, or the 12 hours before the observation of someone being at

home resting. But we see something quite similar, only the lag is quite different. If you go home to rest, chances are if you have a one unit increase in pain two hours before, you are likely to go home within the next time period. There's a 7% increase in the likelihood in each unit in increasing pain you have pain now, two hours later you are going to go home. Exertion is a little more lagged. The strongest lag there is if you have to exert yourself by one unit increase six hours before and six hours later there's a 7% increase in the likelihood you will be at home. These are the kinds of things we tried to do to look at the effect of pain and exertion on just going home. One of the things we want to look at next, is to flip it on its head and say what about people who are more active and going out? I wanted to highlight, as we're thinking about the environment, some other interesting descriptive results. And that is what increases pain? Where are the statistically significant differences in pain based on where they go? It turns out being outside is associated with increases in people's pain based on where they go. Gyms, healthcare facilities, office buildings, other places are unrelated. With respect to exertion, everything is related to hire exertion except for going to a church or going to a restaurant. So, what we see is places related to what people experience in terms of pain and exertion, we can also look at the kinds of activities they are engaged in. People's pain is increased when they indicate they are working, doing household chores or shopping. These are contemporaneous with the activities they are engaged in and the exertion here is kept in for completeness because these are in comparison to resting. All of these increases in exertion, relative to just resting at home. I'm almost done.

What we are aiming for in all of this is What is the role of the environment in people's exertion? If this is an important variable, pain and exertion and headed home, one of the things we're working toward is another pathway for understanding how the environment limits participation. When you work with people that have pain, you hear this quite often. That is, I went out and went to Walmart and I was totally wiped out when I went home and didn't do anything else the rest of the day. If Walmart doesn't have great access, or not a cart available or people don't want to use it, the environment, in some way, is contributing to the exertion that is potentially sending people home. So, again, these are things that we're still working toward. With this real-time data about where people are and how much they are exerting themselves and what their pain is, we can begin to model, I think, very clearly, another pathway for how very accessible the universally designed environment might extend participation for people because it makes it easier for them to move through it.

Finally, this is work that Diep Dao developed, an assistant professor in Geography here at the University of Montana. She pulled together a couple of different methods to do these graphs. These look at individuals who report that they have pain greater than six during some proportion of the period where they responded to the EMA questions. What she's done, this is a map of Missoula. We've taken the street map out to preserve the confidentiality of the participants. This line is home. This is where they spend the majority of their time and this is home over 14 days. It's basically 14 lines on each other. These show the trips that they made. Diep has used the GPS coordinates to look at when people went out.

Because it's 12 hours from here to hear, it shows the basic duration how long they were out. And, where they went. If we had all the street maps drawn in here, there are lines that show precisely where they were going. This individual had 80 to 83 periods with pain greater than six and you can see from the key--the dots and the size of them-- are keyed to the amount of pain they are reporting. Pain greater than eight to 10 is here and, actually I think this scale is off a little bit. I think many of these are pain greater than 10, greater than six, given this person's source.

This person had only 21 of 75 periods with pain. One of the things we've observed, by asking people about their experience with pain throughout the day, we see these people that have more consistent pain tend to have pain whether they're home or out. If you have that much regular pain, you can't necessarily avoid it when you go about. Maybe there's little relationship because these look like times where they headed back home. So that, effectively, we see in the statistics, might be represented graphically where I'm out, I have pain-Boom!-I head home. Not quite sure about that, but that's one hypothesis.

People that have more temporary, intermittent pain, tend to have graphs more like this. Where they might have low pain when they are out, but rarely do they have the big pain. If you have intermittent pain, people learn signs and symptoms and signals of pain and they may be changing their activity on the basis of their experience. This kind of work and what we are headed toward is to try to show graphically, where people are going, how their experiences might affect that and one of the things that Dr. Dao is presently working on is how to help us visualize these in a more aggregated way so you can look at subgroups across an example to understand what people are doing.

Lastly, just for your consideration. People may adapt their spatial patterns to minimize encountering problematic environments. And if so, then the environments create behavioral patterns that limit participation. These problematic environments determine behavioral patterns that, in turn, these define the social problems of inaccessibility that we can begin to show.

