

Managing OHV Use in Tennessee: Understanding Impacts and Opportunities for Sustainable Solutions

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In collaboration with Tennessee Division of Forestry



Figure 1: OHV on a forest trail in Pickett State Forest

Why This Matters

Off-highway vehicle (OHV) use is expanding across Tennessee. Riders are using all-terrain vehicles (ATVs), side-by-sides, and dirt bikes to connect with nature, enjoy the outdoors and explore both public and private lands.

While this recreation offers many benefits, unmanaged or degraded trails can lead to severe ecological impacts, such as soil erosion, habitat disturbance and costly maintenance challenges. In addition, poorly maintained trails and concentrated use may create negative social impacts, such as noise, crowding or displacement, that diminish the experiences of other recreationists, potentially heightening inter-group conflict.

This Extension publication summarizes key findings from a mixed-methods study conducted on Tennessee Division of Forestry (TDF) lands. The study focused on Pickett, Franklin and Natchez Trace state forests, but the results may have broader relevance for OHV trail systems across the state.

By combining on-the-ground ecological assessments with survey data from OHV users, this research helps shed light on:

- What types of environmental impacts are occurring
- How riders perceive those impacts
- Why there is often a disconnect between trail conditions and user awareness
- What landowners, riders and public agencies can do to support more sustainable OHV recreation

Understanding both the physical and social dimensions of trail use is crucial for developing practical solutions that reflect the needs and values of Tennessee's OHV community in practice.

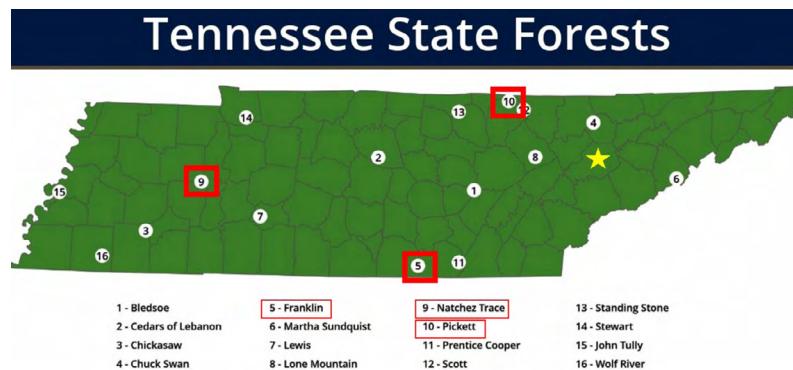


Figure 2: Map of Tennessee State Forests. The yellow star denotes the University of Tennessee, Knoxville campus, and the red squares indicate Franklin, Natchez Trace, and Pickett State Forests where ecological assessments were conducted.

Key Findings from the Field

Ecological Impacts: Trails Under Stress

Recreation ecology is the study of how outdoor activities, such as hiking, biking and OHV use, affect natural environments. It helps land managers understand how human use leads to issues like soil erosion, vegetation damage, water quality problems and disturbance to wildlife. By identifying the causes and patterns of these impacts, recreation ecology supports decisions that protect ecosystems while still allowing people to enjoy public lands.

In Tennessee state forests, OHV trails are showing visible signs of ecological stress, especially in high-use areas such as Pickett State Forest, with similar, though less extensive, impacts also observed at Franklin and Natchez Trace state forests. Field assessments have documented trail widening, soil erosion, muddiness and damage to surrounding vegetation. These conditions suggest that current use levels and trail designs are putting more pressure on the landscape than it can handle. However, not all state forests are mandated for public recreation, and only a handful permit OHVs on designated roads or trails. Districts foresters make such decisions based on ecological sensitivity, safety and management priorities. Without intervention, these impacts can worsen, threatening both the environment and the long-term quality of recreation in these forests.



Figure 3: Rutting and water on an OHV trail in Pickett State Forest during ecological assessments.

Figure 4: Illustration of soil loss at Pickett State Forest equivalent to filling approximately 20 standard dump trucks.

