Barkly Beef

DEPARTMENT OF PRIMARY INDUSTRY AND RESOURCES

MARCH 2017

Inside this issue:

You paid for it, now make sure it works: Principles of vaccine handling 1

The Townes are leaving town 3

Have you seen it? 4

Riparian and wetland zones – grazing best management practice 6

Following rain, prickly acacia requires treatment by pastoralists 9

Livestock disease investigations 12

Livestock disease investigation case reports 13

Toxic algal blooms 17

Livestock movement and identification in the Northern Territory 19

Botulism in the Northern Territory 20

Around the traps... 23

Barkly House staff 26

You paid for it, now make sure it works: Principles of vaccine handling

Jodie Ward, Livestock Industry Development, DPIR, Katherine

Results from the 2010 Pastoral Industry Survey indicate that a large majority (92%) of the stations on the Barkly routinely vaccinate the herd for botulism, while more than half (62%) of those surveyed annually vaccinate their bulls for vibriosis (Collier, C 2014).

I ask you, however, are you confident that you have done the best you can to make sure those vaccines were effective?

Vaccines have been proven to be effective at preventing the targeted disease, but once the vaccine has left the manufacturer there are a number of ways that the contents can be rendered ineffective. Below are some tips to ensure your vaccines are effective.

At the station:

- most vaccines need to be kept between 2 and 7 degrees Celsius at all times, therefore placing a thermometer in the fridge is ideal for tracking temperature fluctuations and making sure your vaccines are kept in prime working order. While you're there, check the seals on your vaccine fridge
- when bringing home new vaccines, bring the old stock to the front to be used first and discard any that have passed the expiry date
- if you have a good quality vaccination gun that needs to be cleaned (as should be done after each session of use), DO NOT use disinfectants or antiseptics as these will interfere with the next vaccine used. The best practice method is to boil the disassembled vaccination gun in hot water, allowing the pieces to air dry and then storing the dry gun in a zip lock bag in the vaccine fridge once reassembled.

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At the yards:

- invest in a vaccine cooler. Made out of wet suit material, this cheap yet effective device will keep your vaccine out of direct sunlight, and if pre-chilled before use, they will keep your vaccine cooler
- keep your vaccines in an esky with ice bricks when not being used, such as in between race loads of cattle. Rather than allowing direct contact between the ice bricks and the vaccine container, wrap the ice bricks in newspaper, this will prevent the contents of the vaccine getting too cold and potentially freezing, rendering it ineffective
- a car fridge on site is an excellent option to store unopened vaccines until they are needed. Make sure to check the temperature is between 2 and 7 degrees Celsius.

During transport:

- temperature control and exposure to direct sunlight are important factors to consider during transport as well. If going to town to collect vaccine, leave home prepared with enough space in an esky or car fridge to keep your vaccines cool on your travel home.

Beyond all other recommendations, if you are unsure of the right specifications for your vaccines, it is best to read the manufacturer's instructions inside the box.

For more information about vaccination schedules or correct application technique, simply type "vaccine" into the search function of https://futurebeef.com.au/

References:

Collier, C. 2014. The 2010 Pastoral Industry Survey - Barkly Region. Northern Territory Government, Australia.

As important as setting up data recording equipment is the care you take with vaccines

The Townes are leaving town

Kylie Jones, Helen Springs Station

Chris and Sally Towne's contributions to the Barkly community have been invaluable. Since arriving as the new managers of Helen Springs Station, nearly seven years ago, they have worked tirelessly on a range of projects and have been members of numerous committees. Sadly, their time in this part of Australia has come to an end. They will be taking an exciting step into the Kimberly region in Western Australia to manage Gogo Station in March. A new challenge awaits and we have no doubt their new community will eagerly accept such hardworking, dedicated and passionate people, just as we have over the years.

Both Chris and Sally have made significant contributions in so many ways and it's almost hard to believe how much they have been a part of the community during their time. Chris has been the President of the Barkly Campdraft Association for the past five years. Over this period, he has ensured this popular weekend has run smoothly. In 2016 he played a vital role in receiving a grant and organising construction of a shed over the camp, which has improved the facilities dramatically. He has been the President of the Barkly Landcare Association for the past three years and has also served as a committee member of the Northern Territory Cattleman's Association Barkly Branch and the NT Bushfires Barkly Branch.

Sally has worked tirelessly as the Barkly Campdraft Association Secretary for the past five years and has been the founder and organiser of the NT Triple Crown Challenge. The introduction of the Triple Crown has seen the entries of competitors in challenge events rise which ensures the sport will stay strong in the Territory.

Not only have Chris and Sally served on numerous committees but they have been there to lend a hand wherever required. They have mentored countless young people as they strive to build a career in the cattle industry and have been inspiring role models to all who call the Barkly home.

We as a community would like to thank both Chris and Sally for their efforts toward the development and growth of the Barkly. We wish them all the best for their future endeavours and hope to catch up with them in the Northern Territory again soon. Good luck at Gogo!

Chris and Sally Towne, with Emily, Annabelle, Jack and Chloe

Have you seen it?

The CashCow Project has released yet another publication for pastoralists titled “Could your herd be more productive?” Using the data collected from over 78,000 cows from 142 breeder mobs across northern Australia between 2008 and 2011, the CashCow team have been able to identify the main causes of low productivity for the four regions, from which they have created this comprehensive eight page document. In an easy to read format, with ‘if this, than that’ functionality, this really is a “must read” for people managing cattle and rangelands in the north.

Co-authored by DPIR’s Kieren McCosker, this document outlines the four steps to herd productivity:

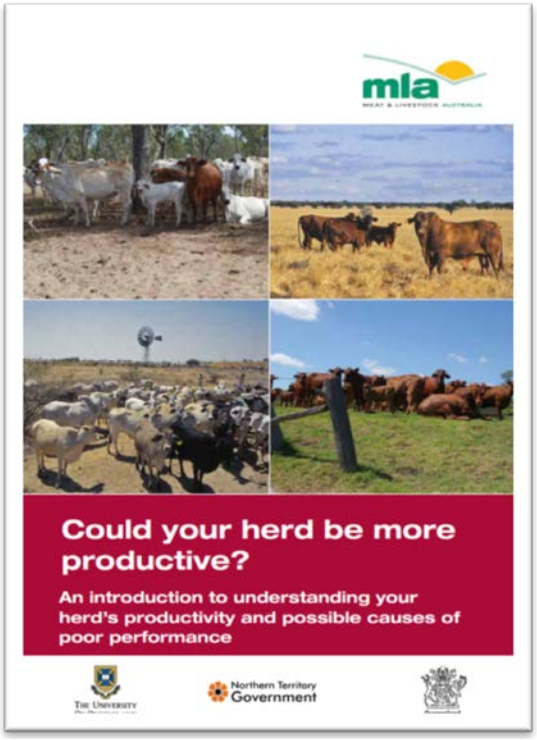
1. Recording the right information
2. Understanding what is achievable in your environment
3. Identification of low productivity
4. Assessing the management options to address the identified issues.

Another selling point for this publication is that it outlines what is possible for each region, as well as the average and typical range of the herds observed for annual weight gain of steers, weaner production and cow performance with links to tools that can assist you with making economic decisions.

All of this is provided absolutely free.

