

PROJECTED CONSUMPTION OF OUTDOOR RECREATION ACTIVITIES
WITHIN MT. RAINIER NATIONAL PARK AND
SURROUNDING REGION

Submitted to the
Pacific Northwest Region
National Park Service

by

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Introduction

During the past six years, the National Park Service (NPS), along with nine other federal and state outdoor recreation management agencies, have sponsored cooperative research to identify current and projected future consumption of recreation activities in the Pacific Northwest. Known as the Pacific Northwest Outdoor Recreation Study (NORS), the research effort represents a coordinated, inter-agency approach to managing public recreation resource systems. For the purposes of the NORS research, recreation resource systems were conceptualized as interrelationships evident within a geographic region between consumer demand for recreation activity opportunities, the supply of resource settings for activity opportunities, and the resource management institutions enabling consumer access to public resources (Hospodarsky, 1988). Appendix 1 contains an overview of NORS.

A primary goal of NORS was to provide outdoor recreation planners and managers with an empirically based model of the regional recreation system in order to facilitate recreation resource decision making. The conceptual basis for this model was that human populations establish regional patterns of recreation activities in the process of satisfying demand for diverse and geographically widespread setting opportunities. No single resource management agency controls sufficient resources to satisfy population demand. Consequently, coordination of management activities among agencies is necessary to efficiently provide the diversity and quantity of recreation opportunities a population desires, within constraints of resource productivity.

Pursuant to this goal, an empirical model was developed depicting exchanges of recreation activities between multi-county geographic areas within Oregon, Washington, and

Idaho at various future times and under various hypothetical conditions of resource supply and consumer demand. The model was of necessarily broad scale and scope in order to accommodate the disparate information needs of the 10 public agency participants in the study. As a consequence, not all the data resulting from NORS were directly applicable to meeting specific resource management needs; particularly, those needs requiring data at levels of scale smaller than the multi-county regions, which were the basis for the NORS analysis.

The data, however, have found widespread application in recreation research, planning, and management despite their necessarily general nature. Appendix 2 contains a list of some of the uses to which the NORS data have been put during the period from 1988 through the present. In addition to data outputs, the entire NORS continues to serve as a processual model for inter-agency and regional recreation resource management activities in the Pacific Northwest (Hospodarsky, 1993).

One aspect of the NORS results that has hindered the direct application of results by NPS managers is the broad scale at which the spatial structure of the recreation system was modeled. In NORS, recreation participation was modeled as exchanges of trips for activities between geographic regions comprised of blocks of contiguous counties within states. The boundaries of these regions generally do not coincide with the administrative boundaries of land management units such as national parks: national parks are considerably smaller in area than the multi-county regions used in NORS and, in some cases, the boundaries of a single park fall within two NORS regions. In order for the original goal of NORS to be

achieved to the satisfaction of the NPS, therefore, additional steps must be taken to make the NORS results more applicable to NPS resource management activities.

A demonstration project was proposed for Mount Rainier National Park (MORA) to illustrate the feasibility of adapting NORS results to specific NPS administrative areas. The boundaries of MORA fall wholly within NORS Region 2, as shown on the map in Figure 1. The region is comprised of 10 counties and includes the Seattle metropolitan area. The Park encompasses about three percent of the total land area of the region and is within three hours drive of nearly two million people. The population of the region is among the fastest growing in the nation, largely the result of growth in the south Puget Sound area.

Because of its popularity and proximity to a large population center, Mt. Rainier National Park is heavily visited by people living within Region 2 and adjoining NORS regions in Washington and northern Oregon. Considered together, visitors to MORA from Washington, Oregon, and Idaho constitute about 63 percent of the Park's total visitation (Johnson et al. 1991). The proportion of visitors from areas proximate to the Park is about average when compared with visitation to other national parks in the United States.

Projections of consumption of outdoor recreation activity opportunities within Region 2 were made as part of NORS. These projections, which were the result of modeling characteristics of recreation travel to Region 2 from origins throughout Washington, Oregon, and Idaho, have been documented elsewhere (Hospodarsky 1989a). This summary report was preceded by three additional reports which developed projections of future recreation consumption by residents of each of the three states (Hospodarsky 1989; Hospodarsky and Lee 1989a; Hospodarsky and Lee 1989b). Together, these reports described current

THE PACIFIC NORTHWEST

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Outdoor Recreation Study
1986-87

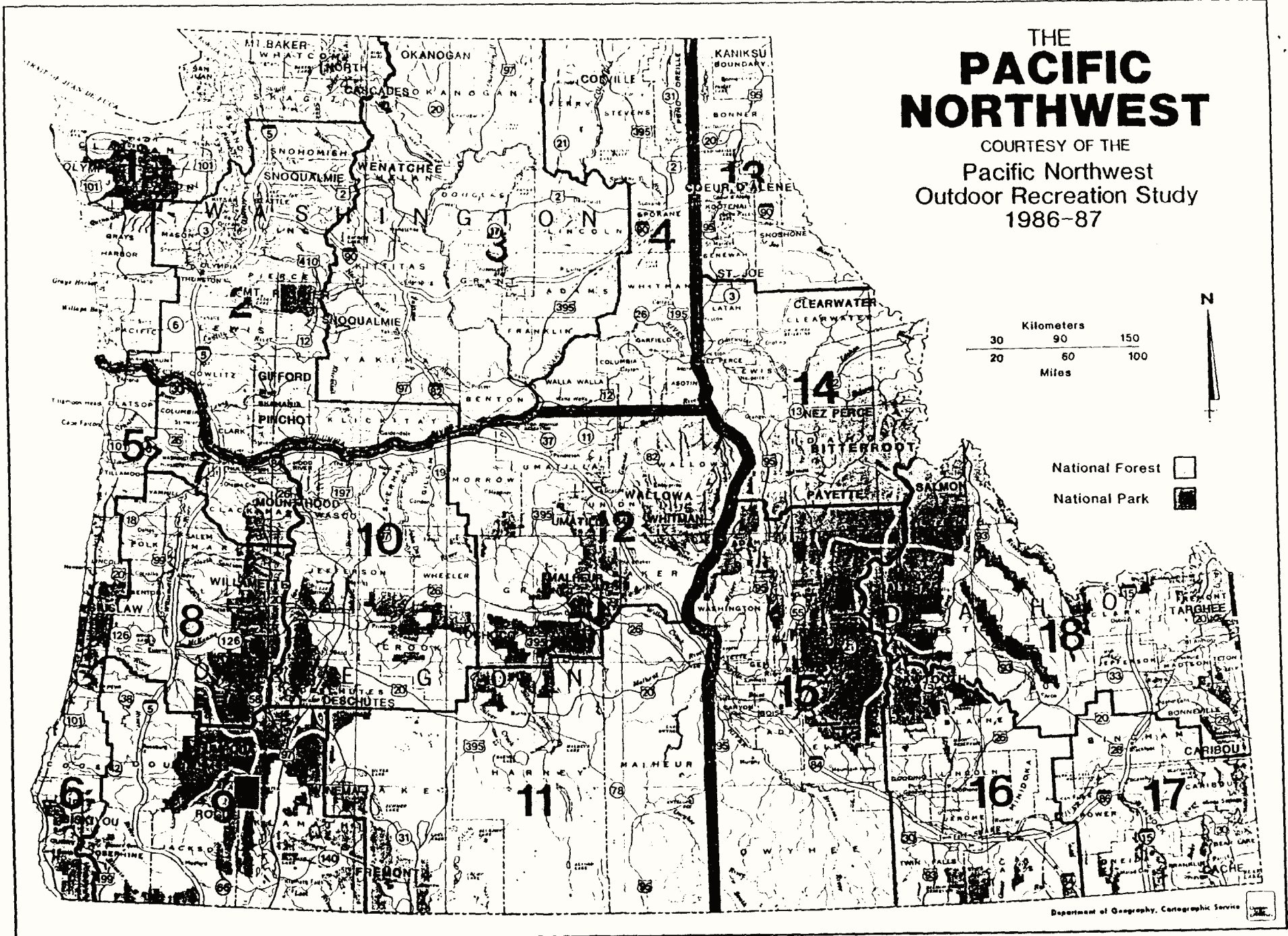


Figure 1. Multi-county regions used in the NORS project.

consumption of recreation activity opportunities within Region 2 and made projections of future consumption of activities to the year 2010 under three scenario futures.

