

Case study: integrating high value grazing and wetland management on Torilla Plain

Managers of the five grazing properties that cover Torilla Plain, adjoining Broad Sound in Central Queensland, have developed productive resilient enterprises for breeding and fattening of cattle. Wise use of natural pastures on their marine plain is the key. Wetlands across the plain also support biodiversity of national and global importance. By implementing externally-supported programs, often in collaboration with neighbouring properties, managers have enhanced the sustainability of their natural resources, livelihoods and wildlife.

Torilla Plain

- 120 km NNW of Rockhampton, on the Torilla Peninsula, between Broad Sound and Shoalwater Bay
- Marine plain system with a complex network of fresh and saline wetlands
- 25,000 hectares of plain; 5 properties

Sustainable cattle production on a marine plain

Landholders on Torilla Plain have natural resources and a grazing system that, if managed optimally, should support viable cattle enterprises for the foreseeable future. The key is grassland on a marine plain, grazed in rotation with upland forest country.

Since grazing of cattle began in the late 1800s, managers have understood that Torilla's marine plain grasslands can carry livestock through dry and drought periods—if not grazed too early or too heavily. Grazing pressure can be varied according to circumstances but grass cover must be retained on the plain to ensure enterprise survival. It is a flexible and resilient system.

This case study describes principles and initiatives from Torilla Plain, which could be adopted on other grazing properties with both wetland and hilly country.



Torilla Plain (yellow outline). (Google Earth & FBA)



Evening view across wetland and grassland, Torilla Plain

The grazing enterprises and their management objectives

Five independently-owned properties cover Torilla Plain and adjacent low hills (from south to north): Fernleigh, Toorilla Plains, Toorilla, Couti-Outi and Hollins Bay. All focus on cattle breeding and (in most cases) fattening, using breeds of Brahman-Angus cross in various proportions (or either type exclusively) to optimise tick and heat resistance, walking capacity, fertility and meat quality.



Moving cattle on couch pastures, Couti-Outi. (L. Geddes)

Lawson Geddes Snr. (Couti-Outi) says his goal has been “to breed better cattle and to not belt the country”.

Four of the properties are around 10,000 ha (25,000 acres) in area with in the order of 2000 head of cattle; one is only 3200 ha with 400 breeders and is run to create enough profit to make a living and put money back into the property, to assure its future. Each property has a mix of marine plain (flat, mostly tree-less, on grey clay) and upland forest country (ironbark, poplar gum, gum-topped box and/or tea tree on ridges, slopes or flats; from red soil to sand). The layout varies, impacting how managers can rotate their stock. All have fresh-water and salt-water dominated wetlands, supporting the plains pastures.

In each case, the management objective or focus of the property is to enhance land condition.

Lachlan Mace (Toorilla) says “a key test is whether the country is in better condition now than it was ten years ago”.



Ralph Bartlem (Fernleigh) states “our aim is to leave the property in better condition than when we came here”.

In a more personal context, managers want to “pass the property on to the next generation debt-free” (Craig Mace, Toorilla Plains) and keep it in good condition because “we have family ties to this place” (L. Mace).

Lachlan Mace working the cattle (T. Mace)

“The owner-managers of the Torilla Plain are mindful custodians of this sensitive land and live here because we prefer the way of life” (R. Bartlem). The local sea-breezes and pleasant outlook from each homestead are greatly appreciated. Landholders also enjoy the conspicuous storks, pelicans, swans, brolgas and bustards and flights of thousands of ibises on the plain, witnessing their life cycles at different stages.

Unique and important wetlands

The most striking feature of the plain, best seen from an aircraft or hill, is its exceptionally dense network of small channels and ponds. Micro-relief that varies only 1-2 m in height supports thousands of water bodies, each a few to tens of metres in width, across the entire plain. Small seasonal lakes also occur. This distinctive wetland landscape is unusual in Australia; it is possibly derived from when the plain was a shallow sea bay.

Eastern and landward parts of the plain are dominated by freshwater ecosystems due to inflowing creeks, whereas western parts closer to Broad Sound are



High density of channels and ponds, northern Torilla Plain inundated periodically by saline tidal water. The transition where fresh and salt water mix provides important habitat for plants and animals able to cope with, or preferring, these fluctuating influences.