If people adapt and don't go particular places, we can now show, graphically, where the problem is. Finally, is the effect of the environment on exertion of pain another pathways for understanding accessibility and participation?

Great. Thank you, Craig. That was great. At this point, we are going to open it up for more discussion. You can begin by specifically asking Craig about his presentation and also more broadly going back to Wayne's presentation, as well. Tom, you may have some opening comments?

Craig, this is fantastic to see the work coming together. Thank you very much for putting it together and sharing it with us. I saw so many connections with Wayne's presentation. But the last one, I would just ask maybe if you would comment. Wayne had talked about how the creation of the historical infrastructure and some of the places had made some predetermined decisions. You commented about how environments may be

problematic designed environments. Could you comment, do you see a connection between that?

You know, I think the problematic environment is clearly an inaccessible environment we all defined as a problem. I think one of the connections that I'm seeing to what Wayne is doing, is that I think we are going beyond that in some way, to look at a problem. An environment can be problematic because of noise. A problem -- the environment can be problematic because of traffic. We all know that places in our hometowns where traffic can be a problem and we avoid those areas. And so the infrastructure creates the problem to begin with. We then adapt to them and figure out ways around them. And I think the connection is probably around universal design on the one hand, but also around information and helps people recognize the impact of the environment on their behavior and their patterns. I think I'll stop there.

Thank you. It looks like Steve Kaye has a question for you, Craig. I will read it. Craig, how could you go about confirming your hypothesis that it is the pain that since people home?

For one thing, what we've been trying to do, and thanks, Steve, for the question. We've been trying to rule out other possibilities. So, if you look at the amount of time people have been out, or whether a weekday or a weekend, or just fatigue in general, we tried to take the day that we have and rule out other features of it. What we've seen, in that, and what I tried to show real quickly and that slide, was the things that we have in our data file, our results, our lag results on pain, are very robust. They're kind of that 8% to 10% increase in likelihood for each increase in pain. SO for this, I think even this kind of longitudinal EMA pain data, it's still observational, right? We are not going to have the control or ability to change pain and watch that effect. Perhaps, we can do things that change the environment, that would have an effect on pain and exertion and look for effects on the other end, in terms of what people participate in. We were just talking about that this morning. If we did a random assignment of improving and increasing the available carts in Walmart and then follow people for the rest of the day, we might be able to vary the environment in ways that allow us to look at future participation based on a reduction in exertion. That is just one that came up today off the top of my head.

Great. Thank you. It looks like Gale Whiteneck is typing a comment or question. As we wait for that, I welcome other questions and comments from staff here at RTC or attendees on the call.

Hi this is Gale. I will just ask my question. When increases, as you are showing as X number of hours before returning home, does that mean pain itself tells the person to go home? Or, does it subside? And is that a predictor of whether they actually go home are not? And is the pain less at home?

That's a great question and I'm going to have to think off the top of my head about those correlational results. Pain is less at home, is what I remember off the top of my head. We don't have those results built in yet--that look at, okay, you're out, you have more pain, you go home, your

pain reduces, what's the time frame? What are the lags of going out to participate again? We are not there yet. If I understand your question, the contemporaneous relationship between being pain and being at home is that you have less pain at home.

Thank you. I guess where I was headed, was if you have a spike in pain but two hours later you aren't yet home, but it's subsided, is that a predictor of not going home? And if it's still there, a predictor of going home? I'm not quite understanding the lag that you have.

Right. That's an interesting part of the lag, itself. It's just that crude. It's just looking at that two hour -- when we're looking at resting at home or that kind of six to eight hours if we are looking at home. And it's crossing days. Literally, we are just saying, here are the 84 different time periods, and we are looking at lagging back, those two or three lags and those are just the overall results. What happens in between, we don't know. At this point.

Lots to study.

Craig, this is Meg. I wondered if the exertion scale has been validated in populations experiencing that level of pain and whether there are some opportunities to incorporate some things like Fitbit that into this kind of study design to get some of that convergence, creating exertion and heart rate.

