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Proposed Terms of Reference for the Tramp Ant Consultative Committee (TACC) for 2010-11

1. Terms of reference of the Tramp Ant Consultative Committee (TACC)

1.1 General roles in relation to a national biosecurity incident response

The Tramp Ant Consultative Committee (TACC) will:

(a) receive notification of pest and disease outbreaks

(b) provide timely advice to the affected parties via the reporting point on whether it considers an National Biosecurity Management Group (NBMG) should be convened

(c) advise the NBMG on whether the outbreak requires a national biosecurity incident response

(d) consider and recommend a national response plan

(e) consider regular reports on progress of the response and develop a consensus on whether further actions are required

(f) provide regular, consolidated reports to the NBMG on the status of the national biosecurity incident response

(g) when eradication is judged to be no longer technically feasible or cost beneficial, provide advice and recommendations to the NBMG on when a national biosecurity incident response should cease

(h) determine when a pest or disease has been eradicated

(i) advise the NBMG when proof-of-freedom has been achieved following successful implementation of a national biosecurity incident response plan

(j) ensure incident responses comply with Australia's international rights and obligations, including those contained in the SPS agreement.

1.2 Role in providing technical and expert advice

The Tramp Ant Consultative Committee is to provide technical and expert advice to the NBMG, in accordance with **Part V, Section 6** of the NEBRA agreement, or the flow chart summary at **Attachment 1** on **page 5**, to support determinations on whether a national biosecurity incident response is required, including advice on the following elements:

(a) identification of the pest or disease

(b) the control technique options

(c) any legislative impediments to undertaking a national biosecurity incident response

(d) the resources required to undertake a national biosecurity incident response

(e) interim control measures that have been put in place by the notifying party and other relevant parties

(f) the likely distribution of the pest or disease

(g) the estimated impacts of the pest or disease

(h) endemic pest or disease controls that may limit establishment

(i) identification of pathways

(j) the level of confidence that all areas affected by the outbreak have been identified

(k) surveillance activities in place to confirm proof-of-freedom

(l) community consultation activities.

2. Membership

2.1 Flexibility of membership of existing consultative committees

(a) The membership of the new consultative committee must be sufficiently flexible to allow the appropriate agencies (primary production, environment and natural resource management) relating to a specific outbreak to represent the affected parties on the TACC.

2.2 Composition of the TACC

The TACC membership will comprise the following:

(a) Chair	One (1) representative of the Commonwealth. The Commonwealth will select a representative for each pest or disease outbreak from the agency it determines most appropriate to sit as chair of the TACC for that outbreak. The chair will not vote.
(b) Members Members can participate in discussions. Each party has one (1) vote on TACC	One (1) representative of each party, including the Commonwealth (in addition to the chair). Each party will have one representative on the TACC constituted for each pest or disease outbreak. That member will be a representative from the agency that the party determines as the most appropriate. Each party's representative member must liaise with that party's other agencies and

	decisions.	provide a whole-of-government perspective on the TACC and ensure that those other agencies are kept informed. One (1) representative from Biosecurity Australia or subsequent body, where there are trade implications associated with the outbreak. One (1) representative from the Australian Quarantine and Inspection Service (AQIS) or subsequent body. One (1) representative from CSIRO. Note that while the Commonwealth, in effect, has five (5) representatives (the chair, and members representing the Commonwealth as a party, Biosecurity Australia, AQIS and CSIRO), the Commonwealth will have only one (1) vote.
(c)	Observers Observers may attend TACC meetings but may not participate in discussions or vote on any TACC decisions.	Members may be accompanied by advisers who have specific expertise, including health department staff (or others depending on the nature of the outbreak in question), if appropriate. The chair may determine that an affected stakeholder may have a representative on the TACC as an observer.

3. TACC meeting protocols

(a) The TACC will be convened and meet as necessary.

(b) Members may be represented at meetings by a delegate.

(c) Members or their delegates need to be available at short notice (less than 24 hours).

(d) All TACC decisions must be made by the consensus of its members.

(e) The Commonwealth and each party have a single vote. All Commonwealth agencies, such as AQIS, Biosecurity Australia and CSIRO, and the chair, are incorporated within the Commonwealth vote.

(f) The number of observers/resource persons must be kept to the essential minimum.

(g) Observers will not be party to decisions.

(h) All attendees must be announced and recorded as ‘present’ in the minutes.

(i) Members are responsible for ensuring that the observers they invite abide by the requirements of the TACC as detailed in this schedule.

(j) Communication with the NBMG will be via the chair of the TACC.

(k) Secretariat services will be provided by the Commonwealth (from the relevant agency).

4. Specialist or working groups to assist the TACC

The TACC may, if it requires, establish individual, technical specialists or working groups (the Tramp Ant Scientific Advisory Panel, **TASAP**) **to advise it**.

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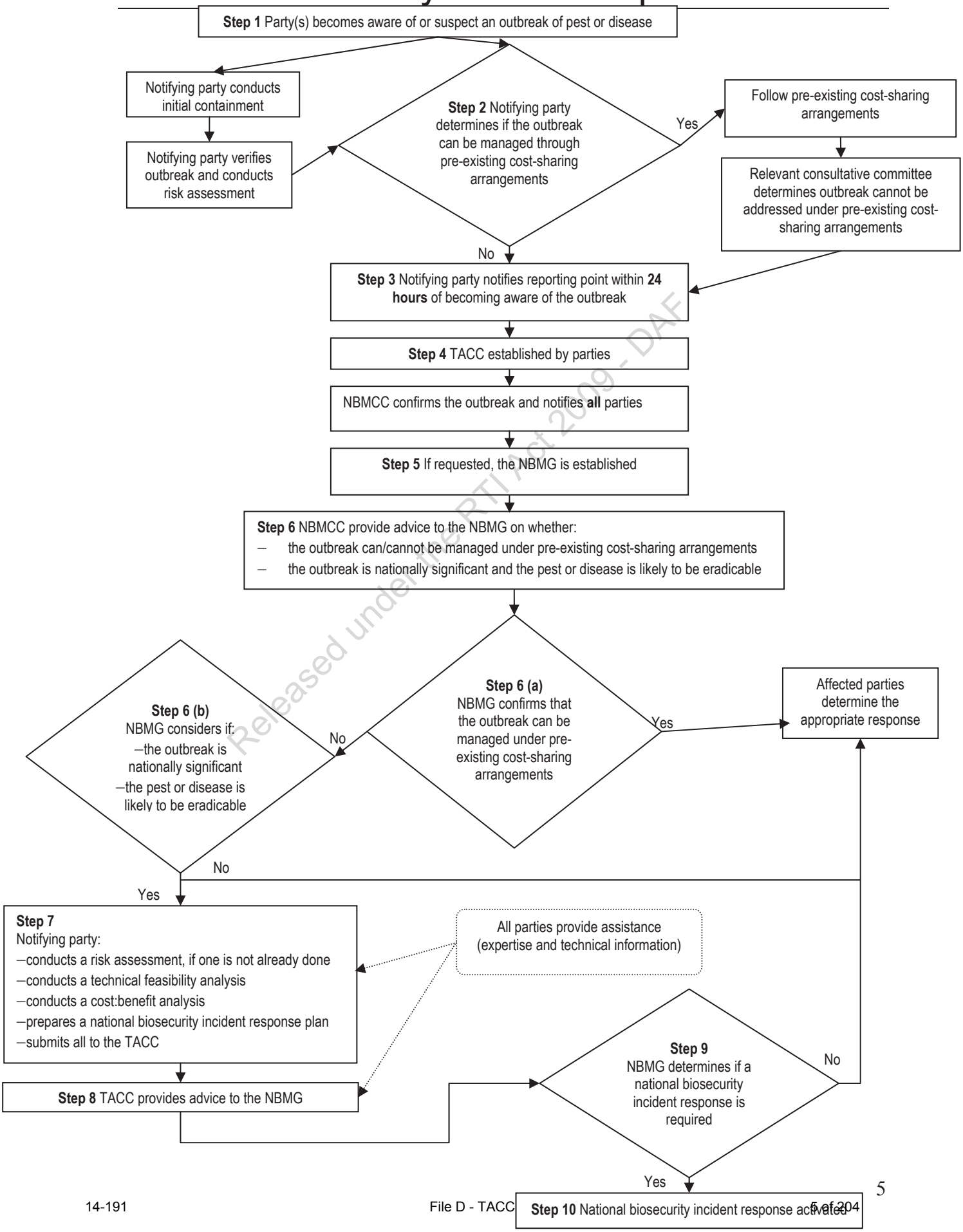
Attachment 1: Flow chart of approach to national biosecurity incident response



Response plan

Eradication of the red imported fire ant – Yarwun 2013

Version 1.0
February 2014

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Contents

1 Executive summary

Solenopsis invicta (red imported fire ant (fire ant)) was confirmed on land at a shipping port terminal in Yarwun, near Gladstone Queensland, on 1 December 2013. An emergency response was declared by Queensland's Chief Biosecurity Officer on 9 December 2013.

Genetic testing has shown that this fire ant population in Yarwun (2013) is a new incursion in Australia and not linked to the Yarwun (2006) or any other incursion of fire ant in Australia. The most likely source of infestation is the southern USA.

As at 4 February 2014, fire ant has been confirmed on five land parcels in Yarwun, with a total area of infestation of 32.9 ha, with the majority of nests being detected on the first infested property (1-IP).

Intensive on-ground surveillance has been conducted on all infested properties and targeted surveillance is being conducted on all suitable fire ant habitat out to 6 km from the infested properties and on all sites identified as 'at risk' through tracings investigations to delimit the incursion and determine the level of infestation on infested properties.

'Notices of Infestation' have been issued to all land owners/lessees/occupiers of infested land to control and prevent further spread of the pest through the introduction of control and containment measures.

This response plan covers the proposed eradication activity at Yarwun until June 2016. The plan has been developed to directly address all key criteria specified in the National Environmental Biosecurity Response Agreement (NEBRA). The purpose of NEBRA is to establish national arrangements for responses to nationally significant biosecurity incidents where there are predominantly public benefits.

The estimated cost of the eradication activities outlined in the plan is $3.18 million until August 2016. It is anticipated an application for the establishment of a pest-free area status for Yarwun would be submitted to the Tramp Ant Consultative Committee by September 2016.

List of figures

List of tables

Glossary

dog	For the purposes of this document means odour detection dog
colony	Means a group of ants that are living together and dependent on each other for reproduction and survival
colony point	A colony point includes fire ant mounds within a 6 m radius of a central mound
fire ant	For the purposes of this document means red imported fire ant
infested property (IP)	Means a property on which red imported fire ant has been confirmed
inspector	Means a person appointed as an inspector under the Queensland *Plant Protection Act 1989*
nest	Means a structure which ants form and use for reproduction and survival
mound	Means a structure that ants use for survival or reproduction that is associated with one colony of ants
pest	For the purposes of this response plan, 'pest' means red imported fire ant
pest quarantine area	A quarantine area declared under section 11 of the *Plant Protection Act 1989*. For red imported fire ant, the whole of Queensland has been declared as a pest quarantine area
red imported fire ant	Means *Solenopsis invicta* Buren, 1972
restricted area	A defined area within a pest quarantine area where specific obligations are placed on persons to contain, control and eradicate red imported fire ant
surveillance	Means an official process that collects and records data on pest occurrence or absence by survey, monitoring or other procedures
surveillance zone	A 2 km buffer around the treatment zone
tramp ant	Means a diverse group of ant species originating from many regions that are readily moved across the world through a variety of transport pathways
treatment	Means the application of chemical solution, or substance impregnated with a chemical solution, for the purposes of destroying an infestation of red imported fire ants
treatment zone	Means a 2 km zone around known colony points

Acronyms

ABARE	Australian Bureau of Agriculture and Resource Economics
BQCC	Biosecurity Queensland Control Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DNI	Direct nest injection
IGR	Insect growth regulator
IP	Infested property
NBMG	National Biosecurity Management Group
NEBRA	National Environmental Biosecurity Response Agreement
NRIFAEP	National Red Imported Fire Ant Eradication Program
TACC	Tramp Ant Consultative Committee
US	United States of America

2 Status report on pest

2.1 Pest details

Solenopsis invicta Buren 1972, commonly known as the red imported fire ant, is the most well studied and notorious ant in the world. The extensive damage caused to ecological and agricultural systems by fire ant is well documented, and the multiple painful stings caused by multiple attacks can cause allergic reactions to humans. Fire ant is considered by the IUCN/SSC Invasive Species Specialist Group to be one of the world's worst 100 invasive species (Global Invasive Species Database 2009).

In February 2001, fire ant was confirmed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to have been found at two locations within the Brisbane region. Current thinking is that they may have arrived more than 10 years before detection; however it is unlikely to ever be definitively confirmed. A study by Ascunce *et al.* (2011) showed that the two incursions in Brisbane in 2001 and a later incursion at Yarwun, near Gladstone, in 2006 originated from the southern United States.

2.2 Classification

Ants are insects belonging to the order Hymenoptera and the family Formicidae. Worldwide, there are 16 subfamilies, about 300 genera and 15,000 described species and subspecies of ants. Australia is currently known to have 10 subfamilies, 101 genera and 1,275 described species and subspecies and many more undescribed species. A few of Australia's ant genera are unique and endemic to this country, and many are only shared with its closest neighbours. However, most of the species are endemic to Australia with only a minority occurring in both Australia and its neighbouring regions (Shattuck 1999).

The red imported fire ant belongs to the tribe Solenopsidini, genus *Solenopsis*, binomial name *Solenopsis invicta*, and is exotic to Australia. There are six Australian *Solenopsis* species which occur throughout the eastern and western coastal regions; one species has only been recorded in Queensland (Australian Faunal Directory 2009)

2.3 Distribution

Fire ant is native to the South American countries of Brazil, Paraguay, Uruguay and Argentina (Tschinkel 2006).

It has become a pest in the southern United States of America, Taiwan (Yang *et al.* 2009), mainland China (Zhang *et al.* 2007), Puerto Rico (Callcott & Collins 1996), Virgin Islands (Wetterer & Snelling 2006), Bahamas Islands, Antigua, Trinidad, Turks & Caicos Islands (Davis *et al.* 2001), Cayman Islands, Hong Kong, Malaysia (Global Invasive Species Database 2009), Australia (Vanderwoude & McCubbin 2002) and there are media reports of infestations at Macau and the Philippines.

2.4 Lifecycle / ecology

2.4.1 Reproduction

Like most insects, the fire ant life cycle consists of four distinct phases; egg, larva, pupa and adult. All the eggs in the colony are laid by the queen or queens. In fire ant colonies queens are able to lay 600–800 eggs per day (Vargo and Fletcher 1986; Vinson and Greenberg 1986). Once the eggs hatch, the ants have four discrete larval instars. All appear somewhat grub like, dirty white in colour and are unable to move without assistance from the nursery attendants (Vinson and Sorensen 1986). It is during the larval stage that ants do most of their growing. The fourth instar larva is very important to fire ant colonies. These individuals are the only ones able to digest solid food. Adult workers break up solid food into small particles which are placed in the 'food basket' of the larva (Petralia and Vinson 1978a; Petralia and Vinson 1978b). The larva produce enzymes that digest the food, the fluid produced is then sucked up by the larva. This liquid food is collected by the workers and passed to all members of the colony by trophallaxis (Vinson and Sorensen 1986).

There are two identifiable pupal stages. The first is a glossy white form in which some adult structures are visible for the first time. The second is a pigmented or coloured form; all adult structures are clearly visible at this stage but individuals are unable to move unassisted (Vinson and Sorensen 1986). As in all insects, during the pupal stage ants do not eat and the body tissues are reorganised so that the insect changes its appearance completely.

The final stage of the life cycle is completed when the ant ecloses. Adult ants do not change size. Adults in fire ant colonies are either workers or reproductives. The workers are polymorphic (i.e. vary in size) and are classified as major, median or minor workers. This is a distinct trait of fire ant colonies (Tschinkel 2006). Fire ant workers live for approximately two months (minor workers) to four months (major workers) depending on conditions (Tschinkel 2006). Adult fire ants are not able to eat solid food and therefore rely on liquids brought into the colony in the crop of foraging workers or regurgitated by fourth instar larva (Vinson and Sorensen 1986). Workers´ functions are determined by their age, size and the colony's needs. Newly emerged workers act as nurses and feed the brood and queen. As worker ants age, their role changes to colony maintenance, sanitation and defence. The oldest workers function as foragers, leaving the colony to search for food (Tschinkel 2006).

Mature colonies produce a number of reproductive ants which are winged males and females called alates. These are cared for by workers until they leave the colony to begin their mating flights, which usually occur during the warmer summer months when environmental conditions such as temperature and humidity are suitable. However, mating flights can occur throughout the year (Markin *et al*. 1971; Tschinkel 1987).

Mating occurs on the wing some 100–300 m above ground level (Markin *et al*. 1971; Tschinkel 1998). After mating the male dies and the inseminated female sheds her wings and begins a new colony if an appropriate nest site is found. New queens are particularly vulnerable at this stage and only small percentages (thought to be less than 1%) survive to start a new colony (Markin *et al*. 1971).

New queens either dig a chamber or find a crevice in which to lay their eggs. This is called a claustral chamber, and the opening will be sealed by the queen and only be opened when the first

workers are ready to begin foraging. Within the first 24 hours the queen lays 10–20 eggs, which hatch after 6–10 days. The newly hatched larvae develop through four stages, or instars, over the next 12–14 days, before becoming pupae. After 9–16 days, the newly developed ants emerge. Development from egg to ant takes approximately one month (Tschinkel 2006).

During this time the queen continues to lay eggs, which are tended by the newly emerged workers called nanites, or minims. The nanites also expand the nest and gather food. With the queen capable of laying 600 or more eggs a day (Tschinkel 1988), numbers build up quickly, and a year-old colony can have approximately 11,000 workers, rising to 240,000 workers after three years (Hung *et al*. 1977; Markin *et al*. 1973). Queens can live for over seven years (Tschinkel 1987) and insemination studies have shown in the south-eastern US some queens had approximately 7 million sperm in their spermathecae (Tschinkel 1987).

An overview of the fire ant lifecycle is provided in Appendix 1.

2.4.2 Colony-founding

A single, newly-mated queen can found a colony, which can develop into a nest with tens or hundreds of thousands of workers. Alternatively, a queen and a small number of workers from an existing nest are able to establish a new colony if the old one is disturbed or part of it is accidentally transported to a new location (Markin *et al*. 1974; Obin *et al*. 1988; Vander Meer & Porter 2001; Vargo & Fletcher 1986). In the situation where colonies form beach-head populations, they can multiply by fission or budding in which a queen and a number of workers simply walk away and start a new colony some metres away from the maternal colony (Vargo & Porter 1989).

2.4.3 Mounds

Fire ant build a soil nest or mound, which are typically 30 cm tall and 60 cm in diameter when three years old (Markin *et al*. 1973), but have been measured at up to 90 cm tall (Green 1952). In Australia, they have been observed up to 40 cm or more in height. Soil type, availability of soil moisture and other factors affect the height, diameter and structure of mounds (Green *et al*. 1999). New colonies do not produce a conspicuous mound for several months after the new queen begins egg laying (Drees & Vinson 1993).

An unusual feature of the mound is that it has no obvious entry or exit hole. Internally, the nest consists of many interconnecting galleries, which give it a honeycomb appearance. The ants enter and leave the mound via underground tunnels which radiate outwards from the nest. These tunnels can be up to 20 to 30 m long, winding through a colony's territory (Tschinkel 2006).

Nests can be established under logs, rocks or other materials lying on the ground. These materials absorb heat from the sun in the same way that the fire ant mounds absorb heat, thus assisting thermoregulation of the colony (Tschinkel 2006). Fire ant appear to have an attraction to electricity, and nests have been found in buildings and equipment around electrical systems (MacKay *et al*. 1992; Vinson and MacKay1990).

Mature colonies of up to 500,000 workers have been recorded, although around 150,000 workers is more usual (Oi *et al*. 1994). Despite their large size and elaborately constructed subterranean nests, colonies will readily abandon an existing nest and re-locate to a more desirable location at very short notice. This characteristic is useful in environments where resources are not available

at all times and at sites subject to periodic inundation or disturbance. It also serves an invasive pest ant well as it allows an invading colony an opportunity to form a 'beach-head' in an undesirable niche without compromising its ability to move to a new location once a critical mass has been reached (Nattrass & Vanderwoude 2001).

2.4.4 Diet

Fire ant has a non-specialised diet which allows it to take advantage of a wide range of habitats and food resources. The polymorphic structure of fire ant workers provides opportunity for the species to exploit a wide range of resources. For example, the larger major workers are able to overpower large insects such as grasshoppers and carry large seeds, while the minor workers can collect nectar from inside small flowers, collect small seed and soil invertebrates (Vinson 1997; Vinson & Greenberg 1986).

2.4.5 Social forms – monogyne and polygyne

There are two social forms of fire ant colonies; monogyne or polygyne, which have marked differences in their social and reproductive characteristics (Ross & Keller, 1995).

Within a polygyne nest there may be up to a few hundred reproductive queens which may be unrelated, as reported in the US (Ross & Keller 1995). In native South America, polygyne nests tend towards fewer queens and there is a higher relatedness between queens within a nest than observed in the US (Ross & Keller 1995). In Queensland, polygyne fire ant require further investigations, however, preliminary genetic analysis reveal nests displaying characteristics of both the US and South American populations (Oakey 2009).

Ants from polygyne fire ant colonies are able to move from one mound to another without hostile reaction from other fire ant workers; they willingly adopt and support founding queens from other colonies (Tschinkel 2006). This type of colony is more stable and has a much greater mound density per unit area than monogyne colonies (Vargo & Porter 1989; Greenberg *et al*. 1992; Macom & Porter 1996; Drees & Vinson 1993). Drees & Vinson (1990) reported mound densities averaging 1,635 per 10,000 m^2 in a pasture infested with the polygyne form in Texas, whereas a monogynous infested pasture in Maryland averaged 72 per 10,000 m^2. The higher mound densities achieved by polygyne colonies increases their effect on the environment (Tschinkel 2006).

A monogyne nest will only support one reproductive queen (Vinson & Sorensen 1986). Workers from monogyne colonies are territorial and defend the area around their mound from fire ant from other colonies, new queens that land and attempt to start new colonies nearby, and from other ant species (Tschinkel *et al*. 1995; Tschinkel 2006).

3 Risk assessment

Schedule 2

Risk assessment is used to assess the likelihood of a pest or disease entering, establishing and spreading and the pest or disease's potential impact.

3.1 Entry

The Department of Agriculture (Australian Government) manages quarantine controls at the national border to minimise the risk of exotic pests and diseases entering Australia and has in place measures to prevent the entry of fire ant into Australia.

Key measures for the prevention of entry of fire ant into Australia include:

- Implementation of measures by the Department of Agriculture to prevent or treat materials that could be infested by fire ant prior to their entry into Australia.
- Inspection of items entering Australia for contamination by tramp ants and provision for their return, treatment or destruction should fire ant be detected.
- A national threat abatement plan for dealing with tramp ants.

National border protection measures

Australia's *Quarantine Act 1908* and *Quarantine Regulation 2000* provide legislative measures to prevent the entry of fire ant into Australia and to address the risk of re-infestation.

The Department of Agriculture conducts both pre-border and border quarantine inspections of cargo and other high-risk items. Inspections generally focus on the external inspection of cargo. The detection of ants as 'contaminants' can result in risk mitigation actions being taken that can include re-export, treatment or destruction of the infested items.

Further, import entry requirements, or exclusions, are placed on specific commodities based on their risk of carrying or introducing pests or disease.

National threat abatement measures

Fire ant was determined to have the potential to impact Australian native fauna and flora and as such was listed as a key threatening process on 2 April 2003 under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Under the *Environment Protection and Biodiversity Conservation Act 1999* the Australian Government, in consultation with the States and Territories and other key stakeholders, has developed a threat abatement plan to provide a national framework to mitigate the potential impact of the group of ants known as tramp ants, including fire ant.

The plan focuses on actions such as public education, surveillance and monitoring, quarantine and border control, and development of contingency plans in the other States and Territories.

Known incursions

Fire ant has entered Australia at least seven times since 2001; six times into Queensland (Port of Brisbane (2001), south western suburbs Brisbane (2001), Yarwun (2006, 2013), Lytton (2009) and Roma (2011)), and once into the Northern Territory (Darwin (2007)).

3.2 Establishment

Fire ant is one of a small subset of tramp ants that is classed as highly invasive. This is because it is not just restricted to urban areas (as with, for example, Argentine ant) but also invades natural areas where it competes with and may displace native ants. Almost any environment may be suitable for these fire ant provided there is a source of food, water and shelter for the colony. Fire ant has been found living in salt marshes, in deserts (provided there is some water e.g. irrigation), in buildings, inside water metre boxes and in areas covered by snow in winter. They do have some preferences though - they prefer open ground to shaded areas because they can use the sun to heat their mounds in winter. In the summer they shelter deep in the soil profile. They are not often found in forests under full shade. They prefer disturbed ground to undisturbed ground for ease of establishment of their colonies and because ground disturbance often displaces other ants that may be competitors. Even apparently inhospitable sites may contain pockets of suitable habitat for fire ant. A fire ant colony is highly migratory – the colony may move several times a year to find new food sources or in response to disturbance or inundation by water.

Given the biology of fire ant, a fire ant queen that is not detected and destroyed on entry, has a high likelihood of establishing a viable nest if it finds suitable habitat.

Of the seven known entry events, fire ant was not detected on four occasions resulting in establishment of the pest at the Port of Brisbane (2001), in the south western suburbs of Brisbane (2001) and Yarwun (2006, 2013). Fire ant did not establish as a result of the Darwin (2007), Lytton (2009) and Roma (2011) incursions as the infestations were detected and eradicated prior to establishment.

3.3 Spread

3.3.1 Dispersal mechanisms

There are four mechanisms of dispersal that fire ant employ: nuptial flight, budding, rafting, and human-assisted means.

Nuptial flights

As part of the reproduction cycle, the male and female alates fly and mate in the air. Once mated the inseminated female will fly to a location where she will lay her eggs to begin a new colony. Both monogynes and polygynes employ this dispersal method, however it is predominately used by monogynes (Vargo & Porter 1989). There have been reports in literature which suggest that reproductive flights can result in fire ants travelling up to 12–16 km away from the natal nest, however this is likely to be either wind assisted, or dispersal over water where there would be a lack of visual landing site clues (Tschinkel 2006), a case which would reduce the opportunity for reproductive success due to a serious depletion of stored resources.

Recent evidence from genetic analysis in Australia suggests that the majority of nuptial flight distances are approximately 500 m. Out of 108 direct parental relationships found between colonies only three indicate dispersal greater that 3.7 km with the greatest being 12 km (Oakey 2009). These are preliminary data and further investigation is required to assess if human-assisted or natural movement is the cause of these large dispersal distances. With the biology of the monogyne alates being larger in body size and wing development than their polygyne counterparts, monogyne fire ant are thought to be more likely to successfully mate and survive to establish a new colony through nuptial flights (Mescher *et al*. 2003).

Budding

Dispersal and colony founding by budding is much simpler and more reliable than nuptial flights but can only occur in polygyne colonies. A queen will leave her maternal nest, taking with her group of workers, walk away for 1–50 m, and establish a new nest. The new nest is capable of functioning independently, however it has been found that there may be regular interchange of workers, food and even brood between neighbouring polygyne nests (Bhatkar & Vinson 1987; Porter & Savignano 1990; Vargo & Porter 1989). Polygyne colonies have been found to use the budding process to re-establish colonies after disturbance and even after flooding.

Rafting

The fire ant core natural range is the headwaters of the Paraguay River, which arises in one of the largest wetlands in the world. Every year during the rainy season, the waters of the Paraguay River flood an area of approximately 180 km^2. Fire ant has adapted to this regular inundation; colonies are able to float on the water's surface (rafting) for weeks, until land is once more available. It is interesting to note that areas of regular and continual flooding do not support large populations of fire ant (Tschinkel 2006). Rafting consists of bundling the queen and immatures inside a ball of worker ants, which is continuously rotating allowing workers access to surface air (Morrill 1974; Taber 2000) and floating upon the water surface until contact with land is made.

Human-assisted movement

Fire ant may also spread through the movement of items they are associated with or housed within, such as soil, potting mix, plant equipment and other cargo (Tschinkel 2006; Vinson 1997). This is believed to be the method of introduction of fire ant into Australia, through the Port of Brisbane and into Yarwun near Gladstone. As recently as November 2011, a consignment of mining equipment originating in the US was found to be infested by fire ant after being unpacked in Roma. Further evidence of successful colony spread through mechanical vectors was demonstrated after a fire ant nest was detected by tracing the movement of high risk items from infested commercial premises to a discovery of a small infestation at Doonan 150 km away from Brisbane, and a consignment of infested plants in Victoria (Vanderwoude & McCubbin 2002). The risk of successful colony spread through mechanical vectors is minimised through the declaration of restricted areas and the requirement for movement controls within these areas.

3.4 Potential impact

Since they were accidently introduced into the US around the 1930s, fire ant has become a significant ecological and economic pest in the southern states. By 1986, they had spread to infest

more than 260 million acres of land in nine south-eastern states, including all or portions of Florida, Georgia, South Carolina, Tennessee, Alabama, Mississippi, Arkansas, Texas and Oklahoma (Lofgren 1986). Unlike many insect pests that are either an urban, agricultural, or medical problem, fire ant is a pest that is a problem in all of these areas (Vinson 1997).

Climate modelling conducted by CSIRO using CLIMEX for the National Red Imported Fire Ant Eradication Program (NRIFAEP) has shown that fire ant has the potential to inhabit most of the major coastal areas of Australia, and extensive areas of the tropical north. Vast areas of the continent's natural environment, including world heritage areas and national parks, are prone to fire ant invasion (Sutherst & Maywald 2005).

Modelling was also conducted to assess the potential speed of spread and the extent to which Australia could become infested with fire ant. These models indicated that if left unchecked fire ant could infest the majority of the Australian mainland and the spread of the ant would mimic the pattern of invasion seen in the US where fire ant is now spread across most of the southern states (Sutherst & Maywald 2005).

Figure 1 is an indicative map generated by CLIMEX, based on a model built by Bob Sutherst at CSIRO Entomology in Indooroopilly, Queensland, using the 1995 reported geographical distribution of fire ant in North America. It should be noted that the variances of minimum temperature in North America differ greatly from those in Australia; resulting in intermittent severe winters that make the North American average climate statistics underestimate the limiting effects of extreme conditions there. The result is that the distribution in Australia is likely to be slightly larger than that illustrated in relation to low temperature limitation (i.e. in the high altitude areas). The effect of added moisture (e.g. irrigation) is not represented.

Nevertheless it is clear that most of Australia is climatically suitable for establishment of the fire ant, although the southern states will have limited population growth potential due to the lower temperatures in the east and the lack of rainfall during the warm months in the west.

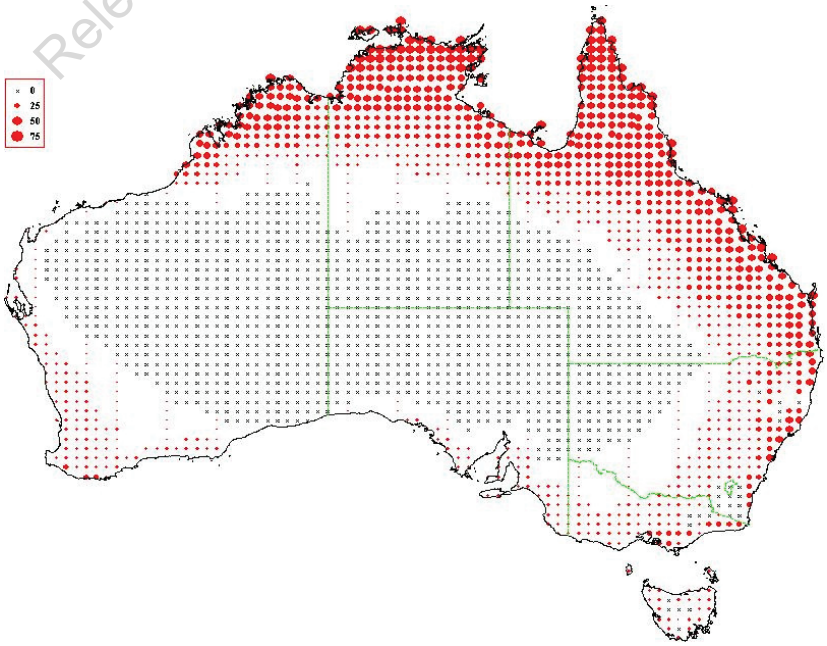

Figure 1: Indicative CLIMEX map demonstrating potential for seasonal population growth

The rate of spread within Australia was estimated using a conditional Markov chain process with the probability of state change determined by the condition of neighbouring cells. This was coupled with an estimate of the spread of fire ant to new locations over time based on human-assisted movement. The combination of spread at one location with spread to new locations was used to estimate the total rate of spread within Australia (Sutherst & Maywald 2005).

It is proposed that, for consistency, the existing modelling employed for the NRIFAEP be utilised for the Yarwun (2013) fire ant eradication program.

3.4.1 Social

Fire ant has the potential to seriously impact outdoor lifestyle. In the US, people in fire ant infested areas have changed their habits to avoid exposure to the ant (Drees & Vinson 1993) by avoiding having picnics on their lawns, walking barefoot, sitting or lying on the ground, or even standing for too long in one spot. In Australia, public areas such as parks and recreational areas may become unsafe for people and their pets (Swepson 2001).

Outdoor activities, such as gardening, increase the risk of stings. Although fire ant typically nests outdoors in the ground, they have been found inside dwellings and other structures. In the US, fire ant have been discovered in wall cavities, under rugs, in electrical boxes, computers, cars, and even beds and wardrobes (Vinson 1997). As a result, fire ant can become a problem in homes, apartments, schools and businesses. In a US survey, 89% of people living in a fire-ant infested area said they, or someone in their family, had been stung (Vinson 1997).

The impact of fire ant is not restricted to people (Barr *et al*. 1994; Vinson 1997). Pets and domestic animals can also be stung and injured, and may have allergic reactions to fire ant venom. Fire ant stings are a major reason for visits to veterinarians in fire ant infested parts of the US (Barr *et al*. 1994).

A social impact study (Swepson 2001) of the concerns of Australian residents with infested properties, list their concerns to be:

- safety of small children in their backyards
- restricted access to their backyards as a place of relaxation
- impacts on pets and wildlife
- impacts on homes and electrical equipment
- repeated costs of having to control fire ant.

While the data for this study was taken exclusively from first hand experiences of infested property residents, it is reasonable to extrapolate their concerns to any social situation that requires grass and lawns, school ovals, nature strips, sporting field, and outdoor concerts/festivals. In other words, fire ant will have a major impact on the Australian outdoor lifestyle (Swepson 2001).

3.4.2 Human health

Fire ant can have significant impacts on human health because of the sting in their tail, similar to wasps and bees. However, unlike bees, fire ants can sting repeatedly.

Colony defence is a feature of fire ant (Nattrass & Vanderwoude 2001). When disturbed, workers rush out from the damaged colony and swarm over the mound surface and over the perceived

disturbance vector (Vinson & Sorensen 1986) – usually the nearest moving object. They sting in synchrony which is initiated by an alarm pheromone. Fire ant has the ability to sting repeatedly and will continue to do so even when their venom supply has expired. Their venom is unique among Hymenoptera in that it is composed largely of alkaloids instead of acids (Lofgren 1986).

Symptoms of a fire ant sting include: the rapid onset of flushing, general hives, swelling of the face, eyes or throat, chest pains, nausea, severe sweating, breathing difficulties and faintness. Generally however, the usual response is the immediate development of dermal welts followed by pustules within 24 hours (Stafford 1996). There is a risk of secondary infection if the blisters or pustules at the sting sites are broken causing severe complications to the original stings (Lofgren 1986; Parrino *et al*. 1981). Multiple stings give the sensation that the skin is on fire; hence, the name fire ant (Tschinkel 2006).

With the increase in density of fire ant colonies in the US, there have been increased reports of stings occurring indoors. Between 1991 and 2004, 20 people were stung indoors, mostly in long-care facilities. Three involved hospitalised patients, and there were also a number of infants stung. Effects ranged from nightmares to death in seven adults. One of the infants died and two suffered long-term morbidity. Six of the 20 sting victims died within one week of the attack. Seven of the 10 attacks reported in newspapers did not result in significant medical consequences, as compared with only two of the 10 attacks in previously published reports (Rupp & deShazo 2006).

In the US, over 40 million people live in areas infested by fire ant. Annually, 14 million people are stung and one quarter of these are expected to develop some sensitivity to fire ant toxin (Lofgren *et al*. 1975). A survey of 1,286 practitioners in South Carolina (US) (population, 4 million), where fire ant are well established, estimated that annually over 33,000 people (94 per 10,000 population) seek medical consultation for fire ant stings, and, of these, 660 people (1.9 per 10,000 population) are treated for anaphylaxis (Caldwell *et al*. 1999). Direct extrapolation of these data to the Australian situation would suggest that about 140,000 consultations and 3,000 anaphylactic reactions are to be expected each year by 2030 if fire ant eradication is not successful (Solley *et al*. 2002).

