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Rating Ecological Status and Resource Values

E. William Anderson

As early as the 1960's there was some localized recognition of the need to correct several conceptual problems that existed in the current procedure for rating range condition class. For example:

1. There was the need to measure species occurrence in the plant community by a quantitative method instead of by composition. While composition is a useful term, it is strictly a relative comparison and, when used as a measurement, a number of erroneous interpretations can be involved. Unfortunately, composition is still being used as a method of measurement in some instances.

2. Although the concept of Decreaser, Increaser and Invader species is meaningful, the use of these terms as criteria for determining how much of each species to count toward ecological status is an erroneous procedure. Range condition based upon the manipulation of the Decreaser-Increaser-Invader ratings was actually a resource value rating. As a result, many were led into equating range condition class not only with ecological status, but also with resource values, stocking rates, and other interpretations.

3. A procedure for making practical value ratings for various uses of the resource was needed. The current procedure, which required dependency upon experienced judgement, should be replaced with a procedure that could be checked and used by others with acceptable uniformity and consistency, thereby lending credibility to the process.

Toward this purpose, a procedure for quantitatively rating ecological status and resource values had been tested in Oregon prior to 1968. It has since been modified slightly to conform with suggestions made in the 1983 report of the S.R.M. Range Inventory Standardization Committee (RISC). For rating resource values, the purpose of this procedure is to quantify the relative value of the present plant community, per se, as a factor in watershed quality and as a source of food for selected herbivores. This is NOT a habitat nor watershed evaluation. The value of a habitat involves evaluation of such factors as the availability of water, steepness of slope, nearness to and kind of cover in addition to the forage value of the current vegetation. A watershed evaluation

includes such factors as surface geology, soils, climate, topography, and land use as well as the vegetation.

Although much thought and testing has been involved to date, this procedure undoubtedly can and should be improved. Hopefully, it will provide a starting point for those who are interested in developing a practical field procedure.

Guide to Rating

The first step is to develop a guide sheet for rating ecological status and resource values for each ecological site (Figure 1). Plant species usually found on each site are listed (column 1) and the approximate amount of each in the potential natural plant community (PNC) is shown (column 2) and totalled at the bottom of the column. The method of quantitative measurement represented by the guide must be indicated because the same method must also be used in measuring the present plant community in order to rate ecological status and resource values.

The rating procedure developed in Oregon uses percent canopy cover as the method of quantifying the plant community (column 2) because this method is equally adapted to grassland, shrubby, savannah, woodland and forest ecological sites. Furthermore, all species of gramineae, forbs, shrubs and trees, as well as mosses and lichens, bare ground, gravel and stones, litter and mulch can be measured by the same method of quantification. This enhances the value of the data for ecological interpretation.

In the guide to resource value ratings (RVRs), each species is ranked High (H), Medium (M) or Low (L), or not present (dash) as to its watershed value (column 3) and as food during spring (column 4), summer (column 5), fall (column 6), and winter (column 7) for a specified animal. Ratings for cattle and mule deer are illustrated in Figure 1, however, additional columns can be added to provide ratings for other herbivores such as horses, sheep, antelope, and sage grouse. Interdisciplinary input to this process is essential and should involve the best expertise available, therefore necessitating the involvement of scientists and practitioners.

An RVR for watershed (column 3) is important because of the tendency to overlook watershed values of the current vegetational cover. Water is a very valuable product and this fact needs constant emphasis so as to improve the degree to which it is recognized by resource users. Improving watershed quality should be emphasized as a primary objective in resource management programs.

Rating Sheet Instructions

The following step-by-step instructions for using the rating sheet (Figure 2) to rate ecological status and resource values for watershed and forage should be printed on the reverse side of the rating sheet for convenience in the field.

General

1. Identify the ecological site being rated and complete the information block at the bottom of the Rating Sheet.

2. Record the type of measurement used, i.e., % canopy cover, herbage weight, frequency hits, in the space provided above the columns. The type of measurement used in rating the present plant community must be the same as used in the Guide.

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Guide to Rating Ecological Status and Resource Values

SPECIES COMMONLY FOUND ON THIS SITE AND AMOUNT IN PNC (POTENTIAL PLANT COMMUNITY)		RESOURCE VALUE RATINGS								
		WATERSHED	CATTLE FORAGE				MULE DEER FORAGE			
Measurement:	%canopy cover		Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Mosses & lichens	30	H	L	L	L	L	L	L	L	L
Bluegrass, Sandberg	35	H	H	L	L	M	H	L	L	M
Brome, cheatgrass	0	L	H	L	L	L	H	L	L	H
Needle-and-thread	0	H	M	L	L	M	H	L	L	M
Wheatgrass, bluebunch	25	H	H	M	M	H	H	L	L	M
Agoseris, annual	T	L	M	—	—	—	H	—	—	—
Balsamroot, Careys	T	H	M	L	—	—	M	L	—	—
Filaree	0	L	H	—	—	—	H	—	—	—
Fleabane, shaggy	T	M	L	L	L	L	M	L	L	L
threadleaf	1	M	L	L	L	L	M	M	L	L
Loco, woollypod	T	M	L	L	L	L	H	M	M	L
Phlox, longleaf	2	L	L	L	L	L	M	M	L	M
spreading	1	M	L	L	L	L	M	M	L	M
Yarrow	1	H	L	L	L	—	L	L	L	—
Rabbitbrush, gray	T	M	L	L	L	L	L	L	L	L
Sagebrush, basin big	0	M	L	L	L	M	L	L	M	M
PNC Total	95									
ECOL. PROVINCE: Columbia Basin Oregon		ECOL. SITE: Arid Rolling Hills								