Download it today at: https://futurebeef.com.au/wp-content/uploads/CouldYourHerdBeMoreProductive.pdf (748 KB)

Or contact local Livestock Industries Development Officer, Jane Douglas, for a hard copy: 08 8962 4483 or Jane.Douglas@nt.gov.au



Electronic and hard copies are available

2017 BARKLY HERD MANAGEMENT FORUM

DEPARTMENT OF PRIMARY INDUSTRY & RESOURCES

SAVE THE DATE!

Date: 3-5th April 2017

Some of our industry's finest will be on hand at the Barkly Herd Management Forum to assist station staff (Head Stockmen/women, Overseers, Assistant Managers) with developing their knowledge base and understanding of the basic principles required to manage a profitable enterprise. The BHMF will help participants develop an appreciation of the region's resources, understand the steps necessary to preserve land condition and expand their knowledge on the factors affecting production in northern Australian beef herds. Attendees will participate in interactive sessions that provide recommendations and key strategies specifically for the Barkly region and allow them to learn from experts in various fields

The course will be run in conjunction with the MLA– funded 5-in-1 Producer Demonstration Site and will include practical demonstrations in the yards, and informative discussions from leading veterinarians from around Australia.

VENUE: Brunchilly & Helen Springs Station

Numbers are limited, get your booking in quick!

CONTACT NT DPIR TENNANT CREEK OFFICE:

NORTHERN TERRITORY GOVERNMENT

Jane Douglas
Pastoral Production Officer
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Jane.Douglas@nt.gov.au

mla
MEAT & LIVESTOCK AUSTRALIA

Riparian and wetland zones – grazing best management practice

Anne Alison, Co-ordinator, Barkly Landcare

The definition of **riparian** is "relating to or situated on the banks of a river or stream". The health of riparian and wetland zones can be severely impacted through the operation of a grazing enterprise.

We have all seen the significant impact livestock cause from grazing adjacent to and watering in rivers, creeks, waterholes, swamps and lakes.

Riparian fences force stock to shelter away from where they water

Left to their own devices stock:

- preferentially graze and, if not well managed, overgraze pastures within riparian or wetland zones
- enjoy the shade and the cooler breezes under the more heavily timbered riparian vegetation, leading to erosion
- trample deep cattle pads down to the water causing erosion of stream banks and sediment loss into the streams and waterholes
- pug up the wet or damp soil close to the water as it recedes
- lower the quality of the water as they drink by stirring up the sediment
- urinate and defecate in or close by the water supply
- under-utilise good quality pasture that is distant from the water supply, allowing it to go rank and dry by the end of the Dry Season.

Best management practice of riparian and wetland zones involves fencing off the rivers, creeks, waterholes and wetland areas to minimise the access that stock have to precious fresh water and, where appropriate, supplying off-stream water infrastructure.

Each situation is different so a number of factors need to be taken into account.

Options could include:

- fencing close to the streams and allowing stock to access only designated waterholes where the bottom is sound and the banks are not steep or likely to be degraded
- fencing off the frontage country to allow it to be spelled, as the alluvial flats and their better soils grow better pastures
- if there are existing alternative watering points beyond the proposed fence, it not only forces stock to graze other areas of a paddock but provides them with more even grazing pressure across the paddock over the year
- the provision of off-stream water infrastructure in conjunction with the fencing will force stock to graze areas that tend not to have been grazed to its full potential otherwise
- allowing cattle to graze the frontage country later in the season when it is still of a better quality that the pasture further out.

Streambank showing deep erosive cattle pads on the bank

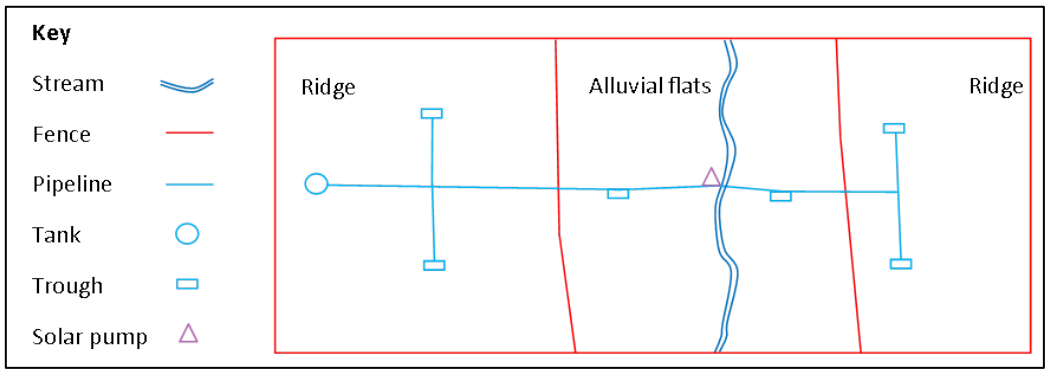
Cattle on the far right enjoying free access to fresh water and shade at any reachable site along the bank

Strategic grazing of the protected zones can be undertaken after the Wet Season; after the frontage pasture has been rested and when it is deemed suitable to be grazed without significant damage to the more highly susceptible riparian/wetland areas. If natural supplies of freshwater are available elsewhere in the paddock beyond the riparian fence during the Wet Season, cattle can be forced to graze these areas early in the season. As waterholes dry up during the year, stock can then be allowed into the riparian zones.

Off-stream water infrastructure, although often the ideal best management practice, is not always practical, depending on how easy it is to check water points regularly. If water infrastructure is the only water supply for stock and access to tanks and troughs is not available year-round due to seasonal conditions, it is not necessarily practical.

Issues to be considered:

- the placement of the fence in relation to the terrain
- the placement of the fence in relation to flooding events – the distance and height from the main flood flow, taking into account how regularly the stream floods to the height of the fence
- the terrain and its impact on placement of water infrastructure to ensure sufficient flow to troughs supplying large mobs of cattle
- the best deep pool of water from which to pump and whether it will last an entire season
- the best pump option to suit the particular site and management system – solar, diesel or windmill
- the number of troughs – troughs should be placed within the riparian zone as well as beyond the riparian fence
- the amount of water storage required to ensure adequate supply to all troughs during peak periods of hot weather
- management access to water infrastructure during the Wet Season if stock cannot access water elsewhere - i.e. whether a diesel pump be accessed for refuelling if required during the Wet Season.



An example of riparian fencing and off-stream water infrastructure

Benefits of riparian fencing and off-stream water infrastructure are:

- protection of waterways and wetlands
- spelling of frontage country during the Wet Season
- erosion prevention
- enhanced biodiversity of riparian flora and fauna
- improvement of water quality within the streams and wetlands
- saving of pasture frontage country for later in the season
- forcing stock to graze pastures further from riparian areas
- forcing stock to access smaller ephemeral streams, water holes and dams before they dry up and graze the areas around them first
- better distribution of grazing pressure across paddocks
- increasing carrying capacity and thereby production from the same paddocks.

During the strategic planning process undertaken by Barkly Landcare in December 2016, many pastoralists identified fencing off overgrazed riparian areas as a priority.

As a result, one of the targets in the Barkly Landcare 2017 – 2020 Strategic Plan is to:
"determine grazing land management (GLM) best practice for the Barkly through:

- four sites demonstrating methods to improve land condition by 2020 and underway in 2018
- convene annual GLM workshops or field days.