The regional scale at which recreation consumption was modeled in NORS precluded making consumption projections specific to MORA or other NPS areas in the three states. In order for park managers to better understand the interrelationships between the park and its region, the effects of the park on regional recreation patterns must be isolated and quantified. Machlis and Tichnell (1985) stress consideration of parks as part of a wider regional system which social, biological, and physical elements affect the park itself. The inter-relationships between park and region imply that conditions of human population, social organization, technology, and environment in the surrounding region have an influence on the park, and vice versa. In terms of recreation, the demand placed on park resources is a consequence of the relative importance park resources play in fulfilling demand for recreation experiences expressed by all those who use the region's recreation resources.

While comprehensive models of the human, biological, and physical relationships comprising park systems remain elusive (Agee and Johnson, 1988), it is believed that NPS recreation resources currently and in the future, will continue to be in higher demand than similar resources on other public or private lands (Machlis and Tichnell, 1985). The same trend is suspected to hold for MORA resources. The future level of demand for park resources is unknown. Efficient planning and pro-active management of MORA resources require projections of future consumption of MORA resources be developed, which reflect the unique recreational attractiveness of the Park's resources and the role of the park in shaping regional recreation demand.

The objective of this research is to develop projections of future consumption of recreation activities within MORA from NORS and other existing data sources. Methods show how consumption projections were made in a manner reflecting the unique recreation resources within the Park and the Park's relationship to the surrounding region. Recreation activity consumption projections were made separately for MORA and for NORS Region 2. The projection results show the change in consumption projected for activities within the Park as compared to the change in consumption projected for the remainder of NORS Region 2, outside MORA.

The implications of projected recreation trends for MORA management and the remainder of the region are discussed. Methods similar to those used in this study could also be used to develop recreation use projections for other national Parks in the tri-state area. Discussion of these projection methods and other research questions that might be addressed by further analysis of the NORS data conclude the report.

Methods

A variation of Clawson's (1984) Effective Acreage Equivalent (EAE) method was used to develop separate recreation activity consumption projections for MORA and for NORS Region 2, excluding the Park. The procedure followed is a variant of the EAE method as it, like EAE, relies upon comparisons between land area and activity consumption to describe relative resource demand, but it deviates from EAE by not converting relative demand into a measure of effective acres as a final step. (Clawson's original article on the EAE method is included in Appendix 3.) The EAE variant method, hereafter called EAEV,

uses the NORS consumption projections for Region 2 and resource supply and demand information for MORA and the surrounding region, to make activity consumption projections for the Park.

The specific procedures used to accomplish this research rely upon a series of arithmetic manipulations of existing data describing the demand and supply of outdoor recreation resources within NORS Region 2. These calculations allow differentiation of demand-supply relationships for distinct geographic areas comprising Region 2 viz., MORA and the remainder of Region 2 that excludes MORA.

The procedures used in applying the EAEV method are as follows.

1) Selection of Recreation Activities. Previous research by Johnson et al. (1991) indicated frequencies of participation in recreation activities at MORA. The activities most frequently cited for participation by MORA visitors provided the basis for a final list of activities to be considered when making activity consumption projections for the Park. This initial list was reduced upon review of the supply variables used in the activity consumption projection models to make future consumption projections for MORA. Activity models containing only supply elements not found within MORA were eliminated e.g., the surface acres of water in Corps of Engineer and Bureau of Reclamation impoundments required by the motorized boating model.

The process of identifying MORA recreation activities to be modeled resulted in the selection of 13 activities modeled by nine NORS models (Table 1). In the cases of primitive camping and day hiking activities, the appropriate NORS model was used to make consumption projections for more than one MORA activity. In these cases the respective

NORS models can be considered as abstractions of demand-supply relationships characteristic of activities which were narrowly defined for purposes of the MORA visitor survey by Johnson et al. (1991).

Table 1. Description of activity consumption projection models and MORA activities modeled.

NORS Model		MORA Activity
Model Name	Description	(as described in Johnson et al. 1990)
DCAMP	Developed Camping	*Camping - Developed site
PCAMP	Primitive Camping	*Camping - Backcountry site *Winter Camping *Technical Mountain Climbing - self led *Technical Mountain Climbing - guided
SIGHT	Sightseeing	*Driving to View Scenery
PICNIC	Picnicking	*Picnicking
MUSEUM	Attending Visitor Center/Museum	*Going to Visitor Center or Museum
WILDOB	Wildlife Observation	*Observing Wildlife
PHOTO	Outdoor Photography	*Photography
DHIKE	Day Hiking	*Day Hiking - self led *Day Hiking - self guided nature trail
BIKE	Bicycling	*Bicycling

2) Resource Supply Inventory. Having identified salient recreation activities within MORA, and the appropriate NORS models for making projections of future activity consumption, the model supply variables were then identified through a review of model

specifications. A description of these supply variables and their associated models is provided in the left columns of Table 2.

This list of supply variables was sent to the Southeast Forest Experiment Station, Outdoor Recreation and Wilderness Assessment Group, Athens, GA, who then provided the supply inventory for the variables. The supply inventory was compiled from the 1987 National Outdoor Recreation Supply Inventory System (NORSIS) data base to allow identification of supply available within MORA separate from that available within NORS Region 2, excluding MORA. The supply of recreation activity resources obtained from the NORSIS database is shown in the center columns of Table 2.

Table 2. NORS Region 2 activity consumption models and activity resource supply and consumption, 1987.

NORS Model	NORS Model Supply Variable	Resource Supply ¹		Activity Consumption	
		Region 2 (no MORA)	MORA	Region 2 (no MORA) ²	MORA ³
				Trips	
DCAMP	Miles fed. rd.	2,002	100	3,008,464	90,475
	A. fed. land < 1/2 mi from rd	1,394,291	63,690		
	A. state land < 1/2 mi from rd	736,532	0		
PCAMP	A. state land open to rec.	1,143,369	0	2,801,175	64,625
	A. fed. land < 1/2 mi from rd	1,394,291	63,960		
	A. state land < 1/2 mi from rd	736,532	0		

NORS Model	NORS Model Supply Variable	Resource Supply ¹		Activity Consumption	
		Region 2 (no MORA)	MORA	Region 2 (no MORA) ²	MORA ³
				Trips	
SIGHT	Number resorts and tourist accomo.	68	2	6,100,392	1,034,000
PICNIC	A. fed land < 1/2 mi from rd	1,394,291	63,690	3,148,772	387,750
	A. state land < 1/2 mi from rd	736,532	0		
	A. state land open to rec.	1,143,369	0		
MUSEUM	Miles fed. rd.	2,002	100	1,126,148	749,650
	A. fed. land < 1/2 mi from rd	1,394,291	63,690		
	A. state land < 1/2 mi from rd	736,532	0		
WILDOB	A. state land 1/2-3 mi from rd	81,000	0	2,295,701	607,475
	A. fed land 1/2-3 mi from rd	445,000	189,000		
	A. Non -wilderness > 3 mi from rd	0	14,600		
	Nature Conservancy Acres	439	0		
	A. state Fish & Game land	2,260	0		
PHOTO	A. state land open to rec.	1,143,369	0	8,778,946	762,575
	A. fed land < 1/2 mi from rd	1,394,291	63,690		
	A. state land < 1/2 mi from rd	736,532	0		

NORS Model	NORS Model Supply Variable	Resource Supply ¹		Activity Consumption	
		Region 2 (no MORA)	MORA	Region 2 (no MORA) ²	MORA ³
DHIKE	A. federal wilderness	704,443	3,194	2,127,607	814,275
BIKE	Miles fed. rd.	2,002	100	5,360,011	12,925
	A. fed. land < 1/2 mi from rd	1,394,291	63,960		
	A. state land < 1/2 mi from rd	736,532	0		
	A. state land open to rec	1,143,369	0		

¹Source: NORSIS data base.

²Source: NORS data base.

³Source: Mt. Rainier National Park visitation statistics for 1987.

3) Calculation of Activity Consumption in 1987. Recreation activity consumption in 1987 within MORA was estimated using data from the Johnson et al. (1991) and Park visitation figures for 1987. Total visitation in 1987 was 1,292,500, according to Park statistics. To determine the number of visitors in this total who participated in recreation activities, the percent of visitors engaged in activities (from Figure 4.16 in Johnson et al. 1991) was multiplied by the total number of visitors. The results of this calculation for relevant MORA activities are shown in Table 3.

Recreation activity consumption within NORS Region 2, excluding MORA, was estimated from the NORS survey data. Since the Region 2 consumption estimates originally included recreation consumption within MORA, the MORA consumption was subtracted

from the Region 2 consumption estimates. Recreation activity consumption estimates for NORS Region 2, excluding MORA, are shown in Table 2.

