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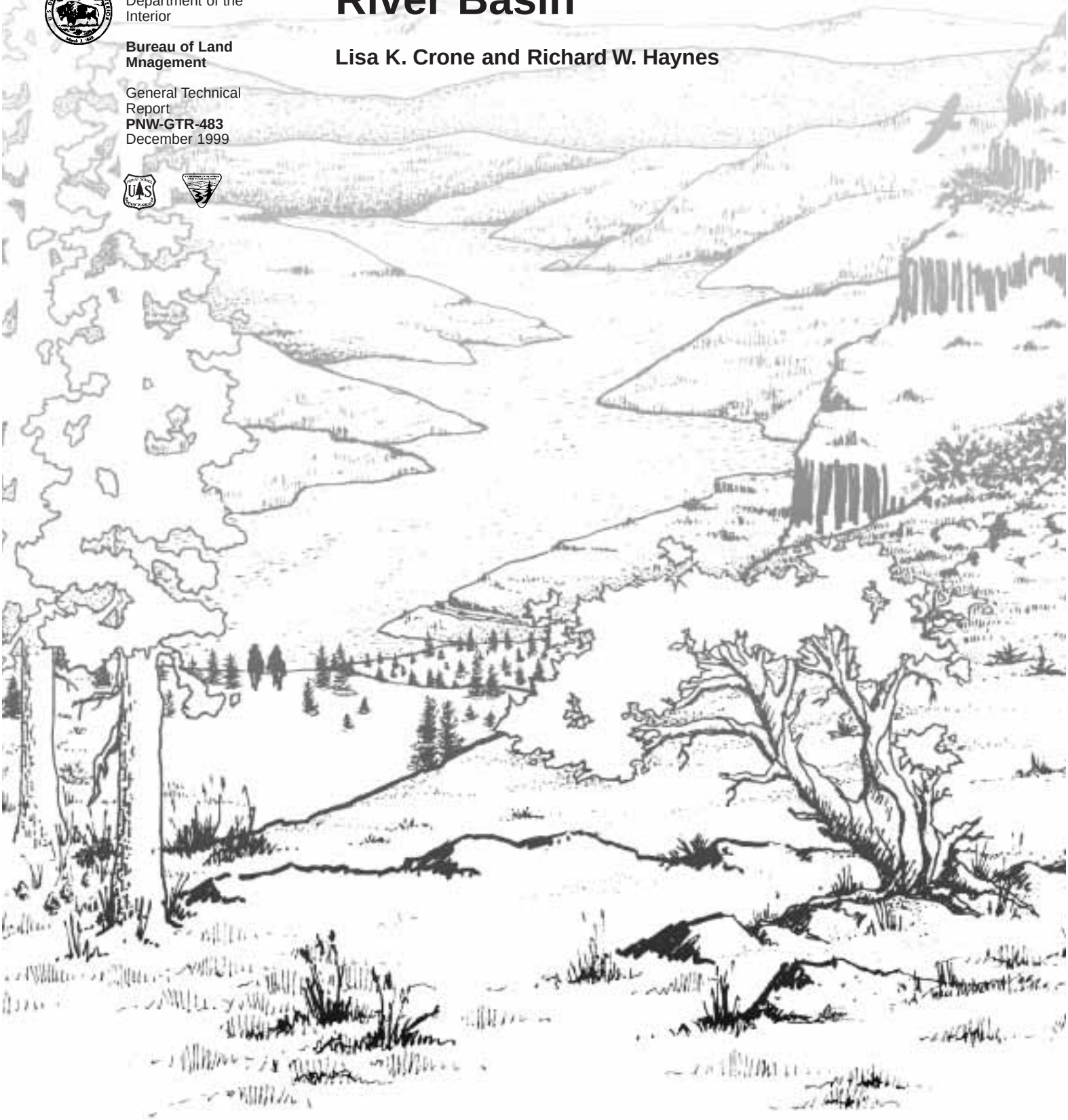
Revised Estimates for Direct-Effect Recreational Jobs in the Interior Columbia River Basin

Lisa K. Crone and Richard W. Haynes



Authors

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Revised Estimates for Direct-Effect Recreational Jobs in the Interior Columbia River Basin

Lisa K. Crone and Richard W. Haynes

Interior Columbia Basin Ecosystem Management Project: Scientific Assessment

Thomas M. Quigley, Editor

U.S. Department of Agriculture
Forest Service
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Preface

The Interior Columbia Basin Ecosystem Management Project was initiated by the Forest Service and the Bureau of Land Management to respond to several critical issues including, but not limited to, forest and rangeland health, anadromous fish concerns, terrestrial species viability concerns, and the recent decline in traditional commodity flows. The charter given to the project was to develop a scientifically sound, ecosystem-based strategy for managing the lands of the Interior Columbia River basin administered by the Forest Service and the Bureau of Land Management. The Science Integration Team was organized to develop a framework for ecosystem management, an assessment of the socioeconomic and biophysical systems in the basin, and an evaluation of alternative management strategies. This paper is one in a series of papers developed as background material for the framework, assessment, or evaluation of alternatives. It provides more detail than was possible to disclose directly in the primary documents.

The Science Integration Team, although organized functionally, worked hard at integrating the approaches, analyzes, and conclusions. It is the collective effort of team members that provides depth and understanding to the work of the project. The Science Integration Team leadership included deputy team leaders Russel Graham and Sylvia Arbelbide; landscape ecology—Wendel Hann, Paul Hessburg, and Mark Jensen; aquatic—Jim Sedell, Kris Lee, Danny Lee, Jack Williams, and Lynn Decker; economic—Richard Haynes, Amy Horne, and Nick Reyna; social science—Jim Burchfield, Steve McCool, Jon Bumstead; and Stewart Allen; terrestrial—Bruce Marcot, Kurt Nelson, John Lehmkuhl, Richard Holthausen, Randy Hickenbottom, Marty Raphael, and Michael Wisdom; spatial analysis—Becky Gravenmier, John Steffenson, and Andy Wilson.

Thomas M. Quigley
Editor

United States Department of Agriculture

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Interior Columbia Basin Ecosystem Management Project

Abstract

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This paper reviews the methodology used to derive the original estimates for direct employment associated with recreation on Federal lands in the interior Columbia River basin (the basin), and details the changes in methodology and data used to derive new estimates. The new analysis resulted in an estimate of 77,655 direct-effect jobs associated with recreational activities on Federal lands in the basin. This estimate is a little over one-third of the previous estimate. The new estimated direct-effect recreational jobs amount to 4.48 percent of the total estimated jobs in the basin in 1994. This is still slightly larger than the estimated percentage of jobs in ranching, mining, and lumber and wood products combined (3.52 percent) in the basin. The intent of the original analysis is clarified, limitations of the data are brought forward, a cross-sectional analysis is conducted, and suggestions for future research are provided.

Keywords: Recreation, employment, Columbia River basin.

Contents

Introduction

In the economics component of the assessment of ecosystem components (referred to as the "economics assessment;" Haynes and Horne 1997), estimates of the number of jobs directly associated with recreation on Federal lands in the interior Columbia River basin (the basin) and Bureau of Economic Analysis (BEA) functional economic areas (described below) are reported. Many readers of the economics assessment and the draft environmental impact statements (USDA and USDI 1997a, 1997b) felt that the estimates were too high. To address these concerns, a review of the methodology and data used in the analysis was conducted.[1] Based on this review, two steps were taken to improve the estimates: the first was to use a more direct method to allocate recreational visits geographically, and the second was to use more representative expenditure estimates.

This paper presents new direct job estimates based on the revised expenditure estimates and the new method of allocating recreational visits to BEA areas. We begin with a review of the recreational use data and outline the original and new methodology used to spatially allocate the recreational activity. The new expenditure estimates, their sources, and their differences from the original estimates are then presented. Next, we provide a brief overview of what a recreation-response multiplier is, what it measures, and how it is calculated, followed by the original and new estimated direct-effect employment recreation-response multipliers. The intent of the original analysis is clarified and limitations of the data are discussed. The new direct employment estimates are then displayed and analyzed, including a discussion of the sources for differences between the original and new direct employment estimates and an analysis of sources of variation in the new estimates across the BEA areas in the basin. Finally, we offer suggestions for future research.

The methods used for the computation of jobs have been used in past studies of the economic contribution of selected sets of recreational activities (see for example Haynes and others 1992). What differs here is that the selected set of recreational activities are broader than those used in most previous studies. Twelve activities considered representative of the types of recreational activities that occur on Federal lands in the basin were used in this study.

Recreational Visits and Their Geographic Distribution

To estimate the amount of direct employment associated with recreational activity on Federal lands in the interior Columbia River basin, information on recreational use had to be gathered by the project staff. The recreational use estimates were obtained by contractors who contacted every national forest, Bureau of Land Management (BLM) district, national park, and national wildlife refuge site in the project area. For ease, these are referred to as "management units" in this paper. Seventy-five percent of the management units solicited in the project area provided data on estimated use for this study. The management units that did not respond were given null values for visits.[2]

The information was standardized and compiled, and the average of the reported use data for 1991, 1992, and 1993 was calculated. This averaging was done to decrease the bias of using a single year when lower or higher use levels might have occurred owing to external influences, such as weather conditions or gas prices. The data were

[1] The specific methodology is described in: Horne, Amy. 1997. Calculation of employment supported by recreation activity in the interior Columbia basin. Portland, OR. 2 p. Plus tables. On file with: Interior Columbia Basin Ecosystem Management Project, 112 W. Poplar St., Walla Walla, WA 99362.