As stated above, in extreme cases fire ant stings have been lethal to humans due to anaphylactic shock and lack of medical attention (Solley *et al*. 2002; Stafford 1996). It is believed that worldwide, 100 people have died as a result of a sting or multiple stings from fire ants. No deaths have occurred in Australia but there have been people hospitalised for treatment following fire ant stings (Solley *et al*. 2002).

3.4.3 Infrastructure

Fire ant does not always build nests in the ground. Colonies in the US have been observed to infest electrical equipment, such as air conditioners and traffic signal boxes, they will nest in walls, drawers, boxes and under rugs (Vinson 1997). They also infest telephone junctions, airport landing lights (Lofgren 1986), electric pumps for oil and water wells, computers, car electrical systems, and have caused portions of roads to collapse (Lofgren 1986). Foragers occasionally cause short circuits in electrical wiring (Lofgren 1986; Slowik *et al*. 1997) and fires have been started after such incidents (Brenner *et al*. 1994; cited in (Taber 2000). Fire ant will bring soil into these structures, and chew on insulation (Drees & Vinson 1993).

Fire ant also have the potential to impact on the tourism industry if eradication is not successful, and have already impacted on businesses that deal in soil and soil related products and equipment; the export trade of 'high risk' materials with fire-ant free countries, building industries, wholesale and retail nurseries, turf farms, developers, market gardens, swimming pool installers to give examples.

3.4.4 Agriculture

While fire ants have been prevented from infesting Australia's significant agricultural areas, they have had a major impact on agriculture in the US. According to a professor at the Texas Agricultural Extension (US) the agricultural economic losses caused by the ant are an estimated US$90 million annually. In Texas, at least US$580 million was spent in 2000 to control this pest. Gutrich *et al*. (2007) undertook a study to estimate the potential economic costs to Hawaii, in case of the introduction and establishment of the fire ant. The authors of the study conclude that the estimated impact on various economic sectors in Hawaii would be around US$211 million per year.

The Australian Bureau of Agricultural and Resource Economics (ABARE) has estimated that losses in rural industries would amount to more than AUD$6.7 billion over 30 years.

Newborn or hatching animals are particularly prone to attacks that can result in death. Fire ant is attracted to mucous areas and wounds. Thus many young animals are stung in and around the eyes, which can lead to blindness; and around the mouth and nose, which can lead to swelling and suffocation (Drees & Vinson 1993). This is a common occurrence, as heavily grazed pastures support the highest populations of fire ant in south central Texas (Summerlin *et al*. 1984).

Fire ant invades the food and water supplies of animals, for example, hay, stock feed and water troughs. The animals are unable to reach the food or water without being seriously stung, and this can lead to starvation and dehydration. They can cause problems on poultry farms by attacking chickens and foraging on broken eggs. Stings cause blemishes that can reduce the quality of poultry (Drees & Vinson 1993).

Fire ant can sometimes cause fatal damage to some plants by tunnelling through roots and stems, by girdling various parts of young ornamental plants (Vinson 1997), and feeding on planted food crop seeds (Banks *et al*. 1991; Drees & Vinson 1993; Morrison *et al*. 1997). In citrus trees they have been discovered eating the bark and cambrian of young trees to obtain sap while chewing off new growth, feeding on flowers and developing fruit (Banks *et al*. 1991; Jetter *et al*. 2002). Like some other ants, fire ant will farm some species of homopteran pest insects that produce ´honeydew´ (Vinson 1997; Vinson & Sorensen 1986). This downgrades the quality of produce and assists in the spread of some diseases.

Fire ant invades bee hives and feed on developing bee larvae, occasionally destroying weak colonies (Drees & Vinson 1993). In the US, farmers are not only disadvantaged by the costs of controlling a fire ant infestation, but are encroached upon by the ants' mounds interfering with some types of harvesting operations, damaging irrigation systems (Drees & Vinson 1993), and reducing their productivity by workers who have been stung. Their effect extends to interfering with integrated pest management practices, and feeding on important biological control agents.

3.4.5 Environment

In the US, fire ant is an aggressive predator, reducing populations of many pest species including ticks, chiggers, boll weevils, the sugar cane borer, and the corn earworm. However it also preys on parasitised aphids, parasitic insect pupae, eggs of beneficial lacewings, and larvae and adults of many other beneficial insects that are important in reducing pest problems. Further, many other species of effective predatory ants are eliminated by fire ant, resulting in a simplified predator component of the ecosystem. Thus, its beneficial effects are offset by its reduction in the diversity of important beneficial arthropods (Vinson 1997).

Fire ant reduces biodiversity among invertebrates, reptiles, frogs, lizards, ground-nesting birds and small mammals (Nattrass & Vanderwoude 2001), and native ants populations (McGlynn 1999). It is competitively dominant to most other invasive ant species; it has displaced the Argentine ant (*Linepithema humile*) in areas in the US where the species have been introduced (Holway *et al*. 2002). In the US, it has been found to negatively impact at least 14 bird species, 1 reptile species, one fish species and two small mammal species (through predation, competition and/or stinging) (Holway *et al*. 2002).

There can be no doubt that fire ant will pose a substantial risk to Australia's fauna if it spreads beyond its current Australian range and is not eradicated. If the worst-case scenario occurs and their range increases to cover most of the continent as predicted, wide-ranging species declines in a variety of habitats are to be expected. Although endangered species are of particular concern, many common Australian animal species have experienced range declines, and the additional pressure caused by fire ant may be sufficient to result in a new wave of local or country-wide extinctions (Moloney & Vanderwoude 2002).

Serious negative impacts on Australian native ant species and native Scinid lizards have already been observed in the early stages of the eradication program (Nattrass & Vanderwoude 2001), in infested bushland in Brisbane's south-west. Nattrass & Vanderwoude (2001) report on anecdotal accounts of small mammals, possibly weakened by other factors, being attacked and repeatedly stung by fire ant, resulting in death. However, the main impact on vertebrates is much more likely to consist of interference with nesting, predation on juveniles and competition for resources.

Fire ant also has the potential to seriously impact the vegetation communities in natural areas. Being omnivorous, it can exert not only a direct effect on the plants (e.g. predation on seeds and seedlings may alter the ratios and the distribution of plants available to develop, which can cause major changes in an ecosystem, but also secondary effects (Vinson 1994).

Disturbing the assemblage of invertebrates and vertebrates in an area will ultimately affect plant assemblages. The farming by fire ant of aphids and scale insects will increase stresses on plants (Vinson 1997; Vinson & Sorensen 1986). The removal of specific ant/plant pollinators and replacement with fire ant, could adversely affect pollination and seed set. If fire ant intercepts insect pollinators, some of which are very specific to some plant species (e.g. a range of native bees, flies and beetles), the plants pollination service may be disrupted. Common species of plants may become rare or locally extinct if their symbiotic relationship with native pollinators is disrupted or their seed is removed and destroyed.

Worldwide, it is estimated that ants disperse 35% of all herbaceous plant seeds (Beattie 1985), and at least 70% of the carbohydrates used to support fire ant colony maintenance and growth are

obtained directly or indirectly from plants (Shatters & Vander Meer 2000). Invertebrate herbivores may be important for regulating seed viability, plant architecture and competition amongst plants. The loss of decomposing species will affect soil nutrient levels that will ultimately affect the plant assemblages. The ability of ants to facilitate vegetation change is recognised worldwide (Levey & Byrne 1993), extrapolated to an Australian context, fire ant will adversely affect Australian vegetation communities.

4 National significance criteria

Schedule 3

It is proposed that red imported fire ant meets all three national significance criteria listed under Schedule 3 of NEBRA:

i. environment

ii. people, including human infrastructure and social amenity

iii. business activity.

Human health impacts have also been considered when determining whether fire ant is nationally significant. Fire ant has previously been assessed as a pest of national significance.

Evidence supporting the assessment of red imported fire ant as a pest of national significance as defined in NEBRA can be found below.

4.1 Environment

Fire ant meet the ‘extensive impacts’ sub-criterion under ‘environment’.

‘Impact’ is defined in NEBRA as ‘causing significant negative consequences’.

Fire ant is considered by the International Union for Conservation of Nature (IUCN)/Species Survival Commission Invasive Species Specialist Group to be one of the world's worst invasive alien species (Global Invasive Species Database 2009).

Fire ant was determined to have the potential to impact Australian native fauna and flora and as such was listed as a key threatening process on 2 April 2003 under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Fire ant have been shown to have a broad environmental impact in the US, including damage to plants and plant communities, reduction in invertebrate fauna (food sources for other species), altered ecological balance (simplified ecosystems) and increased endangerment of species. The Tramp Ant Threat Abatement Plan lists threatened Australian animal species that are recognised by the *Environment Protection and Biodiversity Conservation Act 1999* as potentially being adversely affected by fire ant (Commonwealth of Australia 2006).

In the US, fire ant is an aggressive predator, reducing populations of many pest species including ticks, chiggers, boll weevils, the sugar cane borer, and the corn earworm. However, fire ant also preys on parasitised aphids, parasitic insect pupae, eggs of beneficial lacewings, and larvae and adults of many other beneficial insects that are important in reducing pest problems. Many other species of effective predatory ants are eliminated by fire ant, resulting in a simplified predator

component of the ecosystem. Thus, any beneficial effects of fire ant are offset by a reduction in the diversity of important beneficial arthropods (Vinson 1997).

Fire ant reduce biodiversity among invertebrates, reptiles, frogs, lizards, ground-nesting birds and small mammals (Wojcik *et al*. 2001), and native ant populations (McGlynn 1999). It is competitively dominant to most other invasive ant species; it has displaced the Argentine ant in areas in the US where the species have been introduced (Holway *et al*. 2002). In the US, it has been found to negatively impact at least fourteen bird species, thirteen reptile species, one fish species and two small mammal species through predation, competition and/or stinging (Holway *et al*. 2002).

Invertebrate herbivores are important for regulating seed viability, plant architecture and competition amongst plants. In particular, the ability of ants to facilitate vegetation change is recognised worldwide (Levey & Byrne 1993; Beattie 1985). As fire ant colonies obtain at least 70% of their carbohydrates for colony maintenance and growth directly or indirectly from plants (Shatters & Vander Meer, 2000), negative effects to natural plant assemblages will be:

- increased stress on plants from the farming by fire ant of aphids and scale insects (Vinson 1997; Vinson & Sorensen 1986)
- changes to pollination and seed set by the displacement of specific ant/plant pollinators by fire ant. If fire ant intercept insect pollinators, some of which are specific to some plant species (e.g. a range of native bees, flies and beetles), the plant's pollination service may be disrupted. Common species of plants may become rare or locally extinct if their symbiotic relationship with native pollinators is disrupted or their seed is removed and destroyed, and
- predation on seeds and seedlings by fire ant which will alter the ratios and distributions of plants available to develop. It is estimated that worldwide ants disperse 35% of all herbaceous plant seeds (Beattie, 1985), therefore altering the ratios and distributions will cause not only major changes in an ecosystem, but also secondary negative effects (Vinson 1994).

Serious negative impacts on Australian native ant species and native Scinid lizards have already been observed in the early stages of the eradication program (Nattrass & Vanderwoude 2001) in infested bushland in Brisbane's south-west. Nattrass & Vanderwoude (2001) repeat anecdotal accounts of small mammals, possibly weakened by other factors, being attacked and repeatedly stung by fire ant, resulting in death. However, the main impact on vertebrates is much more likely to consist of interference with nesting, predation on juveniles and competition for resources.

If the worst-case scenario occurs and their range increases to cover most of the continent as predicted, wide-ranging species declines in a variety of habitats are to be expected. Although endangered species are of particular concern, many common Australian animal species have experienced range declines in recent years, and the additional pressure caused by fire ant may be sufficient to result in a new wave of local or country-wide extinctions (Moloney & Vanderwoude, 2002).

Environmental studies conducted in the infested area in Queensland have revealed that since implementation of the NRIFAEP (and the significant reduction in the population of fire ant present) there has been a reversal in the decline of native ant species (NRIFAEP unpublished data 2002).

4.2 People, including social amenity and human infrastructure

Fire ant meet the following sub-criteria under 'people, including social amenity and human infrastructure':

- impacts on human infrastructure
- impacts on social amenity
- cultural impacts.

Fire ant has the potential, if left uncontrolled, to adversely affect the Australian outdoor way of life, agriculture and, in high densities, invade public and private structures.

Worldwide, fire ant have been responsible for over 100 deaths, and in the US alone, more than 14 million people are stung annually with 1% of these seeking medical attention.

Without the national eradication program, Australia could expect similar fire ant impacts to those seen in Texas where it costs the community over US $1.2 billion each year in control, repair works and medical costs.

4.2.1 Impacts on human infrastructure

Although fire ant typically nests outdoors in the ground, in high density populations they bring soil into and make nests inside of wall cavities, under rugs, in electrical boxes such as air conditioners and traffic signal boxes, computers, car electric systems, beds, wardrobes (Vinson 1997), telephone junctions, airport landing lights, electric pumps for oil and water wells, and have caused portions of roads to collapse (Lofgren 1986).

Foragers also occasionally cause short circuits in electrical wiring by chewing on insulation (Lofgren 1986; Slowik *et al*. 1997) and fires have been started after such incidents (Brenner *et al*. 1994; cited in Taber 2000).

In Australia, in the initial stages of the program, when infestations were high compared to today's relatively low infestation levels, there were reports of fire ant nesting in pot plants on verandas, and invading homes. There have been no reports of this occurring since the reduction in the density of the infestation.

4.2.2 Cultural/social amenity impacts

Fire ant has the potential to seriously impact outdoor lifestyle.

In the US, people in fire ant infested areas have changed their habits to avoid exposure to the ant (Drees & Vinson, 1993) by avoiding having picnics on their lawns, walking barefoot outside, sitting or lying on the ground, gardening or even standing for too long in one spot. In Australia, public areas such as parks and recreational areas may become unsafe for people and their pets (Swepson 2001).

A social impact study (Swepson 2001) of the concerns of Australian residents with infested properties, list their concerns to be:

- the safety of small children in their backyards
- the restricted access to their backyards as a place of relaxation
- the impacts on pets and wildlife

- impacts on homes and electrical equipment, and
- the repeated costs of having to control fire ant.

While the data for this study was taken exclusively from first hand experiences of infested property residents, it is reasonable to extrapolate their concerns to any social situation that requires grass and lawns such as school ovals, nature strips, sporting fields, and outdoor concerts/festivals. In other words, fire ant will have a major impact on the Australian outdoor lifestyle (Swepson 2001).

Importantly, it should be noted that there are a range of health impacts experienced in countries where fire ants are found.

In a US survey, 89% of people living in a fire-ant infested area said they, or someone in their family, had been stung (Vinson 1997).

In an area where over 40 million people live in areas infested by fire ant, this equates to 14 million people annually. One quarter of these people are expected to develop some sensitivity to fire ant toxin (Lofgren *et al*. 1975).

Direct extrapolation of these data to the Australian situation would suggest that about 140,000 medical consultations and 3,000 anaphylactic reactions are to be expected each year by 2030, if fire ant eradication is not successful (Solley *et al*. 2002).

Increasing pest density positively correlates with an increase in stings occurring indoors. Between 1991 and 2004 in the US, 20 people were reportedly stung indoors, mostly in long-care facilities. Six of the 20 sting victims died within one week of the attack (Rupp & deShazo 2006).

The impact of fire ant is not restricted to people (Barr *et al*. 1994; Vinson 1997). Pets and domestic animals are also stung and injured, and may have allergic reactions to fire ant venom. Fire ant stings are a major reason for visits to veterinarians in fire ant infested parts of the US (Barr *et al*. 1994). If fire ant were left unchecked, Australian outdoor dwelling pets and domestic animals will be adversely affected.

4.3 Business activity

While fire ants have so far been prevented from infesting Australia's significant agricultural areas, they have had a major impact on agriculture in the US.

A 2006 study by the Department of Agricultural Economics, Texas A&M University, found that the annual economic impact of fire ant would be $6,323,404,458 in the United States and Puerto Rico, extrapolated from data collected in 1999. The two states with the greatest impact economically from fire ant were Florida and Texas with annual damages of US $1.6 billion and US $1.4 billion respectively. The types of damages which were the greatest were residential households with almost US $5 billion, electric and communication almost $800 million, and agriculture over $500 million (Lard *et al*. 2006).

The Australian Bureau of Agriculture Resources Economics (ABARE 2001) estimated that fire ant if not controlled would cost Australia $8.9 billion within 30 years, not accounting for damages to Queensland's national parks which, in 2001, reportedly contributed more than $1.2 billion each year to the Queensland economy (ABARE 2001). The 2008–09 benefit cost analysis estimates that the cost to the Australian community, if fire ant was left uncontrolled, would reach $43 billion over 30 years.

Fire ant can affect agricultural practices by:

- invading the food and water supplies of animals
- attacking livestock and chickens
- predating on newborn animals, as fire ant are attracted to mucous areas and wounds (Drees & Vinson 1993). This commonly occurs in south central Texas, as heavily grazed pastures support high populations of fire ant (Summerlin *et al*. 1984)
- invading bee hives and feeding on developing bee larvae (Drees & Vinson 1993)
- mounds damaging harvesters operations in the US, costing farmers time in machinery repairs, and money in controlling infestations (Drees & Vinson 1993)
- damaging irrigation systems (Drees & Vinson 1993)
- reducing worker productivity
- hindering integrated pest management practices, and feeding on important biological control agents
- causing fatal damage to some plants by tunneling through roots and stems, by girdling various parts of young ornamental plants (Vinson 1997), and feeding on planted food crop seeds (Banks *et al*. 1991; Drees & Vinson 1993; Morrison *et al*. 1997)
- eating the bark and cambrian of young citrus trees to obtain sap while chewing off new growth, feeding on flowers and developing fruit (Banks *et al*. 1991; Jetter *et al*. 2002), and
- farming species of homopteran pest insects that produce honeydew (Vinson 1997; Vinson & Sorensen 1986) downgrading the quality of produce and assisting in the spread of some diseases.

In Australia, fire ant will impact on the tourism industry if eradication is not successful, and has already had a negative impact on businesses such as wholesale and retail nurseries, soil and soil related products, the machinery and equipment industry, export traders of 'high risk' materials within Australia and to fire-ant free countries, the building industry, developers, turf farms, market gardens, and swimming pool installers.

Further to this, in 2008 the Nursery and Garden Industry Australia reported that the Queensland nursery industry invests over $18 million a year on fire ant compliance costs and the implantation of interstate and intrastate movement restriction protocols. At the time of this report this totalled over $108 million over the past six years (NGIA 2008).

5 Technical feasibility

This section assesses the technical feasibility of the proposed response for eradication of fire ant in Yarwun (2013) against the following criteria:

(a) Capability to accurately diagnose or identify fire ants

In comparison with Australian native *Solenopsis* species, *Solenopsis invicta* is easily distinguishable by its generally larger size, polymorphic workers, darker colour and the presence of a middle clypeal tooth.

Positive identifications are determined entirely by microscopic laboratory diagnosis. Field identifications however provide preliminary identification and genetic analysis reveals social form, population structure and intra-population analysis.

Field identification

Preliminary identifications in the field are made using the following characteristics:

- worker caste is polymorphic
- head and body is a coppery-brown colour, with a darker abdomen, and
- if visible, nests vary in shape and size, but can be up to 40 cm high dome-shaped mounds without any obvious entrance and exit holes. Foraging holes are generally found from 1–5 m from the mound.

Ants with features consistent with the above characteristics are then sampled and submitted for diagnostic testing.

Laboratory diagnosis

Laboratory diagnosis is conducted using visual diagnostic characteristics.

Sample diagnosis is provided by the NRIFAEP entomology diagnostics staff using visual examination of morphological diagnostic characteristics as outlined by the specialised scientific web databases such as AntWeb and PaDIL.

Key *Solenopsis invicta* Buren diagnostic characteristics are as follows:

- worker caste is polymorphic and range in size from 2–6 mm
- head and body is a coppery-brown colour, with a darker abdomen
- propodeal spines absent
- antennal scrobes absent
- waist with a petiole and a post-petiole
- 10 antennal segments with a two-segmented club
- petiolar process either reduced or absent
- mandibles with four teeth
- a single central seta visible on the lower edge of the clypeus, and
- anterior clypeal margin with middle tooth between two lateral teeth.

All positive diagnoses are confirmed by a second member of the diagnostics team as part of the confirmation process.

Confirmed positive samples are then sent for genetic analysis. A large investment has been made in progressing genetic analysis of fire ant populations in Queensland. There are two components to the current analysis; determination of social form (monogyne or polygyne) and fragment analysis using microsatellites to determine relatedness.

Determination of social form

The social forms of the Queensland samples have been determined from the Gp-9 alleles. Since December 2007, this has been conducted using a High Resolution Melt (HRM) polymerase chain reaction (PCR) technique developed by Jane Oakey (Biosecurity Queensland Control Centre) (Oakey 2009). During 2007, this method was validated against the standard restriction endonuclease analysis (REA) PCR described by Krieger & Ross (2002). Development of this test was necessitated by the DNA extracted from field samples being of inadequate quality to amplify sufficient quantities of the 800+ bp amplicon required for objective interpretation of restriction digestion. The HRM technique was designed to detect the same polymorphism detected by the REA method, and required amplification of only 390 bp.

A 'bulk' DNA extraction is performed upon a pool of five to ten worker ants from a colony. This is because a polygyne colony may consist of workers from three different Gp-9 genotypes: Bb (predominant), BB and bb (rare). Testing pooled multiple ants, rather than single ants, from a colony eliminates falsely assigning the monogyne genotype to a polygyne colony if a single selected ant were of the BB genotype. DNA extraction is performed using a commercial kit (QIAgen DNeasy Blood and Tissue kit) according to the manufacturer's instructions. Amplification of a 390 bp fragment of the Gp-9 gene is performed using PCR, and is confirmed with agarose gel electrophoresis. The 390 bp amplicons are used as a template for further amplification of a 76 bp internal fragment in the presence of a Sybr-green derivative. Amplification is detected in real-time using a Rotorgene 6000. When amplification reaches a plateau, the amplicons are denatured ('melted') in fine temperature increments and the associated decrease in green fluorescence is recorded. The melting curve shape and the temperatures at which the amplicons denature are constant for the B and the b alleles; hence the genotypes can be differentiated.

Knowledge of social form is useful as they have different dispersal characteristics and the operational response to the detection of a polygyne colony can be different to a monogyne colony. For instance the detection of an isolated polygyne colony would result in more thorough tracing but may not require the same level of treatment as the discovery of a monogyne colony as the polygyne social form rarely develop from nuptial flights.

Fragment analysis (microsatellites)

Microsatellites are short tandem repeats (STRs) that occur in eukaryotic genomes.

Repeats are commonly 2 to 4 bases in length. Microsatellites most likely occur from stuttering, or slippage, during the DNA replication process that causes mutations in the form of numbers of repeats. The variable number of repeats can be detected using polymerase chain reaction (PCR) primed in the STR flanking regions, where variation is indicated by the length of the amplicon. An

individual's pattern of microsatellite lengths (alleles) at multiple microsatellite sites (loci) in nuclear DNA provides a microsatellite genotype for that individual.

Reportedly, there are potentially thousands of microsatellite loci in a eukaryotic genome (Goldstein & Pollock 1997). The more loci studied, the higher the discriminatory power of the technique will be.

Two levels of analysis are currently being conducted.

- Population structure – which will aid in the determination of:
    - how many populations/incursions
    - presence/absence of sub-structure, and
    - genetic equilibria (population stability).
- Intra-population analysis – which will aid in the determination of:
    - estimation of number of founders
    - relatedness between colonies
    - estimation of dispersal distances
    - differentiation between treatment survival and re-infestation, and
    - estimation of number of undetected colonies.

(b) Effectiveness of the control technique options, including a recommendation on the control technique likely to be the most cost-effective in eradicating fire ants

The incidence of fire ant infestation is reduced through:

- the early detection of fire ant colonies;
- the destruction of those colonies and the treatment of areas around the colonies (based on the limit of natural dispersal of the pest), and
- the prevention of new colonies forming in areas outside of the limit of natural dispersal of the pest (as a result of human-assisted spread).

Australia currently has in place measures to detect, and control and contain fire ant in areas of Queensland where they are known to occur, and measures to eradicate fire ant from known infested areas.

Detection strategies used depend largely on abiotic and resource related factors (such as targeting surveillance to suitable fire ant habitat in proximity to known infestations, and conducting detection surveys at times when treatment will be ineffective due to ant foraging behaviour). Control and containment measures include addressing the risk of human assisted movement, and eradication measures include the use of chemical products to destroy infestations.

Experience gained in controlling fire ant in the US initially provided the basis for developing a course of action for control and eradication of fire ant in Australia. Subsequently, national oversight groups, including the Tramp Ant Consultative Committee and its technical reference group, the Scientific Advisory Panel, have been responsible for analysing, endorsing, developing or rejecting any proposed modification to the course of action based on experience of fire ant in Australia, and to reflect the changing situation and ensure eradication is achieved in the most efficient and effective way possible.

Detection methods

The NRIFAEP employs a number of surveillance strategies for the detection of fire ant, dependent on abiotic factors that influence the ant's behaviour, infestations levels and available resources.

Technical feasibility criterion (o) 'The level of confidence that the organism is detectable at very low densities', (page 31) provides an overview of the surveillance methods to be employed in the Yarwun (2013) response.

Containment measures

Key control measures for containment of fire ant include:

- Implementation of measures to contain the pest including quarantine of infested properties.
- Implementation of movement controls on infested areas and high-risk materials.

Queensland's *Plant Protection Act 1989* (the Act) provides legislative powers to prevent, control or remove pest infestations of plants, and for related purposes. The *Plant Protection Regulation 2002* (the Regulation) prescribes measures and describes objects of quarantine for serious plant pests.

Prescribed measures that deal specifically with fire ant are included as Part 2 of the Regulation.

The Act and Regulation are administered by Biosecurity Queensland, Department of Agriculture, Fisheries and Forestry.

Phytosanitary measures prescribed within the Regulation include:

- the establishment of Queensland as a Pest Quarantine Area (PQA) making it an offence to move fire ant
- definition of restricted items for fire ant
- restrictions on moving live fire ants and things infested with fire ant within a PQA
- restrictions on commercial activities that could reasonably spread fire ant
- obligations on land owners to allow surveillance and preventative treatment for fire ant
- obligations on persons for the treatment of fire ant and infested things
- provision for declaration of restricted areas
- obligations on persons for moving and treating restricted items within a restricted area, and
- obligations on persons to keep records and have those records audited by an inspector.

Eradication measures

The NRIFAEP has applied for, and has been granted use of, a number of chemical products to be used under the conditions of the relevant product label or permit. The following section details chemicals currently used in the NRIFAEP, as well as their destruction effect on the pest. These chemicals have been employed in the eradication of the Yarwun (2006) and Port of Brisbane (2001) incursions.

It is proposed that the same chemicals will be used to treat fire ant in Yarwun (2013).

Fipronil treatment and effect

Currently, direct nest injection (DNI) uses fipronil in a liquid form, in a once only application. Fipronil is a slow-acting poison which is non-repellent and undetectable which enables it to be carried back to contaminate the colony. It kills insects by both contact and ingestion as it disrupts normal nerve function, and works by blocking the GABA-gated chloride channels of neurons in the central nervous system. The GABA-receptor system is responsible for inhibition of normal neural activity (i.e. prevents excessive stimulation of the nerves). When the system's regular functions are blocked by fipronil, the result is neural excitation and the death of the insects.

Insect Growth Regulator (IGR) treatment and effect

Currently, broadcast treatment baits are crushed corn impregnated with soybean oil and an IGR, either S-methoprene or pyriproxyfen. The use of an IGR interferes with the growth or development of ants by breaking the reproductive life cycle, causing starvation of the colony. Ant workers pick up the bait granules and take them back to the colony, where workers extract the toxic oil and feed the bait to both the queen and immature ants thereby preventing worker replacement. Due to the degeneration of reproductive organs, the ant queen cannot replace workers. The lack of worker replacement results in colony death as the existing worker ants age and die. Within 3–4 weeks there is substantial colony mortality and within eight weeks the majority of the colony population has been eliminated. By three months post treatment, 100% control is expected (Barr 2002).

S-methoprene is permitted for use up to 1.5 m over waterways whereas pyriproxyfen cannot be applied within 8 m of water if applied by air and can only be applied up to the water's edge when applied by ground methods. S-methoprene is used for the aerial baiting regime.

Bait distribution methods

Bait in Yarwun will be distributed either aerially or by foot, with aerial baiting being the most efficient method of application. Manual application of bait by foot is the most labour intensive and expensive method of treatment, but it is the only option available for use in heavily built-up areas or other areas where it is not possible or practical to treat using mechanical methods. This method involves individuals carrying hand held/operated bait dispersal devices and systematically walking over all parcels of land generally up to 1 ha in size in built-up areas. In heavily vegetated areas and steep terrain a backpack blower unit may be substituted for, or work in combination with, hand operated bait spreaders to ensure a more effective coverage of the area.

(c) Level of confidence that all individual fire ants present (including at all life stages) can be removed/destroyed by the recommended control techniques

Australian efficacy data proves that the direct nest treatment (injection) of known fire ant colonies is almost 100% effective in destroying a fire ant colony, and is not subject to foraging activity and associated temperature considerations (NRIFAEP unpublished data 2009).

Published data from America indicates that broadcast baiting has proven to be effective against fire ant (Drees *et al*. 1996), with reports indicating 80–95% control within 1–6 months (Barr 2000).

The strategy for eradication of fire ant in Yarwun is to destroy all known fire ant colonies by direct nest injection and to apply six broadcast bait treatments over an area of 2 km radius from known fire ant nests between March 2014 and April 2015 at times where fire ant is actively foraging.

A higher level of confidence in achieving eradication of a known infestation is achieved through the conduct of multiple rounds of treatment and combining the confidence obtained from each treatment.

This is represented by the formula:

$C=1-(1-C^1) \times (1-C^2) \times (1-C^3)$ …..

Where

C -is the confidence provided after n treatments

C^n -is the confidence provided by each round of treatment

Assuming the confidence provided by each round of treatment is constant, the confidence of success over multiple rounds of treatment may be represented by the following formula:

$C=1-(1-t^E)^n$

Where

t^E -is the treatment efficacy

n -is the number of treatments conducted in the treatment area

Assuming a treatment efficacy of 80% for each round of bait treatment, Table 1 demonstrates that a confidence of success in destroying fire ant infestation in the treatment area after six rounds of treatment is 99.994%.

However, additional unquantifiable factors such as temperature, terrain and the effectiveness of delivery systems can impact on the confidence of eradication of a colony provided by an individual or series of treatments. The theory also assumes that each treatment is a 'perfect' treatment and is applied without error and as specified over the treatment area.

Assuming a gross overestimate of the efficacy or accounting for imperfect treatment during each round of treatment, Table 1 also demonstrates that to achieve an acceptable 99% confidence that fire ant have been destroyed in the area after six rounds of treatment, the efficacy provided by each round of treatment may be as low as 53.6%.

This is represented by the formula:

$t^E=1-(1-C)^{1/n}$

Where

t^E -is the treatment efficacy

n -is the number of treatments conducted in the treatment area

C -is the desired confidence to be provided after n treatments

$t^E=1-(1-0.99)^{1/6}$

$t^E= 53.58\%$

Table 1: Confidence of treatment success over multiple rounds of treatment

Efficacy of treatment	Treatment Round					
	1	2	3	4	5	6
10%	10.000%	19.000%	27.100%	34.390%	40.951%	46.856%
20%	20.000%	36.000%	48.800%	59.040%	67.232%	73.786%
30%	30.000%	51.000%	65.700%	75.990%	83.193%	88.235%
40%	40.000%	64.000%	78.400%	87.040%	92.224%	95.334%
50%	50.000%	75.000%	87.500%	93.750%	96.875%	98.438%
55%	55.000%	79.750%	90.888%	95.899%	98.155%	99.170%
60%	60.000%	84.000%	93.600%	97.440%	98.976%	99.590%
70%	70.000%	91.000%	97.300%	99.190%	99.757%	99.927%
75%	75.000%	93.750%	98.438%	99.609%	99.902%	99.976%
80%	**80.000%**	**96.000%**	**99.200%**	**99.840%**	**99.968%**	**99.994%**
90%	90.000%	99.000%	99.900%	99.990%	99.999%	100.000%
100%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%

(d) Level of confidence that it is possible to remove fire ant at a faster rate than they can propagate until the population is reduced to a non-viable density

Direct nest injection (DNI) of known fire ant colonies is almost 100% effective in destroying a fire ant colony and broadcast baiting has proven to be effective against fire ants (refer Technical feasibility criterion (c) 'Level of confidence that all individual fire ants present can be destroyed by the recommended control techniques', page 27).

A treatment program utilising a combination of DNI and broadcast baiting was used to eradicate fire ant at Yarwun (2006) and the Port of Brisbane (2001), with these areas being declared free of fire ant in 2010 and 2012, respectively. The same strategy is proposed for eradication of the Yarwun (2013) fire ant incursion.

(e) Confirmation that the recommended control techniques are publicly acceptable (taking into consideration cultural and social values, humaneness, public health impacts, non-target impacts and environmental impacts)

The proposed eradication program for Yarwun (2013) will use the same chemical products that are being used in the NRIFAEP. The NRIFAEP has operated since 2001, and operates with the full support of the community, as evidenced by continual submission of ant samples by the public throughout the life of the program. The NRIFAEP has applied for and has been granted use of a number of chemical products to be used under the conditions of the relevant product label or permit. All chemicals are used in accordance with label specifications and permits as issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA).

(f) Interim control measures that have been put in place by the notifying party

Interim control measures as described in Section 7 'Course of action' of this response plan have been implemented (refer page 39).

(g) Endemic pest or disease controls that may limit or prevent establishment

No endemic pest or disease controls have been identified that may limit or prevent establishment.

(h) Any legislative impediments to undertaking an emergency response

There are no legislative impediments to undertaking an emergency response. Fire ant is a prescribed pest under the *Plant Protection Act 1989* and the whole of Queensland is a pest quarantine area for fire ant. It is proposed a 'restricted area' under the Act be declared for the Yarwun (2013) incursion, should this response plan be approved.

(i) Resources required to undertake an emergency response

The aim of the response is to eradicate fire ant from Yarwun through a process of ongoing delimitation, surveillance, destruction and validation techniques.

As the treatment and surveillance zones in Yarwun are relatively small and the proposed response activities in the Gladstone area will be intermittent, it is proposed that the eradication of fire ant from Yarwun (2013) will be managed by the Biosecurity Queensland Control Centre (BQCC) in Brisbane. Personnel required for on-ground eradication activity will travel to Yarwun from BQCC and be sourced locally (in the case of contract hire personnel for surveillance and ground treatment) to conduct eradication activities as required. It is proposed that during the periods of on-ground eradication activity, staff will continue to operate out of Queensland Government facilities in Gladstone.

A proposed response structure is provided in Appendix 4.

A nationally cost-shared budget of $3.18 over three years has been proposed to eradicate fire ant from Yarwun (refer Section 10 'Projected budgets and indicative costs', page 50).

(j) Known area of infestation

At the time of submission of this response plan, there are five infested properties in Yarwun with a total area of infestation of 32.9 ha (refer Appendix 2). On-ground surveillance has been conducted out to 6 km from known colony points and on all high risk properties identified through tracing investigations to delimit the pest.

A treatment zone of 2,838 ha and a suitable habitat surveillance zone of 792 ha have been identified for response activity.

While fire ants were detected in 2006 at Yarwun, this area was declared free from fire ants in 2010 following the full complement of treatment and surveillance on all properties. There has not been a positive detection since 2006.

Genetic analysis undertaken on the most recent incursion at Yarwun in early December 2013 has shown that this is a new incursion into Australia. This incursion is not related to the south east Queensland population nor to the previous population at Yarwun (2006).

(k) Likely distribution of fire ants, in accordance with Attachment 5A, in Schedule 5, in relation to a terrestrial pest/disease

Refer Section 3.4 'Potential impact', page 12.

(l) Identification of the pathways for the entry into and spread within Australia of fire ants

Refer Risk Assessment, Section 3.1 'Entry', page 10 and 3.3 'Spread', page 11.

(m) Level of confidence that further introductions are sufficiently low

Refer Risk Assessment Section 3.1 'Entry', page 10.

(n) Dispersal ability of fire ants (that is, whether fire ants are capable of rapid spread over large distances)

Refer Risk Assessment Section 3.3 'Spread', page 11.

(o) Level of confidence that fire ants are detectable at very low densities (to help determine if eradication has been achieved), and that all sites affected by the outbreak have or can be found

The NRIFAEP employs a number of surveillance techniques for the detection of fire ant. Selection of the most appropriate method must consider infestation and treatment status, terrain type, infrastructure, available resources and cost efficiency. Most commonly, surveillance is undertaken on foot by a field team, however post-treatment validation processes may use odour detection dogs, in ground lures, as well as visual surveillance. Community engagement (passive surveillance) is also a very effective surveillance tool, generating valuable positive and negative sample data.

It is proposed that on-ground visual surveillance, odour detector dogs and passive surveillance will be employed at Yarwun to determine that all infested sites have been found and that fire ant has been eradicated.

