**Alan Harris asks:** Looking for low cost means that will tell trail users apart by use (walk, bike, quads (not currently allowed) on trails w/o photos (concerns with privacy/big brother) so far we have limited volunteer/ intern data.

Gene answers: I immediately think that ‘direct observation’ of users is your best option. While you don’t have expensive overhead for equipment, DO still has a high cost related to ‘people time’ to observe users. You might want to think of picking one week for DO on four days (M, W, Sat, Sun), 4 times a day for an hour at a time.

**Alex Nouanesengsy asks:** The API utilized to create the public facing trail data website for the City of Boulder.... can that be shared or is that proprietary?

Matt A: The API that boulder uses is the Eco-Counter API, and it’s a paid access API through Eco-Counter.

**Andy Benoit asks:** We have had counters on our trails for over a year; we have purchased 4 and have had two stolen.  Are others experiencing this problem?

Colin answered: We had one problem, we eventually had to give up on putting a counter there.

Gene answered: I’m only had one problem with over the past 20 years of using counters. It happens and you can only shake your head. I have started to use tamperproof nuts/bolts to help when counters go on posts.

Matthew answered: I would say you could go about it two different ways. Putting them in the background, I think that is how most of our counters are. Some locations you have to embrace it and you to educate people about what they are. And, I've seen counters all around the world and in Europe, there are a number of them that have lived counts immediately. You know you're part of a greater data network at that point.

**Angela Emery asks:** We are interested in learning more about sharing our trail data. Platte River Trails in Casper, WY. platteriver@wyoming.com

**Anne Wallace asks Matthew and Eugene**: First and foremost as a South Knoxville resident and a neighbor to the Urban Wilderness, thank you for your work and a great presentation! Are there things we can do to help get the word out about your survey process?

Gene answered: Anne, Matthew and I will reach out to you as the survey gets ready to lauch. We appreciate any help you can provide.

**Bill Stevens asks:** Local users less likely to fill out on-line surveys, since there on a regular basis. How does one reliably separate out local vs nonlocal, since econ impact differs dramatically.

Gene answered: Good question. We are planning on asking two questions – ‘Do you live in Knox County?’ yes or no; ‘What is your household zip code?’. And you are right, this distinction is essential for the economic impact calculations.

**Bob Duke asks:** Will automated counting systems be reviewed (assuming that there are some)? How have trail counts been used in planning or gaining public support of trail projects? Will we be given information on budgeting for/planning trail counts in our community?

**Cameale Johnson asks:** Do the counters work for skiers?

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.

Matt A: The PYRO-Box people counter counts trail users with no distinction, and skiers are included in that! We (Eco-Counter) have some trails in Alaska and Quebec that count cross country skiers, and there are some downhill ski areas in the alps that capture usage trends with PYROs also.

**Cheryl Lea asks:** Do you have Eco trail counters that are solar powered?

Matt A: Unfortunately, at this time there are no solar powered ECo-Counters. But all of them are battery powered (up to 10-year battery) which means that they can be installed in rural areas with no power supply with no issue.

**Dan Berlin asks:** How do you account for animals which may trigger the counter, if at all?

Collin answered: We have a couple of areas where we know that it does happen. They usually show up as some random counts, typically in late hours of the night. If it is something you're really concerned about's, one approach could be to put a wildlife camera out, probably limit it's time to just nighttime hours when you're most likely to see the wildlife, and then just set it to be motion activated and have it pointed at the counter. That might give you a sense of how you will be able to match the timestamps with the hours when those counts were detected and determine if they were animals or not.

**Doug Habermann asks:** Doug from Bike Walk Montana - Montana is a very large and diverse state... Can you share your experience in extrapolating trail use for a larger area such as a state from a group of trail counts from a smaller area within that state? Thanks for a great seminar and your advocacy support..

Matt A: Hi Doug, Matt from Eco-Counter here. That’s a great question, and one with a complex answer that merits more than a few lines in a question chat response. Give me a shout: [mai@eco-counter.com](mailto:mai@eco-counter.com) and Id be happy to expand on that, in coordination with my data services colleagues who are the data-extrapolation pros. We have a lot of experience helping organizations do just that, and are currently working with Bike Maine, a small advocacy organization, to help them overcome this.

**Drew Gatlin asks Torsha:** Do you see ethical concerns with subjective judgement of ethnic appearances?

Gene responded: This is an excellent question. Judging ethnicity is subjective, as well as gender and age. We always train our observers and do mention the need to be as unbiased as possible. Saying that, we do realize that there is error associated with these type of judgements.

**Eric Gerhardt asks:** Is Eco Counter part of any purchasing collectives such as GSA?

Matt A: Unfortunately we are not.

