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Science FINDINGS

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INSIDE



"Science affects the way we think together."

Lewis Thomas

# How Much Fun? Evaluating Economic Implications of Recreation in National Forests

U.S. Forest Service

*Hikers in the Gifford Pinchot National Forest, Washington. In 2016, recreationists spent $49 billion while visiting federal lands and supported 826,000 jobs with these visits.*

IN SUMMARY

*Millions of people head to federal lands every year for recreation—891 million visits in 2016 alone. These visits have significant economic implications, not only for restaurants, resorts, outfitters, and other businesses near recreation sites, but also for the people actually participating in outdoor recreation.*

*Scientists Eric White and Jeff Kline, both with the U.S. Forest Service Pacific Northwest Research Station, worked with colleagues to summarize results from more than 400 studies that measure the economic value that people hold for recreation opportunities. The information shows that the economic importance of national forests and other public lands for recreation is substantial.*

*Forest Service scientists predict steady growth in outdoor recreation over the next decade and beyond as incomes rise and the population of the United States grows. That's good economic news, but it also means that more people will be competing for campsites, parking spaces at trailheads, and prime fishing spots. Crowding may make these special places less appealing, while overuse can lead to ecological damage.*

*The work by White, Kline, and their colleagues quantifies the value of recreation, not just through monetary transactions, but in terms of the economic value of outdoor recreation enjoyment. This information is helping forest managers as they manage public lands for multiple uses.*

"Leave all the afternoon for exercise and recreation, which are as necessary as reading. I will rather say more necessary because health is worth more than learning."

—Thomas Jefferson

People have been recreating on lands managed by the U.S. Forest Service since the agency's inception around the beginning of the 20th century. As early as 1916, the nascent Forest Service was attempting to measure the amount of recreation on national forests and its economic value. Back then, the agency estimated there were 3 million visits to those first national forests, and the value each visitor placed on an hour of recreating was about what it might cost to go to a reasonably good movie—10 cents. Moving forward 100 years, the Forest Service continues to measure the amount of outdoor recreation in the United States and the values people have for recreation access, albeit with the tools of modern science.

Recreation is the primary way that the public interacts with national forests and other federally managed natural resources. Land managers and policymakers often need information about the number of people engaging in different recreation activities and how it benefits them in order to best manage and promote outdoor recreation. Three questions about outdoor recreation often arise: (1) what is the current and expected future participation in outdoor recreation, (2) what are the benefits of outdoor recreation to the economy, and (3) what is the value that people place on this recreation?

Forest Service scientists have been helping to answer these questions for decades. Eric White, a research social scientist, and Jeff Kline, a research forester—both with the U.S Forest Service Pacific Northwest Research Station—have been contributing to this research effort with a series of recent studies to understand changing patterns in recreation use and the economic benefits of recreation.

## More People Are Heading Outdoors

As part of the agency's ongoing effort to measure and help meet outdoor recreation demands on all federal, state, and local lands, White partnered with J. Mike Bowker in the Forest Service's Southern Research Station to summarize recent trends and project where they are likely heading in future decades.

The number of people participating in outdoor recreation grew dramatically over the past half-century. The growth included more people recreating in both traditional and newer activities that have emerged with new types of equipment. That's particularly true of camping, canoeing, kayaking, and mountain biking, which all saw rapid increases in the 1960s throughout the 1980s.

Growth in recreation is measured two ways: the number of participants recreating outdoors, and the number of days they spend recreating. Bowker, a research social scientist and one of White's coauthors, reported that the number of participants in 50 nature-based outdoor recreation activities increased 7 percent between 1999 and 2009, while the number of days of recreation increased at least that much as well. Some of the fastest growing activities during this period, both in terms of participant numbers and activity days, were viewing and photographing nature, especially birds, scenery, and flowers, which all saw a double-digit growth in participants. Flower viewing, for example, had an 83-percent increase in the number of participant days. Off-highway vehicle driving realized a 34-percent increase in participants. Several physically challenging activities, such as kayaking, snowboarding