Visual surveillance

Members of the field team form a line with a pre-set spacing, determined by difficulty of detection as a result of terrain or vegetation type, moving forward to conduct a survey sweep across the land parcel to be surveyed. The method is repeated until all areas of the land parcel have been inspected.

Priorities of the field team are responding to public reports of suspect ants, pre-disturbance inspections, and surveying high risk areas around infestations.

It is estimated that visual surveillance gives 80% efficacy of detection. It is proposed that one rounds of on-ground visual surveillance is conducted in the 2 km treatment zone, approximately 12 after the completion of the six chemical treatments.

Odour detector dogs

Odour detector dogs will be employed to conduct post-treatment validation surveillance in areas where fire ant has been detected and DNI has occurred. The NRIFAEP has a 100% confidence level for odour detector dogs in detecting fire ant infestation if present.

Passive surveillance

Passive surveillance by the community is a useful tool to detect infestation within and outside of known infested areas. Community engagement events and mainstream advertising promote awareness of the fire ant infestation infested areas. Passive surveillance techniques may also be employed through community and industry awareness, or incentive schemes. The invasive and aggressive nature of fire ant support their detection through passive surveillance techniques in areas where there is human activity and fire ant awareness material or activity is provided.

(p) Surveillance activities that are in place or could be put in place to confirm proof-of-freedom for sites possibly infested by fire ants

A pest-free area is defined as 'an area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained' (FAO 1996).

The International Plant Protection Convention sets international standards for phytosanitary measures (ISPMs), including principles for establishing and maintaining pest free areas for trade facilitation purposes. The guidelines are published as ISPM No. 4: Requirements for the establishment of pest free areas (FAO 1996). In Australia, principles for the establishment of pest free areas have also been set to provide guidance to Commonwealth and state agencies in making formal decisions about the pest free status of Australia, or parts of it, and to provide evidence to that effect. These guidelines are provided as a report commissioned by the Department of Agriculture, Fisheries and Forestry Australia and Plant Health Australia, *Guidelines for the Establishment of Pest Free Areas for Australian Quarantine* (Jorgensen *et al*. 2003).

In cases where the spread of the pest has been clearly delineated and the infested area clearly has some form of natural or artificial boundaries that would in some way limit the spread of a pest (e.g. host availability, climate characteristics or regulated control and containment measures that would limit the spread of the pest out of the area), national principles for the establishment of pest-free areas may be applied as the risk of re-infestation from outside the defined area has been addressed.

The pest free surveillance protocol for the Yarwun (2013) response includes one rounds of surveillance in the treatment zone conducted approximately 12 months after the final (6th) treatment, in the cooler months of the year, to increase likelihood of detection.

Estimating a minimum predicted apparent pest prevalence

As part of the survey validation process, estimation must be made on the minimum predicted apparent prevalence of the pest within the survey area at the time of survey.

In this instance, a determination of minimum predicted prevalence at the time of each survey is based on a conservative, but realistic consideration of the likely multiplication, spread and survival of the pest since the 'pest prevalence start date', which in this case is the date after which the last treatment was applied.

A conservative approach has been taken by assuming that the minimum number of colonies survived treatment; that being, one colony.

Modelling work by Schmidt *et al.* (2010) provides a quantitative estimate of the increase in fire ant nests over time. The estimates are based on colony point data in south east Queensland provided by the NRIFAEP.

Table 2 provides an analysis of likely growth in the number of fire ant nests present at a site (a site being a 1 ha area) by class P.

Table 3 provides an analysis of the number of likely new infested sites produced per infested site.

Table 2: Estimated intra-site growth in the number of red imported fire ant (*Solenopsis invicta*) nests per year, Brisbane, Australia (Schmidt *et al.* 2010).

Class	λ_k (SE) Mean number of nests per class	w_k Proportion of sites in each class	*P* Range of nest numbers in class
1	1.73 (0.001)	0.9275	1-5
2	7.46 (0.07)	0.0569	6-13
3	15.29 (0.662)	0.0123	14-24
4	33.72 (5.403)	0.0033	25+

The rightmost column (labelled *P*) shows the number of nests that are classified as being in a particular class, and thus, of a particular age.

Table 3: Dispersal component of the model: Details of posterior probability distributions for model parameters.

Parameter	Interpretation	Mode	Mean	Stand. Dev.
θ_1	East-west spread	2.35	2.34	0.32
θ_2	Reproductive rate (no. of new infested sites produced per infested site)	1.91	2.01	0.12
θ_3	Outliers	0.000010	0.000009	0.000005
θ_4	Habitat effect	1.40	1.39	0.015
θ_5	North-south spread	4.97	4.74	0.67
θ_6	Urban effect	0.24	0.24	0.03

North-south and east west are expressed in the same units and are directly comparable (Schmidt *et al.* 2010).

A minimum apparent pest prevalence (in nests) may be estimated from these tables at the time of each survey round.

As Table 2 reports the estimated intra-site growth in the number of nests and Table 3 reports the growth in the number of infested sites over time, both tables are required to make an approximation of apparent prevalence of nests in the infested area at the time of survey. As the survey was conducted over the entire infested area the estimation is the sum total of nests per site and across sites.

Table 2 provides an estimation that if we assume one viable nest survives treatment, then there will be at least five additional nests after a year (7.46 - 1.73 or class 2 minus class 1 in Table 2) and roughly two additional sites with nests (2.01) (Table 3), each site having at least one (1.73) nest. So the conservative number of new nests would roughly be seven (five in the imperfectly treated site and two in nearby sites). The total number of nests would be eight.

Estimating sensitivity of surveillance and overall test sensitivity

Collaborative survey sensitivity trials conducted in Taiwan by the NRIFAEP provide some guidance for estimating surveillance sensitivity.

The trials consisted of multiple passes of surveillance of plots with low to high densities of fire ant mounds. The trials found that for a fire ant colony where a nest structure is visible, and the area is inspected by staff on foot undertaking an 'emu parade' inspection, an average of 82% survey sensitivity was achieved using the specified inspection method. For large mounds (>30 cm) 100% were detected.

Based on these trials, the NRIFAEP assumes a conservative 80% sensitivity of surveillance for detecting a fire ant nest using the specified method. Suspicious samples collected during surveys are considered as 'presumptive positives' and are sent for laboratory diagnosis.

The final assessment of the presumptive positive sample taken as part of the field inspection is undertaken through the conduct of two independent diagnostic tests. The initial diagnostic identification is followed by an additional confirmatory analysis by a second diagnostician. This process also provides for independence by allowing the independent diagnostician to confirm the result by performing the same test. This provides for an extremely high diagnostic test specificity (the probability of a negative test result given that the sample is not fire ant).

However, multi-layer diagnostic tests can provide a potential for reduction in diagnostic test sensitivity (the probability of diagnosing a positive test result given that the pest is present) by providing more opportunities for test failure where a final determination is made based on the result at the final level diagnostic test (the test layer where the result comes up negative and the result is considered as negative and no further action is taken).

In this case, and in many cases where multiple independent tests are performed, the testing protocol incorporates a number of controls and the provision for the diagnostician to repeat the test where the test result is ambiguous or unexpected based on the results of previous tests. Further, samples generally include between one and ten ants. The diagnostic process requires that each ant in the sample is diagnosed, further reducing the likelihood of a sample being fire ant and being dismissed as a negative sample.

The test sensitivity is the probability of detection of a red imported fire ant nest, taking account of the survey sensitivity and that provided by the diagnostic test. In this instance, the probability of detection through two statistically independent tests equals the product of the individual probabilities of detection of both tests. It is represented by the following equation:

$Se^t = Se^s \times Se^d$

Where

Se^t - is the test sensitivity

Se^s - is the survey sensitivity

Se^d - is the diagnostic test sensitivity

No studies have been undertaken on the diagnostic test sensitivity, however the NRIFAEP suggests a 99% diagnostic test sensitivity as a conservative estimate. The estimation of test sensitivity is provided in Table 4 which provides likely test sensitivities over a range of diagnostic test sensitivities and a range of survey sensitivities. Assuming a survey sensitivity of 80% and a diagnostic test sensitivity of 99%, an overall test sensitivity of 79.20% is achieved.

Table 4: Estimation of test sensitivity for diagnosing fire ant in an area.

Sensitivity of survey	Sensitivity of diagnostic test						
	95.00%	**96.00%**	**97.00%**	**98.00%**	**99.00%**	**99.50%**	**99.90%**
65%	61.75%	62.40%	63.05%	63.70%	64.35%	64.68%	64.94%
70%	66.50%	67.20%	67.90%	68.60%	69.30%	69.65%	69.93%
75%	71.25%	72.00%	72.75%	73.50%	74.25%	74.63%	74.93%
80%	76.00%	76.80%	77.60%	78.40%	**79.20%**	79.60%	79.92%
85%	80.75%	81.60%	82.45%	83.30%	84.15%	84.58%	84.92%
90%	85.50%	86.40%	87.30%	88.20%	89.10%	89.55%	89.91%
95%	90.25%	91.20%	92.15%	93.10%	94.05%	94.53%	94.91%
99%	94.05%	95.04%	96.03%	97.02%	98.01%	98.51%	98.90%

Validation surveillance strategy and determining the likelihood of success

Table 5 provides estimations for the likelihood of detecting pest infestation in an area should it be present. The table provides estimates of confidence of pest freedom over a range of test sensitivities after completion of each survey. Calculations are made against the estimated apparent pest prevalence at the time of each survey and highlight combinations where a confidence level of greater than 99% will be achieved.

Table 5: Estimation of confidence of pest freedom where the pest was not diagnosed.

Likelihood of detecting infestation (%) in the survey area should infestation be present.											
Test sensitivity (*Se'*)	**Number of visible mounds present within the survey area at the time of inspection**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8 [A]**	**9**	**10**	**20**
10.000%	10.000	19.000	27.100	34.390	40.951	46.856	52.170	56.953	61.258	65.132	87.842
20.000%	20.000	36.000	48.800	59.040	67.232	73.786	79.028	83.223	86.578	89.263	98.847
30.000%	30.000	51.000	65.700	75.990	83.193	88.235	91.765	94.235	95.965	97.175	99.920
40.000%	40.000	64.000	78.400	87.040	92.224	95.334	97.201	98.320	98.992	99.395	99.996
43.780%	43.780	68.393	82.231	90.010	94.384	96.842	98.225	**99.002**	99.439	99.685	99.999
50.000%	50.000	75.000	87.500	93.750	96.875	98.438	99.219	99.609	99.805	99.902	100
60.000%	60.000	84.000	93.600	97.440	98.976	99.590	99.836	99.934	99.974	99.990	100
65.000%	65.000	87.750	95.713	98.499	99.475	99.816	99.936	99.977	99.992	99.997	100
70.000%	70.000	91.000	97.300	99.190	99.757	99.927	99.978	99.993	99.998	99.999	100
75.000%	75.000	93.750	98.438	99.609	99.902	99.976	99.994	99.998	100	100	100
79.200%	79.200	95.674	99.100	99.813	99.961	99.992	99.998	**99.999**	100	100	100
80.000%	80.000	96.000	99.200	99.840	99.968	99.994	99.999	100	100	100	100
90.000%	90.000	99.000	99.900	99.990	99.999	100	100	100	100	100	100
100.000%	100	100	100	100	100	100	100	100	100	100	100
A – Predicated minimum apparent pest prevalence after treatment assuming a 12 months period of dispersal and development.											

In this example, the analysis demonstrates that the likelihood of pest freedom when at least 8 nests are present after 12 months, and assuming a test sensitivity of 79.20%, is 99.999%.

As reported in *Guidelines for the Establishment of Pest Free Areas for Australian Quarantine* (Jorgensen *et al*. 2003), a higher level of confidence in confirming pest absence may be achieved through the conduct of multiple rounds of inspection within the survey population and combining the confidence obtained from each survey.

This is represented by the formula:

$C=1-(1-C^1) \times (1-C^2) \times (1-C^3)$ …..

Where

C -is the confidence provided after n surveys

C^n -is the confidence provided by each survey

By combining the confidence provided by each survey conducted within the survey area

($C=1-(1-0.99961) \times (1-0.999999999999977)$) at the estimated test sensitivity of 79.20% (refer Table 4) for detection by field staff on foot, it is estimated that the confidence of freedom from fire ant provided by the surveillance program is virtually absolute (100%) when the pest is present as one or more apparent colonies within the survey area.

Further, we can calculate the minimum test sensitivity required to achieve an acceptable 99% confidence of pest freedom by applying the formula:

$Se^t = 1-(1-C)^{\wedge n}$

Where

Se^d -is the desired test sensitivity to be provided at each survey

^{n} -is the sum of apparent nests at each survey

C -is the desired confidence to be provided for all surveys

Then

$Se^d=1-(1-0.99)^{\wedge 25}$

$Se^d=0.1682$ or 16.82%

(q) Community consultation activities undertaken

The following list summarises the community engagement activities undertaken during the Yarwun (2013) response to fire ants to 31 January 2014:

- The NRIFAEP training package has been adapted to cater for the new incursion in Yarwun. Since early December 2013, close to 350 people have been either trained or briefed on fire ant identification and reporting, including staff from key businesses within close proximity to the infested properties, utility companies and from Gladstone and Bundaberg Regional Council. Additional training sessions are scheduled for the coming weeks.
- Investigations are underway for opportunities to 'Train the Trainer' which would increase the number of people aware of and educated about fire ant. The NRIFAEP has successfully adopted this practice in south east Queensland.
- Prior to Christmas, high level stakeholders, including those industries situated on Fisherman's Landing were briefed about the incursion and potential impacts. The local community were also offered an opportunity to attend a public forum to address any concerns they had. A briefing with the Gladstone Regional Council Mayor and Councillors was held in late January 2014.

- Fortnightly communiqués have been distributed to affected stakeholder groups, updating them on the current situation and plans for the response in the coming weeks.
- Biosecurity Officers staffed a display at the local shopping centre where live fire ants were on display on 16 January 2014. Officers fielded a variety of questions from interested members of the public. Another display was conducted at the beginning of February 2014. A static display has been installed in the local shopping centre and will be there for a number of weeks.
- Local media were invited to attend the launch of the aerial treatment program on 23 January 2014 and were given the opportunity to see the helicopter conducting fire ant treatment before departure from the Gladstone Model Aero Club.
- Key stakeholders and local media were invited to view a fire ant nest that was being treated via direct nest injection with an opportunity to take photos and vision, and interview the Community Engagement manager on 30 January 2014.

6 Benefit:Cost analysis

Schedule 4 Item 5

Two benefit:cost analyses have been conducted for the eradication of fire ant in Queensland. Both analyses have shown significant benefit to Australia in eradicating the pest.

ABARE benefit:cost analysis (2001)

A cost benefit analysis for the eradication of fire ant in Queensland was completed by the Australian Bureau of Agricultural and Resource Economics (ABARE) in 2001. Based on this study the mean value of the potential cost of fire ant over a thirty year period was estimated to be approximately $8.9 billion.

Since damage costs were based only on explicit and available market and survey data, the mean estimated costs of fire ant in Australia of $8.9 billion should be viewed as a conservative estimate of the damages from fire ant and thus the potential benefits from its eradication. Potential cost components not quantified includes damages to the tourist industry, national parks, native habitat and native species. A copy of this document is available through the TACC Secretariat.

Queensland Primary Industries and Fisheries benefit:cost analysis (2009)

A benefit:cost analysis for the eradication of fire ant in Queensland was completed by the then Department of Primary Industries and Fisheries in January 2009. Based on the study, the value of the potential costs of fire ant over a thirty year period was estimated to be approximately $43 billion within the modelled impact zone, with an unknown error margin.

The objective of the 2009 study was to extend the 2001 ABARE analysis by including quantitative indicators of potential environmental impact. The study also re-assessed impacts acknowledged in the original report in light of accumulated evidence on fire ant in Queensland and changed costs.

Due to limitations in computing resources, the spread of fire ant was modelled in a spatial window of 180 km by 180 km centred on the current infested areas to the west, south and east of Brisbane, which includes and extends beyond the full extent of the current known restricted area and surrounding surveillance buffers. The square covers much of what is commonly referred to as south east Queensland, plus a part of northern New South Wales. The study concluded that costs

would be significantly higher if spread outside the modelling zone were also considered. A copy of this document is available through the TACC Secretariat.

7 Course of action

7.1 Extent of incident

Red imported fire ant was confirmed at a port facility at Yarwun (1-IP), near Gladstone (525 km north of Brisbane) on 1 December 2013. The site is owned by Gladstone Ports Corporation Limited and comprises 123 ha of reclaimed land. The site is a multi-use site that is sub-leased to a number of businesses. Lessees use the site as a landing and storage area for materials and equipment used in the construction of three liquid natural gas (LNG) projects on nearby Curtis Island, as an access point for personnel working on the LNG projects, as a port facility and storage site for imported raw materials used by a nearby chemical manufacturing plant and alumina refinery, and as an export terminal for cement from an adjacent cement plant. Development of the facility commenced in 2009 with further expansion planned.

Following confirmation of fire ant at the site, Biosecurity Queensland Control Centre established a State Control Headquarters (SCHQ) in Brisbane and deployed operational staff to Yarwun to establish a Local Control Centre (LCC).

The initial response objectives were to:

- Identify the origin of the incursion
- Prevent further spread of fire ant by preventing movement of risk items from infested land
- Delimit the extent of the infestation
- Conduct effective treatment to support eradication of fire ant in Yarwun
- Maintain community and stakeholder confidence in the response
- Minimise disruption to businesses.

Treatment, delimiting surveillance and tracing activity at Yarwun commenced on 5 December 2013 and has continued throughout December 2013 and January 2014.

7.2 Quarantine and movement control

Red imported fire ant is a prescribed pest under the *Plant Protection Act 1989*. The whole of Queensland is a pest quarantine area for red imported fire ant.

Where fire ant was confirmed, a 'Notice of Infestation' under the Act was issued to the affected land owners/lessees/occupiers to control and prevent the spread of fire ant through restrictions on the movement of risk items from infested land.

7.3 Treatment

Where suspect fire ant samples were taken, broadcast baiting was undertaken out to 20 m radius from the suspect nest using an IGR (pyriproxyfen).

Where fire ant was confirmed, direct nest injection was conducted with the contact insecticide fipronil to kill the nests and broadcast baiting was undertaken out to 50 m radius from the confirmed nest using an IGR (pyriproxyfen).

Aerial baiting of the five known infested properties was conducted in late January 2014 with the IGR, S-methoprene.

7.4 Surveillance

Intensive surveillance has been conducted on all infested properties and targeted surveillance is being conducted on all suitable fire ant habitat out to 6 km of 1-IP to delimit the incursion and determine levels of infestation on infested properties (refer Appendix 3 for map of surveillance conducted to 31 January 2014).

7.5 Tracing

Tracing investigations have been conducted with the owners of infested land to identify potential sources or spread of infestation and to inform surveillance priorities. All high-priority trace-forward and trace-back investigations were completed by 31 January 2014 and have informed the proposed treatment and surveillance strategy for eradication. All remaining properties identified as 'at risk' through tracing activity will be investigated.

7.6 Infested area

Subsequent to the confirmation on 1-IP, fire ant has been detected on four additional land parcels in the area, bringing the total number of infested properties to five. Approximately 60 nests have been detected and treated via direct nest injection. The vast majority of the nests have been detected at 1-IP suggesting that this site is the entry point of the incursion. Initial genetic analysis has determined that the incursion is new to Australia and not linked to the Yarwun (2006) infestation. Genetic analysis indicates that it is likely that the fire ant population from this incursion originated from the southern United States.

A map of the infested sites showing confirmed nests and the treatment and surveillance (either full or partial surveillance) zones is provided in Appendix 2.

7.7 Summary of key events

A summary of key events for the response to date is provided in Appendix 6.

7.8 Costs incurred

As at 31January 2014, it is estimated that the Queensland Government has spent approximately $670,000 on the Yarwun response.

8 Proposed response activity

Results of delimiting surveillance and tracing activity conducted to date suggest that the fire ant infestation at Yarwun is contained to a relatively small area and eradication is highly feasible. A proposed course of action to contain and eradicate the pest is outlined below.

A map of the infested area showing proposed 2 km treatment zone and 2–4 km surveillance zone is provided in Appendix 2.

The response objectives are to:

1. contain the pest and prevent spread to uninfested areas
2. eradicate fire ant in Yarwun through destruction of nests by direct nest injection (DNI) with fipronil and through prophylactic broadcast baiting with an insect growth regulator (IGR)
3. conduct buffer and targeted surveillance to delimit the area of infestation
4. conduct engagement activities to garner support and cooperation from the community to assist with movement controls and passive surveillance
5. conduct verification surveillance to demonstrate proof of freedom and support the declaration of eradication of the Yarwun (2013) incursion.

These response objectives will be achieved through implementation of control and containment measures, and a process of treatment, surveillance and validation, in addition to passive surveillance through community engagement as described below.

8.1 Quarantine and movement control

8.1.1 'Notices of Infestation' on infested properties

'Notices of Infestation' (written notices) under Sections 42 and 43 of the *Plant Protection Regulation 2002* (the Regulation) will be issued to the owner/lessees/occupiers of land infested with fire ant to control and prevent the spread of fire ant through restrictions on movement of risk material from infested land.

Control and containment measures prescribed within the Regulation include:

- The whole of Queensland is a pest quarantine area for fire ant, making it an offence to move fire ant
- definition of high-risk items for fire ant
- restrictions on moving live fire ant and things infested with fire ant within a pest quarantine area
- restrictions on commercial activities that could reasonably spread fire ant
- obligations on land owners to allow surveillance and preventative treatment for fire ant
- obligations on persons for the treatment of fire ant infested things.

It is proposed to impose a 'restricted area' under section 49 of the Regulation that aligns with the 2 km treatment zone around known colony points (refer Appendix 2).

Persons carrying on a commercial activity in a restricted area that deals with restricted items must implement and keep an (auditable) approved risk management plan (ARMP). The purpose of an ARMP is to manage the risks associated with the commercial activity carried on in a restricted area

by a person using appropriate risk management techniques to prevent the activity, or the things associated with the activity, from spreading fire ant.

8.2 Treatment and surveillance

Eradication of fire ant at Yarwun will be achieved through a scheduled series of prophylactic chemical treatments and surveillance across two zones:

- Treatment zone: 2 km zone around known colony points (approx. 2,838 ha, refer Appendix 2)
- Surveillance zone: 2 km buffer around treatment zone; note only suitable habitat is surveyed (approx. 792 ha, refer Appendix 2).

8.2.1 Treatment

It is proposed that six treatments of an IGR will be delivered between March 2014 and April 2015 (refer Table 6).

Areas to be treated will include the 2 km treatment zone (refer Appendix 2), Benaraby waste facility and areas otherwise inaccessible for core or buffer surveillance and which are associated with infested sites and present a risk of being infested.

Table 6: Treatment and surveillance schedule

	2013–14	2014–15	2015–16
July		Buffer & target surveillance Dog verification surveillance	
August			
September		Treatment Round 3	
October			
November		Treatment Round 4	
December	Detection		
January	Initial aerial treatment		
February		Treatment Round 5	
March	Treatment Round 1		
April		Treatment Round 6	
May	Treatment Round 2		
June			Verification surveillance

Bait will be broadcast by air and foot, but where possible, baiting will be conducted aerially as this is the most efficient method of application (it is estimated that 95% of the baiting will be conducted aerially).

Broadcast treatment baits are comprised of crushed corn impregnated with soybean oil and an IGR, either S-methoprene or pyriproxyfen. S-methoprene can be used up to 1.5 m over waterways

whereas pyriproxyfen cannot be applied within 8 m of water if applied by air and can only be applied up to the water's edge when applied by ground methods.

Broadcast bait treatment activities will be scheduled to occur during warmer months of the year when ground temperatures are consistently above 20 °C when thermal regulation of the colony is stable resulting in a tendency for ants to forage above ground and actively take up bait.

8.2.2 Surveillance

Buffer surveillance

Surveillance will be conducted in all suitable habitat in the 2–4 km surveillance zone in July 2014 to allow time for any nests that were below ground at the time of delimiting surveillance to become detectable.

Targeted surveillance

Surveillance will be conducted in high risk target areas, such as railway freight yards and waste facilities in July 2014.

Verification surveillance

Treatment zone

Verification surveillance will be conducted in accessible areas of the 2 km treatment zone in June 2016, following completion of all six scheduled treatments.

Odour detection dog surveillance

Odour detector dogs will be used to assess DNI efficacy in the treatment zone in July 2014. In the round of dog surveillance, dogs will conduct structured surveillance out to a radius of 50 m around each injected nest and also reconnaissance surveillance across all accessible areas of 1-IP, as this is believed to be the origin of the incursion.

Dog reconnaissance surveillance is where the dog is placed at a location and left to work up the wind direction in a manner undirected by the handler. The dog determines the search area based upon all odour/s detected rather than following a structured search pattern directed by the handler which covers 100% of a defined area as specified by the job extent. Reconnaissance surveillance is much quicker than structured dog surveillance.

As there is a possibility that the odour of the Yarwun fire ant incursion may not be the same as the south east Queensland fire ant population on which the dogs have been trained and validated, prior to the dogs conducting the onsite surveillance in July 2014, they were provided odour taken from live Yarwun colonies, to ensure they are equally as effective in the detection of the odour of this fire ant incursion at Yarwun.

Passive surveillance

The public contribute through passive surveillance activities whereby suspect ants observed by the public are reported to the program through the Customer Service Centre.

8.3 Community engagement

A Communications Plan for the eradication of fire ant in Yarwun has been developed. Ongoing engagement will follow on from the initial response approach which has been highly effective in establishing strong relationships with key stakeholders. A higher frequency of engagement will be scheduled in the first two years. This will be reduced in the third year and increased slightly in the fourth year to cater for the declaration of eradication. The response's communications and engagement activities will be administered from the NRIFAEP Brisbane office.

8.3.1 Objectives

- Maintain and build stakeholder relations
- Keep stakeholders informed and engaged in the response
- Provide training to industry personnel
- Encourage public surveillance as well as industry and public compliance

8.3.2 Key Deliverables (engagement)

Media

Local media includes radio and television and a daily newspaper. They will be provided with:

- Regular updates on the status of the response
- Proactive stories to promote public passive surveillance as well as public and industry compliance.

Industry and Council Stakeholders

Key industry stakeholders include those businesses in the Yarwun area that are within the 6 km boundary from the core infestation. These stakeholders along with the local council are the primary stakeholder group. Secondary stakeholders include businesses and utilities in the Gladstone area. Industry will be engaged through:

- Fire Ant Training
    - General awareness. Includes; identification, reporting, risk management plans, compliance and preventative measures.
    - Updated training to be provided in the years 2016–17 (provided through online training).
- Regular industry communiqué
- Provision of media releases
- Electronic road signage promoting compliance and prevention on key transport routes
- Regular meetings

General Public

- Media stories
- Public briefings, displays and events

- 'Check your yard' mail out campaigns
- School education
- Electronic road signage

Government

Local, state and federal representatives engaged through:

- Regular email updates on the status of the response
- Briefings
- Provision of media releases

Notification of a Restricted Area

Includes:

- Declaration notices placed in state and local newspapers
- Email notification of changes to stakeholders
- Media engagement

8.4 Science

Science will provide input into the response through the following activities;

- diagnostic services
- genetics analysis
- technical advice on risk management

8.4.1 Diagnostic services

Diagnosis of ants collected at Yarwun, either during surveillance or from public reports, will be conducted from the BQCC laboratory in Brisbane. A positive diagnosis of fire ant is the trigger for a range of activities including the review of plans, surveillance, treatment, genetic analysis and tracing.

8.4.2 Genetic analysis

Various genetic analyses will be performed on positive fire ant samples collected to provide information vital to the response.

8.4.3 Determination of the social form of the ant

This analysis determines whether the colony is a monogyne (single queen) or polygyne (multiple queen) colony. Each form has different behaviours that govern our response (e.g. monogyne queens fly further than polygynes; polygyne colonies are more likely to be accidentally moved with high-risk materials). The social form (Gp9) is determined using a pool of 8–10 ants from each mound sample by the PCR-HRM (Polymerase Chain Reaction-High Resolution Melt) technique.

8.4.4 Genotyping

Genotyping by microsatellites is conducted using ten individuals from each mound sample. The timeline for raw data collection is approximately is three weeks from receipt of sample.

Data analysis will be used to investigate:

a) Population assignment using the Paetkau method on genotypes from single worker ants from each mound compared to previous and existing fire ant populations in Queensland. This will determine if all Yarwun samples are from the same source population (it has already been determined that the first 21 samples are the same population and are different from the population in south east Queensland and a previous incursion in Yarwun during 2006). Further statistics such as Fst (Fixation Index) will be applied to demonstrate the degree of difference between identified populations.

b) Colony assessment to determine the number of colonies will be investigated by inferring the queen's genotype from the multiple workers; mounds that have identical queen genotype will be assumed to be the same colony. The determination of the number of colonies will provide a more accurate assessment of the extent of the incursion compared to that suggested by the number of mounds.

c) Relatedness using R coefficients (Kingroup) and maternity/paternity testing will be investigated using the multiple workers from each sample. From a temporally- and spatially-limited small population such as Yarwun, it may be possible to ascertain the best-fit pedigree/family tree. The level to which this pedigree is complete will give an indication of number of generations present (from this an estimation of the duration of the incursion may be inferred), an indication of surveillance efficacy (how many family tree nodes are missing?) and, by comparing with spatial data, a depiction of the route of spread.

d) Number of founding queens will be estimated using allele frequency data and validated using the proposed pedigree (if the pedigree is sufficiently populated).

e) Bottleneck analyses will investigate the level of genetic instability of the population.

f) Comparison of allele frequencies in the population with reported allele frequencies from the global study may provide further information on the probable geographical source of the incursion. From the samples tested early in the response, the alleles indicated that the source was most likely southern USA or, although less likely, South America. If the pedigree described above is populated sufficiently, and the likely first colonies identified, the probable geographical source may be defined further.

   The timeline for the analysis of the data, after the initial three weeks raw data collection, may be up to an additional 3–4 weeks depending upon what is found (for example, if the pedigree is incomplete, then some analysis may not be performed). Hence, a total of up to seven weeks may be required for the full analysis of the samples.

8.4.5 Technical Advice on Risk Management

Given the number and variety of businesses operating within the area of interest/infestation in Yarwun, and the range of high risk items being moved from the area that could accidentally

transport fire ant, input from the Science Manager is required to formulate or assess risk mitigation measures.

8.5 Containment (risk management and security)

The response will continue to implement measures to contain fire ant.

Containment priorities include:

- issuance of 'Notice of Infestation' to all owner/lessees/occupiers of land infested with fire ant
- establishment of a restricted area
- implementation, maintenance and audit of Approved Risk Management Plans of high risk businesses
- maintaining and monitoring compliance with movement controls to mitigate the risk of human-assisted spread of fire ant
- provision of information on detections of fire ant to facilitate management of interstate entry requirements.

8.6 Policy and planning

Policy and Planning will provide input into the response through:

- ongoing review of eradication program/management strategies to ensure they remain effective to eradicate the current pattern of infestation
- reporting response results to cost-share partners
- preparation of the pest-free area submission.

8.7 Support services

Mapping, program office and administrative services as required, will be provided to support the response.

9 Recommended approaches for determining proof-of-freedom, including surveillance

9.1 National and international standards for pest freedom

A pest free area is defined as 'an area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained' (FAO 1996).

The International Plant Protection Convention sets international standards for phytosanitary measures (ISPMs), including principles for establishing and maintaining pest free areas for trade facilitation purposes. The guidelines are published as *ISPM No. 4: Requirements for the establishment of pest free areas* (FAO 1996).

In Australia, principles for the establishment of pest free areas have also been set to provide guidance to Commonwealth and state and territory agencies in making formal decisions about the pest free area status of Australia, or parts of it, and to provide evidence to that effect. These guidelines are provided as a report commissioned by the Department of Agriculture, Fisheries and Forestry Australia and Plant Health Australia, *Guidelines for the Establishment of Pest Free Areas for Australian Quarantine* (Jorgensen *et al*. 2003).

ISPM No. 4 states that the following three components are considered in the establishment and maintenance of a pest free area:

- systems to establish freedom;
- phytosanitary measures to maintain freedom, and
- checks to verify freedom has been maintained.

9.2 Strategy for Yarwun (2013)

The strategy for determining proof-of-freedom for Yarwun (2013) is outlined in Section 7 'Proposed response activity' and includes:

- maintenance of control and containment measures to control the pest within, and prevent its spread from, the restricted area
- delimiting surveillance to determine the spread of the pest in the Yarwun area
- tracing to identify possible source of infestation and human-assisted spread out of the area
- destruction of all known fire ant colonies at the known infested sites
- prophylactic treatment of areas surrounding known fire ant colonies to destroy any undetected infestation
- dog surveillance in the treatment zone to determine that the treatment has been effective
- buffer surveillance surrounding the treatment zone to validate the treatment zone
- passive surveillance provided through community engagement activity
- additional surveillance of the treated area approximately 12 months after the final treatment to confirm freedom from the pest in Yarwun.

9.3 Confidence levels

9.3.1 Treatment

Assuming each round of treatment provides a conservative 80% likelihood of success, by combining the confidence provided by each round of treatment, the treatment program will provide a 99.994% confidence that if a fire ant infestation was present in the treatment area, it will have been destroyed as a result of the treatment program (refer Table 1, Technical feasibility criterion (c) 'Level of confidence that all individual pest organisms present can be destroyed by the recommended control techniques', page 29).

9.3.2 Verification surveillance in the treatment area

Pest-free verification surveillance will be undertaken within the 2 km treatment area for fire ant to provide evidence of pest absence, subsequent to the treatment of the infested area. The surveillance will include two rounds of visual inspection of the treatment zone, approximately 12 months after the final treatment. In addition, dog surveillance will be conducted in the second round of verification surveillance.

Modelling work by Schmidt *et al*. (2010) was used to determine an estimated minimum pest prevalence in the area should at least one fire ant colony survive the treatment program. The model determined that at least eight apparent nests would be present in the area, following a period of 12 months of undisturbed colony development and dispersal.

A statistical analysis of the pest free-verification surveillance program has determined that the likelihood of detecting infestation (at least one nest) at the time of a survey, when an estimated minimum apparent pest prevalence of eight nests are present, was 99.999%, assuming a test sensitivity of 79.20% (refer Table 5, Technical feasibility criterion (p) 'Surveillance activities that are in place to confirm proof-of-freedom', page 36).

The confidence provided by the treatment program that all infestation was destroyed in the treatment zone, supported by the confidence of pest freedom provided by the pest free area surveillance program will provide the required proof of freedom for fire ant for the Yarwun (2013) infestation.

10 Projected budgets and indicative costs

The current cost sharing apportionment for the NRIFAEP is based on a 50% contribution by the Australian Government, with the remaining 50% provided by each state and territory on a pro-rata basis based on population. It is proposed the same cost sharing apportionments would apply to the Yarwun 2013 response as applies to the NRIFAEP as shown in Table 7.

Table 7: Cost-sharing proportions by funding source

Jurisdiction funding source	Cost-share %	2013–14 $	2014–15 $	2015–16 $	2016–17 $	Total budget $
Australian Government	50.0	286,255	753,455	540,051	11,388	1,597,150
New South Wales	16.9	96,754	254,668	182,537	3,849	537,809
Victoria	12.4	70,991	186,857	133,933	2,824	394, 605
Western Australia	4.9	28,053	73,839	52,925	1,116	155,933
South Australia	3.9	22,328	58,770	42,124	888	124,110
Tasmania	1.2	6,870	18,083	12,961	273	38,188
Northern Territory	0.5	2,863	7,535	5,401	114	15,911
Australian Capital Territory	0.8	4,580	12,055	8,641	182	25,458
Queensland	9.4	53,816	141,650	101,530	2,141	299,136
Total Cost-Sharing	**100.0**	**572,510**	**1,506,910**	**1,080,103**	**22,776**	**3,182,300**

A proposed response structure is provided in Appendix 4 and details of the indicative budget is provided in Appendix 5.

11 Management and governance structure

The response plan, in accordance with NEBRA, will be implemented by the Biosecurity Queensland Control Centre, Department of Agriculture, Fisheries and Forestry (Queensland) and will report to the Tramp Ant Consultative Committee (TACC) as the nominated National Biosecurity Management Consultative Committee (NBMCC) for the Yarwun (2013) response, and through the TACC to the National Biosecurity Management Group (NBMG).

Management and governance roles and responsibilities under the NEBRA are as follows:

11.1 Ministerial councils and standing committees

- The parties must ensure that the Natural Resource Management and Primary Industries Ministerial Councils and Standing Committees, or their successors, include in their respective agendas, and consider, a consolidation of their individual biosecurity agendas.
- The parties must ensure that the Natural Resource Management and Primary Industries Ministerial Councils, or their successors, engage other ministerial councils on biosecurity matters that may have relevance to or affect the business of those other ministerial councils.

11.2 National Biosecurity Committee

The National Biosecurity Committee's role includes:

- developing strategic national biosecurity policy
- consulting with other national committees on biosecurity matters that may have relevance to or affect their business
- implementing the agreement
- monitoring the implementation of the agreement, including providing input to the review of the agreement.

