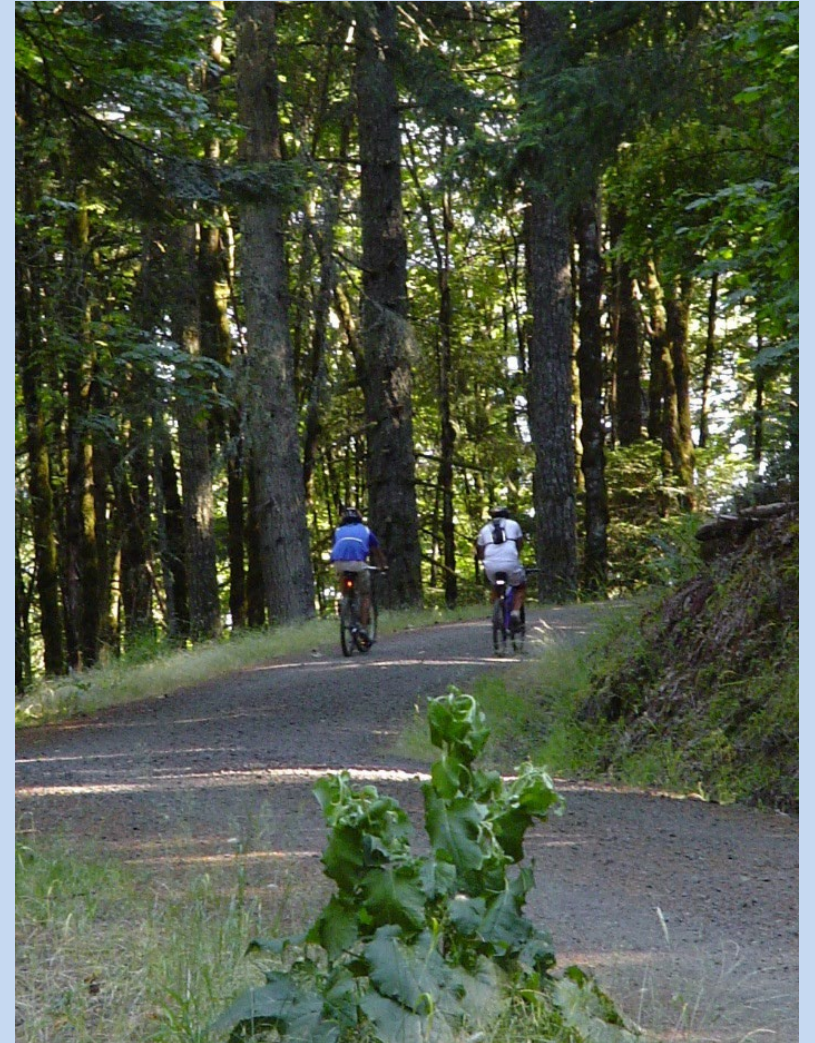
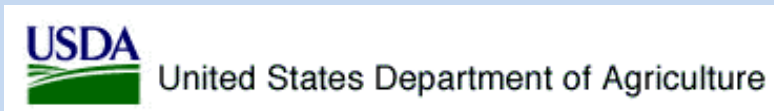


Update of the recreation use values database for estimating outdoor recreation benefits

Jeff Kline

USDA Forest Service
Pacific Northwest
Research Station



Co-authors

Randy Rosenberger
Oregon State University

Eric White and Abigail Kaminski
USDA Forest Service

Funding:

USDA Forest Service
National Center for Natural Resource Economics Research

Characterizing recreation benefits

What activities occur?

How many people do them?

How much do they value their experiences?

