Getting started with our conservation Webinar today. I'm Holli Kuykendall, National Technology specialist for NRCS's East National Technology Support Center.

I'm pleased to turn the Webinar over to our moderator, Kevin Ogles. Kevin is the grazing land specialist for the East National Technology Support Center. Kevin, you can right now begin.

Thank you, Holli. Well, we have a real treat for you today. We have a couple of very experienced people in the equine industry. First of all, we're going to hear from Doctor Carey Williams. She has a vast amount of experience. She got her bachelor's degree from Colorado State University in equine science. She also got her doctorate and master's degree in equine nutrition and exercise physiology from Virginia Polytechnic Institute and State University. So she has a wealth of experience.

She's now an Associate Director of Extension in the Equine Science Center at Rutgers in New Jersey, and she does research. She works with the equine community, and she's very much been in touch with the AG agents in Rutgers. So she has a lot of on-the-ground experience with equine and pasture management. So we're very fortunate to have Doctor Williams with us today.

Also, after she gives her presentation, we will be hearing from Suzette Truax. Suzette was born and raised on an equine operation in California, and Suzette got her bachelor's degree in animal science from Delaware Valley College in Pennsylvania, and she's been working for NRCS and as a grazing equine specialist. And I've known Suzette for quite awhile. She does a great job working with landowners. Lots of practical experience in dealing with horses and conservation.

So we're really glad to have both of these ladies with us today, and with that I'm going to go ahead and turn it over to Carey. And Doctor Williams, you can begin.

All right, thank you very much for inviting me to speak, and thank you everybody for logging on on what, in the east coast, is turning out to be a gorgeous day. So thank you. Let me just say that there's not a lot of time to get anything and everything to do with equine horses pasture grazing, rotational grazing. So what I'm going to do is just give little snippets of information about why pasture's important, how it's good for horses, how it impacts their nutritional status. And then a couple little management tips before it's turned over to Suzette to talk specifically about the rotational grazing side, and some stress management, drylots, things like that.

So when I start I always feel I have to define a pasture for everybody, regardless if you are a farm owner, or if you work with NRCS or USDA. When we're talking about a pasture in our sense, it's usually an area of land more than

half an acre-- and I know some parts of the west, that is very tiny and not usually considered a pasture. But here in the east, a half acre is also considered a pasture.

But specifically, it's where grasses and legumes are grown for the purpose of supplying nutrients to the grazing animals. So all of our pastures will contain carbohydrates, fats, proteins, minerals, vitamins, water, et cetera. So pretty much everything our horses need.

So now let's look at what is really in the pasture. I compiled some data from our Dairy One Feed Composition Library. You can find these online fairly easily. Let's just look at a few things here. Let's first take a look at the protein. Now, the level of protein in an average grass pasture-- now this is just average grass pasture-- is about 15% . So this 15% is actually over what most horses are going to need on a daily basis. Your average horse is going to need about 8% to 10% protein. So their protein is covered by the grasses.

We can also check out some of the minerals, here, our calcium and phosphorus. Now, calcium and phosphorus need to be in a two to one ratio for healthy bone growth in horses. Particularly, young growing animals. The two to one ratio is found in most average grasses. But I also do want to quickly point out, though, is the sugars, starches, and other non-structural carbohydrates, like [INAUDIBLE]. Not going to get into that a whole lot, but you can see that there are levels of these sugars and starches in grass pastures.

And this is why with some horses, if they consume too much pasture, if they overeat, they can get fat. And the fat will accumulate from having a higher sugar and a higher starch content in the grasses. But this is about average. I think that you'll see in terms of grass pasture, and I want to say for those of who might be logging into from the south or the west, typically most of what you'll see with the Dairy One Library is going to be cool season grasses, because they are located in Ithaca, New York.

So more onto the horse eating basics here. Horses have evolved as grazing animals. They do consume forage in small, frequent meals throughout the day. However, when we bring them inside, and we tailor their feeding to meet our needs, we should remember that horses need to consume at least 1% of their body weight in pasture or hay per day, and that's in forage. And actually I think new research is coming up that says that 1% is actually even too low. I always like to recommend 1.5% of their body weight.

So to make math easy, if you have that 1,000 pound animal, they should be getting at least 15 pounds of forage. That could be in either pasture or hay per day. Well, 1,000 pound horse, when you take this into account, should require approximately two to three acres of pasture to meet their requirements for maintenance. Now this is not pregnant, or lactating, or growing, or any sort of exercise. This is just at maintenance. And that's two to three acres of good growing pasture. And we're going to talk about stocking density density here in just a little bit as well.

So what are some advantages of pasture? I can go on about this probably forever, but just to summarize some of these, research has proven that it can reduce the likelihood of colic, lower the incidence of any gastric ulcers, decreases the incidence of COPD, or chronic obstructive pulmonary disease, which is also called heaves in horses. It also increases bone mineral content in young horses by allowing them the ability to get out and run around, and to help with their bone growth.

More from your neighbor's point of view, it can provide an aesthetically pleasing environment. It's much more pleasing to your neighbor's eye to have a nice, green field than a mud plot next door. Productive pastures also can maintain good vegetative cover, they compete for weeds, it reduces erosion-- all good [INAUDIBLE] decrease that dust production in your field.