Fig. 1. Format for developing a guide to rating ecological status and resource values based on the species that commonly occur and the amount they contribute to the potential natural plant community of a specific ecological site.

3. List species in the present plant community (column 1) and, for each one record its quantity in column 2. Enter the total of column 2 at the bottom as item (a).

4. Record in column 3 the amount of each species in the present plant community that occurs in the PNC. Obtain these data from the Guide to Rating Ecological Status and Resource Values (Figure 1) that applies to the site being rated. At the bottom of column 3 record the total quantity of the PNC as shown in the Guide (do not enter the total of this column). This total is item (b) in the community similarity formula explained in Step 5(d) below.

5. Determine how much the present plant community is

like the PNC by the following procedure:

a. Where the present quantity of a species exceeds that in the PNC, record in column 4 only the amount shown for the PNC. The difference indicates how much this species has increased or invaded due to past conditions. For example, threadleaf fleabane and gray rabbitbrush have increased; cheatgrass and big sagebrush have invaded in the plant community shown in Figure 2.

b. Where the present quantity of a species is less than in the PNC, record in column 4 the lesser amount. The difference indicates how much this species has de-

R A T I N G S H E E T ECOLOGICAL STATUS AND RESOURCE VALUES

SPECIES IN THE PRESENT PLANT COMMUNITY (PPC)	ECOLOGICAL STATUS			RVR for WATER SHED	RESOURCE VALUE RATINGS FOR FORAGE							
	Approx. quantity				CATTLE				MULE DEER			
	in PPC	in PNC	like PNC		Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
Measurement: % canopy cover												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Mosses & Lichens	7	30	7	7	0	0	0	0	0	0	0	0
Bluebunch wheatgr.	10	25	10	10	10	10	10	10	10	0	0	10
Sandberg bluegrass	15	35	15	15	15	0	0	15	15	0	0	15
Cheatgrass brome	10	0	0	0	10	0	0	0	10	0	0	0
Needle-and-thread	3	0	0	3	0	0	0	0	3	0	0	0
Longleaf phlox	T	2	T	0	0	0	0	0	T	T	0	T
Threadleaf fleabane	3	1	1	1	0	0	0	0	1	1	0	0
Filaree	10	0	0	0	10	-	-	-	10	-	-	-
Yarrow	1	1	1	1	0	0	0	-	0	0	0	-
Basin big sagebrush	1	0	0	0	0	0	0	0	0	0	0	0
Gray rabbitbrush	2	T	T	T	0	0	0	0	0	0	0	0
Total	(a)62	(b)95	(w)34	37	45	10	10	25	49	1	0	25
Ecological Status %	43											
Ecol. Status Class	MS											
Resource Value %				47	57	13	13	32	62	1	0	32
Resource Value Class				F	G	P	P	F	G	P	P	F
Ranch or Unit: Boeing Range	Date: 4/20/70				Write-up No. A-7							
Photo or map: BBB 78-121	By: Rugg - Anderson											
Ecol. Province: Columbia Basin - Oregon	Ecol. Site: Arid Rolling Hills											

Fig. 2. Format for determining the ecological status and for rating resource values of the present plant community for watershed and forage on a specific ecological site.

creased due to past conditions. For example, bluebunch wheatgrass, Sandberg bluegrass, and longleaf phlox have decreased.

c. Total column 4 at the bottom as item (w).

d. Calculate the similarity between the present plant community and the PNC by the coefficient of community similarity formula: $2w$ divided by $a + b$ where a is the sum of species values in the present plant community, b is the sum of values in the PNC, and w is the sum of the values common to both. Enter this figure in column 2 as the Ecological Status %.

6. Enter the Ecological Status Class symbol in column 2 using the following:

Ecological Status %	Ecological Status Class Symbol
76 - 100	PNC (potential natural plant community)
51 - 75	L S (late seral)
26 - 50	M S (mid seral)
0 - 25	E S (early seral)

Resource Value Rating

7. Enter the names of the animals for which ratings will be made in the spaces above seasonal forage columns 6 through 9 and 10 through 13. Add columns as necessary for additional herbivores.

