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TRAFFIC INSIDE PROTECTED AREAS: DON'T STAND ASIDE

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ABSTRACT—In this note, we provide documentary evidence of how inviting slower vehicles to move over to facilitate the passage of faster vehicles on roads in protected areas can pose a conservation threat in these areas that were so designated precisely because they host healthy wildlife populations.

Key words: cars, motorhomes, national parks, recreation visits, roadkill, speeding, *Tamiasciurus hudsonicus*

The world's protected areas receive 8 billion visits annually, most of them in Europe and North America (Balmford and others 2015). For instance, in 2024, the United States National Park Service reported 332 million recreation visits for the more than 400 areas managed by this federal agency (National Park Service 2025). Most of these visitors accessed the protected areas using private vehicles (see, for example, data for Yellowstone National Park; National Park Service 2024).

This massive amount of access to protected areas leads to road congestion inside parks. For decades, protected area managers have been implementing measures to reduce congestion, such as establishing partial or temporal road closures or parking fees, designing bicycle or pedestrian trails, or establishing shuttle lines (e.g., for US National Parks including Zion, Yosemite, and Denali; National Park Service 2020). These mitigation actions are aimed at reducing road-related impacts such as wildlife roadkills, barrier effects, habitat fragmentation, and several types of pollution from vehicles (van der Ree and others 2015). For this reason, it is counterintuitive to find signages that encourage faster driving within protected area boundaries, such as signs recommending that drivers of slower vehicles move over to facilitate the passage of faster vehicles (Fig. 1A). This instruction makes sense in other areas where human movement is the priority, but not on roads bisecting environmentally rich habitats, such as those built in protected areas.

Drivers commonly exceed road speed limits when there is little to no slower traffic present in protected areas (pers. obs.). Indeed, "speeding" (i.e., cars moving faster than the posted speed limit) is a common driving pattern on rural or secondary roads, especially when traffic flows are low (e.g., European Road Safety Observatory 2006; Yanis and others 2013; Riginos and others 2022). For example, 40–55% of European drivers confessed that they exceeded the speed limits on country roads (Yanis and others 2013). Even in those stretches identified as wildlife corridors in southwest Wyoming and with nighttime speed reduced, motorists exceeded speed limits by 10–12 mph (16–19 kph) (Riginos and others 2022). Speed limit has a quadratic influence on roadkill rates, as mortality peaks at intermediate speeds (Iuell and others 2003). For instance, in a wildlife-tourism hotspot in Australia, Rendall and others (2021) found that mortalities increased along roads of 45–50 mph (72–80 kph) before declining again along roads with speed limits of 60 mph (96 kph). So, an increase in wildlife mortality is expected in the presence of signs recommending that drivers of slower vehicles move over to facilitate the passage of faster vehicles (Fig. 1B). Conversely, lower traffic speeds in protected areas are associated with lower rates of roadkill (Jones and others 2014). The additive impact of road mortality to those of natural causes can reduce wildlife population viability even in protected areas if this is not managed (reviewed in Barrientos and others 2021). For instance, when road mortality was added to natural mortality causes, extirpation was nearly certain for a population of Diamondback Terrapins (*Malaclemys terrapin*) near Jekyll Island, Georgia (Crawford and others 2018). Also, quasi-extinction probability was increased by 4 times when road mortality was included in the viability analysis of a population of Spotted Turtle (*Clemmys guttata*) inhabiting ephemeral and permanent wetlands in central Maryland (Howell and Seigel 2019).

Thus, based on these studies, we encourage: (1) the removal of "slower vehicle turnout" signs in protected areas; and (2) the expansion of ongoing actions aimed at modifying the current car-based model of visiting protected areas

FIGURE 1. (A) Signage that encourages drivers to give way to faster traffic in Glacier National Park, Montana. (B) American Red Squirrel (*Tamiasciurus hudsonicus*) killed by a vehicle a few meters from the sign. Photos: R Barrientos.

