Table 1 Academic articles and reports on impacts of ORVs on turtle eggs and hatchlings

Jurisdiction	Source	Data/findings	Notes on source
International	T Schlacher et al., 'Adverse impacts of off-road vehicles on coastal dune vegetation are widespread, substantial and long-lasting: Evidence from a global meta-analysis of sandy beach-dune systems', *Estuarine, Coastal and Shelf Science,* vol 312, 2025, pp 1-13.	Article focused on examples from the United States, Israel, South Africa, Australia, Canada and the United Kingdom: • *Adverse environmental impacts attributed to ORVs in beach-dune ecosystems span a broad range of responses, ranging from depletions of invertebrate populations, declines in animal diversity, disturbance and morality of birds (including their nests/eggs),* ***crushing of sea turtle hatchlings****, enhanced erosion, and harmful impacts on costal vegetation [p 2].* • *Whilst the above catalogue of ORV damage to plants is clear, the consequence of changes to vegetation that are attributable to vehicles extended well beyond greenery. Plants in beach-dune ecosystems have multiple functions, but two cardinal attributes stand out: Firstly, dunes protect coastal assets and unplanned ecosystems from storms; typically, this critically important ecosystem service of erosion mitigation is firmly dependant on intact*	Please note, this article is not available in full PDF copy through library services but can be read via the Moreton Bay Foundation website.[4] Numerous media articles were published in response to this research report, including: • J Ross, 'Queensland study prompts calls for 4WD ban on beaches being 'pummelled to death'', *ABC News,* 24 March 2025. • J Attanasio, 'Calls for rule change as Aussie beach problem spirals out of control: Cannot continue', *Yahoo News,* 20 May 2025.

[4] The Moreton Bay Foundation, 'Vehicle Impacts on Ocean Shores', *Our Research,* n.d., accessed 6 January 2026.

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		and diverse vegetation at the land-sea boundary [p 7]. • ***Loss of vegetation can also increase the likelihood of nest failures in beach-nesting birds and turtles**. It follows that the degradation of plant communities will translate into adverse effects on animal populations and assemblage [p 9].*	
Federal	Australia. Department of the Environment and Energy, *Recovery Plan for Marine Turtles in Australia: 2017-2027*, 2017.	Recovery plan implemented due to the vulnerability of turtles: *[marine turtles] also display late maturation as well as experience high juvenile mortality. All these traits mean that they are slow to recover from population declines and are vulnerable to a wide range of threats [p 4].* Habitat impact caused by ORVs was listed as a threat to the species: *The use of off-road vehicles on coastal beaches in Australia is a popular recreational activity. However, **off-road vehicles can effect marine turtles** either by crushing eggs or reducing emergence success via compacting sand over nests, eroding dunes (reducing suitable nesting habitat), and/or creating tyre ruts that can impede hatchlings reaching the sea.* *Beach access is generally managed by local councils. Some councils have closed marine turtle*	The recovery plan was developed in conjunction with state and territory governments.

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		nesting beaches to the public during the breeding season to reduce the impact on nesting turtles [p 42].	
International	M Aguilera et al., 'Assessing the effects of multiple off road vehicles (ORVs) tyre ruts on seaward orientation of hatchling sea turtles: implications for conservation', *Journal of Coastal Conservation,* 2019, vol 23, pp 111-119	This article replicated tyre ruts on the beach to test the impact on logger head turtle hatchlings. The article stated the following findings: • *Specifically, we found that the tyre rut depth affects the time needed to reach the ocean; the deeper the tyre rut, the longer it took the hatchlings to reach the sea. We showed that the tyre ruts 4 cm and deeper had a significant effect on the time it took the hatchlings to reach the ocean. Although no significant differences were found between the control and the minor tyre rut scenarios, we showed that shallow tyre ruts can minimise the time needed to reach the ocean. In addition, the deepest tyre ruts (severe; treatment 8.5cm) were associated with an increased probability of disorientation [p 116].* • *On human-altered beaches, where ORV use can occur in addition to light pollution, the combination of these circumstances may decrease the probability of hatchling survival [p 117].* • ***Tyre ruts may delay the ability of a sea turtle to reach the ocean**, but they also*	Study area was Boa Vista Island, Cape Verde.

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		result in disorientation on the beach. Some studies have shown that when hatchlings are inside a tyre rut they crawl along it parallel to the water…, increasing their exposure time to predators. In our study, we found extensive disorientation in sea turtles within the severe rut treatment, which was likely caused by the shadow of the tyre rut. In those cases, some hatchlings were disorientated continuously – whereas others were oriented incorrectly and started to crawl inland [p 117].	
International	J van de Merwe, E West & K Ibrahim, 'Effect of off-road vehicle tyre ruts on the beach dispersal of green sea turtle *Chelonia mydas* hatchlings', *Endangered Species Research,* vol 18, 2012, p 27-34.	Article replicated ORV tyre ruts to assess the impact on green sea turtle hatchlings: • ***Simulated ORV ruts were found to significantly increase the time taken for hatchlings to disperse**, with deeper ruts impeding dispersal completely [p 31].* • *In the worst-case scenario presented here, the majority of the Chelonia mydas [green sea turtle] hatchlings (91%) were unable to make it through a single 15 cm deep rut. This indicated that ORV rut depts of >15 cm dan completely prevent sea turtle hatchlings from reaching the ocean. It is not uncommon for ORV ruts on sandy beaches to exceed 15 cm. In fact, tyre*	Study conducted at the Ma'Daerah Turtle Sanctury on the east coast of Terengganu, Peninsular Malaysia.

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		ruts up to 50 cm deep have been observed on South Stradbroke Island, southeast Queensland, Australia. Simialrly, on North Stradbroke Island a maximum rut depth of 28 cm was recorded and 21 % of ORV ruts were deeper than 10cm [p 31.]	
International	United States of America. Department of the Interior National Park Service, *Chapter 3: Final Cape Hatteras National Seashore Off-Road Vehicle Management Plan*, 10 November 2010.	Report from the US National Park Service recorded the following impacts of ORVs on turtle nests, eggs and hatchlings: • ***ORVs drove over four to five nests per year from 2000 to 2002**; however, the nests survived. Two nests in 2007 and one nest in 2008 were known to have been run over by ORVs before they were found during the morning turtle patrol and fenced off. Of these three nests, the 2008 nest and one of the 2007 nests appeared undamaged; however, four eggs were crushed in the second 2007 nest. In 2004, a total of ten hatchlings were killed by vehicles in two separate incidents [p 237].* • *In 2010, an ORV driving on the beach at night, in violation of the consent decree, struck and killed a nesting female loggerhead turtle during the nighttime hours between June 23 and June 24. The turtle had crawled out of the ocean and*	Study area was Cape Hatteras, North Carolina, United States.

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		attempted to lay a nest between ramps 70 and 72 on Ocracoke Island. The turtle was hit by an ORV and dragged approximately 12 feet, causing fatal injuries to the turtle. The turtle was found dead by NPS turtle patrol at 6:10 a.m. on June 24. This particular incident is believed to be the first time documented that a nesting sea turtle has been killed by an ORV at the Seashore [p 237].	

Source: Compiled by the QPL from sources as referenced.