There's been some studies done, and actually we're doing a little bit more of this right now at Rutgers. We don't have numbers, per se, quite yet but a pasture can reduce hay cost up to $60 to $100 per month. And actually in one season, one growing season here in New Jersey, we decreased our hay consumption by about $3,000 to $4,000. So it can get pretty significant depending on how many horses you have and the pasture you have.

It can reduce the amount of fertilizer costs by recycling nutrients, and we'll talk about that a little more. Reduces the need to deal with manure from bedding the stalls, like you see here, filling up a wheelbarrow, decrease labor time, et cetera.

Some other things that you should actually ask yourself if you're a farmer, or if you're a consultant for the farmer, we need to have each farm realize that they need to figure out what their own goals are. Will they be turning out for exercise, or will they be able to have pasture. What is their stocking density? How much time do you have? Et cetera. So each requirement is going to have its goal that they need to try to figure out.

So they need to, again, figure out your finances, the size of the place, the time that's involved, how many people they have on staff that can help deal with some of these, how many horses you have, and then what are the existing facilities. So just draw that scenario like this, all that you're going to be able to do, or afford, or have time for, or are you able to have horses out on pasture.

So let's look at stocking rates just a little bit closer because that seems to be the thing I deal with the most when I'm consulting with farms in New Jersey, is how many pastures, how many acres do they have, and how many horses do they have on those acres? So our guideline here in New Jersey-- and, again, this is just guidelines. We don't have any strict rules on this. Each municipality makes up their own rules, and I probably shouldn't have said makes up. But there really is no hard and fast research on this.

In order to maintain 70% vegetative cover, and that's in your field, 70%. If you think about it as 100% meaning every little, last millimeter of that field is covered with grasses. So you can maintain 70%, so at least 30% of something else, whether it's rocks or bare ground. One horse can be maintained on the 70% cover.

If you have a half acre of turnout, you might have to limit turnout time to about three hours per day. And we have a lot of farms that do this. They only have morning turnout, than the horses come back in, allowing the grasses regrow a little bit. If you have one acre of pasture per horse, you could probably limit turnout time to about three to eight hours. So that would be sort of a daytime turnout situation. About one horse can be on 1 and 1/2 acres eight to 12 hours per day. Or, as I mentioned before, if you have more than two acres of pasture per horse, you can have unlimited turnout time.

Now these are all going to vary. These are really rough guidelines, because there are a lot of management techniques that I'm going to start talking about soon that will help you increase the ability to have less acres or more horses per acre. Well again in the end, all farms need to be very flexible. If you have a field that has five acres and has six horses on it, you might have to be flexible with the horses that are in it because if they're eating all the grasses down, you might need to move them, or you might need to do something whether it's renovate, or reseed, et cetera.

You need to plan ahead and monitor the grasses condition. So if you have a back 40 don't be afraid to get out there and walking it on occasion, see what's out there, see what's back there, and adjust your original plan, as I mentioned, keeping good records is also a good way to go.

So just to make sure that everybody is on the same page because we have a lot of different backgrounds out there, let's talk specifically about pasture plants and how they grow. So pastures, we have to remember, are made up of individual little plants. Yes, there might be nice, lush grass that we see like this, but each plant grows individually. And we have to understand how these plants grow before we understand, really, how we're going to manage these fields.

So this is a nice little schematic of a pasture plant, and where it's growing points are. So growing points are where each plant is going to have a seed grow from. Unlike flowers, which only grow right from the end of that flower, grasses grow differently. They're going to have a bunch of points at the base of the roots, of the top of the roots and the base of the plant. All these little buds.

They grow dormant in the winter, but in the spring they're ready to grow. So they're going to have offshoots of the leaves from the bottom of the plant. As the plant grows up, the stem, the seed of the growing points also grow up a little bit, so that they're at the base of each of these leaves. Until this plant grows pretty tall, growing buds are only going to be about midway. But they slowly and slowly will move up that plant. There's always going to be a

few of those growing buds down at the bottom, at the top of the roots. So that's how each one of these grow.

Now why is this important? Well, we have a rule that's called take half, leave half. So if you think about it in terms of the amount of leaf volume that is removed, and let's say by your horse, if your horse takes off 10% of the top of that grass. So if you look up here, if they just remove the top 10% of that plant you're not stopping any of the root growth. So your forage is going to be able to grow continuously just like it was if it was never grazed.

You can take up to 40% of that plant and still not affect any of the root growth in that plant. You can even take 50% of that plant and only stop about 2% to 4% of the root growth. So that means your pastures are going to maintain its productivity, and the pastures are going to continue to grow at a fairly rapid rate, even if your horses graze 50% of that plant.

Where it becomes really important is when you start overgrazing pastures, even 60%. Once you take 10 more percent from the halfway mark, you are stopping 50% of that root growth. 70%, and even up to 80%-- once you remove 80% of that plant, you have completely stopped any of that root growth. So that's why it's really important to not allow horses to overgraze the field, because then you're basically stopping any of that plant growth back to nice, healthy vegetative plants. And that's when you need to start looking at doing some renovation and reseeding to get some new plants in there that can be healthier.

So that's why we say take half, leave half. Just take 50% of the plant, leave the rest so that it's able to grow back. And this principle is going to become extremely important when talking about rotational grazing.