The National Biosecurity Committee will carry out its role in accordance with Australia's international rights and obligations.

11.3 National Biosecurity Management Group

The National Biosecurity Management Group (NBMG) established for an outbreak of a pest or disease will:

- be the peak national decision making forum, through which parties will seek decisions on, but not limited to
    - whether the outbreak is of national significance
    - whether an emergency response is technically feasible and cost beneficial
    - whether the outbreak requires a national biosecurity incident response
    - agreeing the national biosecurity incident response plan
    - cost-sharing in accordance with the national biosecurity incident response plan
- be constituted, have the roles and objectives, and will meet and conduct its affairs in the manner set out in the agreement

- perform the obligations specified in the agreement in relation to that outbreak.

The NBMG will carry out its role in accordance with Australia's international rights and obligations.

11.4 Tramp Ant Consultative Committee

The Tramp Ant Consultative Committee (TACC) established for an outbreak of a pest or disease will:

- advise the NBMG on various matters concerning the outbreak and any resulting national biosecurity incident response, and effectively and efficiently coordinate the technical aspects of the national biosecurity incident response
- be constituted, have the roles and objectives, and will meet and conduct its affairs
- perform the obligations specified in the agreement in relation to that outbreak.

The TACC will carry out its roles in accordance with Australia's international rights and obligations.

11.5 Combat state

The response will be subject to all of the regular Queensland Government departmental governance functions including the internal audit processes, achievement planning processes, internal reporting, and briefs to the Senior Executive Team, Director General and Minister as appropriate.

12 Information systems and management

The NRIFAEP has developed a number of information systems to support the management of operational activities. The program is currently undertaking a major redevelopment of its legacy information systems to mitigate the critical risk of system failure. This project will see the consolidation of systems into a single Fire Ant Management System (FAMS). This is expected to be completed by 30 June 2014. At the present time, information used by the program is split between various information systems including FAMS, the Fire Ant Information System (FAIS), the Client Contact System (CCS) and the Sample Submission Register (SSR). A brief description of these systems is provided below.

12.1 Fire Ant Management System (FAMS)

FAMS is currently in the process of being developed with only some functionality being made available in a production environment. The end result of this system will be to entirely replace the Fire Ant Information System (FAIS) by 30 June 2014. The business functions that the system currently supports can be summarised into the following categories:

- Clients (Companies) – manage operational client information such as company name, phone numbers, address information, key contacts and correspondence.
- Risk Management – manage the activities undertaken by Biosecurity inspectors in relation to approved risk management plans for businesses, including audits and correspondence.
- Remote Sensing – manage all remote sensing activities undertaken by the NRIFAEP.
- Bookings – manage booking of sites missed in structured visits and requested site inspections.
- Staff – manages and maintains all data for NRIFAEP staff including skills, attendance, WHS incidents and rehabilitation.
- Power of ntry – manage the activities undertaken by operational field staff when they are exercising their legislative powers to enter a property without obtaining consent first.
- GPS Tracking – manages the GPS track coordinates collected by operational field staff and provides a management reporting function to conduct quality assurance against those track logs.

12.2 Fire Ant Information System (FAIS)

FAIS was developed to handle the unique requirements of the NRIFAEP. The business functions that the system supports can be summarised into the following categories:

- Clients – manage operational client information such as name and phone number and client complaints.
- Addresses – manage street address information.
- Locations – manage property information such as area and zone information.
- Jobs – creation of surveillance and treatment jobs.
- Treatment – record treatment chemicals, methods and treatment activities on sites.
- Surveillance – manage and process surveillance activities on sites.

- Infested Properties – to manage infestation data.
- Complaints – all public complaints recorded with tracking of resolution process.
- Reports – to report on the deliverables of the program.

The system is based around geographical sites/properties and, as such, is heavily integrated with the digital cadastre database (DCDB) supplied by the Queensland Department of Natural Resources & Mines. The spatial representation of information is paramount to the treatment and surveillance program. BQCC uses ESRI's ArcGIS software in addition to extensions such as Spatial Analyst, 3D Analyst and Image Analyst.

The spatial system is used to define the boundaries of the restricted areas. This information is passed through to the FAIS system where the textural property information is updated with the current zonings.

Treatment and surveillance jobs are created using a combination of spatial layers and textual information. Maps and hard copy forms are produced to provide field staff with as much information as possible to ensure they can undertake their duties safely, and effectively. Field staff complete the job and return the forms for processing by data entry.

FAIS maintains a complete history of activities including treatment and surveillance that has occurred on a site and produces a series of management reports outlining progress to date at both a parcel and area level. This data can also be used to produce maps showing a variety of data including task progress, identified hazards, treatment methods etc.

A GPS system is also used to record coordinates of infestation so these can be accurately recorded in the system and displayed spatially.

The fire ant toolbar is a custom set of spatial tools programmed such that they are accessible via a toolbar within the ArcGIS software. This software was developed to exploit the benefits of using spatial systems at the same time as negating the need for specialist training of staff. The toolbar allows users to designate sites to become a job and the toolbar does the rest, such as issuing the job number and printing job forms and job maps. Jobs are created into FAIS and a series of 'spatial views' refer that data back to the ArcGIS software.

The business functions that the system supports can be summarised into the following categories and will be replaced by the Fire Ant Management System by 30 June 2014:

- Create surveillance and treatment jobs spatially.
- Display those sites required by the scope of a specific task.
- Display frequently used layers such as Zones, Hazards and Sites.
- Print ROT (Record of Treatment) /ROS (Record of Surveillance) forms.
- Print work crew maps, maps or aerial maps for a created job.

12.3 Client Contact System (CCS)

The CCS is an online system for NRIFAEP business units to record and facilitate events and contacts including public reporting and sample tracking including diagnostic results, community engagement activities, trainees, industry contracts and stakeholders such as environmental groups and elected representatives. It was originally developed as the scope of community engagement

activities often extend outside of the boundary of operational activities. This system is currently under review for consolidation into a proposed Queensland Department of Agriculture, Fisheries and Forestry customer relationship management system using Microsoft Dynamics.

12.4 Sample Submission Register (SSR)

The SSR is an online system used to record and report on diagnostic sample information for the NRIFAEP. It has a built-in workflow which manages the sample diagnosis and reporting process by notifying key business users when an action needs to be completed. High risk and high priority sample notifications are e-mailed for immediate action while all other sample information is provided as part of a daily summary.

13 Monitoring and effectiveness of the response plan

13.1 Reporting

A 'Quarterly Situation Report' and a 'Significant Detection Report' will be issued as required, to keep cost-sharing partners informed of program progress.

The Quarterly Situation Report will provide regular updates on the program's progress and report on program management, including expenditure of funds and policy, planning, surveillance, treatment, risk management and security, science, community engagement and information services.

Significant Detection Reports will be provided to TACC where there are detections of fire ant that have the potential to significantly impact on eradication progress. Significant Detection Reports include detections that occur outside of known areas of infestation, significant new detections within known areas of infestation or unusual events where fire ant is detected.

13.2 Review points

The following trigger points will initiate a review of the response have been developed for consideration and endorsement by TACC. Should a trigger point for review be reached, TACC will be advised within 24 hours.

1. Confirmation of fire ant infestation outside the 2 km treatment zone, after approval of the response plan.
2. Confirmation of fire ant infestation in the 2 km treatment zone, after the fourth treatment.
3. Detection of an active colony within the treatment or surveillance zone that is genetically distinct from the Yarwun (2013) infestation.
4. Evidence that the chemical treatments being applied are not effective at killing fire ant.
5. Any event or circumstance that means the objectives of the response plan are unlikely to be achieved within the agreed timeframe or budget detailed in this response plan.

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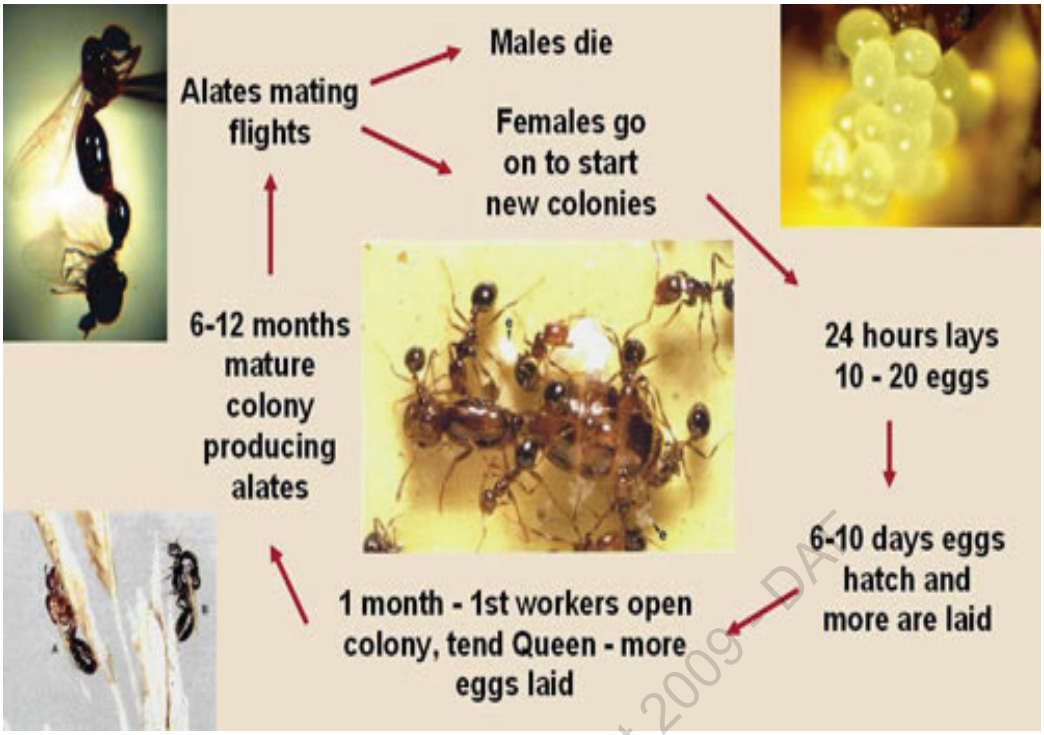
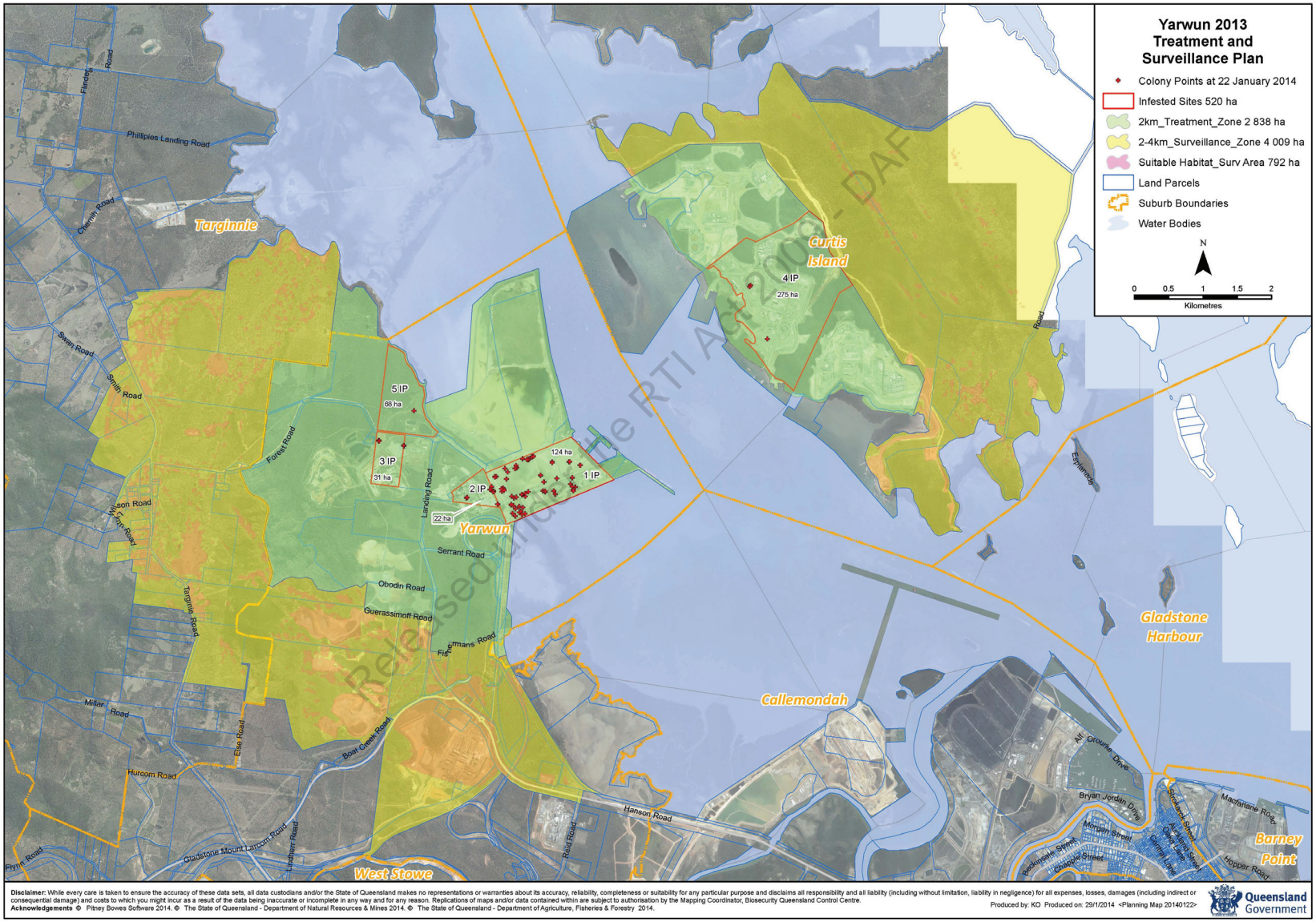
Appendix 1 – Pest lifecycle



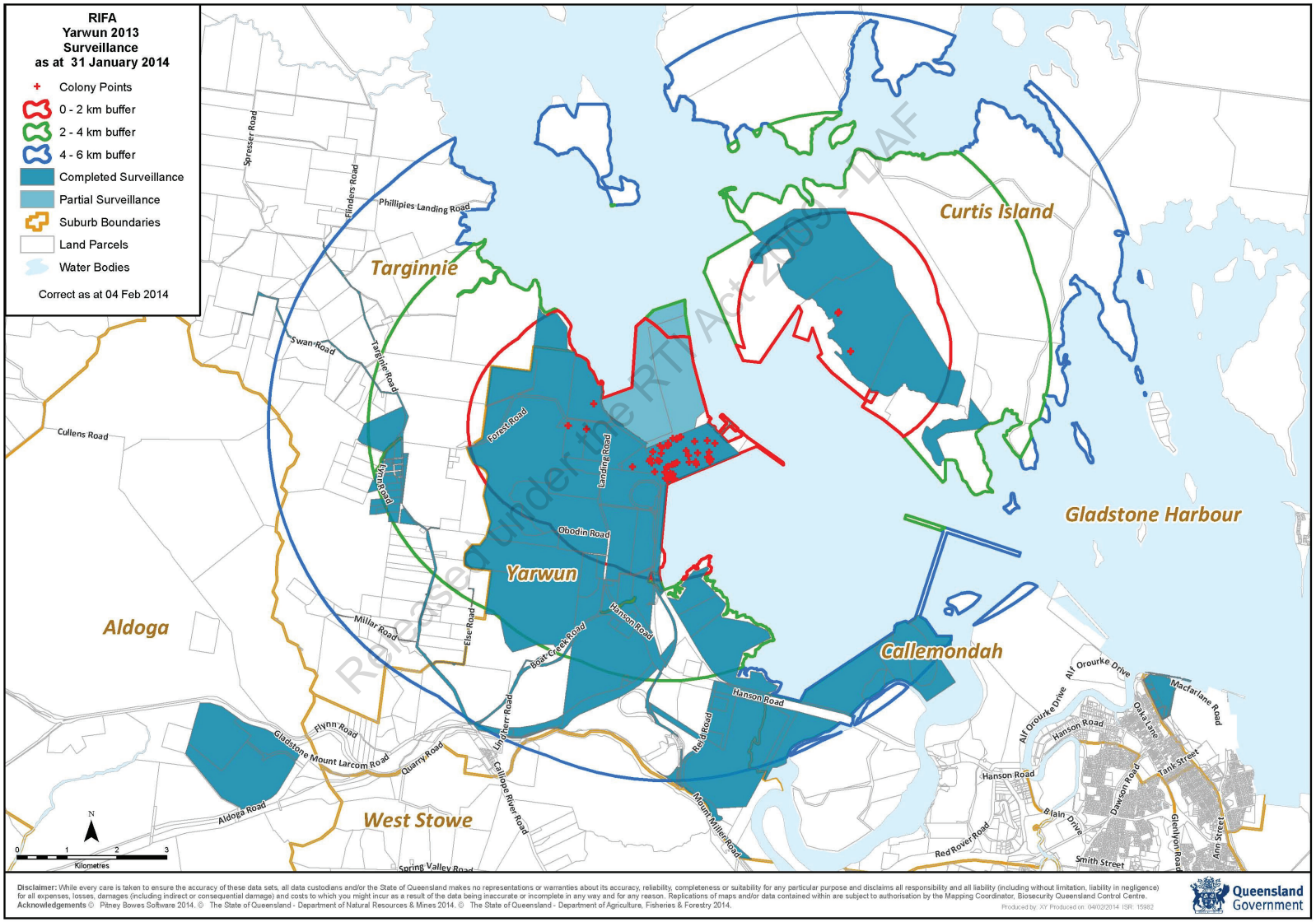
Fire ant biology and ecology lifecycle. (*Images Courtesy SARE and Texas A & M University*)

1. Males and females embark on their nuptial flight when abiotic conditions are favourable.
2. After sperm transfer, the males will drop to the ground and die shortly afterwards.
3. Inseminated females (queens) lands, shed their wings, locate a suitable area and begin digging their claustral chamber, which they will seal behind them.
4. Queens shortly afterwards lay their first eggs, which she will feed and care for when they hatch into larvae.
5. These first workers are called nanites or minims, and are smaller than subsequent worker broods. After the nanites emerge into sterile female workers, the queen will lay more eggs which are tended by the nanites.
6. After one month, the nanites open the claustral chamber and commence foraging, and tending queen and brood.
7. In 6–12 months male and females alates have been produced and are ready for their nuptial flight

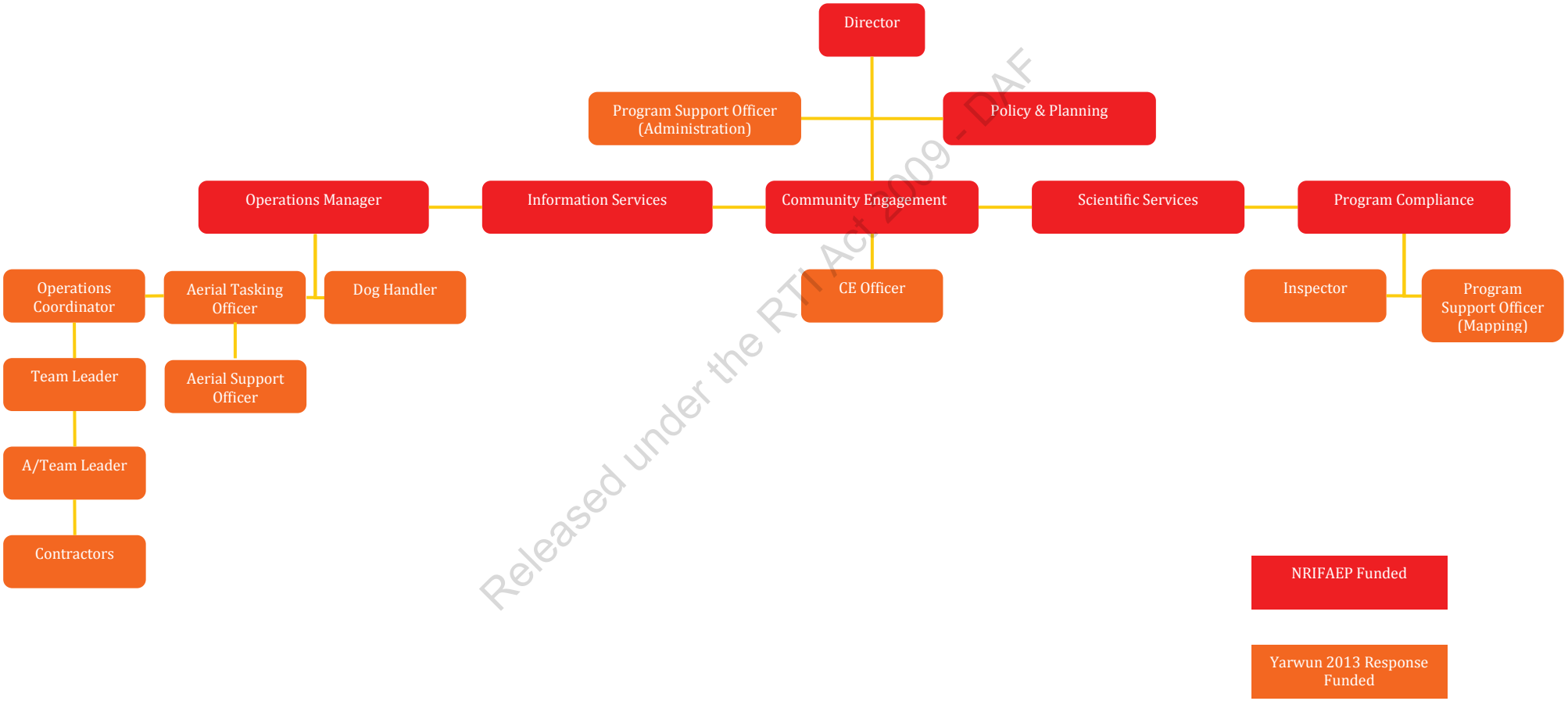
Appendix 2 – Map of treatment and surveillance zone



Appendix 3 – Map of surveillance conducted to 31 January 2014



Appendix 4 – Proposed response structure



Appendix 5 – Yarwun 2013 indicative budget

SUMMARY					
Description	**2013–14**	**2014–15**	**2015–16**	**2016–17**	**TOTAL**
Labour (including contract Operations staff)	120,163	494,364	785,758	10,259	1,410,544
Operating	452,347	1,012,547	294,345	12,517	1,771,756
BUDGET	**572,510**	**1,506,910**	**1,080,103**	**22,776**	**3,182,300**

Description	**2013–14** Total Salary & Oncosts (4mths) $'000	**2014–15** Total Salary & Oncosts (12mths) $'000	**2015–16** Total Salary & Oncosts (12mths) $'000	**2016–17** Total Salary & Oncosts (2mths) $'000	**TOTAL** Total $'000
LABOUR					
Operations	70,905	410,754	740,663		1,222,322
Communications	11,263	17,267	8,823	1,503	38,857
Compliance	25,920	47,831	29,965	5,534	109,250
Program Support	12,075	18,511	6,306	3,222	40,115
TOTAL LABOUR	**$120,163**	**$494,364**	**$785,758**	**$10,259**	**$1,410,544**
OPERATING					
Travel (Other)	2,616	2,616	2,616		7,848
Motor vehicles hire	400	400	400		1,200
Travel - allowances (Treatment)	11,542	23,085			34,627
Travel - allowances (Surveillance)		27,380	71,820		99,200
Travel - airfares (Treatment)	4,000	8,000			12,000
Travel - airfares (Surveillance)		3,600	10,800		14,400
Accommodation (Treatment)	16,460	28,350			44,810
Accommodation (Surveillance)		34,435	88,200		122,635
Vehicles (Treatment)	5,344	19,225			24,569
Vehicles (Surveillance)		12,377	53,542		65,919
Printing, advertising and community engagement	24,550	40,845	38,345	12,517	116,257
Uniforms/safety supplies	2,500	7,500	2,500		12,500
IT Contractors(1000/day)	5,000	15,000	15,000		35,000
Chemicals (Bait, DNI Chemical)	245,200	505,100			750,300
Diagnostic/GeneticTesting		6,760	6,760		13,520
Freight, cartage and postage	20,770	42,785			63,555
Helicopter charter	111,400	229,460			340,860
Office supplies	155	409	342		906
Office lease	800	2,000	800		3,600
Phones and IT charges	1,610	3,220	3,220		8,050
TOTAL OPERATING	**$452,347**	**$1,012,547**	**$294,345**	**$12,517**	**$1,771,756**

Appendix 6 – Summary of key events

Date	Event
2013	
28 November	Suspect *Solenopsis invicta* (red imported fire ant or RIFA) reported to the National Red Imported Fire Ant Eradication Program call centre from a sulphuric acid terminal in Yarwun, north of Gladstone, located on Lot 502 Landing Rd (a port terminal owned by Gladstone Ports Corporation, also known as Fisherman's Landing).
1 December	National Red Imported Fire Ant Eradication Program (NRIFAEP) Science Manager travelled to Yarwun to collect sample and confirmed RIFA at 1-IP.
2 December	NRIFAEP advised the Tramp Ant Consultative Committee (TACC) of the confirmed detection.
3 December	DAFF (Queensland) Minister notified of the incursion.
4 December	Preliminary genetic analysis indicates that the population is of monogyne social form and is a new incursion in Australia and not linked to the 2006 Yarwun or South East Queensland incursion.
4 December	An Operational Plan outlining the objective and actions to be taken in respect of the infestation was presented to and endorsed by the TACC.
5 December	NRIFAEP staff began treatment, surveillance and investigative operations in Gladstone.
9 December	Notice of Infestation issued to 1-IP.
9 December	Declaration of Emergency Response signed by the Chief Biosecurity Officer
10 December	Interstate Plant Biosecurity informed of Yarwun detection and provided with Interstate Plant Quarantine 5 km buffer map.
10 December	Genetic analysis results from 1-IP returned confirming a new incursion most likely originating from southern USA and inferring that it is a relatively new incursion.
11 December	The NRIFAEP Director conducted a briefing with key stakeholders from 1-IP.
16 December	Interim response plan endorsed by TACC. Approval for a for a separate response plan under NEBRA to be presented in February 2014.
18 December	Public forum held at the Central Queensland University campus.
19 December	Notice of Infestation issued to 2-IP.
20 December	Notice of Infestation issued to 3-IP.

2014	
9 January	Surveillance of liquid natural gas plants on Curtis Island commenced.
9 January	Media release: Fire ant surveillance extended in Gladstone.
10–12 January	Interview with Chanel 7.
16 January	Notice of Infestation issued to 4-IP.
20 January	First Communiqué sent to affected business, and general industry (Council, Utility companies, peak industry bodies).
21 January	All Curtis Island surveillance completed.
21 January	Notice of Infestation issued to 5-IP.
23 January	Channel 7, Gladstone Observer and ABC interviews conducted in Gladstone with Manager (Communications).
23 January	Aerial treatment of 1-IP, 2-IP, 3-IP, 5-IP and Benaraby Landfill south of Yarwun completed.
24 January	Aerial treatment of 4-IP completed.
28 January	Media reports on Channels 7 and 9.
30 January	Media event conducted around direct nest injection of 5-IP infestation.

Tramp Ant Consultative Committee (TACC):
Red Imported Fire Ant

FINAL MINUTES

Teleconference Number: 18 **Date:** 10 February 2014

Location: L.3.73 **Time: 2.00-3.00 pm (AEDT)**

Participants		
Name	**Organisation**	**State/Terr.**
Susie Collins (Chair) Enrico Perotti Cheryl Grgurinovic (Secretariat) Clare Ryan (Communications) s.73 irrelevant information	Department of Agriculture	C'wealth
Julie Quinn	Department of the Environment	C'wealth
John Burley	Department of Environment and Primary Industries	VIC
Mark Ramsey	Department of Primary Industries and Regions	SA
Royce Holtkamp	Department of Primary Industries	NSW
Rob Emery Marc Widmer	Department of Agriculture and Food	WA
Mike Ashton Heather Leeson Gary Morton Neville Cook Cara McNicol Ross Wylie	Biosecurity Queensland Department of Agriculture, Fisheries and Forestry	QLD
Anne Walters	Department of Primary Industry	NT

Apologies

Lionel Hill	Department of Primary Industries, Parks, Water and Environment	TAS

Purpose:

s convened to consider the draft Red Imported Fire Ant (RIFA) Yarw Plan, the draft discussion paper developed by South Australia and the evant info s.73 irrelevant information detections in Queensland.

1. Opening

Meeting commenced 2 pm

Welcome and roll call

Participants were welcomed and names were recorded.

Confidentiality requirement

The chair reminded participants that proceedings are to remain confidential, and that proceedings are recorded for minute taking purposes. No conflict of interest was declared.

Papers distributed prior to the meeting:

- Agenda
- n 2013 Response Plan
- gaps and the roles of the national program
- s.73 irrelevant information
- a.

2. Situation Update

QLD provided an update on the RIFA Yarwun incursion, with the following new information:

- Tracings investigations have been undertaken for all businesses on the Fisherman's Landing site. Any 'at risk' sites identified through these investigations have been surveyed, including quarries in the Gladstone/Yarwun area; Port Central, Gladstone where commodity may be stored before moving to Yarwun or Curtis Island; and waste facilities that have received material from infested properties in Yarwun and on Curtis Island. Investigations have included any materials moved off the Fisherman's Landing and Curtis Island sites that could have spread RIFA.
- Delimiting surveillance has been completed on all suitable RIFA habitat in a 2 km radius around known infested sites. To date, RIFA has only been found on five properties: four on the mainland close to Fisherman's Landing and one on Curtis Island (one of the three LNG construction sites). 64 colonies have been detected in total with 52 on Fisherman's Landing and 12 on the four other properties.
- QLD is continuing with delimiting surveillance out to six kilometers radius from known infestations and this is expected to be completed by the end of February 2014.
- Genetic analysis indicates that this is a new infestation not associated with the previous Yarwun 2006, Port of Brisbane or western Brisbane incursions. Genetic analysis indicates that the incursion is recent, probably two to three years, and the source of origin is likely to be the southern United States.
- QLD has engaged with businesses and the community in the Gladstone/Yarwun area. Over 300 individuals have been trained, including from companies involved in construction on Curtis Island, the Gladstone Regional Council, the Department of Environment and Heritage, and Queensland National Parks and Wildlife Service.

- A range of media has been done in the area, including presentations at local shopping centres with displays of live RIFA.
- In relation to control and containment, direct nest injection with a contact insecticide (Fipronil) has been undertaken on all nests detected as well as baiting with an insect growth regulator out to 50 m radius. Aerial baiting of all five infested properties covering an area of about 500 ha was done on 23 and 24 January 2014.
- Notices of infestation have been issued to all landholders and all businesses associated with the five infested properties: owners/leaseholders/businesses conducting activities that could spread RIFA. The notice of infestation effectively quarantines the infested properties and prohibits movement of risk items without an inspector's approval. Queensland plans to declare a high risk restricted area for RIFA encompassing the core treatment area of a two kilometre radius around the known infestations.

TACC discussion of the situation update

SA asked for clarification about whether a quarantine area had been gazetted for the Yarwun incursion. QLD advised that the entire State of QLD is a declared pest quarantine area for RIFA. Notices of infestation are served on the owners of infested properties and any businesses conducting commercial activities on infested properties which effectively places them under quarantine and prohibits the movement of restricted items from those properties. Restricted areas are used to place a broader quarantine over an at-risk area including land that is not known to be infested.

Draft Response Plan

QLD summarised the key points in the Draft Response Plan. Key discussion points are outlined below.

- Due to time constraints, a full risk assessment on RIFA has not been completed.
- However, since 2001 there have been seven known introductions of RIFA into Australia – six into Queensland and one in the Northern Territory. Four have established and spread. This indicates a high probability of entry and a high probability that if introduced RIFA will establish and spread.
- National Significance criteria - TACC and NMG already recognise that RIFA is a pest of national significance.
- Modelling indicates that most of Australia is suitable for RIFA's establishment.
- Two benefit:cost analyses have been completed previously for RIFA indicating substantial benefit in eradicating the pest.
- The assessment of technical feasibility of eradication has been based on NEBRA criteria.
- Techniques and methodologies have already proven effective in eradicating RIFA including the Port of Brisbane and Yarwun 2006 incursions.
- The draft Response Plan starts with activities in early March 2014 and runs through to August 2016.
- The draft Response Plan proposes six aerial bait treatments in the 2 km core treatment area from March 2014 to April 2015. This will give 99.994% confidence of control of all infestation in that area.
- A second round of surveillance will be conducted in July 2014 of all suitable habitat within the 2-4 km buffer zone to ensure the incursion has been delimited. Targeted surveillance will also be conducted in July 2014 on high risk sites such as railway

freight yards and waste facilities, and the RIFA odour detector dogs will be used to verify that all known infestation on the infested properties has been destroyed.

- There will be a round of on-ground surveillance 12 months after the last treatment in June 2016 of the core treatment area to confirm eradication. This will give near 100% confidence of detecting a RIFA nest if present.
- Businesses in the restricted area will be required to have approved risk management plans to prevent further RIFA spread that are subject to audit.
- QLD will continue community engagement and awareness training. QLD will follow up suspect reports and maintain signage to support surveillance and movement restrictions.
- The proposed $3.18 million budget for the Yarwun 2013 Response Plan does not include QLD's normal commitment obligations associated with the investigation phase of the response which are estimated to be approximately $670 000 up to 31 January 2014. The indicative budget only includes the direct costs associated with delivering the proposed response activities in the Gladstone/Yarwun region from 1 March 2014.
- The proposed budget also does not include costs associated with managing the Yarwun response following endorsement of the Response Plan. It is proposed that as the plan involves intermittent activities in the Gladstone/Yarwun region over a period from 1 March 2014 to 31 August 2016, it would be more efficient and cost-effective if the management and other administrative support activities associated with the response were provided by existing National Red Imported Fire Ant Eradication Program staff and the costs associated with those activities were absorbed within the existing NRIFAEP budget. It was noted these staff are already funded by the program's cost-sharing partners under the same cost-sharing proportions proposed in the Yarwun 2013 Response Plan.
- It was noted that additional surveillance activities had been removed from the plan as the draft Response Plan as it currently stands gives near 100% confidence of eradication. The additional surveillance activities included a second round of buffer surveillance (2-4 km zone) and a second round of verification surveillance, including the use of odour detector dogs, 24 months after the last treatment round. These additional activities and the inclusion of program management costs would have resulted in a total indicative Response Plan budget of $5.4 million.

Discussion about the draft response plan

- The chair advised that it is unlikely that the Commonwealth has conducted a specific pest risk assessment on RIFA as tramp ants are hitch hikers and tend to be associated with machinery and vehicles. The risks are therefore dealt with in import conditions around specific commodities.
- VIC asked about funding arrangements for previous incursions outside Brisbane. QLD advised that the 2006 Yarwun incursion ($1.6 million), which was smaller than the current incursion, had its program management costs absorbed within the existing NRIFAEP cost-sharing budget. QLD advised the Roma incursion was a small interception prior to establishment which was dealt with by the NRIFAEP.
- QLD believes that management of this new incursion within the existing NRIFAEP budget will not have any significant effect on the SE Qld eradication program.
- SA asked about the number of treatments proposed in the Response Plan. QLD advised that the number of treatments applied in Brisbane (1 or 2 treatments per year) is inadequate to eradicate the pest.

- QLD reminded TACC that the current South East QLD Response Plan focuses on delimitation, containment and suppression of RIFA up to 2014/15. TACC will then decide if the incursion is still technically feasible to eradicate and, if so, the remaining years of the work plan to 2017/18 focus on eradication.
- QLD advised that the round of treatment already applied was restricted to the five infested properties. The six treatments in the draft Response Plan are additional and will be applied to the entire 2 km core treatment zone.
- The C'wealth asked about the comparative costs of the two response plans. Yarwun has ~33 ha infested compared with more than 2 000 ha in Brisbane. The Yarwun response is comparatively more expensive than the ~$18 million response in SE Qld. QLD advised that under the current Response Plan for SE Qld only one or two treatments of the infested areas are done which accounts for the cost differences. QLD reiterated that the current treatment schedule in SE Qld is not designed to achieve eradication, only containment and suppression, and noted the pest is continuing to slowly spread.
- The C'wealth asked about QLD's normal commitments and asked if QLD could include this as a line item in the budget. To demonstrate to NMG that there is no double-dipping and transparency in cost sharing, the C'wealth asked for program management costs of the proposed Yarwun 2013 response, in-kind contributions and costs to date to be included in the draft Response Plan's budget.
- QLD advised that the Queensland government has spent approximately $670 000 to 31 January 2014 and this could increase to up to $800 000 by the end of February 2014. The management costs associated with the Yarwun response will be absorbed by the NRIFAEP rather than adding program management costs to the Yarwun response. QLD is not proposing to put managers in Gladstone for delivery of the Response Plan but will manage the response from Brisbane using existing NRIFAEP staff.
- The NMG Secretariat advised that CLIMATCH is the preferred modelling program in NEBRA and that QLD has used CLIMEX. For NEBRA, cost sharing is linked to population and CLIMATCH outputs on affected area. QLD advised that CLIMEX has already been applied to RIFA before NEBRA was implemented. The jurisdictions agreed that CLIMEX was an acceptable program to use but the draft Response Plan will need to include a justification for the use of CLIMEX if it is retained.
- The jurisdictions agreed that the incursion is technically feasible to eradicate, but expressed concern about the current eradication program in SE Qld. TACC agreed to revisit the global strategy at the next meeting. The chair advised that this will tie-in with the paper prepared by SA which will be discussed at the face to face meeting.
- QLD advised that the meeting needs to be held urgently as timing is critical in relation to the treatments which are only effective when the ants are foraging. Purchasing baits for two rounds of aerial treatments ($240 000) needs to be done as soon as possible as there is a two to three week turnaround time. The baits currently held by QLD will be used in Brisbane by March 2014.