[2] These units were given null values because we had no way of estimating their use levels with any degree of accuracy. All tables and analyses were based only on data from the units that reported their recreational use.

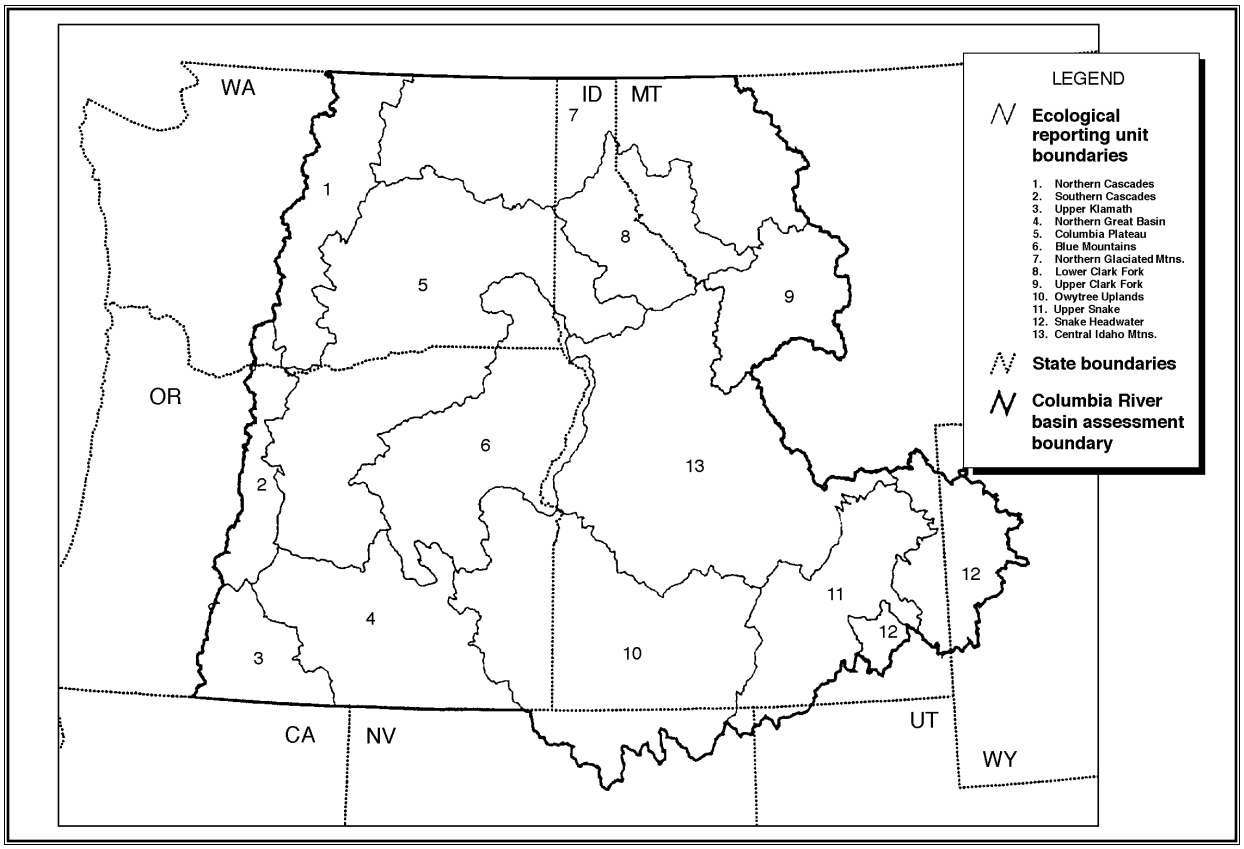

Figure 1—Interior Columbia River basin and ecological reporting units. Source: Interior Columbia Basin Ecosystem Management Project GIS staff.

summarized as the number of visits at each of the management units for each of 12 recreational activities. A visit was defined as an excursion by one individual to a recreation area for the purpose of participating in one or more recreational activities for any length of time. Only the primary activity for the visitor was recorded.[3] The 12 recreational activities measured were camping, day use, fishing, hunting, motorized boating, motorized viewing, nonmotorized boating, off-highway vehicle (OHV) use, snowmobiling, trail use, viewing wildlife, and winter sports.

[3] In the new analysis, adjustments were made to the visitation data for one management unit, the National Bison Range, where it was apparent that visits were being double counted into more than one activity category. A few other minor data errors also were corrected.

Original Methodology for ERU Areas

In the original design of the assessment process, the Science Integration Team divided the basin into 13 geographic areas called ecological reporting units (ERUs) as shown in figure 1. The ERUs were developed by the aquatic, landscape ecology, and terrestrial staff to facilitate the analysis and presentation of information and results on areas smaller than the entire basin. These ERUs are regions in which lands have similar capacities to produce various ecosystem goods, functions, and conditions. As part of the integrative approach, the original recreation methodology focused on determining the amount of estimated recreational activity occurring in each ERU. The percentage of each management unit in each ERU was obtained

Table 1—Regional economies of the interior Columbia basin, by BEA[a] area

Area	BEA area	Coverage of BEA area[b]	Counties included
Boise	Boise	Full	OR: Harney, Malheur ID: Ada, Adams, Boise, Canyon, Elmore, Owyhee, Payette, Valley, Washington
Butte	Butte	Partial	MT: Deer Lodge, Granite, Lewis and Clark, Powell, Silverbow
Idaho Falls	Idaho Falls	Full plus	ID: Bannock, Bingham, part of Bonneville, Butte, Caribou, Clark, Custer, Fremont, Jefferson, Lemhi, Madison, Power, Teton WY: Teton
Missoula	Missoula	Full	MT: Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli, Sanders
Pendleton	Pendleton	Full	WA: Columbia, Walla Walla. OR: Baker, Gilliam, Grant, Morrow, Umatilla, Union, Wallowa, Wheeler
Bend-Redmond	Portland-Salem	Partial	WA: Klickitat, Skamania OR: Crook, Deschutes, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco
Spokane	Spokane	Full	WA: Asotin, Ferry, Garfield, Lincoln, Pend Oreille, Spokane, Stevens, Whitman ID: Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latah, Lewis, Nez Perce, Shoshone
Tri-Cities	Richland-Kennewick-Pasco	Full	WA: Adams, Benton, Chelan, Douglas, Franklin, Grant, Yakima, Kittitas, Okanogan
Twin Falls	Twin Falls	Full	ID: Blaine, Camas, Cassia, Gooding, Jerome, Lincoln, Minidoka, Twin Falls

[a] BEA = Bureau of Economic Analysis.
[b] Full = regional economy includes all the counties in the BEA area; partial = regional economy does not include every county in the BEA area; full plus = regional economy includes all counties within the BEA area and additional counties.

from the Project Spatial Team. The assumption made was that activities were evenly distributed across each management unit. Thus, for example, camping visits to the Deschutes National Forest, which were estimated to be 362,557, were allocated as follows:

ERU2 = 0.76573 x 362,557 = 277,621
ERU3 = 0.00018 x 362,557 = 65
ERU4 = 0.1241 x 362,557 = 44,993
ERU5 = 0.10999 x 362,557 = 39,878