**Ernest Rodriguez asks:** Do you offer grants or discounts to non-profits?

Torsha answered: We have been partnering with a different. When I mentioned in Pennsylvania. It has been a leader in trail counts. They have funded trail counters in and around the whole state. If you can make the case, it helps if the leaders are already tuned into that. Otherwise education and awareness can come in handy. Down in Brownsville, Texas, we have a funder which is a health organization. Our plug-in was the high diabetes rate in the low physical activity rate. They have been a big funder of a trail count. Just finding the right fit with your audience, and the problem that localities are facing. We found there are different types of organizations that will come in. Some insurance providers will step up for these kinds of counters.

How does this compare to Strava or RideWithGPS heat maps?

Gene answered: We actually are looking to see if these platforms can help us with our count program. It is possible that the statistics of ride times will help us calculate some the physical activity measures. I do think it is important to realize that not all people have a GPS computer and/or account with these platforms, so use would be underestimated if we only rely on them.

**Faye Rhault asks Matthew:** Could the IMBA Trail Count Program fund multi-use trails?

Matthew answered: It is in our standpoint. We are interested in catching everybody that using our network. Just because we happen to have mountain biking in within our organization's name, we are the trail keepers for all of the natural surface trail in Knoxville. That is what we care most about.

**Gary Meyer asks Colin:** I hear cameras being negatively referred to. Why? Cameras watch us everywhere. With cameras and ML you can log usage very accurately by use. For instance, counts based on mode of travel which I have yet to find another solution for. Shoes vs walking in boots vs XC skis vs fat bike vs dogs.

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.

**Gavin Hoban asks:** Given a huge land base in a remote, non-urban setting and a limited number of counters & staff available, is there a standard minimum duration for a trail study to determine reasonable baseline use before moving counters to a new study area?

Gene answered: I would think one month would be ideal. However, the seasonal impact of trail use may limit you being able to directly compare one trail to the other. Saying that, maybe a week would be useful because you might limit possible seasonal bias or error.

**Greg Stachon asks:** Interested in the economic impact. How do you determine out of town users? Do a few samples and average # out of towners?

Gene answered: Good question. We are planning on asking two questions – ‘Do you live in Knox County?’ yes or no; ‘What is your household zip code?’. And you are right, this distinction is essential for the economic impact calculations.

**Jessica Wineberg asks:** Do people share the data with the public? Via ecovisio or another program?

Matt A: Yes data can be shared with the public through Eco-Counter. We offer ‘public web pages’, which are interactive maps with count data for the public to access. Rails-to-trails conservancy has this for example. Otherwise, you can provide specific people access to Eco-Visio (online data analysis platform) to analyze data.

**Jessica Toubman asks:** How do you decide when to keep or erase outliers when you have a normally low use trail. Find that one spike can throw off the entire months average/count.

Matt A: Hi Jessica, Matt from Eco-Counter here. We usually recommend keeping a close eye on data for anomalies. The more you keep an eye on the data, the more those spikes makes sense. Maybe there was an event, maybe there was a gorgeous unexpected spring day etc. That sort of context is much easier to keep in mind when it’s the same week, as opposed to looking back at data 6 months later trying to figure it out. Hope that makes sense.

**Jody DeMeyere asks:** Forgive my VERY basic question: If we wanted to approach a University to assist us in diving deeper into our trail count data and gathering direct observation data, what should we look for in a good partner? What kind of school or which department does this type of work?

Eugene answered: The built in environment epidemiologist and physical activity are throughout multi levels of academia, community colleges. Look for the exercise science kinesiology departments, or look for geography, or transportation. I know I have collaborated with people who use trail counters a lot to through different departments. It's not just a big university. I think you will find people who can collaborate with you and help you even at community colleges. It's just a matter of looking for the department, may be searching your faculty profiles.

Gene follows up: Please feel free to email me and I’ll try and locate the nearest college or university that might have faculty that might be able to collaborate with.

**John McCall asks:** Are there grants available for trail counters on USFS managed National Forest public land managed by non-profit partner groups?

Torsha answered: We have been partnering with a different. When I mentioned in Pennsylvania. It has been a leader in trail counts. They have funded trail counters in and around the whole state. If you can make the case, it helps if the leaders are already tuned into that. Otherwise education and awareness can come in handy. Down in Brownsville, Texas, we have a funder which is a health organization. Our plug-in was the high diabetes rate in the low physical activity rate. They have been a big funder of a trail count. Just finding the right fit with your audience, and the problem that localities are facing. We found there are different types of organizations that will come in. Some insurance providers will step up for these kinds of counters.

Tahoe Rim Trail have a number of counters. Despite hiding them quite well, some are spotted and stolen each year. Have others has these problems. What might be done?