Lowest wetlands on the plain support communities of short water couch *Paspalum distichum* and tall sedges *Schoenoplectus subulatus* and *Cyperus alopecuroides*, with mats of the aquatic fern nardoo *Marsilea* sp.. Slightly higher-set, less-often inundated areas support marine couch *Sporobolus virginicus*, which is replaced by samphire *Tecticornia* spp. dwarf shrubs and bare scalds where the soil is more saline. Most of the plain is naturally tree-less although tree swamps of *Melaleuca* spp. persist in some depressions near landward edges.



Marine couch: key to survival of the grazing enterprises

Torilla Plain has no formal conservation designation, but is described in A Directory of Important Wetlands in Australia. It has been highly rated in State-wide aquatic assessments and in 2015 it topped an assessment of wetlands in the Fitzroy Basin region, in terms of values and of potential for effective interventions in natural resource management. Queensland legislation related to wetlands, vegetation and fisheries is applicable.

As a wetland system, Torilla Plain potentially meets several criteria for international importance. Its swamps support threatened wetland-dependent birds: the Capricorn subspecies of Yellow Chat *Epthianura crocea macgregori*, for which the plain is its primary refuge and breeding area, and Australian Painted Snipe

Rostratula australis, a breeding visitor. In some wetter years, 10,000 to 20,000 waterbirds occur, mostly ibises, magpie-geese, egrets and ducks, some of which breed locally. Furthermore, Asian-breeding migratory shorebirds, notably Latham's Snipe *Gallinago hardwickii* and Marsh Sandpiper *Tringa stagnatilis*, regularly feed in the Plain's shallow wetlands.



Magpie Geese in Torilla Plain wetland

The plain enables stocks of barramundi *Lates calcarifer* and other fishes to migrate between the sea and persistent waterholes in the forest country. This is possible because, unlike much of coastal Central Queensland, it has not been completely isolated by constructed seawalls. Several decades ago, the plain's major outflow channels were blocked by small earthen banks, to limit inflow of tidal saltwater, but these permitted fish to bypass in floodwater moving in either direction. As well as shifting the freshwater ecosystems seaward, on the landward side the block banks retained fresh water and improved pasture in the dry season.

The plain's high ecological values are complemented by surrounding areas that include one of only five Ramsar Wetlands in Queensland as well as national parks and Fish Habitat Areas.

How cattle and wildlife are sustained on Torilla Plain

Late in the dry season, the plain is desiccated, with dried-out wetlands and limited wildlife but with cattle able to browse well-managed, marine couch pastures.

The wet season typically starts around New Year with showers and thunderstorms revitalising grasses and some ponds on the plain, attracting the first waterbirds. With heavier rain events, Wadallah and Coonyan Creeks deliver floodwaters from the adjacent Shoalwater Bay Training Area to the plain; smaller creeks significantly impact other parts of the plain. Inundation dictates that graziers remove all cattle to their upland forest country.

On Cout-Outi, flooding can rapidly inundate all of the plain. Early in the wet season, the manager and helpers



Heavy flooding sometimes occurs on the plain. (L. Geddes) on horseback have sometimes needed to swim cattle off the plain after an overnight downpour. But unlike droughts, floods are welcome, because they trigger growth of pasture:

“Once a flood occurs the business should be OK for the next 12 months” (L. Geddes Snr.)

Cattle can graze fresh grass under the forest for several months. Back on the plain, subsequent floods have been slowed by rapidly regrowing grass and sedge, causing water to spread into all channels and hollows. Excess flood waters drain to Broad Sound, rarely spoiling the pastures. As water levels stabilise, swans, ducks and stilts begin nesting in the plain's wetlands.

As the dry season begins, wetland plants mature and set seed, young waterbirds become independent and fish and other aquatic animals thrive. The plain steadily dries out. By about September, with increasing heat and dryness, grass feed in the forest country is no longer suitable and remaining cover must be retained, so livestock are moved back on to the plain. After a poor wet season, the plain may be accessible two or three months sooner and therefore can be grazed again much earlier, with care.