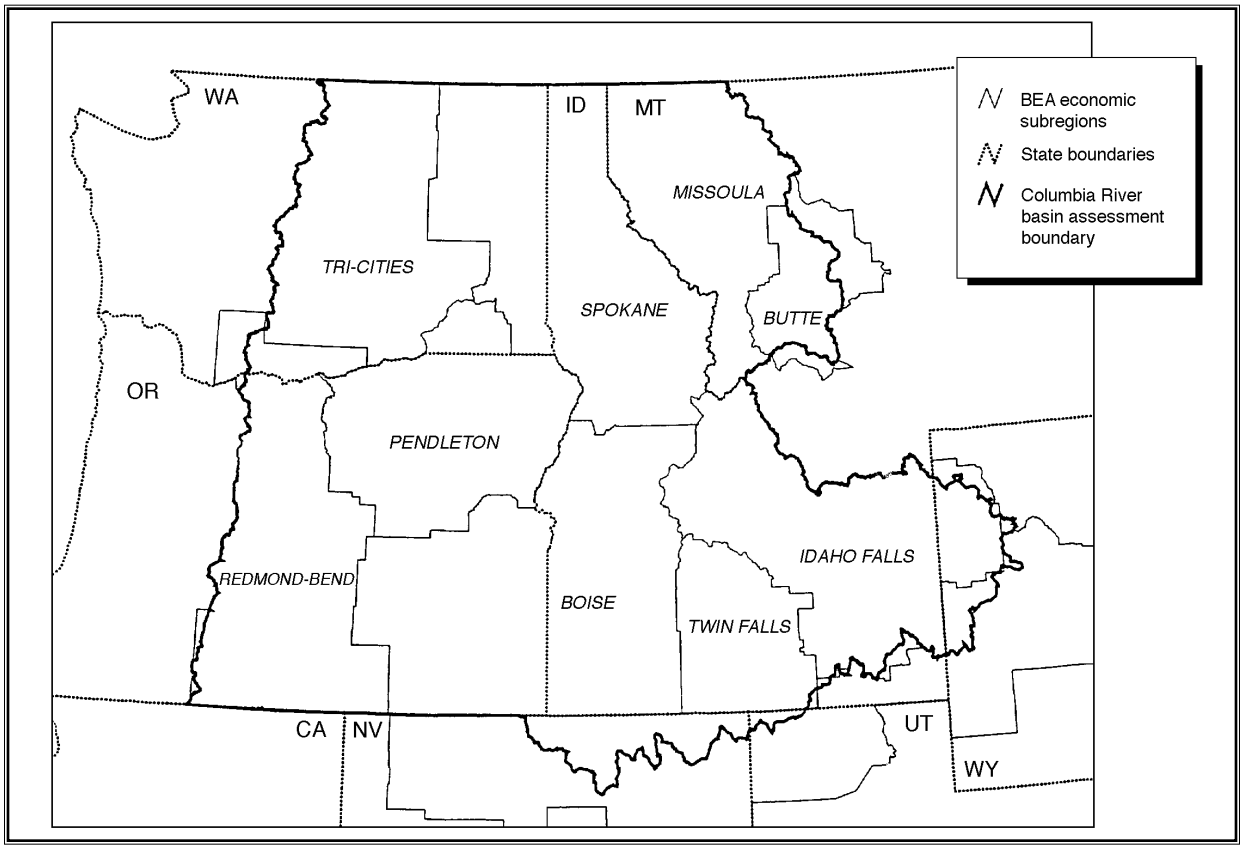

Figure 2—Interior Columbia River basin and Bureau of Economic Analysis areas. Source: Interior Columbia Basin Ecosystem Management Project GIS staff.

Visits in each ERU were then summed across all management units having some portion of their land base within that ERU.

In the economics assessment, economic activities were geographically described by using the BEA definition of functional economies.[4] A functional economy is one large enough to include the bulk of economic transactions or flows of trade. The BEA defined functional economic units by identifying economic nodes and the surrounding counties economically linked to them. For this analysis, the BEA areas were modified to include only those counties fully or partially contained wihin the basin. Table 1 describes the extent of each regional economy and compares regional definitions used in this study to the BEA functional economic areas (U.S. Department of Commerce 1995). A map of the basin and BEA areas is shown in figure 2.

Visits by ERU were converted into visits by BEA area. To do this, conversion factors were obtained from the Project Spatial Team to show the percentage of Forest Service- and BLM-administered lands in each ERU that lies in each BEA area. Again the assumption was made that recreational activity was evenly distributed across the Forest Service- and BLM-administered lands within each ERU. For example, in the Southern Cascades ERU (2), 0.0032 of the activity was assumed to occur in BEA 1 (Tri-Cities), and 0.9968 in BEA 8 (Bend-Redmond).

[4] For a detailed description of the methodology used by the BEA to delineate these areas, see Johnson (1995). In 1995, the BEA areas were redefined based mainly on new information on commuting patterns.This resulted in the aggregation of the Butte BEA area into the Missoula BEA area. Because the data reported in the economic assessment were based on the previous area definitions, those area definitions were maintained here for consistency.

New Methodology for ERU Areas

Recreational activity for each land management unit again was assumed to be evenly distributed across that unit. The percentage of the management unit in each county was calculated, and that percentage was used to distribute the management unit's recreational visits to each county. These visits then were allocated to the BEA area of which the county was a part. The percentages used to allocate management unit visits to BEA area visits are shown in table 2. The original and new estimated recreational visits to Federal lands for the basin and BEA areas are shown in tables 3 and 4, respectively.[5]

Original Methodology for BEA Areas

In the original analysis, visits were converted into days[6] to be compatible with the direct-effect recreation-response multipliers, which were measured as jobs per thousand days of recreational activity. To convert to days, visits were multiplied by the average length of stay (in days) for each activity. The estimates of average length of stay are presented in table 5. As an example, for camping, one visit would represent an average of 3.71 days. Thus, in the Boise BEA area, which had 893,212 camping visits per year, the conversion to days is:

Days = 893,212 visits x (3.71 days per visit)
= 3,313,816 days.

New Methodology for BEA Areas

The new expenditure estimates for nine activities (hunting, fishing, and wildlife viewing excluded[7]) were measured as spending per person per trip. We assumed that a trip was the same as a visit and thus eliminated the need to use estimates of average length of stay for these nine activities. The new direct-effect recreation-response multipliers were measured in jobs per thousand recreational visits. The procedure used to convert the response multipliers for hunting, fishing, and wildlife viewing from jobs per thousand days to jobs per thousand visits is discussed in the following section.

Expenditure Estimates

The original expenditure estimates were derived from only the CUSTOMER and PARVS surveys[8] conducted within the basin. Due to small sample sizes or location-specific samples, or both, the representativeness of these estimates has been questioned. The new expenditure estimates for nine of the activities (hunting, fishing, and wildlife viewing excepted) came from CUSTOMER and PARVS expenditure data from Forest Service sites across the country. The assumption made here is that expenditures by recreationists at sites outside the project area are similar to expenditures by recreationists at sites within the project area. These new expenditure estimates were provided for four broad activity types rather than for the nine specific activities listed above. The four activity groupings were camping and picnicking (includes camping and day use activities), trail use (includes trail use and nonmotorized boating), mechanized travel (includes motor

(Text continues on page 11.)

[5] Total visits differ in the two tables because of the adjustments noted in footnote 3.

[6] A day refers to a 24-hour period.

[7] The 1991 national survey of fishing, hunting and wildlife-associated recreation (USDI 1993) estimates were used for these activities because these estimates were derived from a sampling technique and statistical methodology that was applied consistently across the lands in the basin.

[8] CUSTOMER is an acronym that stands for customer use and survey techniques for operations, management evaluation, and research. PARVS is an acronym that stands for public area recreation visitors survey. Details on the survey techniques and data sets may be obtained from: USDA Forest Service Outdoor Recreation and Wilderness Research Group, 320 Green St. Athens, GA 30602-2044.

Table 2—Percentages used to allocate management unit visits to BEA[a] areas by management unit

Management unit	BEA allocation by BEA area
	Percent
National Forest System:	
Deschutes	100 Bend-Redmond
Fremont	100 Bend-Redmond
Malheur	80 Pendleton, 20 Boise
Mount Hood	100 Bend-Redmond
Ochoco	51 Bend-Redmond, 27 Boise, 22 Pendleton
Umatilla	90 Pendleton, 10 Spokane
Wallowa-Whitman	100 Pendleton
Colville	100 Spokane
Gifford Pinchot	100 Bend-Redmond
Okanagan	100 Tri-Cities
Wenatchee	100 Tri-Cities
Winema	100 Bend-Redmond
Boise	100 Boise
Caribou	100 Idaho Falls
Challlis	100 Idaho Falls
Clearwater	100 Spokane
Idaho Panhandle	86 Spokane, 14 Missoula
Nez Perce	100 Spokane
Payette	65 Boise, 35 Spokane
Salmon	92 Idaho Falls, 4 Boise, 4 Spokane
Sawtooth	76 Twin Falls, 16 Idaho Falls, 8 Boise
Targhee	100 Idaho Falls
Bitteroot	70 Missoula, 30 Spokane
Deerlodge	100 Butte
Flathead	90 Missoula, 10 Butte
Helena	100 Butte
Kootenai	97.5 Missoula, 2.5 Spokane
Lolo	80 Missoula, 20 Butte
Humboldt	100 Boise
Bridger-Teton	100 Idaho Falls
BLM[b] districts:	
Burns	97.1 Boise, 2.7 Bend-Redmond, 0.2 Pendleton
Lakeview	79 Bend-Redmond, 21 Boise
Prineville	80 Bend-Redmond, 20 Pendleton
Vale	91.4 Boise, 8.4 Pendleton, 0.2 Spokane
Spokane	78 Tri-Cities, 17 Spokane, 5 Bend-Redmond,
Boise	100 Boise
Burley	100 Twin Falls
Coeur d’Alene	100 Spokane

Table 2—Percentages used to allocate management unit visits to BEA[a] areas by management unit (continued)

Management unit	BEA allocation by BEA area
	Percent
Idaho Falls	100 Idaho Falls
Salmon	100 Idaho Falls
Shoshone	100 Twin Falls
Garnet	91 Butte, 9 Missoula
Nevada, all	65 Boise, 35 Twin Falls
National Park Service:	
Crater Lake	100 Bend-Redmond
John Day Fossil Beds	100 Pendleton
Lake Chelan and North Cascades	100 Tri-Cities
Coulee Dam	100 Spokane
Whitman Mission National Historic Site	100 Pendleton
City of Rocks	100 Twin Falls
Craters of the Moon	75 Idaho Falls, 25 Twin Falls
Hagerman Fossil Beds	100 Twin Falls
Nez Perce National Historic Park	100 Spokane
Glacier	100 Missoula
Grant-Kohrs Ranch	100 Butte
Fish and Wildlife Service:	
Klamath Basin	100 Bend-Redmond
Malheur NWR[c]	100 Boise
Columbia NWR	100 Tri-Cities
Conboy Lake	100 Bend-Redmond
Deer Flat NWR	100 Boise
Kootenai	100 Spokane
South East Idaho NWR Complex	66 Twin Falls, 34 Idaho Falls
Lee Metcalf NWR	100 Missoula
National Bison Range	100 Missoula

[a] BEA = Bureau of Economic Analysis.
[b] BLM = Bureau of Land Management.
[c] NWR= National Wildlife Refuge.

