

CRITERIA FOR THE ANALYSIS
OF THE MANAGEMENT SITUATION

Volume 4
(Appendix 4)

COEFFICIENTS

Kootenai National Forest

February 1981

RECREATION COEFFICIENT DEVELOPMENT

Introduction

Every acre of land on the Kootenai National Forest has the inherent capability, to some degree, to provide a recreation experience^{1/}. Recreation activities either occur on or affect almost every acre of the Forest to some extent. Recreationists are either participating on-site, in activities, such as bicycling, berrypicking, hiking, hunting, fishing, skiing, or swimming; or they are enjoying scenic resources through activities such as photography, driving for pleasure, or viewing.

The Kootenai National Forest has recognized the need to provide a spectrum of recreation opportunities to meet the needs and demands of its permanent residents, Regional and National visitors, and its Canadian neighbors by land management prescriptions such as recreation viewing, primitive recreation, and viewing/timber. These prescriptions provide for an emphasis on recreation activities along major highways, scenic drives, rivers, major fishing streams, and on developed recreation sites. In fact, every Forest management prescription contains a set of recreation opportunity spectrum (ROS) derived^{2/} objectives that specify the type of recreation opportunities that are emphasized or accommodated on each analysis area. Each management prescription has the potential to provide some level of recreation output; therefore, each has a distinctive RVD recreation coefficient which we are expressing in recreation visitor days per acre per year (RVD's/acre/year).

In our judgment, the inherent capacity of the Kootenai to provide recreation experience is determined by three principal factors^{3/}:

1. Natural setting or physical environment.
2. Social environment.
3. Management setting.

1. The natural setting includes:

- a) Land types
 - 1) topography
 - 2) erodibility
 - 3) site regenerative capability (productivity)
 - 4) resistance to compaction
- b) Climate
- c) Site attractiveness
- d) Water features
- e) Vegetation
- f) Accessibility
- g) Wildlife and fish

2. The social setting includes:

- a) Number of contacts with others
- b) Frequency of contact with others
- c) Types of encounters (behavior)
- d) Types of recreation activity
- e) Patterns of use
- f) Preferred occupancy length
- g) Location and numbers of private landowners
- h) Social carrying capacity

3. The managerial setting includes:

- a) Degree of controls or restrictions
- b) Managed length of season
- c) Design capacity
- d) Man-induced barriers
- e) Provision (or lack of it) for roads and trails (access)

The amount of use (RVD's) is determined by the combined effect of these three factors. The RVD potential for each management prescription can vary greatly because of differences in attractiveness, accessibility, and the management emphasis on the control of recreation use. In a primitive recreation situation for example, we consciously avoid controls whereas in a Grizzly Timber prescription we look for ways to reduce recreation use.

A number of methods for estimating the inherent recreation capacity of wild lands have been proposed in recent years. The Recreation Opportunity Inventory and Evaluation Process (R-1, Behnert, 1973) and other methods (Tribe, 1972; Lime and Stankey, 1971) were used by many Forests in R-1 in the preparation of unit plans. These methods, however, were used primarily to measure suitability rather than to estimate capacity.

Research into the effects of managerial actions on recreation capacity have been focused primarily on wilderness (Fazio E. Gilbert, 1974; Lucas, et. al., 1971; Stankey, 1973; and Stankey, 1977).

Because of time and manpower constraints we were not able to pursue any of the above methods and chose to follow the PAOT approach for determining "practical maximum capacity" suggested in FSH 1909.12, chapter 500 (Recreation Input to Land and Resource Management Planning).

2. General Assumptions

1. Existing patterns of use as reflected in RIM documents represent an adequate basis for determining existing use densities for both developed and dispersed sites.
2. The recreation capacity figures suggested in the R-1 February 1, 1980 2310 memo (exhibit #2), provide an adequate range of RVD values for the Kootenai's primitive, SPNM, and SPMROS classes. However, our calculations that follow and the recent FSH 1909.12 procedure for determining RNA coefficients show that R-1 suggested values for the RNA class may be too high.
3. The KNF, ROS inventory provides adequate acreage data for existing recreation opportunity situation.
4. "Practical maximum capacity" (PMC) as suggested in FSH 1909.12 provides an adequate method for developing recreation coefficients (RVD's/acre/year).

