Sandmining on Fraser Island (K'Gari) 1971 -76

Forty years have passed since sandmining concluded on Fraser Island (Kgari) at midnight on 31st December, 1976. Mining ceased because, despite the support for this most destructive industry by the Bjelke-Petersen Government, the Commonwealth Government, responding to the recommendations of the Fraser Island Environmental Inquiry, declared that no export licences would be issued for any mineral sand mined from K'Gari from the end of 1976. Most Australians have been born since sandmining occurred for this brief period in K'Gari history. This Backgrounder (No 80, April 2017) by John Sinclair AO provides some insights into the two separate operations without describing the massive public campaigns to stop them.

QTM (Queensland Titanium Mines)

QTM (Queensland Titanium Mines) operated along the foredunes from the Dilli Village track to the beach south to North spit. QTM moved its main dredge from Inskip Point to North Spit Fraser Island in December 1971. The sandmining operations didn't get underway until January 1972 but arrival of the dredge heralded what a major environmental threat this type of opencast mining posed to the outstanding natural values of this unique island. At that stage the outstanding values hadn't been identified and the World Heritage Convention hadn't been established.

By 31st December 1976 when the Commonwealth Government ban on the export of any mineral sands mined on Fraser Island came into force, QTM had mined about 250 ha of Fraser Island along 17 kilometres of foredune between North Spit and Dilli Village. The Federal Government was acting on the recommendations of a most comprehensive Fraser Island Environmental Inquiry conducted during 1975 after a High Court challenge to the validity of that inquiry.

The QTM mine was a linear strip no wider than a few hundred metres and adjacent to the beach. The workforce was based at Rainbow Beach and Tin Can Bay and commuted on what was then a bitumen road from Hook Point between the mine site and Jabiru Swamp. The foredunes torn up by the mining operations were exposed and, without permanent vegetation, vulnerable to wind erosion. The operations involved clearing additional land to stockpile topsoil and to build the road. This exposed more than twice the area mined to major degradation through salt spray because this protecting buffer on the foredunes was completely removed as well as the vegetation behind which was a cypress-eucalypt forest.

QTM worked parallel to the beach. Note the topography

QTM used a "wet" mining process. That meant that the processing plant separating the heavy mineral sand from the siliceous sand floated in the same pond as the cutter head. All of the sand except for 30 cm of topsoil was pumped back from the cutter head to the separation plants after which the heavy mineral (about 2%-3% of the total volume was trucked back to Rainbow Beach for more processing into the final product — rutile (TiO_2) zircon,, ilmenite and a minute fraction of rare earths. As the pond and plant worked its slow path northwards chewing up the foredunes, the siliceous sand (deprived of minerals) was spewed out the back. This helped push the pond forward.

At the Secondary plant (Rainbow Beach) the ilmenite was deemed non commercial and dumped around the Rainbow Beach plant but a small fraction of radio-active thorium remained. As a result this area has remained quarantined since.

QTM Rehabilitation Method

After mining the backfilled area behind the dredge was levelled and battered up to the unmined area. In the process the fine features of the pre-mining topography with many parallel dunes resulting from past sea-level changes were lost. Thereafter QTM used two different rehabilitation methods— one for the most exposed area on the frontal dune and another for the western area less exposed to wind and salt spray.

The most exposed foredune was covered with brush matting. This consisted of branches of trees in the way of the mining path being laid parallel to the beach. Into this were planted nursery raised *Casuarina equisitrifolia* almost as a monoculture

QTM rehabilitation process. Note the spread of the brush matting close to the beach and the distribution of the previously stockpiled top soil further from the beach

The hind areas were covered with the stock-piled top-soil which had seed from prior vegetation surviving in it. This became a forest of wattle and little of the pre-mining diversity survived. In response to criticism some supplementary planting was belatedly carried out.

FIDO was formed 10 months prior to QTM moving its operation to Fraser Island (K'Gari) and throughout the five years that QRM was destroying the foredunes FIDO was busy documenting the damage. In 1974 QTM sought new mining leases in the high dunes of the Bogimbah area, FIDO strenuously opposed the granting of these new leases and successfully took the case to the High Court of Australia.

