

**Annexure A: Environmental Impacts, as Identified in the *Western Cape Guidelines Series*****TABLE 1:** Summary of the potential for environmental impact to result from actions or activities associated with off-road routes and their use

<b>Activity or Action</b>	<b>Consequence of Activity</b>	<b>Key Resulting Impact on Environment</b>
Clearing of route corridor	Reduction of vegetation cover	Accelerated erosion and loss of soil; Visual degradation
	Alteration of habitat conditions and habitat fragmentation	Impacts on fauna and flora populations; Alteration of the composition of species by damaging existing plants, creating bare spots that favour exotic and alien species, the seeds of which are introduced by route users and their vehicles
	Alteration of habitats known to be sensitive to disturbance and habitat fragmentation	
Routes established on poorly drained (cohesive) soils	Wet muddy patches along route	Tread braiding and widening as users avoid mud holes; Accelerated erosion and loss of soil, particularly where route grades are steep
Routes established on fine and poorly consolidated soils	Gravelly and rough road surface; Dust bowls in road surface	Accelerated erosion and loss of soil (usually by wind); Tread incision; Wash away of materials during wet periods; Poor quality driving surface
Routes established on soils with a high granular component but insufficient fines	Poor compaction; Corrugated effect to the tread surface	Wash away of materials during wet periods; Accelerated erosion and loss of soil; Poor quality driving surface
Cut and fill on steep slopes	Increase in the footprint of a route; Increased velocity of runoff	Erosion potential increases with the steepness of slope and the length of exposed slope; Accelerated erosion and loss of soil; Visual degradation
Channelling of water	Increased water flow in a focussed area	Accelerated erosion and loss of soil; Tread incision
Alteration of surface and sub-surface water flow	Alteration of natural drainage patterns	Surface water ponding; Increased potential for the formation of headcuts and erosion gullies
	Development of mud holes along the route	Tread braiding and widening as users avoid mud holes; Deepening of mud holes where crossed by users

Activity or Action	Consequence of Activity	Key resulting Impact to Environment
Alteration of channel flows at causeways and bridge structures	Sedimentation of watercourses	Increased turbidity, decreased water quality, and associated impacts on aquatic fauna and flora
	Alteration of in-channel habitat and loss of riparian vegetation	
	Impounding of streams	Increased potential for the formation of headcuts and erosion gullies which can create a physical barrier to migration of aquatic fauna;
	Alteration of flow patterns	
	Eddying around engineered structures and associated undercutting of structures, especially where engineered solutions (such as bridges and causeways) are not engineered directly onto competent bedrock.	Potential dewatering of adjacent wetlands and floodplains and impacts on associated vegetation;
	Washing away of road surface at drainage crossing during high intensity rain events (such as are experienced in drier areas)	Potential threat to infrastructure upstream (e.g. farm dams, causeways, etc); Loss of in-stream habitat; Channel widening and decreased bank stability Visual degradation
Soil compaction	Increased runoff and reduced infiltration	Accelerated erosion and loss of soil
Soil displacement	Deepening of tread over time	Accelerated erosion and loss of soil; Formation of ruts
	Increased sedimentation of watercourses downstream	Increased turbidity, decreased water quality, and associated impacts on aquatic fauna and flora

**Note:** The purpose of the information presented in this table is to highlight why responsible management of off-road routes is needed to minimise environmental impact. It should be remembered that every off-road route is unique and the important ecological issues to be considered will vary widely according to the type of route, and the environment within which the route is established (i.e. consideration of local habitats). Therefore, this summary may not present an exhaustive list of activities, consequences and impacts, but can serve as an initial guide (refer to Appendix A).