3. Coefficient Determination

As suggested in FSH 1909.12, chapter 500, we developed coefficients (RVD's/acre/year) for each management prescription by estimating "practical maximum capacity" (PMC) as follows:

1. Developed Sites:

a) We calculated PMC for developed campgrounds as follows:

$$\frac{\text{PAOT} \times \text{Managed Length of Season (days)} \times .40^{4/} \times 2 \text{ (for two 12 recr. days in 24 hrs.)}}{\text{District Developed Campground Acres}^{6/}}$$

District	Campground PAOT ^{5/}	Managed Length of Season Days ^{5/}	X .40 ^{4/}	X 2	Developed Acres ^{6/}	PMC RVD's/Acre/Yr.
1	285	172	19,608	39,216	28	1,400
2	130	134	6,968	13,936	15	929
3	265	104	11,024	22,048	20	1,102
4	435	128	22,272	44,544	42	1,060
5	255	122	11,424	22,848	39	586
6	380	170	25,840	51,680	37	1,397
7	145	183	10,614	21,228	19	1,117

b) We calculated PMC for day use site such as boat ramps, swimming beaches, and picnic grounds as follows:

$$\frac{\text{PAOT} \times \text{Managed Length of Season} \times .40^{4/}}{\text{Developed Day Use Acres}^{6/}}$$

District	Pay Use PAOT Capacity ^{5/}	Managed Length of Season ^{5/}	X .40 ^{4/}	Developed Acres ^{6/}	PMC in RVD's/Acre/Year
1	445	172	30,616	17	1,801
2	0	---	---	---	---
3	220	104	9,152	4	2,288
4	40	128	2,048	1	2,048
5	110	112	4,928	8	616
6	764	170	51,952	29	1,791 ^{7/}
7	250	183	18,300	3	6,100 ^{7/}

c) We determined that the average PMC for the Forest for developed sites is 1710 RVD's/acre/year. We used 1700 as our highest PMC figure; we applied this to the intensive level of funding. We estimated the extensive level at 1000 and the moderate level at 1350 RVD's/acre/year.

2. Wilderness (Cabinets):

We calculated existing recreation use density for the Cabinet Wilderness as follows:

- a) Wilderness acres = 94,360
- b) FY 1979 RIM use = 29,300 RVD's
- c) $29,300 \text{ RVD's} \div 94,360 \text{ acres} = .31 \text{ RVD's/acre/year}$. We used .25 for the extensive funding level, .30 for the moderate level, and .50 for the intensive level.

3. Primitive and Semi-Primitive Non-Motorized:

The Northwest Peaks and Ten Lakes Scenic Area are the only areas on the Kootenai for which we have RIM data that meets the definition of these two unroaded ROS classes. We calculated existing use density as follows:

	<u>FY 79 RVD's</u>	<u>Acres</u>	<u>RVD's/Ac/Yr</u>
a. NW Peaks	2500 ^{8/}	14,400	.17
b. Ten Lakes	3300 ^{8/}	15,700	.21

We estimated PMC at .40 for PRIMRC and .60 for SPNMRC; these apply to the intensive level of management.

In summary, we estimated the primitive and semi-primitive non-motorized recreation coefficients for all levels as follows:

	<u>Extensive</u>	<u>Moderate</u>	<u>Intensive</u>
a. PRIMRC	.20	.24	.40
b. SPNM	.30	.40	.60

4. Semi-Primitive Motorized (SPM) and Roaded Natural Areas (RNA):

We calculated existing use densities by "lumping" these two categories simply because we do not have sufficient use data to make separate existing use estimates for these two ROS classes.