- Severe soil loss was documented, with Pickett losing an estimated total loss of 532,000 cubic inches of soil, roughly equal to 20 dump trucks of dirt.
- Trail widening up to 16 feet and deep ruts as much as 17 inches were common, especially on steep slopes and poorly drained areas.
- Vegetation loss and the presence of bare soil increased the risk of erosion, sedimentation and long-term habitat damage.

Social Trails: Unplanned Paths Causing Damage

Unauthorized trails, often referred to as social trails, were frequently observed. These form when riders go off the main route to avoid mud and obstacles or explore undesignated areas.

- Social trails fragment sensitive habitats, increase erosion and significantly raise maintenance costs.
- They are not part of the official trail system and often go unnoticed until substantial damage occurs.
- Clear signage, updated trail maps and designated routes can help reduce the creation of new social trails.

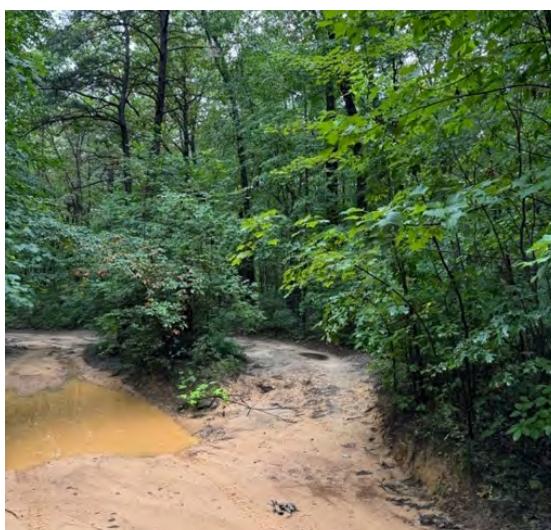


Figure 5: Social trail formed by OHV users driving around a water-filled section of the main trail.

Figure 6: Social trail branching from the main trail into an undesignated area illustrating soil erosion and vegetation disturbance.

What OHV Users Think: The Perception Gap

Managing public lands means balancing the protection of natural areas with the needs and values of the people who use them. While scientists and land managers rely on research to guide their decisions, visitors often respond based on personal experiences and emotional connections to a place. That is why it is important to understand how OHV users perceive current trail conditions. These perceptions can significantly shape how they react to rule changes or new management efforts.

By combining what riders think and feel with recreation ecology data, such as trail width, condition and visible signs of wear, managers gain a clearer picture of where problems are occurring and how users might respond to potential solutions. Considering both the human and environmental sides of trail use helps guide smart, realistic decisions that support long-term access and healthier trails.

Survey results revealed a disconnect between user intentions and actual trail conditions:

- Most OHV riders believe they follow the rules (97.1 percent) and minimize environmental harm (95.4 percent).
- Nearly half of respondents did not believe their riding behavior contributed to trail damage (43.8 percent), indicating a perception gap, not denial.
- This perception gap makes it more difficult for land managers to justify trail closures, implement new rules or gain rider cooperation.

Still, most riders care deeply about continued access, and many expressed support for solutions like:

- Defined trails, such as formally designated and marked routes, with regulations such as prohibiting off-trail riding.
- Consistent signage to provide clear and uniform guidance.
- User fees, meaning the imposition of OHV fees (not necessarily uniform), especially when revenues are tied to better trail conditions and long-term access.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I stick to designated trails when driving	3.3%	2.6%	4.6%	20.3%	69.2%
I always yield the right of way to non-motorized users of the trail	2.0%	0.0%	2.9%	15.0%	80.1%
I avoid driving my OHV on sensitive terrain (bluffs, steep slopes, etc.)	7.5%	9.5%	22.3%	23.0%	37.7%
I avoid creating new trails when using my OHV	1.3%	1.0%	5.2%	22.2%	70.3%
I avoid driving my OHV in streams, except at specific stream crossings	1.3%	0.3%	4.2%	23.5%	70.6%
I go around obstacles such as rocks and large puddles on the trail	9.5%	11.8%	34.6%	26.1%	18.0%
I like to spin my OHV's wheels on muddy and loose terrain	42.0%	23.3%	25.2%	5.6%	3.9%
I maintain a healthy distance from wildlife when driving my OHV	1.0%	0.7%	1.6%	19.3%	77.5%
I am aware of rules and regulations for trails that I plan to ride	0.3%	0.3%	2.3%	23.7%	73.4%
I volunteer to help with trail maintenance projects when I can	2.3%	3.6%	24.3%	32.9%	36.8%
I thoroughly clean my equipment before riding in a new area	1.0%	1.0%	7.6%	25.7%	64.8%
I always try to minimize my impact on the environment when driving	0.7%	0.7%	3.3%	25.0%	70.4%
Generally speaking, my OHV driving habits have a negative environmental impact	43.8%	23.4%	10.2%	14.1%	8.6%