It should be noted the estimates of activity consumption accruing in Region 2, excluding MORA, are those originating in Oregon, Washington, and Idaho, only. That is, Region 2 consumption does not include any consumption originating outside the Pacific Northwest, in important visitor markets such as California and Canada. Since visitation to Region 2 from places outside the Northwest are thought to be substantial, the net effect is to underestimate the total activity consumption that actually occurs in NORS Region 2. The data on activity consumption within MORA is not geographically limited in this way since visitation statistics are compiled on all visitors to the Park. The implications of the effect of this probable underestimation of Region 2 consumption will be discussed later in this report.

4) Calculation of Relative Demand Ratio. A relative demand ratio was calculated for each NORS activity model used to describe MORA recreation activities. First, using the activity resource supply and activity consumption data in Table 2 for each NORS model, visits per acre were calculated for MORA and Region 2, excluding MORA. The results of these calculations are shown in Table 4. Second, visits-per-acre ratios were expressed as a measure of relative demand for each NORS model according to the relationship:

$$\begin{array}{l} \text{Relative Demand} \\ \text{For a NORS} \\ \text{activity} \end{array} = \frac{\text{Region 2 visits/acre}}{\text{MORA visits/acre}}$$

Table 3. Number and percent of visitors who engaged in selected activities at MORA.

MORA Activity	Number of Visitors ¹	Percent Visitors Engaged in Activity ²
Driving to View Scenery	1,034,000	80
Photography	762,575	59
Going to Visitor Center or Museum	749,650	58
Observing Wildlife	607,475	47
Day Hiking-Self Led	568,700	44
Picnicking	387,750	30
Day Hiking-Self Guided Nature Trail	245,575	19
Camping-Developed Site	90,475	7
Camping-Backcountry Site	35,775	3
Winter Camping	12,925	1
Technical Mt. Climbing-Self Led	12,925	1
Bicycling	12,925	1

¹Based on the total MORA visitation of 1,292,500 in 1987

²Percentages are from a survey of MORA visitors by Johnson et al (1990)

This relative demand ratio was used subsequently to modify the supply parameters of the NORS consumption projection models in order to differentiate MORA's contribution to consumption from that in the remainder of Region 2.

5) Calculation of Projected Growth in Activity Consumption. The Tri-State NORS report (Hospodarsky and Lee, 1989) made projections of future recreation activity consumption for Region 2 (including MORA), under three scenario futures for years 2000 and 2010. Similarly, six projections were made subsequently for each MORA activity. These projections for MORA, expressed as cumulative percent growth from the 1987 base year, were made using the modified NORS models appropriate for recreation activities at MORA.

The nine NORS models produced the growth percents for NORS Region 2 including NORA, shown in Table 5. In cases where NORS models were used to model more than one activity, the growth percents in Table 4 are weighted averages of all individual activity consumption projections produced by a model.

It is important to note that all projections of future consumption are predicated on the assumption that the supply and demand of activity opportunities in the years 2000 and 2010

Table 4. Calculation of Relative Demand Ratio.

Activity Model	Visits per Acre (VPA)		Relative Demand (Region 2 VPA/MORA VPA)
	Region 2 (no MORA)	MORA	
DCAMP	1.4106	1.4183	0.9946
PCAMP	0.8555	1.0147	0.8431
SIGHT	89.710*	517,000*	0.1735*
PICNIC	0.9617	6.0881	0.1580
MUSEUM	0.5280	11.7518	0.0449
WILDOB	2.9837	4.3422	0.6871
PHOTO	2.6813	11.9732	0.2239
DHIKE	3.0203	254.9389	0.0118
BIKE	1.6360	0.2026	8.0743

*Ratios are based on visits/facility viz., resorts and tourist accommodations, since this model contained no supply variable measured in acres.

Table 5. Weighted average projected growth in consumption of activities in NORS Region 2 including MORA, associated with various NORS models.

NORS Model	NORS Activity	Scenario & Year					
		LLL		MMO		MMM	
		2000	2010	2000	2010	2000	2010
		Cumulative % growth since 1987					
DCAMP	Recreation Vehicle Camping Tent Camping with Motorized Vehicle	32	62	73	200	75	205
PCAMP	Overnight Camping Along Trails Overnight Camping where are no trails Mountain Climbing	34	66	75	202	79	218
SIGHT	Sightseeing/Train & Bus Touring	37	72	72	187	74	195
PICNIC	Picnicking	45	91	100	274	103	286
MUSEUM	Visiting Interpretive Centers	47	97	109	311	112	322
WILDOB	Nature Study/Wildlife Observation	40	82	93	254	97	271
PHOTO	Outdoor Photography	45	92	100	273	103	284
DHIKE	Day Hiking on Trails	41	82	95	260	101	289
BIKE	Bicycling on Road Bicycling off Road	45	93	114	340	121	372

are proportionately the same between MORA and Region 2 in those future years as they were in 1987, the base line year. That is, under the respective scenarios and points in time, the ratio of supply and demand within MORA and Region 2 does not change.

Specifications of the three scenario futures used in the original NORS modeling are described in Table 6. These scenarios were designed to present a range of possible future conditions of recreation supply and demand, comprehensive enough to give high likelihood to assumptions that true future conditions, and growth percent projections, are described in the analysis. In general, the three scenarios can be described as follows: LLL - demand increasing slowly, net supply decreasing; MMO - demand increasing moderately, net supply constant at 1987 levels; and MMM - demand increasing moderately, net supply increasing moderately.

It is important to the later interpretation of results to understand that levels of demand and supply under each scenario are assumed to pertain to all of Region 2, including MORA. For example, under the MMO scenario supply remains constant for all futures, within all the geographic area that is Region 2; under scenario LLL, supply decreases within all of Region 2, including MORA, at the same rate. This assumption is necessary in lieu of existing demand and supply future projections for the separate geographic areas comprising MORA and Region 2, excluding MORA.

6) Model Modification. Finally, the previously described computation products are used to modify the NORS activity consumption projection models. Modification of the models was undertaken for each scenario for years 2000 and 2010. The results of model modifications revealed Region 2's (excluding MORA) contribution to recreation

Table 6. Parameter conditions for activity consumption projection model scenarios

Scenario	Parameter Condition
L	Percent of households earning \$30,000 or more growing at 1/2 the growth rate calculated in the M scenario for this parameter.
L	Percent of population 12 years or older growing at 1/2 the population growth rate. Percent of population between 18 years and median age growing at 0.8 the population growth rate.
L	Supply of resources declining at 1/4 or 1/2 the population growth rate. ¹
M	Percent of households earning \$30,000 or more growing at the population growth rate as adjusted for employment growth. ²
M	Percent of population 12 years or older growing at the population growth rate. Percent of population between 18 years and median age growing at population growth rate.
M	Supply of resources increasing at 1/2 population growth rate.
M	Same as first listed "M" in scenario, above.
M	Same as second listed "M" in scenario above.
O	Supply of resources constant at 1987 level.

¹Rate of supply decline was determined by the relative permanence of the resource e.g., acres of boating water were decreased at 1/4 the population growth rate; the number of boat ramps were decreased at 1/2 the population growth rate. The more permanent the resource the slower the rate of decline that was applied.

²Census projections of the percent of households earning \$30,000 or more were adjusted by a factor derived from projected employment rates. It was assumed if employment growth exceeded population growth then the resulting percent of households earning \$30,000 or more would be greater than if the employment rate lagged behind population growth.

consumption. These results were subsequently entered into a calculation to determine MORA's contribution to recreation consumption within the region.

As an example, modification of the Region 2 NORS model for picnicking, under scenario LLL, in the year 2000, yielded the following results:

NORS Model - PICNIC (NORS Region 2)

$$15.33420 \text{ (LN)} = 8.74481 + .0485683 (27.563) + .128083 (18.11) \\ (4,566,225\text{ex}) \\ + .00000121032 (2,767,470) - .068562 (9.044) \\ + .00000517983 (39110.3)$$

$$\text{Projected Activity Consumption} = 15.3340 \text{ LN}$$

where: Intercept = 8.74481
 Percent of households earning \geq \$30,000 = 27.563
 Percent population between 18 and median age = 18.11
 Population \geq 12 years of age = 2,767,470
 Resource supply availability constant = 9.044
 Resource supply viz., = 39110.3
 - fed land < 1/2 mi rd.
 - state land < 1/2 mi rd.
 - acres state land open to rec.
 All other numbers are regression coefficients

NORS Model - PICNIC (NORS Region 2) - Supply variable parameter adjusted by Relative Demand Coefficient of 0.1580 (Table 4)

$$\text{LN } 15.16365 = 8.74481 + .0485683 (27.563) + .128083 (18.11) \\ (3,850,249\text{ex}) \\ + .00000121032 (2,767,470) - .068562 (9.044) \\ - .00000517983 (39110.3) (0.1580)$$

The ratio of the predicted number of trips from the two equations is:

$$\frac{3,850,249}{4,556,225} = 0.8432$$

which is the factor by which the activity consumption growth percent for Region 2, year 2000, under Scenario LLL (45% in Table 5) is to be adjusted. Thusly, 0.8432 (45%) = 37.944% which is the projected growth in consumption of trips taken for Picnicking in Region 2, exclusive of MORA.