D-M Minerals (aka Dillinghams or Murphyores)

While QTM was slowly chewing up the foredune, a much larger more aggressive threat to the integrity of Fraser Island was being posed by a new operation led by the Dillingham Mining Company.

QTM and D-M Mineral Operations Note the QTM process

In May 1975, Dillingham's operations got underway using a Maryborough based fly-in and fly-out workforce. It was a much larger operation than QTM, working at about five times the pace of QTM. The dunes were higher than the foredunes and covered with a much more substantial forest. Soil profiles that had taken eons to develop were destroyed. Murphyores also held leases covering a vast area of Fraser Island. Had the Commonwealth not intervened in 1976, the operation could have devastated and transformed thousands of hectares, tragically scarring forever what is now a World Heritage site. It was the anticipated scale of this operation that motivated the conservation movement to form a coalition that became the Fraser Island Defenders Organisation (FIDO) in January 1971, although Dillingham didn't actually start operations until May 1975. Mining began just before the Inquiry that ended it just 18 months later also began. However it managed to tear up about 500 hectares of dunes.

Dillingham Mine operations 1975. The primary separation plant located amongst the trees (just above the middle of the photo) separated the minerals using centrifuges shown below

D-M Minerals (aka Dillinghams or Murphyores) worked south west of Dilli Village away from the foredunes using a "dry mining" operation although it used a cutter head operating in a pond. However the primary separation plant did not float in the pond. It was static in a forest setting. The sand was pumped back to this plant from as far as a kilometre away and similarly the siliceous sand (deprived of minerals) was used to back- fill the pond. A large bulldozer worked in conjunction with the cutter head to keep the sand feeding into this much smaller pond. D-M Minerals trucked the primary treated product across the island (Dillingham's Road) to Buff Creek from where it was taken by barge to Maryborough for secondary separation.

Dillingham's Revegetation Method

After an area had been mined, the dunes were reshaped but without anything like the original contours because that would have made revegetation efforts more difficult especially as the topsoil that had been pushed aside prior to the mining had to be spread as evenly as possible across the re-contoured ground. There wasn't a lot of difference in the volume of sand because the re-contoured surfaces were not as consolidated as the dunes pre-mining. The success of the revegetation has been influenced mainly by three factors:

The time the topsoil was stored was significant because the seed-bank in the topsoil diminished over time.

The depth of topsoil over the mined area generally became thinner the further from the stockpile. Stockpiles were generally beside the roads and the road and the stockpile sites were never mined. Thus driving through a mined area what one sees from the road is much better than when one walks 100 metres in.

Unexpectedly, the downpwind proximity to unmined areas was an influential factor. For example, a small group of ironbarks adjacent to the site of D-M Minerals primary separation plant has resulted in many ironbarks germinating and growing into reasonably sized trees.

After the topsoil had been spread over the area, mulch gathered by driving huge machines through the adjacent bush and mincing up the under-story was thinly spread over the whole surface. This wasn't very successful in providing the seed source but it provided some soil surface stability.

Into the mulched surface was sown a crop of hybird sorghum because it didn't produce viable seeds. This also helped stabilize the soil surface and also provide protection for the seeds in the topsoil that were germinating (mainly wattle). Such a large area of bare sand open to wind sand-blasting could make survival of any seedlings difficult.

Native plants from the D-M Minerals nursery near the Dilli Village shed were manually inserted amongst the sorghum.

An inspection of the mined areas in December 2016, exactly 40 years since the end of mining, confirmed the view of ecologists to various inquiries that it would *"take 500 years if ever"* to re-establish the original plant communities that once existed there. The whole mining process completely destroyed the soil profile. In DM Minerals case it reduced what was an advanced Dune System 2 back to a very young Dune System 1. It takes hundreds if not thousands of years for the soil profile to develop and it seems that no amount of trying to assist Nature is going to hasten that process. Add to that the issue of weeds, particularly lantana, that have thrived in the disturbed conditions. Mining has turned out to be the environmental disaster that was predicted in 1971.