So here's another little schematic so you can see where the fastest growth of your pastures are going to be, and we'll talk about the types of grasses here in a minute. But most grasses are going to grow rapidly between about three and six inches. Some of your bluegrass and stuff are a little shorter than some of the orchard grasses or Timothies are going to be. But the fastest growth for any grass is going to be between three and ten inches.

Once they start going to seed, and they start growing over 12 inches, they're root growth is also going to slow down, because now they've produced the seeds, they're going to let the seed fly away and start new plant growth. So now it doesn't need to grow as fast. So we want to maintain our growth rate between three and ten inches.

So now we have to remember all about those horses. They graze differently than cows or any other grazing animal, because they graze it all the way down to the ground level. So, yeah, this pasture from far away may look like really nice pasture, but as you get closer, there's really nothing there for the horses to graze on, and they're taking it all the way down to that 80% range, which is not giving the plants a chance to recover.

So let's look at a couple of species of grasses, here, and look at what the seasonal growth pattern might look like.

And again, because I am in New Jersey, we deal primarily with cool season grasses, like Kentucky Bluegrass, and orchard grass. These are going to have a big growth slump down in July and August, because that's when it gets really hot and really dry. But once they start getting into fall, the season gets a little cooler, a little more wet, we're going to have a little bit of an increase again.

Some of the legumes, the alfalfa, and the clover, they really don't have too much of a slump until the winter season. And they'll pretty much maintain their growth. But the grasses we're mainly talking about are going to be cool season grasses here.

Warm season grasses are going to be just the opposite, actually. They really like to have some nice, warm weather, it's just that here in New Jersey and in the northeast, we don't have a long enough warm season for the grasses to stay productive, so they just don't last here. I want to say once you reach down in the Maryland area, you're starting to be able to grow some warm season, however southern Virginia, North Carolina is really where they start to take off.

So let's talk some more about some pasture species for horses specifically. It's very important that you have a pasture mix if you're going to go to a tractor supply or something and grab some seeds, make sure it's not meant for lawns, make sure that it's pasture. If you're going to make your own mix, here's some things that we don't recommend.

And I'm sure some of you are probably surprised to see Timothy on my list because we are talking about horses, and we know that they love to eat Timothy hay. However, it's not a very good pasture grass. While it is very palatable, they will graze it first, and Timothy does not have a very high grazing or a warm weather tolerance. So if you have a full stand of Timothy 100% in your pastures, give it about two years before you start to see it disappear. There's also, especially in the northeast, a cereal rust mite problem, which will cause a decrease in the productivity of the Timothy.

Alsike clover is one of the covers shown here in this picture. It produces a toxin that creates a liver toxicity, or liver toxicosis. It also will produce photosensitivity and slobbering, but it's different than the slobbers you're going to see with the red and white clover. This will actually lead to a more severe problem, which is liver toxicity.

They tall fescue, I'm going to put at the very bottom of this list because only if the farms are housing brood mares or have a breeding program is the endophyte in the tall fescue going to be a problem. It can cause [INAUDIBLE], lack of milk production, and even some other reproductive problems, retained placenta, et cetera.

So I am going to keep tall fescue at the top of my preferable list, because we do like it here in the northeast. It is warm weather tolerant, so in that hot season in July and August, it's going to stay more prevalent. However, it's

not as paletable, so the horses will graze this last. But it's something out there for the warm weather season.

We're going to use an enophyte free or an endophyte friendly variety. There's a whole bunch of different varieties out there now. And these work well. And you can even use those if you have a breeding program.

Kentucky bluegrass is great. While it's a low-yielding grass, so it's not great for hay, it's really great for cool weather and heavy grazing. It's very palatable to the horses. Orchardgrass is good, as well. It responds really well to a nitrogen fertilization and is really ideal in high grazing areas. Reed canarygrass most people don't think of, but if you have some wet areas or you have really wet conditions, this is good because it will grow in those wet areas. However, it does mature very rapidly. So horses will only eat it when it's immature. It does need to be mowed to stay very vegetative.

Perennial ryegrass is great, even though it's not drought resistant, it does tolerate heavy grazing, and it's very easy to establish. I put clovers at the very bottom because while I don't recommend people to actually seed clover, it can be good in very small quantities. Just so you know, if you don't ever see clover in your pastures, give it a year. You're bound to have some in there, because it can just persist no matter what. It can cause the [INAUDIBLE] the slobbers if it has the right growing conditions for a fungus that's called black patch fungus. So while it's not the same problem that outside clover causes, it is just messy and I know a lot of horse owners don't actually prefer it.

So how do we improve pasture quality? Let me just run through some of these. Soil testing-- I'm not going to get really in detail with soil testing. If you don't know how to do this, I recommend if you're farm owner, you can contact your Cooperative Extension agent in your county of any state, or I think NRCS actually even does this as well, so they can help you out, and you can get proper needs for your soil. Do they need nitrogen, does it need phosphorus, potassium, what's the pH like.

If you are spreading manure as a fertilizer, that is good. However, don't forget, not all nutrients are available. So even though you're spreading, you still might need to take a soil test to see if there's other things out there that your pastures might need.

Weed management. I could go on forever with this, but I'm not going to for the sake of time. It's just best to prevent weeds to before they're growing. So other than making sure you really have a high quality seed and avoid spreading any seeds. Pastures that look like this in the top corner picture are perfect for spreading weeds, because all of those seed heads have millions to billions of seeds that they're going to spread in the field.