Table 3—Original estimated recreational visits to Federal lands for the basin and BEA[a] areas (1991-93 average), by activity

Recreational activity	BEA area									Total basin
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls	
	Number of visits									
Camping	893,212	158,193	1,046,705	954,681	573,370	882,821	1,149,585	921,339	210,011	6,789,917
Day use	1,781,576	472,178	2,973,321	3,236,890	1,066,828	2,501,171	3,550,249	1,388,957	491,478	17,462,508
Fishing	877,076	132,340	850,538	781,316	560,749	968,710	987,831	278,132	236,511	5,673,203
Hunting	490,748	176,174	474,294	553,630	256,421	226,949	590,229	154,106	127,792	3,050,344
Motor boating	328,496	51,355	286,956	483,494	44,698	61,711	454,878	102,516	76,146	1,890,251
Motor viewing	2,350,408	394,588	3,515,045	2,247,798	758,330	2,371,552	3,335,255	3,441,879	550,338	18,965,195
Nonmotor boating	134,576	20,083	311,525	93,320	60,280	421,218	170,498	56,951	25,031	1,293,481
OHV[b] use	308,370	48,266	413,126	194,364	59,230	74,708	338,800	181,919	103,102	1,721,917
Snowmobiling	178,426	97,863	432,835	222,892	74,635	99,023	253,945	137,575	44,166	1,541,360
Trail use	595,418	151,902	1,017,444	738,976	386,781	579,625	875,846	861,180	151,094	5,358,266
Viewing wildlife	150,746	175,167	160,278	340,024	181,344	633,374	231,623	114,438	43,423	2,030,418
Winter sports	899,670	103,074	1,423,247	385,346	481,581	858,272	730,714	569,374	274,440	5,725,718
Total	8,988,724	1,981,132	12,905,225	10,232,732	4,504,248	9,679,134	12,669,453	8,208,365	2,333,564	71,502,577

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicle.

Source: Derived from Haynes and Horne 1997.

Table 4—New estimated recreational visits to Federal lands for the basin and BEA[a] areas (1991-93 average), by activity

Recreational activity	BEA area									Total basin
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls	
	Number of visits									
Camping	985,337	166,316	666,279	855,914	704,173	881,755	1,273,616	889,630	382,221	6,805,241
Day use	2,046,412	606,364	2,431,983	4,030,341	1,252,786	2,256,114	3,385,908	837,665	651,722	17,499,294
Fishing	877,392	177,742	780,286	459,433	491,883	1,278,290	1,168,916	116,603	332,401	5,682,946
Hunting	340,536	264,424	443,529	435,774	312,095	246,718	756,298	95,754	206,197	3,101,325
Motor boating	577,891	52,177	111,166	122,980	48,953	63,916	818,087	22,049	71,998	1,889,216
Motor viewing	4,316,792	603,795	1,781,463	1,681,373	814,556	2,445,429	2,962,801	3,184,284	974,086	18,764,579
Nonmotor boating	148,805	26,222	247,588	78,241	51,035	485,513	222,652	25,315	8,415	1,293,787
OHV[b] use	446,927	84,705	237,224	156,644	60,554	80,854	355,961	166,030	187,228	1,689,897
Snowmobiling	295,141	179,708	325,292	119,186	90,796	102,172	255,060	121,803	53,473	1,776,127
Trail use	621,122	212,057	773,180	668,781	478,334	613,131	888,815	1,176,156	358,607	5,790,183
Viewing wildlife	127,977	50,318	96,825	165,514	154,116	829,720	206,238	51,614	120,944	1,803,267
Winter sports	1,228,730	151,348	805,263	405,536	627,450	902,533	318,280	518,945	773,183	5,731,268
Total	12,013,062	2,575,176	8,700,078	9,179,717	5,086,731	10,186,146	12,612,632	7,205,848	4,120,475	71,679,865

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicle.

Table 5—Estimated average length of stay, original analysis, by activity

Recreational activity	Days
Camping	3.71
Day use	2.96
Hunting	5.13
Fishing	3.14
Motorized boating	4.41
Motorized viewing	2.18
Nonmotorized boating	2.64
OHV[a] use	2.72
Snowmobiling	1.79
Trail use	2.99
Viewing wildlife	2.96
Winter sports	1.66

[a] OHV = off-highway vehicle.

Source: USDA Forest Service, Outdoor Recreation and Wilderness Assessment Group, Southeast Research Station, 320 Green St., Athens, GA 30602-2044.

Table 6—Estimated average spending per person per trip within 50 miles of visited site, for all visitors to Forest Service CUSTOMER and PARVS sites[a]

Expenditure item	Camping, picnicking	Trail use	Mechanized travel	Winter activities
		1993 dollars		
Lodging, private	5.88	6.67	8.76	17.25
Lodging, public	6.26	2.53	3.10	.01
Food	9.57	7.59	8.13	4.84
Beverages	2.32	1.77	1.80	1.01
Restaurants	3.35	5.95	8.00	15.20
Gasoline and oil	6.63	6.32	7.89	2.62
Air fares	1.07	3.02	2.96	.94
Car rental	.07	.18	.17	.01
Other trans.	1.47	2.48	2.82	1.19
Rec. equipment	1.64	1.64	2.69	1.33
Rec. services	1.63	1.46	1.55	6.01
All other	3.13	5.03	4.55	2.44
Total	43.02	44.63	52.42	52.85

[a] CUSTOMER = customer use and survey techniques for operations, management evaluation, and research; PARVS = public area recreation visitors survey.

Source: USDA Forest Service, Outdoor Recreation and Wilderness Assessment Group, Southeast Research Station, 320 Green St., Athens, GA 30602-2044.

Table 7—Estimated average spending per person per day for nonresident and resident wildlife viewers in Idaho, 1991

	Wildlife viewing	
Expenditure item	Nonresident	Resident
	1993 dollars	
Food	11.74	5.14
Lodging	7.29	.53
Package fee	.06	.04
Public transportation	12.03	.02
Private transportation	6.42	5.37
Rentals	.00	.24
Total	37.54	11.34

Source: USDI 1993.

Table 8—Estimated average spending per person per day for nonresident and resident anglers in Idaho, 1991

	Fishing	
Expenditure item	Nonresident	Resident
	1993 dollars	
Food	15.70	5.14
Lodging	6.21	.65
Package fee	.04	.23
Public transportation	7.32	.03
Private transportation	6.28	6.00
Bait	.81	.64
Boat fuel	.54	1.14
Boat launch fees	.01	.05
Boat mooring fees	.86	.77
Guide fees	.16	—
Ice	.37	.38
Rentals	.31	.05
Total	38.74	17.85

Source: USDI 1993.

viewing, OHV use, snowmobiling, and motorized boating), and winter activities (includes winter sports except snowmobiling). The previous response multipliers were based on average expenditures per person per day by residents, where "resident" was defined as a resident of the project area. The new response multipliers are based on average expenditures per person per trip within 50 miles of the visited site for all visitors in the sample. Once again, the assumption was made that the percentages of resident and nonresident recreational visitors to all CUSTOMER and PARVS sites would be representative of these percentages for recreational visitors to Federal sites within the project area. These expenditure profiles (measured in constant 1993 dollars) are shown in table 6.

The new expenditure estimates for hunting, fishing, and wildlife viewing were derived from a 1991 national survey of fishing, hunting, and wildlife-associated recreation conducted by the U.S. Fish and Wildlife Service (USDI 1993). Estimates were given for four types of hunting (big game, small game, migratory bird, and other game), freshwater fishing, and nonconsumptive wildlife recreation (observing, feeding, or photographing fish and other wildlife). Expenditure profiles were reported for each activity for each state in two categories: residents of the state and people who travel to the state (nonresidents) to participate in activities within the state. The expenditures included are only those that are trip related and take place within the state. Average expenditures are reported per person per day. For illustrative purposes, tables 7 to 9 show the average expenditure profiles (in constant 1993 dollars) for these activities for one state, Idaho. Table 10 shows the previous and new total average expenditure estimates per person per visit (in constant 1993 dollars) for each activity.

The estimated number of days for each activity and spender type (e.g., resident big game hunter) also were reported for each state. To estimate the response multipliers, these estimates were used to allocate the percentage of a thousand days that would fall into each category of activity and

Table 9—Estimated average spending per person per day for nonresident and resident hunters in Idaho, 1991

Expenditure item	Nonresident				Resident			
	Big game hunting	Migratory bird hunting	Small game hunting	Other game hunting	Big game hunting	Migratory bird hunting	Small game hunting	Other game hunting
	1993 dollars							
Food	20.11	21.00	14.85	1.67	10.97	7.99	4.94	5.13
Lodging	2.50		2.56		.13			
Package fee	2.23				.01		.15	
Rentals					.65		.05	
Private Transportation	24.28	34.26	15.04	3.33	8.54	9.03	5.51	6.32
Total	49.12	55.27	32.45	5.00	20.30	17.02	10.65	11.45

Source: USDI 1993.