You know, the Galaxies and the smartphones all have accelerometers -- built into them. It was on my wish list to collect that data, as well. But, this project had gotten big enough. We actually didn't propose the GPS as part of the data collection to begin with. We proposed to use iPods. As we got further into it, we realized the Samsungs included the GPS receiver at that time and we switched to that device. As far as exertion scale goes and populations with pain, I don't have a hypothesis for why it wouldn't be but I can't point you directly to that resource that would suggest that that exertion scale works as well in a group of people with pain.

I have to ask this question. This is Tom. Wayne, one of the measures that you've collected had to do with something like the spiritual aesthetic experience of peace and harmony in the parks. Solitude and almost a sense of healing the soul. I wonder whether we could explore the relationship between the experience of pain, excursions into natural lands and that kind of sense of healing, how that might fit together. If it does. Craig, I'm curious what you guys might say to that.

Thanks, Tom. I can comment on that line of research. It's the whole kind of getting grounded, spiritual connection, moving away from the typical distractions and trappings of the environment that Craig just described. It's a very consistent theme in the way people talk about experiences and parks, particularly in these big impressive national parks like Glacier. There is a very deep kind of sense of connection that happens. It can be transformative. It's the sort of thing where people go there and they decide to change their jobs, or decide to move to a different place. They have that moment of reflection about their life. Large decisions come

from, change makers in college. Craig, you are welcome over here any time. So there are actually scales that have been developed and kinds of questions that approach this sort of thing. It's a difficult thing to manage from a park manager's perspective. But, it's a great qualitative way to talk about the depth of the meaning of these experiences in these places.

I would just add to that. For example, the Boardwalk that goes up to avalanche Creek in Glacier National Park. I will always view that as a basic accessibility feature for people that use wheeled devices. And have not really considered with how that deals with the problem of uneven surfaces on trails that allow people to go back and see Avalanche Creek and how that comes out without the high exertion that would be a problem for a lot of people.

I think that part of the data, and part of the American Survey questions, like if you have serious difficulty walking or climbing stairs, we start picking up a lot of people with pain that don't use equipment. And so for them to have a walkway that reduces their exertion, this could have a very high benefit for their quality experience, I would think.

That's a whole new layer of thinking about this, Craig. I think it would be really valuable. When we look at a place like Glacier, there really are only a few accessible trails designed that way within this million acre park. That isn't unnoticed by the management staff. A lot of is legacy and zoning and things like that that try to curtail more development. But, it's a tough place for people that need assistance with the wheelchair, for example. Not many places you can go. Yeah, that would be a great rationale. With our society aging, park visitors are aging considerably. The average age of the visitor there is similar to your study. Close to 50 and we're seeing fewer young people. The baby boomers are coming. They are going to, I think, have a lot of these concerns.

Thanks, Wayne. This is Tracy. To follow-up those comments, you may have addressed it in part, for Bob Liston who asked this question through the text chat. Wayne, do you see the parks taking into consideration accessibility issues on new paths that are put in? They don't necessarily need to be boardwalks or paved. Are you doing anything to address Billy's issue about where we might want to go, rather than where we can get to? I hope this makes sense.

Yes. That's a great question. It makes total sense, Tracy. They are. When you do a plan for parks, at a minimum, they have to think through ADA kind of considerations. They are genuinely interested in who the audience for the parks are and to be as accommodating, regardless of whether it's age or gender, international, or people with disabilities. These plans are the times when those things get developed. The big issue that happens with a place like Glacier, and which may make it a bad example, is that there are so many different kinds of demands. People want more biking on the Going to the Sun Road. And people want more dog walking. There's so many people invested in the place, that they want a lot of everything. I think there is a tendency to back off and say, -- and there's a lot of people that want no change at all. There is a tendency to be conservative in their development. But, I'm sure of it, in this case, that they are

thinking about -- if we have limitations within the Going to the Sun Road corridor or about access or vehicle types or alternative mobility types, where else, in this park or in this part, can we design some things that are going to be much more available to society? Yes. It's in the discussion. But, these plans are kind of political documents. The advocacy groups that are going to make sure that people with disabilities concerns are heard loud and clear and need to be involved in the planning process, and need to be commenting on alternatives. I think I've seen that have a big effect, as well.

