

# 4WD Impacts on Fraser Island

*During the first term of Queensland's Beattie Government (1998-2001) a million people visited Fraser Island. During the same period over a million tonnes of sand was sluiced off Fraser Island's sand tracks to degrade its World Heritage values. Over one tonne of sand was permanently relocated for every visitor. The biggest impact of 4WDs on Fraser Island is not on the beach or the foredunes, but along its network of tracks where every heavy downpour relocates tens of thousands of tonnes of sand. Other 4WD impacts include bird kills, disturbance of bird breeding, social impacts (including shrinking of wilderness, noise and safety to humans), damage to the foredunes, increased erosion on tracks and roads and the spread of litter, weeds, pathogens and other injurious agencies. This Education Supplement prepared by the Fraser Island Defenders Organization attempts to summarize the impacts of 4WDs and suggest ways to reduce the impacts.*

## Physical Impacts

**Beach Impacts:** On the beach below the high water mark, the physical impacts of 4WDs are obliterated at each change of the tide. There has not yet been lasting evidence on of any enduring impact on beach worms and molluscs as a result of 4WDs, although there has certainly been a very significant decline in the ghost crab populations. 4WDs have had a significant impact on shore-bird populations decimating numbers of some species.

**Foredunes:** On the foredunes, just above the high water mark, 4WDs destroy vegetation and increase vulnerability to wind erosion as well as disturbing bird nesting sites.

**Sand Tracks:** The greatest impact of 4WDs on Fraser Island though, is out of sight and not readily observed. It occurs along the roads in Fraser Island's interior. Every heavy downpour moves thousands of tonnes of sand along the tracks into hollows and lake basins. This sediment smothers old soil surfaces. To understand the process which is where the greatest 4WD impact on Fraser Island is one needs to understand water repellence in sand.

**Water repellence:** CSIRO Soil Studies in Cooloola noted the nexus between vehicle disturbance and the water repellence qualities of sand. Any disturbance of surface sand increases its water repellence. (Although water is expected to pass as easily through sand as through a sieve, water splashed onto dry disturbed road surface will roll up into balls with grains of sand on the outside). Once the surface is wet, the capacity of the sand to absorb the water slowly increases. The water repellence of sand means that heavy downpours can't be immediately absorbed and water rushes down the slopes carrying much surface sediments.

**Downcutting** of road (and even walking track) surfaces is cumulative. Many Fraser Island roads are now metres below their original elevation. The relocated sand settles at the bottom of the slope as the water velocity decreases. This happens too frequently to be in lake basins. Sand continues to move from sand tracks into lakes: McKenzie, Boomanjin, Allom, Garawongera, Boomerang, Birrabeen and Jennings. Elsewhere the sand moves off the road to smother old soil profiles. Because the outstanding natural values of Fraser Island include its unique lakes and the soil profiles, this is unacceptable.

The degree of downcutting is a direct function of the amount of disturbance to the road surface. The major causes of disturbance to the road surface are wheel slip, the volume of traffic, road widening and consequent desiccation, and, (ironically) road maintenance itself.

**Deposition:** Sand sluiced from roads have converted Yidney Lake from a shallow lagoon to a dry surface with hundreds of tall blackbutts growing in. In places above the lake, the road has down-cut more than two metres, exposing the B horizon. There is clear evidence that this road sand has filled in the lake. Alluvial plumes are spreading into other lakes as a result of adjacent roads. At Lake McKenzie where the sediment contains tonnes of woodchips washed off the adjacent road. Most of the sand washed off the Central Station Eurong Road into Wanggoolba Creek is carried

downstream by the fast-flowing creek, but many formerly waterlogged areas are now filled with silt.

Downpours regularly result in the deposition of more than 30 centimetres of sand. This smothers old soil surfaces and changes the soil profile. This impact is ongoing and cumulative, but the impact of this sand movement on flora and fauna has not been fully evaluated.

**Desiccation** results from the opening up of the canopy to create the roads or widening roads for larger vehicles. This changes the forest ecosystem microclimate. Desiccation results in a considerable change to some epiphytic flora near roads. Recent studies of epiphytic fern along roads near Central Station showed there was a significant variation in the distribution of ferns as a result of the opening up of the forest. Other observations report a loss of epiphytic orchids and ferns along Fraser Island's roads.

Drying out of road surfaces reduces 4WD traction and accelerates disturbance. This increases water repellence and in turn water run-off and sediment flow. Thus desiccation has a major physical impact on the landforms.

**Wheel slip** is influenced by the moisture on the road surface, driver competence and the power:weight:tyre surface ratio of the vehicle (including trailers). Drier roads have much greater wheel slip. Tyre pressure also significantly influences the impact of vehicles. Vehicles towing trailers have much more wheel slip.

The competency of drivers is yet another variable which continues to be overlooked. More competent drivers have a significantly lower environmental impact because of better adjustment of load, tyre pressure and better control of power. Currently many drivers who visit Fraser Island have had no previous experience with four wheel driving let alone driving off road and in sand. These are mainly overseas backpackers who constitute over 40% of the island traffic



**Size of Vehicles:** Not all vehicles have the same impact on roads. Larger vehicles erode roads MORE than smaller vehicles. 40-50 seat buses have more impact than smaller vehicles. It is well established that axle loading impacts heavily on conventional main roads. Despite this common knowledge, the impact of axle loading restrictions haven't yet been considered for Fraser Island. This is despite the obvious conclusion that the roads with the greatest amount of erosion/sedimentation are those used by heavy vehicles.

**Road maintenance:** There is increasing evidence that grading the road surfaces is exacerbating the amount of sediment run-off. More comfortable rides are achieved at an enormous environmental cost to a World Heritage site.