We calculated existing roaded recreation use densities as follows:

- a) Roaded recreation RVD's = 91,000^{9/}
- b) Roaded acres = 1,353,302^{10/}
- c) $91,000 \div 1,353,302 = .07/\text{RVD's/acre/year}$

The above calculation is the present, estimated, Forest-wide roaded recreation use density and does not reflect the higher RVD densities for major recreation use corridors. In order to arrive at some realistic PMC estimates we have created the following theoretical (but quite feasible) "models" to identify maximum practical maximum densities for roaded recreation areas on the Kootenai.

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d) Model #1

We estimated highest roaded RVD densities for major highways assuming:

- 1) RNA areas are one-mile wide corridors
- 2) One mile of corridor equals 640 acres
- 3) $\frac{63,000 \text{ RVD's}^{12/}}{208^{12/} \text{ miles} \times 640 \text{ acres}} = .47/\text{RVD's/acre/year}$

This calculation represents our probable, present, highest existing, roaded natural, and recreation use density.

e) Model #2

We recalculated the existing, Forest-wide, RNA average use assuming:

- 1) The estimated 63,000 RVD's for major highway use is unreported on RIM
- 2) That 75 percent of use occurs along 250 miles of major highway corridors
- 3) $63,000 + 91,000 = 154,000$
- 4) $154,000 \times .75 = 115,500 \text{ RVD's}$
- 5) $208 \times 640 = 133,120 \text{ acres of highway RNA area}$
- 6) $115,500 \div 133,120 = .87/\text{RVD's/acre/year}$

f) Model #3

We created the following possible "maximized" model assuming:

- 1) Roaded recreation use for the Forest could reach 750,000 RVD's annually
- 2) That 80 percent of this projected use would occur on 25 percent of inventoried RNA areas
- 3) $750,000 \times .80 = 600,000 \text{ RVD's}$
- 4) $1,353,302 \text{ acres}^{10/} \times .25 = 338,325 \text{ acres}$
- 5) $600,000 \text{ RVD's} \div 338,325 \text{ acres} = 1.8/\text{RVD's/acre/year}$

From these models we concluded that any RVD figure for RNA or SPM that exceeded 2.25 RVD's/acre/year for the Kootenai would be unrealistic. The attached detailed description for each prescription explains how we adjusted the above calculations to provide a recreation coefficient for each prescription.

1/ - 12/ Refer to reference page.

REFERENCES

- 1/ FSH 1909.12, Chapter 500, Recreation Input to Land and Resource Management Planning, page 10.
- 2/ Ibid.
- 3/ Ibid., page 29.
- 4/ R-1, 2/1/80, 2310 memo suggested .40.
- 5/ RIM Special Report No. 18, 5/12/80.
- 6/ RIM Form 2300-3, 2/1/80.
- 7/ This figure results from the Cabinet Ranger District showing a one-acre boating site having a 200 PAOT capacity. This is technically possible because 50 cars with 4 people each = 200 PAOT. One acre (43,560 sq. ft.) ÷ 50 = 871 sq. ft. per car and boat trailer. Although this is technically feasible, we do not believe this situation would actually occur.
- 8/ RIM Special Report No. 23, 3/3/80.
- 9/ RIM Form 2300-13, 12/1/79.
- 10/ From KNF Forest Plan Data Base.
- 11/ FSH 1909.12, page 18.
- 12/ Estimated From Montana State Department of Highways Traffic Counts for 208 Miles of Highway Through the Kootenai (See Exhibit #1).