To determine MORA's contribution to the overall growth of picnicking within Region 2, begin with the following equation:

$$C_N P_N + C_P P_P = P_R$$

where:

C_N = proportion of consumption that occurs in Region 2, excluding MORA

P_N = projected growth in consumption in Region 2, excluding MORA (%)

C_P = proportion of consumption that occurs in MORA

P_P = projected growth in consumption in MORA (%)

P_R = projected growth in consumption in Region 2, overall (%)

The unknown to solve for is P_P . So,

$$P_P = \frac{P_R - C_N P_N}{C_P}$$

Testing this for the Picnicking LLL scenario where:

$$P_R = 45\% \text{ (from Table 5)}$$

$$C_N = 3,148,772 / 3,536,522 = 0.8704 \text{ (from Table 2)}$$

$$P_N = 37.9\% \text{ (calculated above)}$$

$$C_P = 387,750 / 3,536,522 = 0.1096 \text{ (from Table 2)}$$

Thus,

$$P_p = \frac{45 - (0.8904)(37.94)}{0.1096} = 102\%$$

The solution to the equation is 102%. Thus, cumulative growth in picnicking consumption for all of Region 2 is projected to be 45% by the year 2000 under the LLL scenario. That part of overall Region 2 growth attributable to recreation opportunities within MORA is the result of a 102% projected increase in activity consumption; while the remainder of the region (excluding MORA) contributes with a projected increase of about 38%. A similar procedure was followed in making calculations for all the other activities, years, and scenarios modeled.

Results

The results of the aforementioned procedure for making future activity consumption projections for MORA and the surrounding region are shown in Table 7. This table also shows the projections made for Region 2 in its entirety, as part of the original NORS analysis. The growth projections in Table 7 represent cumulative growth in activity consumption above the 1987 base consumption level.

Figure 2 displays the results in Table 7, graphically. The graphs facilitate comparisons of projected growth in activity consumption within MORA and NORS Region 2, excluding MORA, for the various activities, scenarios, and time periods. Figure 2 shows MORA activities described with NORS models PCAMP, PICNIC, PHOTO, and DHIKE, are projected to incur large increases in consumption within MORA, compared to that within the surrounding region. In contrast the activities described by the DCAMP model are projected

Table 7. Cumulative percent growth in activity consumption from 1987 base.

Activity Model	Scenario								
	LLL			MMO			MMM		
	MORA	Region 2 (no MORA)	Region 2 (all)	MORA	Region 2 (no MORA)	Region 2 (all)	MORA	Region 2 (no MORA)	Region 2 (all)
Year 2000 (cumulative growth %)									
DCAMP	32	32	32	75	73	73	77	75	75
PCAMP	105	32	34	239	71	75	269	75	79
SIGHT	45	35	37	88	69	72	92	71	74
PICNIC	102	38	45	234	83	100	253	85	103
MUSEUM	56	41	47	132	94	109	137	95	112
WILDOB	53	37	40	125	85	93	134	87	97
PHOTO	102	40	45	235	88	100	256	89	103
DHIKE	81	26	41	193	58	95	212	58	101
Year 2010									
DCAMP	68	67	67	205	200	200	210	205	205
PCAMP	198	63	66	645	192	202	784	205	218
SIGHT	86	70	72	228	180	187	246	186	195
PICNIC	202	77	91	643	229	274	733	231	286
MUSEUM	114	86	97	376	267	311	400	270	322
WILDOB	108	75	82	341	231	254	380	242	271
PHOTO	205	82	92	643	241	273	748	244	284
DHIKE	160	52	82	528	157	260	624	160	289

to be consumed at about the same level within MORA and the remainder of Region 2, under all scenarios in future years to 2010. MORA activities described by the models SIGHT, MUSEUM, and WILDOB are projected to incur moderate increases in consumption relative to that in the remainder of Region 2.

Growth in projected consumption of the various activities shown in Figure 2 exhibit consistent trends between scenarios and future years. Under the different scenarios and years the absolute magnitude of projected consumption (cumulative percent growth) changes for each activity model, but the relative magnitude of projections among activities does not change. Recall, from Methods-Procedure 4, a single Relative Demand Ratio was calculated for each activity model. This ratio was subsequently applied as a supply variable coefficient in obtaining consumption projections under all scenarios, in all futures, for an activity (see Methods-Procedure 6). As a result, the activity consumption relationships modeled in NORS for scenarios and years were not altered in this analysis.

The plausibility of the consumption projections can be checked by calculating change in the market share of consumption occurring within MORA and Region 2, excluding MORA. For activities predicted to sustain large increases in consumption, within MORA such as PCAMP, PICNIC, PHOTO, and DHIKE, a large shift in market share may signal problems with the modeling technique. Table 8 shows the market share of consumption of activities within MORA stable or increasing at a moderate rate through time. As a result, the market share calculations do not impugn the face validity of the consumption projections.

Scenario and Growth Percent

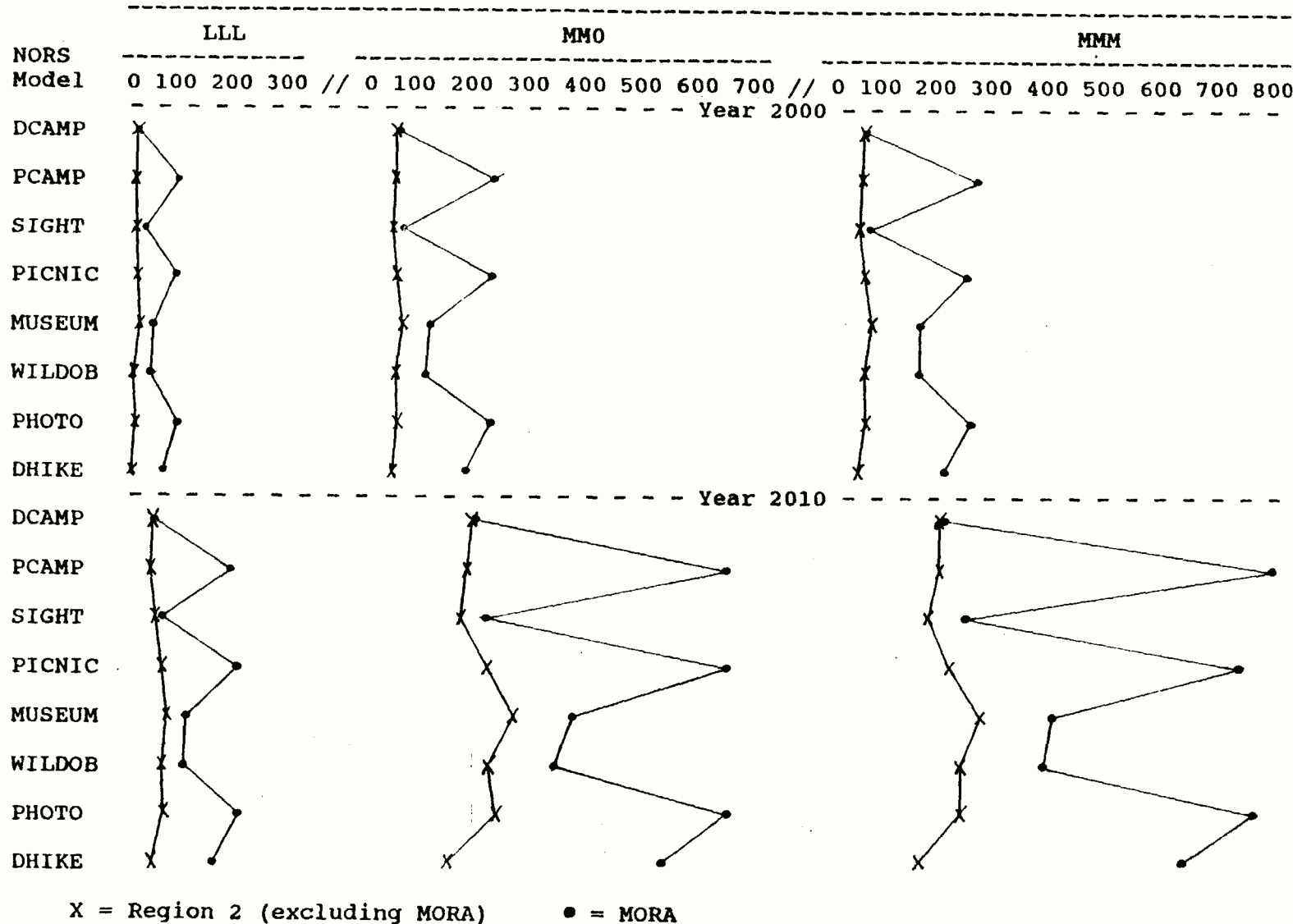


Figure 2. Comparisons of projected growth in activity consumption within MORA and NORS Region 2, excluding MORA.