So the best way to do it is to mow. Mow, mow, mow your pastures. This helps remove the weed seeds and the seed heads. So it prevents any of the reproduction that they're going to have. It also allows for uniform maturity of

your grasses, and will really greatly minimize the need for herbicides. I find now that I've been doing so much pasture management here in New Jersey, it actually-- I can't stand looking at an unmowed pasture, or a pass it looks like this. It just drives me nuts to see that many weeds and how much more weeds that that pasture is actually creating.

So if you have a lot of short grasses, you can mow it to about two to three inches, and then let it grow back to about four to six before grazing it. If you have that timothy, brome, or orchard grass you can mow it a little higher, because they're higher growing grasses.

I'm going to skip over dry lots because I know that's what Suzette's talking about next. And I'm just going to wrap up some things in summary from my talk. All of this goes into creating good quality pastures. If you're controlling your weeds and any undesirable plants that will also help prevent selective grazing by the horses. Mowing all the fields so that they're all at one, even level. It also can help get rid of some of these long [INAUDIBLE] that our horses make in our fields. It will also help improve waste management, as well.

So if you're a farmer and you're out there, or if you're working for a farm owner or helping consult with them, set reasonable goals, plan, observe what's going on in your field, and keep lots of good records. You can easily get your field from looking kind of overgrazed and brown, like this one on the left, to a really nice and productive, like this one on the right. Just by taking some of these short tips.

So I'm just going to wrap up my talk, and I just want to say some of these slides came from a partial grant that we had a few years ago from Northeast SARE, Northeast Sustainable Research Agriculture and Education, and it was a big collaborative project with a bunch of universities shown here. So with that, Kevin, how are we looking with questions?

OK, thank you Doctor Williams, that was great. I had a few questions come in. First of all, I want to remind everybody that our topic came in for this. This was really strongly desired by NRCS staff in the northeast states, so that's kind of where our presentation and our speakers are concentrating their efforts. So we realize that we're going to be talking about different species of plants and different situations for how much areas horses need, and that kind of thing in other parts of the country especially areas with less rainfall.

OK, so the questions. So timothy would still be a preferred pasture plant for a horse pasture?

I never recommend it, Kevin. It doesn't make any sense for people to spend a lot of money reseeding a pasture with timothy only for to be gone in two years.

OK.

You know, instead of timothy, orchard grass is a very good comparison. They have very good nutrient profiles, they're very similar, and horses actually prefer that almost just as much as the timothy. So it's still a high yielding tall grass, but it can withstand a lot more grazing.

OK. OK. We had a comment come in that depending on what state you're in, reed canary grass is considered invasive in some states, or on the state noxious weed list so in some states it's not allowed to be planted.

Yeah. I didn't realize that.

Yeah. But we've also noticed, in my work as a grazing specialist, where it already exists it can be managed to be a good forage. Something else that people were wondering, is there ever-- from an NRCS planner standpoint, is there ever a situation where there's just too many horses for the acreage, even if it's being treated as a bare lot and there's no grazing being done to supply the diet of the horse.

That is a really good question. I've actually consulted with some farms that have 30 horses on three acres, and while are some people think that that is way too overstocked and they should never have it that way, there's one particular farm that actually just got an award for their environmentally friendly farming, because they were really doing everything correct in terms of how they were managing their horses on these acreage.

So I think it all depends on how the farm is managed. If it's managed poorly then, yes, I think there can be a situation where there are way too many horses for them on the acreage. But if the farm is willing to put in the extra effort and do things correctly in terms of watching their water quality, and watching any of their runoff, and dealing properly with their manure management, I think-- I don't want to say the sky's the limit, but three horses on three acres was quite the limit that I've seen.

OK. Just a couple more questions, and then we'll get to Suzette's presentation, which we definitely want to hear. Have you ever had mixed livestock species grazing with horses, such as goats, or sheep, or-- any work you've done on that?

Absolutely. We have done some work here at Rutgers. We actually did multi-species. We started with goats, and we had about 20 goats on an acre. Which I will say didn't work very well. You need probably double that, because instead of clearing out just the weeds, it allowed for too much of the good grasses to grow, and even though their goats, they still like the good grass. So they actually grazed too much of the good grass along with the weeds.

But if you're able to incorporate them at the same time-- like we rotated, we rotated goats and then horses and then cattle. So we did it a little bit differently. But things like multiflora rose, once they get into pastures there's really nothing decent that will get rid of those. You can go with the herbicide route, but yeah. Goats will really help if they're in with horses to graze out some of the more woody plants and things like that. That we would definitely

help out.

OK. OK. This last quick question, and then we'll hold the rest for later, and get to Suzette's information. Dragging pastures to break up the manure from the horses, is that-- do you recommend that? What are your thoughts on that?

I actually saw that question and I wanted to save a little bit of time in my talk, so I didn't address it a whole lot. So I know a lot of people are concerned with the parasites and the spread of the parasites when you drag the field. If it's done properly, you can reduce the spread of parasites, and properly meaning make sure that if it is spread, it's spread in very thin layers. You never want a lot of it accumulating, so that you're putting inches of manure over your grasses because that will keep it moist, and that's when parasites will grow.