### KEY FINDINGS

- The number of people participating in outdoor recreation is projected to increase through 2030 in almost all forms of outdoor recreation considered in the studies, largely because of population growth and the popularity of nature-based recreation.
- People made more than 891 million visits to recreate on federal lands in 2016. They spent $49 billion and supported 826,000 jobs with these visits. Average spending by visitors to national forests generally ranged from $21 for local day visitors to $800 for nonlocal overnight visitors.
- People value the recreation opportunities provided by public lands, and economists can measure what these recreation opportunities are worth to society. Those values, along with the values society places on other forest goods and services, can be used by managers and policymakers to better understand the tradeoffs associated with forest managements.
- The number of recreation visits in 2016 combined with the average value recreationists hold for recreation implies a total value of access to recreation opportunities on national forests in Oregon and Washington of $1.3 billion. The value of recreation opportunities to people visiting national forests in Alaska in 2016 was $296 million.
- Changing climate conditions, including reduced snowfall, likely will lead to future changes in recreation patterns. Although participation in downhill skiing and snowboarding is projected to continue to increase, future reductions in natural snowpack are expected to reduce participation in backcountry skiing and snowmobiling by 2030. Slower growth in floating activities, such as rafting, canoeing, and kayaking, also is anticipated.

Emily Jane Davis

*A cross-country skier in the Deschutes National Forest, Oregon. Activities that rely on natural snowfall may experience declines as winter precipitation shifts from snow to rain in some areas.*


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and surfing also had relatively large increases during this time.

New technology had some interesting effects on how people changed their recreation behavior during that time. For example, there was a change in how people engaged in alpine snow sports in the early 2000s. The number of people who engaged in downhill skiing declined 8 percent; however, that drop was more than made up by a 34-percent increase in the number of people snowboarding during that time.

As population and incomes rise, the amount of outdoor recreation is projected to continue to grow in coming decades. The numbers of participants in all the activities tracked in this research are projected to see a double-digit percentage increase between 2008 and 2030. Activities such as hiking, visiting interpretive sites, and motorized boating, for example are all projected to rise 30 percent or more, according to White and his colleagues.

Although the number of participants is projected to grow, people are expected to engage in some outdoor activities with less frequency. For example, the average annual number of days hunters go hunting is projected to decline by 1 day (5 percent) by 2030. Similarly, the average number of days people participate in motorized off-road recreation each year is projected to decline 3 percent by 2030. However, because the number of people engaging in these activities is projected to rise, the total days of recreation in those activities are still expected to increase.

The same can be said for motorized snow activities and visiting less-developed areas: per capita participation is expected to decline, but the difference will be more than made up for in population growth. One reason for projected declines in per capita participation for some outdoor activities, White explains, may be due to increasing population density in places with easily accessible public lands. More people will be competing for access to the same destinations, possibly making activities in those areas less attractive. This research highlights the important role of public land in providing opportunities for recreation, especially given the shrinking per capita supply of land where many of those activities take place.