TABLE 1
RECREATION COEFFICIENTS BY MANAGEMENT PRESCRIPTION
IN RVD'S/ACRE/YEAR

Prescription	Management Intensity		
	Ext.	Mod.	Int.
<p>1. <u>MINREG, MINSLO & MINYUK</u></p> <p>Recreation values are very low in these areas because these lands are very steep "left over" lands with little value to either onsite recreation use or to viewing. Lands allocated to this prescription produce the least recreation outputs. The recreation activities that do occur under this prescription occur primarily on a few roads that cross these steep areas. Activities are classed primarily as Semiprivate Motorized (SPM) and Roaded Natural Appearing (RNA).</p>		.01	.01
<p>2. <u>TIMOPT</u></p> <p>Because of the extensive road development usually associated with this management prescription, we classed these management zones as Roaded Natural (RNA). However, because of heavy logging traffic, long cul-de-sac roads, road closures, lack of parking areas, and the generally modified appearance of the forest landscape we reduced the RVD outputs to about one half the high "practical maximum capacity" for RNA areas. We felt that there would be little difference between the three levels of management intensity under this prescription.</p>	.5	.5	.75
<p>3. <u>BGSRTM</u></p> <p>(Big Game Summer Range Timber) The intent of this prescription tends to deemphasize roaded recreation activities and we will likely classify those areas as SPNM or SPM. If management activities are intensified to increase big game populations, hunting use will increase as will summer and spring wildlife viewing activities.</p>	.25	.50	.75
<p>4. <u>BGWRTIM</u></p> <p>(Big Game Winter Range Timber) The recreation setting in this prescription may include SPNM, SPM, and RNA situations. However, RNA settings will be deemphasized. Management activities aimed at increasing big game populations will increase RVD's. In spite of our best efforts to minimize road access most of our hunting RVD's will continue to occur on or along roads.</p>	.25	.5	.75

Prescription	Management		
	Ext.	M	
<p>5. <u>TIMVIEW</u></p> <p>(Timber Viewing) Because of the primary emphasis on timber production more roads will be available for roaded recreation use; by giving some consideration to viewing, the lands allocated to this prescription will tend to be more desirable for dispersed recreation use than TIMOPT lands.</p>	.60	.60	1.0
<p>6. <u>BGWRGE</u></p> <p>(Big Game Winter Range) The management intent of this prescription will tend to discourage roaded recreation and will provide excellent opportunities for SPNM, SPM, and Primitive Recreation. Roded hunting and sightseeing will, however generated most of the RVD's.</p>	.50	.50	.75
<p>7. <u>WLDTIM</u></p> <p>(Wildlife Timber) This prescription will apply to small unroaded areas approximately 200 acres in size. However, the recreation setting may at times be close to roads. Opportunities to view wildlife including small game and birds in a semiprimitive setting will be high.</p>	.25	.30	.50
<p>8. <u>GRIZTIM</u></p> <p>(Grizzly Timber) The management emphasis in this prescription will preclude the opportunity for roaded natural recreation activities and will provide excellent SPNM and SPM settings. Dispersed recreation use, however, may be somewhat controlled because of the grizzly. More intensive management here will tend to reduce recreation use. Coefficients should be slightly lower than SPNM coefficients,</p>	.25	.30	.25
<p>9. <u>VIEWTM</u></p> <p>(Viewing Timber) This prescription is directed at creating a pleasant viewing experience associated with driving for pleasure (Roded Natural ROS Class). The setting will be primarily natural or natural appearing.</p>	.75	.75	1.0
<p>10. <u>VIEWING</u></p> <p>This prescription is entirely directed toward producing a natural or natural appearing setting; it will have one of the highest RVD outputs for dispersed areas because of its association with heavily traveled roads and waterways in combination with a high degree of visual attractiveness. This prescription encompasses both foreground and middleground viewing zones.</p>	1.0		2.0

Int.
Mod.