8. Other business

Electric ant detections

s.73 irrelevant information

s.73 irrelevant information

Discussion about the update

The chair asked if there was a risk that the program would not meet its June 2015 eradication target. QLD advised that all operational activities will be complete before end June 2015. VIC asked if these incursions will trigger the review process. QLD advised that they do not trigger a review. They can be traced back to previous infestations and genetic work indicates that they are not separate incursions.

Actions arising and next steps

Action 1. Review the terms of reference for TACC in the draft Yarwun 2013 Response Plan to ensure they are consistent with those in NEBRA**. – TACC #19**

Action 2. The Commonwealth to assist QDAFF to revise the draft Yarwun 2013 Response Plan's budget to clarify QLD's funding of its normal commitment obligations and to address the use of CLIMEX rather than CLIMATCH. – **Complete.**

Action 3. QDAFF to organise a face to face TACC meeting on Thursday 27 February 2014 to:

i. formally consider the revised draft Yarwun 2013 Response Plan for recommendation to the NBMG

ii. review the approved *Red Imported Fire Ant Eradication Program Response Plan 2013-18*, with particular reference to the current phase of delimitation, containment and suppression, to ensure it still preserves the likelihood of eradication within an acceptable timeframe

iii. review the 'Triggers for review by TACC' in the *Response Plan 2013-18* to ensure they are still appropriate

iv. prepare advice to NMG on:

- whether current funding of the NRIFAEP is sufficient to achieve stated objectives of the delimitation, containment and suppression phase
- likely funding requirements for the eradication phase of the NRIFAEP
- potential ways of resourcing the NRIFAEP over and above the current government cost-sharing arrangements.

- develop an overarching strategy for RIFA that includes consideration of the SA paper. **- Complete**

Action 4. Plant Heath Policy to contact ACPPO to confirm that TACC is the consultative committee under NEBRA for the Yarwun incursion response. **- Confirmed**

Action 5. Plant Health Policy to investigate whether the Commonwealth has conducted a risk assessment on Red Imported Fire Ant to assess the likelihood of the pest entering, establishing and spreading and its potential impact. **- Complete**

Outcomes

- TACC agreed that the Yarwun incursion is technically feasible to eradicate.
- TACC expressed concern about the number of rounds of treatment proposed under the draft 'Eradication of the red imported fire ant – Yarwun 2013' Response Plan compared with that under the 'Red Imported Fire Ant Eradication Program Response Plan 2013-18'. However, it was noted that the south-east Queensland program was in a 'delimitation, containment and suppression' phase rather than an eradication phase and that, as outlined in the plan, six rounds of treatment with an insect growth regulator with an estimated average treatment efficacy of 80% will provide 99.994% confidence of successful treatment of all colonies in the proposed 2 km Treatment Zone.

9. Next meeting

Jurisdictions agreed to a face to face meeting in Brisbane on Thursday 27 February 2014.

10. Close

Meeting closed at 3.15 pm AEDT.

Tramp Ant Consultative Committee (TACC):

Red Imported Fire Ant (RIFA) and s.73 irrelevant information

Final MINUTES

Meeting 19 **Date:** 27 February 2014

Location: Oxley, Brisbane **Time: 9 am–4.15 pm (AEST)**

TACC Representatives		
Observers		
Name	**Organisation**	**Party**
Sally Troy Enrico Perotti (Secretariat) s.73 irrelevant information	Department of Agriculture	C'Wealth
John Burley	Department of Environment and Primary Industries	VIC
Mark Ramsey	Department of Primary Industries and Regions	SA
Oonagh Byrne Rob Emery	Department of Agriculture and Food	WA
Royce Holtkamp	Department of Primary Industries	NSW
Mike Ashton Ross Wylie Cara McNicol Heather Leeson Gary Morton Craig Jennings	Department of Agriculture, Fisheries and Forestry	QLD
Anne Walters	Department of Primary Industry	ACT
Apologies		
Name	**Organisation**	**Proxy**
Julie Quinn	C'wealth Department of the Environment	–
Lionel Hill	Department of Primary Industries, Parks, Water and Environment, Tasmania	–

Purpose:

Th

- s.73 irrelevant information the Yarwun Red Imported Fire Ant (RIFA) nce
- Program Response Plan 2013–18 including considering advice to NMG on funding levels
- the overarching strategy for RIFA [South East Queensland plan]

- the discussion paper on surveillance gaps and the roles of the national program
- the draft Yarwun 2013 Response Plan for recommendation to the NMG.

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1. Opening

Meeting commenced 9 am

Welcome and roll call

Participants were welcomed and names were recorded.

Confidentiality requirement

The chair reminded participants that proceedings are to remain confidential, and that proceedings are recorded for minute taking purposes. No conflict of interest was declared.

Papers distributed prior to the meeting:

- TACC #19 Agenda.
- National Red Imported Fire Ant Eradication Program Quarterly Report—2nd Q 2013–14.
- s.73 irrelevant information
- RIFA Response Plan 2013–2018 plus two attachments.
-
- NEBRA Cost Apportionments/Yarwun RIFA (Attachment C).
- Final minutes TACC #18.
- Discussion paper: surveillance gaps and the roles of the national program.

Note: *WA on line and confirmed it had all the documents.*

An updated Yarwun 2013 Response Plan was distributed during the meeting.

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1. Minutes

TACC endorsed final minutes for TACC # 18.

s.73 irrelevant information

TACC NOTED the report.

3. Situation Update-National Red Imported Fire Ant Eradication Program (NRIFAEP)

QLD provided a summary of the NRIFAEP Quarterly Report for the 2nd Quarter 2013–14. The four performance indicators (surveillance, treatment, containment and budget) are all on track. Anytime a new nest is found, the nest is treated once (by direct nest injection) and an area of 50 m around the nest is baited with an insect growth regulator (IGR). Sixty-nine audits of movement controls have been completed and any instance of non-compliance has been rectified.

QLD provided a summary of the treatment program for 2013/14:

- 8 476 ha of high density infestation has been identified to receive two rounds of treatment. The principles used to determine high density infestation include recent infestations with >10 colony points (colony point = confirmed infestation of RIFA) within a 500 m radius. As of 21 February 2014, 12 585 ha of this type of infestation has been treated. High risk or disturbed areas have been identified through remote sensing and Google Earth imagery. Disturbed areas greater than 5 ha were prioritised for inclusion in the treatment program. Disturbed sites less than 5 ha were not proactively treated owing to lack of resources. SA noted that there are aerial mapping services that are more up to date than Google Earth, providing imagery every three months. QLD advised that it had investigated using these services, but they do not cover the areas of interest frequently enough; central Brisbane was well covered, but other areas may be updated only every one or two years. QLD is using the most current imagery available.

SA confirmed with QLD that the significant detection identified in appendix 2 of the NRIFAEP Quarterly Report was the new Yarwun 2013 incursion. TACC decided that the report should be modified to clarify the significant detection as the Yarwun 2013 incursion.

TACC NOTED the report.

4. Update on Remote Sensing Surveillance

QLD provided an update on Remote Sensing Surveillance (RSS). Some issues are:

- the first season's image capture had been performed when there is 50% or less cloud cover. Due to too many poor quality images when cloud cover was high, this has now been set at 30% or less
- disturbed nests, such as those in cultivated ground or in lawn areas that are regularly mowed, do not have the same identifiable heat signature as undisturbed nests and are therefore less likely to be detected by RSS
- RSS is designed to identify nests >30 cm and could therefore potentially miss smaller nests
- there is not a lot of infestation to detect (10 fire ant nests were detected on 8 sites during RSS point of interest field surveillance).
- the algorithm and the manual analysis has a 38% confidence level by itself; a RSS detection is followed by field surveillance to a 10 m radius around each point which gives a combined confidence level of 68%; if a suspect nest is detected, 100% surveillance occurs out to a 500 m radius which gives a combined confidence level of 100%.

A review after the 2012 season found that RSS was effective to support delimitation. A cost comparison (100 000 ha of all components of RSS) with visual surveillance indicated that RSS is 4.5× more cost effective.

TACC NOTED the work to date on RSS development and that there may be undetected infestation outside the delimitation zone after June 2015.

Comment [MR1]: This statement suggests a reasonable probability of nests outside the area and should be further explained. It almost reads like we are predicting a failure of the program.

This risk was considered when the plan was prepared and balanced against the risks of inadequate treatment of known infested areas inside the quarantine zone. The TACC agreed that leaving areas inside untreated posed a greater risk of ongoing spread than isolated monogyne nests that might exist in the 5-10Km zone. As a result the decision was taken in the plan to limit the outer ring of surveillance beyond 5 Km to only those areas adjacent to known infestations. This created a boundary for surveillance that moved out when nests were discovered in the 0-5Km zone.

5. Review of the RIFA Eradication Program Response Plan 2013–18

The chair flagged that TACC needed to consider the following options.

1. Current strategy of delimitation, containment and suppression in South East Queensland to continue until delimitation is completed in June 2015. Eradication of the incursion in Yarwun as per the proposed response plan.

2. Both incursions are contained pending completion of delimitation surveillance in June 2015 and determination if the South East Queensland incursion is eradicable.
3. Transition to management or containment of both South East Queensland and Yarwun infestations.
4. Eradication of both South East Queensland and Yarwun infestations.

VIC proposed an additional option:

5. Eradication of Yarwun (as a fulminant outbreak under the NEBRA) and transition to management for the South East Queensland incursion.

TACC AGREED that the NRIFAEP continues to meet its objectives and performance indicators under the 'Red Imported Fire Ant Eradication Program Response Plan 2013–18', noting that it is possible that the 600 ha Trigger for Review will be breached this financial year owing to the amount of surveillance being done and to the reduced level of treatment.

TACC NOTED the risks and implications identified in its advice to NMG on the revised response plan in April 2013 and that there was evidence that some of these risks may be being realised.

TACC AGREED to continue with implementation of the current Response Plan and to prepare advice to NMG for the period beyond the 2014–15 financial year.

TACC AGREED that strategies needed to be developed for eradication and containment, including indicative budgets and timeframes, to inform a decision on the future of the South East Queensland eradication program after June 2015.

6. Advice to NMG on funding levels in the NRIFAEP Response Plan: delimitation, containment, suppression, eradication phases

QLD advised that it believes the incursion is technically feasible to eradicate, is cost beneficial and the tools are available for eradication. The chair noted TACC's advice to NMG about the program includes a budget with a breakdown of costs in the response plan. NMG may respond with the economic constraints and a request to revise the program or find alternate sources of funding.

VIC noted that it was still concerned about the proximity of RIFA to cultivated areas in the Lockyer Valley and the risks that this might pose and whether this would be picked up by the trigger points; VIC also noted that it is comfortable that the response is on track to achieve containment and suppression, but there is still a question if eradication in the long term is feasible.

QLD advised that the Rouse Scientific Review of 2010 found that RIFA was not eradicable using current techniques. At the time NMG had asked for containment and suppression while key research on ecology and remote sensing was done. Baits were found to be effective if six treatments are applied over two years. Research demonstrated that native ants were seriously impacted if RIFA is in high density. However, nine out of the ten selected native ant genera were not affected by treatments and provided biotic resistance to RIFA.

Comment [MR2]: Roush review not Rouse

QLD advised that modelling might be possible to indicate how many generations are needed for the genetic bottleneck to impact RIFA.

7. Draft Yarwun 2013 Response Plan for recommendation to the NMG

QLD advised that the Yarwun is a major construction area with a lot of subcontractors moving equipment in and out of the area.

QLD advised that the proposed indicative budget includes efficiencies such as program management for the Yarwun 2013 response will be undertaken by the NRIFAEP management team and these costs will be absorbed within the existing NRIFAEP budget. This is a similar arrangement to the Yarwun 2006 response. In addition, as core response activities in Yarwun will be intermittent over the course of the eradication program, these activities will be undertaken/overseen by experienced NRIFAEP staff supplemented by local contractors. NRIFAEP positions in Brisbane will be back-filled using contractors to ensure the program's objectives and deliverables are not affected.

In July 2014 QLD will carry out surveillance of the 2–4 km Buffer Zone to ensure the incursion is delimited. Validation surveillance will be done on all infested properties to ensure known infestation has been destroyed. Baiting will be conducted six times across the entire 2 km Treatment Zone from March 2014 to April 2015 (as per the Response Plan) as nests may be outside known infected properties which may not have been picked up during delimiting surveillance.

QLD advised that a section on efficiency and financial audits (Section 14.2) had now been included.

TACC AGREED that the response plan should have provision for an efficiency audit once a year and this would be best done, where possible, in conjunction with efficiency audits of the South East Queensland program.

QLD advised that the budget has also been increased for the provision for compliance inspections. Owing to the higher number of businesses and subcontractors on the site, there needs to be an increase in the level of monitoring and checking and the ability for inspection and certification of risk items for interstate movement.

TACC AGREED that the Response Plan should use the CLIMATCH climate modelling software to model the potential spread and calculate the cost-sharing apportionments under NEBRA.

TACC NOTED that the two models produced by ABARES only used 2009 data and AGREED that the modelling should be re-run using the most up-to-date data.

TACC AGREED to recommend the draft Yarwun response plan to NMG subject to discussed amendments.

TACC NOTED that funding decisions past 2014–2015 may be contingent upon the outcomes of the review of the 'Red Imported Fire Ant Eradication Program Response Plan 2013–18' in February 2015 and a decision on technical feasibility and ongoing support for the eradication program following conclusion of the delimitation phase.

8. Surveillance gaps and the roles of the national program

TACC NOTED the discussion paper provided by SA.

The Department of Agriculture agreed to prepare an analysis of potential entry pathways and current risk management arrangements in place against Red Imported Fire Ant and identify areas for improvement. TACC AGREED to consider the analysis at its next meeting.

9. Other business

The chair raised the issue of private beneficiaries and risk creators. QLD advised that, as requested, a discussion paper was prepared for PISC and SCoPI providing interim advice on broadening the funding base. However, the issue has now been referred to the National Biosecurity Committee (NBC) for national policy direction. It was noted that NBC was considering this issue at its Strategic Workshop prior to NBC 17 and the chair proposed to follow up the outcomes of this workshop and provide advice to the next TACC.

VIC asked for agreed text coming out of today's meeting to advise the NMG.

A communiqué is to be agreed to and incorporated into TACC's advice to NMG: TACC supports the Yarwun response plan, but it needs to be considered within the context of NMG's consideration of continuation of funding of the South East Queensland response plan to June 2015; TACC agrees the South East Queensland Plan continues to meet its objectives and performance indicators.

The chair thanked participants and the host jurisdiction

The next meeting date was not set.

ACTIONS	RESPONSIBILITY	STATUS
1. Amend appendix 2 in the 'National Red Imported Fire Ant Eradication Program (NRIFAEP) Quarterly Report - 2nd Quarter 2013-14' to identify that the one significant detection reported is the new Yarwun 2013 incursion.	QDAFF	**Complete**
2. Provide TACC with the link to the YouTube film about the NRIFAEP and the use of remote sensing for surveillance.	QDAFF	**Complete**
3. Update the map of the preventative bait treatment program for NRIFAEP to include colour changes to more easily differentiate areas and to include the restricted area.	QDAFF	**Complete**
4. Review 'Triggers for review by TACC' in the 'Red Imported Fire Ant Eradication Program Response Plan 2013-18' and provide	QDAFF	

	recommendations for any changes for consideration by TACC out of session.		
5.	Prepare budget/timeframe scenarios for both eradication and containment for future years to inform the NRIFAEP 2015 review.	QDAFF/TACC	
6.	Present analysis of potential entry pathways and current risk management arrangements for Red Imported Fire Ant and identify areas for improvement to next TACC.	C'wealth	
7.	Rerun the CLIMATCH model using latest detection data, including spread in east coast USA, and, if applicable, revise the cost-sharing apportionments under NEBRA for inclusion in the Yarwun 2013 Response Plan.	C'wealth	**Complete**
8.	Develop paper advising NMG of TACC support of the Yarwun 2013 Response Plan and for continuation of the 'Red Imported Fire Ant Eradication Program Response Plan 2013-18' until June 2015.	C'wealth	
9.	Update the Yarwun 2013 Response Plan to reflect the requested changes identified by TACC and circulate to TACC for endorsement out of session.	QDAFF/C'wealth	

Outcomes

- Accepted the half yearly report of the National Electric Ant Eradication Program. Noted that the program and activities were on track.
- Noted the discussion paper: surveillance gaps and the roles of the national program. Agreed on action 5 to be completed by the next TACC.
- Agreed that C'wealth seek direction from National Biosecurity Committee about alternative funding models (risk creators) and provide advice to the next TACC.
- Agreed that TACC needs to have a clear plan developed to achieve eradication before July 2015 and to have this plan accepted by NMG.

Comment [MR3]: I assume this means that we have a plan prepared before July 2015 not have eradication by that date.

Agreed recommendations to NMG

- TACC agreed that the NRIFAEP continues to meet its objectives and performance indicators under the 'Red Imported Fire Ant Eradication Program Response Plan 2013-18'.
- TACC agreed to recommend to NMG that the 2014/15 budget identified in the 'Red Imported Fire Ant Eradication Program Response Plan 2013-18' is sufficient to achieve the response plan's objectives, noting the risks that were identified during the development and endorsement of the plan. TACC will review the plan by February 2015.
- TACC agreed to recommend the 'Eradication of the red imported fire ant-Yarwun 2013' Response Plan prepared by Queensland to NMG pending OoS endorsement by TACC. Funding decisions past 2014-2015 may be contingent upon the outcomes of the review of the 'Red Imported Fire Ant Eradication Program Response Plan 2013-18' in 2015.

National Red Imported Fire Ant Eradication Program

Quarterly Report – 1st Quarter 2013–14

Program Management

Governance

The National Red Imported Fire Ant Eradication Program (the Program) operates under the nationally agreed Response Plan 2013–18 (the response plan). The aim of the response plan is to delimit, contain and recommence eradication of red imported fire ants (fire ants) in South East Queensland.

- Under the response plan, the Program is assessed through four main performance indicators:

  1. **Surveillance** – the extent of infestation is delimited by June 2015 (subject to review by the Tramp Ant Consultative Committee (TACC) in February 2015). Delimitation is primarily achieved through the use of remote sensing technology.

     In the first quarter 2013-14 (July–September), 68 500 hectares of remote sensing surveillance (RSS) image capture has occurred with 7885 hectares finalised having gone through all four stages of RSS including field surveillance.

  2. **Treatment** – treatment results in property freedom for all identified infested sites allowing suburb-based restricted areas to be removed.

     During the quarter, infested status was removed from 49 hectares following completion of all required treatment and surveillance in accordance with the accepted protocol.

     The total area of infestation at 30 September 2013 is 2148[1] hectares. The area of new infestation for the quarter is 217 hectares.

  3. **Compliance** – containment is being achieved through community and industry compliance with movement controls thereby preventing human-assisted spread beyond the restricted area.

     79 audits of movement controls were conducted during the quarter with no significant non-compliance found. Two fire ant detections were found outside the restricted areas during the quarter. However, both were located within the 5–10 km RSS delimitation zone and tracings investigations found no evidence that these were caused by human-assisted movement.

     There were no reports of long distance human-assisted spread during the quarter.

  4. **Budget** – annual program expenditure is within 5% of the allocated budget.

     At 30 September 2013, the Program's year-to-date expenditure is underspent by $0.241 million or 4.7% percent (Appendix 1). This is due to the delay in the start of the treatment season.

- Five review triggers have been identified in the response plan that may indicate a threat to Program objectives:

  - The effectiveness of RSS is compromised.
  - The new area of infestation is more than 600 ha in a given financial year.
  - Infestation is detected beyond the 30 km boundary.
  - Reproductive areas of infestation are found beyond the area scheduled for RSS.
  - A dramatic and ongoing decline in community support is evident.

  None of these triggers have been activated this quarter.

[1] This figure includes all active colonies plus the surrounding 50 metres found since 1 July 2008

- Two fire ant detections (Yatala and Glen Cairn) were reported to the TACC as significant detections as they were reproductive infestations beyond the 5 km RSS delimitation zone. These detections were within 2.6 km of the low risk restricted area and both were located in the 5–10 km RSS delimitation zone. Neither infestation is considered a risk to the success of the program. Both infestations were reported by the public.

- A table detailing the key statistics of the Program is attached as Appendix 2.

The primary components of the response plan can be broadly grouped into three essential components – surveillance, treatment, and containment. Additional components of the response plan include community engagement activities, scientific support, and continued support functions such as information technology, administration, and program policy and management.

Surveillance

Remote sensing surveillance

- **Response plan** – 100 000 hectares of RSS targeted on a risk-based approach within the 10 km buffer around the core infested area.

- Results for the quarter for the four RSS steps are as follows:

  - 68 500 hectares of image capture (a total of 103 000 hectares for the season May–September 2013) (Appendix 3).
  - 56 100 hectares of this imagery has been analysed (algorithm and manual analysis) (a total of 66 700 hectares for the season May–September 2013).
  - Processing issues encountered by the external contractor has resulted in delays in the provision of imagery with 36 300 hectares outstanding.
  - Analysis of the imagery (algorithm and manual) has identified just under 258 000 possible fire ant mounds that require follow-up field surveillance.
  - 31 000 of these possible mounds have received follow-up field surveillance with an estimated 7885 hectares finalised having completed all four stages of RSS.
  - 227 000 possible mounds are still to be checked. This will increase when the outstanding imagery is processed.

- Two infested sites (with a total of 5 colonies) were detected through RSS within the delimitation buffer during the quarter.

- Development of the remote sensing algorithm continued through the first quarter with a new version (Version 1.41) being delivered and implemented by the University of Sydney. Detection rates are being maintained at around 70% for all mounds through a combination of validating points of interest (possible fire ant mounds) and buffer field surveillance.

- The analysis process (algorithm and manual analysis) is currently producing an average of 1.7 possible fire ant mounds per hectare for follow-up field surveillance. This is a significant improvement from the results received in May and June 2013 where many sites had over 5 possible fire ant mounds per hectare identified for follow-up field surveillance. These improvements in the analysis process will significantly reduce the resources required to complete follow-up surveillance on the imagery captured.

Targeted field surveillance

- **Response plan** – targeted field surveillance will occur in high risk zones and area of new detections.

- 2828 hectares of targeted field surveillance occurred during the quarter. Targeted surveillance includes post-treatment validation surveillance, delineation surveillance of new infestations, and compliance surveillance.

Community engagement

- **Response plan** – engagement of the community across all zones out to 30 km to promote surveillance, reporting of suspected fire ant infestation, and compliance with movement controls.

- In the quarter, 59% of infestations were reported by the community.

- Three community engagement campaigns, initiated towards the end of 2012–13, continued into this quarter. These campaigns included notifications regarding remote sensing surveillance, a 'Check your yard' campaign to assist delimitation, and a survey of residents on large properties outside the Program's operational areas including in the Lockyer Valley (Appendix 4).

  1. RSS notifications continued to be distributed in July 2013 with the response rate rising from 5.3% to 5.9%.

  2. Of the over 700 000 'Check your yard' requests sent to residents to assist with delimitation, almost 7460 responses were returned from across 292 suburbs with a 1.06% return rate. Of these responses 94.55% reported to have checked their yard and found nothing and 5.19% reported suspect ants.

     As a direct result of this campaign a fire ant nest was found by a member of the public in a suburb outside the fire ant restricted area.

  3. A survey notification card was mailed to over 5000 rural and semi-rural landowners in the 5–30 km delimitation zone. A phone survey was conducted after the mail-out with over 400 people participating in the survey. The majority of respondents would willingly inspect their properties with more assistance from the Program in the identification of fire ants.

- It is estimated that campaign activity including the notification form, advertising, traditional media and views of the website reached an audience of well over 15.7 million people.

Treatment

- **Response plan** – 32 000 hectares of treatment of small isolated infestations, areas with high density infestation, and areas that are at a high risk of becoming infested.

- Apart from new infestations, treatment is conducted between September and May. Due to a delay in treatment notifications to local government, proactive treatment of high density infestations and high risk areas will commence in October this year.

- 912 hectares of treatment of new infestation and surrounds has been conducted in the quarter (Appendix 5).

- A trigger for review of the Program is that the area of new infestation is more than 600 hectares in a given financial year. However, it has previously been acknowledged by the TACC that detections will most likely increase in the short term due to the increase in the level of surveillance and the extensive community engagement campaigns being conducted to support this activity. With the introduction of an agreed protocol to clear infestation, the total area of infestation is considered a more accurate reflection of the

achievements of the Program. This figure will increase with the area of new detections and decrease as areas of infestation are cleared. Once the Program returns to eradication mode the total area of infestation should begin to decrease.

- The area of new infestation for the quarter was 217 hectares (Appendix 6). At 30 June 2013, the total area of infestation was 1980 hectares. With the addition of the area of new infestation for the quarter less the area cleared during this period of 49 hectares, the total area of infestation at the end of the quarter is 2148 hectares.

Containment

- **Response plan** – Application of agreed protocols and strategies to contain fire ants through movement controls including community engagement, risk management strategies focussed on the high risk restricted area, audits of Approved Risk Management Plans (ARMPs), and inspector's approvals for movement of risk materials.

- Currently there are 281 947 hectares under movement restrictions (RIFA Restricted Area – Version 45).

- Risk management strategies conducted during the quarter include:

  - Four tracing activities to ascertain the origin of infestation – 2 were polygyne colonies and the other 2 were detected outside the restricted areas. In all cases the origin of the infestation was inconclusive.
  - 72 spot audits on businesses operating within the restricted areas. 70 were compliant with movement controls with the remaining 2 having minor issues that were immediately rectified.
  - Seven audits of ARMPs with all but one found to be compliant with their plan. The minor non-compliance found at this audit has since been rectified.
  - 57 inspector's approvals issued for the movement of restricted items.
  - 285 plant quarantine inspections of businesses transporting restricted items interstate.

- Community engagement continues to plays an essential role in communicating movement controls which assists in containing the fire ant infestation. This occurs through updating key industry stakeholders on program activities and changes to the restricted areas, and by providing training to businesses as a mandatory component of their ARMPs.

  These actions also assist with delimitation by communicating to the public the importance of checking for fire ants and reporting any suspicious ants.

Community Engagement

The focus of community engagement activities this year is aimed at public reporting, increased knowledge of fire ants to improve public reporting, industry training and promotion of updated risk management plans, as well as improved communication with relevant industry bodies and encouraging in-kind support from industry and business.

- In 2013, awareness of fire ants in the greater Brisbane region remains very high at 95%[1].

[1] 2013 Queensland Regional Householder Survey

- During the quarter, the overall engagement from the campaign activities has been successful including:
    - A combination of communication channels is estimated to have reached an audience of over 15.7 million people. Most significantly, an estimated 14.6 million motorists viewed fire ant messages on freeway emergency road signs.
    - Over 670 reports of suspect ants were received in July 2013 which is a 162.5% increase on average monthly reports from 2012–13.
    - Almost 1520 fire ant related calls were received by the Customer Service Centre in July, which is an 89% increase on average monthly calls from 2012–13.

Scientific Support

Science provides diagnostic and genetic analysis of ant samples, assessment of operational treatment and surveillance activities, and research and development.

- Research is being undertaken to demonstrate whether there is an increasing incidence of male sterility (if too many sterile males are produced a colony will collapse) in the Queensland population which may eventually tip it towards extinction. An interim report on this work is due in the next quarter.

- Submissions have been made to the Australian Pesticides and Veterinary Medicines Authority for alternative chemicals that can be used as a substitute for chlorpyrifos for treatment of turf, domestic pot plants and as a barrier treatment. A response is expected in the next quarter.

- Research continues into aspects of the biology, ecology and impacts of fire ants in the Queensland environment including colony structure and its implications for the Program.

- A collaborative project with the Queensland University of Technology to identify areas that have been recently disturbed using Landsat imagery was due for completion in September. This work will now extend into the next quarter because of the need for further testing. The intention of this project is to allow targeted treatment of disturbed areas, a preferred habitat for fire ants, to eliminate infestation before it can spread.

Continued support functions

Essential support functions include information technology, operational mapping, planning and scheduling, administration, and Program policy and management. Activities during the quarter include:

- An analysis of the Program's current beneficiaries and risk creators including an assessment of the level of risk industry poses to the success of the Program.

- An assessment of the in-kind contributions received from local governments, businesses and individuals who contribute to the Program through promoting awareness, conducting surveillance, and assisting in the containment of fire ants.

- A discussion paper regarding seeking financial contributions from private beneficiaries and risk creators for the Program was drafted and is to be considered by the Primary Industries Standing Council (November) and the Standing Committee on Primary Industries (December).

- A new declaration of the fire ant restricted areas is scheduled for 31 October 2013. During the quarter, a suburb assessment was undertaken to determine which suburbs are to be added and which are to be removed from the restricted areas.

- A number of Program policies are under development, including:

  - power of entry for surveillance (resulting from a recommendation from the Deloitte efficiency audit conducted early in 2012)
  - risk management
  - remote sensing surveillance.

- A major redevelopment of the Fire Ant Information System (FAIS) and all supporting databases was commenced in 2011–12 to help mitigate the critical risk of system failure. The project has amalgamated several supported databases and systems into one tightly integrated Fire Ant Management System (FAMS).

  - The development and production release of a number of components of the RSS functionality within FAMS has been finalised. This includes significant performance improvements to the manual analysis tool resulting in a 400% increase in productivity by the manual analysis team.
  - Stage 5 of the FAMS development project is continuing. This includes the development of a power of entry module which supports the change in policy for accessing properties where land owners cannot be contacted to gain consent.

A summary of the Red Imported Fire Ant Eradication Program Response Plan is attached (Appendix 7).

Appendix 1 – Financial Report 2013–14

For period ending 30 September 2013

WORK UNITS	Notes	2013–14 Initial Budget			Initial Budget	2013–14 Revised Budget			Revised	2013–14 Actual Expenses		
		Labour $'000	Non-Labour $'000	TOTAL $'000	FTE	Labour $'000	Non-Labour $'000	TOTAL $'000	FTE	Labour $'000	Non-Labour $'000	TOTAL $'000
FAE Management		214	220	434	2.0	214	220	434	2.0	57	17	74
Policy and Planning		468	10	478	4.0	468	10	478	4.0	122	2	124
Resources and Administration		807	661	1,467	9.75	807	661	1,467	9.8	201	115	316
Community Engagement		681	224	905	6.9	681	224	905	6.9	173	52	225
Information Services		541	741	1,283	5.0	541	741	1,283	5.0	130	52	181
Scientific Services		806	236	1,042	8.0	806	236	1,042	8.0	205	54	259
Field Operations		4,106	1,257	5,363	66.0	4,106	1,257	5,363	66.0	1,017	164	1,182
Program Compliance		1,498	115	1,613	19.0	1,498	115	1,613	19.0	367	35	401
Sub-Total		**9,122**	**3,463**	**12,585**	**120.7**	**9,122**	**3,463**	**12,585**	**120.7**	**2,271**	**491**	**2,762**
Site Lease Charges			399	399			399	399			15	15
Odour Detection Dogs		175	166	341	2.0	175	166	341	2.0	47	25	72
Chemical Treatments			480	480			480	480				
Aerial Applications			1,364	1,364			1,364	1,364			2	2
Remote Sensing		240	2,928	3,168	3.0	240	2,928	3,168	3.0	65	1,910	1,974
Sub-Total		**415**	**5,337**	**5,752**	**5.0**	**415**	**5,337**	**5,752**	**5.0**	**111**	**1,952**	**2,063**
TOTAL COST-SHARING + QLD SUPPLEMENTARY FUNDING		**9,537**	**8,801**	**18,338**	**125.7**	**9,537**	**8,801**	**18,338**	**125.7**	**2,382**	**2,443**	**4,825**

Notes:

The 2013–14 budget includes a $337.6K carryover from 2012–13.

Revenue Update:

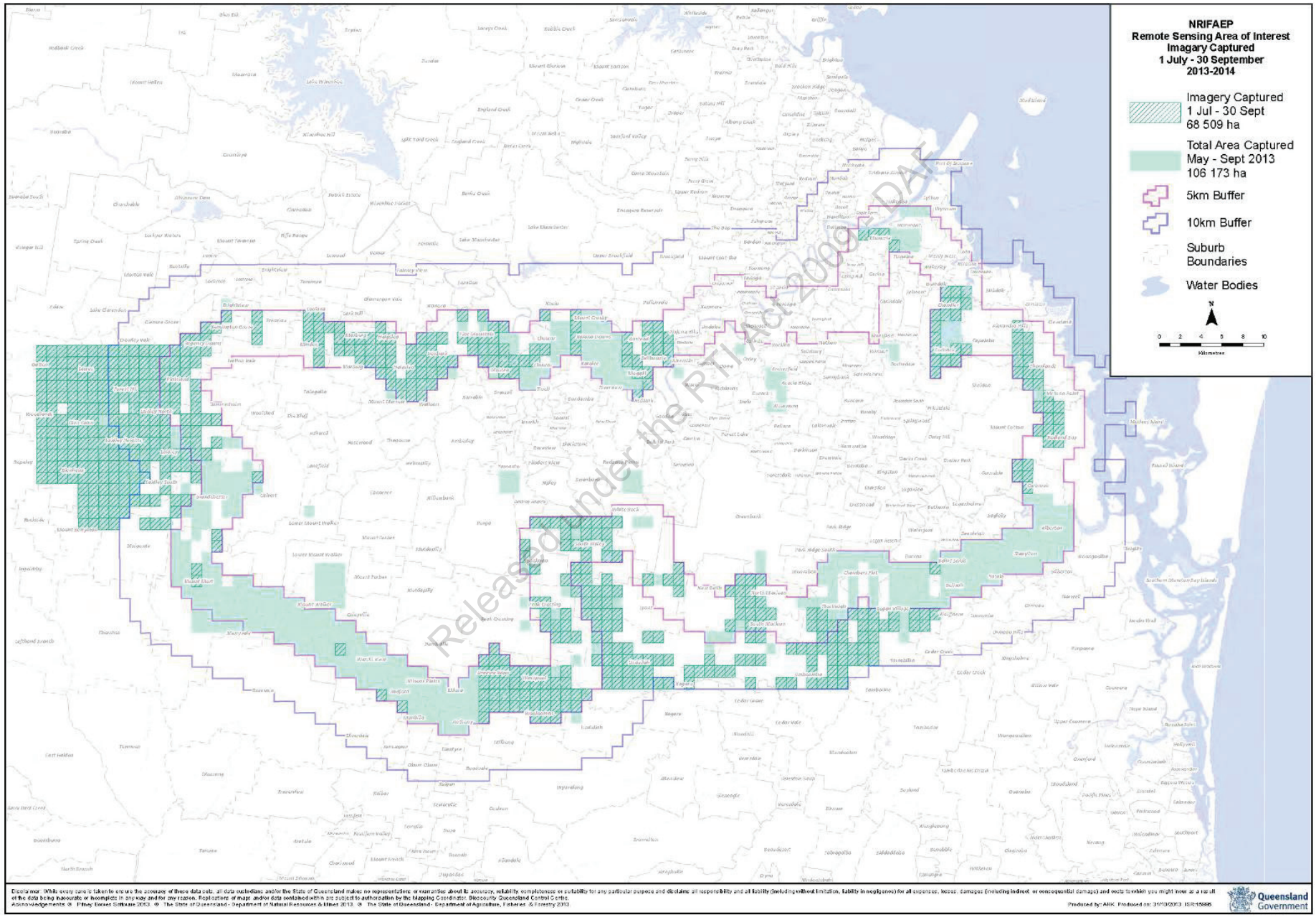
No invoices have been raised as at 30 September 2013.