Table 1. Respondents' OHV use habits in Tennessee State Forests based on self-reported statements.

Management Challenges



Managing OHV use on public lands presents a range of logistical and communication barriers:

- Many areas lack consistent signage or trail markers, leading to confusion and off-route travel.
- Limited staffing and funding restrict the ability to monitor trails and repair damage.
- Without effective outreach, it is difficult to connect individual rider behavior with the long-term condition of trail systems.

Opportunities for Sustainable Management

Land managers, riders and other stakeholders across Tennessee have an opportunity to improve OHV trail sustainability through a combination of education, partnerships and targeted strategies.

Laying the Groundwork: Trail Visibility and User Education



A few key actions can help reduce confusion and trail damage:

- Mark official trails with clear, durable signage and updated maps.
- Use visuals at trailheads to show real-world impacts like erosion and soil loss.
- Where social trails have formed, block off, rehabilitate and replant these areas while providing clear explanations to users.

Linking Social Science with On-the-Ground Management

Research shows that most riders want to do the right thing but do not always recognize what that means in practice.

- Use survey insights to design better outreach and signage that reflect rider values, such as continued access, fair treatment through clear rules and maintaining good trail conditions.
- Frame stewardship as a shared goal and help users understand how their behavior contributes to long-term access



Expanding Partnerships for Trail Access and Maintenance

The future of sustainable OHV use depends on creative partnerships that reduce pressure on sensitive public lands.

- Partner with private OHV parks, such as Windrock Park in Oliver Springs, Tennessee, to expand access while protecting public forests. Such partnerships could direct high-intensity OHV use to private lands with established infrastructure while reducing ecological stress in state forests.
- Explore co-management or concessionaire models where clubs, nonprofits or private partners help fund and maintain designated trail systems.
- Collaborate with local governments, tourism boards and outdoor businesses while also considering user-based funding options (e.g. revised fees or conservation permits) to support trail signage, education campaigns, and maintenance costs.



Promoting Sustainable Trail Use Through the Community

A strong OHV community can be a powerful force for stewardship.

- Support trail adopter programs, volunteer workdays and rider-led maintenance teams.
- Encourage clubs to promote “stay on trail” practices during rides and events.
- Recognize riders and groups who model responsible behavior and contribute to trail upkeep.



Figure 7: Scenic overlook at Pickett State Forest.

Summary: A Path Forward

Tennessee's OHV community is growing, and that can be a positive force for outdoor recreation, local economies and connection to nature. To keep trails open, safe and enjoyable, it is essential to monitor and address the impacts occurring on the ground.

This study highlights both ecological challenges, such as erosion, vegetation loss and the spread of unauthorized trails as well as a social disconnect between rider behavior and awareness of these impacts. Many OHV users care about trail access but may not realize how their actions affect trail health over time.

Solutions will require a coordinated effort among riders, landowners and public agencies. Improved signage, consistent communication and strong public-private partnerships can reduce damage and support long-term access. Education strategies informed by social science can help riders understand how their choices impact trail sustainability.

The University of Tennessee Institute of Agriculture and UT Extension are committed to supporting responsible recreation through applied research, collaborative partnerships and practical tools for landowners, managers and OHV users. By working together, Tennessee can maintain trail systems that protect natural resources and support outdoor recreation for years to come.



Figure 8: OHV trail at Pickett State Forest.

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Notes



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