Table 10—Estimated average spending per person per trip by activity

Recreational activity	Original estimate	New estimate
		1993 dollars
Camping	95.79	43.02
Day use	99.22	43.02
Fishing	120.20	29.86,[a] 60.54,[b] 26.11,[c] 21.68[d]
Hunting	667.67	23.56,[a] 58.16,[b] 29.51,[c] 19.82[d]
Motorized boating	125.11	52.42
Motorized viewing	119.38	52.42
Nonmotorized boating	1007.55	44.63
Off-highway vehicle use	27.88	52.42
Snowmobiling	192.60	52.42
Trail use	91.40	44.63
Viewing wildlife	41.82	45.38,[a] 100.74,[b] 35.57[c], 30.31[d]
Winter sports	77.80	52.85

[a] Estimate for Idaho.
[b] Estimate for Montana.
[c] Estimate for Oregon.
[d] Estimate for Washington.

Sources: Original estimates (based on data only from sites in the basin) from USDA, Outdoor Wilderness and Assessment Group, Southeast Research Station, 320 Green St., Athens, GA 30602-2044. Source for new estimates same as original (based on data from sites nationwide) except for hunting, fishing, and wildlife viewing, which were derived from USDI 1993.

spender type for each state. In Idaho, for example, 48.6 percent of the hunting days were estimated to be by resident big game hunters, 6.1 percent by nonresident big game hunters, 10 percent by resident migratory bird hunters, 0.5 percent by nonresident migratory bird hunters, 23 percent by resident small game hunters, 3.5 percent by nonresident small game hunters, 8.2 percent by resident other game hunters, and 0.1 percent by nonresident other game hunters. Some BEA areas included counties from two states. For these BEA areas, the estimated expenditure and activity percentages used were from the state containing the most counties in that BEA area.

Because the response multipliers for these activities were in jobs per thousand days, but the recreational use data was reported in visits, we had to convert the response multipliers to jobs per thousand visits. The 1991 U.S. Fish and Wildlife survey (USDI 1993) reports the estimated average days per trip as well as the estimated number of trips by each activity and spender type. The percentage of trips by each activity and spender type was multiplied by the average days per trip for that activity and spender type. These numbers were summed to derive the overall estimated days per visit for each broad activity category (hunting, fishing, and wildlife viewing). The response multipliers per thousand days were then multiplied by the estimated days per visit to obtain response multipliers per thousand visits.

The assumptions made here were that the statewide estimates of average expenditures, percentage of day, percentage of trips, and average days per trip—by activity and spender type—are representative of these activities on Federal lands in the project area within each state.

Recreation-Response Multipliers[9]

Economic multipliers typically describe the rate of change in one parameter, such as employment or income, with respect to another, such as the demand for a good or service. Input-output (I-O) models include multipliers of this type. The I-O models are systems of multipliers describing the production response (e.g., the response of producers in terms of required labor inputs, earnings, etc.) in an economy to the demand for various goods and services. The I-O models are usually sufficiently detailed in their specifications that it is possible to determine the multiplier for any of several hundred different types of goods and services.

The activity of recreation unfortunately is not and cannot be classified as a particular good or service. Recreation is an activity engaged in by individuals and can be viewed as an activity in which a variety of goods and services are consumed concurrently. Thus, what is required is not a multiplier relating the production response to the demand for a single good or service, but rather an aggregate multiplier relating the production response to the demand for a collection of goods and services. Such aggregate multipliers are referred to as “recreation-response multipliers” and can be derived for units of various recreational activities, which may have different patterns of demand for goods and services.

Multipliers, either for a particular good or aggregate multipliers for recreational activities, also are typically described as being composed of three parts: the direct effect (the rate at which the primary producers of the demanded good or service are affected), the indirect effect (the rate at which the suppliers of primary producers are

[9] This section is based in part on: Alward, Greg. 1997. Methods used to derive the recreation response multipliers for the Columbia River basin ecosystem assessment. Fort Collins, CO: Inventory and Monitoring Institute, USDA Forest Service. 3 p. Plus tables. On file with: Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

affected), and the induced effect (the largest indirect effect and the rate at which worker earnings affect producers). Addition of the three parts of a multiplier yields the total multiplier. For example, if a recreationist purchases a meal at a restaurant, the direct employment effect would be the restaurant labor needed to provide that meal. Indirect employment effects would include the labor needed to produce the other inputs (e.g., fish, electricity, napkins) that the restaurant must purchase to provide the meal. Induced employment effects would include the labor needed to produce the goods and services purchased with the wages paid to the employees of the restaurant, as well as other input suppliers that produced the other items necessary to provide the meal.

Only the direct-effect portions of the aggregate multipliers are reported and used in this analysis. Thus for the restaurant meal example, only the restaurant labor needed to provide the meal is included as direct-effect employment.

Many people were concerned that total effect multipliers were used in the previous analysis: They were not. Some of the confusion may have arisen from the fact that all I-O models use producer prices (those paid at the factory door) but expenditures are measured in purchaser prices (those paid at the retail level). In working with the producer-priced I-O model, the purchaser prices must be assigned back to the producing economic sector. Some sectors keep only a part of each dollar spent and pass the rest directly through to the primary commodity sectors. This process is called margining. The following explanation of margining is excerpted from Minnesota IMPLAN Group, Inc. (MIG; 1997: 93-96):

> Margins represent the difference between producer and purchaser prices. Margining assigns direct expenditures to the correct I-O sectors. It splits a purchaser price into the appropriate producer values, each value impacting a specific industry. Margins allow us to be more specific as to the economic activity triggered by a retail purchase. Only retail stores that buy goods from manufacturers use margins. Any purchases made by consumers from service-oriented stores do not have margins. Service businesses produce the service at the same time it is purchased so there is no mark-up. Eating and drinking establishments also have no margins, producing their consumables at the time of purchase.

An example, from Johnson and others (1995: 20):

> . . . if a recreationist buys a dollar's worth of milk, the grocer may keep a margin of $0.25 to cover business expenses and use the remaining $0.75 to buy milk from the wholesale dealer. The wholesaler may keep $0.25 to cover business expenses but use the remaining $0.50 to buy milk from the local dairy. Therefore, the dollar spent is margined off to three sectors.

The I-O models were estimated for the nine BEA functional regional economies listed in table 1. These I-O models were derived by using the IMPLAN modeling system (e.g., Alward and others 1993, MIG 1997). These models are based on highly detailed economic accounts for the counties within each area. Specifically, the I-O models were constructed from economic data for calendar year 1991.

The direct-effect recreation-response multipliers[10] for employment (full- and part-time jobs) were estimated for each functional regional economy within the basin, for each of 12 recreational activities.[11] The original and new direct-effect recreation-response multipliers for employment for each activity in each BEA area are presented in tables 11 and 12, respectively.[12]

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[10] In strict I-O terminology, the direct effect is not considered a multiplier but a response coefficient. For consistency with earlier documentation (see footnote 7), we use the term "multiplier" here.

[11] These response multipliers were provided by Greg Alward and Susan Winter, USDA Forest Service Inventory and Monitoring Institute, 240 W. Prospect Rd., Fort Collins, CO 80526-2098.

[12] For ease of comparison, the original direct-effect recreation-response multipliers were converted from jobs per thousand days to jobs per thousand visits.

Table 11—Original estimates of recreation-response multipliers for direct-effect jobs for the BEA[a] areas, 1993, by activity

Recreational activity	BEA area								
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls
	Jobs per thousand visits								
Camping	1.86	1.82	2.04	1.95	1.76	1.77	1.64	1.64	2.02
Day use	1.99	1.91	2.20	2.07	1.89	1.88	1.72	1.73	2.19
Fishing	2.82	2.51	2.90	2.66	2.65	2.51	2.35	2.53	2.97
Hunting	15.72	16.09	16.77	16.85	15.24	15.53	13.90	14.22	16.71
Motorized boating	2.52	2.41	2.72	2.54	2.39	2.35	2.13	2.19	2.69
Motorized viewing	2.19	2.06	2.33	2.19	2.07	1.98	1.88	1.88	2.36
Nonmotor boating	22.39	23.00	24.14	24.00	21.30	22.06	20.41	20.35	23.59
OHV[b] use	.46	.44	.51	.46	.47	.43	.39	.40	.51
Snowmobiling	4.44	4.59	4.74	4.60	4.31	4.17	3.91	4.01	4.57
Trail use	2.26	2.26	2.44	2.37	2.08	2.18	2.00	2.02	2.38
Viewing wildlife	.87	.90	.94	.92	.86	.86	.77	.78	.91
Winter sports	2.48	2.39	2.71	2.60	2.31	2.31	2.20	2.19	2.67

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicles.

Source: Derived from Haynes and Horne 1997.