Barkly Landcare is currently attempting to source funding to initially develop two riparian projects. Later projects will be considered that focus on overgrazing around existing water infrastructure. Unfortunately, most funding sources do not cater for infrastructure, but investigation to find such grant funding will continue so that such projects can be implemented. If you are intending to fully fund such a project, Barkly Landcare is interested in hosting a field day to highlight the benefits of it.

Please contact the Barkly Landcare office (08 8962 4494) if you are considering undertaking such a project over the next year or two.

BARKLY LANDCARE

Following rain, prickly acacia requires treatment by pastoralists

Naomi Cassilles Southgate, Weed Management Branch, Tennant Creek

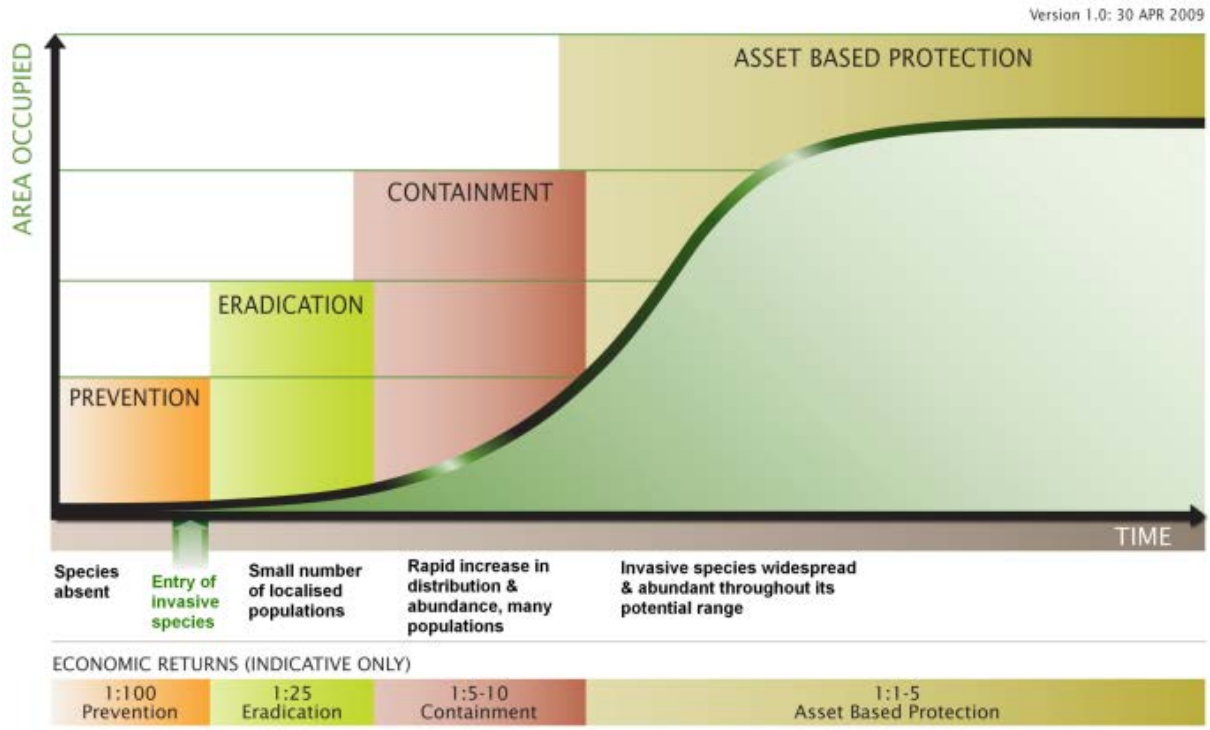
During this Wet Season the Barkly Tablelands has experienced heavy rainfalls; this is great news for pasture growth. However, it is bad news for the spread of weeds and seed germination. The Tennant Creek Weed Management Branch recommends that after this rain and when access permits, it is a great time to manage your weeds.

Eradicating prickly acacia from the Barkly

In the Northern Territory, prickly acacia is a declared Class A weed (to be eradicated from the NT), and listed as a Weed of National Significance (WoNS). Prickly acacia has caused substantial economic loss in neighbouring Queensland's pastoral areas and it has been found;

- that over 6.6 million hectares of arid and semi-arid Queensland are infested with prickly acacia, mainly in the Mitchell Grass Downs
- that a 25 % canopy cover of prickly acacia resulted in a 50 % loss of pasture, and a 50 % canopy cover almost resulted in complete pasture loss.

Prickly acacia poses long-term management cost and losses to pastoral productivity. The eradication of prickly acacia becomes less likely and control costs increase as the species spreads. Prevention is the most cost-effective solution, followed by eradication. See the diagram below for a cost-benefit analysis.



Generalised invasion curve for pests, weeds and diseases showing actions appropriate at each stage and return on investment. Source: Department of Environment and Primary Industries, Victoria

On the Barkly Tablelands concerted effort is needed to protect the productive grasslands, by preventing prickly acacia infestations and finally eradication. Prickly acacia has been found on 21 properties in the Barkly, three of these have significant infestations, and the remaining properties have isolated stands. Based on climatic modelling and soil type there is huge potential for the invasion and spread of prickly acacia in the Barkly region. Landholders are required to actively take control and eradicate all plants on their property to ensure they are compliant under the Weeds Management Act.

You kill one and thousands come to its funeral

Resource-intensive efforts for long-term outcomes

The Weed Management Branch, with help from Barkly Landcare and Conservation Association along with pastoralists, are working toward the eradication of prickly acacia from the Barkly. A lot of hard work went into treating our largest stands during 2016. The commitment from managers and landholders can be seen with all the dead standing prickly acacia. However, there is still a significant amount left on the Barkly and a large seed bank. This Wet Season has provided the perfect conditions for mass germination and all stations should be on the lookout for and treating established and new plants.

Seed spread

Follow your cow pads, cattle spread viable seeds effectively.

On pastoral properties, cattle are the major contributors to seed spread, as they preferentially graze the high protein seed pods, and then excrete the viable seeds. Seeds can also be transported when stuck in mud on an animal's hooves or on vehicles. The spread of prickly acacia can be largely minimised through stock management, for example, applying fencing and quarantine procedures. Further information on weed spread prevention is available at https://nt.gov.au/environment/weeds/prevent-weed-spread-industry-and-recreation/pastoral-industry.

Seeding and germination

A mature prickly acacia plant can produce up to 175, 000 seeds, with mature infestations producing millions of seeds annually. Seeds can remain viable in excess of seven years. However, 95 % of germination occurs within the first two years. Intensive follow up control of seedlings during this period will significantly deplete seed banks and preclude the next generation from seeding.

Seedlings keep a low profile, don't leave these guys

Prickly acacia germinates following rainfall in the wet season, with seedlings growing rapidly near water; the trees can flower and fruit two to three years after germination, and more quickly after high rainfall years. For more contexts please refer to the Desert Channels video emphasising the recruitment explosion in Queensland after the 2012 higher than average rain event:https://www.youtube.com/watch?v=8hql_cTXXrc

Working together

The Weed Management Branch is implementing a number of activities to assist landholders to make informed decisions on the management of prickly acacia, including demonstration chemical trial sites,

extension material, a cost-benefit analysis, and identifying suitable control methods. Funding has been obtained for a project entitled – "Increased productivity of high value grazing lands through management of prickly acacia with improved stakeholder capacity." This project is funded through the Established Pest Animals and Weeds initiative, part of the Australian Government's Agricultural Competitiveness White Paper, the government's plan for stronger farmers and a stronger economy. For more information on these activities contact Project Officer Nathan Mills on (08) 8973 8845.