You also never want to do it when there's a forecast of rain, or when there's been a lot of rain. You want to wait until it's nice, hot, sunny, and dry. So we always say to make sure it's, you know, mid-80s and sunny. You really want it to dry, because then the parasites will dry out, and they won't produce, because they need a wet, moist area in order to produce. So spreading is fine, thin layers, hot and dry environment.

OK. Great. Well, thank you very much--

-- one more that I failed to mention in my talk, and that was about millet.

Oh, yes, go ahead.

Someone had asked about foxtail millet and the mix of hays and pasture and cover crops and things. The problem with foxtail is when it has the barbs on the seedheads or the yarns on the seedheads, they can get lodged in the horse's mouth. Now, I don't have a lot of experience with the foxtail millet. If it doesn't have the awns on the seedheads, it should be OK, but not in large amounts because it's not really nutritionally balanced for horses. A little can be in there, but as long as the barbs aren't there. It should be OK, just in small quantities.

OK, great. Thank you, and I'm sure we'll have some more questions for you later. We're going to let Suzette go ahead and get started, and I'll let you take right off, Suzette.

Thank you, Kevin. I'm going to switch gears a little bit. We were talking about pastures, now we're going to talk about our heavy use areas sacrifice lots, and why are they so important on a horse operation.

So first off-- what is it? What NRCS refers to are the heavy use area, or an ACA. I go out to a lot of farms, and I say, you probably should install heavy use area, and they look at me like I'm from Mars, and they have no idea. So when we're dealing with the horse people, we need to think in terms like they would, that these are sacrifice

lots, or dry lot, an exercise lot. A lot of them call barnyards or mud lots. So when you say heavy use area, they might look at you funny. Think of some of the other terms you may be able to refer to them, and that way they're like, oh, I understand exactly what you're talking about.

So why do horses need a heavy use area or a sacrifice area? It's very crucial that a horse has a lot of movement. It's very critical to their health and well-being. Horses should at least walk at least two miles a day. It's very important to their digestive system. Their digestive system is very complicated. Their small intestine alone is 70 feet long. So you can imagine all the stuff that's crammed inside there. So the more they move, the healthier a horse can be.

They can't change food rapidly. So in the springtime, we can't just throw the horse out in the pasture and expect everything to be fine. They need to go out at limited times. Go out for a few hours today, a few hours the next day, and gradually build their way up. We have strong herd hierarchies if we have a lot of horses become the alpha animal and dominate the food in shelters. They dominate around the gates and the water, so we need to have areas where we could separate these horses.

We can't combine all horses in the same group like we do with our cattle and our sheep. We can't put, generally, our small mares or fillies in with our colts. We have to keep them separated. Stallions, we don't really want them to go near our mares unless we have certain fence systems. So it gets a little bit more complicated when we start dealing with the horses, and I know from an NRCS standpoint people get very confused. Well, I don't understand why they think they have to have double fencing, and all that kind of stuff.

But a lot of it is just because of the dominance within the horse, and then some horses just don't get along. They don't get along with anybody. So you need a place to put them, so at least they're getting out and getting some movement.

So when should horses be confined to these areas? To protect the pasture. Basically, like what Carey was mentioning about pasture and the importance of it, we also need to be able to protect it. A lot of the farms we work on have more horses than they do acreage. So we need to look at that. We need to make sure that we can help utilize the rotational grazing system. We need to make sure the landowner understands what rotational means.

A lot of times I go to farms and I mention rotational grazing, and they think that means moving-- putting a horse out for two hours, bringing it back into a barn, and putting another horse out for two hours. So we need to make sure they understand what rotational grazing actually means.

Managing their turnout time. This depends on the number of animals versus the number of acres they have. We want to prevent trampling and compaction, and then also we need an area where horses can recover from injuries

and just needs limited space, such as a horse that has laminitis or colics very easily when it goes out on pasture. If we have a small area where we can put them in.

And it also helps with healthier horses. We want to keep our horses out of the mud as much as possible. Mud can be slippery. It can cause many issues, it can cause our horses to lose their shoes in the winter. It can strain tendons, it could rip tendons on extreme cases. It causes a lot of health problems. A lot of mud rot, thrush, parasite problems, as well as abscesses, which can be very costly in the end.

So how do we keep horses from overgrazing pastures? What practices do we employ? We could put those horses back in the barn. Most people don't like to do that because they want them to exercise. Or we can keep them in a barnyard, dry lot, heavy use area, and by doing this, like I said, we promote our healthier pastures, we can increase our grass production and overall health.

In general here in the northeast, when the pastures get around three inches we recommend they pull them off and then put them back on when it gets to be about six to eight inches. Now this varies depending on the type of horse that they have, and metabolical issues. Horses can range anywhere from diabetes to-- there's all kinds of different things out there that you have to be concerned about when you go talk to a horse person. They're going to say, well, my horse can't go on grass. He can only be on grass if the grass is two inches or less. So you need to be able to explain to them how a plant grows, where the sugar content is in that grass, and why it's more beneficial, and that they get more fiber at more of the six to eight inches opposed to having them out on two to three inches.

For an example, our traditional pastures, this is what we usually go out to when we're out on the farms. Most of us see the pasture with the water and shed. If we could recommend to them to do a rotational grazing system-- and I understand not every paddock is going-- every farm we go to is going to be square, and it's not going to be this easy. But if we could do a water system with the shed and the corral maybe down the middle, split that field in half, and now we have four paddocks and we can let those horses out.