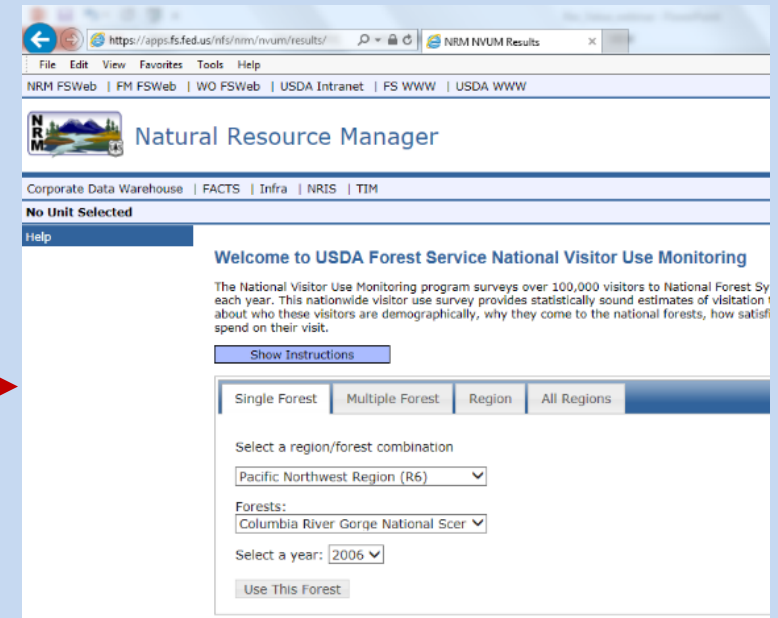
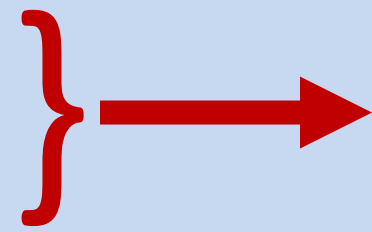


Characterizing recreation benefits

What activities occur?

How many people do them?

How much do they value their experiences?

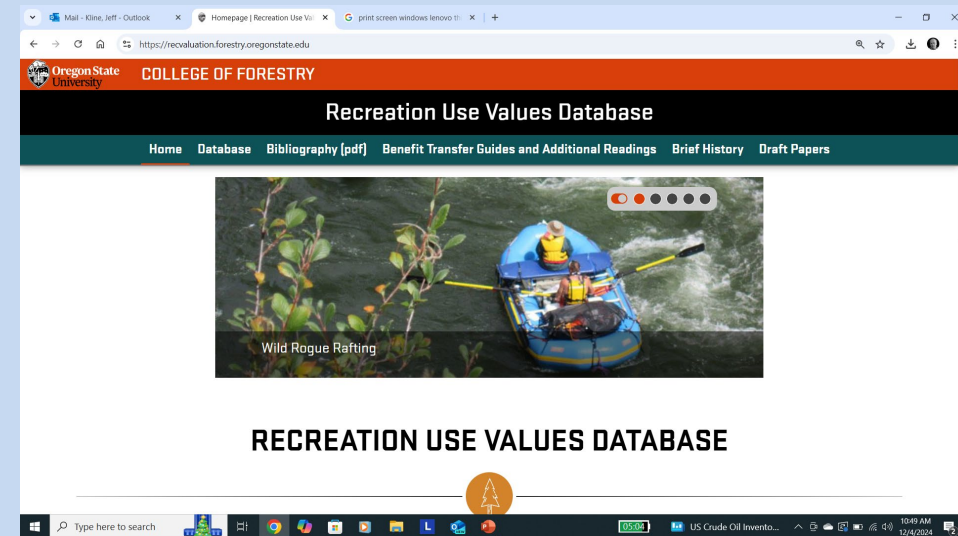
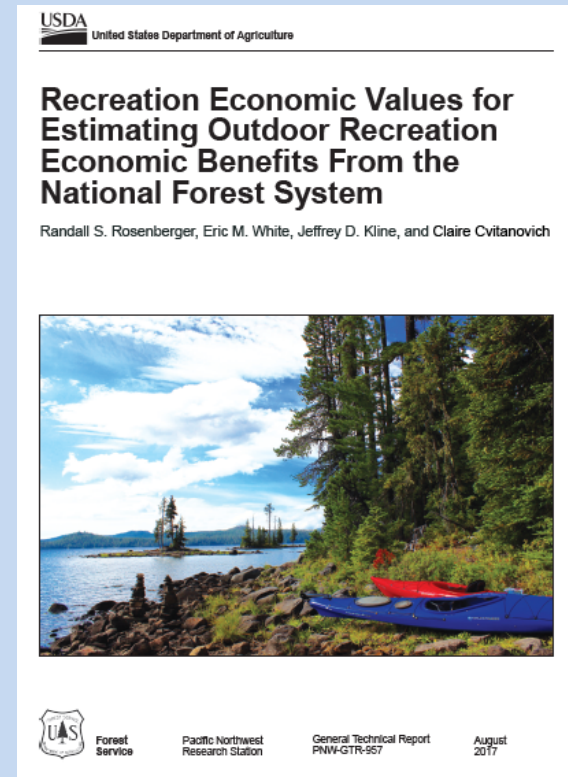


Characterizing recreation benefits

What activities occur?

How many people do them?

How much do they value their experiences?



