

Module 7D continues the New Mexico example reference sheet development.

Our discussion has lead us over to invasive species and those of you, who have been following along with the reference sheet will notice that we actually do have an indicator that is associated with invasive species and that was indicator 16. So, although, if you were leading a group through this whole process, you might fall onto the discussion associated with the invasive species and in this particular case you would start to write up the narrative that might be associated with that particular indicator and indicator 16 is going to talk about mesquite in that particular write-up. I'd like to ask Pat to talk specifically about the narrative that is written for this particular ecological site and then we can have some discussion associated with that particular narrative. So, Pat, can you give us the narrative that has actually been developed for this particular ecological site?

Yes, I sure will and if you will notice on the blank that's in the technical reference that you're following along with when you look at the overhead here in just a minute you'll notice that it's structured somewhat differently and the reason for that, don't get confused. The reason for that is the date that this reference sheet was put together, it's dated the 27th of August 2002 and while we were in the process of developing the protocol for putting reference worksheets together we had to finalize the format of the reference sheet itself. So, the format is slightly different and so don't let that confuse you as we go to the overhead and look at what the narrative is for the functional / structural groups indicator.

First, we're going to take a look at the version that's actually in the technical reference and the reason that we inserted these categories, dominant, subdominant and others is if you go to the actual descriptions of this particular indicator it asks you to evaluate these categories. Pat, you want to go back then to what they did in 2002?

Okay, just to make sure everyone's on the same page what Jeff just showed on the overhead is on page 72 of the technical reference, that's where the reference worksheet is located. Indicator #12 functional / structural groups you'll notice that what was put together for this ecological site description shows that black Grama is greater than short-lived perineal C4 bunch-grasses. One thing I'd like to point out here is that really try even in those functional / structural groups that are single species, really try to give it a name that is more functional and structural and less species specific and as we started out talking about this as the warm season stoloniferous grass rather than black Grama. I think that's real important and it'll be a lot less confusing. As Dave said in his presentation it really doesn't matter what the name of the species is or what species it is we're looking at functional / structural groups not species. So, the stoloniferous warm season grass is greater than the short-lived perennial C4 bunch-grasses which is much greater than the long-lived perennial C4 bunch-grasses and that's about the same as the shrubs, the Yucca, they separated Yucca again and then the other shrubs which is about the same as or could be more or less than the forbs and

plains bristle grass. Again, be careful with how these are put together so that you're not using species names, but, using functional / structural group's names and then those are also equal to the short statured grasses and that's that others group and those are then greater or equal to the succulents and the broom snake-weed.

Okay, so, now that we've gone through that narrative and remember indicator #12 tends to be the longest one for groups of individuals to come together with on a consensus on what that narrative will be, but, the other thing that you recognize is that as you're doing this you're getting a better appreciation of the spacial distribution of those types of functional / structural groups, you're also thinking about what that community looks like and by thinking about what that community looks like you can also think about the annual production that you have on that area and so I'd like to move on to another indicator which is indicator #15 on our reference sheet which specifically deals with annual production and Pat, can you lead us through where we would gather that information and then how we would put that into the reference sheet itself?

Yes, I will and again as Dave said the functional / structural group's indicator is one of the most difficult and time consuming that's part of why we like to start with that indicator, it gets everybody's mind in the same place and exercises our minds as we begin to develop that and the description to that indicator. Once that's done, then it's nice to go to the indicator that maybe is the easiest one to

come up with and that's annual production. So, you kind of exercise your brain and then give it a little bit of a rest. One of the other sections in the ecological site description is in the plant community part of the site description as well lists the total production for that site and if we go to the overhead we can see what that looks like for this sandy site and that just real quickly is the table that shows that and you'll see it's broken down by plant type, grasses and grass life, forbs, trees, shrubs, vines, lichens, mosses, microbotic crusts and then the total. It gives a low range representative value and a high range, the total for the site then is 225 pounds per acre in the low end and 650 pounds per acre in the high end and those are the figures that you want to put in the reference sheet is that low to high range and then you might mention something about the representative value. That representative value is not necessarily the average between the high and the low many times and particularly in systems that have a wide fluctuation in variability and precipitation events and precipitation timing relative to temperatures. Many times, that high range may be much higher than the corresponding low range relative to that relative value, so, don't just assume that that relative value is halfway between. Those of the kinds of statements, in fact, that you might put on the reference sheet.

Do we, just briefly, do we have that on the reference sheet on this one or not?

Sure.

