

This module is the discussion of the five step process which is designed to help plan and conduct Rangeland Health assessments. Instructors are Mike Pellant and Jeff Herrick.

This is on; if you go to page 17 in your technical reference you'll see a flowchart and what I've done here is just kind of summarized the five steps that we will apply to use as protocol. Steps one and two and four and five are required, step three on supplementary information is recommended, highly recommended, although, it's not required and what I'll do now is just kind of go through these five steps in a little more detail. Again, this is gonna kind of serve as a cornerstone for the presentations for the remainder of this session. If we look at step one in the flowchart, again, we are up at the top here. Step one, we are verifying the soils because we want to identify the ecological site at the evaluation area, so, this is the fun part, we get to go to the field to determine what ecological site we're on where we're going to do the evaluation. Several components to step one that we would ask you to do, first, take a look at the slope aspect, elevation, kind of the topographic position around your evaluation area, sometimes, these have impacts on the evaluation are. We also ask you to verify the soil with a shallow soil pit, looking at such things as surface texture, depth to restrictions and diagnostic horizons. This is generally enough information to then allow you to identify the ecological site you're on and once you identify that ecological site, we ask that you document it on the evaluation sheet in appendix one. So, if you'll turn to, it says page 66, if you go to page 68, there is actually an example

and we'll ask Jeff Herrick to pull that example up on the overhead here and show you where we want to document this type of information, so, Jeff.

So, basically, what we are looking at here is the evaluation sheet on page 68.

The top section is just gonna provide information on the location. The part that we want to zoom in on here is the sulfide verification. Can we be turned on the overhead here? Oh there we go, okay, great, thank you. I'm gonna zoom in on the sulfide verification and basically what we're doing here is putting some key information in here that's gonna help us identify the ecological site. So, soil surface texture is obviously very important, surface depth, in this case, it should be deep and the type and depth of the diagnostic horizon, a diagnostic horizon sounds like a fancy term if you haven't had a lot of soils background, but, in this case, the calcic horizon, so, you're gonna be seeing kind of a whiter soil and it's going to effervesce if you throw some vinegar on it or some acid and it's going to effervesce pretty strongly, it says down here. So, we then take this information, we go to the evaluation area, dig a small pit and again, we find that the texture is very similar, it's gravely fine sandy loam and over here, we had a gravely fine sandy loam as which that is one of the possible textures. Depth here, again, it's deep, so, that's a good indication that again, we're on the similar ecological site. Calcic horizon is a little bit shallower, 15 inches as opposed to 20 inches here for the reference, but, again, that's pretty close and the effervescence of the soil is strong, similar to air and so forth; the precipitation, similar pattern, so, that tells us that we are probably on the same ecological site. On this evaluation sheet, then,

we can also make a number of other observations, there's a lot of information down there to make notes and we do encourage you to document your observations as much as possible. Mike.

Yeah, thanks Jeff. Again, I think kind of the analogy here is we want to compare apples to apples; we don't want to have an evaluation area, have one ecological site we identify there and then use a reference sheet for another ecological site and we'll go through this a number of times as we go through the session today because this is a very critical point. We move on now to step two. Step two is a, actually has two components to it and it's, we're looking, this is a step where we either attain or develop a reference sheet, a very critical step as well and we also will talk a little bit about the valuation Matrix, but, first, relative to the reference sheet, this is the standard that we use, we incorporate information from a lot of different sources. Previously, in version three, we really focused on the reference area and the ecological site description. What we've done now is kind of expanded that to capture all of this information into one place and that one place is on the reference sheet. So, again, I won't say anything more about that, we're gonna have a lot of discussions on that later in the day. Another component to step two is to modify the evaluation Matrix, this is something that Pat Shaver will visit with you about tomorrow, so, again, I'll just go on to our next step at this time. The next step is to collect supplementary information, that's I think is important, we're not going to talk about that during the course of this training, but, I'll just kind of give you a little bit of an idea on the four main

components that we are looking at here, we want again to capture any kind of spacial or temporal variability disturbance regimes, things that are going on around the site could be very influential on our evaluation area. Secondly, the importance of ecological reference areas, again, they give you a good visual representation of the various indicators and we really encourage you to look at reference areas if you have them, the functional structural group sheet, this is another form in your appendix, we ask you to take a look at that, it's a good way to look at what you would expect in terms of dominance for a functional structural group and what you have on your evaluation area and the importance of quantitative data, any kind of quantitative data that can help you make a better rating of the indicators, we certainly encourage the use of quantitative data if it's available or collection of it if you're out on an evaluation to help supplement your qualitative assessment and with that, we will move to step four, what we're doing here is now actually rating the 17 indicators, again, this is comparing what we see on the ground to what we have on the reference sheet, we'll maybe switch to the overhead again here and ask Jeff to kind of show us how this works on the evaluation sheet on page 69.

