Exploring Sustainable Transport Options for K'Gari (Fraser Island)

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Bio: Ross Waldron

- Probationary PhD Candidate at the University of the Sunshine Coast (USC) July 2017
- Class 1 hons in Bachelor of Science in 2014 (USC) in Forest Fire Ecology/Management
- Student Representative for the Sustainable Management Committee at USC in 2014
- Work experience with the Sunshine Coast Environment Council (SCEC) and Noosa Biosphere

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My Role:

- Using rigorous Scientific methods and current literature to develop sustainable transport options for K'Gari (Fraser Island).
- Communication with stakeholders for best Options that may enhance and not compromise;
  - the world Heritage and National and State Park values,
  - cultural and Indigenous Values of the Butchala Peoples,
  - tourism values for Operators and Industry on K'Gari.

Stakeholders

- **FIDO members**
- **Local Butchala indigenous group**
- **GHD interests**
- **Kingfisher Resort**
- **Tourism Operators and tourists including 4WD enthusiasts**
- **Local Residents**
- **Council**
- **QPWS/NPWS etc.**
- **World Heritage Rules and Regulations**
- **USC, learning centre and academics**

Focus

- Minimising the various impacts from 4WD Vehicles on the island.
- Investigation into more sustainable transport Options can;
  - maintain visitor amenity while,
  - minimising environmental impacts and preserve the island's uniqueness for future generations.

K'Gari's Roads

- Vast Network of over 1000 km's of sand roads and tracks.*
- Over 300, 000 visitors annually.*
- Used previously for;
  - mineral sand extraction,
  - logging activities, heavy industry*
- Consequently many older roads have poor engineering layout and alignment*
  - Vulnerable to;
    - 4WD vehicle impacts,
    - weather impacts,
    - runoff.*

(Goonetilleke and Bullen, 2000)*

The Issue

The movement of 4WD vehicles displaces material causing unnatural sand distribution and channelling of rainwater impacting the Island's ecosystem.

Unnatural Water Channelling

Sand Barricade at Lake Allom

Barricades in place to prevent sand displaced from roads travelling down slopes

Sand Barricade at Lake Allom

Barricades often fail due to fallen trees and heavy weather impacts

Sand and Sediment Build-up Close to Lake

Research Aim

- To produce sustainable transport solutions for K'Gari (Fraser Island).

Objectives:

- 1. Examine all the literature and research into the negative impacts that the existing transport model may be having on the Island,
- 2. Investigate broadly all sustainable transport solutions that may offer a similar level of tourist amenity whilst reducing ongoing environmental impacts, and
- 3. Identify preferred transport solutions via appropriate methods.

Options

- Researching current real world sustainable solutions to transport issues worldwide:
- Looking at possibility of different types of infrastructure/transport types:
- Gondola/skylifts
- Train/light rail
- Monorail, etc.

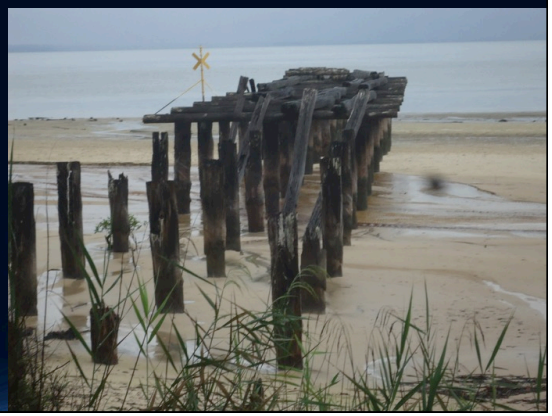
Options

Alternative materials for road surface:

- Recycled plastic composites
- Organic non-organic composites etc.

Simple solutions;

- Closing roads at certain times,
- Restricting vehicle types and use on certain roads.



Previous Road Treatment Trials

- Queensland Transport and the QPWS undertook a series of pavement studies from 1992 to 1995 for heavily degraded areas on Fraser Island (K'Gari).*
- Four different test sites,
- nine different treatments
- consisting of;
  - pallets,
  - wood chips,
  - tyre wall matting,
  - cellular confinement systems*
- Study found heavy vehicles were main contributing factor in track degradation,
- cellular confinement systems may be a solution in degraded areas,
- not financially viable.*

(Queensland Transport, 1993)*

Rubber Matting

Consideration of Different Variables:

The Environment of the Road:

- Dune system type.
- Slope/incline of road.
- Micro-climate of road.
- Proximity of road to important environmental features, especially lakes.
- Proximity of road to important cultural and indigenous sites.
- Type of Flora and Fauna in road environment.

Road use:

- Type of vehicles and amount of traffic,
- seasonal trends, road closures etc.

Complexity: Water Repellence

More complexity occurs:

- Bare sands generally have high water infiltration rates.*

Higher levels of water repellence occur on sand road surfaces according to increased amounts of;

- litter on surface under rich organic vegetation,
- large Fungal populations,
- also varies according to the type of vegetation and fungal population. *

Different dune systems have different compositions of sand and organic material.*

*(Goonetilleke and Bullen, 2000; Bond, 1964; Thompson and Bowman, 1984)

Complexity: Dune System Types

Dune System Types*

Dune system type 1: Youngest system , bare sands, pioneer plants

Dune System type 2 to 3: increases with the amount of vegetation

Dune System 4: Fully grown forest system

Dune System 5: Much older system, impoverished, diminished plant sizes

Dune System 6: Oldest dune system, end of degradation process for plants (retrogression)

Different dune systems behave differently for water repellence and permeability on sand roads

(cited in Sinclair, 1997)*

Deep cutting on a section of the Northern Road

Methods

Project in early stage.

Exact methods yet to be determined.

They may include:

- Sediment fencing
- traffic counters,
- mesh bags,
- soil analysis,
- road profiling,
- erosion modelling,
- weather observations.

Three Year PhD Study Plan

2017/18

- Gathering literature/information on real world examples and data on roads and environment
- Communicating with stakeholders
- Determining particulars of field study and overall study/thesis

2018/19

- Continue gathering literature/ information on real world examples and data
- Undertaking Field study, measurements etc.
- Preliminary analysis and synthesis of results of study, submitting academic papers

2019/20

- Completing analysis and synthesis of study and results
- Producing options for sustainable transport on K'Gari
- Completing thesis and academic Papers for peer Review and final Presentation

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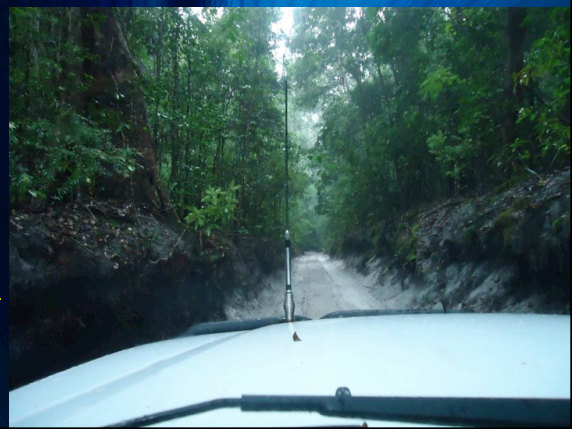
QUESTIONS?



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