Need for recreation value estimates

1. Renewable Resources Planning Act requirements;
2. Forest planning rule issued in 2012 by USDA Forest Service requiring identification and evaluation of ecosystem services;
3. Report to Congress and the public about the services and benefits of National Forest management;
4. Provide resource for other agencies, organizations, and private entities to develop recreation benefit estimates.



Recreation Use Values Database

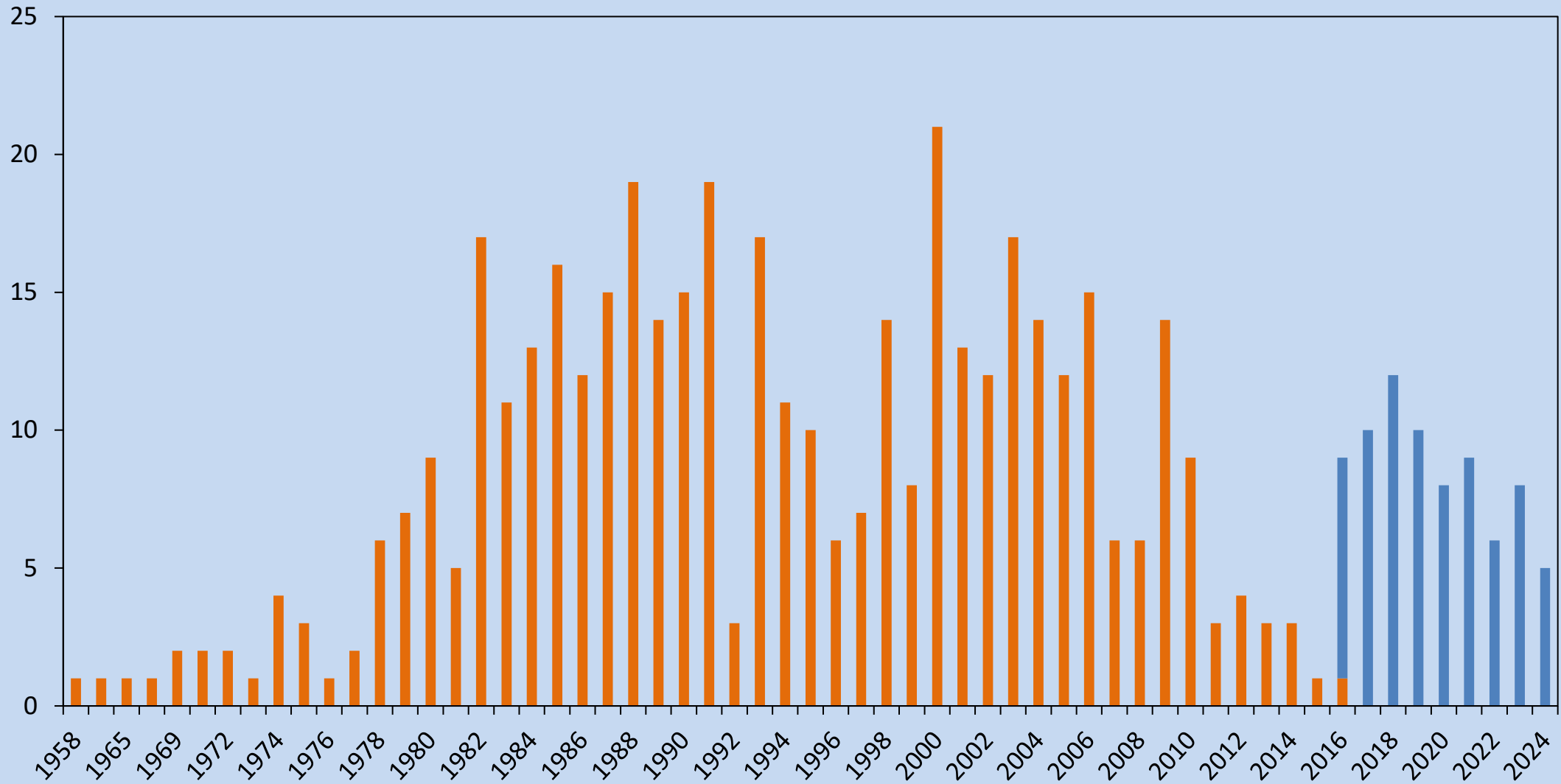
Rosenberger and Loomis (2001): 163 studies from 1969 to 1998; 700 value estimates.

Loomis (2005): studies from 1969 to 2003; 1,239 value estimates.