Table 8. Market share of recreation activity consumption.

Activity Model	Scenario					
	LLL		MMO		MMM	
	MORA	Region 2 (no MORA)	MORA	Region 2 (no MORA)	MORA	Region 2 (no MORA)
Year 1987 (Market Share %)						
DCAMP					2.9	97.1
PCAMP					2.6	97.4
SIGHT					14.5	85.5
PICNIC					11.0	89.0
MUSEUM					40.0	60.0
WILDOB					20.9	79.1
PHOTO					8.0	92.0
DHIKE					27.7	72.3
Year 2000						
DCAMP	2.9	97.1	3.0	97.0	3.0	97.0
PCAMP	3.4	96.6	4.4	95.6	4.6	95.4
SIGHT	15.3	84.7	15.8	84.2	16.0	84.0
PICNIC	15.3	84.7	18.3	81.7	19.1	80.9
MUSEUM	42.4	57.6	44.4	55.6	44.7	55.3
WILDOB	22.9	77.1	24.4	75.6	24.9	75.1
PHOTO	11.1	88.9	13.4	86.6	14.0	86.0
DHIKE	35.5	64.5	41.6	58.4	43.0	57.0
Year 2010						
DCAMP	2.9	97.1	3.0	97.0	3.0	97.0
PCAMP	4.0	96.0	5.6	94.4	6.3	93.7
SIGHT	15.7	84.3	16.6	83.4	17.0	83.0
PICNIC	17.3	82.7	21.8	78.2	23.7	76.3
MUSEUM	43.4	56.6	46.3	53.7	47.4	52.6
WILDOB	23.9	76.1	26.1	73.9	27.1	72.9
PHOTO	12.7	87.3	15.9	84.1	17.6	82.4
DHIKE	39.5	60.5	48.3	51.7	51.1	48.9

The magnitude of differences between activity consumption projected for MORA and Region 2, excluding MORA, can be standardized by computing an activity consumption ratio for the two resource areas. This ratio describes MORA activity consumption as some multiple of the consumption projected for the surrounding region. Table 9 shows standardized growth projected in MORA activities under the three scenarios, in years 2000 and 2010. The activity models used to project activity consumption have been listed in descending order of size of standardized growth.

These rank orders remain the same for years 2000 and 2010, and under scenarios of the same year. MORA activities projected to exhibit larger relative growth are modeled by NORS models PCAMP, DHIKE, PICNIC, and PHOTO. The activities modeled by WILDOB, MUSEUM, SIGHT, and DCAMP are projected to incur increasingly lower-ranked levels of standardized growth, respectively.

Conclusions

The predictive validity of the NORS models following application of EAEV methodology cannot be determined until the time periods for which activity consumption was projected have elapsed. No error predictions or confidence levels for consumption projections could be calculated since the models were unvalidated as they were applied in the EAEV procedure. Thus, evaluation of project results must proceed using less objective measures of product performance.

The validity of the original NORS models and associated data have been evaluated elsewhere (Hospodarsky and lee, 1989b). Evaluation of results of the EAEV procedure can be facilitated through inductions about possible threats to the validity of projects results.

Table 9. MORA projected activity consumption as a ratio of NORS Region 2 - excluding MORA - projected activity consumption.

Activity Model	Scenario					
	LLL	MMO	MMM	LLL	MMO	MMM
	Year 2000			Year 2010		
PCAMP	3.2	3.4	3.6	3.1	3.4	3.8
DHIKE	3.2	3.4	3.6	3.1	3.3	3.9
PICNIC	2.7	2.8	3.0	2.6	2.8	3.2
PHOTO	2.6	2.7	2.8	2.5	2.7	3.0
WILDOB	1.4	1.5	1.5	1.4	1.5	1.6
MUSEUM	1.4	1.4	1.4	1.3	1.4	1.5
SIGHT	1.3	1.3	1.4	1.2	1.3	1.3
DCAMP	1.0	1.0	1.0	1.0	1.0	1.0

Validity threats can be assessed at two levels: at the level of methods, procedures, and assumptions used in making model modifications and subsequent EAEV calculations; and at the final products level when evaluating projections of growth in activity consumption within MORA and the remainder of Region 2.

Two general types of validity concerns are operative in this discussion. At the level of methods, procedures and assumptions used in the EAEV application, construct validity threats are a primary concern. Construct validity refers to the extent to which a measure reflects the intended mental construct or theoretical concept it is supposed to measure. Threats to construct validity can be met only through careful assessment of the measures used in research.

In evaluating the final products of the EAEV procedure, on the other hand, criterion validity becomes the focus of concern. Criterion validity refers to the comparison of the measure to be validated with another called the criterion, which is an adequate indicator of the characteristic to be measured. The criterion validity of the Washington NORS models has been discussed in Hospodarsky and Lee (1989). Since the projections produced by EAEV build directly upon the NORS results, the criterion validity threats to EAEV results are similar to those discussed in 1989.

Threats to construct validity could have been introduced from several sources in the course of applying EAEV. Several assumptions and reasoned judgements were made in conforming the EAEV procedure for application to the NORS models and data.

One threat to the validity of EAEV results would be inaccuracy or incompleteness in the supply and consumption data, which were the basis for developing the relative demand coefficients used to modify the NORS models. These coefficients are a potential source of projection error since they are the arithmetic basis for separation of activity projections for MORA from the remainder of Region 2. As a result, if the supply inventories for MORA and the remainder of Region 2 are inaccurate in a way that misrepresents the proportion of resources in each, then the relative demand coefficient will also reflect the inaccuracy. Inaccuracies in consumption estimates that misrepresent the proportion of consumption within MORA and the surrounding region, would affect EAEV results in a similar way.

The different ways in which the number of recreation visitors to MORA and the surrounding region were estimated, introduced another source of possible error into the EAEV consumption projections. The estimate of MORA visitors in 1987 was based on NPS gate counts of park visitors regardless of origin. Estimates of visitors to NORS Region 2 -

excluding MORA, however, include only visitors whose residence is in Oregon, Washington, and Idaho.

The effect on the EAEV results of using estimates of these distinctly different populations is to lower the relative demand ratio applied to the NORS activity models, raising the MORA consumption projections relative to the surrounding region. If it is assumed, for example, that 80 percent of Region 2 activity consumption is by Pacific Northwest residents, then we might also expect some MORA activity consumption projections to actually be as much as 20 percent lower than the EAEV results indicate.

Another possible validity threat was alluded to in the previous discussion of research methods. Recall that all activity consumption projections assume the supply and demand of activity opportunities stay proportionately equal between MORA and the remainder of Region 2 in all future years. This is undoubtedly a strong assumption to make as inherent differences in land management policies governing the two geographic areas will more certainly differentially alter the supply-demand relationship over time. The magnitude of differential change in resource supply on these two land areas will eventually determine the accuracy of the recreation consumption projections made with EAEV.

The EAEV trend of relatively higher levels of projected activity consumption within MORA compared with the surrounding region, seemed to be consistent with what would be expected of consumption, given the premium placed on National Park recreation experiences. This, in itself, does not support the validity of the EAEV results for drawing conclusions about the recreation behavior of visitors to NORS Region 2. It does indicate that the EAEV procedure yields a fairly uniform response to demand and supply modeled at the sub-state

regional and Park level. The accuracy of this response remains to be confirmed by way of actual consumption in 2000 and 2010.

Implications

This research has implications for two audiences: resource managers seeking useful information with which to plan for and manage future recreation demand; and applied researchers whose charge is providing managers with relevant, accurate decision information, while developing research procedures to facilitate effective inquiry into resource issues.