Appendix 2 – Key statistics for the Program

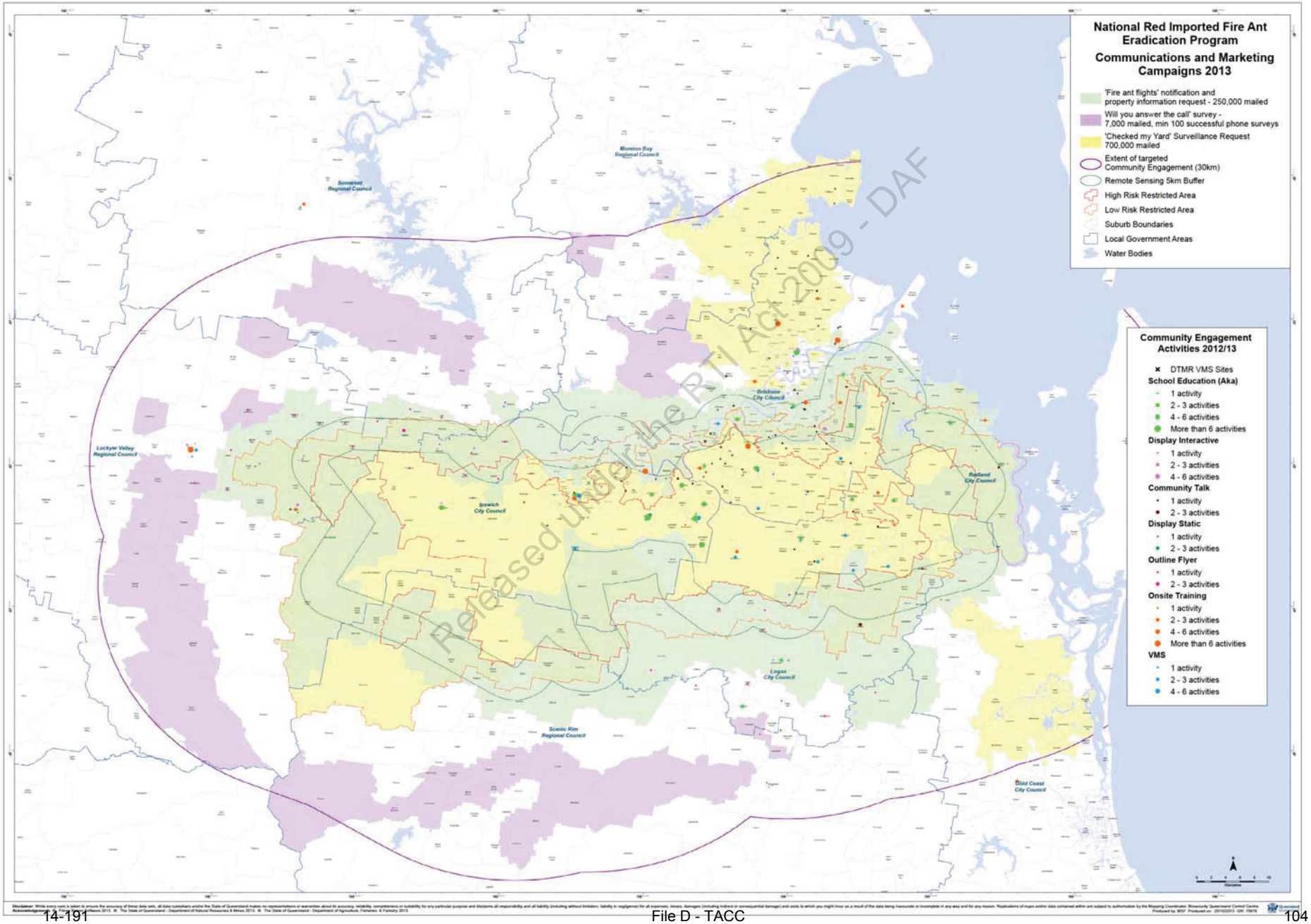
2013-14 Financial Year	Scheduled activities	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total 2013–14
Total area of infestation[1]		2148 ha				2148 ha
New infestation		217 ha				217 ha
Cleared infestation		49 ha				49 ha
Significant detections		2 detections				2 detections
RSS – imagery captured	100 000 ha	68 500 ha[2]				68 500 ha
RSS – imagery analysed	100 000 ha	56 100 ha				56 100 ha
RSS – finalised[3]	100 000 ha	7 885 ha				7 885 ha
Targeted field surveillance		2828 ha				2828 ha
Treatment[4]	32 000 ha	912 ha				912 ha
Total size of restricted areas		281 947 ha				-
Total suburbs in the restricted areas		205				-
Number of high risk suburbs		109				-
Number of low risk suburbs		96				-
Suburbs removed from the restricted areas		-				-
Audits of movement controls		79 audits				79 audits
Inspector's approvals		57				57

[1] The total area of infestation includes all active colonies plus the surrounding 50 metres found since 1 July 2008. The total area of infestation on 30 June 2013 was 1980 ha.
[2] A total 103 000 ha of imagery has been captured for the season with approximately 36 300 ha currently unavailable for analysis
[3] No further work is to be conducted around this imagery – all stages of RSS are complete
[4] The treatment season runs from September through until May

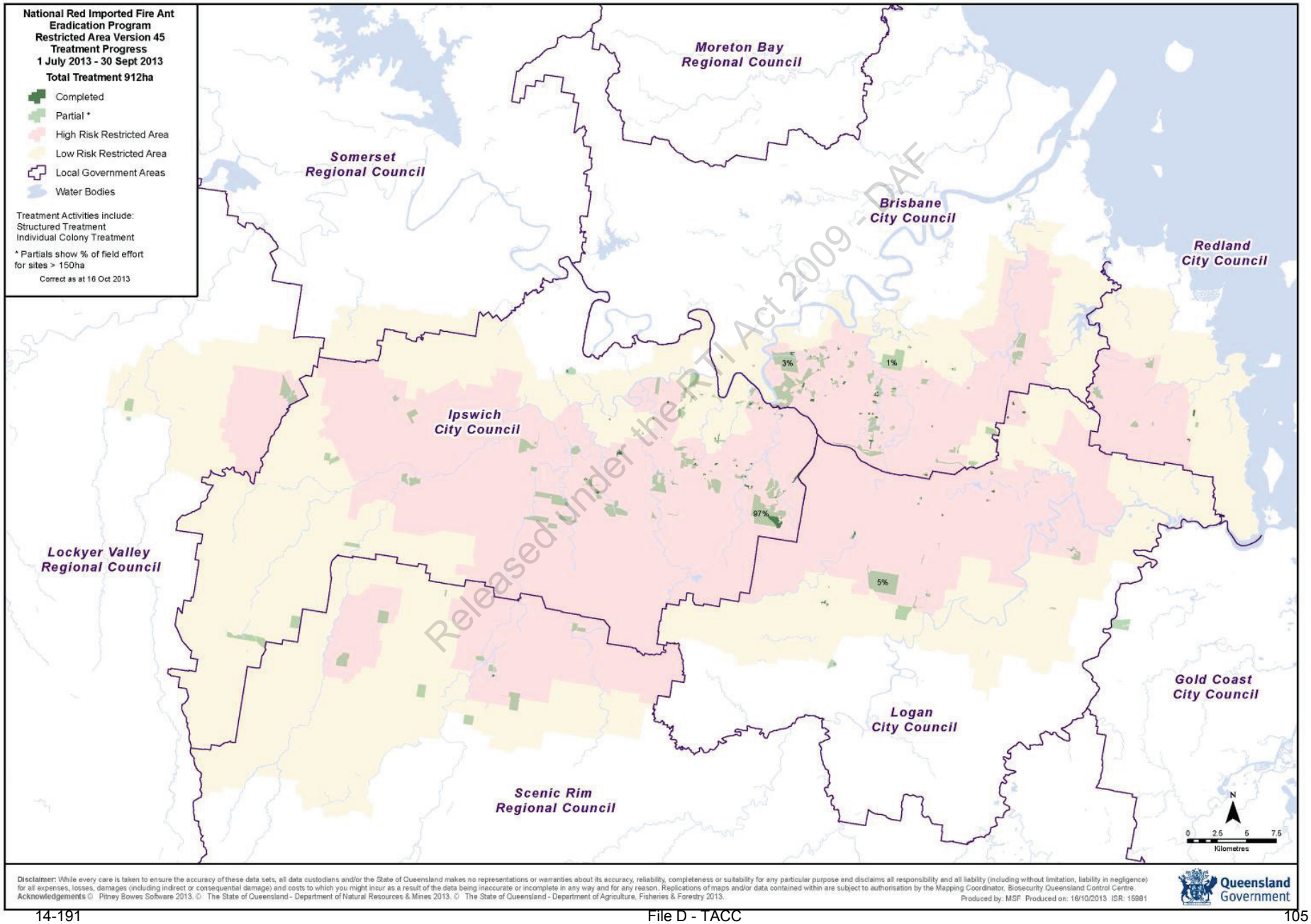
Appendix 3 – RSS imagery captured for May–September 2013



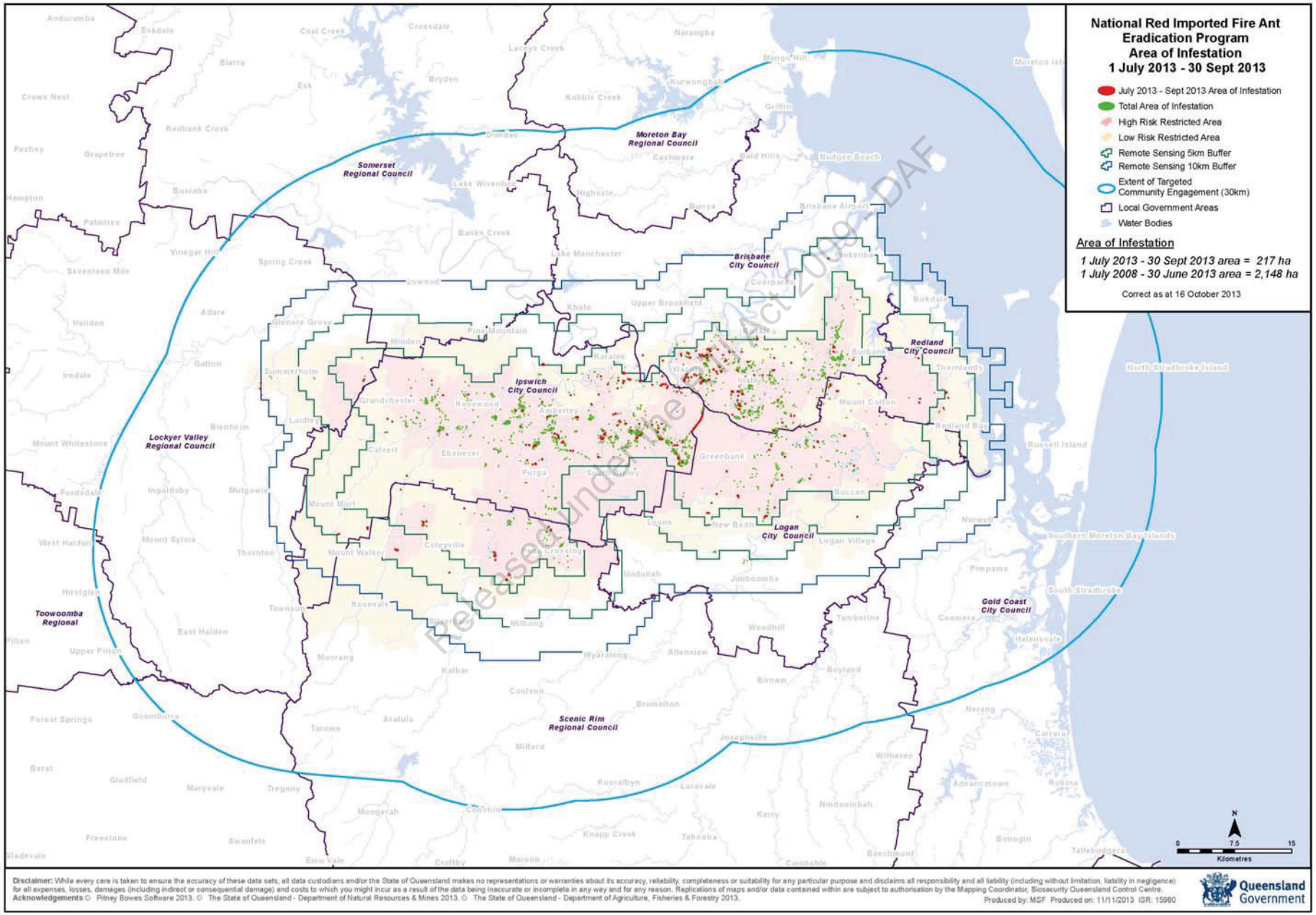
Appendix 4 – Community engagement and marketing for 2012–13



Appendix 5 – Treatment progress for 1 July–30 September 2013



Appendix 6 – Area of infestation 1 July–30 September 2013



Appendix 7 – Summary of the 2013–18 RIFA Eradication Program Response Plan

Program Components	Approaches/options	2012-13 - Year 1[1]	2013-14 - Year 2	2014-15 - Year 3	2015-16 - Year 4[2]	2016-17 - Year 5	2017-18 - Year 6[3]
		Delimitation, Containment & Suppression			Eradication		
1. Delimitation							
Core infested area • ≈150 000 hectares (Feb 2013)	• Community engagement (CE). CE results in passive surveillance, RIFA reporting & compliance with containment measures. • Targeted field surveillance • 100% surveillance • Remote Sensing Surveillance (RSS)	• CE • Targeted field surveillance	• CE • Targeted field surveillance incl. RSS (high risk zones & new detections) where feasible	• CE • Targeted field surveillance incl. RSS (high risk zones & new detections) where feasible • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Targeted field & dogs surveillance	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Targeted field & dogs surveillance	• CE • 100% around any remaining breeding populations • Targeted field & dogs surveillance
5 km zone • 500 m – 5 km from core infested area • ≈122 000 hectares in 2012–13 (Feb 2013) • 57 455 hectares of 'suitable' habitat (Feb 2013)	• Community engagement = passive surveillance (CE) • 100% RSS coverage • RSS suitable habitat only	• CE • Remote sensing surveillance (RSS) of suitable habitat only	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS of suitable habitat only (filter out false positives previously identified) • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Additional targeted RSS to address risk that residual infestation has spread from known infested area	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • All RIFA free areas as demonstrated from preceding surveillance declared pest free • Surveillance continues on remaining risk areas to build towards pest free status.
10 km zone • 5–10 km from core infested area • ≈135 000 hectares (Feb 2013); • 63 780 hectares of 'suitable' habitat (Feb 2013)[4]	• Community engagement = passive surveillance (CE) • 100% RSS coverage • RSS suitable habitat only • Targeted RSS based on risk	• CE • Limited RSS	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • All RIFA free areas declared pest free
30km zone • 10–30 km from core infested area (as defined in February 2013)	• Community engagement = passive surveillance (CE) • 100% RSS around any detections[5]	• CE	• CE	• CE • ***Delimitation complete***	• CE	• CE	• CE
2. Treatment[6]							
• Small, isolated infested sites	• Direct nest injection with 50 m buffer (bait) as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol
• Treatment around areas that have high density infestation	• Up to 3 treatments per year with broadcast baiting at least 500 m out	• 1-2 treatments	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year
• Targeted treatment of disturbed land in known infested area (out to 5 km around infestation) & all risk linked landfills & dump sites	• Nil treatment • 1 treatment per year • 2 treatments per year	• 1 treatment	• 1-2 treatments per year	• 1-2 treatments per year	• 1-2 treatments per year	• Based on risk assessment to determine level of treatment if any.	• Based on risk assessment to determine level of treatment if any.
3. Containment (movement controls)							
• Remove suburbs from restricted area as infested sites are treated	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Community engagement to ensure compliance & shared responsibility	• Community engagement strategy endorsed by TACC	• As per strategy	• As per strategy	• As per strategy	• As per strategy	• As per strategy	• As per strategy
• Risk management strategies to be focused on high risk restricted area	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Audits of Approved Risk Management Plans	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Inspector's approval for soil movement	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol

Note: Remote sensing surveillance (RSS) involves four steps – (i) Image capture; (ii) Image analysis by algorithm; (iii) Manual analysis of composite images; and (iv) Field investigation of points of interest

[1] Actual activity levels for 2012-13, based on a budget of $16.125M
[2] Areas will change as zone boundaries are redefined due to demonstrated evidence of absence and presence of infestation in various parts of zones
[3] Yr 7-8 (2018-20) would be a continuation of the Eradication Phase, with Yrs 9-10 (2020-2022) being Proof of Freedom Phase
[4] RSS buffers will continue be modified each year to reflect actual infestation patterns
[5] If any infestation is detected in the 30km zone, RSS will occur around the detection
[6] Preventative treatment across the entire core area (150 000 ha) would cost approximately $18M for one treatment or $54M for three treatments. This was not considered as a viable option.

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National Red Imported Fire Ant Eradication Program

Quarterly Report – 2nd Quarter 2013–14

Great state. Great opportunity.

Queensland Government

Executive Summary

The National Red Imported Fire Ant Eradication Program (the Program) continues to be on track to meet the four main performance indicators of surveillance, treatment, compliance and budget set out in the nationally agreed *Red Imported Fire Ant Eradication Program Response Plan 2013–18*. To date, remote sensing surveillance activities have resulted in over 100 000 hectares of imagery being captured with 21 585 hectares finalised through field surveillance.

The Program continues to remove the infested status from a number of hectares (26 hectares for this quarter) following the completion of treatment and surveillance activities. The total area of infestation at the end of the quarter was 2187[1] hectares.

Preventative treatment has been conducted on 6469 hectares, while treatment of new infestation has occurred on 194 hectares during the quarter. Fire ants have been contained to South East Queensland during the quarter with no reports of long distance human-assisted movement. Expenditure remains within the allocated budget.

With the detection of fire ants in Yarwun, Gladstone two review triggers have been activated:

- infestation is detected beyond the 30 km boundary
- reproductive areas of infestation are found beyond the area scheduled for RSS.

This detection was immediately reported to the Tramp Ant Consultative Committee (TACC). Genetic testing has confirmed that the Yarwun infestation is a new incursion of fire ant in Australia and it is therefore not related to the previous Yarwun infestation nor is it related to the infestation in South East Queensland. This infestation in Yarwun is therefore deemed a new infestation rather than an incursion through long distance spread.

A determination on technical feasibility of eradication of the Yarwun (2013) incursion will be made by the TACC following completion of delimitation. This will inform a decision on whether the Yarwun incursion represents a threat to Program objectives.

[1] This figure includes all active colonies plus the surrounding 50 metres found since 1 July 2008

Summary of Activities

Governance

The National Red Imported Fire Ant Eradication Program (the Program) operates under the nationally agreed *Red Imported Fire Ant Eradication Program Response Plan 2013–18* (the response plan). The aim of the response plan is to delimit, contain and recommence eradication of red imported fire ants (fire ants) in South East Queensland.

- Under the response plan, the Program is assessed through four main performance indicators:

  Surveillance – On track

  The extent of infestation is delimited by June 2015 (subject to review by the Tramp Ant Consultative Committee (TACC) in February 2015). Delimitation is primarily achieved through the use of remote sensing technology.

  In the second quarter 2013–14 (October–December), 13 700 hectares of remote sensing surveillance (RSS) was finalised having gone through all four stages of RSS including field surveillance. At the end of the image capture period, 1500 hectares of imagery was captured. .

  Treatment – On track

  Treatment results in property freedom for all identified infested sites allowing suburb-based restricted areas to be removed.

  During the quarter, infested status was removed from 26 hectares following completion of all required treatment and surveillance in accordance with the accepted protocol.

  The total area of infestation at 31 December 2013 is 2187 hectares. The area of new infestation for the quarter is 65 hectares.

  Compliance – On track

  Containment is being achieved through community and industry compliance with movement controls thereby preventing human-assisted spread beyond the restricted area.

  69 audits of movement controls were conducted during the quarter with all non-compliance rectified.

  Fire ants were detected outside the restricted areas during the quarter in Yarwun, Gladstone. However, genetics results on the samples show that it is a new incursion into Australia. A separate response to this incursion is being undertaken.

  There were no reports of long distance human-assisted spread during the quarter.

  Budget – On track

  Annual program expenditure is within 5% of the allocated budget.

  At 31 December 2013, the Program's year-to-date expenditure is underspent by $0.496 million or 5.5% percent of the projected year to date budget (Appendix 1). This is due predominantly to less bait being used than initially projected and delays in receiving some invoices.

- Five review triggers have been identified in the response plan that may indicate a threat to Program objectives:

  - The effectiveness of RSS is compromised.
  - The new area of infestation is more than 600 ha in a given financial year.
  - Infestation is detected beyond the 30 km boundary.
  - Reproductive areas of infestation are found beyond the area scheduled for RSS.
  - A dramatic and ongoing decline in community support is evident.

  One fire ant detection (Yarwun) was reported to the TACC as a significant detection as it was a reproductive infestation beyond the 30 km RSS delimitation zone. This detection was reported by the public. Genetic testing has confirmed that the Yarwun infestation is a new incursion of fire ant in Australia and it is therefore not related to the previous Yarwun infestation nor is it related to the infestation in South East Queensland.

  A determination on technical feasibility of eradication of the Yarwun (2013) incursion will be made by the TACC following completion of delimitation. This will inform a decision on whether the Yarwun incursion represents a threat to Program objectives.

  None of the other three triggers have been activated this quarter.

- A table detailing the key statistics of the Program is attached as Appendix 2.

The primary components of the response plan can be broadly grouped into three essential components – surveillance, treatment, and containment. Additional components of the response plan include community engagement activities, scientific support, and continued support functions such as information technology, administration, and program policy and management.

Surveillance

Remote sensing surveillance

- **Response plan** – 100 000 hectares of RSS targeted on a risk-based approach within the 10 km buffer around the core infested area.

- Results for the quarter for the four RSS steps are as follows:

  - 1500 hectares of image capture (a total of 104 500 hectares for the season May–September[1] 2013) (Appendix 3).
  - Over 31 000 hectares of the total imagery captured has been analysed this quarter (algorithm and manual analysis) (a total of 102 700 hectares have been analysed for the season May–September 2013).
  - Processing issues encountered by the external contractor has resulted in delays in the provision of imagery with 1800 hectares outstanding.
  - Analysis of the imagery (algorithm and manual) has identified 342 500 possible fire ant mounds that require follow-up field surveillance.
  - 67 600 of these possible mounds have received follow-up field surveillance with an estimated 13 700 hectares finalised having completed all four stages of RSS.
  - 222 600 possible mounds are still to be checked. This has increased following the processing of outstanding imagery.

- Three infested sites (with a total of six colonies) were detected through RSS within the delimitation buffer during the quarter.

[1] In 2013–14 weather conditions remained favourable for image capture during October 2013.

- Development of the remote sensing algorithm during the second quarter focused on improving detection rates in the absence of significant new infestation (usually used for training purposes). Alternative approaches have been identified to train the algorithm. It is expected that this will significantly reduce the number of points detected by the algorithm, thereby reducing resources required for manual analysis and subsequent field follow-up.

- The analysis process (algorithm and manual analysis) produced an average of 2.3 possible fire ant mounds per hectare for follow-up field surveillance. Although this is slightly higher than the previous quarter the count remains far lower than the previous version of the algorithm and the improvements described above are expected to reduce this rate even further.

Targeted field surveillance

- **Response plan** – targeted field surveillance will occur in high risk zones and areas of new detections.

- 1457 hectares of targeted field surveillance occurred during the quarter. Targeted surveillance includes post-treatment validation surveillance, delineation surveillance of new infestations, and compliance surveillance.

Community engagement

- **Response plan** – engagement of the community across all zones out to 30 km to promote surveillance, reporting of suspected fire ant infestation, and compliance with movement controls.

- In the quarter, 43% of infestations were reported by the community.

Treatment

- **Response plan** – 32 000 hectares of treatment of small isolated infestations, areas with high density infestation, and areas that are at a high risk of becoming infested.

- Apart from new infestations, treatment is conducted between September and May. Proactive treatment of high density infestations and high risk areas commenced in October this year.

- 6469 hectares of preventative treatment was conducted in the quarter.

- 194 hectares of treatment of new infestation and surrounds has been conducted in the quarter (Appendix 4).

- A trigger for review of the Program is that the area of new infestation is more than 600 hectares in a given financial year. However, it has previously been acknowledged by the TACC that detections will most likely increase in the short term due to the increase in the level of surveillance and the extensive community engagement campaigns being conducted to support this activity. With the introduction of an agreed protocol to clear infestation, the total area of infestation is considered a more accurate reflection of the achievements of the Program. This figure will increase with the area of new detections and decrease as areas of infestation are cleared. Once the Program returns to eradication mode the total area of infestation should begin to decrease.

- The area of new infestation for the quarter was 65 hectares (Appendix 5). At 30 September 2013, the total area of infestation was 2148 hectares. With the addition of the area of new infestation for the quarter less the area cleared during this period of 26 hectares, the total area of infestation at the end of the quarter is 2187 hectares.

Containment

- **Response plan** – Application of agreed protocols and strategies to contain fire ants through movement controls including community engagement, risk management strategies focussed on the high risk restricted area, audits of Approved Risk Management Plans (ARMPs), and inspector's approvals for movement of risk materials.

- Currently there are 315 287 hectares under movement restrictions (RIFA Restricted Area – Version 46). 215 suburbs are now included in the restricted areas compared to 205 suburbs in the previous version.

- Risk management strategies conducted during the quarter include:

  - One tracing activity to ascertain the origin of infestation – with multiple polygyne colonies. The origin of the infestation to date is inconclusive, however investigations are continuing.
  - 50 spot audits on businesses operating within the restricted areas. 47 were compliant with movement controls with the remaining three having minor issues that were immediately rectified. One of the businesses was found to be operating without an ARMP. An ARMP is now in place for this business.
  - 19 audits of ARMPs with all but three found to be compliant with their plan. The most serious non-compliance was one business no longer worked under an ARMP as the former owners had taken all the records. The non-compliance has been rectified for all three businesses.
  - 44 inspector's approvals issued for the movement of restricted items.
  - 189 plant quarantine inspections of businesses transporting restricted items interstate.

- Community engagement continues to play an essential role in communicating movement controls which assists in containing the fire ant infestation. This occurs through updating key industry stakeholders on program activities and changes to the restricted areas, and by providing training to businesses as a component of their ARMPs.

These actions also assist with delimitation by communicating to the public the importance of checking for fire ants and reporting any suspicious ants.

Community Engagement

The focus of community engagement activities this year is aimed at public reporting, increased knowledge of fire ants to improve public reporting, industry training and promotion of updated risk management plans, as well as improved communication with relevant industry bodies and encouraging in-kind support from industry and business.

- In 2013, awareness of fire ants in the greater Brisbane region remains very high at 95%[1].

[1] 2013 Queensland Regional Householder Survey

- During the quarter, the overall engagement from the campaign activities has been successful including:

  - The Program continues to develop material to assist with communication with key stakeholders and training activities. A short film of the Program was finalised during the quarter which focuses on the new RSS technology and its application in the field. The film was used to open the Minister's briefing for local government Mayors, as well as briefings for state members and other local government representatives. The film has also been uploaded to YouTube and has been used to open the Lockyer Valley's weekly "Movies in the Park".
  - Following the Minister's local government briefing at Oxley, council briefings were provided to all staff of the Scenic Rim Regional Council, Toowoomba Regional Council and Lockyer Valley Regional Councils. All relevant councils are working with the Program to assist our public awareness and education objectives as well as compliance requirements.
  - The Program continues to receive assistance from businesses to publicise fire ants. Transport and Main Roads supported the Program's recent release of the Restricted Areas by publishing fire ant messages on 46 freeway emergency signs for a two week campaign. A number of local businesses in risk areas distributed 37 000 fire ant identification cards to members of the community.
  - The Program's first online fire ant training package prepared by Energex staff and hosted on their system has gone live with over 200 staff trained. This training package demonstrates the collaborative relationship between industry on the frontline and the Program.

Scientific Support

Science provides diagnostic and genetic analysis of ant samples, assessment of operational treatment and surveillance activities, and research and development.

- Research is being undertaken to demonstrate whether there is an increasing incidence of male sterility (if too many sterile males are produced a colony will collapse) in the Queensland population which may eventually tip it towards extinction. It has been decided to conduct two different research approaches, one looking at percentages of sterile males in the population over time and the other searching for the gene where the sex of the ant is determined from which further analyses can be undertaken. Work to date indicates increasing male sterility but the sex locus is yet to be found.

- Submissions have been made to the Australian Pesticides and Veterinary Medicines Authority for alternative chemicals that can be used as a substitute for chlorpyrifos for treatment of turf, domestic pot plants and as a barrier treatment. Bifenthrin has now been approved for use in pot plants and as a barrier treatment for turf. Approval is pending for the use by nurseries of suSCon ® Green (a controlled release granular formulation of chlorpyrifos) in nursery stock.

- A collaborative project with the Queensland University of Technology to identify areas that have been recently disturbed using Landsat imagery was due for completion in September 2013. The report, due to be delivered last quarter, has now been extended because of the need for further testing of the model. The intention of this project is to allow targeted treatment of disturbed areas, a preferred habitat for fire ants, to eliminate infestation before it can spread.

Continued support functions

Essential support functions include information technology, operational mapping, planning and scheduling, administration, and Program policy and management. Activities during the quarter include:

- As requested by the National Management Group, interim advice on options for securing financial contributions for the Program outside the current national cost-sharing arrangements was prepared. This advice included an assessment of the private beneficiaries and risk creators for the Program, their capacity to contribute and potential funding mechanisms.

- A discussion paper on this issue was considered by the Primary Industries Standing Council (PISC) in November 2013. The paper was not endorsed by all jurisdictions at PISC4 OOS 09 and as a result was not provided to the Standing Committee on Primary Industries in December as scheduled. Issues raised in the discussion paper requiring national resolution are to be considered by the National Biosecurity Committee in late February 2014.

- A new declaration of the Fire Ant Restricted Areas (Version 46) became effective on 31 October 2013. A total of 215 suburbs are included in the restricted areas (205 in the previous restricted areas – Version 45)—116 suburbs are included in the high risk restricted area while 99 suburbs are included in the low risk restricted area.

- A number of Program policies continue to be developed, including:

  - power of entry for surveillance (resulting from a recommendation from the Deloitte efficiency audit conducted early in 2012)
  - risk management
  - remote sensing surveillance
  - waste facilities.

- A major redevelopment of the Fire Ant Information System (FAIS) and all supporting databases was commenced in 2011–12 to help mitigate the critical risk of system failure. The project has amalgamated several supported databases and systems into one tightly integrated Fire Ant Management System (FAMS).

  - Stage 6 of the FAMS development project has been completed on time and within budget. Some of the modules within Stage 6 include the power of entry module which supports the change in policy for accessing properties where land owners cannot be contacted to gain consent; bookings; GPS tracking; job processing; and job tracking. Stage 6 production release is due in the next quarter.
  - Preparations are underway for the Information and Communications Technology (ICT) roadmap review process. This review will investigate future support and maintenance of the Program's information systems—with the intention of reducing costs.

A summary of the *Red Imported Fire Ant Eradication Program Response Plan 2013–2018* is attached (Appendix 6).

Appendix 1 – Financial Report 2013–14

For period ending 31 December 2013

WORK UNITS	Notes	2013–14 Initial Budget			Initial Budget	2013–14 Revised Budget			Revised	2013–14 Actual Expenses			Actual
		Labour $'000	Non-Labour $'000	TOTAL $'000	FTE	Labour $'000	Non-Labour $'000	TOTAL $'000	FTE	Labour $'000	Non-Labour $'000	TOTAL $'000	FTE
FAE Management		214	220	434	2.0	415	36	451	2.0	126	23	149	2.0
Policy and Planning		468	10	478	4.0	449	10	458	4.0	244	5	248	4.00
Resources and Administration		807	661	1,467	9.75	783	682	1,465	9.8	395	266	661	7.00
Community Engagement		681	224	905	6.9	656	264	920	6.9	342	97	439	6.80
Information Services		541	741	1,283	5.0	512	705	1,218	5.0	280	140	420	4.00
Scientific Services		806	236	1,042	8.0	777	236	1,013	8.0	381	80	461	8.20
Field Operations		4,106	1,257	5,363	66.0	3,944	1,257	5,201	66.0	1,963	305	2,268	62.89
Program Compliance		1,498	115	1,613	19.0	1,441	115	1,556	19.0	714	78	791	18.00
Sub-Total		**9,122**	**3,463**	**12,585**	**120.7**	**8,977**	**3,305**	**12,282**	**120.7**	**4,445**	**993**	**5,438**	**112.89**
Site Lease Charges			399	399			399	399			204	204	
Odour Detection Dogs		175	166	341	2.0	165	291	456	2.0	93	80	174	2.00
Chemical Treatments			1,364	1,364			1,364	1,364			261	261	
Aerial Applications			480	480			480	480			140	140	
Remote Sensing		240	2,928	3,168	3.0	234	3,123	3,357	3.0	120	2,195	2,315	3.00
Sub-Total		**415**	**5,337**	**5,752**	**5.0**	**399**	**5,657**	**6,056**	**5.0**	**213**	**2,881**	**3,094**	**5.00**
TOTAL COST-SHARING + QLD SUPPLEMENTARY FUNDING		**9,537**	**8,801**	**18,338**	**125.7**	**9,376**	**8,962**	**18,338**	**125.7**	**4,658**	**3,874**	**8,532**	**117.89**

Notes:

The 2013–14 budget includes a $337.6K carryover from 2012–13.

Revenue Update:

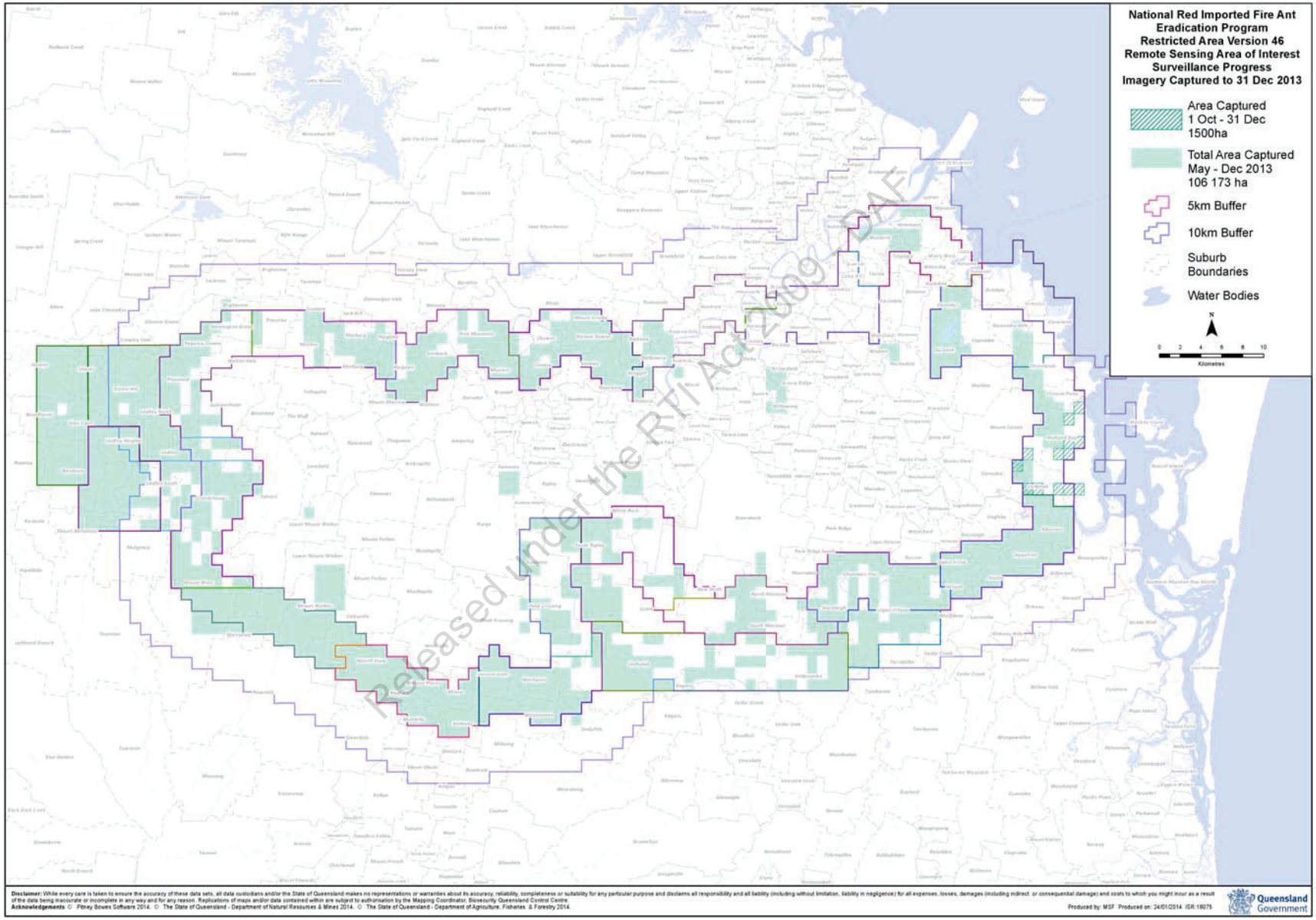
July–Dec 13 invoices were raised in 13 November 2013.