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**Siesmic Impact:** Vibrations from large vehicles travel considerable distances through the sand. Just as the impact of heavy vehicles can destabilize and cause cracking in large urban buildings, so the shock waves transmitted through the sand can affect vegetation some distance away. Wanggoolba Creek bank vegetation is already showing evidence of a slow, on-going landslip. The track beside Yidney Lake collapsed under the weight of a fully loaded bus.

**Axle loading is critical factor in 4WD impacts.**

**Impacts on Vegetation:** Roads can become wind tunnels especially the cross island roads which mainly follow the valleys shaped by prevailing winds. This wind tunnel exacerbates desiccation.

Changes to the substrate can leave surface and subsurface roots are exposed thus weakening or killing plants, even relatively large plants. At the mouth of Bogimbah Creek substrate rapid accretions changes resulting from road sediments caused mangroves to die. The smothering of original soil profiles is burying seeds and spores vital for the forest regeneration. The nutrient status of soils will inevitably change as a result of sediment movement. The precise impact is unknown but of concern.

Significant secondary impacts of 4WDs on Fraser Island include removing fuel woods from the forests, the increase in litter, the cause of removal of protected plants. 4WDs have been used to illegally remove ferns from Fraser Island.

**Impacts on Fauna:** There is an established impact on some of the very specialized fauna of the Great Sandy Region. CSIRO studies in Cooloola showed the distribution of ant were affected by tracks. Some ant species will not exist within a certain distance of roads or other significant disturbance. Others are opportunistic. Other researchers have identified the impact of roads on acid frogs. The more disturbance there is, the more likely it is that non-acid frogs will invade the territory of acid frogs. Thus roads very markedly change the species composition. Roads also affect the distribution of small birds and mammals which are vulnerable to predation in crossing open spaces. The wider the road clearing the fewer species which will cross it.

There has been a very heavy impact on beach and foredune fauna both through "road kills" and through the impact of constant disturbance. Fraser Island populations of Pied Oyster catchers, red-capped dotterels and Beach Thickknees have been decimated since the beach had become a highway for 4WDs. Terns are weakened by having to continually move to allow 4WDs passage. Dingos have also been affected by 4WDs and have now hunt less and scavenge more.

**Roads as Vectors for Injurious Agencies:** Off-road vehicles are a potential vectors for spreading injurious agencies around Fraser island. Fraser Island has been remarkably free of feral animals most notably *Rattus rattus* and brown mice. These, plus weeds, soil pathogens and a whole range of other injurious agencies can accidentally be spread through vehicle movements. Vehicles also allow access which can be used to spread fire and litter. These impacts should not be understated.

**Shrinking of wilderness:** The impact of vehicles on the wilderness values is a difficult concept for many utilitarians to accept. People who only see value in something which is being physically used or which has investment /speculative potential (such as a rare painting) cannot accept the concept of wilderness. The concept is that people can get value from wilderness without actually physically visiting it and exploring it is an incomprehensible anathema to some. Utilitarians can only see value in natural areas as long as it is generating perceived economic activity. Such soul-

less people don't appear to understand that religion has no perceived economic value, that memorabilia which people most enthusiastically cherish and which means so much to them may have no perceived economic value.

Wilderness nourishes the soul and inspires people at least as much as parochialism, patriotism, religion or the arts. People don't have to go to wilderness to be inspired by it. Most Australians will not visit Antarctica yet 93% Australians want that remote and wild continent kept free from mining and commercial exploitation.

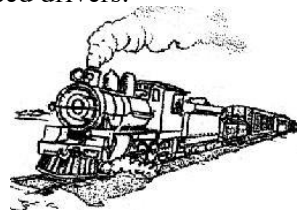
**Wilderness is a function of being remote from roads. Roads erode wilderness.**

**Noise:** The aesthetic impact of noise is well known and understood. While we are not talking of the volume of noise to cause pain or nervous disorders, we are talking about the intrusiveness of noise in a natural area. For example anyone walking along Wanggoolba Creek would have found the sound of vehicles roaring and clanking out of sight along the road above them will understand the intrusiveness of noise.

**Some remedies:**

There are many potential remedies to ameliorate the very serious degradation of Fraser Island's World Heritage values resulting from the present widespread use of 4WDs. The main principle to reduce the impact is to reduce the amount of surface disturbance by 4WDs. Just as the impact of pedestrians can be minimized by using boardwalks, so lifting vehicles travelling on the interior of Fraser Island onto rails would minimize impacts.

- \* Buses should be scaled down in size. Commercial tour operators should be encouraged to use much smaller vehicles. Current visitor numbers could be carried in more environmentally friendlier sized vehicles.
- \* ***Instead of making the roads to fit the vehicles of tour operators, tour operators should be required to get vehicles to fit a better road standard.***
- \* Axle loading limits must be enforced on Fraser Island sooner rather than later.
- \* High priority should be given to exploring the option of a light rail people mover to reduce surface disturbance resulting from the increasing volume of 4WD traffic.
- \* There should be a restriction on trailers there travelling on many Fraser Island tracks, particularly inland tracks.
- \* Tracks must be relocated away from lakes and streams and steep grades.
- \* Alternatives to 4WDs such as improving options for walking tracks need to be developed.
- \* Roads need to be closed and more quarantine enforced to limit the spread of injurious agencies through 4WDs.
- \* More emphasis must be given to reducing 4WD traffic on Fraser Island particularly by inexperienced drivers.



The impact of 4WD sand tracks is probably Fraser Island's most urgent management issue. The Commonwealth and the QPWS needs to listen to community concerns instead of proceeding on their own agendas.