Let's just put that up real briefly and show you how that would be written in the overhead for indicator 15 annual production. In that particular case, the annual production would be written so that the annual production in years with favorable precipitation should be approximately 225 pounds per acre and going up to 650 pounds per acre in a favorable precipitation year for that ecological site, so, that's coming directly out of the ecological site description and remember we'd like you to be able to put those citations in there when you have them available

and Dave, this is really a nice example of where they have actually cited the source of information.

Right.

and this is actually an example of where since this ecological description site was written, a lot more production data has been generated in association with experimental work, in this case, on the Jornada, I think (NRCS) has also done some more clipping down in this area; the National Resource Inventory has some new data and when this is revised we might be citing three or four different sources of information and it's really good to include those citations in there because then we go back to it.

Great. we've talked about a lot of biotic indicators because of the plants and some of the plant components here, but, before we have to go off the air for

today, I want to at least touch on one of our soil site hydrologic indicators and that indicator is the water flow pattern and so, Jeff, can you briefly talk about water flow patterns here and then we'll move on to the last little bit that we have before the end of our broadcast for today.

Sure. If we go back to those slides,

the PowerPoint.

the PowerPoint slides that we had and take a look at those two different photographs. When we're looking at water flow patterns lets step back and think of it from a process perspective. Water flow patterns are not described in the ecological site descriptions and so, what you want to do is step back and think about, okay, this is a site that has pretty coarse textured soil it's usually not going to run a lot of water and shouldn't, in fact, someone argues that it never does, but, talking with ranchers and having been out there myself a couple of times if you get a real good thunder storm you will run some water across the site. So, we would expect to see some water flow pattern, but, they're going to be pretty short, we've got lots of plant basil cover and pretty good infiltration capacity, not going to get a lot of runoff, but, we will see some. So, my guess is that you probably see something maybe three or four feet in length following an intense storm, those are probably going to disappear, after a few days, the wind blows the sand around a little bit on the surface, you get some trampling, you're not

going to see them, but, following an intense storm, you will see a three to four foot maximum. Now, you go over to this other one, black Grama, boy, those are going to be really hard to see and so that's why that really is a maximum on there. We now go to the overhead, we can see what they wrote and see if they're sent to this group that wrote this site description and I will point out that as we go to the overhead there is quite a list of folks here that were involved in the development of this worksheet looking on the overhead. Bruce \_\_\_\_\_, David \_\_\_\_\_, Roy Parker, Willard Hall, Phil Smith, George Chivas, Earlene \_\_\_\_\_, Lori Abbott and Brandon \_\_\_\_\_. You've actually got at least three agencies represented here, members from (BLM) as well as some (ARS) folks and (NRCS) national level soil scientists.

University.

university, right here with Lori Abbott \_\_\_\_\_ and an (ARS) representative. So, take advantage of those, I mean it really and particularly, if you can develop a number of them together, it can be fairly efficient, the first one's always pretty slow. So, here, let's see what they've said, large storms can produce short, less than one meter water flow patterns across the bare patches. The only thing that I might have done here is I might have noted that on some of the finer textured soils, particularly, the loamy sands or loamy fine sand that are included in this site we might have slightly longer flow patterns because those won't infiltrate the water as quick as some of the coarser sites.

Jeff, I'm not sure that I would say that they would ever get that long even with that coarser or the finer textured soil, while certainly, you would expect to have a little more runoff, the soils are such on this site I'm not sure you would ever have a two meter long water flow pattern.

You know, that's a good point and come to think of it I know I've seen longer flow patterns out there, but, maybe the sites that I'm thinking of where I've seen longer flow patterns were actually ones that you wouldn't consider to be in a reference state, they were in fact, a little more like what we're seeing in the foreground here on that slide to the right that we were looking at, the short, the bunchgrass. So, yes, I could see why you might not want to put that down and again maybe, maybe, is there anybody else we could talk to?

Well, I'm sure there is and that's probably what we would need to do is make sure that we included people that would have more knowledge and more experience on that site and if we did put down that water flow patterns might extend to two meters we certainly would want to put when and where and how and it might include not only the texture, but, the slope and it might also talk about adjoining sites, is this site adjoining a gravelly site that's upland or a loamy site.

What we can do is, yes, this is a great way of being able to look at the variation you can have, the kinds of input that you would have from different members of the team. Remember as you go through we've only talked about four of the indicators, but, you're going to have to develop narratives for all 17 of these indicators and those narratives need to include the variation that you would expect to have on that reference state for each of those indicators and so, you know, where you would go on the additional indicators we find that that's an option that each of those groups will use, everybody does it slight differently from that point on, we think that if you start with indicator 12, talk about the annual production with indicator 15, some invasive species information and then start moving in to some of the soil and hydrologic indicators that seems to help in the development of these sheets. So, I think we'll have to wrap up our discussion that we have here on the indicators and the developing of the reference sheet and right now we're going to finish this small group discussion and move on to some homework for some of you folks out there.