Appendix 2 – Key statistics for the Program

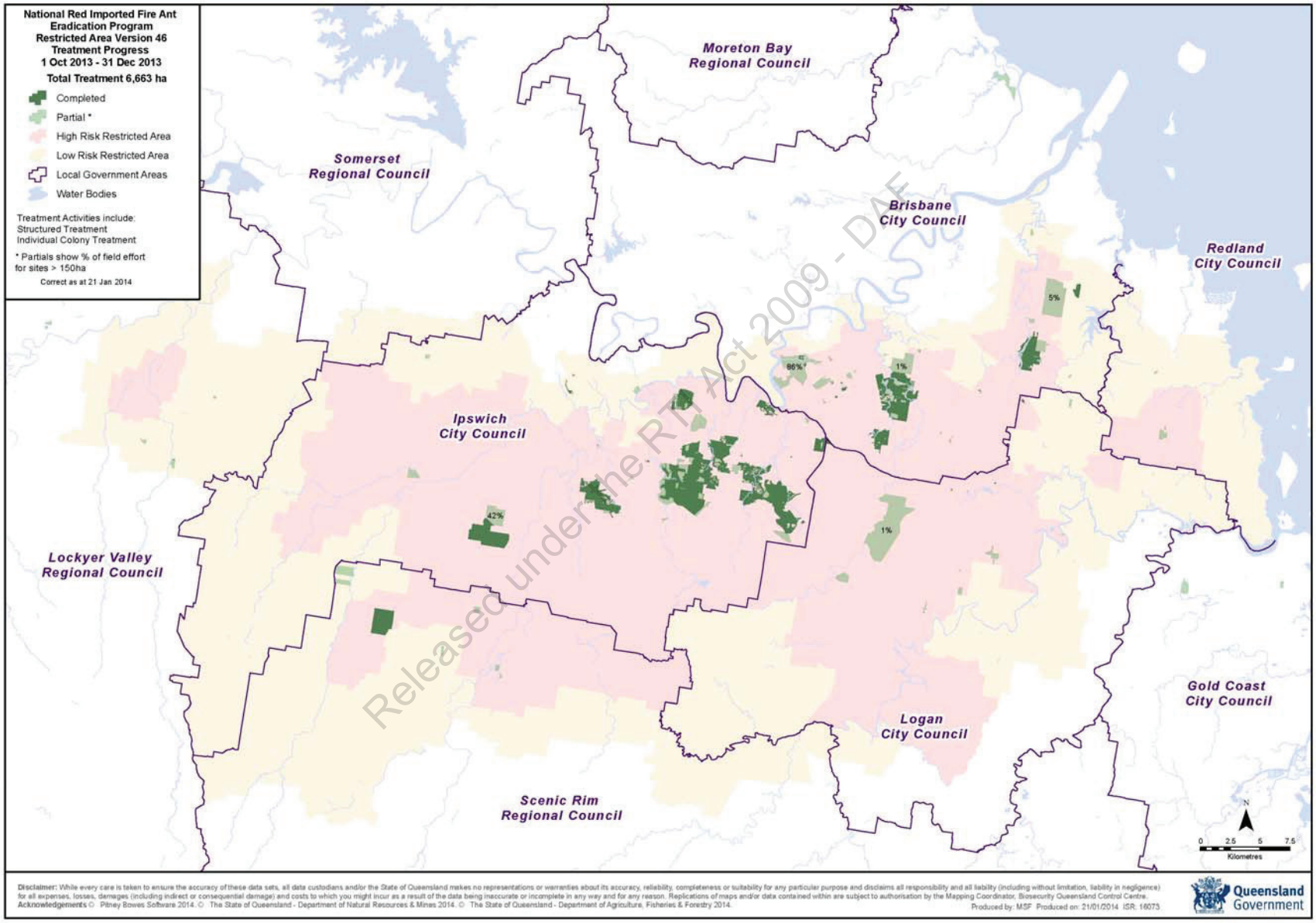
2013-14 Financial Year	Scheduled activities	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total 2013–14
Total area of infestation[1]		2148 ha	2187 ha			2187 ha
New infestation		217 ha	65 ha			282 ha
Cleared infestation		49 ha	26 ha			75 ha
Significant detections		2 detections	1 detection			3 detections
RSS – imagery captured	100 000 ha	68 500 ha[2]	1500 ha			70 000 ha
RSS – imagery analysed	100 000 ha	56 100 ha	31 000 ha			87 100 ha
RSS – finalised[3]	100 000 ha	7 885 ha	13 700 ha			21 585 ha
Targeted field surveillance		2828 ha	1457 ha			4285 ha
Treatment[4]	32 000 ha	912 ha	6663 ha			7575 ha
Total size of restricted areas		281 947 ha	315 287 ha			-
Total suburbs in the restricted areas		205	215			-
Number of high risk suburbs		109	116			-
Number of low risk suburbs		96	99			-
Suburbs removed from the restricted areas		-	-			-
Audits of movement controls		79 audits	69 audits			148 audits
Inspector's approvals (IAs)		57 IAs	44 IAs			101 IAs

[1] The total area of infestation includes all active colonies plus the surrounding 50 metres found since 1 July 2008. The total area of infestation on 30 September 2013 was 2148 ha.
[2] A total 104 500 ha of imagery has been captured for the season with approximately 1800 ha currently unavailable for analysis
[3] No further work is to be conducted around this imagery – all stages of RSS are complete
[4] The preventative treatment season runs from September through until May. This figure includes preventative treatment and treatment for new infestation.

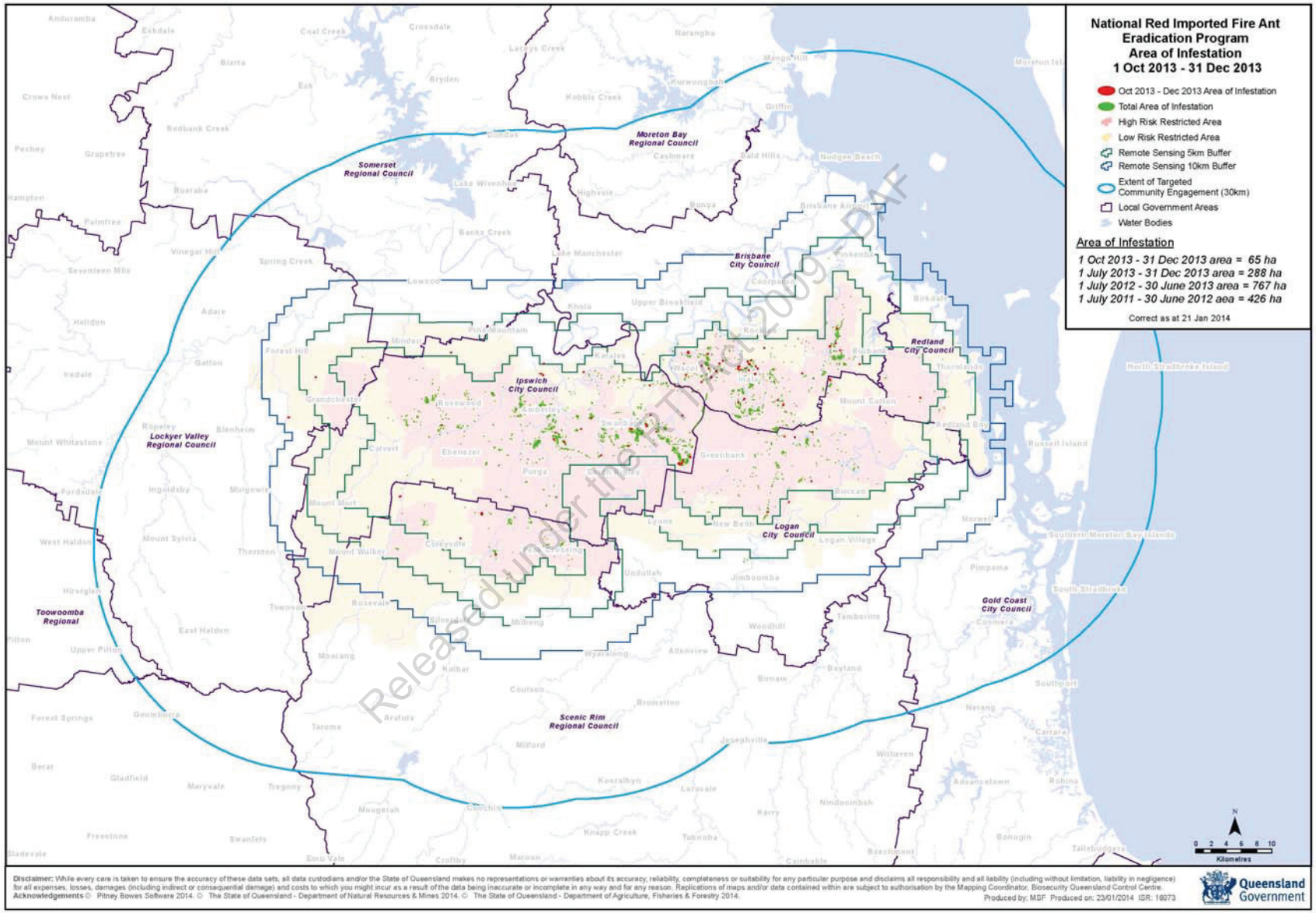
Appendix 3 – RSS imagery captured for May–September 2013



Appendix 4 – Treatment progress for 1 October–31 December 2013



Appendix 5 – Area of infestation 1 October–31 December 2013



Appendix 6 – Summary of the 2013–18 RIFA Eradication Program Response Plan

Program Components	Approaches/options	2012-13 - Year 1[1]	2013-14 - Year 2	2014-15 - Year 3	2015-16 - Year 4[2]	2016-17 - Year 5	2017-18 - Year 6[3]
		Delimitation, Containment & Suppression			Eradication		
1. Delimitation							
Core infested area • ≈150 000 hectares (Feb 2013)	• Community engagement (CE). CE results in passive surveillance, RIFA reporting & compliance with containment measures. • Targeted field surveillance • 100% surveillance • Remote Sensing Surveillance (RSS)	• CE • Targeted field surveillance	• CE • Targeted field surveillance incl. RSS (high risk zones & new detections) where feasible	• CE • Targeted field surveillance incl. RSS (high risk zones & new detections) where feasible • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Targeted field & dogs surveillance	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Targeted field & dogs surveillance	• CE • 100% around any remaining breeding populations • Targeted field & dogs surveillance
5 km zone • 500 m – 5 km from core infested area • ≈122 000 hectares in 2012–13 (Feb 2013) • 57 455 hectares of 'suitable' habitat (Feb 2013)	• Community engagement = passive surveillance (CE) • 100% RSS coverage • RSS suitable habitat only	• CE • Remote sensing surveillance (RSS) of suitable habitat only	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS of suitable habitat only (filter out false positives previously identified) • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Additional targeted RSS to address risk that residual infestation has spread from known infested area	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • All RIFA free areas as demonstrated from preceding surveillance declared pest free • Surveillance continues on remaining risk areas to build towards pest free status.
10 km zone • 5–10 km from core infested area • ≈135 000 hectares (Feb 2013); • 63 780 hectares of 'suitable' habitat (Feb 2013)[4]	• Community engagement = passive surveillance (CE) • 100% RSS coverage • RSS suitable habitat only • Targeted RSS based on risk	• CE • Limited RSS	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • All RIFA free areas declared pest free
30km zone • 10–30 km from core infested area (as defined in February 2013)	• Community engagement = passive surveillance (CE) • 100% RSS around any detections[5]	• CE	• CE	• CE • ***Delimitation complete***	• CE	• CE	• CE
2. Treatment[6]							
• Small, isolated infested sites	• Direct nest injection with 50 m buffer (bait) as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol
• Treatment around areas that have high density infestation	• Up to 3 treatments per year with broadcast baiting at least 500 m out	• 1-2 treatments	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year
• Targeted treatment of disturbed land in known infested area (out to 5 km around infestation) & all risk linked landfills & dump sites	• Nil treatment • 1 treatment per year • 2 treatments per year	• 1 treatment	• 1-2 treatments per year	• 1-2 treatments per year	• 1-2 treatments per year	• Based on risk assessment to determine level of treatment if any.	• Based on risk assessment to determine level of treatment if any.
3. Containment (movement controls)							
• Remove suburbs from restricted area as infested sites are treated	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Community engagement to ensure compliance & shared responsibility	• Community engagement strategy endorsed by TACC	• As per strategy	• As per strategy	• As per strategy	• As per strategy	• As per strategy	• As per strategy
• Risk management strategies to be focused on high risk restricted area	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Audits of Approved Risk Management Plans	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Inspector's approval for soil movement	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol

Note: Remote sensing surveillance (RSS) involves four steps – (i) Image capture; (ii) Image analysis by algorithm; (iii) Manual analysis of composite images; and (iv) Field investigation of points of interest

[1] Actual activity levels for 2012-13, based on a budget of $16.125M
[2] Areas will change as zone boundaries are redefined due to demonstrated evidence of absence and presence of infestation in various parts of zones
[3] Yr 7-8 (2018-20) would be a continuation of the Eradication Phase, with Yrs 9-10 (2020-2022) being Proof of Freedom Phase
[4] RSS buffers will continue be modified each year to reflect actual infestation patterns
[5] If any infestation is detected in the 30km zone, RSS will occur around the detection
[6] Preventative treatment across the entire core area (150 000 ha) would cost approximately $18M for one treatment or $54M for three treatments. This was not considered as a viable option.

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Queensland Government

National Red Imported Fire Ant Eradication Program

Quarterly Report – 3rd Quarter 2013–14

Executive Summary

The National Red Imported Fire Ant Eradication Program (the Program) continues to be on track to meet the four main performance indicators of surveillance, treatment, compliance and budget set out in the nationally agreed *Red Imported Fire Ant Eradication Program Response Plan 2013–18*.

Approximately 40 000 hectares of remote sensing surveillance (RSS) have been finalised this quarter with a total of 61 585 hectares finalised so far this year. It is anticipated that the remainder of the 100 000 hectares scheduled for completion in 2013–14 will be finalised over the coming quarter.

The Program continues to remove infested status from a number of hectares (37 hectares this quarter) following the completion of all required treatment and surveillance activities. The total area of infestation at the end of the quarter was 2191[1] hectares, a rise of only 4 hectares from the previous quarter.

Preventative treatment has been conducted on 9389 hectares, while treatment of new infestation has occurred on 184 hectares during the quarter. In total, 17 148 hectares have been treated to the end of the quarter of the 32 000 hectares scheduled for treatment in 2013–14.

Fire ants have been contained to south-east Queensland during the quarter, with no reports of long distance human-assisted movement. Expenditure remains within the allocated budget.

No review triggers have been activated this quarter.

In mid-March 2014, the Biosecurity Queensland Control Centre began relocating to two new sites at Richlands and Moggill following a decision by the Queensland Government to sell the former Oxley Secondary College site where the Program has been based since 2001. Management, policy, inspectorial, scientific, community engagement and associated administrative and support staff have relocated to a government facility at 55 Priors Pocket Road, Moggill, and operational, field and associated administrative support staff are in the process of relocating to a commercial warehouse and office facility at 51 Fulcrum Street, Richlands.

[1] This figure includes all active colonies plus the surrounding 50 m found since 1 July 2008

Summary of Activities

Governance

The National Red Imported Fire Ant Eradication Program (the Program) operates under the nationally agreed *Red Imported Fire Ant Eradication Program Response Plan 2013–18* (the response plan). A summary of the response plan is included as Appendix 7 to this report.

The aim of the response plan is to delimit, contain and recommence eradication of red imported fire ants (fire ants) in South East Queensland.

- Under the response plan, the Program is assessed through four main performance indicators:

  Surveillance – On track

  The extent of infestation is delimited by June 2015 (subject to review by the Tramp Ant Consultative Committee (TACC) in February 2015). Delimitation is primarily achieved through the use of remote sensing technology.

  In the third quarter 2013–14, 40 000 hectares of RSS was finalised having gone through all four stages of RSS including field surveillance. No imagery was captured during this quarter.

  Treatment – On track

  Treatment results in property freedom for all identified infested sites allowing suburb-based restricted areas to be removed.

  During the quarter, infested status was removed from 37 hectares following completion of all required treatment and surveillance in accordance with the accepted protocol.

  The total area of infestation at 31 March 2014 is 2191 hectares. The area of new infestation for the quarter is 41 hectares bringing the total area of new infestation for 2013–14 at 31 March 2014 to 323 hectares.

  Compliance – On track

  Containment is being achieved through community and industry compliance with movement controls thereby preventing human-assisted spread beyond the restricted area.

  59 audits of movement controls were conducted, with all non-compliance rectified during the quarter.

  There were no reports of long distance human-assisted spread and no evidence of human-assisted spread beyond the south-east Queensland RIFA Restricted Area during the quarter.

  Budget – Under budget

  Annual program expenditure is within 5% of the allocated budget.

  At 31 March 2014, the Program's year-to-date expenditure is $0.905 million or 6.92% under the projected year-to-date budget (Appendix 1). This under expenditure is a result of the transfer of salaries from the Program's national cost-shared funding to Queensland funding for staff seconded to the Yarwun 2013 incursion response. Also, timing differences between receipt of invoices and profiled budget projections for treatment and delimiting surveillance activities have affected reported expenditure.

It is anticipated that by June 2014 total expenditure for the year will be within 5% of the allocated budget. It is likely there will be a small surplus at the conclusion of 2013–14 which will be the subject of a request for carry-over to 2014–15.

- Five review triggers have been identified in the response plan that may indicate a threat to Program objectives:

  - The effectiveness of RSS is compromised.
  - The new area of infestation is more than 600 hectares in a given financial year.
  - Infestation is detected beyond the 30 km boundary.
  - Reproductive areas of infestation are found beyond the area scheduled for RSS.
  - A dramatic and ongoing decline in community support is evident.

  None of the five triggers have been activated this quarter.

- A table detailing the key statistics of the Program is attached as Appendix 2.

The primary components of the response plan can be broadly grouped into three essential components – surveillance, treatment, and containment. Additional components of the response plan include community engagement activities, scientific support, and continued support functions such as information technology, administration, and program policy and management.

Surveillance

Remote sensing surveillance (RSS)

- **Response plan** – 100 000 hectares of RSS targeted on a risk-based approach within the 10 km buffer around the core infested area.

- Results for the quarter for the four RSS steps are as follows:

  - 0 hectares of image capture (a total of 70 000 hectares of imagery has been captured in 2013–14)
  - Over 300 hectares of the imagery captured in season 2013 has been analysed this quarter (algorithm and manual analysis) (a total of 87 400 hectares have been analysed in 2013–14) (Appendix 3).
  - Processing issues encountered by the external contractor has resulted in delays in the provision of imagery with 1500 hectares outstanding.
  - Analysis (algorithm and manual) of the 104 500 hectares of imagery captured in season 2013 has identified 193 000 possible fire ant mounds that require follow-up field surveillance.
  - 120 000 of these possible mounds have received follow-up field surveillance.
  - An estimated 40 000 hectares have been finalised during the quarter having completed all four stages of RSS (a total of 61 585 hectares have been finalised in 2013–14).
  - 73 000 possible mounds identified from imagery captured in season 2013 remain to be checked.

- Three infested sites (with a total of nine colonies) were detected through RSS within the delimitation buffer during the quarter.

- Approximately 50 contracted field assistants have been engaged to undertake follow-up surveillance of possible fire ant mounds prior to the upcoming season of RSS image capture due to begin in May 2014.

- The algorithm used to identify possible fire ant mounds from imagery captured during remote sensing continues to be refined. A voting system was implemented in the manual analysis application requiring several users to agree that a point of interest was a potential fire ant mound before allowing it through for field verification. This voting data was used as a means of training the algorithm on what a fire ant mound might look like.

- Incorporating this data yielded only a mild increase in the detection rate, confirming previous advice by University of Sydney that the current implementation is reaching the limit of how well it can perform. However, the data has been useful in dividing the imagery into “scenes” such as “canopy” or “open paddock”. This means the algorithm is now able to utilise different approaches depending on the land type for the captured imagery. It is likely that this new multi-scene approach will lead to a significant reduction in false positives.

Targeted field surveillance

- **Response plan** – targeted field surveillance will occur in high risk zones and areas of new detections.

- 1403 hectares of targeted field surveillance occurred during the quarter. Targeted surveillance includes post-treatment validation surveillance, delineation surveillance of new infestations, and compliance surveillance.

Community engagement

- **Response plan** – engagement of the community across all zones out to 30 km to promote surveillance, reporting of suspected fire ant infestation, and compliance with movement controls.

- In the quarter, 43% of infestations were reported by the community.

- Over 152 000 people in the 5–30 km area have been engaged through interactive displays, electronic road signage, the ‘Aka the Fire Ant Tracker’ school education program, and through local businesses distributing materials to their local communities.

- An engagement plan is being developed to support the delimitation requirement by 2015.

Treatment

- **Response plan** – 32 000 hectares of treatment of small isolated infestations, areas with high density infestation, and areas that are at a high risk of becoming infested.

- Apart from new infestations, treatment is conducted between September and May. Proactive treatment of high density infestations and high risk areas commenced in October 2013.

- 9389 hectares of preventative treatment was conducted in the quarter.

- 184 hectares of treatment of new infestation and surrounds has been conducted in the quarter (Appendix 4).

- The area of new infestation for the quarter was 41 hectares (Appendix 5). At 31 December 2013, the total area of infestation was 2187 hectares. With the addition of the area of new infestation for the quarter less the area cleared during this period of 37 hectares, the total area of infestation at the end of the quarter is 2191 hectares.

Containment

- **Response plan** – Application of agreed protocols and strategies to contain fire ants through movement controls including community engagement, risk management strategies focussed on the high risk restricted area, audits of Approved Risk Management Plans (ARMPs), and inspector's approvals for movement of risk materials.

- Currently there are 317 159 hectares under movement restrictions (RIFA Restricted Area – Version 47) (Appendix 6). There are currently 212 suburbs included in the restricted areas, compared to 215 suburbs in the previous version.

- Risk management strategies conducted during the quarter include:

  - Three tracing activities to ascertain the origin of infestation were undertaken.
    - A detection of fire ants during an interstate plant quarantine inspection at a plant nursery sending plants within Queensland and interstate. Tracing is continuing to determine where the plants were sent. Interstate trading partners have been informed.
    - Following the detection of a polygyne[1] fire ant infestation, tracing was conducted on a property where turf, mulch, topsoil and aggregate had been brought onto the site. Tracing the origin of the infestation has proved difficult as the material was from a number of sources. However investigations are continuing.
    - Following the detection of numerous fire ant nests at a turf farm it transpired that turf had been taken off the site after an inspector's approval allowing turf to move off site had expired. However, the business continued to work in accordance with the inspector's approval. A list of sites where the turf had been sent was provided by the turf farm to allow the Program to trace any movements and conduct surveillance. No fire ants were detected during the follow-up surveillance.

  - 38 spot audits were conducted on businesses operating within the restricted areas—15 businesses were deemed non-compliant with movement controls. However the non-compliance breaches were considered minor, e.g. insufficient surveillance records and staff not attending training. These issues were immediately rectified and follow-up audits arranged to close out the non-conformances.
  - 21 Approved Risk Management Plans (ARMPs) were audited, with all but one found to be compliant with their plan. This business was no longer conducting on-site monitoring or applying a perimeter treatment. The non-compliance has been rectified by the business.
  - 62 inspector's approvals were issued for the movement of restricted items.
  - 107 plant quarantine inspections were conducted for businesses transporting restricted items interstate.

Community engagement continues to play an essential role in communicating movement controls which assists in containing the fire ant infestation. This occurs through updating key

[1] A colony containing multiple queens which indicates human-assisted movement.

industry stakeholders on program activities and changes to the restricted areas, and by providing training to businesses as a component of their ARMPs.

These actions also assist with delimitation by communicating to the public the importance of checking for fire ants and reporting any suspicious ants.

Community Engagement

The focus of community engagement activities this year is aimed at public reporting, increased knowledge of fire ants to improve public reporting, industry training and promotion of updated risk management plans, as well as improved communication with relevant industry bodies and encouraging in-kind support from industry and business.

- Awareness of fire ants in the greater Brisbane region is very high at 95%[1].
- Key initiatives for the quarter include:
  - The signing of a Memorandum of Understanding (MoU) with Telstra and Dial Before You Dig to formalise the in-kind support they provide to the Program. The 'Dial Before You Dig' service provides clients with maps showing underground pipes and cabling on land being developed or otherwise disturbed. Documentation provided to clients in the south-east Queensland RIFA Restricted Area now includes an alert on fire ant movement restrictions. The alert encourages users of the service to seek further information by linking through to the DAFF website. To date, 16 000 notifications have been forwarded to clients. During March, 49 people visited the DAFF website following the link provided in the alert.
  - Additional in-kind support has been provided by companies such as Mitre 10 who have distributed over 4000 fire ant identification cards to shoppers when issuing purchase receipts. Over 200 businesses have been involved in distributing fire ant identification cards to over 37 000 shoppers during the quarter.
  - The Lockyer Valley, Somerset, and Gold Coast councils are exhibiting the fire ant short film at their fortnightly 'Movies in the Park' events. Over 2,600 people have attended these film evenings.
  - The declaration notice for Version 47 of the RIFA Restricted Area was published in the *Courier Mail* and *Queensland Times* on 1 March 2014. Notifications were also sent to key stakeholders including representatives from the three levels of Government, key industry stakeholders, current ARMP holders, and businesses and residents that are now included in the new area.
  - A workshop was held for farmers in the Ipswich and Lockyer Valley regions on 24 March 2014 regarding the movement of hay. The meeting was attended by 51 people including the State Member for Lockyer and a representative from the Lockyer Valley Regional Council. This targeted engagement activity sought to address issues related to general understanding, identification and risk mitigation related to hay movements from the RIFA Restricted Area.
  - Over 200 Energex staff successfully completed the Energex fire ant online training course. Energex have provided an evaluation of the training which will assist in the development of an online training course for wider use by the Program.
  - The longest serving odour detector dog, Aka, was recently retired and a replacement has been trained to fill his place. Aka had been retrained to deliver the 'Aka the Fire Ant Tracker' show and the show has been receiving consistent positive feedback with the introduction of the new dog.

[1] 2013 Queensland Regional Householder Survey

Scientific Support

Science provides diagnostic and genetic analysis of ant samples, assessment of operational treatment and surveillance activities, and research and development.

- Research to discover the sex locus of the fire ant (where the sex of the ant is determined) is continuing. This forms part of a study which is examining whether the eradicative pressure being exerted by the Program is affecting the biological fitness of the ant (through the production of sterile males) and may tip it towards extinction.

- A collaborative project with the Queensland University of Technology to update the Habitat Model used to guide surveillance for fire ant is nearing completion. The model uses data collected by the Program on the location of every fire ant colony detected since 2001 to determine what sort of habitat the ant is most likely to be found in. This involves spectral analysis of Landsat imagery of a target area. Forests and bare earth provide different spectral responses and it is known that the ant prefers bare open ground to establish new colonies and is rarely found in heavily vegetated areas. The model can demarcate these preferences. Testing of the model has shown that 98.9% of all known colonies fall within the top 50% of this habitat range. Use of the model allows for more efficient, targeted surveillance. The intent of the current project is to refine the model using additional data collected over recent years.

- Testing of a model that uses Landsat imagery to detect recently disturbed land that is likely to be infested by fire ant is continuing.

- Approval has been given by the Australian Pesticide and Veterinary Medicines Authority for the use of suSCon green (a controlled release granular formulation of chlorpyrifos) on containerised nursery stock by persons generally. Previously this product could only be used under the direction of officers from the Biosecurity Queensland Control Centre. This provides a business with another option.

Continued support functions

Essential support functions include information technology, operational mapping, planning and scheduling, administration, and Program policy and management. Activities during the quarter include:

- TACC met on 10 and 27 February 2014 (TACC18 and TACC19) to discuss a range of issues including the Program's progress during the second quarter. The second quarter report 2013–14 was endorsed. TACC agreed that the Program continues to meet all of its performance indicators, that it remains on-track to achieve the objectives of the current delimitation, containment and suppression phase, and to recommend to the National Management Group (NMG) that the Program continues to be supported in 2014–15.

- A discussion paper providing options for securing financial contributions for the Program outside the current national cost-sharing arrangement was provided to the Primary Industries Standing Council (PISC) in November 2013. PISC did not endorse the discussion paper. Issues raised in the paper requiring national resolution were considered by the National Biosecurity Committee (NBC) on 27 February 2014 (NBC17). It was agreed that a project would be established and funded by the NBC to investigate new funding models for long term eradication programs.

- A new declaration of the south-east Queensland RIFA Restricted Area (Version 47) became effective on 1 March 2014. A total of 212 suburbs are included in the high and low risk restricted areas (215 in the previous restricted areas – Version 46)—113 suburbs are included in the high risk restricted area while 99 suburbs are included in the low risk restricted area.

- The suite of guidelines and factsheets developed to coincide with the declaration of the two restricted areas in December 2012 continues to be refined. The working group met in late January and late March 2014 to review and discuss ongoing changes to the guidelines.

- A number of Program policies continue to be developed, including:

  - power of entry for surveillance (resulting from a recommendation from the Deloitte efficiency audit conducted early in 2012)
  - risk management
  - remote sensing surveillance
  - waste facilities.

- A major redevelopment of the Fire Ant Information System (FAIS) and all supporting databases commenced in 2011–12 to help mitigate the critical risk of system failure. The project has amalgamated several supported databases and systems into one tightly integrated Fire Ant Management System (FAMS).

  - Stage 7 of the FAMS development project has been completed on time and within budget. Some of the modules within Stage 7 include the scope of treatment, ability to manage zone boundaries, integration of stakeholder engagement functionality, integration of the Sample Submission Register, integration of all RSS activities including flight scheduling and job bookings for treatment and surveillance.
  - The Information and Communications Technology (ICT) roadmap review process is underway for the Program. This review will provide future support and maintenance of the Program's information systems—with the intention of reducing costs.
  - The Program has planned and implemented strategies for the relocation of equipment and resources to multiple locations following the decision to relocate from the Oxley site.
  - In preparation of the upcoming RSS season, the Program has been planning and initiating end-to-end testing with the relevant business areas and stakeholders.

Appendix 1 – Financial Report 2013–14

For period ending 31 March 2014

WORK UNITS	Notes	2013–14 Initial Budget			Initial Budget	2013–14 Revised Budget			Revised	2013–14 Actual Expenses			Actual
		Labour $'000	Non-Labour $'000	TOTAL $'000	FTE	Labour $'000	Non-Labour $'000	TOTAL $'000	FTE	Labour $'000	Non-Labour $'000	TOTAL $'000	FTE
FAE Management		214	220	434	2.0	415	36	451	2.0	188	30	218	2.0
Policy and Planning		468	10	478	4.0	449	10	458	4.0	346	8	354	3.00
Resources and Administration		807	661	1,467	9.75	783	682	1,465	9.8	516	417	933	6.99
Community Engagement		681	224	905	6.9	656	264	920	6.9	506	132	639	6.90
Information Services		541	741	1,283	5.0	512	705	1,218	5.0	375	305	680	3.20
Scientific Services		806	236	1,042	8.0	777	236	1,013	8.0	575	132	708	8.20
Field Operations		4,106	1,257	5,363	66.0	3,944	1,257	5,201	66.0	2,705	718	3,423	61.89
Program Compliance		1,498	115	1,613	19.0	1,441	115	1,556	19.0	1,030	116	1,146	18.00
Sub-Total		**9,122**	**3,463**	**12,585**	**120.7**	**8,977**	**3,305**	**12,282**	**120.7**	**6,242**	**1,859**	**8,101**	**110.18**
Site Lease Charges			399	399			399	399			301	301	
Odour Detection Dogs		175	166	341	2.0	165	291	456	2.0	139	144	283	2.00
Chemical Treatments			1,364	1,364			1,364	1,364			818	818	
Aerial Applications			480	480			480	480			301	301	
Remote Sensing		240	2,928	3,168	3.0	234	3,123	3,357	3.0	180	2,201	2,381	3.00
Sub-Total		**415**	**5,337**	**5,752**	**5.0**	**399**	**5,657**	**6,056**	**5.0**	**319**	**3,765**	**4,084**	**5.00**
TOTAL COST-SHARING + QLD SUPPLEMENTARY FUNDING		**9,537**	**8,801**	**18,338**	**125.7**	**9,376**	**8,962**	**18,338**	**125.7**	**6,561**	**5,624**	**12,184**	**115.18**

Notes:

All budget and actual amounts are rounded to the nearest $'000.

The 2013–14 budget includes a $337.6K carryover from 2012–13.

Revenue Update:

July–Dec 13 invoices were raised in 13 November 2013.

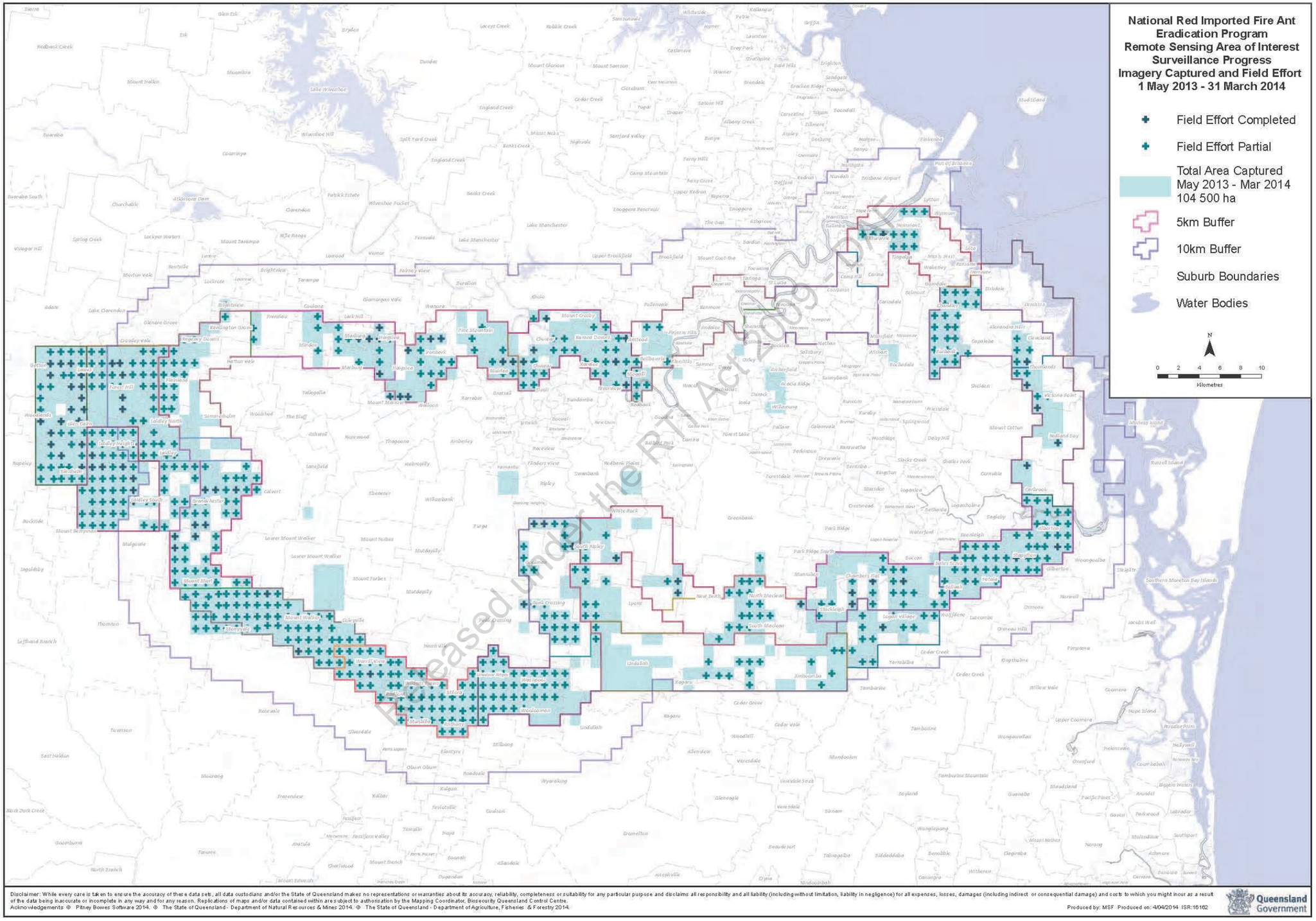
Jan–June 14 invoices were raised in 18 February 2014.