Great. Thank you, Wayne. Another question from Gale Whiteneck. Wayne seems to conduct studies in order to make an interventional decision. Craig, what thoughts do you have about designing your research to help facilitate intervention?

Thanks, Gail. Appreciate the question. We've kind of thought about that in a couple of different ways. On the one hand, the kinds of maps that Wayne showed, they were great. I loved the moving maps showing where people travel. I'd like to learn that technology. We can show it at a systems level, where people go. We can show people with different characteristics in real time, where the barriers are, where they don't go. That kind of mapping and data could be used at the systems advocacy level to build up the infrastructure that's more accessible and less problematic. I liked the inclusion of noise which bothers some people a lot more than others. It's a problematic environment. At the individual level, I think there's opportunities for education. That is, if a person makes the personal choice that I don't want to use wheeled mobility at WalMart because I don't want to look disabled, the education to help them understand the trade-off which might be in terms of social or recreational or other kinds of activities they might do later on in that day is part of the trade-off, as well. That may be a message that may be useful for people to hear. Finally, this kind of interactive technology has intervention written all over it. And so pacing is an important part of treatment and pain so that people are not doing too much activity to trigger that pain. So, these kinds of methods could easily become ways to help people monitor exertion and to pace their activities a little better and avoid some of those spikes. That's one of the real difficulties in treatment, is getting people to gradually increase their activity level and this kind of monitoring device could certainly help them do that.

Great. Thank you.

I want to throw in an addition to that. I think what Craig showed us is really game changer in the way that I think about this. Just knowing how time lags work. We tend to catch people at a snapshot in time, even in a diary sense. Now, not only can you look at how geographic distribution is happening spatially, but you can think about it in terms of cause and effect with different experiences. I would love to know, for example, how running into a large crowd or the inability to park, for example, at Avalanche, which is one of our big problems. It's a great trail if you can get there. If you drive there at 10:00 in the morning and you can't park, what do you do next? Do you come back and adapt? So, tomorrow, I'm coming back at 9:00 in the morning? We just aren't able to capture that stuff very well, yet. You are showing me that the ability is right there.

If we could merge your understanding of time lags with mine of geographic spatial stuff, we'd really be able to do something great.

Thanks, Wayne. Christianne, do you want to pose a question?

1:22:00 It's not coming through. You can type it, as well. Or, comment. Just make sure you are unmuted. As we wait for Christianne to type out the comment a question, I realize we are almost half past the hour, which is when we were scheduled to finish this discussion. For those of you who need to go, just thank you for your participation. We will have a recording of this entire seminar available in the near future, as well, the transcript. You are free to sign off and we will make sure you get those connections. For anyone else who would like to continue with this discussion, please feel welcome to stay on the line. Also, if you have other questions, other people have questions while Christianne is typing hers, please submit them.

I had a question. This is Meg Traci. For Wayne about the infrared sensors and your ability to estimate aid and detect gear. Are you able to detect whether someone is using a mobility device like a wheelchair or a hand cycle on the trails?

There were two parts to that particular study. One was a human observation. So, that's how we got the activity style, that sort of thing. The infrared counter will just tell you a number. It was broke up this way or that way. You could, in some situations, use the kind of counters we use for cars, which are magnetic. If you put a magnetic counter on a trail, it would be able to tell you if it was a bicycle or a wheeled device. You wouldn't know which. Now, there are other things that we've done like used camera traps. Blurred the focus so you are not seeing an individual engaging in detail, but you can tell whether they are carrying a back pack or not. You can tell if they are on a wheeled device or not. And, get an estimate.

Great. Thank you, Wayne. Okay. It looks like Christianne's comment came through. She says thanks for two great presentations. Wayne, I was struck by your findings on crowding, fear of crowding were unfounded as visitors found ways of distributing. Is this the new finding?

We have a very interesting -- thank you, Christianne. It's nice to see you typing. It's been a while since we talked. We have a very interesting history with this crowding issue. In some places, like Arches, where I started, it's highly apparent and people will complain about crowding as a major issue for them. And a lot of other places, the people that manage the area may actually have a higher sensitivity to crowding than the visitors, themselves. The visitors, as Craig aptly laid out, have done adaptations for the good. If you go to Logan pass on an August day, if you are from Montana, you know it will be crowded. You've still chosen to go there. You've either, in your mind, decided another goal is more important like showing Logan pass to my family, or you've decided that another experience may be bonding with my family would be more important than solitude.