Table 12—New estimates of recreation-response multipliers for direct-effect jobs for the BEA[a] areas, 1993, by activity

Recreational activity	BEA area								
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls
	Jobs per thousand visits								
Camping	1.00	0.89	0.97	0.96	0.88	0.85	0.86	0.83	0.95
Day use	.52	.98	.54	1.02	.73	.71	.48	.51	.53
Fishing	.60	1.44	.62	1.49	.54	.53	.55	.35	.60
Hunting	.45	1.39	.48	1.43	.55	.53	.41	.36	.46
Motor boating	1.39	1.25	1.35	1.34	1.24	1.19	1.20	1.15	1.34
Motor viewing	1.39	1.25	1.35	1.34	1.24	1.19	1.20	1.15	1.34
Nonmotor boating	1.11	1.00	1.08	1.08	.98	.95	.96	.92	1.07
OHV[b] use	1.39	1.25	1.35	1.34	1.24	1.19	1.20	1.15	1.34
Snowmobiling	1.39	1.25	1.35	1.34	1.24	1.19	1.20	1.15	1.34
Trail use	1.11	1.00	1.08	1.08	.98	.95	.96	.92	1.07
Viewing wildlife	.91	1.91	.92	1.98	.83	.78	.82	.59	.92
Winter sports	1.89	1.74	1.83	1.85	1.76	1.68	1.66	1.59	1.83

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicles.

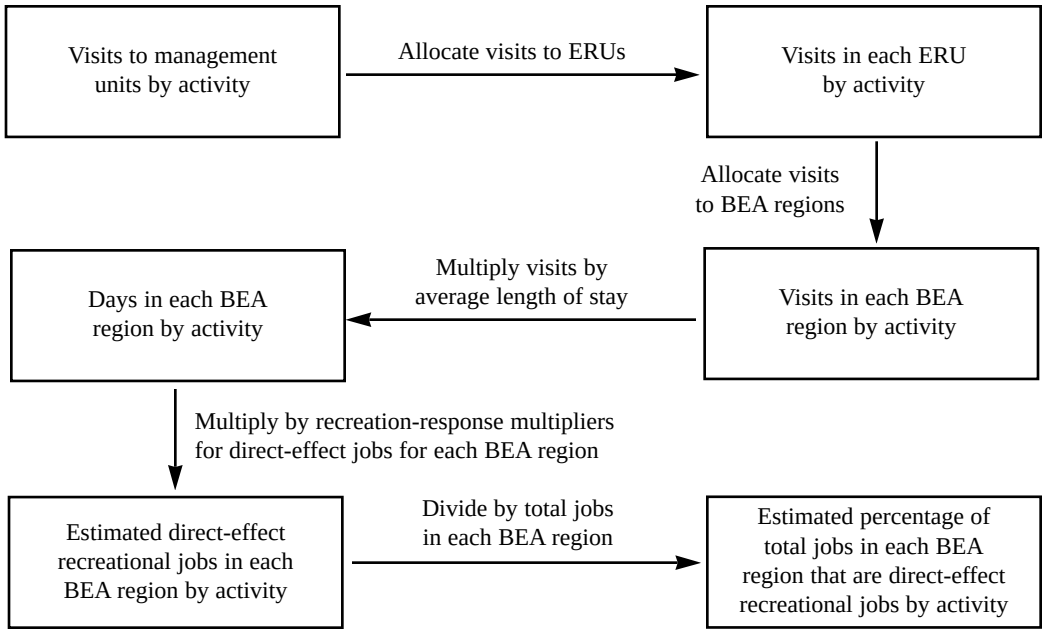

Figure 3—Original methodology for calculating direct-effect recreational jobs. ERU = ecological research unit; BEA = Bureau of Economic Analysis.

Direct Employment Estimates

Original Methodology for Direct-Effect Jobs

To estimate the number of direct-effect jobs associated with recreational activity, the estimated days for each recreational activity in each BEA area were multiplied by the direct-effect response multipliers for each BEA area for each activity (measured in jobs per thousand days in the original analysis).

New Methodology for Direct-Effect Jobs

The new methodology is essentially the same except that the new response multipliers are based on the new expenditure estimates and are measured in jobs per thousand visits.

Original Methodology for Percentage of Economy Associated With Recreation

To calculate the percentage of the economy represented by direct-effect jobs associated with recreational activity on Federal lands, the estimated number of direct-effect recreational jobs was divided by the total number of jobs projected by the BEA in 1995 for each BEA area and multiplied by 100. For example, in the Bend-Redmond area where the BEA projected 122,200 jobs in 1995, the estimated percentage of jobs directly associated with camping was 1.28 percent:

$$1{,}569/122{,}200 \times 100 = 1.28 .$$

New Methodology for Percentage of Economy Associated With Recreation

The new methodology used to calculate the estimated percentage of the economy represented by direct-effect jobs associated with recreational activity on Federal lands is similar to the original

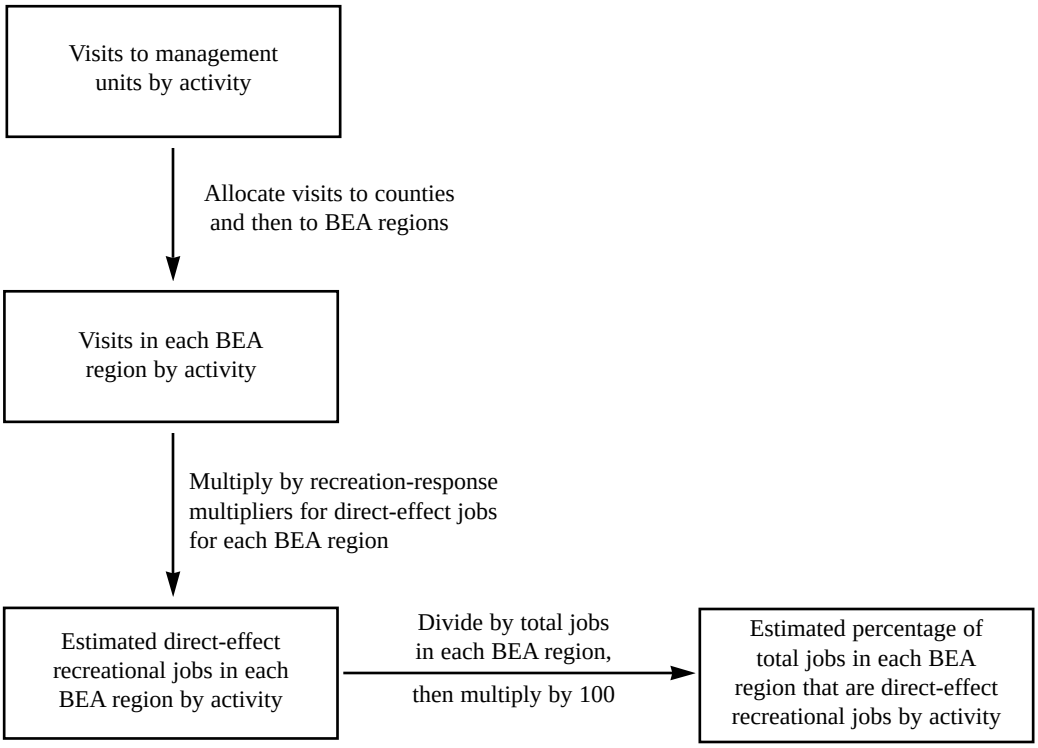

Figure 4—New methodology for calculating direct-effect recreational jobs. BEA = Bureau of Economic Analysis.

methodology, except that actual 1994 total employment figures were used instead of 1995 projected employment figures.[13]

Flow charts summarizing the original and new methodologies used to calculate direct-effect recreational jobs are provided in figures 3 and 4, respectively.

Purpose of the Study

Many readers of the original analysis had a misconception regarding its design and intent. This misconception was that it was an economic base analysis wherein only recreational expenditures representing an inflow of new dollars to the economies of the basin were considered. The actual intent of the analysis was to look at the contribution of expenditures by recreational visitors to Federal lands to economic activity in the area, regardless of whether the expenditures represented an inflow of new money to the area or a recirculation of money already there. This type of analysis has been referred to as both a "contribution analysis"[14] and a "significance analysis."[15]

This contribution analysis was not an attempt to measure the value of recreational activities to the individuals engaging in those activities on Federal lands.

Limitations of the Visitation and Expenditure Data

Given the present state of data collection on recreational use, we cannot specify levels of confidence

[13] These latter figures were used in the earlier analysis because they were available as part of the BEA data sets, and the 1994 figures were not available at that time.

[14] Alward, Greg. 1998. Economic impact analysis. Presentation at national workshop on obtaining recreation values and economic impacts; 1998 March 10-12; [Chattanooga, TN]. On file with: Warnell School of Forest Resources, University of Georgia, Athens, GA 30602.

[15] Stynes, Daniel. 1998. Economic impacts of recreation. Presentation at national workshop on obtaining recreation values and economic impacts; 1998 March 10-12; [Chattanooga, TN]. On file with: Warnell School of Forest Resources, University of Georgia, Athens, GA 30602.

for the accuracy of these data. The reliability of the data may differ by land management agency, by management units within a single agency, and by recreational activity occurring at a single management unit. Visitation data, for example, may be more accurate for controlled and monitored access areas such as national parks, national historic sites, and developed campgrounds. Estimates for activities such as motorized viewing and other forms of dispersed recreation occurring in areas with multiple entry and exit points may rely more on human judgment and thus be less reliable. For increased confidence, future visitation estimates should be generated under statistically valid sampling techniques applied consistently across the basin.