(e.g., developing traffic calming policies, reducing traffic speed and volumes). Many protected areas, especially in high-income countries, are reaching a tipping point in which mass tourism can put protected areas at risk of decline (Hadwen and others 2007; Thomas and Reed 2019). Therefore, the idea that people can drive to and through protected natural areas needs to evolve. In our opinion, only a more sustainable model of tourism, which includes limits on the use of motor vehicles and prevalence of driving, will reinforce the leading role of protected areas in the conservation and study of the privileged nature they host.

LITERATURE CITED

BALMFORD AJ, GREEN MH, ANDERSON M, BERESFORD J, HUANG C, NAIDOO R, WALPOLE M, MANICA A. 2015. Walk on the wild side: Estimating the global magnitude of visits to protected areas. PLoS Biology 13:e1002074.

BARRIENTOS R, ASCENSÃO F, D'AMICO M, GRILO C, PEREIRA HM. 2021. The lost road: Do transportation networks imperil wildlife population persistence? Perspectives in Ecology and Conservation 19: 411–416.

CRAWFORD BA, MOORE CT, NORTON TM, MAERZ JC. 2018. Integrated analysis of population estimation, management impact evaluation, and decision-making for a declining species. Biological Conservation 222: 33–43.

EUROPEAN ROAD SAFETY OBSERVATORY. 2006. Speeding. https://road-safety.transport.ec.europa.eu/system/files/2021-07/09-speeding_en.pdf. Accessed 09 July 2025.

HADWEN WL, HILL W, PICKERING CM. 2007. Icons under threat: Why monitoring visitors and their ecological impacts in protected areas matters. Ecological Management & Restoration 8:177–181.

HOWELL HJ, SEIGEL RA. 2019. The effects of road mortality on small, isolated turtle populations. Journal of Herpetology 53:39–46.

IUELL B, BEKKER GJ, CUPERUS R, DUFEK J, FRY G, HICKS C, HLAVÁC V, KELLER VB, ROSELL C, SANGWINE T, TØRSLØV N, WANDALL BM (editors). 2003. Wildlife and traffic: A European handbook for identifying conflicts and designing solutions. European COST 341. https://www.cedr.eu/docs/view/606328a595fb7-en. Accessed 9 July 2025.

JONES DN, GRIFFITHS MR, GRIFFITHS JR, HACKER JLF, HACKER JB. 2014. Implications of upgrading a minor forest road on traffic and roadkill in southeast Queensland. Australasian Journal of Environmental Management 21:429–440.

NATIONAL PARK SERVICE. 2020. Managing congestion: A toolkit for parks. https://www.nps.gov/orgs/1548/upload/Congestion_Management_2021-508.pdf. Accessed 9 July 2025.

NATIONAL PARK SERVICE. 2024. Annual traffic counts by month. https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Park%20All%20Months. Accessed 9 July 2025.

NATIONAL PARK SERVICE. 2025. Visitation numbers. https://www.nps.gov/aboutus/visitation-numbers.htm. Accessed 9 July 2025.

RENDELL A, WEBB V, SUTHERLAND DR, WHITE JG, RENWICK L, COOKE R. 2021. Where wildlife and traffic collide: Drivers of roadkill rates change through time in a wildlife-tourism hotspot. Global Ecology and Conservation 27:e01530.

RIGINOS C, FAIRBANK E, HANSEN E, KOLEK J, HUIJSER MP. 2022. Reduced speed limit is ineffective for mitigating

the effects of roads on ungulates. Conservation Science and Practice 4:e618.

THOMAS SL, REED SE. 2019. Entrenched ties between outdoor recreation and conservation pose challenges for sustainable land management. Environmental Research Letters 14:115009.

VAN DER REE R, SMITH DJ, GRILO C. 2015. Handbook of road ecology. West Sussex, UK: John Wiley & Sons.

YANNIS G, LOUCA G, VARDAKI S, KANELLAIDIS G. 2013. Why do drivers exceed speed limits. European Transport Research Review 5:165–177.

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