8. Using the Guide to Rating Ecological Status and Resource Values that applies to the site being rated:

a. If a species is rated High in the Guide for a particular use of the vegetation, record all that occurs in the

present plant community (column 2) in the column designated for that use. For example, mosses and lichens are rated High in value for watershed, so all that occurs in the present plant community is recorded in the column for watershed (column 5). Filaree is rated High in value as spring forage for both cattle and deer, so all that occurs in the present plant community is recorded in the spring-forage columns 6 and 10.

b. If rated Medium, record the lesser of the two amounts shown for the present plant community (column 2) and the PNC (column 3). For example, bluebunch wheatgrass is rated Medium in value as summer and fall forage for cattle and as winter forage for deer, so the lesser of the two amounts (10) is recorded in columns 7, 8, and 13.

c. If rated Low, record a zero and, if not present, record a dash in appropriate columns. For example, filaree is rated low in value for watershed, so a zero is recorded in column 5. After maturity in the spring its foliage dries and blows away, so a dash is recorded in all columns representing summer, fall, and winter forage.

9. Total the watershed and each seasonal-forage column in the space provided at the bottom. This sum is item *w* in the formula used to compute Resource Value %.

10. For each column, calculate the Resource Value % by the formula: $2w$ divided by $a + b$ where a is the sum of species values in the present plant community, b is the sum of values in the PNC, and w is the sum of watershed or forage values common to both. Record the Resource Value % for each column in the appropriate space at the bottom.

11. For each column, enter the Resource Value Class symbol in the appropriate space using the following:

Resource Value %	Resource Value Class Symbol
76 - 100	E (Excellent)
51 - 75	G (Good)
26 - 50	F (Fair)
0 - 25	P (Poor)

Discussion

The plant community represented in Figures 1 and 2 has been simplified for illustration purposes. In this example, the present plant community has a 43% similarity to the PNC which places it in the mid seral (M S) ecological status class (bottom of column 2). Mosses and lichens, bluebunch wheatgrass, Sandberg bluegrass, and longleaf phlox have decreased on this site as a result of whatever conditions occurred in the past (compare column 2 with 3). Cheatgrass, needle-and-thread, filaree, and big sagebrush have invaded the site. No arbitrary assignment of species to Decreaser, Increaser or Invader status is involved in this interpretation which enhances the ecological significance of these terms. Speculation as to the causes of these changes necessarily includes consideration of such historic items as kind(s) of grazing animal, seasons of use, degree of utilization, crop- and growing-season climate, fire and other disturbances.

The RVR for watershed (column 5) indicates that the present plant community, per se, has a high Fair value as one factor for judging watershed quality of this particular site location.

Seasonal RVRs for forage (columns 6 through 13) take into

account the relative forage value of all species presently on the site irrespective of whether they are decreaseers, increasers or invaders, thereby giving a realistic assessment of the forage value of the present plant community. No arithmetic is involved as was the case with proper use factors and palatability ratings used in the past. Invaders have often been equated with undesirable forage which sometimes, but not always is true, especially when more than one herbivore or season of use is taken into account.

Seasonal RVRs for forage provide an indication of potential seasonal conflicts between herbivores grazing simultaneously on the site. For example, in Figure 2 a potential conflict between cattle and deer on this site in the spring is indicated since the plant community rates in the GOOD resource value class for each herbivore (columns 6 and 10). Persons familiar with this rangeland would likely come to the same conclusion based on experienced judgement without using this RVR procedure. However, the RVR procedure documents the rationale upon which this interpretation is based; those who are unfamiliar with this rangeland would arrive at the same interpretation by using this procedure and others could check the procedure used. Having a documented rationale based on the best expertise available provides a basis for obtaining unanimity and objectivity within and between disciplines, which is needed.

Conclusion

The foregoing procedure is based upon knowledge of specific ecological sites, the species commonly found growing on them, and the make-up of the potential natural plant community for each site. It provides a direct quantitative comparison between the present plant community and the PNC as a basis for determining ecological status. Decreaser, increaser, and invader species are identified on the basis of what has actually happened instead of by arbitrary assignment of status. Resource value ratings for watershed and forage are based on a species-by-species evaluation which results in a realistic assessment of the value of the present plant community for these uses.

The task of documenting current experienced-judgement knowledge of the value of plant species for various uses may seem insurmountable. Nevertheless, it needs to be done in order to assemble this existing knowledge for use by range-land managers who should have not to learn, generation by generation, solely from their own experience. Furthermore, there is already a considerable amount of research which cites seasonal values of specific plant species as food for various herbivores. I have compiled a list of 62 such references mainly from the *Journal of Range Management*¹. This RVR procedure can help synthesize such research and general knowledge into a practical field procedure thereby encouraging additional research of this type.

¹A blank copy of the forms designed for field use, of which Figures 1 and 2 are simplified versions, and the reference list can be obtained from the author sending a self-addressed, two-stamp envelope.

Reference Cited

- Range Inventory Standardization Committee. 1983. Guidelines and terminology for range inventories and monitoring. (unpublished report). Society for Range Management, 2760 West Fifth Avenue, Denver, CO 80294. 13 pg.