So, we see that happen quite a bit and I do see a difference in the way people with long-term attachments to the place, like managers, feel about crowding compared to visitors. Usually, 30% to 40% will show up very consistently, in studies around the country. 30% to 40% of the people will, on a scale of 1-9, feel crowded above a three or four, much like Craig laid out. That's a substantial number of people. We think our national park system gets about 250 million visits a year. So, if 30% of them have an issue, that's a big number of people. It should be taken seriously. In any given context, it may be more or less.

Well, just to comment on that, Wayne, I can imagine helping people tailor their experiences based on some self-assessment. It would be fairly easy to put together an app that says, what are your values? Are you looking for solitude, or the common experience? Do you have to go to Yellowstone Falls, because that's where you're going to find a lot of people. We need something different? If it's family bonding, you might be able to tailor where people go based on what their values are and I think we can do the same in our work in terms of community work and how people access community and choices that they make that have trade-offs in terms of exertion and potentially, pain.

Very good point. I had written that down when you were talking. One of the strategies for management that we talked about quite a bit now that we have this data, is to share it with the visitors, so they can make an informed choice. If we show them our use level graphics, or time it takes to park at Logan pass on a busy day and tell them, if you go there now, this is what you're going to get. If you wait four hours, it will be very different. You choose, depending on how much time you have and how important it is to you. And I think they will redistribute quite a bit.

We need to communicate with them so the data, if we can make that digestible, that's a nice thing to have.

This is Meg. I wondered in terms of these negative projected ratings. Are they in any way correlated with negative environmental impacts? Do users have the intuitive sense that this crowding or other things like noise really is impacting the wilderness?

Very much so. Visitors to a place like Glacier, like a community, have a wide range of sophistication in their way of assessing a setting. Some are very astute wilderness advocates that will think about the sound from a Harley Davidson, for example. They think of it in terms of their own experience and whether it was annoying or distracting or preventing them from cutting the rope with society and actually getting a spiritual restoration that they want. They also think of it in the terms of the cumulative effect it has on the idea of wilderness, or wild things, in general, the pristine quality of the place or the ecological impacts that could happen as a result of that sound intrusion. You have some folks way out on that end of the continuum and then you have other people that are walking up to Avalanche Lake on a 10-foot wide trail with roots exposed and trees and they think it's the most beautiful place they've ever been. They don't see, you know...

That highlights the role of personal factors and that's been one of the surprising things to me. Just asking people the question, what have been the environmental conditions that bothered you? And to see the distribution. For some folks, no, nothing bothers me, it's all right. For others, everything bothers them. There's quite a lot, in terms of intervention that can be done in that as well. Unpacking and teasing some of that out may be an important part of intervention, back to your question, Gale. There are things we can do as clinicians to help people develop a little more tolerance for things like noise and traffic that can increase their quality of experience in a lot of places.

I would also add, Craig, this sense of power that you have some impact and some ability to impact the environment. Thinking about some of your comments, Wayne, and how that would translate to people with disabilities in terms of their perspective and power to be an advocate for change of the environment. How they potentially rate their experience either from a very personal or individual perspective or thinking about the community accessibility, broadly, for the community.

That's a really interesting, intervening variable in this. When people are not empowered-- what does that mean for your experience of the environment? Very insightful.

Well, I want to thank both of you and everyone else for a fascinating discussion this morning. Very grateful. One of the things Tracy and I would ask of folks, if you've got suggestions of topical connections that we might make in the future, let us know. Having said that. Wayne, thank you so very much. Craig, thank you very much. I think we are going to try to have another one of these sessions in February. So, Tracy, thank you.

Thanks, everyone. We will end the session now. If you have questions or comments, you can email me directly. I will put that up on the screen. Feel free to sign off. Thanks, everyone.

Thanks, Tracy. Appreciate your organizing this. It's been great.

Yes, me too. Please keep me on the mailing list.

[Event concluded]