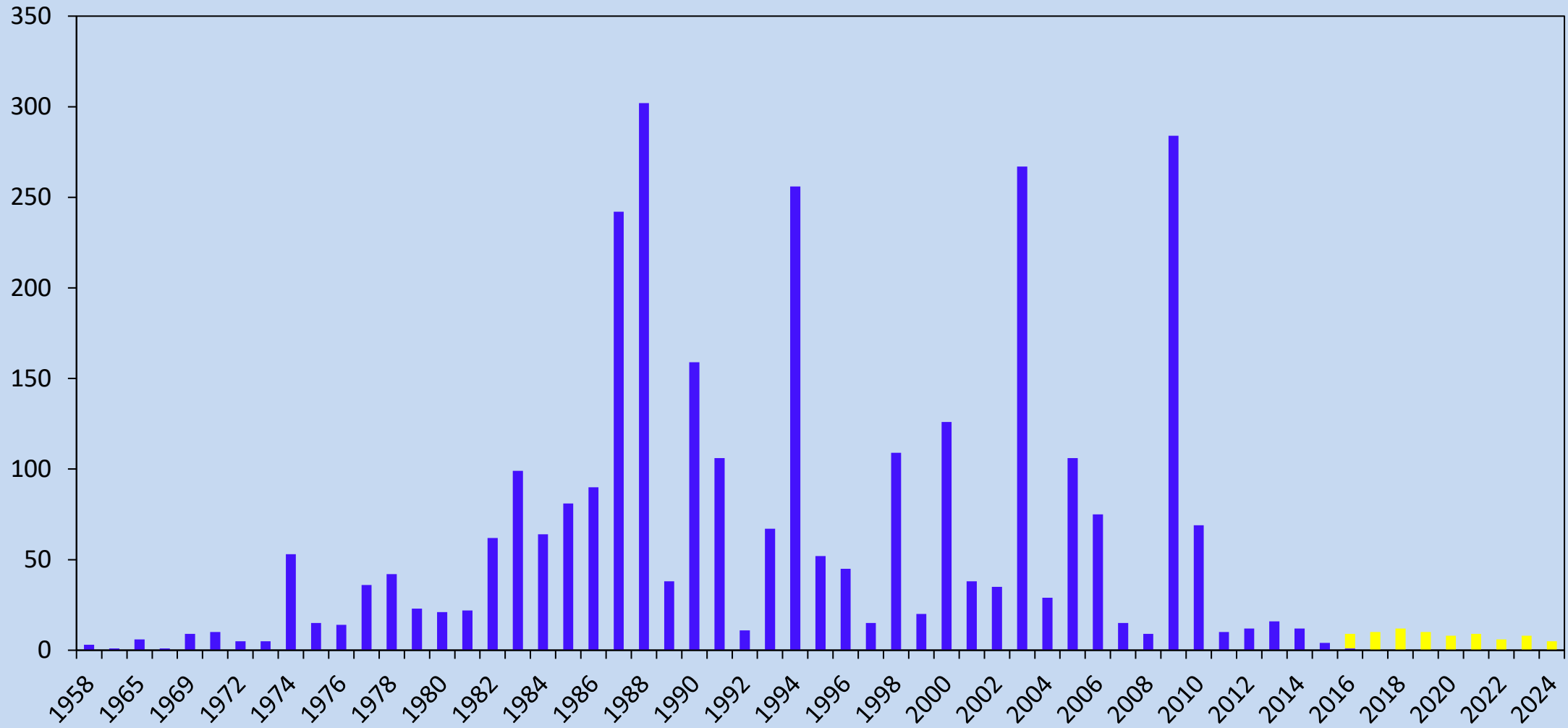
Rosenberger et al. (2017): 421 studies from 1958 to 2016; 3,194 value estimates.