Colin answered: We had one problem, we eventually had to give up on putting a counter there.

Matthew answered: I would say you could go about it two different ways. Putting them in the background, I think that is how most of our counters are. Some locations you have to embrace it and you to educate people about what they are. And, I've seen counters all around the world and in Europe, there are a number of them that have lived counts immediately. You know you're part of a greater data network at that point.

Can you distinguish counts off pets vs humans?

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.

**John Paliga asks:** The Eco-Counters appear to be plastic boxes. Anyone have problems with vandalism?

Matt A: All of the counters are designed to withstand that harshest urban and rural environments. We trust them and stand by them, and on a personal level I’m always amazing when our clients send us photos of what the counters have been through – hurricanes, flooding, unrest in downtowns, you name it.

**Joyve Papp asks:** Do you work with any equestrian trails and/or trail users?

Matt A: Eco-Counter offers one counter (our MULTI) that can count and classify any combination of bikes, cars, pedestrians and horses using a trail facility.

**Kathryn Tobias asks Matthew:** Can these trail counters be used with any user - pedestrians?

Equestrians?

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.

Matt A: Eco-Counter offers one counter (our MULTI) that can distinguish between any combination of bikes, cars, pedestrians and horses using a facility.

How often do these counters get stolen?

Colin answered: We had one problem, we eventually had to give up on putting a counter there.

Matthew answered: I would say you could go about it two different ways. Putting them in the background, I think that is how most of our counters are. Some locations you have to embrace it and you to educate people about what they are. And, I've seen counters all around the world and in Europe, there are a number of them that have lived counts immediately. You know you're part of a greater data network at that point.

**Kimberly Bradley asks:** Are there concerns around season impact to QR code survey timeframes? In NE this may a bigger issue than the south.

Gene answers: You raise a good point related to the seasonal impact. We plan on keeping the survey in the field over one year in order to control for that potential bias. We can then align them with our count data.

**Kimo Rogala asks:** Can any of your multi-use counters document horse rider activity separately from other use types.

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.

Matt A: Eco-Counter offers one counter (our MULTI) that can count and classify any combination of bikes, cars, pedestrians and horses using a trail facility.

**Kory Iman asks:** Has anyone tied this trail counter data to a GIS map for analysis?

Gene answered: I believe the answer would be yes. I know in Knoxville, we do plan on examining how we can integrate mapping into our counts. I believe Colin, from Boulder, had used mapping and may be the best person to reach out to.

**Marcus Riehl asks**: Are there any grant opportunities available to help pay for the cost of trail counters?

Matt Anderson asks: Has anyone found issues with getting reliable counts with carbon fiber bikes? is there a counter designed to specifically count an ebike?

Matt A: we extensively test all of our counters with all types of bikes, and are proud to say that we count and classify carbon bikes with no problem. For us, the count is triggered based on electro-magnetic detection, and even on the most high end carbon bikes there is enough metal to trigger a count (spokes, bearings, spoke nipples, there’s something!)

**Michael Roberts asks:** What equipment do you use, why was it chosen over other brands or models?

Missed the first few minutes. What is the make and model of the unit deployed here? Eco counter?

Matt A: I’m not sure at exact what moment you are referring to, but the majority of counters shown were Eco-Counter PYRO-Box counters, or Eco-Counter PYRO in a Wooden Post.

A lot of this data is super granular: direction of travel for users, number of users per day of the week, etc. What challenges are these data going to help solve?

**Mike Vandeman asks:** Are there any devices to detect bicycles on trails closed to bikes and notify the police automatically?

**Nathaniel Welch asks Torsha:** I am interested in Hearing more about what rail trail group should expect in terms of budgeting for tracking program to measure use of our greenway.

Interested to see that RTC had no counters on most of the Great Allegheny Passage. What was the reason for not tracking more use on the GAP?

Is there other publicly available data for counters in New England that we can access?

Does RTC provide financial and/or other support to organizations that are trying to do a rail to trail conversion?

**Paul Gritten asks:** What are some of the manufactures of counters that agencies are using?

**Pauline Burnes Matt:** Have you developed a way to count equestrian trail riders?

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.

**Robert Patten asks:** How do you relate usage data with demographics, and individuals to tie it to health behavior?

Gene answered: Our online surveys will be how we really link health metrics to trail use. While we have some direct observation of users that will give us a demographic profile, the online surveys will be key for us.

Are you able to develop a method for determining the % of trips for "Transportation" vs "Recreation" trip purpose?

Gene answered: I can only think of two methods – intercept surveys and online surveys – where you have to ask the user of their purpose.

**Ryan Dusil asks Collin:** For counters you moved each year, were you using a counter meant for mobile (mobile MULTI) or one meant for permanent counts (MULTI w/ post)?