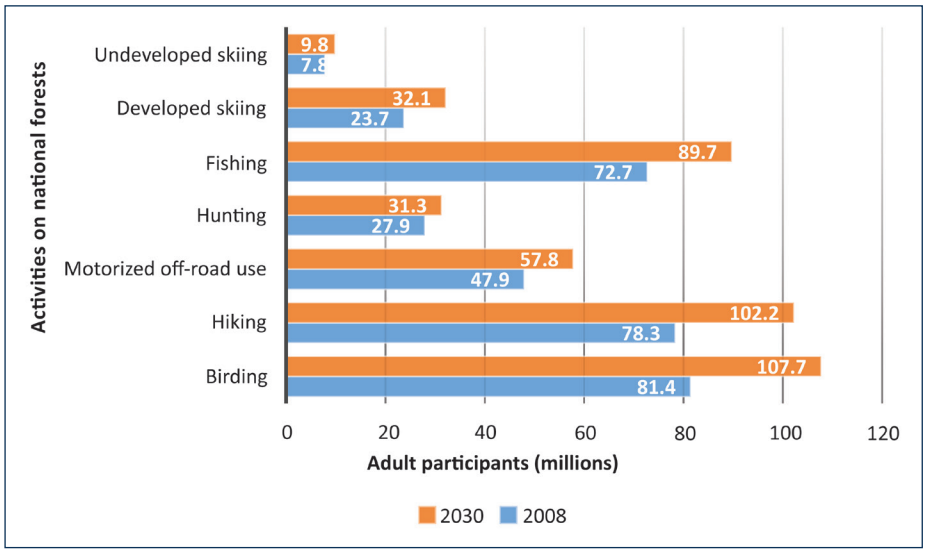
"Development of forest and other open-space lands is inevitable," says Kline. "As these lands become more scarce, it becomes all the more important to ensure that national forests provide the benefits that people desire from undeveloped landscapes, whether they be water, recreation, habitat, natural resource commodities, or other benefits."

The projected effects of climate change on recreation are complex. Many activities such as motorized off-road use and horseback riding are projected to experience gains as people are able to recreate more days of the year. Other activities, especially those that depend on snow or precipitation, may suffer under climate change. For winter sports, developed areas that can make artificial snow will likely continue to thrive, supporting the projected growth of downhill skiing and snowboarding. But fewer people are likely to go snowmobiling, backcountry skiing, or snowshoeing—activities that more typically depend on natural snowfall. The effects of climate change likely will outweigh the effects of population growth for these activities, resulting in projected net declines by 2030.

**Table 1—Spending by nonlocal visitors to national forests, dollars per trip per party**

| Spending categories | Nonlocal visitors | | |
|---|---|---|---|
| | Day trip | Overnight in national forest | Overnight |
| | | *Dollars* | |
| Lodging | 0 | 72.56 | 217.53 |
| Restaurant | 14.77 | 27.47 | 116.41 |
| Groceries | 10.67 | 55.09 | 72.52 |
| Gas and oil | 30.2 | 62.27 | 82.47 |
| Other transportation | 0.58 | 1.34 | 4.98 |
| Entry fees | 4.12 | 7.13 | 12.85 |
| Recreation and entertainment | 2.96 | 7.36 | 33.31 |
| Sporting goods | 3.15 | 10.77 | 13.75 |
| Souvenirs and other expenses | 1.93 | 7.73 | 25.87 |
| Total | 68.38 | 251.72 | 579.69 |
| Sample size (unweighted) | 2,112 | 3,600 | 2,289 |
| Standard deviation of total | 72 | 399 | 714 |

Adapted from White 2017.




White et al. 2016

*Number of adults participating in featured activities on public and private lands in 2008 and projected participants in 2030.*

## Contribution to Economic Activity

Like running a household, going on a vacation, or managing a forest, engaging in outdoor recreation usually requires spending money. Money could be spent on a pair of boots, a backpack, transportation, a guide or outfitter, overnight lodging, or perhaps a post-hike cooldown with food and refreshments at a local restaurant.

The Outdoor Industry Association estimates that Americans annually spend $887 billion on

recreation equipment and the goods and services connected with outdoor recreation. And that spending supports 7.6 million full- and part-time jobs.

Much of that money, White says, goes to communities near recreation areas—in the towns near ski resorts and popular camping areas but also around places off the beaten path such as that secret swimming hole that only locals know about. Researchers estimate that recreation visitors to federal public lands spend at least $49 billion in the local economies around their destinations. This spending supports 826,000 jobs. That doesn't count what they spend at home to get ready for a trip or what they spend en route.

The level of spending in local communities depends on whether recreation trips are day trips or overnight trips and, to a lesser extent, the activity itself. On average, overnight visitors can spend up to eight times what visitors on day trips spend in a local area. Most of that spending is for lodging, food in restaurants and grocery stores, and gasoline.