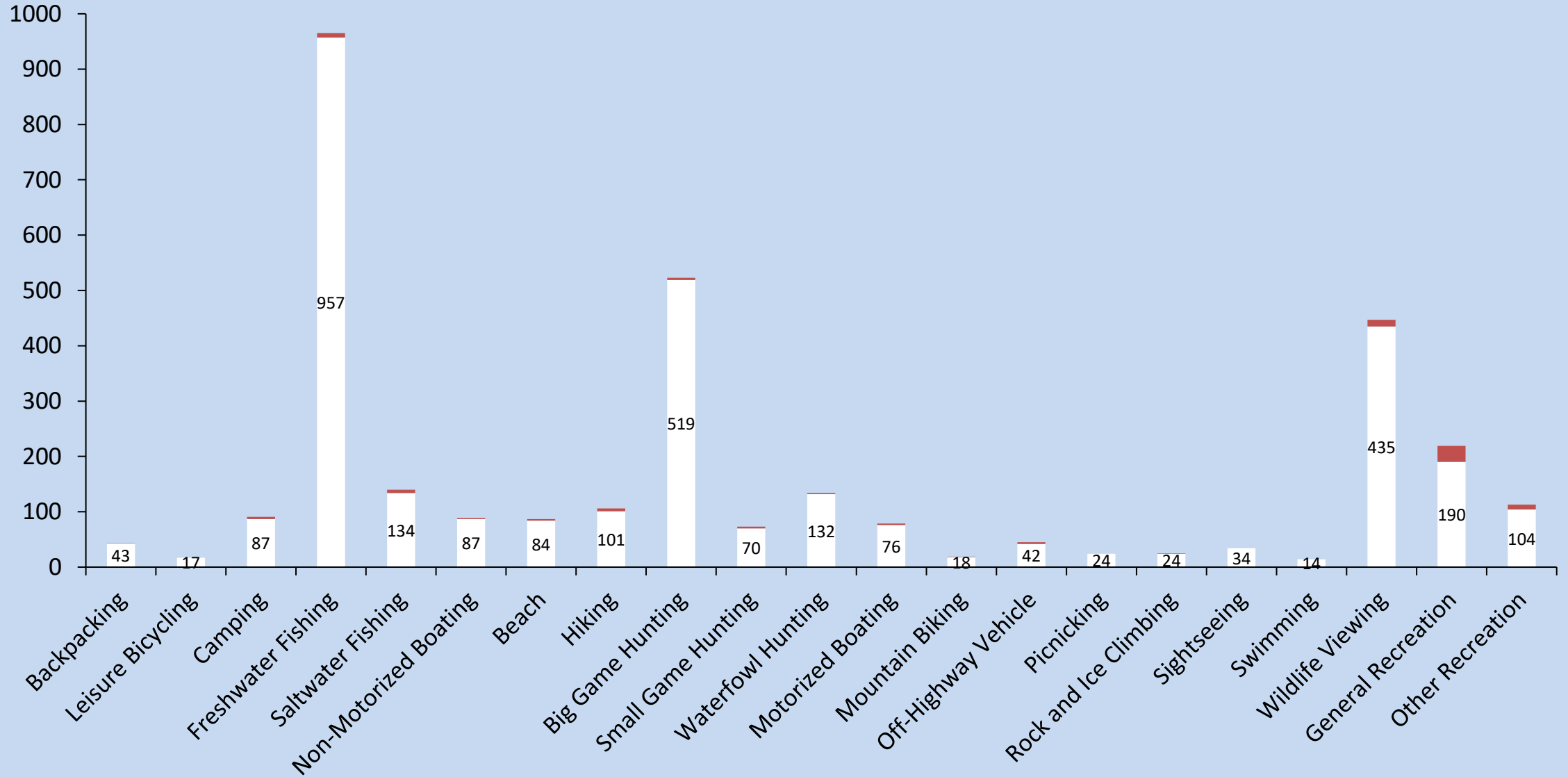
Number of studies by year, N=497



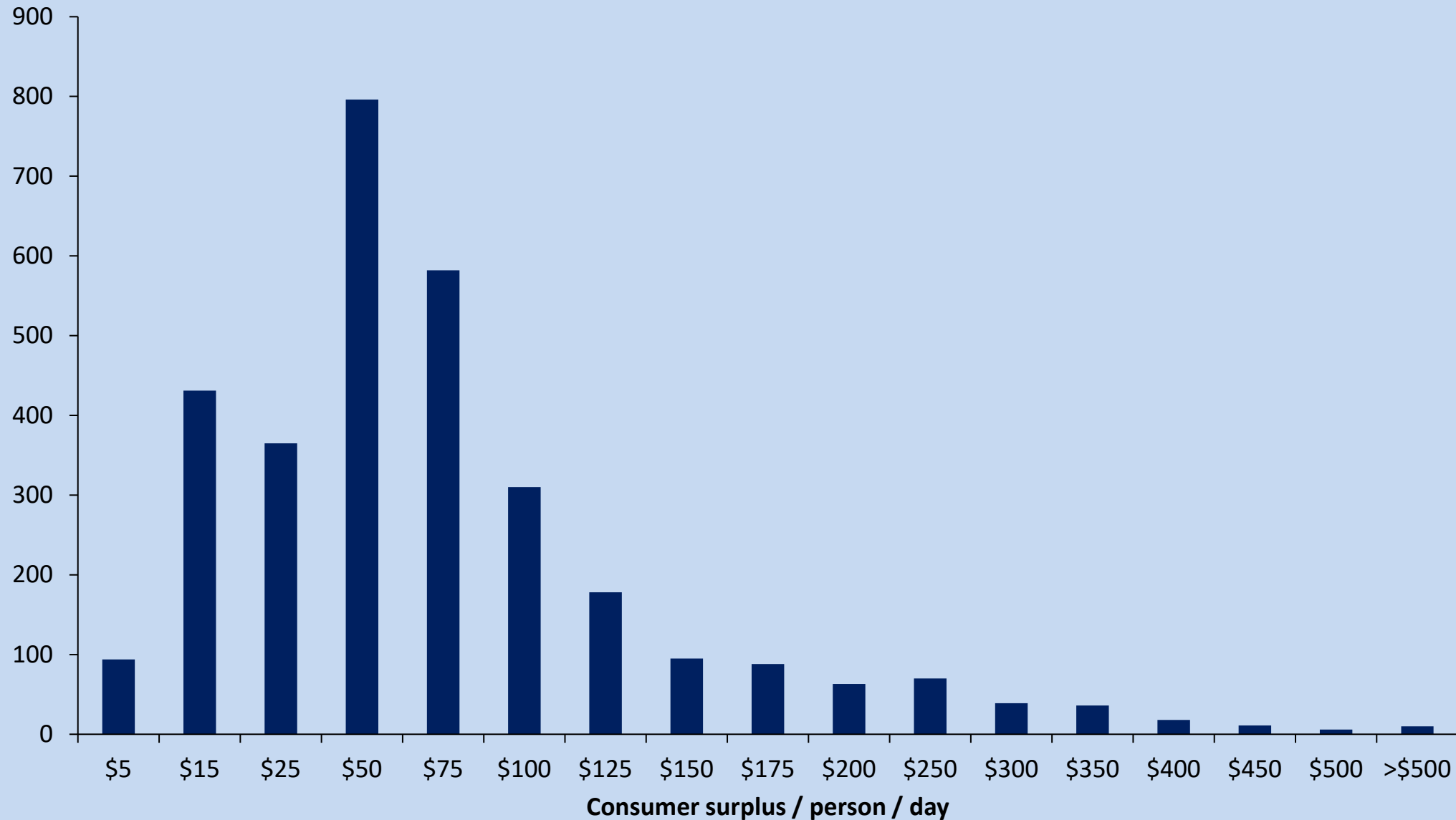
Number of estimates by year



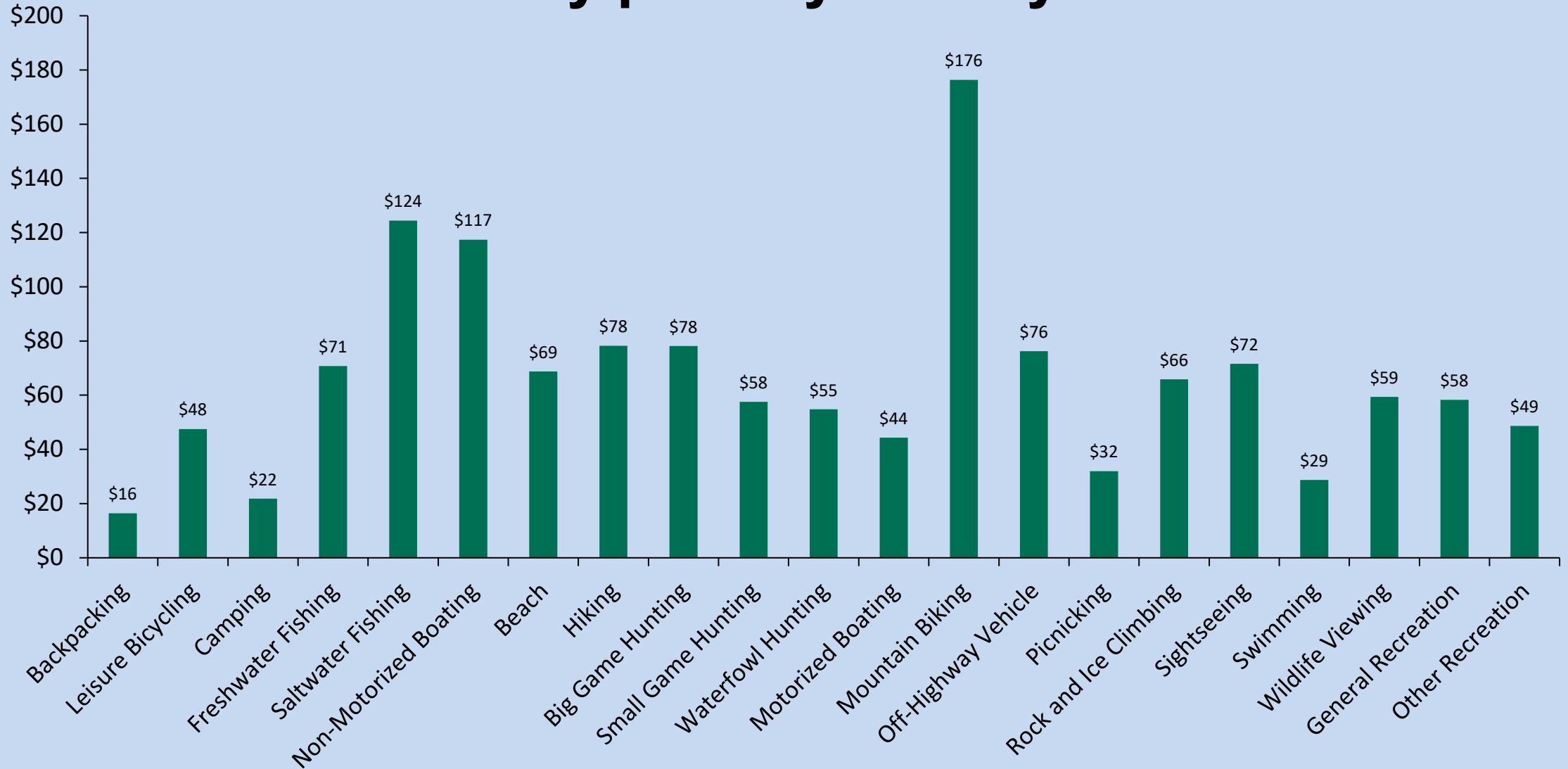
Number of estimates by primary activity



Frequency distribution of consumer surplus estimates



Mean consumer surplus per person per day by primary activity



Outdoor recreation values used by National Forests



Average consumer surplus per person per primary activity day from recreation demand studies

Activity	Number of studies	Number of estimates	Mean value estimate	Median value	Standard error	Range of value estimates	
						Minimum	Maximum
Backpacking	6	41	\$17.04	\$9.83	2.44	\$6.30	\$60.16
Biking	13	36	\$98.94	\$63.48	17.43	\$11.78	\$499.34
Cross-country skiing	3	5	\$36.84	\$31.43	6.93	\$20.12	\$60.18
Developed camping	22	82	\$22.99	\$16.12	2.47	\$5.08	\$166.11
Downhill skiing	5	13	\$77.63	\$30.54	25.62	\$7.85	\$277.86