Thanks Mike. Yeah, if you turn to page 69 and go right up to the top of the sheet, on the top of that and it actually summarizes those instructions. The first one there is the sign, the 17 indicator ratings. Well, how are we gonna do that, we move over along the top, we got five possible codes, none to slight (N to S), slight to moderate, moderate, moderate to extreme and extreme to total, those

are the five options we've got and they are defined here, again, at the top. So, for each of the indicators then, I'll zoom in a little bit more so you can see it. For each of these, we need to select one of those ratings and again, this is no different from version three, we realize that in a lot of cases we are covering things that everybody is pretty familiar with, we wanna make certain we've got all of this down as a start and then we'll get into some of the changes later on. This is actually a newer sheet and we find a little bit easier to use than the one that was published in version three. In each case, we've listed the attributes to which the indicator is assigned, so, in the case of reels, it's relevant to soil site stability and hydrologic function (S & H), we assigned it a moderate rating. Water flow patterns, again, the same two attributes, moderate to extreme. We move down the sheet now to some of the biotic indicators, let's take plant mortality and decadence, number 13, is relevant only to the biotic integrity indicator slight to moderate. Next, we wanna talk about the attributes a little bit, we've rated the 17 indicators and so, what we will do now is kind of how do we aggregate those 17 indicators into a final evaluation of the three attributes of Rangeland Health. So, in step five, again, we're going to pull all of this information together in the evaluation sheet. Before we go to that, I'll just quickly kind of graphically show you how these indicators relate to the various three attributes. At the top, we have soil site stability, hydrologic function and biotic integrity. As you can see below that, each of the indicators, some of them apply only, for example, for reels, it applies to two, whereas the soil surface resistance to erosion applies to all of the attributes, all three of them and we have several indicators, for example,

for reels, it applies to two whereas the soil surface resistance to erosion applies to all of the attributes, all three of them and we have several indicators, example, litter movement which applies only to the soil site stability attribute. So, with that, I think we'll again go back to the overhead; Jeff will kind of lead us through how we apply this to the worksheet on page 69.

Yeah, if you go down to the bottom of page 69, what you see are three sets of boxes, one each for each of the three attributes, soil site stability, hydrologic function and biotic integrity. I'm going to zoom in on soil site stability and see how we rated this. Basically, what we're doing, is each of the indicators is numbered above, so, we go back up here, indicator number 8, soil surface resistance to erosion, that was rated moderate to extreme, we move down here and in the moderate to extreme column, we put the number eight, we did the same thing for all of the other indicators and what we end up with is basically a histogram, a distribution. We can then look at that and the first thing that we do is just look at the general distribution, we can see that the median value, the middle value with the same number on each side is probably somewhere around moderate, but, we really wanna to use the preponderance of evidence approach which means we wanna make sure that we're thinking about the individual indicators and how they apply to the site and so what you'll find in the comments where we justified a moderate rating which is what we ultimately gave it, we talked about, although there is some active erosion in flow patterns, most as older feeling.. Why do we talk about flow patterns? We talk about flow patterns

because flow patterns is indicator number two and indicator number two is rated moderate to extreme and we wanted to explain that although there were some of these indicators that suggested that the site might actually be in worse condition, we thought that it was appropriate to rate it moderate. In some cases, if we had had and I'm gonna move over here to the hydrologic function indicator where we rated this one moderate to extreme even though the medial value is probably somewhere around moderate. Now why did we do that? Because although over here, we acknowledged there was a lot of water moving through the site, it wasn't actually causing a lot of erosion. Here, water is what's important and as it turns out; we've got a lot more values in moderate to extreme. We talked about here in the comments runoff is increasing and all litter is being washed away, this is fairly unusual, usually, we're gonna take the median value, but, in this case, what we found was the indicators that we felt were most important on this site were the ones that were in this moderate to extreme category, so, we shifted it down and we carefully justified it. Mike.

Yeah, thanks Jeff. Hopefully, it gives you a good idea on how we use these techniques, how we use the forms, the steps that we go through, what I'd like to do is to kind of close on this with one more overhead. We've also provided a checklist, if you will, to kind of help you as you prepare to go to the field and once you go to the field kind of one stop shopping for all of the information that you need and again, we'll put this up on the overhead quickly here and kind of go through that, but, if you're like me as you get ready to go to the field, it's nice to

have a little reminder on the information that you need to have with you as well as some of the data that might be available. Then, for each of the five steps, we've also kind of given you some information on what you're going to be doing within that step and how to carry it out, so, again, this is just say a quick way to go through, maybe checkoff, maybe make assignments on who's responsible and help you with implementing the Interpreting Indicators of Rangeland Health. Jeff, I think we've covered what we had planned to cover, now that we've finished this and gone through the five step process, let's take some questions.

