Watson River: Phosphorus case study

> ***"On Watson River we do our P lick order for our cattle before we do our food order for the station."*** *(Cameron Quartermaine)*

The productivity and profitability of many northern Australian beef businesses rely on timely and adequate phosphorus (P) supplementation. However, industry adoption of phosphorus feeding, particularly over the wet season, is modest at best.

The Queensland Drought and Climate Adaptation Program (DCAP) *GrazingFutures* project assists beef producers to identify phosphorus deficiencies, tailor supplement recipes and adopt practical feed delivery systems at the property and paddock level. When implemented, phosphorus supplementation greatly improves the herd performance (branding, death and growth rates) of northern breeding operations faced with seasonal variability, and is a fundamental feature of resilient livestock businesses.

In many cases innovative supplement delivery technologies and persistence are necessary to overcome wet season 'property access' challenges and achieve sufficient phosphorus intakes across the herd. The profitable and innovative phosphorus feeding program on Watson River applies directly to a large number of extensive producers across the *GrazingFutures* project area who are implementing P supplementation.

Background

Watson River station, located just south of Weipa on Cape York Peninsula, has an annual rainfall of 1500 mm. Like many area across north Queensland the soils are acutely deficient in phosphorus (P) and wet season property access is a challenge. With a mix of sandy and mostly clay soils on forest country, Watson River runs 1300 – 1500 Brahman breeders and followers. Weaning rates, including joiner heifers, average 57% and breeder losses range from 2-3%. Weaner steers are transported to a second family property on the Atherton Tablelands to be grown out to

around 320kg prior to sale to local bullock producers. Bullock producers pay premium prices for Watson River steers due to their agreeable temperament and quality.

It is about a decade since the first phosphorus case study was completed on Watson River station. At that time, Cameron and Doreen Quartermaine had developed the 89,000 hectare property to the point where half was fenced and the balance was bush country. During the intervening period, intergenerational transfer has occurred with Luke and Ally Quartermaine now managing Watson River. Their goal is to continue developing the bush country and equip a third generation with the necessary skills to take over the Watson River beef operation.

Feeding phosphorus

Aside from property development and herd improvement, the most significant management strategy applied over several decades by the Quartermaine family on Watson River has been the feeding of phosphorus (P) supplements to all cattle for the entire wet season. As Cameron says: *"On Watson River we do our P lick order for our cattle before we do our food order for the station."*

The Watson River wet season phosphorus recipe (Table 1) includes a mix of monodicalcium phosphate (MDCP: 21% P), GranAm™, lime, sulphur, salt and trace minerals, as well as 2% molasses to settle dust during supplement production in the factory. A similar recipe has been used for decades on the Watson River and reliably delivers adequate P supplement to all classes of cattle throughout the wet season. Feeding in lick sheds eliminates rain spoilage and maintains lick palatability. Over the wet season mature breeders require at least 10g P/head/day while daily P requirements are less for weaners or replacement heifers. The Quartermaines aim for breeders to consume around 80 g/head/day of lick which, at 12% P (as fed), delivers the required 10 g of P/breeder/day. However it is not unusual to see daily lick intakes fluctuate during the wet season.

GranAm™, a source of non-protein nitrogen, is used to help fill the protein gap as pasture quality declines later in the wet season. While used successfully on Watson River, GranAm™ is sour and can reduce supplement intakes in some situations. Many northern producers are reluctant to use GranAm™ in their wet season supplements as target wet season P intakes are often difficult to achieve. The inclusion of lime (5%) in exposed wet season P loose licks (eg bulker bags) helps form a surface crust and weatherproof the recipe. In the case of Watson River, all supplement is fed and protected in substantial lick sheds meaning the inclusion of lime in their recipe may be revisited next year. High humidity during the 2019/20 wet season caused some crusting of covered supplement and may have restricted intakes.

Table 1. The wet season lick recipe is 12% phosphorus as fed and is readily consumed by all classes of cattle on Watson River.

Watson River wet season lick recipe

Ingredients	Inclusion rate
Gran Am	10%
MDCP	57%
Lime	7%
Sulphur	3%
Salt	20%
Molasses	2%
Trace Minerals	1%

Phosphorus supplementation on Watson River greatly improves pasture intake over the wet season and is critical in maximising herd productivity, from liveweight gain through to pregnancy and lactation. The herd and economic benefits of wet season P are further highlighted by the Watson River herd analysis conducted by the Department of Agriculture and Fisheries (DAF) team in March 2020. When compared to not feeding P supplements, phosphorus supplementation on Watson River increased weaning rates from 46% to 57% and reduced breeder mortalities from 6% to 3%. Feeding P also increased female and steer sale weights by 7% and 9% respectively. Even though the number of weaners produced by the wet season P supplemented herd only increased by 29 (776 to 805), the overall lift in herd efficiency due to the wet season P feeding program improved overall property profitability by about 60% (Table 2).