Prescription	Management Intensity		
	Ext.	Mod.	Int.
<p>11. <u>RECVEW</u></p> <p>(Recreation Viewing) Like viewing this prescription is directed at the management of the forest to produce a natural or natural appearing setting. It has one of the highest RVD outputs because of its association with developed recreation sites, major recreation trails, key fishing streams and lakes, and important forest access roads and highways. This prescription is generally considered a foreground prescription.</p>	1.50	1.50	2.25
<p>12. <u>DEVREC</u></p> <p>(Developed Recreation) Developed sites have the highest RVD outputs per acre.</p>	1000.0	1350.0	1700.0
<p>13. <u>ADMSIT</u></p> <p>(Administrative Sites) Although these sites are very small from an acreage standpoint they are key contact points for information to the traveling public and are often part of the "total recreation experience" to many visitors who want to see the "Forest Ranger".</p>		250.0	
<p>14. <u>SPECNT</u></p> <p>(Special Interest) The intent of this prescription is to protect and interpret cultural values. Although these areas may be small in acreage they have the potential to produce high RVD outputs per acre. This coefficient would be approximately equivalent to 2 people/acre/day for 143 day season for moderate intensity.</p>		300.0	
<p>15. <u>PROTEC</u></p> <p>(Protection) Although these sites may attract public attention the intent of this management emphasis is to discourage public use. The more intense management practices would tend to reduce use. Most of these areas will occur in a roaded natural situation. (equal to .1 people/acre/day/ 143 day season)</p>		10.0	
<p>16. <u>PWILDER</u></p> <p>(Proposed Wilderness) This prescription applies only to the Cabinet additions and the Scotchman Peaks area. We have assumed for planning purposes that these areas have the same RVD potential as would a formally classified wilderness.</p>	.25		

Prescription	Management Int.		
	Ext.	Mod.	
<p>17. <u>WLDSTD</u></p> <p>(Wilderness Study Area) This prescription applies only to the Mt. Henry and Ten Lakes Scenic area. Snowmobile use is presently permitted in the Ten Lakes Scenic area.</p>	.25		
<p>18. <u>WILDER</u></p> <p>(Wilderness) Applies only to the existing Cabinet Wilderness area.</p>	.25		.5
<p>19. <u>PRIMRC</u></p> <p>(Primitive Recreation) The RVD potential may be slightly lower than for formally classified areas that would have national recognition. Under intensive management these areas may get more regional attention through the publication of brochures and related public information.</p>	.20	.25	.40
<p>20. <u>SPNMRC</u></p> <p>(Semiprimitive Nonmotorized Recreation) This prescription provides for an unroaded experience small in size than PRIMRC. Because these areas would generally occur in between the PRIMRC and wilderness areas it would be more accessible; therefore have the potential for more RVD's.</p>	.30	.40	.60
<p>21. <u>SPMREC</u></p> <p>(Semiprimitive Motorized Recreation) This prescription provides for a primitive roaded experience in a natural appearing environment. These areas offer one of the best opportunities for the average recreationists to experience some degree of solitude and still gain access with an automobile. This type of recreation setting is the most preferred type according to the 1973 Montana Statewide Outdoor Recreation Plan.</p>	1.5	1.5	2.0
<p>22. <u>CORDOR</u></p> <p>(Corridor) Contains both nonrecreation and very high use recreation areas because both utilities (gas lines and electrical transmission lines), and highways fall into this prescription. Potential recreation RVD outputs within this prescription would range from very low to very high. The coefficient used here may have to be adjusted to fit each alternative. The recreation setting would be primarily that of a roaded natural environment.</p>		.30	

TABLE 2
IFP RECREATION COEFFICIENT SUMMARY

Prescription	Coefficient in RVD's/ACRE/YEAR		
	Ext.	Mod.	Intensive
1. MINREG, MINSLO, MINYUK		.01	.01
2. TMBOPT	.5	.5	.75
3. BGSTIM	.25	.5	.75
4. BGWRTM	.25	.5	.75
5. TIMVEW	.60	.60	.75
6. BGWRGE	.50	.50	.75
7. WLDTIM	.25	.30	.50
8. GRIZTM	.25	.30	.25
9. VIEWTM	.75	.75	1.00
10. VIEWNG	1.00	1.00	2.00
11. RECVEW	1.50	1.50	2.25
12. DEVREC	1000.00	1350.00	1700.00
13. ADMSIT	250.00	250.00	250.00
14. SPECNT		300.00	
15. PROTEC	15.00	10.00	5.00
16. PWILDR	.25		
17. WLDSTD	.25		
18. WILDER	.25		.50
19. PRIMRC	.20	.25	.40
20. SPNMRC	.30	.40	.60
21. SPMREC	1.50	1.50	2.00
22. CORDOR		.30	