Management

Surviving all validity threats--including management's face validity evaluation of projected activity consumption growth rates--one implication of study results is clear; MORA managers can expect demand for Park recreation experience opportunities to continue to outpace demand in the surrounding region. Even if projected consumption growth within MORA for primitive camping, day hiking and picnicking are somewhat overstated, relative to activity consumption in the surrounding region, MORA will continue to bear more than its "equivalent" share of use.

Obviously at some elevated level of recreation use MORA resources and other elements of the recreation experience will exceed acceptable limits of change. This point would likely be reached well before the full increase in consumption projected for many MORA activities is achieved. In fact, vigilant managers would undoubtedly take action to reduce resource impacts long before potential consumption growth is realized. Such

management actions might include limitation of visitors engaged in specific activities, in certain geographic locations within the Park.

Any management activities within MORA--or the surrounding region--that change the relative, effective amount of recreation opportunities available, also alter the Park's role in meeting regional demand. The reciprocal relationship between MORA and its surrounding region, described by results of the EAEV procedure, suggest an alternative to the inevitable spiralling recreation use of the Park. It is hardly likely extra-Park resources will ever be the effective equivalent of those within MORA in meeting demand for scenic view-based experiences, for example. After all, MORA is a National Park because it does contain unique vistas of great natural beauty.

This does not mean, however, that desirable opportunities could not be made more available within the region outside the Park, thereby effectively increasing opportunities in the surrounding region relative to MORA. By identifying and marketing to recreationists who may, at times, be satisfied with recreation opportunities of less than national park caliber, some pressure may be removed from Park resources. In this regard the implication of the research suggests the need for greater cooperation between recreation land management agencies at a regional scale in order to more effectively accommodate growing recreation demand. For urban proximate parks like MORA, it is clear no one park or for that matter, a single resource management agency, can hope to accommodate recreation demand generated by a large, fast-growing population.

Research

The implications of results to applied recreation research are tempered by the validity considerations already expressed. In this regard it may suffice to point out the activity consumption projection models, which provided the basis for application of the EAEV procedure, have produced widely accepted and applied result (see Appendix 2 for a list of NORS applications). On this basis we can at least infer their face validity.

The modified EAEV procedure, applied to the NORS model results, is another matter. The procedure is conceptually and mathematically fairly straightforward. If properly conducted using reliable recreation supply and consumption information, the EAEV analysis results should be expected to be as good as those obtained from the original NORS analysis.

Seemingly, the availability of reliable recreation supply and activity consumption data for specific land management units is all that is required to perform similar EAEV procedures for other national parks, national forests, BLM, Corps of Engineers, Bureau of Reclamation and other lands in the Pacific Northwest. For many of these areas, all that would be needed outside the information available from the USDA-FS NORSIS data base would be estimates of current recreation activity consumption. However, before the EAEV procedure receives widespread application in a variety of resource management environments, it should be more thoroughly tested through further applications.

Wider applications of the EAEV procedure to more diverse land areas and activities would require some further revision of the analysis terminology. In the current application, the supply parameter of the NORS sightseeing model was measured in terms of number of resorts and tourist lodgings, rather than as acres of suitable land. The NORS models for some other activities also require measures of supply in units other than acres. For this

reason future applications of the procedure might better be referred to as the effective experience opportunity equivalent, denoting the range of equivalency measures that might be actually used.

The NORS data base, which includes results from the consumption projection modeling, was designed to model current and future recreation behavior for large geographic areas within Oregon, Washington, and Idaho, for the states as a whole and for the Pacific Northwest. In this capacity the data have potential to describe regional outdoor recreation phenomena that may be of particular interest to agencies whose clientele and land management responsibilities transcend political boundaries. Some more general analytic prospects for the NORS data are discussed in Appendix 4.

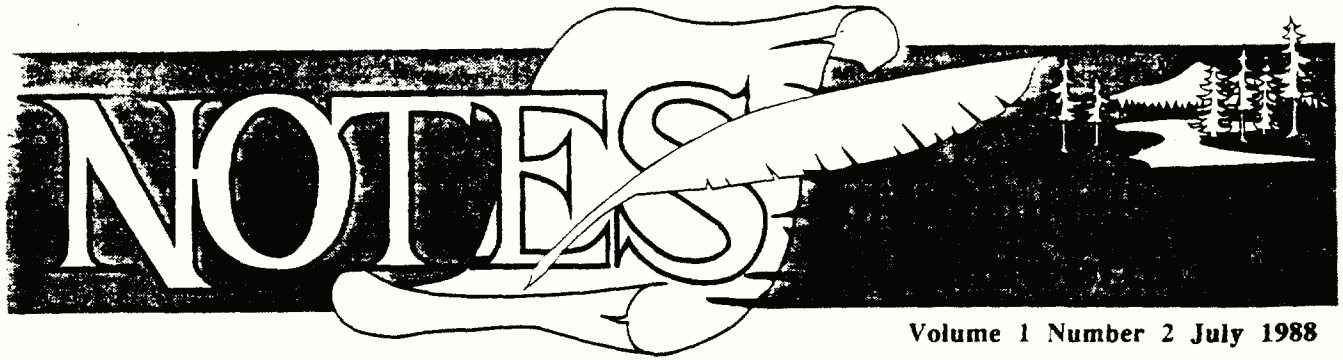
Validation of the EAEV procedure extends the capability of the NORS data to analysis of more localized recreation activities such as those in national parks and forests. As an ad hoc procedure, EAEV lacks the methodological sophistication that might be realized through a priori research designs to assess these localized recreation phenomena. However, the EAEV procedure yields new information from the NORS data, which is in keeping with the original NORS goal of maximizing the usefulness of study results.

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APPENDIX 1

**An Overview of the Pacific Northwest
Outdoor Recreation Study (NORS)**



Volume 1 Number 2 July 1988

Assessing Regional Recreation Patterns: A Cooperative Approach

by Denver Hospodarsky

INTRODUCTION

Outdoor recreation is an important part of the lives of Northwesterners. The relative abundance of natural resources and a cultural history of work and play in the outdoors make outdoor recreation synonymous with the Northwest lifestyle. Everyday in Oregon, Washington, and Idaho people's lives are affected in innumerable ways by the time they spend outside. For many, the most valuable portion of this time is that spent recreating in the natural environment away from the immediate demands of the working world.

While enthusiasm for outdoor recreation is not unique to the Northwest, it plays a vitally important role ensuring the quality of life Northwesterners enjoy. Outdoor recreation is largely a local phenomenon with most activities taking place within an hour or two drive from home. For the majority of people, most of the time, a similarly localized supply of recreation services and facilities provide the recreation experiences people demand. For others less frequently, outdoor recreation activities are pursued outside the local area. Despite their greater dispersion, however, most of these activities continue to take place within the adjoining states that comprise the Northwest region.

Recreation providers in the public and private sectors can enhance the effectiveness of recreation management activities by monitoring the resource demands of their clientele. An agency's or firm's clientele is often diverse from the standpoint of requiring a variety of opportunities in order to obtain the recreational experiences different segments of the clientele desire. Study designs that capture the diversity of the market segments - such as the activities of local/frequent versus distant/infrequent recreationists - provide the information bases for improving current recreation delivery systems and for developing recreation opportunities and new markets for those opportunities.

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Why Notes on People, Parks, and Forests?

The second issue of Notes on People, Parks, and Forests is published with the purpose of the newsletter, which is to provide information to resource managers to consider submitting articles for publication.

Scientists working on natural resource management have a professional obligation to publish their research in professional journals. For managers in land management agencies like the National Park Service and U.S. Forest Service, this provides a measure of the quality of their research as judged by the professional peers of the field.

These same scientists likewise need an outlet to synthesize their work, focusing on the practical applications and management relevance for land management.

Notes on People, Parks, and Forests provides researchers and managers this opportunity to share their insights into the nature of social science and its applications to the management of natural and cultural resources. A variety of topics will be covered in coming issues. We are interested in getting your impressions of the journal and welcome your comments and contributions.

If you know of others who'd like to be on our mailing list, let us know.

