'*There's Camels on the Beach!*' The Nine Mile Beach, Central Queensland Macrotidal Beach Experiment

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It often seems that the more remote and environmentally challenging coastal fieldwork is, the more memorable the experiences and resulting stories become, and it is not uncommon for strong lifetime bonds, both professionally and personally, to form between the fieldworkers involved. While this is not always the case, it is certainly true of the field experiments conducted by the Coastal Studies Unit of the University of Sydney on Nine Mile Beach, Queensland, Australia in February 1992 (Figure 1a).

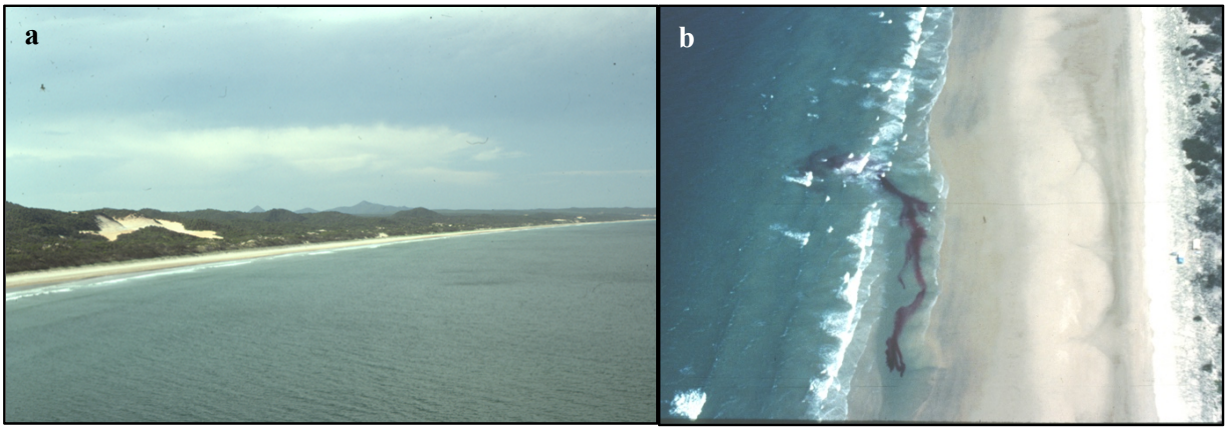

Figure 1. (a) Nine Mile Beach, Queensland taken from the headland at the southern end of the beach. The field site is towards the far end of the beach in this photograph. (Photo: R.W. Brander.) (b) Low tide bar and rip beach state morphology at Nine Mile Beach in early February 1992. Dye release shows a rip current while the field camp is on the foredune, roughly in the middle of the picture. (Photo: A.D. Short.)

The experiments were part of the Australian Macrotidal Beach and Estuarine Research Project (AMBER) and were led by Gerd Masselink and Ian Turner, who at the time were Ph.D. students under the supervision of Dr. Andy Short. Both were studying macrotidal beaches and six months earlier had conducted a fruitful reconnaissance of the Queensland macrotidal coastline, surveying a plethora of macrotidal beaches in Queensland that contributed significantly to the development of the macrotidal beach model (Masselink, 1993; Masselink and Short, 1993). The Nine Mile Beach experiment was the next chapter, so to speak, focussing on nearshore hydrodynamics (wave transformation, infragravity waves, bed return flow; Masselink, 1995) and morphologic change across a neap-spring tidal cycle (Gerd) and the effect of water table outcropping on the beach gradient (Ian). I became involved because following the completion of my M.Sc. with Professor Brian Greenwood at the University of Toronto (Scarborough), I embarked on an extended backpacking trip in early January 1992, the first stop being Sydney.