Prickly Acacia Statutory Weed Management Plan

Land managers throughout the Territory are required under the Statutory Weed Management Plan for prickly acacia, to actively identify and eradicate all prickly acacia infestations and prevent new infestations establishing. There is a summary of specific management requirements and related actions designed to assist landholders in managing prickly acacia, this is located in appendix one at the back of the plan, available at https://nt.gov.au/environment/weeds/list-of-declared-weeds-in-the-nt/prickly-acacia.

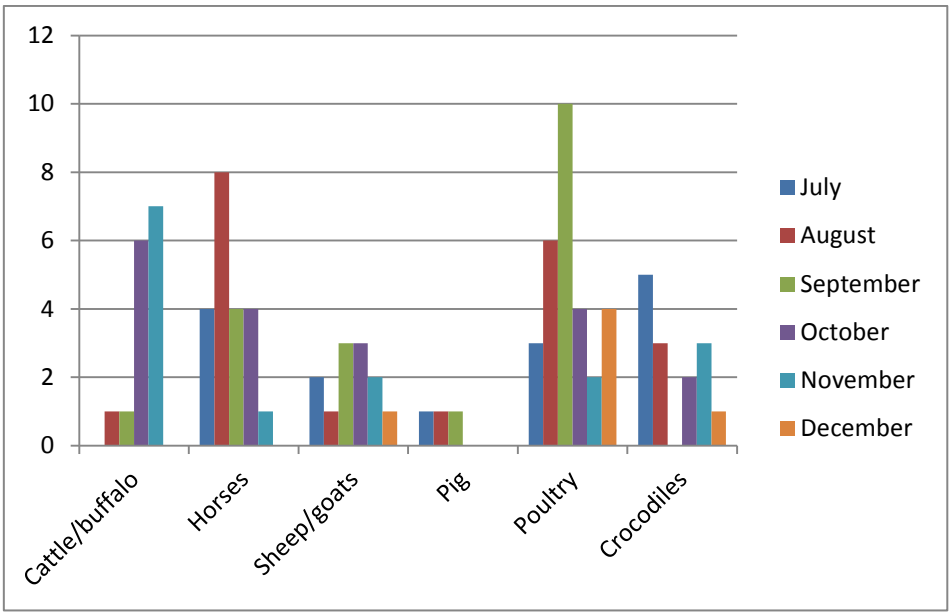
The Tennant Creek Weed Management Branch is able to assist land managers to develop programs that align with the plan and offer advice on weeds in the Barkly Tablelands: ontact Daniel Steel or Naomi Cassilles Southgate on (08) 8962 4314.

Renae McLean, Livestock Biosecurity Officer, Katherine

Livestock disease investigations

The Department of Primary Industry and Resources (DPIR) provides a free disease investigation service to livestock owners for diagnosis of notifiable emergency, exotic and endemic disease, including zoonotic diseases. Berrimah Veterinary Laboratories provide free diagnostic testing for exclusion of notifiable disease for all disease investigations, and subsidies are available to private veterinarians for significant disease investigations in livestock.

During July–December 2016, 111 livestock disease investigations were conducted to rule out emergency diseases or investigate suspect notifiable diseases across the Northern Territory. Figure 1 shows the number of investigations by species of livestock.



Livestock disease investigations by species for July - December 2016

Berrimah Veterinary Laboratories processed 271 livestock sample submissions, including samples to substantiate proof of disease freedom certifications, for accreditation programs and targeted surveillance to support market access.

The following case reports are a selection of field investigations of livestock disease incidents during the quarter.

Livestock disease investigation case reports

Bovine ephemeral fever causes mortality in cattle during dry season muster

Bovine ephemeral fever (BEF), also known as Three Day, is a disease found in cattle. BEF is spread by flying insects and is most commonly seen during the wet season in the Northern Territory. Cattle that have been exposed to the disease will usually build up immunity. Young cattle or cattle not previously exposed to BEF are more likely to be affected by the disease.

A manager on a flood plain property in Arnhem Land noticed approximately 30 head of two-year-old cattle from a mob of 450 showing signs of lameness, lack of coordination and lying down during the muster.

Samples taken from two of the affected animals by DPIR regional veterinarians showed no abnormalities. Although unseasonably early, laboratory tests on the blood samples taken detected BEF in blood samples from all animals sampled. Early rain resulting in increased insect activity likely contributed to illness and deaths in naïve cattle.

Sudden death and preputial swelling in steers caused by poor castration hygiene

Following castration, station staff noticed a dead steer and a further 12 steers were noticed to have massive swelling in the preputial area (in the front of the genital area). Despite swelling, all steers appeared to be moving and urinating normally.

Steers with swollen preputial area

An autopsy on one steer found no remarkable changes in the ureter and urethra. The greater omentum (a fold which hangs down from the stomach) was found to be congested, inflamed and had migrated into the lower pelvic cavity. There was a hard mass in the prepuce (pizzle) which appeared to be a mass of dead tissue.

The poor hygiene at castration likely contributed to an opportunistic bacterial infection of the castration wound. The 12 steers were given antibiotic therapy, and all recovered rapidly.

Suppurative cholangiohepatitis in a steer

A station manager found an eight-month-old Brahman bull calf lying down, unable to stand and moderately dehydrated. The calf was without a fever, and appeared to be fairly bright.

Tests conducted on the live animal did not reveal significant internal parasites, persistent infection with pestivirus, or evidence of bovine ephemeral fever. Mild muscle damage was found, likely due to the calf being unable to stand. The calf received supportive care for a week without improvement and was then euthanised.

Enlarged and inflamed gall bladder

A DPIR regional veterinarian conducted an autopsy on the calf. The most notable of the samples taken was the enlarged haemorrhagic gall bladder containing thickened bile. It was also observed that the liver was enlarged. All other organs appeared to be normal. Laboratory tests found that a bacterial infection had ascended through the bile duct from the intestine through to the gall bladder and on to the portal areas of the liver. In the lab, the bacteria *E. coli* was grown from the samples collected from the liver, spleen and bile.

In this case, the final diagnosis was suppurative cholangiohepatitis, which is a blockage of the biliary ducts by bacteria which prevents a suppression of the flow of bile into the intestine.

Various conditions cause mortality in mixed age poultry flock

The sudden death of five chickens out of a flock of 60 was investigated by DPIR regional vets in the Darwin region.

A number of birds in the flock showed signs of sneezing, nasal discharge, swollen faces and ruffled feathers following the introduction of a new bird into the mixed age flock approximately one month previously.

Post mortem and laboratory investigations of the dead birds revealed a moderate to mixed gastrointestinal parasite burden in two juvenile chickens. One adult layer was found to have moderate to severe uveitis (eye inflammation), moderate keratitis (inflamed cornea), mild conjuctivitus and a concurrent yolk peritionitis was diagnosed. A lymphatic neoplasia affecting the lung, kidney, ovary and intestinal serosa was found in another adult layer hen, likely due to infection with lymphoid leucosis. Avian influenza and Newcastle disease virus were ruled out in all birds. Given the varied range of conditions in this case, DPIR veterinarians provided the owner with management and biosecurity advice, and the owner has not reported any further losses.