Cattle initially favour water couch and other lush feed in the depressions, accessible as the wetlands dry out,



Torilla Plain fully inundated. (T. Mace)

but as the dry season intensifies they shift to grazing marine couch on the minor rises. They also eat dense introduced Para grass *Urochloa mutica* on channel margins in the floodout zone of the two main creeks, on three of the properties. (Fernleigh has no introduced pasture and the managers have chosen to keep it that way.) Native sedges may be browsed but are less beneficial to cattle weight gain.

Benefits to landholders and the wider community

In terms of Torilla Plain's ecosystem services, its provision of fodder for beef cattle enterprises is pre-eminent. Retention of water-carried sediment and filtering of water by the plain's dense low vegetation is another service, limiting negative impacts on the lagoon of the Great Barrier Reef. The plain contributes to fishery stocks, but at a modest scale due to the small number and size of upstream waterholes.

From a biodiversity perspective, Torilla Plain serves as a migration stop-over area for shorebirds in the East Asian – Australasian Flyway and supports waterbirds at other critical stages of their life cycle (breeding).



Provision of fodder is an ecosystem service of Torilla Plain.

Management responses to support production and wildlife

Potential threats to values and benefits

Key ecosystem services could be reduced or lost if landholders allowed unsustainable loss of ground cover, or soil erosion, in connection with their grazing enterprises, or did not control weed and feral animal infestations. Wildlife tends to be impacted negatively from the same threats: healthy habitats are needed.

Enhancing ground cover

All of the landholders try to optimise ground cover on the plain. By fencing to land type and creating smaller paddocks, graziers have been able to more effectively rotate stock off the plain/wetland pastures in the wet

season and return them from forest/upland pastures in the dry season.

Craig Mace says: "our first aim is to get all land types fenced and especially to get the plain separate from the upland".

"The more intensive grazing system enables us to view the cattle more often and make better decisions on timing of rotations and providing supplements" (L. Mace).



New fencing at the edge of the plain (T. Mace)

Particularly in drought years, marine couch can be the saviour that enables graziers to survive—but it must be preserved from over-use.

It's a case of "keeping the best paddocks for the worst months" (R. Bartlem).

Gary Hall (manager, Hollins Bay), aims to "keep the plain as good as it can be, because it can save you in the end."

Fernleigh usually keeps two forest paddocks spelled in case heavy rains come and force cattle off the plains.

Using new fences together with new watering points to control cattle use of marine couch on the plain, has proved highly effective. Many areas that previously tended to be lightly covered, especially on more saline parts of the western plain, have reverted to good condition, e.g. now with 80% ground cover (L. Mace).

Several properties have entered into cost-sharing projects with Fitzroy Basin Association, facilitated by Capricornia Catchments, to erect fencing and install watering points. Labour and equipment have been supplied by the properties, with materials covered by the external funding. The co-funding has enabled a lot more to be done than would have been achieved

Enhancing ground cover

- On Toorilla, five original paddocks from 3200 to 6200 acres have each been split into 3 paddocks, all watered to facilitate rotational grazing
- At Fernleigh, a 10% increase in carrying capacity after NRM interventions
- Fencing materials: typically \$4 per m.

otherwise. Projects on Fernleigh and on Toorilla have won Fitzroy River and Coastal Catchments (now Capricornia Catchments) Best Coastal Project awards.

As well as helping production, enhancement of ground cover has sustained characteristic wetland plant communities and improved habitat for wildlife such as ground-nesting waterbirds.

Control of feral pigs

Feral pigs dig up water couch in the plains wetlands, seeking tubers of sedge such as bulkuru *Eleocharis dulcis*. The disturbed soil takes more than a year (up to five) to revert to full ground-cover. Pigs also take many small native animals and disturb nesting waterbirds.

At first, landholders on Torilla Plain were unsure that control of pigs was an issue worthy of large scale cooperative effort. With funding from Fitzroy Basin Association (100% in the first year, mostly 50% in subsequent years), a first cull by shooting from a helicopter destroyed over 900 feral pigs. This tally opened managers' eyes to the size of the pig population. With smaller kills (68 in the latest) and less damage to plains country by pigs in subsequent years, most properties remain keen supporters of the annual control program. With control also now occurring in the adjacent Shoalwater Bay Training Area, pig populations and their impacts are likely to remain low.