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With grand plans of travel, adventure and diving on the Great Barrier Reef, I was also angling for a Ph.D. in warmer climes, and within days had arranged to meet with Andy Short, who then introduced me to Gerd and Ian, who were preparing for their field experiments. Gerd was a tall Dutchman wearing pink overalls with the strongest Australian accent I'd experienced at the time. Ian took me to Bronte Beach, one of Sydney's iconic suburban beaches, where he pointed out a rip current that I couldn't see (a chance moment that piqued my interest in rips and ended up influencing my entire academic career and life – thanks Ian!). Both Ian and Gerd encouraged me to come join them for their fieldwork. I was planning to travel north up the Australian coast anyway and fieldwork can be addictive, so we agreed to meet at a certain day, time and location about a month later in the town of Yeppoon, about 1,500 km north of Sydney by road.

Despite no mobile phones or internet back then, Ian was waiting to meet me in a Landcruiser bang on time. I was, however, slightly disturbed by his haggard appearance, his legs covered with bites, the haunted faraway look in his eyes, and the fact that he was wolfing down a large bag of potato chips as if he was starving, which he probably was. Thus, I was a little apprehensive about what was in store.

Nine Mile Beach is a sandy low-tide bar and rip beach characterised by a transverse bar-rip system around the low tide level, a 100 m wide intertidal zone with swash bars and a relatively steep high tide beach (Figure 1b; Masselink and Hegge, 1995). Behind the beach is a small foredune backed by very extensive dune systems characterised by blowouts and parabolics. The choice of Nine Mile Beach as a location for the experiment was interesting. Many similar macrotidal beaches existed close to towns with amenities, or at least some hint of civilisation, and would have been perfectly suitable. But Nine Mile Beach is quite remote, being an almost 2 hour drive from Yeppoon, with most of the journey involving difficult four wheel driving over the extensive dune fields. While the location did offer a high-energy window of wave activity through the Great Barrier Reef (modal breaking wave height = 0.75 m), I often wonder if young academic bravado was the main factor involved in choosing such an isolated and challenging location. Nevertheless, my jaw dropped as we careened through a final blowout dune and onto an incredibly beautiful, wide, flat and very remote beach. It was low tide and it seemed to go on forever. It also seemed to be shimmering, but this was an illusion created by thousands of ghost crabs scuttling away from the Land Cruiser. This was not good. I hate crabs.

As it turns out, Nine Mile Beach is only 8 miles (12.6 km) long and the field station was set up approximately in the middle, and consisted of a large 3 compartment tent, a tarp for shade, and the CSU Camper (Figure 2a), which housed the data acquisition system and computers and was equipped with a ventilation system not dissimilar to a sauna. Before I arrived, it had taken the team (including at that time Andy Short and Skip Davies, who was visiting from the University of Florida) a full day to winch the Camper over the 100 m high sand dunes onto the beach. By the time I arrived, aside from Ian and Gerd, the field team consisted of Dave Mitchell, a field technician from Sydney Uni, and Adam Cranfield, an undergraduate student and surfer who mumbled in a language that I assumed was English. The standard uniform was distinctly 1990's Australian – hat and speedos (Figure 2b).

By the time I arrived, the team had sort of adjusted to the living conditions, which were, well, challenging. It was incredibly hot and humid, about 35°C daily and the water at 28°C felt almost as warm. There were a lot of bugs. During the day, clouds of sand flies would swarm around your head and in the morning and evening, mosquitoes would do the same. Every night there seemed to be a population explosion of a different type of bug. Everyone was getting lots of bites. When I first enquired where the toilet was, I received a silent outraised arm pointing toward the ocean. Disgusted,

I used the alternative, which was the swale behind the foredune. It wasn't the oven-like heat or the snakes that were the problem, it was my introduction to Australian flies that motivated me in joining the rest in suddenly disappearing for long private swims. This was also not without its perils as this part of the coastline was the approximate southern range of the Deadly Box Jellyfish, which as its name implies, is extremely deadly. But Ian had talked to a Park Ranger in Rockhampton who said, '*we should be ok.*' So we had that going for us.