Lead toxicity in a dog

An eight-year-old dog was examined by a private veterinarian after it began having acute seizures, along with a rapid heart rate and hyperthermia. The dog failed to improve with treatment and was euthanised. The dog was sent to Berrimah Veterinary Laboratories (BVL) for post-mortem.

The post-mortem showed that the dog was in good condition. There was evidence of diarrhoea, along with water and mucus mixed with small stones and plant material. BVL staff examined a wide range of tissues, including the brain; however, no significant findings were made.

Further discussion with the dog owner revealed that two other dogs had showed similar symptoms and died over the previous couple of months. The owners reported that the dogs had access to an area on the property where people had been making lead sinkers by the smelting of old car batteries.

Toxicology results showed that the liver had a markedly elevated level of lead (110 μmol/kg wet weight, ref <2 μmol/kg), confirming a diagnosis of lead toxicity in the dog.

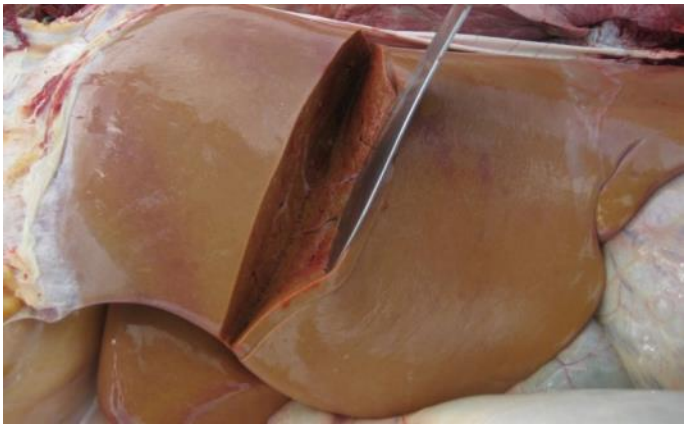
Pregnancy toxaemia the cause of sudden death in mustered cattle

Department of Primary Industry and Resources veterinary officers received a call regarding sudden deaths in a mob of 50 previously unhandled Brahman cross cattle that had been mustered by a helicopter. Staff held the cattle for a time before trucking them to the station yards for processing. Several of the heifers displayed signs of panting, agitation and varying degrees of lameness and lack of control over body movements. Three heifers died over the following two days.

Post-mortem examination revealed that one of the heifers was approximately 30 months old, in moderate to poor body condition. There was extensive carcase bruising and bones were unusually brittle, the liver was diffusely pale, gall bladder enlarged and the omasum was dry and hard. The heifer was approximately seven months pregnant with a bull calf.

Laboratory tests showed that the heifer had elevated muscle enzymes and raised ketone levels and a diagnosis of pregnancy toxaemia was made.

Pregnancy toxaemia, or fatty liver disease, occurs when the body begins breaking down fat for energy and produces ketones. A build-up of ketones in the bloodstream is toxic to the brain, which is fatal and difficult to treat once it has progressed. Post-mortem will often show a characteristic enlarged, soft, pale yellow liver and a later-term pregnancy.



Characteristic soft, pale yellow liver in a cow with pregnancy toxaemia

Pregnancy toxaemia occurs most commonly in fat pregnant cows when feed is limited or of poor quality. Stress, such as transport and yarding and time off feed and water, can also induce the disease, and a number of cows can be affected at the same time. While it can be difficult to identify late-pregnant cattle in a muster situation, stress should be minimised where possible and good quality feed should be available at the destination. When trucking cattle in late pregnancy, avoid transporting cattle which are due to calve within four weeks (unless the journey is less than four hours and directly to another property), and minimise time off water.

Australian bat lyssavirus exclusion in a dog

A one-year-old crossbred dog was taken to a private veterinarian after the owners noticed it had been fitting and acting unusually for the past day. The veterinarian found that the dog was hyper-sensitive to light and movement, had stiff limbs and a head tilt. Differential diagnoses included tetanus and rabies. The dog was euthanised after it failed to improve with treatment.

Post-mortem examination found the dog was underweight and dehydrated, with pale gums.

Laboratory testing showed there was mild inflammation of the brain. There was also inflammation of the lungs and the tissue of the paw pads, which suggests the dog may have inhaled or had contact with of some kind of irritant. Severe bleeding in the gastrointestinal tract may have been due to a blood clotting disorder.

A number of tests were conducted at the Australian Animal Health Laboratories and Australian bat lyssavirus, rabies and morbillivirus (canine distemper) were excluded. Tests were also run to check for lead, metaldehyde and snake venom levels, but levels did not provide a diagnosis. The signs seen in this dog are consistent with exposure to a toxin which could not be confirmed.

Nervous signs in a bovine viral diarrhoea virus persistently infected steer

A producer called Department of Primary Industry and Resources field veterinary officers to have a look at a three-year-old Brahman cross steer on a property just out of Darwin. The steer was apprehensive of people and extremely sensitive to noise and contact. The steer was in a mob of 100 cattle that were not exhibiting any of the same behaviour. The manager of the property also mentioned that the steer was significantly stunted compared with other steers on the property that were of similar age. The steer was euthanised and submitted as a transmissible spongiform encephalopathy (TSE) exclusion case to Berrimah Veterinary Laboratories.

Post-mortem examination found no abnormalities other than the spleen being smaller than expected. Tests proved that the steer was persistently infected with bovine pestivirus.

Bovine pestivirus is endemic in the Northern Territory and if a cow is infected while pregnant, the calf will also become infected. If the pregnancy is not aborted and the calf survives, it will shed the pestivirus for life (which is why they are known as persistently infected or 'PI'). PI cattle can grow well, but are generally unthrifty with a rough coat compared to other cattle the same age. They are a source of infection for other cattle which have not been exposed to the virus. PIs usually have a reduced life expectancy.

Sudden death in a mixed poultry flock

A hobby farm reported the sudden death of 11 birds from a free range mixed poultry flock of 15 birds outside Darwin. There had been no recent management changes or introduction of new birds.

Eight chicken, duck and guinea fowl carcases of mixed ages and sexes were found in varying degrees of decomposition and covered with maggots. Post-mortem examination showed all birds were in good condition, and four had maggots present in the upper gastrointestinal tract. Internal parasites were found in the faeces and there was no histological evidence of systemic infectious disease. Newcastle disease and avian influenza were excluded in all of the birds and the maggots were not those of the screw worm fly.

Warm, humid weather and rotting vegetable matter favour the grown of the *Clostridium botulinum* toxin in maggots. The presence of ingested maggots in the birds in this case is highly suggestive of botulism as the cause of disease. Cases of botulism in poultry occur annually during the wet season in the northern part of the Northern Territory. Poultry owners should prevent birds from having access to possible sources of the toxin by removing decaying food scraps, animal carcases and rotting vegetation.

Toxic algal blooms

When a body of water becomes discoloured with a super abundance of free-floating, microscopic plant or, in rare cases, animal life, it is said to develop a 'water bloom' or algal bloom. Algae are primitive plants and include seaweeds, fine hair-like green forms and microscopic single cells or colonies. Some of the microscopic species are the most dangerous and can multiply rapidly to produce prominent green, red, yellow and other discolouration of water. A group of algae known as blue-green algae produces the most spectacular blooms in fresh water dams and several of these can produce toxins when conditions are favourable.