I'm Paul _____ Soil Scientist in Boise, Idaho and just to go over something you guys just finished talking about this preponderance of evidence thing and I'm trying to go in the book

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on page 41 where you give an example of interpretation of other information and ecological sites now support the rating, however, one of the four indicators in the moderate category is particularly important for the site, example, bare ground, a rating of moderate can be supported, so, in a since, when I'm out there looking at all of these things, you know, wind erosion is kind of on a lot of sites a false positive because maybe a wind erodibility group is really low, so, it's always going to be a slight, none to slight, you've got flat terrains, there are reels and gullies that are probably gonna be none to slight, so, you get a few false

positives, but, as a soil scientist or a person out there working, your pedestals and your flow patterns are rated maybe moderate, so, you get all these none to slight, you have a couple that you think are real indicative of the site in a moderate rating, so, that basically, the way I'm seeing you rewrite this new version, I can go and give it that moderate rating based on the fact that I think that's more important than those other none to slight.

This is actually not a change from version three to four, We've always taken a preponderance of evidence approach and we've always been very conservative in the way that we apply that, so, basically, what we're gonna try to do is in most cases, you're gonna go for that median value. However, in cases, where you've got several indicators and I wouldn't say just one, but, in general several indicators that are on and these can go either direction, you can have a moderate rating based on the median value and you can go up to slight to moderate if those important indicators are actually in the slight to moderate category and again, not a change from version three to version four, but, a very important one to understand and again to be conservatively applied.

Yeah, Paul, great question and I think it also brings up a good point and that is the importance of the interdisciplinary team to have, you know, you as a soil scientist, the range, the others and I think collectively when you make that final evaluation that really helps to have, you know, the power of the different resource specialists.

Mike, this is Michael, I'm at Boise to. Lot of times, a lot of times, the preponderance of evidence is none to slight or slight to moderate or in that range there. I guess when you're looking at the site as a whole and one of the things I think is important when you're digging around the inner spaces how strong that the vesicular crust is, if I chose, if it's thin and weak as opposed to strong and thick and the subangular is starting to reform, the point being, I think we need to be looking both evidence toward recovery as well as evidence of degradation and when we're making the final call, I think that needs to be weighed pretty heavily and that's what I'm seeing in your example here.

That's a really good point and I think it also raises another point which is that this really does depend on which ecosystem you're in, which ecological site you're in. A vesicular crust is important in a loamy site in Idaho, it is not important in a sandy site in New Mexico, recovery of subangular blocky structure is going to occur in a loamy site in Idaho, it simply will not occur in a sandy site in New Mexico, so, this is the whole idea of the preponderance of evidence, we have 17 indicators, they are all applied throughout the United States, in fact, throughout the world, however, the way that they are applied varies. Now, when I hear you say pretty heavily raises a yellow flag, not a red flag. We wanna be real careful because it really is, we found that one of the things and we've done some research on this actually looking at the repeatability of these observations and consistency among different folks. It's real important to consider all of the

indicators, although, we may weigh some slightly higher than others in some cases. The other thing is, make sure you document that, not only on the evaluation sheet, but, also there on the reference sheet, if you think it's really important, put a little description in the reference sheet, if you're involved in editing those or working on those, put a little description that explains the importance of that variable and the key things that you should be looking for and you did a nice job of that there where you didn't just talk about the vesicular crust, but, you said one of the things you wanna look at in addition to that is the structure in what you'd expect a subangular blocky structure and if you're not familiar with that term, subangular blocky, find a soil scientist that's a real useful one.

Yeah, thanks Jeff and thanks Mike. Did that answer your question?

Yeah, it sure did. All I'm saying is we can usually see evidence of degradation, but, when we're marking up these indicators and doing the study, we need to be looking not only for evidence of degradation, but, also for evidence of recovery, that's my main point.

Yeah, again, remember the assessment we're the assessments we're doing at the moment and time, evaluation of the indicator or indicators, so, looking at, again, if we have any kind of quantitative data, much better to use that obviously to look at signs of recovery, but, again, you have a good question. I think right

now we have time for maybe one or two more questions, so, I'll ask you to jump in and

Hello.

Yes, go ahead,

Hello.

Yes, you're live. Who is this and where are you from?

Yes, this is Joseph _____ and I have a question to Jeff regarding repeatability.

Can you verify, I mean, can you clarify what you were talking about earlier as far as the indicators being repeatable.

Well, what we've found is that the attributes are much more repeatable than the indicators are, not only much more repeatable, but more importantly more consistent among observers, so, we've done some research and it's pretty clear that if you compare individuals on their indicator rating, you're often going to be off by one, maybe even two categories. However, with the preponderance of evidence approach, the fact that you take a nine-10 indicators per attribute, those differences tend to even out. One person may rate water flow patterns moderate, the other one rates it slight to moderate, but that same person that

rated the water flow patterns moderate might rate reels none to slight, what happened there? Well, they had taken what the first person was looking at in reels and they put it into their water flow pattern evaluation. So, these things tend to, tend to even out and that's why people have always asked us, you know, why do we need 17 indicators, it take so long, you know, 30 seconds per indicator or a couple of minutes for an indicator? But, it does, it take some time and that's the reason because we get much better numbers, not numbers, I'm sorry, much better ratings.