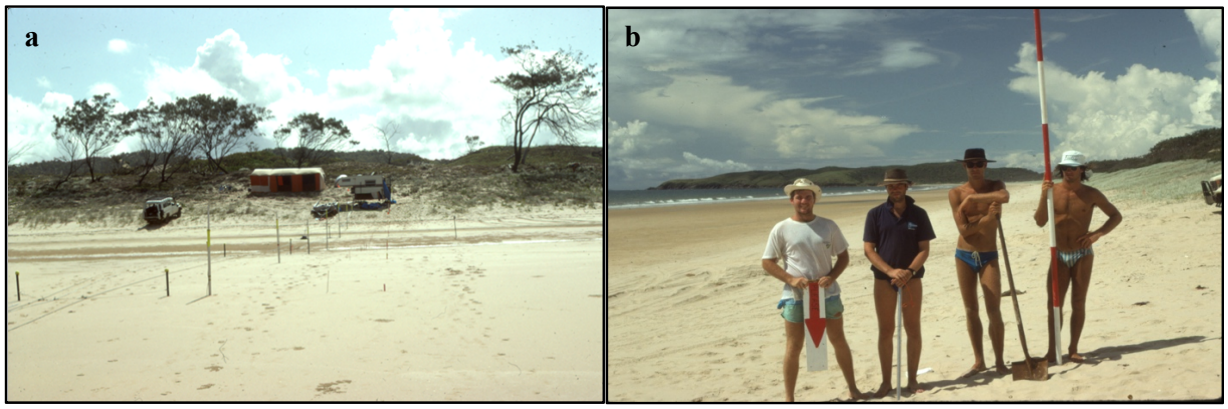

Figure 2. (a) The Nine Mile base camp with 3 compartment tent to the left and the Coastal Studies Unit Camper with data acquisition and computers on the right. (b) The field team towards the end of the fieldwork, from left to right: Rob Brander, Ian Turner, Gerd Masselink, and Adam Cranfield. David Mitchell (*our best man*) had already left. Note that the lead author is under the influence of strong painkillers. (Photos: R.W. Brander.)

The fieldwork itself was an eye-opener for me; and I think for Gerd and Ian, as well. They had set up a single cross-shore instrument line extending 200 m down the beach, that was cabled to the camper. Every instrument had its own 2- or 3-strand cable and an estimated 2.5 km of cabling was deployed onto the beach. The advantages of working on a macro-tidal beach became quickly apparent: you could install equipment at low tide without getting wet and could easily fix something that wasn't working during the next low tide. The instrument stations consisted of water wells, pressure sensors and ducted impellor flowmeters. One of the problems with the flowmeters was that the impellors would spin madly in the wind when exposed, which could quickly wear out the bearings. This resulted in what is still the most impressive field innovation I have ever seen when Dave Mitchell placed children's *Tiny Teddy* biscuits in the impellors when they became exposed, stopping them from spinning (Figure 3a). The biscuits would dissolve when the sensors next became submerged and the flowmeters would start measuring again. Sheer genius.

Most days were spent moving around the instrument stations, repairing sensors, conducting dumpy level surveys to get daily nearshore bathymetry and examining the sensor data in the camper, thanks to LabTech Notebook – the first real-time data acquisition system I'd seen at that point. It was a fantastic experience learning from Gerd and Ian. And Nine Mile was not without its charms. For showers we'd drive to the north end of the beach where there was a lovely natural waterfall (Figure 3b) and we'd often cook dinners and damper over a campfire. And eventually you got used to the conditions and it became enjoyable, mostly because of the company of course. It all seemed to be going so well. Gerd was proud of the fact that he had already collected 15 Mb (!) of data.