Livestock losses on stations in the Victoria River district of the Northern Territory have previously been associated with algal blooms.

Poisoning of livestock

Blue-green algae (cyanobacteria) blooms thrive in warm, calm, shallow bodies of water where the water is hard, alkaline, and rich in nitrogen, phosphates, carbonates, and organic matter. These algal blooms can pose a threat to livestock as poisoning can occur if they swallow the algae while drinking the contaminated water. Fish are often safe until a pond or dam dries or is drained, bringing them into contact with floating algae.

Poisonings attributed to blue-green algae usually occur in the dry season. Runoff from arable land and animal droppings greatly increase the likelihood of algal blooms ponds or lakes.

Blooms of the blue-green alga *Nodularia spumigena* form a scum on sheltered shorelines when concentrated by winds or currents and can form a suspension in the water. The blue-green algae species most commonly associated with the deaths of livestock, waterfowl and fish are *Microcystis aeruginosa* and *Anabaena circinalis*. *Anabaena* and *Nodularia* have been implicated in skin and eye irritations in people and dogs, while *Microcystis*, *Anacystis*, and another less commonly encountered alga, *Lyngbya*, have been reported to cause hay fever symptoms.

Symptoms of poisoning

The most common sign is finding a dead animal near affected water. In some cases, the forelimbs, lips and muzzle of the animal will show traces of algal scum.

Post-mortem examination will sometimes reveal bleeding from the tiny blood vessels under the skin and between the muscles. However, it can be difficult to make a confident diagnosis of algal poisoning, since the clinical signs and post-mortem findings can resemble a variety of diseases.

If stock must be moved to another paddock, do it at a very easy pace.

Identification of algae

Once livestock have been moved, seek veterinary advice to confirm the diagnosis and send a sample of the bloom for identification to the Berrimah Veterinary Laboratories where it will be viewed under high magnification to identify the algae.

Algae submitted for identification should preferably be fresh and healthy and the water sample is to be submitted in a small (100 millilitre) screw-topped jar fresh, or if possible, with sufficient formalin added to make up a three per cent solution.

Treatment and prevention of contamination of farm water supplies by algal blooms

Station water supplies

Algae in water tanks may be controlled by covering the tank to exclude light and reduce the temperature. Deep dams are better than shallow dams as they reduce algal use of the sun's energy. The nutrient levels in station dams may be reduced by screening systems. These screening systems reduce fouling of dam water by stock excreta and plant debris, and ensure the restriction of fertilisers in the immediate catchment area. The screens also ensure that the size of the catchment area is large enough to cater for sufficient runoff to cause an overflow in most seasons.

Chemical control

Dosing dams with alum and gypsum has proven to be an effective means of removing phosphorus from the water. As the phosphorus is the most important nutrient for blue-green algae, the removal of this can prevent the algae from forming. For the best results, dams should be dosed prior to the formation of the bloom. If the dam is dosed after the bloom has started to form, stock should be excluded from the water source for five days as algae are at their most toxic as they are dying off.

It is recommended that the alum and gypsum should be applied at a rate of 50 kilograms of alum and 50 kilograms of gypsum per megalitre of water. The alum crystals are to be added first and should be mixed in to the water. The water should be left to stand for a few hours prior to adding gypsum. Once the gypsum has been added, let the water stand for at least 24 hours, or until clear. If the water has not cleared in two to three days, add an additional 25-30 per cent of the recommended dosage of the alum and gypsum.

A preliminary trial can be conducted by filling a 44-gallon drum with the dam water to ensure that the dosage is correct. Once the dam has been dosed and becomes clear, a pool pH test kit can be used to ensure that the pH is between six and nine. If the pH is not in the right range, allow the water to stand two days and check again.

Cattle in dam containing algal bloom

Please note that older algal treatments are not environmentally friendly and should not be used.

Reference:

New South Wales Department of Primary Industries 2013, viewed 21 December 2016, <http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/103785/Managing-blue-green-algae-in-farm-dams.pdf>.

Livestock movement and identification in the Northern Territory

Regulation of livestock identification and movements is an essential component of any disease control system. The *livestock Act and Regulations* is the legislation that regulates livestock identification and movements in the Northern Territory. Livestock Transport Standards (LTS) is administered by the Department of Primary Industry and Resources (DPIR). Failure to comply with the NT Livestock Act and Regulations could result in penalties which may include an infringement notice being issued or prosecution.

Animals defined under the *Livestock Act as* 'identifiable livestock' are:
Alpacas, llamas, bison, buffalo, cattle, camels, deer, emus, ostriches, goats, horses, mules, donkeys, pigs, poultry, pigeons and sheep.

Under the *Livestock Act* and *Regulations*, livestock owners are required to comply with the following identification and movement requirements to support market access and traceability in the case of an animal disease or chemical residue incident:

Property Identification Code (PIC)

All parcels of land in the NT that have identifiable livestock are required to register for a PIC with the Department.

More information on PICs is at .
https://www.nt.gov.au/industry/agriculture/livestock/get-a-property-identification-code

NT PICs can be searched at http://pic.primaryindustry.nt.gov.au.

Brands

Under the NT *Livestock Act a* NT registered brand is required on all cattle over eight months of age. The brand is required to be legible and in the correct position as stated on the registered brand certificate.
It is an offence to apply an earmark to a cow unless the animal has a legible brand applied.

NT Brands can be searched at http://brand.primaryindustry.nt.gov.au/

Brand/earmark application forms and further information on brands is at
https://nt.gov.au/industry/agriculture/livestock/brand-and-identify-livestock/livestock-brands-in-nt

National Livestock Identification System (NLIS)

The NLIS system in Australia was introduced by Industry and enacted in state and territory legislation. It commenced in the NT on 1 July 2007 and is Australia's system for identifying and tracing livestock for food safety, product integrity and market access purposes.

In the NT, all cattle and buffalo must have an approved NLIS device attached to their right ear before they are moved off a property, regardless of where they are going. All sheep and goats must have an approved transaction tag for any movement off a property.

Identification before movement

The owner of the property must ensure all livestock moving off the property have an NLIS device attached to the off side (right) ear before the livestock movement begins.

Reporting requirements for the owner of the property of destination

The owner of the property of destination must ensure that the NLIS information is entered on the NLIS database within 48 hours after the movement is completed.
The NLIS database stores all cattle and buffalo movements.

Further information is at https://nt.gov.au/industry/agriculture/livestock/brand-and-identify-livestock/nlis-in-the-nt

Botulism in the Northern Territory

Botulism still causes significant stock losses in the NT despite the rigorous vaccination programs adhered to by most cattle stations.

2015 botulism survey results

In 2015 a survey was carried out on 19 properties in the Northern Territory to determine what percent of protective antibodies there were in the cattle after vaccination. A study by Kelly and Fordyce (2014), '*Analysis of serological responses by cattle against C. botulinum following vaccination'*, confirmed that a blood antibody level greater than 0.45 was protective against a challenge of botulinum toxin. Using this parameter of 0.45 serological ELISA units as the acceptable vaccination standard affording protection, it was found that the range of protection in animals measured in the 19 vaccinated herds varied from 0% to 100% with an average of only 67% of the animals being covered. This means that over 30% of the supposedly vaccinated animals failed to have a protective titre against botulism.