And then we can also get more into the intensive rotation where we divide even more paddocks. But we always have that opportunity to bring those horses in where we can feed them on the barnyard or the corral. They've got their shed, they've got their water.

So how many heavy use area/ sacrifice areas do I need? That depends on the number of horses that we go out to, and one thing we've realized here in the northeast, especially in Pennsylvania, we want to watch is we don't want to size these based on the total number of horses. We want to base it on the size-- the number of horses that are going out together at one time.

So if you go out to a farm and they have 20 horses, we don't want to size it for 20 horses unless all 20 are going out together. Otherwise it's going to end up being an arena or some other thing that we really don't want to see. We want to see something-- if five horses go out together, we size it for five horses, and maybe we have two or three heavy use areas opposed to one.

So that's really going to depend on how many groups of horses we have. Depend on how many sacrifice areas we have. We usually try to figure-- can range from a 20 by 20 square to long narrow. Most of the producers I've been working here in Pennsylvania are liking the square with rounded corners more and more. They feel like the long, narrow paddocks, the horses are getting-- they're getting too much of a run, when they get to the end, and then they just go right through the fence. Seems like the square paddocks, they don't get quite the speed. They seem to see the fence a little better, and they respect it a little bit more.

There is different ways that we can size these. I didn't really give you guys a slide or anything on it. I can give you a quick example, and then if any of you guys are interested you can give me a call later. But for example, here in PA, the way we size our heavy use areas is by-- automatically, the first two horses get 1,200 square feet, and then any additional we would add that and multiply it by 400. If we were looking at six to 1,200 pound horses, three to 600 for mares and foals.

So it depends on what we're dealing with, how we would do it. If anybody's interested in that, just let me know and we can go more into detail on how we actually size these for here and in Pennsylvania.

I keep forgetting to hit the wrong button. So locations of these. We want to locate them on the highest, driest ground away from streams and wetlands. We want a slight slope to help with drainage. We want to divert the Clean Water away from the heaviest areas, and we want to divert our runoff away from these areas, either into a storage or into some type of filter system.

We also want to make sure that it's convenient for cleaning and feeding. Most horse operations will go out once a day, once a week, and pick these heavy use pads. They'll actually go out with their wheelbarrow, pick it up. So we need to make sure that it's close to some type of storage so that they can clean it. You want to make sure they have access to fresh water, and the other thing that's really important is making sure that they have easy access to pastures.

We want to make sure that these paddocks are close to pastures, otherwise they end up leaving the horses out in the pasture couple days longer, couple hours longer than they really should be, and then we end up with issues with our pastures not growing correctly, or--

Construction of these. We want to eliminate water flowing. Usually a general grade is a 1% to 3%. Be sure that the

water flows into some type of grass filter, so we want to make sure we have some sort of filter or filter around it, and we want to make sure we're not-- the grade is not going towards the barn or the house. We want to cover with some type of geo-textile fabric, especially if it tends to lay wet. Some of our soils are slate soils, and we don't really need the geo-textile, but if the area seems to lay wet then we want to go to geo-textile.

We want to build a perimeter of some sort of around the heavy use area to keep the stone, the sand or whatever we're using in place. With the geo-textile, we want to be sure to tuck the ends into trenches along the perimeter. Either dig like a two to three foot trench and then tuck them in, or we want to put the geo-textile down and then pound our fence posts in.

The reason I say this is from experience. We had a lady put in her geo-textile, stones and everything. Horses got to pawing, having a good time, running, skidding. Well, the black part of the textile came up, and the next thing we know the one horse had it in his teeth and had ripped the whole geo-textile completely out. So you want to make sure you have that geo-textile anchored into the ground somehow.

Types of splitting we generally use on heavy use areas for horses-- gravel, the sand, wood products, and rubber. We generally stay away from concrete. I'm not going to say we don't use concrete, because we have had a few farmers that have used concrete and are perfectly happy. But in general, we stay away from the concrete.

So with gravel I kind of do an overkill. I like to see at least six inches of the three to four to three inch crushed rock. This helps with our drainage, it also helps with our horses that like to paw, and then I like to see a four to six inch of either sand, crusher run, or limestone dust on top. This allows us to have a good cover so we don't have to worry about that larger rock causing abscesses or bruising of anything to the foot.

The nice thing about using the limestone dust, if you use it as a cover, is it helps control your urine odor. So you don't, if you have multiple ones and you use them a lot, they don't get a foul smell to them.

Sand, when we're using sand, we want to make sure that we use the clean and screened medium to coarse, sharp sand. Fine sand breaks down too fast. We want to make sure that we use the hard, coarse sand, which will last, and we don't want to install it deeper than six inches. If we get too deep, we can cause some issues, some stress on our tendon, which will then cause us some problems down the road.

The downfall of sand is it dries out very quickly. If you're having rain, like we've been having lately, it's not that big of a deal. But if you have a dry spell it dries up very quickly and just becomes dusty, which then not only causes dust for you, it causes irritation to the horse's eyes.

