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Module 8B continues the discussion of the homework assignment from the April 2006 broadcast.

This is a new development of a new reference sheet.

The presence of water flow patterns, it says runoff is medium to very rapid. No information was listed in this on pattern or when.

Basically, I think that what they're trying to say here is that there was as I understand it Pat, is that there was no information on pattern in the ecological site description and that's where they didn't think that it was appropriate to list anything in the reference sheet on pattern

O, okay.

and so, I'm wondering is that the case or should we be able to infer and come up with some other source of information on pattern so we can include that in the reference sheet?

Good and that will be the case many times, there will not be specific information in the site descriptions about many of these indicators and presence of water flow pattern is certainly one of them. So, what kind of information is available in the site description in the information other information site description soil

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survey, those kinds of things that could lead you to make an informed decision on water flow pattern coupling that information along with some personal knowledge and expertise on the site. One of the major pieces of information is the soils information, what is the texture, what is the slope or is there gravel on the surface, couple that with the plant community and the kind of plant community that we're looking at, is it a bunchgrass plant community or a Snodgrass plant community in the reference state, what are the plant communities that are there, what's the structure of that plant community along with the soil texture, the slope, those sorts of things. In the climate section in the site description it talks about the kinds of precipitation events that occur, heavy intense thunderstorms or more gentle frontal storms, is most of the precipitation coming in snow or some in thunderstorms. That kind of information can give you a pretty good idea of what you might expect to see when you do get a precipitation event and thereby then tying that with the plant community what the pattern will be on the ground as the water floats across it. Couple that information with personal knowledge and experience with experts and I think you can begin to get a good picture of what the water flow patterns may look like.

Yes, Dave, comment for everyone?

Yes, I think that one of the things that people need to remember here is that they can begin to include with the information that they have for the water flow patterns is to begin to look at the different types of plants that you have in that

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system and the spacial distribution of those plants and you're knowledgeable of the ecological site, the fact that the ecological site description you have in that particular location may not provide a lot of detail doesn't mean that you can't use your expert knowledge and the expert knowledge of the other individuals around you to be able to write a draft of the reference sheet for that area and I emphasize draft because in many cases what you will be doing is putting together the first draft of a reference sheet for that location and then once you have drafted that you can then take that information and send it off to the Natural Resources Conservation Service at the state Rangeland Management Specialist and that will go together with other people, who have drafted similar reference sheet for that ecological site and then we can pull together good information and come to a consensus for what that narrative should be for each of these indicators.

Yes, good point Dave. Pat, should we get back in the reference sheet?

Okay, good and we'll continue with this particular one, we'll go back to the overhead real quick. Indicator number four, bare ground, listed 5 to 15% and it says it's an estimate, it didn't come from any measured data, with no large patches except under shrubs and that's a good kind of a statement to make and that's the kind of information that we need to include. One of the inconsistencies with this then is if you look at the functional and structural groups there really are not many shrubs listed, they're just another minor component of the site, so, it

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makes it, there is a little bit of a conflict there and that needs to be explained and tied together so that someone that wasn't involved in the development of this reference sheet, that wasn't involved in the discussions that took place can take this piece of paper, can take what's written down here and understand what was the thought process and what went through the peoples minds as they put this together. The other indicator on this example is indicator #15, total expected production or total annual production and it shows a thousand to thirty three hundred pounds per acre and that's a pretty wide range, that's a thousand to thirty three hundred pounds and it gives no indication of when that might be a thousand and when it might be thirty three hundred. It would lead one person to assume that that's based on precipitation events, precipitation temperature events, it might lead another person to assume that the spacial distribution of that site as the soil change slightly across the range of that ecological site and so, we need to be sure that we state those kinds of things in the reference sheet so I don't have to try to assume what was thought as we went through the process of developing this sheet. For the more information you can put down that describes what that range is and how that range was arrived at the better and the more usable these reference sheets will become. The next example, one of the comments that was put on this sheet when it came in to us, when it was faxed in to us was that a diverse group of experts in the field office yesterday sat down and developed this reference sheet and they list, who they were and what their job titles are. Another thing that was listed along with the homework was the references, where they got their information, it list the ecological site description,