Fishing	120	913	\$72.59	\$53.27	2.22	\$5.36	\$464.82
Hiking	37	111	\$78.19	\$47.17	7.97	\$5.02	\$451.64
Hunting	64	618	\$76.72	\$63.12	2.38	\$5.04	\$419.60
Motorized boating	20	83	\$42.48	\$19.72	6.63	\$5.02	\$437.18
Nature-related	47	431	\$63.46	\$47.10	2.79	\$5.04	\$441.26
Non-motorized boating	23	83	\$114.12	\$48.95	13.54	\$5.18	\$473.02
OHV and snowmobiling	14	49	\$60.61	\$51.19	9.58	\$9.06	\$462.96
Other recreation	66	220	\$62.06	\$30.33	5.02	\$5.12	\$390.74
Picnicking	8	24	\$31.98	\$23.62	6.62	\$5.03	\$149.13

Outdoor recreation values used by National Forests



Average consumer surplus per person per primary activity day, by activity and Forest Service region (\$)										
Activity	Forest Service region									National
	R1	R2	R3	R4	R5	R6	R8	R9	R10	
Backpacking	39.59	32.81	40.89	42.81	26.64	33.15	32.61	21.10	65.09	44.00
Biking	93.18	86.40	94.48	96.40	80.23	86.74	86.20	74.70	118.69	97.60
Cross-country skiing	62.96	56.18	64.26	66.18	50.01	56.52	55.98	44.47	88.46	67.37