Marty Lee, Editor

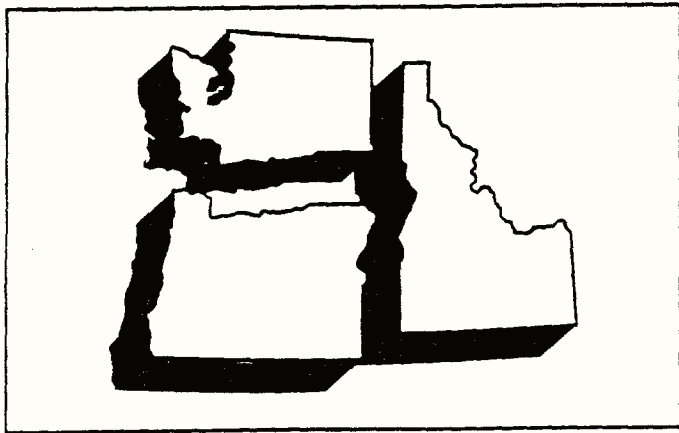
The Regional Recreation Resource System

Public resource management agencies in the Pacific Northwest have a long-standing concern with outdoor recreation within their jurisdictions. City, county, and state parks and recreation departments are charged to provide for the recreational needs of their citizenry. In the past, these agencies have also provided recreational opportunities for non-resident

visitors on a more or less incidental basis. With the growing realization of the economic importance of recreational travel by tourists to the Northwest, providing outdoor recreation opportunities to attract tourists is now receiving increased emphasis in recreation planning and management as well.

Federal agencies, too, recognize the local and regional patterns of recreational use that characterize demand for their diverse and geographically widespread resources. Their response has been to manage the resources in their charge as regional recreation systems that, when considered as a network of interacting parts, meet the diverse recreational needs of their clientele. Now local, state, and federal recreation resource management agencies in the Northwest have recognized the need to work more closely together to develop a more coordinated recreation delivery system. Such a system is to supply a diversity of quality recreation opportunities while increasing the efficiency of delivery to recreationist clients.

The development of an integrated recreation system for the Pacific Northwest requires close coordination among all suppliers of recreation, public and private. Integrated planning and management relies upon accurate estimates of current consumption of recreation activities and reliable projections of future consumption levels in anticipation of future demand. Coupled with inventories of existing services and facilities, use estimates help highlight capital improvement and administrative areas that might prove lacking in the future. An integrated Northwest recreation system can be achieved through analyses such as these that enable individual recreation suppliers to meet the needs of their clientele while contributing to the efficiency of the larger recreation system.



A Partnership Is Formed

The Pacific Northwest Outdoor Recreation Study (NORS) is the public agency response to integrated recreation planning and management. The Study represents a coordinated regional approach to gathering outdoor recreation participation data by State Parks and Recreation agencies in Oregon, Washington, and Idaho, and seven federal resource management agencies with lands in the region. The data gathered in the study provide an overview of recreation participation by residents in the three states. Participation in specific activities is the measurable result of interaction between the social, economic, physical, and man-made resources. These data are central to the par-

ticipating states' respective Statewide Comprehensive Outdoor Recreation Planning (SCORP) processes, part of the Federal Land and Water Conservation Fund state grants program.

It is the responsibility of State Parks and Recreation agencies to manage state-owned recreation resources and to plan for meeting future outdoor recreation demand for the statewide recreation system of private and public resources. Part of this stewardship responsibility involves periodic assessment of current outdoor recreation activities by state residents as part of the SCORP process. Fundamental to SCORP is the survey of state residents to determine current recreation use levels. The demand for certain recreation activities, activity settings, and recreation facilities continues to change. The relative level of demand for these aspects of the recreation experience varies by geographic place, season of the year, the personal and social characteristics of participants, and other factors that characterize distinct groups of recreation consumers. Knowledge of these groups or market segments is necessary to efficiently meet present demand and is, in turn, a necessary base from which to project the future needs of recreationists. This projective function of current use information enables planning outdoor recreation programs, management strategies, and facilities to meet future demand over the SCORP planning horizon.

Tracking recreation trends is another important function of NORS. Previous SCORP surveys provide a history of changing recreation behavior in the Northwest along with a profile of the recreation consumer. When these data are combined with information from the 1986-1987 survey, the resulting data base gives a periodic measure against which to check the accuracy of previous use estimates. Such assessments are useful to improving the methods of determining current recreation use levels while serving as an additional source from which to project future use.

The northwest regional study is intended to provide current recreation participation data from which to base future use projections for the individual participating states and, in aggregate, for the northwest geographic region as a whole. Close coordination among participating states and federal resource management agencies during questionnaire and sample design helped ensure the compatibility and comprehensiveness of data for regional modeling of recreation use.

Interagency Cooperation in Action

The hallmark of NORS is the cooperative effort by participating state and federal agencies. The project goal is to obtain representative recreation use data of practical significance to private, local, state, and federal recreation resource managers. Planning toward this goal began in 1985 with the formation of the Pacific Northwest Regional Recreation Committee (NWRRC). The NWRRC was formed to bring together public agency managers with jurisdiction over recreation resources within the region. Three state and seven federal agencies are active members of NWRRC: Oregon State Parks Department, Washington State Interagency Committee for Outdoor Recreation, Idaho Department of Parks and Recreation, National Parks Service, U.S. Forest Service, Army

Corps of Engineers, Bureau of Reclamation, Bureau of Land Management, U.S. Fish and Wildlife Service, and Soil Conservation Service. These groups along with technical consultants from Oregon State University, Western Washington University and the University of Idaho have worked together closely throughout the project to translate the needs of each participant into the final product.

A technical sub-committee undertook the tasks of study design and implementation. This sub-committee was composed of agency planners and university consultants. Working closely with the entire NWRRC membership, the sub-committee designed the survey sampling plan and questionnaires. The sampling plan and questionnaires underwent extensive review and revision to accommodate the requirements of each member agency. Agencies added survey questions to meet their individual management and planning needs. These questions asked about use of specific sites, use and preference for areas described in terms of the Recreation Opportunity Spectrum (ROS), and the potential of resources as tourism attractions.

Final decisions about the form of study components were arrived at through negotiation by the entire NWRCC membership. The considerable give-and-take of these negotiations was characterized by the spirit of compromise and the quest for creative solutions to enhance the value of the study for each party involved. To this end, maintaining the viability of the cooperative effort became an important part of NORS for many of the participants. The process - and its potential for producing results whose benefit is greater than the sum of the individual agency inputs - came to be perceived as being as valuable as the actual study. As a successful demonstration of interagency cooperation, the study has potential for positive effects beyond the life of the study itself.

RESEARCH DESIGN

Research was conducted in two phases. First, resident outdoor recreation surveys were administered in Oregon, Washington, and Idaho. These surveys obtained current-use information from which to base future use projections for the second project phase. In the second phase now underway, the consumption of outdoor recreation activities is to be projected through the year 2010. Activity projections are being made using regression models to forecast the consumption of trips taken for activities from a geographic area comprised of various numbers of contiguous counties within a state.

The resident surveys used a sequential combination of telephone and mail survey methods to estimate current outdoor recreation consumption. The design was chosen to balance among sampling considerations, survey costs, and questionnaire complexity. A combination of telephone and mail surveys allowed the use of telephone directories, a readily accessible and inexpensive sampling frame. The initial telephone contact with respondents also served the important functions of building credibility and commitment with respondents who were asked to subsequently complete a mail questionnaire. The mail survey method was chosen as the best way to obtain

answers to the complex questions about activity participation asked of respondents. The same versions of the questionnaires were used by all three states to ensure the comparability of responses throughout the region.

The two-stage telephone and mail survey method required a rather complex research design. Specification of the telephone survey sample size was based on expected response rates to both the telephone and the mail surveys. Because of these considerations, the mail survey was designed to be a dependent sub-sample of the telephone survey sample. The mail questionnaire was to be the primary data-gathering instrument and was designed to elicit detailed responses about a variety of recreation behaviors and related attitudes including those pertaining to tourism and tourism development.

Survey Methods

Residents, 18 years old and older, who lived in households with telephones, were sampled over a year's time in each state. Two states, Washington and Idaho, drew three independent samples to correspond with seasonal recreation activity patterns. Oregon drew independent samples each month over the course of the NORS survey period from June 1986 through May, 1987. The independent monthly samples can be aggregated for any desired time period including seasonal analyses.

Calls were made to a systematically selected sample of households in counties selected for sampling with probability proportionate to population. Calls reaching respondents took about 8 minutes to complete. Mail questionnaires were sent to all households completing a telephone questionnaire. A reminder postcard was sent to all respondents and a second questionnaire was sent to individuals who continued not to respond. Response rates for the telephone and mail surveys varied by state: the telephone survey response rate ranged from 60-70 percent while 55-72 percent of the mail survey sample returned questionnaires.