Of all the tracked activities, downhill skiers and snowboarders had some of the highest average spending. On a per-night basis, these visitors typically have higher than average spending on lift tickets, restaurants, bars, and lodging. Participation growth at developed ski areas is projected to be very high in coming years, partially due to income growth, suggesting that these activities will continue to be an important economic engine in the future.

By comparison, hikers spend less during their visits to national forests. But, there are many more hikers than skiers and snowboarders, and hiking is popular on all national forests. Hikers also spend many more days out of the year hiking than their counterparts spend on the slopes. That means the total economic activity that results from hiking is high and is spread over more places for longer during the year.

On average, recreation use fees are a fairly small component of the total cost of an outdoor recreation trip. Changes in user fees at recreation areas on federal lands could affect the level of participation in those areas. How much or in what way is far from certain, according to White. On the one hand, raising entrance fees could deter some people from using those areas. But keeping fees the same—or even lowering them—could have a negative effect as well; there may be less money to maintain those areas, possibly making them less attractive to visitors.

**Table 2—Estimates of the average economic benefits to recreationists using national forests and grasslands**

| | Forest Service Region | | |
|---|---|---|---|
| **Primary activity** | **Pacific Northwest (Oregon and Washington)** | **Alaska** | **National** |
| | *Dollars (2016)* | | |
| Backpacking | 33.15 | 65.09 | 44.00 |
| Biking | 86.74 | 118.69 | 97.60 |
| Cross-country skiing | 56.52 | 88.46 | 67.37 |
| Developed camping | 35.61 | 67.56 | 46.47 |
| Downhill skiing | 82.23 | 114.17 | 93.08 |
| Fishing | 71.52 | 103.46 | 82.37 |
| Hiking | 84.46 | 116.40 | 95.31 |
| Hunting | 77.41 | 109.36 | 88.27 |
| Motorized boating | 58.37 | 90.32 | 69.23 |
| Nature related | 60.13 | 92.08 | 70.99 |
| Nonmotorized boating | 108.93 | 140.87 | 119.78 |
| Off-highway vehicle use/snowmobiling | 50.45 | 82.39 | 61.30 |
| Other recreation | 65.00 | 96.95 | 75.86 |
| Picnicking | 49.17 | 81.12 | 60.03 |
| Weighted average | 68.64 | 103.00 | 79.96 |

Adopted from Rosenberger et al. 2017.

## *The Value of Recreation Opportunities*

Determining how spending by recreationists affects the economy is fairly straightforward. Figuring out the value people hold for the places they recreate is a little more difficult. However, scientists have moved beyond just assuming it is the same as the price of a movie ticket.

Economists measure the value people place on using national forests to produce timber by observing the behavior of wood products markets and examining wood products prices. Because public recreation opportunities, such as access to hiking trails, typically are not bought and sold in the market, economists need something other than market activity to identify the value people place on the ability to use national forests for recreation. To do that, economists use nonmarket valuation approaches. In the most common nonmarket valuation approaches, economists either look at patterns of recreation use by people living at varying distances from recreation sites of different characteristics, or they develop hypothetical scenarios that are used to elicit the values of potential visitors. Both approaches yield comparable estimates of what recreation is worth in dollar terms to individuals doing the recreating.

"A great deal of environmental economics research has gone into developing and evaluating different valuation approaches for nonmarket goods," says Kline. "Estimating economic values for different recreation activities actually has been one of the more common uses of these methods."

White and Kline's cooperator in this research, Randall Rosenberger, a professor at Oregon State University, has been compiling recreation valuation studies for decades. The data from these studies are combined to develop estimates of recreation values for different activities in each of the Forest Service regions using a statistical analysis method called meta-regression.

"Meta-regression has been used in efforts such as this since the 1990s," White says. "In meta-regression, we use information reported in studies of recreation values done across the United States and statistical modeling to estimate the economic value for recreation activities common on national forests. The key for this analysis is that we can control for differences in study methods and develop economic value estimates for activity and region combinations where there have been few or no prior studies."