Some contributing factors that could prevent adequate protective antibody levels after a vaccination program are:

- stress factors imposed on the animal at vaccination
- poor vaccination procedures
- inadequate attention to the 'cold chain' process
- the choice of vaccine
- cattle missed in mustering
- lack of vaccine boosters
- concurrent diseases, such as pestivirus
- poor nutritional status of the animals
- concurrent high parasitic challenges
- stock being vaccinated too young (antibodies transferred from the cow, called maternal antibodies, can interfere with vaccination).

One station in the Northern Territory saw a significant improvement from 82%-100% (the best overall result recorded in the trial) by taking precautions in the following areas:

- improving the cold chain process
- taking time in the vaccination process with a few checks and balances incorporated. See "You paid for it, now make sure it works: Principles of vaccine handling" on Page 1 of this newsletter, or a short video on the correct storage and use of vaccines at **http://www.youtube.com/watch?v=sDuZ5-e6bxI**
- ensuring less stress all round in stock handling.

Cause of botulism

Botulism in cattle is caused by two toxins, C and D, which are produced by the bacterium *Clostridium botulinum.* All warm-blooded animals can be affected by one or more of the seven toxins produced by this gram-positive anaerobic bacterium.

Cattle that have not been vaccinated, and have not been supplemented with phosphorus and protein will seek out and chew bones and decaying carcases. These are the most common sources of contamination. Although both male and female cattle are equally susceptible to the toxin, botulism is more commonly seen in breeding cattle. This is because breeders generally experience larger demands for phosphorus and protein in their diet due to lactation stress.

Clinical symptoms

In botulism, normal nervous function is interfered with resulting in an ascending paralysis, and cattle are one of the most susceptible species. The first observed signs may be depression, muscular weakness and incoordination. The incoordination will usually begin in the hind legs, making the beast stumble and knuckle over and go down. Once down, the animal appears very weak and has great difficulty in rising. Paralysis of the tongue and throat is often seen, causing the animal to refuse to drink, resulting in dehydration. This paralysis eventually affects the muscles involved in breathing, causing respiratory failure. Semicircular marks on the ground resulting from the uncontrolled paddling movement of the legs can sometimes be observed around the carcase.

Diagnosis

The diagnosis of botulism is largely based on clinical signs suggestive of the disease as there are no laboratory tests of any value. These clinical signs can vary dramatically depending on the amount of toxin ingested and any pre-existing immunity the animals might have.

In an affected animal the tongue is usually unable to be retracted and the animal may drop cud and drool saliva, however this can also occur in animals with three day sickness and other disease. Bones or maggots may be found in the reticulum and indicate bone chewing or ‘pica’. The omasum is usually hard, enlarged and dry (‘dry bible’) due to dehydration.

Often the field diagnosis of botulism as the cause of animal losses has been met with some scepticism especially when there is a fairly rigid vaccination program in place. The extent to which the vaccination programs were providing a protective level of antibodies against the disease was not known, however.

Treatment

There is no treatment for the affected cattle. Vaccination is not effective for cattle once the animals are showing signs of having botulism as it takes more than five weeks after vaccination to produce protective antibodies.

Prevention - THREE MUST DOs

1. Vaccination at weaning and then giving the boosters every year or three years as recommended.
2. Supplementary feeding with phosphorus and protein.
3. Removal of all carcases and bones–this will limit bone chewing.

Figure 6: Animal showing signs of botulism

Australian Government
Geoscience Australia

Exploring for the Future
minerals | energy | groundwater

NORTHERN TERRITORY GOVERNMENT

Exploring for the Future

There is currently a large focus on researching the ground resources of Northern Australia. Over the next four years, the Australian Government will partner with the Northern Territory, Queensland, South Australian and Western Australian Governments to research Northern Australia's soil, water and rocks. The project is called **Exploring for the Future**.

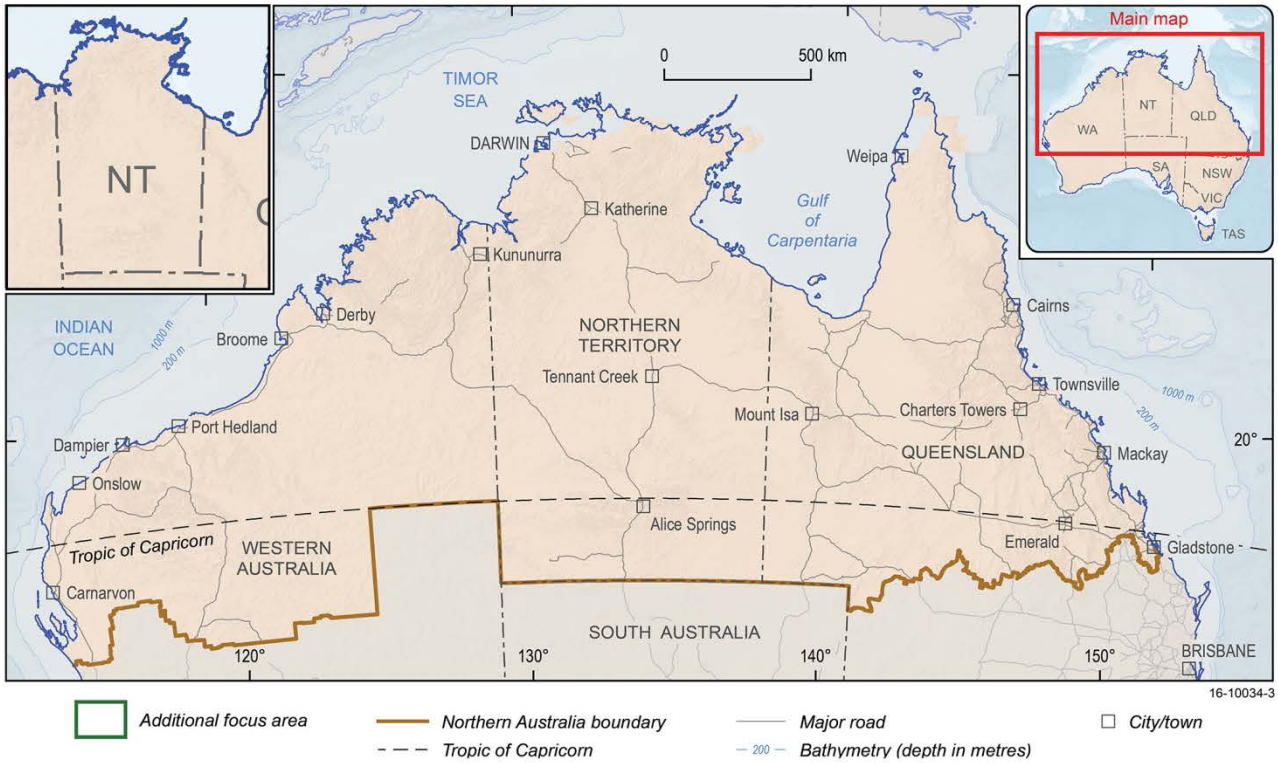
There are a number of research projects that will take place over the next 4 years:

- Water bore testing
- Soil testing
- Magnotelluric surveys
- Seismic surveys
- Airborne electromagnetic surveys
- Gravity measuring surveys

The initial focus area for this program will be in the Barkly region between Tennant Creek, Borroloola and the Queensland border.