We had some post-grad students of Peter Nielson's visit from the University of Queensland (Raj and Hong) for a few days. They pitched a two-man tent not far from ours and we all spent one evening sitting on camp chairs on the beach, having a few beers, watching the nightly electrical storm, and gorging on prawns that a local fisherman had generously provided us with. The lightning

was good, but at one point someone (possibly me) yelled out, '*C'mon God! Impress us!*' Not long after, a strange darkness, much darker than the normal late-night darkness, fell over the southern end of the beach and started moving towards us. This was the sort of darkness that instantly made everyone wordlessly grab their chairs and run up the beach into the shelter of their tents. We settled into the outer compartment of ours, which was the kitchen and dining area, when the tent was suddenly buffeted by gale-force winds and torrential rain. At first it was a bit of a laugh, holding up the tent poles with one arm while holding a beer in the other. It quickly got more serious as the wind intensified and we all had to push the front of the tent with both arms to stop it from collapsing. By now there was deafening cracks of thunder and intense lightning flashing, so we sent Adam (the undergraduate) to go outside and check to see if the instruments were okay.

Figure 3. (a) Field ingenuity at its best. A *Tiny Teddy* biscuit deployed to stop the ducted flowmeter impellors from spinning in the wind. (Photo: I.L. Turner.) (b) The waterfall (shower) at the north end of Nine Mile Beach. From left to right: Ian Turner, Gerd Masselink, and Adam Cranfield. (Photo: A.D. Short.)

As we opened the tent, I caught a brief glance of the conditions. It was horrendous. Soon we heard Adam shouting what sounded like, '*There's camels on the beach!*' This didn't seem to make any sense – as mentioned previously, he mumbled a lot – so we went out to have a look ourselves only to be bombarded with a sensory overload of buffeting wind, noisy thunder, horizontal rain, and flashes of lightning that illuminated a herd of cattle stampeding along the beach and Dave running down the beach yelling and waving his arms to stop them from trampling the gear. I'm not sure where they came from. It didn't seem like a natural place for cattle to be and it did occur to me that maybe they were after the *Tiny Teddys*, but it was hard to think straight with so much going on. We eventually retreated to the tent, equipment unscathed, and returned to holding up the tent. No one was laughing anymore. Finally, one incredible gust of wind collapsed the front of the tent, picked all of us up and, fully airborne, we were hurled backwards crashing into the kitchen and the next compartment, demolishing them both. The roof was gone, there was stuff flying everywhere, there were stars in the sky, and just like that, the tempest was over.

It took quite some time to pick up the pieces and temporarily fix the tent. Raj and Hong had taken shelter under their 4WD vehicle, which was smart given that their tent was gone, never to be seen again. We had a few beers and retired to our air mattresses, which were now floating in about 10 cm

of water. To my horror, the crabs also sought refuge on the mattresses, but I was too exhausted to care. After that the weather settled down nicely. We never did see any cows (or camels) the remainder of the field experiment, nor did we see them before the tempest.

The fieldwork continued as normal, but shortly after the storm I started to feel some discomfort in my right buttock. It turned out to be a seemingly innocent little sandfly bite that I had been scratching absentmindedly. It was still itchy so I kept scratching. Given the heat, humidity and generally un-hygienic conditions, this turned out to be an extraordinarily bad move. It got bigger and bigger and soon became the size of a mango. One day I woke up and knocked on it like a piece of wood. It was rock hard and I knew that I had a boil even though I'd never seen one before in my life, or really even knew what a boil was. It was also extremely painful, but I didn't want to let the team down. As luck would have it, I remembered that I had brought some pain killers that were left over from a nasty root canal experience with a student dentist shortly before leaving Canada. I can't remember what they were, Percocet maybe, but they were strong and excellent. One minute I could barely move, next minute I was doing jumping jacks on the beach for no other reason than I could.