Feral pigs in drying wetland on Torilla Plain

Control of feral pigs

- Up to 9 properties (5 on Torilla Plain)
- 3600 pigs destroyed over 6 years
- Cost: approx. \$10,000 per shoot (each conducted over 2 days); initially three shoots per year, lately just one per year

Neighbourhood cooperation

Cooperation with neighbours on natural resource management is especially important when the same land feature—in this case the plain—is shared across several properties. Long term control of a weed or feral animal may not succeed on one property if the neighbouring properties do not take the same action.

By observing the management practices of neighbours with longer history on the plain, managers have identified strategies to apply on their own properties. Lawson Geddes (Snr.), the fifth generation of his family on the plain, has been a greatly appreciated mentor.

Sharing of machinery and specialised or high cost equipment also facilitates management of the plain.



View of the central-south part of Torilla Plain towards Pine Mountain, which is in the Shoalwater Bay Training Area.

Managing the salt water

Maintaining an optimal balance of salty and freshwater country on the plain is important for cattle production. Long-established block-banks, typically up to 20 metres wide, across tidal channels leading on to the plain have increased the area of freshwater-supported pasture and reduced the extent of highly saline country.

Saltmarsh habitat is now protected in Queensland due to its importance for fish nursery and other ecosystem services. State legislation (Fisheries Act 1994) places controls on new interventions in tidal areas although landholders may maintain their existing banks.

Flow of sea-water from king tides around the block banks and a short distance up-channel, can help graziers in very dry periods. Without rainfall or creek flow, even salt-tolerant couch grasses brown off under the ensuing hyper-saline conditions. Sea-water actually lowers the salinity and reinvigorates these grasses. Manager Gary Hall recognises that two-way flow of big tides around the channel block banks can be beneficial to couch grasses lining the channel banks, seasonally enhancing feed for cattle in parts of the northern plain.



Bank blocking channel flow from right to left, with bypass.

On salt flats at Fernleigh, low bunds were built by previous owners with government agency help about four decades ago, to stop tidal-scour erosion of patches

of valuable marine couch. This also created more persistent shallow wetland on the landward side, which was regularly used by Yellow Chats, migratory shorebirds and (on islets) nesting pelicans. During very wet years earlier in the 2010s, the bund was washed out. However, subsequent repair has caused an increase in samphire and sedge cover on the landward side. Ralph Bartlem has found that his Brahman cattle will browse the samphire at certain times of day. Gradually, birds are returning to inhabit the restored vegetation. Also, recent installation of 500 mm pipes in the repaired bund allows two-way movement of barramundi when water levels are high enough.



Sedge beds inhabited by Yellow Chats, Fernleigh.

Managing the salt water

- Own equipment and labour used to maintain old block banks
- Small size of banks allows limited saltwater bypass to revive salt-tolerant couch grasses in the dry season
- Fish can connect between the sea and inland waterholes during floods

Conclusions and next steps

Torilla Plain's landholders have learnt how to work in concert with a naturally resilient environment to optimise business productivity. Rarely if ever have they needed to bring in feed for their cattle or send them to feedlots.

The graziers have applied multiple strategies to improve pasture production. They have preserved vital pastures for grazing in the driest periods, fenced to land type to enhance rotation and spelling, cooperated with neighbours in control of feral pigs and managed salinity. In many cases, key actions have been supported by external co-funding.

The sustainable grazing regime has also ensured the viability of important wetland habitats for threatened, breeding and migratory waterbirds and for fish stocks. As a wetland complex, Torilla Plain retains high value.

In the future, even greater gains could be made by fencing wettest parts of the plain (to shorten the duration of grazing there) and remaining patches of plain that have least ground cover. Future challenges may include possible mining of shale oil deposits in this region and managing the effects of rising sea level.



New fencing to separate plain and forest, Toorilla.

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Photos are by the author, Roger Jaensch, unless otherwise indicated.

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