Table 2. The herd performance, turnoff age, turnoff value and gross margins on Watson River with, and without, wet season phosphorus supplementation.

	No wet season phosphorus supplementation	With wet season phosphorus supplementation
Total adult equivalents (AE)	2100	2100
Total cattle carried	2467	2341
Total breeders mated and kept	1558	1347
Total calves weaned	776	805
Weaners/Total cows mated	**46%**	**57%**
Overall Breeders deaths	**6%**	**3%**
Female sales/Total sales	39%	46%
Total cows and heifers sold	**244**	**336**
Total steers sold	**388**	**401**
Average female price	**$687**	**$784**
Average steer price	**$382**	**$514**
Direct costs excluding bulls	$50,005	$70,917
Bull replacement	$32,245	$26,737
GM per adult equivalent	**$111**	**$177**

Wet season access

The difficulty of delivering wet season lick during the northern monsoon season should not be underestimated. However, due to the considerable production gains from P feeding, the Quartermaine family have infrastructure and management systems in place so P can be fed to all cattle while ever there is green grass.

Cameron and Luke have installed four large shipping containers at points around the property for bulk lick storage. These containers can hold up to 14 tonnes of lick and are filled prior to the wet season in November each year. Quad bike and “side-by-side” bridges allow access over flooded creeks to deliver lick to 31 covered troughs throughout nine paddocks.

The lick troughs on Watson River are well sheltered from monsoonal rains by wide corrugated iron lick sheds. Each trough holds roughly 240kg of supplement (12 x 20kg bags), and lick shed materials range from steel, to strong and termite resistant bush timber such as Cooktown ironwood.

All lick sheds include back rubbers carefully positioned to control buffalo fly on breeders, weaners and calves. The buffalo fly insecticide and oil is stored in bulk in the shipping containers along with the P supplement. The “side-by-side” and quad bikes are the main means of travel during the wet season to check cattle, fill lick troughs and charge back rubbers on a weekly basis.

Herd and land management

Luke and Ally have used the opportunity provided by recent cattle prices to sell down a portion of the herd and effectively halve the stocking rate on the fenced portion of Watson River. This is aimed at improving land condition through wet season spelling, and reducing end of dry season mortalities. The heavier culling of breeders and replacement heifers has produced a breeding herd with an even temperament and better overall reproductive performance.

The feeding of wet season P supplements and the focus on temperament allows for an efficient first round muster even with extensive surface water across all paddocks. The Watson River first round muster is a couple of months earlier than comparable properties that do not have the same herd supplementation and management strategies in place. This enables more timely weaning and helps preserve breeder body condition.

Watson River currently has approximately 325 hectares of improved grasses and legumes on cleared country, as well as a hay paddock. The fertilised hay paddock produces sufficient hay to meet the Watson River requirements, as well as a surplus supply for sale or use at local events like the annual show and rodeo. Future development plans include: (i) the subdivision of existing breeder paddocks for pasture spelling and improved herd management, and (ii) the installation of additional waters and cattle handling facilities on the remaining bush country to expand the breeder herd over time.

Breeders and heifers are vaccinated for botulism, weaners are vaccinated with 7 in 1 and all cattle are treated to control ticks. Luke has dabbled in keeping a few of the better Watson River male calves as herd bulls. Although there was some local demand due to the temperament and quality of these bulls, Luke is concerned that home bred herd bulls will not meet his exacting standards for the Watson River herd. Time is also in short supply, with many other critical property management activities a higher priority than selecting home bred bulls at this time.

As the next generation of managers on Watson River station, Luke and Ally share a passion for, and a commitment to, the northern beef industry.

Their clear focus on feeding wet season P, herd management, moderate stocking rates and wet season spelling are the key strategies for a successful beef operation on Watson River for years to come.

Created by: Emily Corbett (DAF Beef and Feedbase Team, Mareeba), Fred Chudleigh (DAF Toowoomba) and Luke and Ally Quartermaine (Watson River)
Date: August 17, 2020
Permissions: External use