We have wood products that are also available we can use. Wood products are inexpensive. It does reduce urine smell, it's not near as abrasive to the hooves as what the stone and the sand is. One thing we do need to make

sure that it is a hardwood versus a softwood. The hardwood will-- I mean, the softwood will just kind of disintegrate, and become into mud.

We want to make sure that it is half to three inch in size. We don't want to use just the fine, more like sawdust. We want to make sure that it's the actual more of a three inch, where it weaves itself together. If you're buying or getting off of a local person that's just out chopping trees, you need to be careful of nails, staples, large chunks of wood, and you also want to be sure that you do not use black walnut. We want to avoid that as much as we can. Black walnut can cause laminitis, swelling of the legs, unwillingness for the horse to move, and in extreme cases it can also cause some respiratory difficulties.

So we want to make sure we stay away from any black walnut, which a lot of times when we get these companies that are just out trimming trees, they have no idea what they were trimming so most the time I tell people just avoid that, go somewhere and buy it where you know exactly what is in that material.

Rubber. This can be a little bit more expensive. If you have a place close, it can be nice. Usually it's recycled shoes or tires, but you need to make sure that where you're getting the rubber, that they have took out any of the metal that may have been in the tire. You want to mix it with the sand, usually at a one to two pounds per square inch. It doesn't compose, but it does break down into smaller pieces. So you might have started out with a one, one and a half inch piece and now it's like a third of that within a year, a year and a half. It does help in the wintertime, because of the black it thaws out much quicker.

And then the other thing we got to really take into consideration around our heavy use areas is our fencing. We want to make sure that our fence is visible and sturdy. We've got to look at the cost because different types of fence can be really expensive. What type of horse is going into that, and the height. If it's a pony versus a draft horse versus our standard horse. And then we need to talk does it need to be a double fence? Are there mares on the other side? Are there stallions on the other side?

And then we basically need to look at our maintenance. We need to remove that manure regularly. We need to check the fence, control the dust, and then realize with horses, with using the stone that it's probably going to need replaced every five to 10 years.

So in conclusion, most of our horse people, believe it or not, do really care about the environment, and many of them are looking for assistance. So healthy environments generate healthy people and healthy horses. So with that I'll answer any questions. I know I went through that pretty quick.

No, that was great, Suzette. Thanks a lot. So we had some questions come in, and I got a couple about specifically kind of from NRCS planner aspect. So have you seen people use the heavy use areas, designed as

you suggested in your presentation, also being used for a riding area?

Yes, we've had lots of those.

OK.

They've been made too big, and then after-- especially when you get in the program, then you get over the three year, the four year, the next thing you know, you're driving by and you look over and now there's a set of jumps that are set in there, or they're using them as a ring of some sort.

OK. Another question came in-- what's your thoughts about using crushed road asphalt or something else as a footing material?

I haven't really done much of it with horses. I've done it with cattle. It works very well with cattle. The only thing I'm not quite sure is when-- like, when you roll it in, it gets hard, you know, you harden it up. It can almost be like concrete, and that's the one thing. We need to have a little bit of cushion for horses. Now you may have a producer that wouldn't mind that. I mean, like, we have a few that are like, concrete's fine.

I would never put my horse on concrete, but-- and the other thing you want to make sure is you don't want it to be slick. You want there to be some type of grip, so if that horse slides, or kicks, or bites he doesn't wipe out and get hurt.

OK. Good. So here's some NRCS planner questions. So we have situations where we have a lot a horse owners, as Doctor Williams pointed out, where they don't have enough land for the horses to get all their nutrition from grazing. So in Pennsylvania, there-- so you don't have to be able to do prescribed grazing in order to bribe assistance to horse owners.

No, you just have to be making some type of income from your horse. So if you just needed a heavy use area, and you were limited on your grazing-- on your acres, we could do three or four heavy use areas depending on your animal numbers, and then we could use that as part of the rotation for the little bit of pasture that you do have. So the heavy use area actually becomes part of the rotation.

OK.

If you didn't have any pasture, we would basically use it more for the exercise area, but it would be stabilized. And we wouldn't be getting any mud issues.

Right, and I'm assuming all nutrients, manure management, all that has to be applied as well.

Yes, any time we do a manure storage or a heavy use area, you have to have a nutrient management plan, and follow those rules that come into the programs from that aspect.

Great. Great. Something else that we wanted to address as planners, I guess. I'm not trying to do a commercial here, but I know we've got states in the east-- and my comments are mainly addressed for 45, 55, 65 inches of annual rainfall a year. So I know we have states that say, we're not going to-- we don't provide assistance to horse producers in our state.

So I have seen, and I guess that you've got a lot more experience with it than I do, Suzette-- where improper management of the horse lot has led to resource concerns, such as water quality issues.

Right, and that's basically-- I mean, we tried it as a pilot the one year, and it really worked, and we look at it from a water quality, solar erosion issue. We make sure we don't do-- if it's just a backyard horse, a pleasure riding horse, we can offer technical assistance, but we don't offer any program dollars. We're looking at-- our program dollars goes to somebody who's actually making a living with these horses, and then is also going to be-- and they get ranked, they get put in the ranking pool with the cattle, with our traditional livestock producers.

So they're in there with everybody else. So they're going to be ranked higher based on their water quality. What are we addressing to help that water quality issue? So that's really how our horses got in there is they're causing a resource concern, but they are ranked with everybody else. They're not separated out or anything.