The information collected from these surveys will be publicly available on the Geoscience Australia website for anyone to look at. Some of this data will be very useful for future community development projects, agriculture and other resource development industries.

This project will require vehicle and helicopter access to some pastoral stations and Aboriginal land. **For any immediate enquiries, please contact Peter Campbell on 8951 8170 or Ken Satour on 8951 8176.**



Northern Australia comprises approximately 50 per cent of the country. The programme also investigates a small area in South Australia.

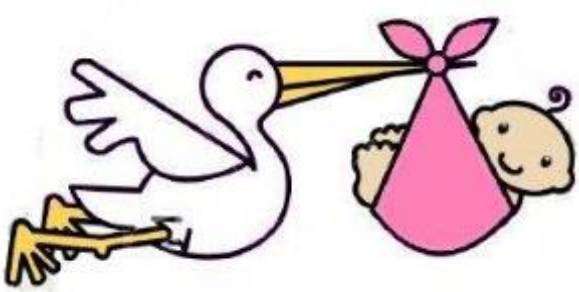
Around the traps…

Sunset over Walhallow (Photo credit: Naomi Casilles-Southgate)

Plenty of water everywhere at Brunette Downs (Photo credit: Peter Raleigh)

The main street in Tennant Creek got its fair share of water too (Photo credit: David Curtis Snr)

The Tennant Creek DPIF office would like to congratulate Casey and Nathan Collier on the birth of their little girl Caitlyn Anne Collier, a little sister for Joshua and Annabelle



Ben Kiss had some fun in the mud at Brunette Downs (Photo credit: Mary Vaughan)

NORTHERN TERRITORY GOVERNMENT

Pastoral Market Update

DEPARTMENT OF **PRIMARY INDUSTRY AND RESOURCES**

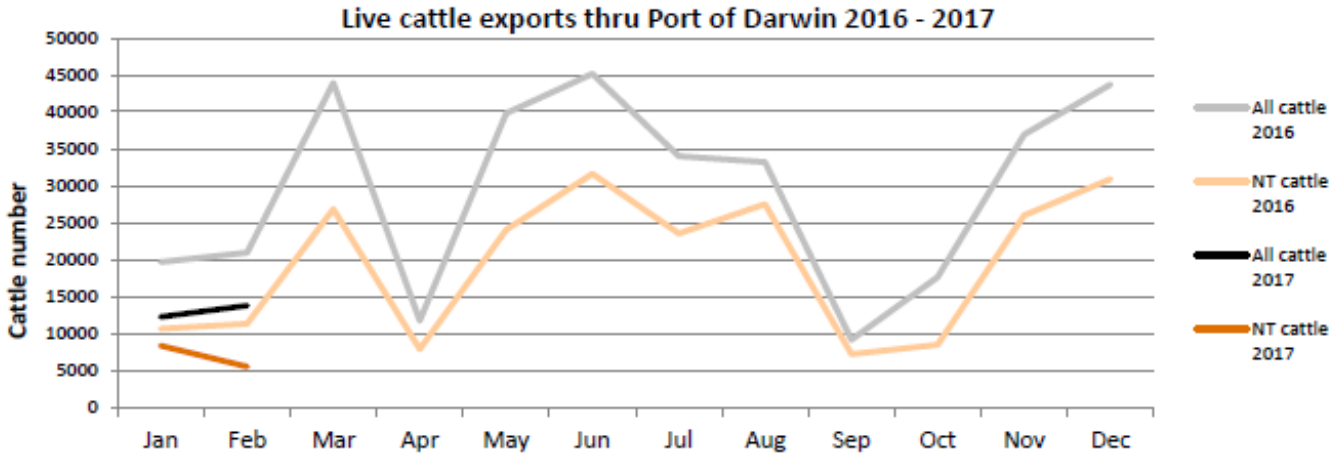
Live Cattle Exports via Darwin Port – FEBRUARY 2017

Please note: figures are for cattle exported through the Port of Darwin only; some NT cattle are exported through interstate ports.

Destination	Export of ALL CATTLE (including interstate) from Darwin Port							Export of NT CATTLE from Darwin Port (estimate only)						
	2015	2016	Last year to 29/02/16	YTD to 28/02/17	FEB	Last month	*Difference*	2015	2016	Last year to 29/02/16	YTD to 28/02/17	FEB	Last month	*Difference*
Brunei	4,122	3,379	0	0	0	0	0	2,069	2,314	0	0	0	0	0
Indonesia	341,759	296,230	36,760	24,622	13,555	11,067	2,488	197,155	195,037	19,850	12,932	5,395	7,537	-2,142
Philippines	23,611	4,697	0	0	0	0	0	13,559	3,236	0	0	0	0	0
Sabah	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarawak	300	1,220	0	0	0	0	0	0	843	0	0	0	0	0
Malaysia	11,503	10,959	0	0	0	0	0	7,499	7,476	0	0	0	0	0
Vietnam	100,119	36,405	3,785	1,324	197	1,127	-930	63,998	24,783	2,044	846	78	767	-689
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thailand	6,154	0	0	0	0	0	0	3,610	0	0	0	0	0	0
Cambodia	0	2,766	0	0	0	0	0	0	1,936	0	0	0	0	0
TOTAL	**487,568**	**355,656**	**40545**	**25946**	**13,752**	**12,194**	1,558	**287,892**	**235,625**	**21,894**	**13,777**	**5,473**	**8,304**	**-2,831**

February at a glance

- 13,752 cattle through the Darwin Port during February; 1,558 more than last month and 7,163 less than in February last year.
- 5,473 NT cattle through the Darwin Port during February; 2,831 less than last month and 5,821 less than in February last year.



OTHER LIVESTOCK EXPORTS VIA DARWIN PORT

Includes NT and interstate stock.

Destination	Buffalo		Goat		Camel	
	YTD	FEB	YTD	FEB	YTD	FEB
Brunei	0	0	0	0	0	0
Indonesia	195	195	0	0	0	0
Philippines	0	0	0	0	0	0
Sabah	0	0	0	0	0	0
Sarawak	0	0	0	0	0	0
Malaysia	0	0	0	0	0	0
Vietnam	479	400	0	0	0	0
Egypt	0	0	0	0	0	0
Thailand	0	0	0	0	0	0
Cambodia	0	0	0	0	0	0
TOTAL	**674**	**595**	**0**	**0**	**0**	**0**

NT CATTLE MOVED INTERSTATE

Destination	FEB
NSW	648
QLD	951
SA	448
VIC	200
WA	70
Total	**2,317**

NATIONAL CATTLE PRICES
www.mla.com.au/prices-and-markets

CURRENCY EXCHANGE RATES
www.oanda.com/currency/converter

Total Cattle, Port of Darwin							
2009	2010	2011	2012	2013	2014	2015	2016
347,314	295,605	269,617	246,990	359,616	493,958	487,568	355,656

NT Cattle, Port of Darwin							
2009	2010	2011	2012	2013	2014	2015	2016
304,818	272,749	253,797	234,249	308,784	324,477	287,892	235,625

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Barkly Landcare & Conservation Association

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