Because the original expenditure estimates were derived from samples subsequently deemed too small or location specific to be representative of recreational expenditures across the basin, the new analysis used a new set of expenditure profiles drawn from larger samples with less location-specific influences. Two new problems accompany these estimates. First, because the new expenditure profiles were derived from the more generalized grouping of recreational activities (i.e., mechanized travel), variations in expenditure patterns and levels among the activities in each group are not revealed. Second, as discussed above, because the surveys used to derive the new expenditure estimates included samples from outside the basin, we must assume that the expenditures by recreationists in those samples are representative of expenditures by recreationists in the basin. In the absence of statistically valid basin-wide expenditure surveys, we cannot determine the accuracy of this assumption.

Results and Discussion

The original and new estimates of direct-effect jobs associated with each recreational activity on Federal lands in each BEA area and for the entire basin are shown in tables 13 and 14, respectively. The original and new estimates of direct-effect recreational jobs as a percentage of total jobs for each BEA area and the basin are presented in tables 15 and 16, respectively. The new estimated percentage of direct-effect recreational jobs along with the estimated percentage of jobs in ranching, lumber and wood products, mining, and natural resources (the previous three categories, combined) for each BEA area and the basin are shown in table 17.[16]

The new estimate of direct-effect jobs associated with recreational activities on Federal lands is a little greater than one-third of the previous estimate. The estimated percentage of total jobs that are direct-effect recreational jobs is still slightly more, however, than the percentage of estimated jobs in natural resources for the entire basin. Previously, estimated direct-effect recreational jobs exceeded estimated natural resource jobs in every BEA area. Now, estimated natural resource jobs exceed estimated direct-effect recreational jobs in the Pendleton, Bend-Redmond, and Spokane BEA areas. Readers should note that the ranching, mining, and wood products job estimates are estimates of *all* jobs in these sectors, not just those stemming from activities on or outputs from Federal lands; and the estimated direct-effect recreational jobs are *not* estimates of *all* jobs associated with outdoor recreational activities, because many of these activities take place on non-Federal lands. Moreover, usage of U.S. Army Corps of Engineer recreational sites was not included, and as noted above, not all the Federal management units solicited provided estimates of their recreational visits.

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[16] These percentages are not directly comparable. The mining and lumber and wood products estimates are based on actual job counts in the Standard Industrial Classification (SIC) categories for these industries. Because there is no SIC category specifically for ranching (a subset of the agriculture and agriculture services categories), that estimate is based on an estimated direct-effect multiplier that relates the number of ranching jobs to the number of animal unit months necessary to support the estimated cattle and sheep inventories in the basin. As discussed above in "Recreation-Response Multipliers," because recreation is an activity in which a variety of goods are consumed, an aggregate multiplier is used to estimate the direct-effect recreational jobs. Although most recreational expenditures typically are concentrated in food, lodging, and transportation purchases, a small portion of direct-effect recreational jobs may occur in the lumber and wood products, mining, and ranching industries because of margining.

Table 13—Original estimates of direct-effect recreational jobs for the basin and BEA[a] areas, 1993, by activity

Recreational activity	BEA area									Total basin
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls	
	Jobs									
Camping	1,664	289	2,136	1,863	1,010	1,569	1,885	1,514	424	12,354
Day use	3,549	900	6,539	6,707	2,018	4,694	6,106	2,401	1,075	33,988
Fishing	2,473	332	2,470	2,080	1,484	2,433	2,326	705	702	15,006
Hunting	7,716	2,835	7,954	9,330	3,908	3,525	8,203	2,191	2,136	47,798
Motorized boating	826	124	780	1,226	107	145	971	225	205	4,607
Motorized viewing	5,139	815	8,176	4,920	1,567	4,705	6,267	6,468	1,299	39,356
Nonmotor boating	3,014	462	7,521	2,239	1,284	9,294	3,481	1,159	590	29,045
OHV[b] use	143	21	209	89	28	32	132	74	53	781
Snowmobiling	792	499	2,053	1,026	322	413	994	552	202	6,803
Trail use	1,344	344	2,479	1,752	804	1,263	1,752	1,741	359	11,838
Viewing wildlife	131	158	151	313	156	546	179	89	40	1,762
Winter sports	2,233	246	3,860	1,001	1,057	1,988	1,611	1,246	732	13,973
Total	29,023	6,974	44,329	32,547	13,745	30,607	33,906	18,365	7,817	217,312

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicles.

Source: Derived from Haynes and Horne 1997.

Table 14—New estimates of direct-effect recreational jobs for the basin and BEA[a] areas, 1993, by activity

Recreational activity	BEA area									Total basin
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls	
	Jobs									
Camping	985	147	645	823	622	749	1,094	734	364	6,163
Day use	2,046	538	2,354	3,877	1,107	1,916	2,909	691	621	16,059
Fishing	525	253	483	686	264	672	638	41	200	3,761
Hunting	155	367	211	622	186	130	311	35	95	2,212
Motorized boating	800	65	150	165	61	76	980	25	96	2,419
Motorized viewing	5,979	753	2,399	2,259	1,012	2,902	3,552	3,662	1,303	23,821
Nonmotor boating	165	26	267	84	50	460	214	23	9	1,298
OHV[b] use	619	106	319	210	75	96	427	191	251	2,294
Snowmobiling	409	224	438	160	113	121	306	140	72	1,982
Trail use	687	212	835	722	469	581	852	1,082	385	5,825
Viewing wildlife	117	96	89	327	127	651	170	30	111	1,718
Winter sports	2,324	263	1,476	749	1,104	1,518	529	825	1,415	10,192
Total	14,811	2,990	9,665	10,684	5,190	9,872	11,981	7,480	4,921	77,665

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicles.

Table 15—Original estimates of direct-effect recreational jobs as a percentage of total jobs in the basin and BEA[a] areas, 1993, by activity

Recreational activity	BEA area									Total basin
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls	
	Percentage of total jobs									
Camping	0.70	0.53	1.47	1.70	1.06	1.28	0.52	0.51	0.56	0.82
Day use	1.49	1.65	4.51	6.14	2.13	3.84	1.68	.80	1.41	2.26
Fishing	1.04	.61	1.70	1.90	1.56	1.99	.64	.24	.92	1.00
Hunting	3.25	5.19	5.49	8.54	4.12	2.88	2.26	.73	2.80	3.18
Motor boating	.35	.23	.54	1.12	.11	.12	.27	.08	.27	.31
Motorized viewing	2.16	1.49	5.64	4.50	1.65	3.85	1.73	2.16	1.70	2.62
Nonmotor boating	1.27	.85	5.19	2.05	1.35	7.61	.96	.39	.77	1.93
OHV[b] use	.06	.04	.14	.08	.03	.03	.04	.02	.07	.05
Snowmobiling	.33	.82	1.42	.94	.34	.34	.27	.18	.26	.45
Trail use	.57	.63	1.71	1.60	.85	1.03	.48	.58	.47	.79
Viewing wildlife	.06	.29	.10	.29	.16	.45	.05	.03	.05	.12
Winter sports	.94	.45	2.66	.92	1.11	1.63	.44	.42	.96	.93
Total	12.22	12.77	30.57	29.78	14.48	25.05	9.35	6.13	10.24	14.47

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicles.

Source: Haynes and Horne 1997.

Table 16—New estimates of direct-effect recreational jobs as a percentage of total jobs in the basin and BEA[a] areas, 1993

Recreational activity	BEA area									Total basin
	Boise	Butte	Idaho Falls	Missoula	Pendleton	Bend-Redmond	Spokane	Tri-Cities	Twin Falls	
	Percentage of total jobs									
Camping	0.34	0.25	0.43	0.62	0.61	0.48	0.26	0.21	0.42	0.36
Day use	.71	.90	1.58	2.92	1.09	1.22	.70	.20	.71	.93
Fishing	.18	.43	.32	.52	.26	.43	.15	.01	.23	.22
Hunting	.05	.62	.14	.47	.18	.08	.08	.01	.11	.12
Motorized boating	.28	.11	.10	.12	.06	.05	.24	.01	.11	.14
Motorized viewing	2.07	1.27	1.61	1.70	1.00	1.85	.86	1.06	1.50	1.37
Nonmotor boating	.06	.04	.18	.06	.05	.29	.05	.01	.01	.07
OHV[b] use	.21	.18	.21	.16	.07	.06	.10	.06	.29	.13
Snowmobiling	.14	.38	.29	.12	.11	.08	.07	.04	.08	.11
Trail use	.24	.36	.56	.54	.46	.37	.21	.44	.44	.34
Viewing wildlife	.04	.16	.06	.25	.13	.42	.04	.01	.13	.10
Winter sports	.80	.44	.99	.56	1.09	.97	.13	.24	1.63	.59
Total	5.12	5.13	6.50	8.04	5.13	6.30	2.89	2.17	5.66	4.48

[a] BEA = Bureau of Economic Analysis.
[b] OHV = off-highway vehicles.