By now, it was getting time to finish the experiment and retrieve the gear. One of the local fisherman drove by and stopped for a chat. He thought we were crazy going in the water because of all the sharks. We nodded our heads, serious like, but as soon as he left, we completely dismissed his concern. What would a local fisherman know? Not long after, Gerd and I were chest deep, more than 100 m offshore, trying to pull out one of the star pickets, when we heard some shouts from shore. Adam was waving trying to get our attention. As usual, we couldn't understand him and were a bit annoyed as the star picket was proving difficult, until finally we realised he was trying to get us to look *behind* us. We both looked offshore at the same time and saw a large fin about 10 m away. Several things go through your mind in that situation, '*not a dolphin*' being one of them. We looked at each other wide-eyed, I thought Gerd's eyes were going to bulge out of his head, and then we bolted for shore, as much as you can bolt through water. We ended up leaving the star picket for the miners to scavenge at low tide.

Yes, *The Miners*. Nine Mile Beach truly is in the middle of nowhere and other than the local fisherman, there was no one there except for a group of miners on a 6-day camping trip. Eight of them had arrived in two 4WD utes (pick-up trucks). One for them and one for their 30 cases of beer, a gun and a generator to power the fridge to cool their beer. At night they slept under a tarp and rubbed kerosene on themselves to keep the insects at bay. One of them had a pet dingo. They would come to visit us occasionally, usually when they needed some help with one of their bogged vehicles, or when they were bored or drunk, or both. I found it difficult to communicate with them. My only attempt at conversation went something like this:

'So, ... you like beer, huh?'
*'Yeah mate, are you a f***n seppo?'* (n.b. a derogatory term describing an American).
'No, I'm from Canada!'
'Canadian eh? Ya drink piss? The dingo ere, she likes Canadians…' (followed by unpleasant gibberish).

Generally their visits were harmless, but on our final day of packing up the miners showed up and started driving around us in circles threatening us with their pet dingo and shooting at phantom kangaroos in the dunes. They made it clear they wanted bits of our cable and our plastic fold-up chairs. It was surreal. The whole situation felt like something out of *Apocalypse Now*, or even worse, *Deliverance*. I thought we were goners. All because of some stupid chairs. It's interesting how different people react to these sorts of situations. Gerd channelled his inner Dutch efficiency by

ignoring them and packing more quickly. Adam, the surfie, who actually resembled and spoke like a miner, hid in the tent. Ian, on the other hand, who was the most cultured of us all, handled it beautifully. He was exchanging all the right banter, having a laugh, it even looked like he was enjoying himself. It was an impressive *tour de force* that may have saved our lives, although it was more likely the fact that he gave them the plastic chairs.

We finally left, but by then my chemical induced pain killer euphoria had worn off and I spent the next few hours in the 4WD bouncing up and down on my mango-sized boil in some sort of coma-like pain-saturated state. The guys were quite concerned (at least that's what they told me at the time) and took me to the Yeppoon Hospital where both the doctor and nurse said, '*My god, that's the biggest tropical ulcer I've ever seen!*' I could go on (and did – there's a 10,000 word story about the rest of the trip, which involved recurrent boils – email me if interested), but that's not the point of this story.

Several months after saying goodbye (including several weeks making daily visits to Yeppoon Hospital), I was at a backpacker hostel in Mt Cook, New Zealand and got the urge to speak to Gerdo, so I phoned him up. He told me that they were going to do another experiment in a few months' time at Lamberts Beach in Mackay, Queensland, located just a couple of hundred km's north of Nine Mile, did I want to join them? Of course! The lure of fieldwork, friendship and camaraderie run deep. So I re-arranged my travel plans and eventually met up with them at Lamberts Beach. Science-wise, the experiment was very successful and also laid the groundwork for future research (Masselink and Hegge, 1995; Turner, 1993a,b, 1995). It was great to see Gerd, Ian and Dave again (and meet Gui Lessa for the first time), but the field site was at a beach close to the town. There was a pub down the road and an amenities block next to the tent. There were houses and people around and we went for a horse ride. We even managed to convince a local pizza place to delivery directly to the beach one night. It was all too easy and there are no good stories.

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