Developed camping	42.06	35.28	43.36	45.27	29.11	35.61	35.07	23.57	67.56	46.47
Downhill skiing	88.67	81.89	89.97	91.88	75.72	82.23	81.68	70.18	114.17	93.08
Fishing	77.96	71.18	79.26	81.18	65.01	71.52	70.98	59.47	103.46	82.37
Hiking	90.90	84.12	92.20	94.12	77.95	84.46	83.91	72.41	116.40	95.31
Hunting	83.86	77.08	85.16	87.07	70.90	77.41	76.87	65.37	109.36	88.27
Motorized boating	64.82	58.04	66.12	68.03	51.87	58.37	57.83	46.33	90.32	69.23
Nature-related	66.57	59.79	67.87	69.79	53.62	60.13	59.59	48.09	92.08	70.99
Non-motorized boating	115.37	108.59	116.67	118.59	102.42	108.93	108.38	96.88	140.87	119.78
OHV and snowmobiling	56.89	50.11	58.19	60.11	43.94	50.45	49.91	38.40	82.39	61.30
Other recreation	71.45	64.67	72.75	74.66	58.49	65.00	64.46	52.96	96.95	75.86
Picnicking	55.62	48.84	56.92	58.83	42.67	49.17	48.63	37.13	81.12	60.03
Weighted average	76.24	71.88	76.20	77.04	63.19	68.64	66.70	55.93	103.00	79.96