Table 17—Estimated percentage of jobs for each BEA[a] area and the basin, 1994

BEA area	Ranching	Lumber and wood products	Mining	Natural resource	Direct-effect recreation[b]
			Percentage of total jobs		
Boise	1.09	1.82	0.22	3.13	5.12
Butte	.89	.99	1.50	3.39	5.13
Idaho Falls	1.34	.49	.70	2.53	6.50
Missoula	.56	4.14	.31	5.01	8.04
Pendleton	1.82	3.40	.13	5.35	5.13
Bend-Redmond	.96	6.94	.18	8.08	6.30
Spokane	.39	2.69	.40	3.48	2.89
Tri-Cities	.27	.96	.12	1.35	2.17
Twin Falls	2.23	.30	.30	2.83	5.66
Total basin	.82	2.37	.33	3.52	4.48

[a] BEA = Bureau of Economic Analysis.
[b] Based on the estimated direct-effect jobs associated with recreation for the Federal land management units that reported their recreational use data.

Source: Estimates for ranching, lumber and wood products, and mining are from Horne and Haynes (1999) and represent estimates of all jobs in these sectors.

The two recreational activities having the largest decreases in estimated direct-effect jobs were hunting (decreased by 45,686 jobs) and nonmotorized boating (decreased by 27,747 jobs). These large decreases were the result of much smaller estimates of average expenditures per visit for these activities. The estimated number of jobs associated with off-highway vehicle use increased as a result of a larger estimate of average expenditures per visit. Using the original estimates, hunting, motorized viewing, and day use accounted for the largest amounts of the estimated direct-effect jobs associated with recreation. Based on the new estimates, motorized viewing, day use, and winter sports account for the largest amounts of estimated direct-effect jobs associated with recreation.

In the original analysis, the top five BEA areas in total estimated direct-effect jobs associated with recreation on Federal lands were, in descending order, Idaho Falls, Spokane, Missoula, Bend-Redmond, and Boise. In the new analysis, the order is Boise, Spokane, Missoula, Bend-Redmond, and Idaho Falls. The switch in order for Idaho Falls and Boise is primarily the result of the change in methodology used to allocate visits to BEA areas. Total estimated recreational visits in the Idaho Falls BEA area decreased by 4,205,147, and estimated visits to the Boise BEA area increased by 3,024,338. The top four BEA areas in terms of the percentage of total jobs estimated to be direct-effect recreational jobs in the previous analysis were, in descending order, Missoula, Idaho Falls, Bend-Redmond, and Pendleton. In the new analysis the top four are Missoula, Idaho Falls, Bend-Redmond, and Twin Falls.

The BEA area with the largest absolute decrease (34,664 jobs) and percentage of decrease (78 percent) in estimated jobs directly associated with recreation was Idaho Falls; the Twin Falls area

had the smallest absolute decrease (2,896 jobs) and percentage of decrease (37 percent) in jobs. These relative decreases are primarily attributable to the fact that Idaho Falls had the largest percentage of decrease (33 percent) in estimated recreation visits and Twin Falls had the largest percentage of increase (77 percent) in estimated recreation visits with the new visit-allocation methodology.

Debate continues over the current and potential roles of recreation in stimulating economic growth in rural and less diverse regions of the basin. Much of this debate is nested within the larger question regarding the primary determinants in location decisions made by people and businesses. The traditional view is that businesses locate near resources and that people are then attracted to these locations by job opportunities (Richardson 1979); i.e., people follow jobs. An alternative view is that people locate in high-amenity areas based on quality-of-life considerations and that businesses follow in the belief that workers will accept lower wages to remain in high amenity areas; i.e., jobs follow people.[17] Niemi and Whitelaw (1997:31) use the phrase "second paycheck" to represent "the value to residents of the various amenities contributing to the quality of life in the area, including access to social, cultural, and environmental amenities, access they would not enjoy if they lived elsewhere."

Another aspect of this debate centers on the issue of whether jobs associated with recreation provide lower average incomes, offer fewer benefits, and provide less stimulus to economic growth than other types of jobs. Smith (1989) writes in support of this view, and Christensen and Nickerson (1995) offer a contrary view. Although both studies focus on the tourism industry, many of their findings are probably applicable to direct-effect recreational employment.

Because our analysis examined only one—recreational opportunities on Federal land—of the many amenities that may attract people and businesses to an area, and at only a single point in time, it cannot be used to fully address these larger issues. Given the generality and broad-scale nature of our estimates of BEA area direct-effect recreational jobs, these estimates also cannot be used for a detailed analysis of the significance of recreation at the county or local level. A simple linear regression does provide some interesting insights, however, regarding the variation of these estimates across the basin. The dependent variable in this regression, %Recjobs, is the new estimate of direct-effect recreational jobs as a percentage of total jobs in the BEA area. The following variables are included as regressors:

%Federal — The percentage of the total acreage of a BEA area that is National Forest System, Bureau of Land Management, National Park Service, or Fish and Wildlife Service land. [18]

%Rural — The percentage of the 1990 population in a BEA area not classified as urban by the Bureau of the Census. A simplified definition is that urban residents live in places with a population of 2,500 or more.[19]

[17] Writings in support of this latter view, and additional references, can be found in Niemi and Whitelaw 1997, Power 1996, Rasker 1995, Rudzitis and Johansen 1989, and Whitelaw and Niemi 1989. Writings critical of this view include Fawson 1997, Marston 1996, Miller, J.R. 1997,* Polzin and Daubert 1997, and Sommers 1996.

*Miller, J.R. 1997. The growth follows amenities doctrine and the Pacific Northwest. Paper presented at the Pacific Northwest Regional Economic Conference. April 24-26. Spokane, WA.

[18] Derived from county figures in McGinnis 1996, table 2.

[19] Derived from county figures in McGinnis 1996, table 1.

Table 18—Ordinary least squares regression results for BEA[a] area direct-effect recreational jobs

Dependent variable	%Recjobs		
Number of observations	9		
R^2	0.93		
Adjusted R^2	0.88		
Variable	Estimated coefficient	t-statistic	Significance level
Constant	12.7630	2.58	.0496
%Federal	.0772	5.37	.0030
%Rural	.0635	3.38	.0196
Pcapinc	- .0009	- 3.19	.0242

[a] BEA = Bureau of Economic Analysis.

Pcapinc The per capita total personal income in a BEA area in 1992, measured in 1990 dollars.[20] Total personal income includes transfer payments (including Social Security and government retirement payments, medicare and medicaid, unemployment insurance benefits, income maintenance payments [including inkind payments, such as food stamps], and others), property income (dividends, interest, and rent), farm income, and nonfarm earnings.

The results of this regression are given in table 18. The adjusted R-squared indicates that the model explains 88 percent of the variation in %Recjobs for the BEA areas in the basin. The most significant explanatory variable is %Federal (significant at α =0.003 level). This variable has a positive coefficient and can be interpreted as, for a 1-percent increase in BEA area in Federal ownership (as defined above), a 0.077-percent increase in the total jobs in a BEA area that are estimated to be direct-effect recreational jobs, all other things constant. This result is not surprising because %Federal can be viewed as a proxy for the supply of recreational opportunities in the BEA area.

The next most significant variable is %Rural (significant at α =0.020). This variable also has a positive coefficient, which can be interpreted as, for a 1-percent increase in the population in a BEA area classified as rural, a 0.063-percent increase in total jobs in the BEA area that are estimated to be direct-effect recreational jobs, all other things constant. This supports a hypothesis that the more rural the BEA area, the larger the role that recreation may play in the economy of the area.

Finally, the Pcapinc variable is significant at α =0.024. The negative coefficient on this variable can be interpreted as, for a $1.00 increase in per capita income in a BEA area, a 0.0009-percent decrease in total jobs in the BEA area that are estimated to be direct-effect recreational jobs, all other things equal. This suggests that the percentage of jobs in recreation are higher in BEA areas where per capita incomes are lower. The degree that lower per capita incomes may be offset by lower costs of living or larger second paychecks cannot be discerned in the present analysis. Additionally, as mentioned above, because this is a static analysis, the dynamic issue of economic growth cannot be addressed.

[20] Derived from county figures in McGinnis 1996, tables 1 and 9.

Future Research

If a broad-scale assessment of the direct economic activity associated with recreation on Federal lands is undertaken in the future, we offer the following suggestions to improve the reliability of such estimates.

1. Ensure that the recreational visitation data are collected in a consistent and statistically valid manner across management units and agencies. Information on the proportions of resident versus nonresident and local versus nonlocal recreationists is a critical data element.

2. Collect expenditure data by using the same categories and units of measurement in which the recreational data are recorded (e.g., expenditures per primary visit by nonlocal motorized viewing recreationists).

3. Stratify the expenditure survey samples by the estimated visitation proportions. If it is estimated, for example, that 70 percent of the off-highway vehicle users are locals, about 70 percent of the expenditure survey sample for off-highway vehicle use should be locals.

4. Collect visitation and expenditure data with as much geographic specificity as possible, so that expenditures and the resultant associated economic activities are attributed as closely as possible to the areas where they are actually occurring.

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