I've got a question for Jeff. I've always been confused about the difference between rills, water flow patterns and gullies, could you explain that?

Yes, I'm always confused about that too. I'm going to start with rills and gullies because that's the best description that I've ever heard and that is that you can't drive a tractor across a gully. Of course, that definition comes from back in the forties when you really couldn't drive tractors across some gullies, these days

they have tractors you can drive across any gullies. The way we've set this up is the reason that we have these multiple indicators is we want to make sure that you capture at some point. In general, the water flow patterns are going to have cuts on one side, but, not on both sides of them whereas the rill is going to start to look like a bit of a channel. The difference between a rill and a gully is when you start to get deep relatively incision, something that is less ephemeral, a rill can come and then form and then may disappear, it may move two or three years later where the gully once it's incised it's pretty much there to stay whereas a water flow pattern is even more ephemeral yet and is going to tend to move back and forth on the landscape because you're not really doing, you're doing some cutting, but, it tends to just be as it's going around its structures. Does that help?

Yes.

There may or may not be any erosion associated with the water flow pattern depending on the plant community you're in and while there will always be some erosion associated with gullies and rills.

Great, any other questions that we have out there?

Yes, under your annual production, the example that you had there, what we'd like to include though is not just that range in the pounds per acre for the site,

but, kind of break it down with is most of that poundage supposed to be from grass types or shrub types, an example, if we're on a loamy site that has sagebrush as a component we may be within that range of production, but, a lot of that production may come from sagebrush and not the grass species which the site guide says, you know, 40 to 50% of the production comes from a certain species, so, we'd like to break that out a little bit so that you know where that production's coming from even if you're in the range it may not be the species that are appropriate.

That's a good observation, but, remember here that we actually have two separate indicators, one that's trying to capture just the overall production of the site and the reason we do that is that this is one of the few indicators that actually gets the community's ability to capture soil irradiation and turn it into production on the site and so, we actually would like you to evaluate that site for the total amount of production regardless of the species composition, but, we capture the compositional makeup under the structural / functional groups, so, what you have done is you've actually tried to combine those two and talk about it under annual production and what we would recommend is that you'd only talk about the overall annual production of the site with annual production and capture the actual changes in the dominant with the structural / functional groups and you can do that by using composition based on the biomass of those groups on that site.

Are there any other.

Yes, another place that that change in species composition may be captured, specifically, if it deals with an effect on infiltration and runoff is in that indicator that talks about composition or distribution change of the vegetation as it effects infiltration runoff and I think that's indicator number, I don't have that in front of me,

like.

six or eight, 5 or.

10.

10. Okay, indicator #10 that deals with that. So, there is another place to capture what you're talking about.

Good, good, good question and it's nice to be able to actually try and clarify some of these issues. Remember, we have overlapping indicators and there are specific reasons for why we have those indicators and this is a good opportunity for you to ask those types of questions where there may be some confusion on how to use these.

This is Mike \_\_\_\_\_ in Boise.

Yes.

I think you said, I think you said that the difference between none to slight and some of the greater departures could be the difference between crossing a threshold or not, but, I'm not sure if I captured that. Could you talk about that a little more?

Mike, with this, what we're actually trying to do is not necessarily determine using this technique whether we've crossed the threshold or not, but, to actually just do the evaluation based on the current moment and time that you go out and do that evaluation and actually evaluate that site based on the 17 indicators and then bring them into those actual three attributes and not worry about the specifics of whether you've

You're losing your signal.

Excuse me. I thought I heard somebody else break in there, but, we don't want to necessarily determine whether we've actually crossed the threshold or not with this particular technique.

Yes, and you know, Mike mentioned this morning the difference between inventory and assessment and monitoring and remembering that and then also recognized that there is not necessarily a correlation between the interpreting indicators of rangeland health assessment of those attributes and range condition similarity index or successional status and trend. If there is any relationship there it's certainly not causal and not correlated, one doesn't mean the other is going to be this way or that way.

If the same transition model is well written and well described, it will include many of the indicators used in interpreting indicators of rangeland health. In general, none to slight assessment means that you are in the reference state, however, what we're trying to say is that this method is not used to assign state in a state and transition model; rather, this is one set of input that you would use to help assign state. The other inputs that you might use are quantitative measurements; observations of trend over time that can help you determine whether or not even that crosses the threshold and many other sources of information. So, we're not trying to say that this is not related, we're simply saying, don't use this as the only source of information to assign state.