Computing recreation benefits

$$\begin{array}{cccccc} \text{NVUM 2015} & & \text{Weighted} & & \text{Weighted} & & \text{Total} \\ \text{visitor} & & \text{conversion} & & \text{\$ value per} & & \text{recreation} \\ \text{estimate} & \times & \text{coefficient} & \times & \text{activity day} & = & \text{benefit} \end{array}$$



Total recreation benefit for Forest Service region 2

NVUM 2015 visitor estimate	X	Weighted conversion coefficient	X	Weighted \$ value per activity day	=	Total recreation benefit
28,291,000	X	1.1	X	\$71.88	=	\$2.4 billion



Total recreation benefit for Medicine Bow National Forest



Primary activity	Primary Activity (%)	Visits	Conversion coefficient	Activity days	Use value	Economic benefit (\$)
Backpacking	0.0	161	2.5	403	32.81	13,209
Bicycling	2.5	13,372	1.1	14,709	86.40	1,270,853
Cross-country Skiing	16.8	90,034	1.0	90,034	56.18	5,058,131
Developed Camping	0.9	4,804	2.7	12,972	35.28	457,654
Downhill Skiing	9.6	51,105	1.0	51,105	81.89	4,185,002
Driving for Pleasure	6.0	32,092	1.1	35,301	64.67	2,282,947
Fishing	2.6	14,072	1.2	16,887	71.18	1,201,981
Gathering Forest Products	0.2	919	1.1	1,010	64.67	65,343
Hiking / Walking	15.0	80,231	1.1	88,254	84.12	7,423,903
Horseback Riding	1.9	9,976	1.3	12,969	64.67	838,724
Hunting	7.2	38,767	1.3	50,397	77.08	3,884,575
Motorized Trail Activity	1.7	9,253	1.3	12,029	50.11	602,786
Motorized Water Activities	0.2	918	1.1	1,010	58.04	58,633
Nature Center Activities	0.0	0	1.0	0	64.67	0
Nature Study	0.1	501	1.1	551	64.67	35,605
No Activity Reported	0.2	1,303	1.0	1,303	64.67	84,258
Non-motorized Water	0.2	964	1.1	1,061	108.59	115,183
OHV Use	4.1	22,094	1.2	26,512	50.11	1,328,540
Other Motorized Activity	0.2	856	1.2	1,027	50.11	51,461
Other Non-motorized	0.6	3,170	1.2	3,804	64.67	246,023
Picnicking	1.0	5,286	1.1	5,814	48.84	283,971
Primitive Camping	0.8	4,258	2.4	10,220	32.81	335,302
Relaxing	4.3	22,999	1.5	34,499	64.67	2,231,062
Resort Use	0.0	0	2.1	0	64.67	0
Snowmobiling	9.0	48,138	1.2	57,766	50.11	2,894,658
Some Other Activity	6.0	32,092	1.2	38,511	64.67	2,490,488
Viewing Natural Features	8.0	42,790	1.1	47,069	59.79	2,814,234
Viewing Wildlife	0.9	4,716	1.1	5,187	59.79	310,145
Visiting Historic Sites	0.0	0	1.1	0	59.79	0
Total	100.0	534,871		620,404		40,564,669

Caveats and other considerations

1. These value estimates are average values, not marginal values.
2. Value estimates are not suited for site-level analysis.
3. Adjustments up or down of as much as 20% could be justified.
4. Value estimates do not indicate which activities are “best.”



Accessing the database

<http://recvaluation.forestry.oregonstate.edu>



Jeffrey.Kline@usda.gov

Eric.M.White@usda.gov