Recreation Consumption Modeling

Phase two of NORS - activity consumption modeling - is currently underway and scheduled for completion in March 1989. The projections produced by modeling of activities will be used by SCORP and other planners to anticipate future recreation demand in the northwest region. Projections of consumption of 52 activities will be made at several points in time for various conditions of demand and supply, to compare effects on the consumption of activities. Estimates of current activity consumption derived from the NORS survey data will serve as baselines from which to project future levels of activity consumption.

A demonstration project already completed, was successful in exhibiting the potential of the national-level consumption models for localized use. The methods used in the demonstration project are also being used in the full-scale modeling study in progress. Sub-state regional projections of consumption of recreation activities are being made for the states using U.S. Forest Service projection models (REC-PRO). The basic structure of the models for each activity de-

lines trips consumed as a function of socio-demographic demand shifters and measures of pertinent recreation supply and substitute supply opportunities. Modification of the REC-PRO models consists of substituting county-level socio-demographic and supply model parameters for the national average values used in the original Forest Service version of the models. The parameter values substituted are obtained from State Census projections and extrapolations where alternate data sources are lacking. Alternative scenarios of activity consumption are constructed by substituting model parameter values for various possible rates of change in population, household income, and supply over time.

IMPLICATIONS

The general implications of the study relate to the fact that most recreation visitors in the northwest are from regionally contiguous points-of-origin. Regional recreation use data, therefore, has enhanced potential for state and federal resource management and planning functions. The greatest potential uses of regional recreation data involve identification of recreation activity and regional travel patterns and trends. These data have application for:

1) determining the interrelatedness of recreation sites as these sites represent multiple destinations in an individual's overall recreation itinerary. Gaps or redundancies in visitor services at various sites may become evident when the overall visitor experience is considered within the context of the recreation system;

2) determining the interrelatedness of individual sites as parts of a regional recreation system allows for the selective promotion of lesser-used areas, thereby directing use away from more popular areas in the same region;

3) determining if differences exist in recreation patterns among states or for regions within a state, and whether these differences are reflected in visitation to certain recreation areas e.g., does a site have a local or more regional clientele?;

4) determining if certain "types" of people visit certain types of recreation areas, e.g., areas managed for historical versus natural values;

5) providing baseline data for the projection of future recreation demand. From this baseline, the effect of demographic and leisure trends such as those toward shorter vacations and regional travel closer to home can be assessed;

6) providing data for the continuing assessment of recreation trends affecting National Park Service, U.S. Forest Service, and other federal land management agencies in the Northwest. Coupled with recreation use data from previous SCORP surveys, the current survey data continues to provide a check on the accuracy of previous use estimates and is an additional source from which to make use projections;

7) determining the type and extent of recreation use of Federal as compared with state and local resources;

8) providing data for anticipating and ameliorating the on-site impacts of visitation resulting from state and regional tourism promotions that are increasingly common in the Northwest. Prior knowledge of the site effects of promotional campaigns allows recreation management agencies the opportunity to assume a collaborative role with economic development organizations in planning promotions that minimally conflict with or enhance resource management objectives; and

9) increasing the efficiency of the individual states' SCORP analyses by incorporating the economies of regional scale in survey design and implementation.

The findings of NORS will be the topic of a future issue of NOTES.

NOTES on People, Parks and Forests

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APPENDIX 2

Some Applications of the NORS Data

- * Statewide comprehensive outdoor recreation plans (SCORPs) - Oregon, Washington, and Idaho
- * Recreation market segmentation analysis - Siuslaw, Gifford Pinchot, Deschutes National Forests and the City of Astoria, Oregon
- * Oregon Coast recreation promotion campaign - Oregon Coast Association
- * Columbia River Gorge National Scenic Area planning - Columbia River Gorge Commission
- * Hanford Reach of the Columbia River use study - U.S. Department of Energy
- * U.S Forest Service recreation facilities and program planning - various National Forests in Oregon, Washington, and Idaho
- * Revision of Land and Resource Management Plans - Bureau of Land Management, Oregon
- * Revision of Project Operations Plans and review of dam re-licensing applications - Army Corps of Engineers
- * Review of National Forest Management Plans for Oregon - Oregon State Parks Department
- * Assessment of the economic impacts of future recreation on the Mt. Hood National Forest, Oregon - USFS and Oregon State University
- * Tourism and economic development planning in Oregon and Washington - various private consultants
- * National Wild and Scenic Rivers review and planning - USFS, NPS, BLM
- * Mt. Hood Meadows ski area expansion environmental impact assessment - Mt. Hood Ski Association

APPENDIX 3

**Discussion of the Effective Acreage
Equivalent Method by Marion Clawson**

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APPENDIX 4

NORS Data Analysis Prospectus

Data Analysis Prospectus

The SCORP data base for Oregon, Washington and Idaho contains information on current and projected future recreation behavior. The state data bases are compatible and complimentary to the extent that similar research methodologies were employed within each state to gather the data. The result is models of current and projected future recreation behavior for geographic areas within the three states, for the states as a whole, and for the Pacific Northwest region. It is this potential of the data to describe regional outdoor recreation phenomena that may be of particular interest to agencies like the National Park Service whose clientele and land management responsibilities transcend political boundaries.

The SCORP data have potential for five main areas of application in NPS policy, planning, and management activities. The SCORP data base has applications to augment existing park recreation data bases, provide baseline and longitudinal data for assessing park use trends, describe the interrelationships of parks in the region with regard to visitor use, provide profiles of recreationists-both park users and nonusers-for marketing and other communications to visitors and potential visitors, and anticipate future visitor demands on park recreational resources. A description of how the SCORP data might facilitate these areas of application is what follows.

Augment existing park data bases. Some parks in the Northwest have extensive recreation data bases while others are much less developed. National Parks such as Crater Lake, Mt. Rainier, and North Cascades already have fairly detailed recreation data from research by Darryll Johnson, Gary Machlis, and others. Generally, less is known about visitor use of lesser-used parks in the region. The SCORP data contains information about visitors to these parks (see the attached list of NPS areas included in the data base). For these parks, the SCORP data can provide profiles of visitors with regard to their sociodemographic attributes, recreation activities in general (it does not contain information about recreation behavior specific to the park in question), and the use of and preference for various types of recreation settings (once again, only generally speaking).

Provide baseline and longitudinal data for trend assessment. Statewide Comprehensive Outdoor Recreation Planning is a periodic process in the Northwest as well as elsewhere. The periodic nature of the recreation data obtained in the preparation of SCORPs are useful to document trends in recreation behavior affecting parks. Assessments of these trends become vantage points from which to anticipate future recreation demand for park resources. In order to fully realize the potential of the SCORP data in assessing trends, the data along key variables from previously accumulated SCORP data bases should be identified and relevant data formatted to allow for ready access and interpretation. To this end, the NPS should extract relevant trend

information from the current and past SCORPs in the three states and compile it in an operational data base in line with their management needs. The NPS should also continue as a key player in future SCORP data gathering efforts in order to ensure that subsequent data bases are amenable to longitudinal data analyses.

Describe interrelationships between parks' recreational opportunities. By constructing visitor use profiles from the SCORP data for parks in the region, the interrelatedness of the parks can be assessed with regard to their respective roles in supplying a range of recreation opportunities. Visitors can be described on the basis of whether or not they use multiple or only a few of the parks in the region, and which parks they use. In turn, the parks can be characterized by various criteria such as whether they are historical, cultural, or natural resource based, their proximity to their clientele, and etc. Concurrently, profiles of park visitors can be developed on the basis of sociodemographics, recreation activities, and setting choices and preferences. Considered together, park use patterns and visitor profiles help to reveal relationships between parks in the region with regard to recreation behavior and user characteristics which are useful for planning and management.

Provide recreationists' profiles to focus interpretation, marketing, and information. The SCORP data base can not only provide profiles of visitors to parks but it also describes the resident population that does not use park resources or that uses them little. Once identified, outreach to nonuser publics can serve to broaden and strengthen constituent and funding support from within the agency and externally as well. This may be

especially true of outreach efforts that increase representation of heretofore underrepresented racial and ethnic groups among the NPS clientele. The SCORP data also allow for segmentation of the recreational public in order to focus communications to promote underutilized recreation opportunities or to divert use away from heavily used areas.

Anticipate future demand in the short term. The current SCORP data base contains projections of future recreation activity consumption for Oregon, Washington, and Idaho. These data reveal the recreation activities for which disproportionate changes in future demand are anticipated. By comparing inventories of the parks' recreation opportunities with future consumption projections, relative levels and the types of resource management activities can be anticipated and planned.