All right. I think that's great. I personally have worked on a watershed project as a district conservationist, and we had a situation where we had a small algae plume in a lake, and we could never find where it was coming from. We finally did, and it was from three horses on a lot adjacent to the stream, and that was contributing to that situation.

So those people needed help with their management, and we need to be doing it, in my opinion, as conservationists we need to be treating resource concerns, and helping the environment, as well.

We were lucky. Our state ponds realized it as a resource concern, and said, well, we'll try it, and see how it works, and we got that opportunity.

OK, great. So here's another planner type question, Suzette, that came in. Let's say we've got a situation where we do have some area to graze, maybe some acreage so that the horses can get quite a bit of their diet, let's say, from grazing. So is there anything special I need to keep in mind about that versus cattle? Do I want square paddocks? Small paddocks? What--

The thing with horses, we tend to get a little bit-- we need to be a little bit bigger, and that's mostly because most

of the time our cattle or our sheep-- there not biting each other. I mean, yeah, they're dropping their heads and pushing each other around. But we're not-- we need to have a horse be able to get away when another horse decides, I'm going to be dominant, and I'm going to kick you, or I'm going to bite you. So a horse needs to be able to get away.

So generally our paddocks need to be a little bit bigger. It just seems, like I said, the producers I've been working with lately, we've tried the long narrows, we've tried the squares, and they both come back, and they said, you know the square seems to be working the best. I'm having less horses going through the fence. It just seems to be working. So you know, we're still all in this trial and error, what is working the best, what isn't.

Sure.

So we've got a long way to go to figure out what's going to be the best. But the thing we do have to realize with the horses, and I know here in PA we do a 50 square foot per head, per cow, when we're sizing things, and with the horses and with the gravel we're looking more to 300 square foot per head. So we're giving the horses a little bit more room so they're not beating each other up.

Sure.

And you're going to get some farms where they can put six horses out together and everybody gets along. But when we're dealing with the breeders and the boarders who have horses coming in and out constantly, those are the ones we have to watch how big are things? We don't want anybody getting hurt.

Right. OK, we'll get Carey back in here. Here was another question that came in-- have you had horse producers or looked at any research on horses grazing annuals?

Annual grasses. I don't have any research on it. I don't know that there's a whole lot out there on it. I think it gets more difficult from a producer's standpoint. Just because they need to keep regrazing it or they keep reseeding it in order for it to work effectively. I will say, the one thing that has been used more here in terms of the annuals is the teff grass hay, [INAUDIBLE]. That seems to be pretty decent for horses, especially in terms of hay. Don't know how much it's been used as a pasture grass, but I know some of our producers here have had good luck with it as hay.

It seems like the nutrient content, however, is all over the place. I've seen some that's very high in nutrients, and pretty much right what the horses need, and other stuff that then is really protein deficient, inverse calcium deposit ratio, et cetera. So that's kind of the extent of my knowledge with the annual grasses.

OK. OK, very good. Suzette, one more question back to you, and then we'll wrap things up here. a fence question

came in. Do you have much experience with the hot coat fence?

Yeah, we do a lot of the white hot coat. We usually recommend that they at least put that on as their top strand if that's the way they're going. Most of our producers, that is what they use. It works well because it's visible and they can see it. That's most of the problem with the high tensile-- it's just not visible, and that's why they go through most of it.

I have a lot of producers are going to the actual-- the rope is what they're going to. The rope twine, and that they seem to really like because it's a little bit bigger, a little bit easier for the horses to see. But, yeah, we've done a lot of the white hot coat, and it's very popular.

OK. Well, I'll give each of you a quick chance to make a final comment if you want about your presentation today. I know we very, very much appreciate it, and this was one of our subjects that a lot of people wanted to hear about. So we appreciate you giving us information today from each of you. So I'll start with Doctor Carey Williams. Do you have any final comments you want to leave with the group?

Well, Suzette's slide reminded me that I never put a contact slide up. So I want to thank everybody for joining us, and I want to say if you ever have a question you can email me. My email is cwilliams-- and that's all lower case, all one word-- it's at aesop, or A-E-S-O-P, dot rutgers dot edu. And I'm also all over online if you Google me along with horses, I'm sure you'll find me. But I'd be happy to answer any questions other than just today.

Great. Great, thank you very much for that. Suzette, any final comments for--

I mean, I know we covered a lot very quickly, so if anybody has any questions or concerns, has seen some of the stuff and can call and just say, you know, we've done this and it's worked really well. I'm open to suggestions. But, yeah, feel free to call me or email me.

Great.

Really appreciate it.

Great. Well, again, thank you both very much, and I'm sorry we didn't have time to get to all the questions. But both of them have just given you their contact information, so feel free to contact them if you have a question that they could help answer for you. So with that, I think we're wrapped up for today, and I'm going to turn it back over to Holli and let her make some final information that you need to know about.

OK, thanks Kevin, and it's been a pleasure working with Carey and Suzette. I enjoyed your presentations, and thanks to all participants for joining in. We had in the neighborhood of about 250 participants in the room today.

So, if you selected to CEUs, or you want to provide feedback about the webinar, please return to your open browser window to continue to process offered by step two at your conservationwebinars.net browser window, and with that, we'll conclude our webinar presentation today. Thanks to all, and have a good afternoon.

Thank you.

Thank you.