Economists measure the value people place on having access to recreation opportunities using the concept of consumer surplus—the difference between what an individual is willing to spend for a good or service and what they actually spent for that good or service. The aggregated consumer surplus values for all those engaging in recreation at a given location is assessed as a measure of the economic value recreationists hold for recreating at that location.

Aaron Poe

*Kayaking in Prince William Sound, Alaska. By using nonmarket valuation approaches, economists can determine the economic value of recreation to the participants. Nonmotorized boating, for example, generates substantial economic benefit to recreationists.*

Meta-regression allows us to compute average consumer surplus of people engaging in various outdoor recreation activities," White explains. "For example, the average consumer surplus value for nonmotorized boating is about $120 per boating day. Similarly, those engaging in backpacking have an average consumer surplus value of about $98 for each day of backpacking."

Kawa Ng, a regional economist with the Forest Service's Rocky Mountain Region, says he has used this kind of information about the economic value people have for recreation activities as part of forest plan revision efforts currently underway for the Grand Mesa, Uncompahgre and Gunnison National Forests in Colorado. "Recreation is a big part of the Forest Service's multiple-use mandate," he says, adding that hunting and fishing are particularly important to his region.

Ng was able to cite a study that looked at the benefits of angling. He found that each angler fishing for trout receives on average $195 per day in the form of nonmarket value. "Nonmarket benefits are a way to measure human happiness," Ng says. "They represent enjoyment above and beyond expenditures."

How much happiness? Multiplying average consumer surplus values by the total number of visits to a recreation resource provides an estimate of the economic benefit people receive from recreating at that place. In just one example, White and Kline estimated that the total economic benefit to those recreating on the Medicine Bow National Forest in Colorado was more than $40.5 million. When they added up all the national forests in the United States, the value totaled $14 billion.

"It's surprising to think about," White says. "That's some real value to the American people."

The economic boon to businesses involved in recreation will continue to go up, and the people doing the recreating will continue to see the benefits to themselves. But the population growth driving the increased participation means there will be a shrinking per capita supply of land on which to enjoy those activities.

"Many recreation resources will likely become more congested, and perhaps less desirable, as more people compete to use them," White says.

This presents a major challenge for public natural resource managers and planners. To ensure that recreation opportunities remain viable and adapt to a changing population, White says they will have to find more creative and efficient ways to manage existing federal recreation resources.

*"The ultimate purpose of economics, of course, is to understand and promote the enhancement of well-being."*

—Ben Bernanke, economist

## LAND MANAGEMENT IMPLICATIONS

- This research provides data and guidance to analysts who want to understand and calculate the economic benefits of recreation at national, regional, and individual forest levels. The research also can be used to evaluate outdoor recreation trends and project future participation.
- Forest Service analysts can use the information in forest assessments, planning, and National Environmental Policy Act applications.
- This research enables Forest Service analysts to evaluate the magnitude of public benefits provided by national forest recreation, and helps policymakers and national forest managers gauge the social benefits of investing in recreation planning, programs, and infrastructure.
- The data provides economic measures for valuating outdoor recreation, enabling policymakers and land managers to align public lands management with public preferences for uses.

## Writer's Profile

*John Kirkland has been writing about science, higher education, and business for more than 20 years. He lives in Portland, Oregon.*

## For Further Reading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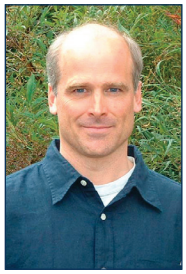

JEFFREY KLINE is a research forester with the Pacific Northwest Research Station in Corvallis, OR. His current research examines the effects of population growth and land use change on forests and their management, as well as related changes in how the public uses and values forests. Kline earned a bachelor's degree in environmental resource management from Pennsylvania State University, a master's degree in resource administration and management from University of New Hampshire, and a doctorate in environmental and resource economics from the University of Rhode Island.

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