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it list the county soil survey, it list the map unit description that they were looking at, it talked about trend plots and photos and frequency data, all used to develop this information. In the presence of water flow patterns in the reference sheet it says that they're short when it rains, 16 to 18 inches in length, no signs of reels or gullies, more precise than we really have the information to support, you know, it's pretty specific that these are 16 to 18 inches in length, well, that's not a lot of range and perhaps that's pretending a level of information we don't really have and while we will continually tell you that you need to be as quantitative as you can in these indicators, that quantitative information needs to have something behind it. If it's an estimate be sure that it's understood it's an estimate. If it comes from data, numbers comes from data and it has that support, then, by all means use those numbers. Be as quantitative as possible, but, make sure that that quantitative information is supported by some real data. The next indicator there, indicator number four, bare ground, if we can go back to the overhead talks about 20 to 30% bare ground says bare patch is six to eight inches, 14 to 16 inches from ants and rodents and I think the important part of that one is to indicate the discussion here on the reference sheet about the variability recognizing that ant activity and rodent activity are important on this site, they occur on this site and where they do occur the bare ground patches will be bigger than in areas where they don't occur. The functional / structural group indicator again is dealing with species and not, or is, I guess it's a mix, the first one is species and then the subdominant says warm seeds and bunchgrass and then it's back to species again. Be careful about that that makes it very difficult to use

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this kind of a reference sheet when you use species list. When you go out to do the assessment, if those species aren't on the site or you have species on the site that aren't listed as a functional group, how do you use that, how do you do that assessment? For instance, on this example, where it lists blue Grama, bottlebrush squirreltail, warm season and bunchgrass, rubber rabbitbrush and then other shrubs and forbs, what if a pretty major component of that plant community was New Mexico feathergrass or needle-and-thread, it's not listed and the only thing that is listed as a functional group is a warm season bunchgrass, most species are cool season bunch-grasses, where do I put them, where do they fit, do I now assume that that's a new functional group that wasn't on that site in the reference state, that's the only assumption that I can make with the information that I have and it may be a valid assumption, but, I need to know that if I'm going to use this reference sheet when I go do an assessment.

Pat.

Yes.

Pete Santa in Stafford Arizona.

Good morning Pete.

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I suggest that you guys develop a standard list of functional structured groups that could be used nationwide and that we could pick and choose from.

Thanks Pete. We've talked about that quite a lot and whether we want to do that or not that I, I think Jeff is sitting over here and really wants to respond to you or Dave does one. They're both chopping at the bid here.

Yes, I actually thank Pete for bringing this up. One of the discussion items that we've actually had is how to begin to develop a list of functional / structural groups that would be usable across the nation and as you start to put these together you can begin to understand that the combinations of these can become enormous. I think that probably the best approach that we will get will be a consensus at an ecological site level where we will come to an agreement as to what the structural and functional groups will be, that would be the major ones within that ecological site and then be able to work with that within that ecological site. There is a movement right now and I believe you'll start to see at the plants data base starting to begin to pull together the information for each of those plant species that we have for some of these functional groups and while we've got a lot of the structural information already there. So, when you go to the plants data base that, that particular location on the Internet will start to have more functional information about plant species as well and one of those will be the photosynthetic pathways for the plants and I think that that will within, as I recall it

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should be within about a year, I believe that we will have that all up and running if not sooner than that.

Yes, thanks. Pete did we answer your question?

Not really, but, go ahead.

Okay.

Well, we _____ around it I think.

I think so.

Yes.

We'll give you maybe another opportunity at the end here as well, so, thanks Pete, let's continue on here.

Okay.

The next one is one that this person sent in, in fact, the whole reference sheet not just the, the four indicators that we asked you all to do, but, they sent this entire reference sheet filled out, they had done it the day before actually to get

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some practice on it and did a good job, this is a good one. Some points that we would like to bring out as we go to the overhead says presence of water flow patterns, few short and stable flow patterns and openings, especially, where slope is greater than 5%, flow patterns have minimal evidence of deposition or erosion, may be more evident following intense storms. It was talking about both some temporal and spacial variability in this indicator, especially, in slopes that are greater than 5% and temporally just talks about the different kinds of storms. Bare ground talks about the basal area described in the (NRCS) ecological site description is 10 to 15%, it says local reference site average 25% bare ground without canopy 25% biological crusts, 10% basal, 5 to 10 gravel and rocks, 30 to 40% litter, bare areas are small interspersed with plant base, litter and biological crusts are not generally connected.

A couple of things to talk about in this, there is some real good information here and it says where the information is coming from, it gives a good indication of what the ground cover ought to look like and what you should be able to expect. One of the things that it does do is kind of show a conflict between what's in the site description, 10 to 15% and all of these other figures, local sites average 25% bare ground without a canopy. That's good because it talks about what that 25% came from, it's bare ground that's not under a canopy. One of the real confusions that occur as we look at data whether it's in the ecological site description, whether it's in research data, whether it's in monitoring data is understanding how that data was collected and what it means when it says bare

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ground and as we've found over the years bare ground is not bare ground is not bare ground everywhere we look in the reference sources that we read, so, be sure that you understand what it means when it says bare ground is 25% how does that bare ground collected or estimated.

Yes, Jeff, if you contribute to that.