**Collin answers:** When we were doing that study we were using a smaller model of counter called traffics. We do have 4 mobile Eco-Counter now. The posts take a fair bit of insulation, they're definitely not something you want to move every year. The mobile PRYO boxes have been great.

**Sara Chmielewski asks:** Can this be used to measure cars coming in and out of parking lots? We have horse trailers, families that bike, hike, etc.

Matt answered: There are counters that can do car counting as well. As we have a counter that can do both pedestrian counter and car counting at the same time. It remains exactly for that purpose. It's mostly developed for access roads, or state park access roads.

**Steve Brown asks:** Aren't there GPS tracking technologies that don't request hardware on the ground to track similar trail use data?

**Tana Kappel asks Torsha:** Do you just count numbers on "rails to trails" trails or all kinds of trails?

Here in Arizona, 6 months is not adequate. We can bike here 365 days a year so we need a system to collect 12 months of data. Also, we have problems with theft and damage to above ground counters. Do you have similar issues, and if so, how do you deal with this?

**Tanna Kappel asks Eugene:** What system are you using for online survey collection using the QR codes?

Gene answered: My university has two different platforms for our online survey. For us, we are going to use Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)) because of its ability to allow people to use smartphones to complete the survey. The QR code can be directly linked to our survey.

**Tanna Kappel asks**: We are not an IMBA chapter and the Eco-Counters are quite expensive, so we have been using the TRAFx counters with good success and have most of the same kinds of data you all have collected, plus we have used on-line surveys analyzed in Qualtrics. Are there other sources of financial support to get these counters?

Torsha answered: We have been partnering with a different. When I mentioned in Pennsylvania. It has been a leader in trail counts. They have funded trail counters in and around the whole state. If you can make the case, it helps if the leaders are already tuned into that. Otherwise education and awareness can come in handy. Down in Brownsville, Texas, we have a funder which is a health organization. Our plug-in was the high diabetes rate in the low physical activity rate. They have been a big funder of a trail count. Just finding the right fit with your audience, and the problem that localities are facing. We found there are different types of organizations that will come in. Some insurance providers will step up for these kinds of counters.

**Tim Coffin asks:** During the first presentation (with Eugene), I noticed that there was no mention of using pneumatic 'bike' tubes connected to the Eco-counter to track cyclists. Are they being used? Would this help to lessen the noted 10% bike error? Any thoughts on why the cyclists’ error was so high?

Gene answered: We were pleased to get the Eco-counter award that provided us with the two Pyro-box counters. The pneumatic tubes weren’t really an option for us. Also, there are no paved trails, they are all dirt and that may limit their potential application. Saying that, we are exploring the cycling error to see if it is the speed of the user or the height of our counter. I suspect we may need to move one of our counters a few inches higher. Our ongoing validation efforts will, I hope, sort that our.

Matt A: Hi Tim. So as much as I love our TUBE counters, I don’t really recommend them to be installed on mountain bike trails as they can get eaten up. The TUBEs also require a nice flat surface for installation, and that really limits you to places like parking lot trailheads for mountain bike trails. So for mountain biking we recommend the PYRO-Box, or a ZELT permament bike counter (which can be installed in either asphalt, gravel, dirt etc.).

**Traci Berry asks:** How do you explain that this isn't a unique visitor/user count, but rather a usage count? How do you determine validity? We have 4 different trailheads with multiple trail entries at two of them. Riders may pass all 6 counter locations in one ride or they may pass a single counter multiple times on a full day of riding. So counts are more about uses rather than count of the number of users. We use TrafX. We have 6 locations each with an infrared and a magnetic counter. We did this to look at total usage (bike and foot) vs bike-only.

Gene only: We have the same situation here in Knoxville. We plan on using direct observation at key points to determine the proportion of users crossing the counters multiple times. Also, this is a limitation that we may have to accept as a source of error. Another option might be motion-activated cameras set next to a counter to determine how many passes the same person is taking.

**Tracy See asks:** Have these counters been used during winter to count runners, snowshoes and snow bike users in a trail complex?

Matt A: They have! We have clients who count at fatbike trail centers, cross country ski trails, backcountry ski areas and much more. They count great in the winter.

**Walt Daniels asks:** Do the counters distinguish between bikes, people and dogs?

Matt answered: Depending on the counter, it changes what you will actually be counting. Some counters are a people counter so it's counting the number of users using a trail not distinguish between user type, and, they took a survey to look at the split in the years, they can scale the data on how many bicycles that are, if there just using a general people counter. There are also counters that are able to differentiate between pedestrians and bicycles. Some counters do the same thing with pedestrians, bicycles and motorcycle riders also.