TABLE 3

RVD'S ALONG MAJOR TRAVEL CORRIDORS

Station & Route	ADT ^{1/}	Recr. Traffic ^{2/} %	Recr. ADT	Total No. Cars ^{4/}	Total Visitors (M)	Distance Miles	Travel Time @45MPH	Visitor Hours (M)	RVD's (M)	Remarks
US#2 to Troy	1941	.42	815	116545	350	14	.3	2053/	17.1	Jct. 56 & Hwy. 2 to Idaho border
US#2 to Libby	1841	.42	773	110539	332	12	.3	100	8.3	Jct. 56 to Libby
MT#56 to Noxon	759	.36	273	39039	117	35	.8	94	7.8	Jct. 56 & Hwy. #2 to Jct. 56 & Hwy 200
MT#37 to Libby	516	.32	165	23595	72	12	.3	22	1.8	Jct. Fisher Road to Libby
MT#37 to Dam	517	.37	191	27313	82	45	1.0	82	6.8	Jct. Fisher Road to Rexford
Fisher Rd to US#2	286	.24	69	9867	30	NA				Predominately private land
US#93 to Canada	582	.39	227	32461	98	7	.2	20	1.7	
US#2 to Libby	876	.37	324	46332	139	30	.7	97	8.1	Libby to McGregor Lake (only about 1/2 counted)
MT#56 to Troy	360	.41	148	21164	64	35	.8	51	4.3	
MT#200 to Thompson Falls	817	.37	302	43186	130	8	.2	523/	4.3	
MT#200 to Idaho	760	.42	319	45617	137	10	.2	543/	4.5	
TOTALS						208	4.8	777	64.7	

1/ Montana Highway Department Traffic Counts

2/ Montana Counts on specific vehicle types

3/ Doubled to reflect two-way traffic

4/ X 193 day use season

EXHIBIT #2
 UNITED STATES DEPARTMENT OF AGRICULTURE
 FOREST SERVICE
 R-1

REPLY TO: 2310 Recreation System Planning

February 1, 1980

SUBJECT: Recreation Opportunity Planning, (Ref: our 1/16)



TO: Forest Supervisors

In our January 16 memorandum transmitting the revised ROS Guidelines, we mentioned recreation capacity figures being used in the Regional Plan. For the full range of ROS Opportunity Classes, we suggest the following capacity ranges for use in Forest planning:

Primitive	0.5 RVD/acre/year
Semi-primitive, nonmotorized	1.0-10.0
Semi-primitive, motorized	1.0-20.0
Roaded, natural-appearing	10.0-300.0
Rural	100.0-1000.0

(and developed sites at 40 percent of theoretical capacity)

These capacity ranges are somewhat lower than those suggested in the ROS Guidelines. However, we feel they may be more appropriate to the Northern Region. Your comments and suggestions are encouraged; we would like to achieve a reasonable level of consensus on capacities, in order to have comparability between Forests.

for *J. R. Price*
 Wm. A. WOLF
 Director
 Recreation & Lands

*125 RVD's/ACW/year
 overall wilderness
 use in R-1
 Telecom w/ Bondsberg
 or*

Receive
 Kootenai
 FS
 DRS
 ZES
 ASB
 B&F
 PER
 COM
 PUR
 FLT
 RES
 ADP
 MP
 WE
 OS
 ESB
 R-G
 O-F
 M-S
 T-ZH
 P-I
 PB
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 H-S
 G-C
 T-A
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WILDERNESS

JOHN DILLON

9/30

WILDERNESS

Index: Acres

The method to arrive at a number for the above index will be simply to measure the entire wilderness or distinct use area and compare acreages by alternative. This applies specifically to Ten Lakes where wilderness options will be examined.

The basic assumption is that potential wilderness areas have already been defined through the RARE II process and S.393. Only Ten Lakes will receive a wilderness option.