Yes, this is an issue that we've dealt with quite a lot and one of my concerns all along is that we all think that we know how to measure bare ground and we all do it the right way, I know I do. Unfortunately, the different ways that we measure bare ground do generate different numbers and it is a different thing if you measure bare ground as only being outside the edge of the plant canopy, that's different than bare ground that might be a space that's four or five, even 10 inches large within a plant canopy, so, it's really important to be as specific as possible about how bare ground or any other plants or soil indicator was measured.

Yes, thanks Jeff, I think that's a very important point, I know in a lot of the training sessions, we do, it's sometimes surprising how much variability there are with the different people what bare ground is, I'd like to call it true bare ground, not just the bare ground outside the canopy, so, that's a very important thing to, to make sure you understand what it is and as well to apply it appropriately.

Yes, thanks Pat.

Let's continue.

Yes, let's go back to the overhead and look at the next indicator that is on this sheet, it's #12, functional and structural groups and this is another example of a good job of grouping the plants into functional and structural groups, cool season bunchgrass greater than biological crusts community, greater than non-resprouting shrubs and again, I will point out on this particular site the biological crusts community are a major component of the functional and structural group and are listed as such on this reference sheet and then other shrubs, warm season rhizomatous grasses, warm season bunch-grasses, cool season rhizomatous grasses and then other forbs, annual grasses and nitrogen-fixing forbs. Another thing to point out is that in this functional and, or in this reference sheet these groups and particularly the crusts group is determined on cover and not annual production, so, the key to the biological crusts is it's not production, but, it's cover when you talk about the biological crusts.

Yes, Dave.

Yes, I think one other thing I'd like to add along with this is that on this particular example we did a very good job of being able to pull together the functional and structural groups, but, one of the things that we would like to be able to see more

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in these reference sheet discussions is the variation that you would see over time with the natural disturbances that will occur and on this particular site, I can see that it has sagebrush as part of the shrub community within that. One of the things that one could consider in this would be after a fire what would happen within this community and then in that particular case you might have eliminated that as being part of the dominant portion of the community and so I think that that's one of the things that could be included in here.

Yes, I think that's exactly right and another reason, well, we'll go on to the production piece of this reference sheet if we could go back to the overhead, another good example of how to build in the variability that occurs on the site, says normal years 900 pounds per acre dry weight, favorable years 1100 pounds, unfavorable years 700 pounds and then it goes on to say drought will reduce production another two or 300 pounds per acre or more depending on severity. So, it's talking about the normal variability that occurs in the weather in this climate on this site between a favorable growing year and a nonfavorable growing year, that combination of temperature and moisture and then it goes on to say an extreme event in drought that's still a part of that normal range of variability, but, outside that bouncing around between just normal and, or between favorable and unfavorable years, we have an additional reduction in production. The next one that we want to talk about.

This is Ed Horn from Prineville.

Yes.

I have a question.

Sure.

On your example there you had the dominant in there; you had biocrust as being dominant?

Yes.

So, how did you? We had a hard time here in Prineville trying to split out dominant, subdominant and minor components in trying to, so, we kind of put those under separate groups and I see that they put their dominant; they had their biocrust under the dominant group.

I think I'll try and address that one if I could Pat. One of the things that this group apparently did was to describe the dominant groups based on cover and that's one of the things that you need to recognize that if you're going to be using the ecological site descriptions some of the earlier ecological site descriptions, look at the compositional makeup of those communities based on production and there's a big difference on what you can have in terms of cover versus

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production. The newer site descriptions, however, will have more information about cover. Because of that you will have situations where in the future on sites where you have a lot of biological soil crusts you could have that become a fairly dominant component of the community because the interspaces which are many of these lower production sites can actually be covered quite heavily by lichens and mosses across that soil surface and so in those particular cases and in those kinds of ecological sites, if this is the case, you could have biological soil crusts as being a fairly major component of that community.

Yes, Jeff, I think you've had some experience with the biological crusts, anything to add to that?

Well, not a lot specifically other than to note that this person did note and this is very important, very few of the forms noted this, that you've got to indicate at the top of the form whether you're using annual production, for layer cover or biomass and they noted that it was a layer cover, if they had used biomass or if they had used the production, then, the crust would have shown up as a trace or other species because it simply doesn't have that much production or biomass, but, it does show up as cover, so, be very careful to note that.

Good point.

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I also have a question on crust, cyanobacteria, when we have early stages of cyanobacteria development; they don't really protect the soil, so, is that bare ground or is that crust?

That's, that's a really good question and something that we've spent quite a bit of time researching. In general, we do not consider the early stages of a cyanobacterial crust as crust. As you pointed out they don't really protect the soil that much from erosion, they're not affecting insufficient capacity in a big way, they're certainly not contributing to the nitrogen economy of the soil and so that would generally be regarded as bare ground until it really form something that's stabilizing that soil surface.

Great.

Thanks, well hopefully, we answered your question and if not, again, at the end of the discussions today we'll have a little bit of time to tie-up loose ends.