Appendix 2 – Key statistics for the Program

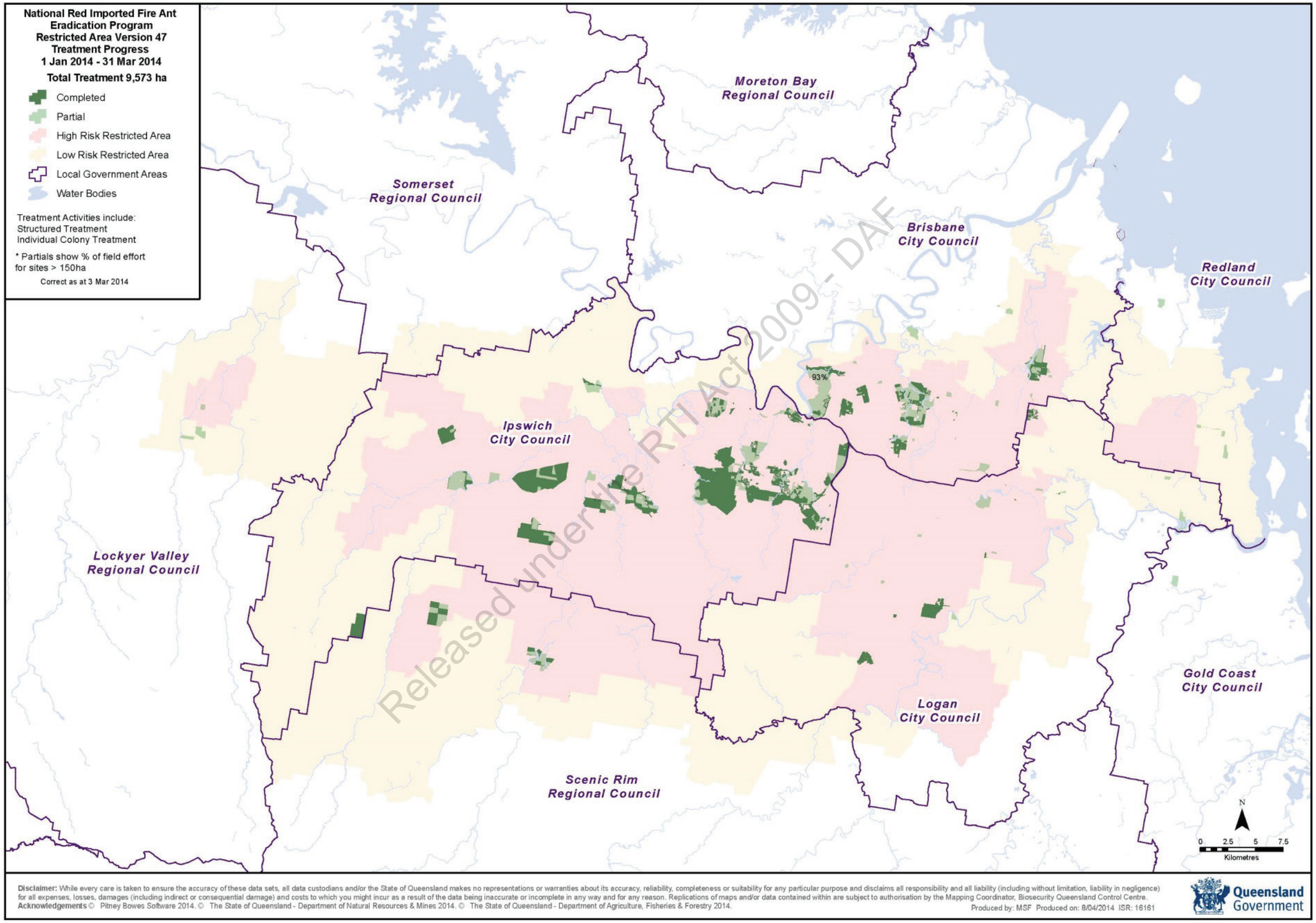
2013-14 Financial Year	Scheduled activities	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total 2013–14
Total area of infestation[1]		2 148 hectares	2 187 hectares	2191 hectares		2 191 hectares
New infestation		217 hectares	65 hectares	41 hectares		323 hectares
Cleared infestation		49 hectares	26 hectares	37 hectares		112 hectares
Significant detections		2	1[2]	0		3
RSS – imagery captured	100 000 hectares	68 500 hectares[3]	1500 hectares	0 hectares		70 000 hectares
RSS – imagery analysed	100 000 hectares	56 100 hectares	31 000 hectares	300 hectares		87 400 hectares
RSS – finalised[4]	100 000 hectares	7 885 hectares	13 700 hectares	40 000 hectares		61 585 hectares
Targeted field surveillance		2 828 hectares	1 457 hectares	1 403 hectares		5 688 hectares
Treatment[5]	32 000 hectares	912 hectares	6 663 hectares	9 573 hectares		17 148 hectares
Total size of restricted areas		281 947 hectares	315 287 hectares	317 159 hectares		-
Total suburbs in the restricted areas		205	215	212		-
Number of high risk suburbs		109	116	113		-
Number of low risk suburbs		96	99	99		-
Suburbs removed from the restricted areas		-	5	5		-
Suburbs added to the restricted areas		-	15	2		
Audits of movement controls		79	69	59		207
Inspector's approvals (IAs)		57	44	62		163

[1] The total area of infestation includes all active colonies plus the surrounding 50 metres found since 1 July 2008. The total area of infestation on 31 December 2013 was 2187 hectares.
[2] Yarwun detection - reported to the TACC on 2 December 2013. On 3 December 2013, TACC was provided a Significant Detection Report as the detection involved a reproductive infestation beyond the 30 km RSS delimitation zone. Genetic analysis subsequently confirmed this to be a new incursion that is unrelated to the 2006 Yarwun incursion or the 2001 south east Queensland incursions.
[3] A total 104 500 hectares of imagery has been captured for the season with approximately 1800 hectares currently unavailable for analysis
[4] No further work is to be conducted around this imagery – all stages of RSS are complete
[5] The preventative treatment season runs from September through until May. This figure includes preventative treatment and treatment for new infestation.

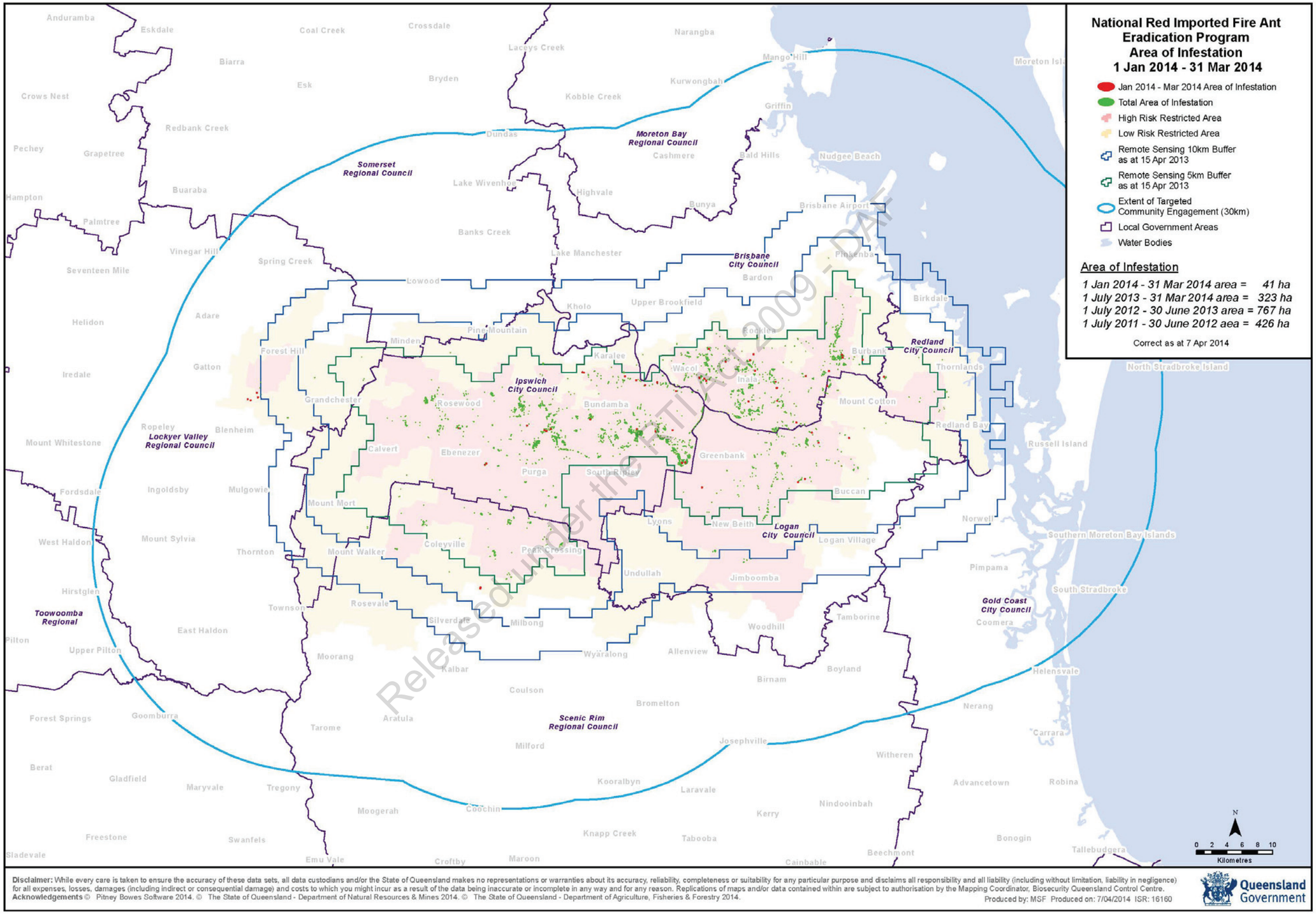
Appendix 3 – RSS imagery captured and finalised RSS to 31 March 2014



Appendix 4 – Treatment progress for 1 January–31 March 2014



Appendix 5 – Area of infestation 1 January–31 March 2014



Appendix 6 – RIFA Restricted Areas - Version 47 (effective 1 March 2014)

HIGH RISK RESTRICTED AREA

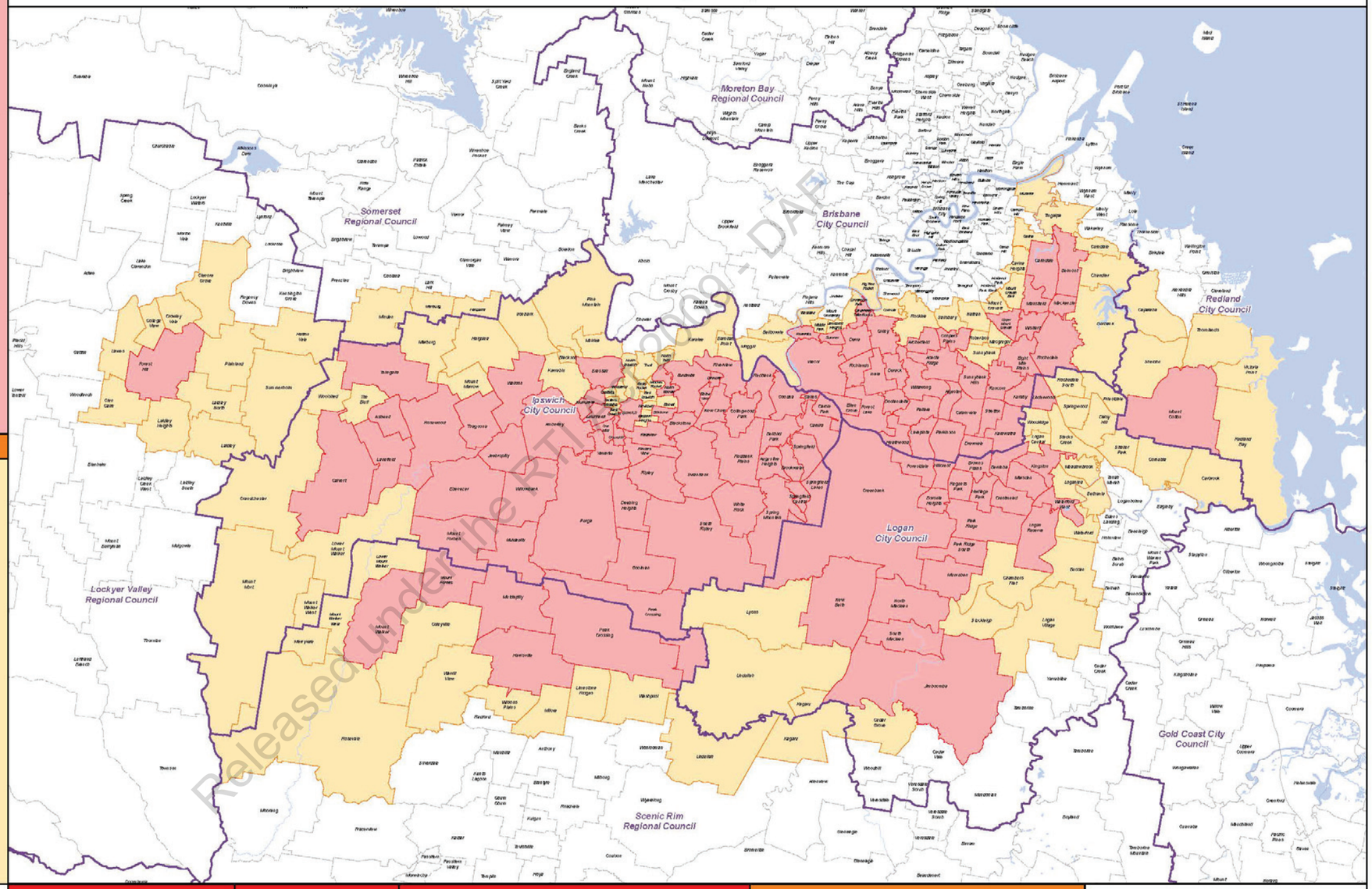
Acacia Ridge
Algester
Amberley
Archerfield
Ashwell
Augustine Heights
Bellbird Park
Belmont
Berrinba
Blackstone
Boronia Heights
Brassall
Brookwater
Browns Plains
Bundamba
Calamvale
Calvert
Camira
Carindale
Carole Park
Churchill
Collingwood Park
Coopers Plains
Crestmead
Darra
Deebing Heights
Dinmore
Doolandella
Drewvale
Durack
Ebbw Vale
Ebenezer
Eight Mile Plains
Ellen Grove
Flinders View
Forest Hill
Forest Lake
Forestdale
Gailes
Goodna
Goolman
Greenbank
Harrisville
Heathwood
Heritage Park
Hillcrest
Inala
Ipswich
Jeebropilly
Jimboomba
Karawatha
Kingston
Kuraby
Lanefield
Larapinta
Leichhardt
Logan Reserve
Mackenzie
Mansfield
Marsden
Mount Cotton
Mount Forbes
Mount Walker
Munruben
Mutdapilly
New Beith
New Chum
North Booval
North Maclean
One Mile
Oxley
Pallara
Park Ridge
Park Ridge South
Parkinson
Peak Crossing
Purga
Raceview
Redbank
Redbank Plains
Regents Park
Richlands
Ripley
Riverhills
Riverview
Rochedale
Rosewood
Runcorn
Seventeen Mile Rocks
Silkstone
South Maclean
South Ripley
Spring Mountain
Springfield
Springfield Central
Springfield Lakes
Stretton
Sumner
Sunnybank Hills
Swanbank
Tallegalla
Thagoona
Underwood
Upper Mount Gravatt
Wacol
Walloon
Waterford West
White Rock
Willawong
Willowbank
Wishart
Wulkuraka
Yamanto

LOW RISK RESTRICTED AREA

Barellan Point
Basin Pocket
Bellbowrie
Bethania
Blacksoil
Booval
Buccan
Burbank
Capalaba
Carbrook
Carina
Carina Heights
Cedar Grove
Chambers Flat
Chandler
Coalfalls
Coleyville
College View
Corinda
Cornubia
Crowley Vale
Daisy Hill
East Ipswich
Eastern Heights
Fig Tree Pocket
Glen Cairn
Glenore Grove
Grandchester
Gumdale
Haigslea
Hatton Vale
Ironbark
Jamboree Heights
Kagaru
Karalee
Karrabin
Laidley
Laidley Heights
Laidley North
Lawes
Limestone Ridges
Logan Central
Logan Village
Loganlea
Lower Mount Walker
Lyons
Macgregor
Marburg
Meadowbrook
Merryvale
Middle Park
Milora
Minden
Moggill
Moores Pocket
Mount Gravatt
Mount Gravatt East
Mount Marrow
Mount Mort
Mount Walker West
Muirlea
Murarrie
Nathan
Newtown
North Ipswich
North Tivoli
Pine Mountain
Plainland
Priestdale
Redland Bay
Robertson
Rochedale South
Rocklea
Rosevale
Sadliers Crossing
Salisbury
Shailer Park
Sheldon
Sinnamon Park
Slacks Creek
Springwood
Stockleigh
Summerholm
Sunnybank
The Bluff
Thornlands
Tingalpa
Tivoli
Undullah
Victoria Point
Warrill View
Washpool
Waterford
West Ipswich
Westlake
Wilsons Plains
Woodend
Woodridge
Woolshed

RED IMPORTED FIRE ANT RESTRICTED AREA

DECLARATION NOTICE



Contact the Department of Agriculture, Fisheries and Forestry for further information

Log on to
www.daff.qld.gov.au/fireants
or call 13 25 23

Queensland Government

Restricted Items	
Soil*refer below	Mulch
Manure	Bark
Hay	Pot plants
Potting media	Turf
Sleepers/logs	Gravels
Poultry litter	

*Soil will require an Inspector's Approval before being moved into an unrestricted area. Log on to www.daff.qld.gov.au/fireants for details.

Requirements for	High Risk Restricted Area (red zone)	Low Risk Restricted Area (orange zone)
Commercial operators	In this area movement of restricted items requires an Approved Risk Management Plan or an Inspector's Approval to move these items **off a property**. Log on to www.daff.qld.gov.au/fireants for details.	Within this area movement of restricted items is allowed. Movement **into the unrestricted area** requires an Approved Risk Management Plan or an Inspector's Approval. Log on to www.daff.qld.gov.au/fireants for details.
Residents	Residents living in this area have several options when moving restricted items off their property. Log on to www.daff.qld.gov.au/fireants for details.	Residents living in this area have no formal requirements. Please check your yard for fire ants and call 13 25 23 if you think you have found suspect ants.

National Red Imported Fire Ant Eradication Program
Restricted Area Version 47
Effective Date: 1 March 2014

High Risk Restricted Area
Low Risk Restricted Area
Suburb Boundaries
Local Government Boundaries
Water Bodies

0 2 4 6 8 10 Kilometres

Produced by: MSF/AHK - Produced on: 25/02/2014 - Project: NFAEP MXD: RIFA_Restricted_Area_Version_47_Suburbs_A3.mxd - ISR 18094

Appendix 7 – Summary of the RIFA Eradication Program Response Plan 2013–18

Program Components	Approaches/options	2012-13 - Year 1[1]	2013-14 - Year 2	2014-15 - Year 3	2015-16 - Year 4[2]	2016-17 - Year 5	2017-18 - Year 6[3]
		Delimitation, Containment & Suppression			Eradication		
1. Delimitation							
Core infested area • ≈150 000 hectares (Feb 2013)	• Community engagement (CE). CE results in passive surveillance, RIFA reporting & compliance with containment measures. • Targeted field surveillance • 100% surveillance • Remote Sensing Surveillance (RSS)	• CE • Targeted field surveillance	• CE • Targeted field surveillance incl. RSS (high risk zones & new detections) where feasible	• CE • Targeted field surveillance incl. RSS (high risk zones & new detections) where feasible • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Targeted field & dogs surveillance	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Targeted field & dogs surveillance	• CE • 100% around any remaining breeding populations • Targeted field & dogs surveillance
5 km zone • 500 m – 5 km from core infested area • ≈122 000 hectares in 2012–13 (Feb 2013) • 57 455 hectares of 'suitable' habitat (Feb 2013)	• Community engagement = passive surveillance (CE) • 100% RSS coverage • RSS suitable habitat only	• CE • Remote sensing surveillance (RSS) of suitable habitat only	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS of suitable habitat only (filter out false positives previously identified) • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • Additional targeted RSS to address risk that residual infestation has spread from known infested area	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • All RIFA free areas as demonstrated from preceding surveillance declared pest free • Surveillance continues on remaining risk areas to build towards pest free status.
10 km zone • 5–10 km from core infested area • ≈135 000 hectares (Feb 2013); • 63 780 hectares of 'suitable' habitat (Feb 2013)[4]	• Community engagement = passive surveillance (CE) • 100% RSS coverage • RSS suitable habitat only • Targeted RSS based on risk	• CE • Limited RSS	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks • ***Delimitation complete***	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • RSS targeted according to risk profile from outcomes of previous RSS & other risks	• CE • All RIFA free areas declared pest free
30km zone • 10–30 km from core infested area (as defined in February 2013)	• Community engagement = passive surveillance (CE) • 100% RSS around any detections[5]	• CE	• CE	• CE • ***Delimitation complete***	• CE	• CE	• CE
2. Treatment[6]							
• Small, isolated infested sites	• Direct nest injection with 50 m buffer (bait) as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol	• Direct nest injection • 1 buffer treatment as per protocol
• Treatment around areas that have high density infestation	• Up to 3 treatments per year with broadcast baiting at least 500 m out	• 1-2 treatments	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year	• 2 treatments per year
• Targeted treatment of disturbed land in known infested area (out to 5 km around infestation) & all risk linked landfills & dump sites	• Nil treatment • 1 treatment per year • 2 treatments per year	• 1 treatment	• 1-2 treatments per year	• 1-2 treatments per year	• 1-2 treatments per year	• Based on risk assessment to determine level of treatment if any.	• Based on risk assessment to determine level of treatment if any.
3. Containment (movement controls)							
• Remove suburbs from restricted area as infested sites are treated	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Community engagement to ensure compliance & shared responsibility	• Community engagement strategy endorsed by TACC	• As per strategy	• As per strategy	• As per strategy	• As per strategy	• As per strategy	• As per strategy
• Risk management strategies to be focused on high risk restricted area	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Audits of Approved Risk Management Plans	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol
• Inspector's approval for soil movement	• Protocol endorsed by TACC	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol	• As per protocol

Note: Remote sensing surveillance (RSS) involves four steps – (i) Image capture; (ii) Image analysis by algorithm; (iii) Manual analysis of composite images; and (iv) Field investigation of points of interest

[1] Actual activity levels for 2012-13, based on a budget of $16.125M
[2] Areas will change as zone boundaries are redefined due to demonstrated evidence of absence and presence of infestation in various parts of zones
[3] Yr 7-8 (2018-20) would be a continuation of the Eradication Phase, with Yrs 9-10 (2020-2022) being Proof of Freedom Phase
[4] RSS buffers will continue be modified each year to reflect actual infestation patterns
[5] If any infestation is detected in the 30km zone, RSS will occur around the detection
[6] Preventative treatment across the entire core area (150 000 ha) would cost approximately $18M for one treatment or $54M for three treatments. This was not considered as a viable option.

Call: 13 25 23 or +61 7 3404 6999

Visit: www.daff.qld.gov.au

This QR code links to: www.daff.qld.gov.au

QR codes can be obtained via the intranet under 'Communications > Communication tools > QR codes'.

National Red Imported Fire Ant Eradication Program

TACC Meeting # 19

Remote Sensing

Overview

- Remote Sensing Process
- Complexities and Limitations
- Challenges and Technical Issues
- Achievements
- Season 13 Progress
- Findings / Results
- Planning for Current Season (Season 14)

Remote Sensing Process

- Developed concurrently with operational delivery – presented challenges and benefits

- Process outline
  - Planning
  - Image capture
  - Analysis (algorithm & manual analysis)
  - Field scheduling
  - Field verification

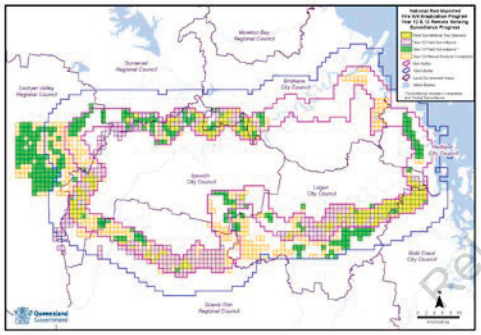
- Developed through contracted suppliers and program development
  - Outline Global, McDermott Aviation, Australian Centre for Field Robotics at the University of Sydney

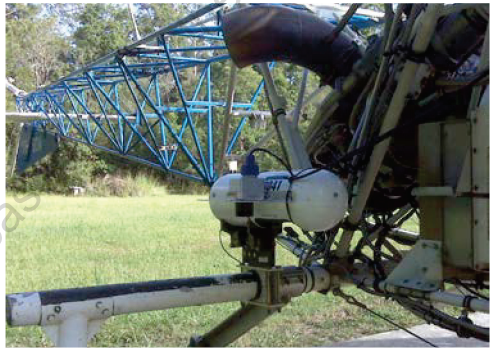
Remote Sensing Aims and Objectives

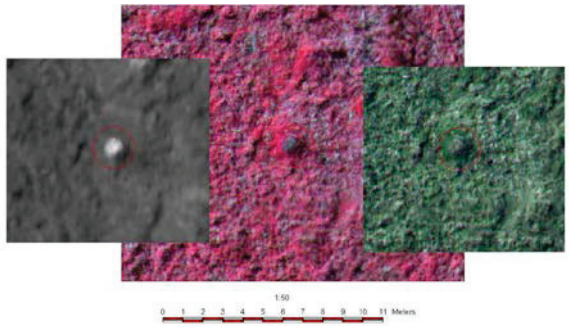
- Cost effective and timely delineation tool
- Seeking to detect nests 30 cm or greater
- Ability to conduct broad scale surveillance

Dependencies

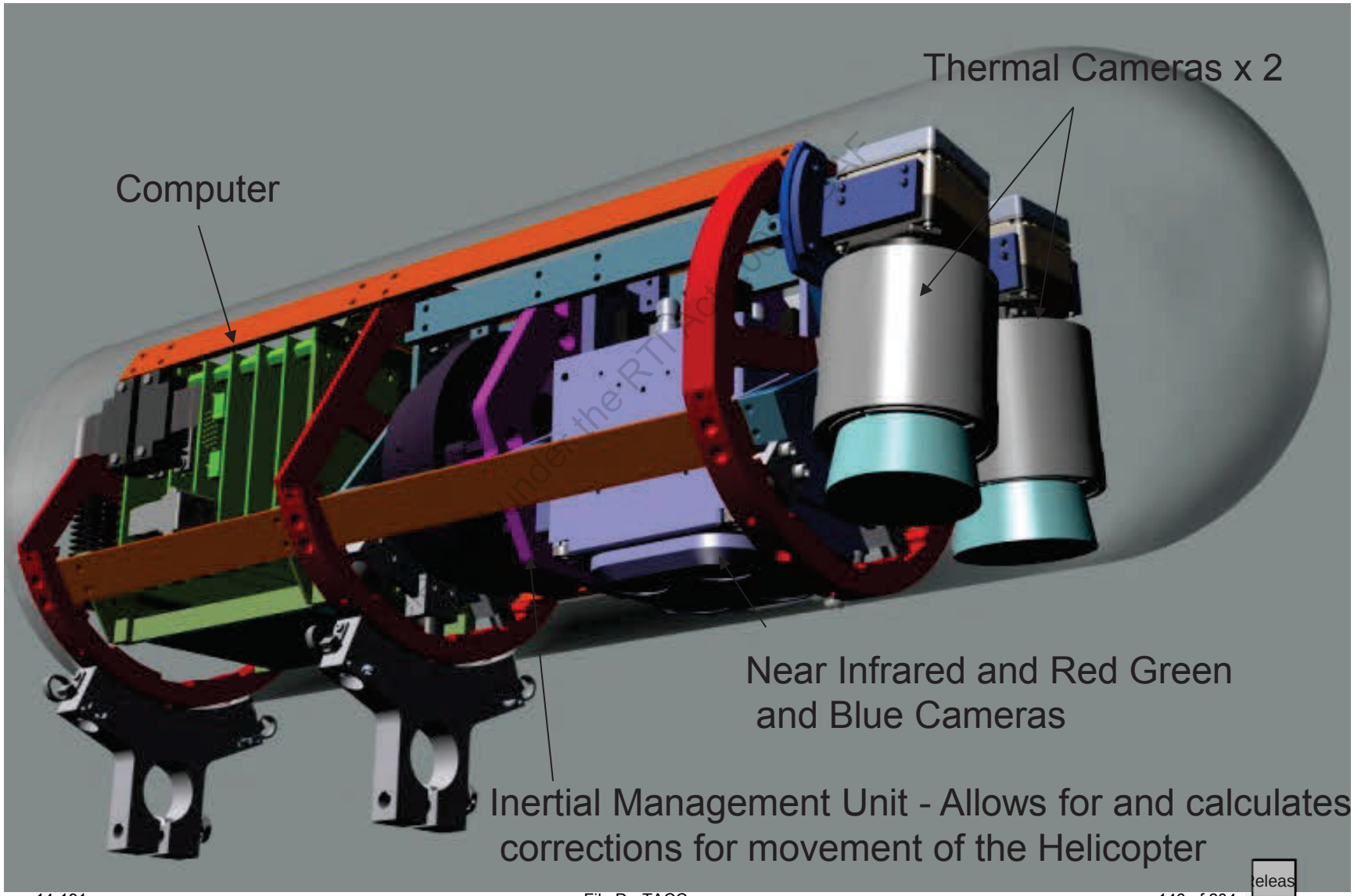
- All components are required for the process to be effective







Camera



Camera Imagery

- High resolution near infrared imagery (NIR)
  - Assesses level of chlorophyll present in plants (RIFA remove vegetation from their mounds)
- High resolution visual imagery (RGB)
  - Size, shape, colour and texture
- High resolution infra-red imagery (thermal)
  - Heat variation (RIFA mounds can be up to 20°C greater than surrounds)

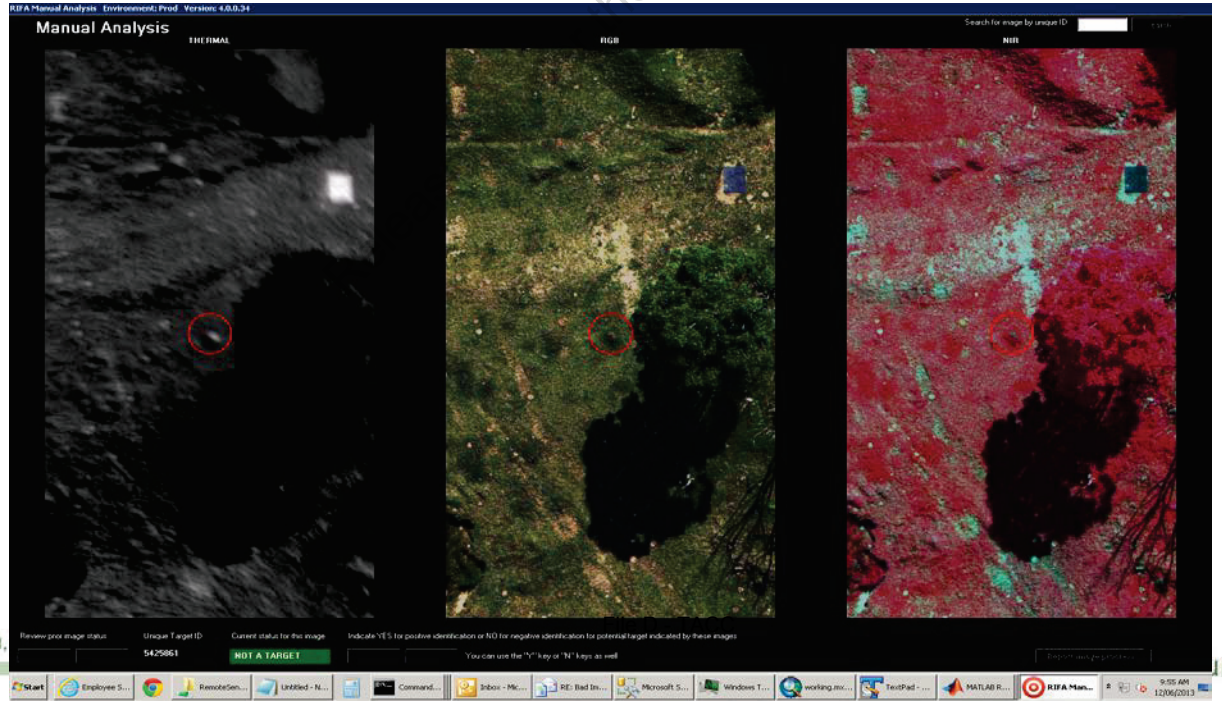


Image Specifications

- Capture images to analyse size, shape, colour, texture, vegetation cover and heat
- Flying at or above 400ft above ground level at a minimum speed of 30 knots
  - Red, green, blue and near-infrared imagery at 1 – 3cm resolution
  - Infrared imagery at 1 – 6cm resolution
- Co-registration of imagery at <= 1 pixels
- Orthorectification of imagery using a high resolution digital elevation model;
- Spatial accuracy <= 1 metres
- Easily adaptable to a commercially available helicopter.
- Ability to capture an average of 750ha imagery per day

Complexities of Remote Sensing

- Camera specifications and imagery processing
  - Mechanical, electrical and alignment issues of cameras and imagery post flight

- Balancing the scientific confidence levels with resource efficiency
  - Currently at 5 versions of the algorithm
  - Versions reduce false positives and increase the detection rates / confidence levels

- Algorithm
  - How the process works
  - How the algorithm learns – providing training imagery
  - First version's output: ~170 PoI/Ha
  - Current version's output: ~30 PoI/Ha

Complexities of Algorithm

- Stage 1 uses information already known about mounds
  - A mound should be at least 1.7 x warmer than surrounding ground
  - A mound should be between 30cm and 225cm
  - A mound will likely be somewhat elliptical

- By using this and additional existing knowledge, the algorithm develops a baseline of potential targets from the source imagery.

- Stage 2 involves running state of the art algorithms to compare the baseline points to a library of known mounds. The algorithms perform many assessments, including:
  - What land type does the baseline target appear in?
  - Is there a training target present with a similar land type?
  - Does the baseline target look similar to the training data?
  - If so, how confident is the algorithm that it is a fire ant mound?

Limitations of Remote Sensing

Assessment	PoI/Ha
Initially	>5
Current	1.7

- False positives
  - Detection rates too high
  - Refining the threshold for inclusion in algorithm
- False negatives
  - Where process doesn't identify any RIFA, when there might be some present

- Known limitations:
  - Cooler temperatures → May – September, times of day
  - Cloud cover → Weather ratings
  - Disturbed nest → Field surveillance, CE
  - Number of mounds for training to improve the algorithm → Rotated images

Confidence Levels

- Cumulative confidence levels

- Analysis
  - Algorithm plus Manual Analysis: 38% at 1.7 PoI/Ha

- Field Verification (Single mound):
  - Conducting surveillance of a 10 m radius from each PoI: 68%

- Field Verification:
  - Conducting 100% surveillance of the area out to a radius of 500 m from single mound: 100%

Does it work?

- Scientific trials conducted
- Initial trials
  - Handheld thermal camera's on known nests
  - Monitoring mound temp & weather conditions every 15 minutes over 8 hours/day
- Secondary trials in 2012
  - 19 sites with known mounds – imagery captured
  - Mound count range 1 – 30
  - All sites had at least 1 mound detected
- Trials in 2013
  - 17 sites with known mounds – imagery captured
  - Mound count range 1 – 30+
  - All sites had at least 1 mound detected

Scientific assessment

- Technical forum of leading Australian agencies and international experts reviewed the development of the technology of remote sensing surveillance in February 2012
  - Review panel found RSS can detect fire ants at levels that would support successful delimitation
  - Recommended a review after 2012 season
  - Further review found RSS to be an effective tool
- Manual analysis testing
  - 233 training images randomly fed through MA assessment at an average of 1:1,000
  - Records the MA operator and their assessment
  - All current operators test rate of 100%

- Science trials planned to continue in 2014
  - Plan to capture more mounds for training images for algorithm

Challenges

- Scientific, Technical and Operational

- System development as no pre-existing systems were available
- Development staged as each step in the process required the prior development step to be completed
- Overcoming the scientific complexities of the algorithm to balance the detection rate with resourced outputs.
- Algorithm training
  - Training required ~60,000 images
  - Able to provide ~1,532 images of colony points using rotated images

Technical Challenges

- Size / quantum of data
  - 1TB / camera / day daily capture,
  - storage onsite
  - Processing software for data
- System development while delivering operations
  - Staged development / business processes changing - bug fixes
- Duplicate points
  - Accuracy between systems resulted in rounding and Points appearing duplicated (71,000 PoI's)
- Spatial software unable to manage data volume
- System performance

- Upgraded 100GB connections direct to server
- Upgraded servers to 250TB storage
- Modified Spatial Software
- Streamlined data processing [IT Worker ant solution]
- System performance improved
  - MA (team of 3 people) processing up to 100,000 PoI/day

Operational Challenges

- Achieving capture target within timeframes with unsuitable weather
  - keep machinery operating by diverting to alternate areas
  - Presents issues with image processing order and field schedule sequencing
- Poor image quality
  - Changing weather conditions
  - Reflight / recapture / partial flight lines completed
- Operations logistics
  - airspace operations
  - aircraft tasking topography,
  - radar interference
- Field Scheduling
  - site & data alignment for job creation,
  - client details for access,
  - distance and duration for travel
- RSY12 – clearing 30,000 ha backlog created by delays in initial commencement
  - Field staff resourcing

Achievements

- Improvements implemented as identified each season
  - Algorithm improvement and output balance
  - System development and performance
  - Infrastructure development and use
  - Image quality and recapture process
  - Image capture efficiency
  - Navigational alignment
  - Improved weather assessment
  - Accurate hours of capture

- Met Operational targets for Season 12 and in progress for Season 13

Costs

- Cost comparison
  - 4.5 x more cost effective than visual surveillance
  - Visual efficacy is 80%
  - RSS process can achieve 100%
- 100,000 ha visual surveillance is approx. $32M
- RSS is costed at $7.225M
- Saving of $24.775M
- Costs don't include increased public reporting due to greater awareness in areas

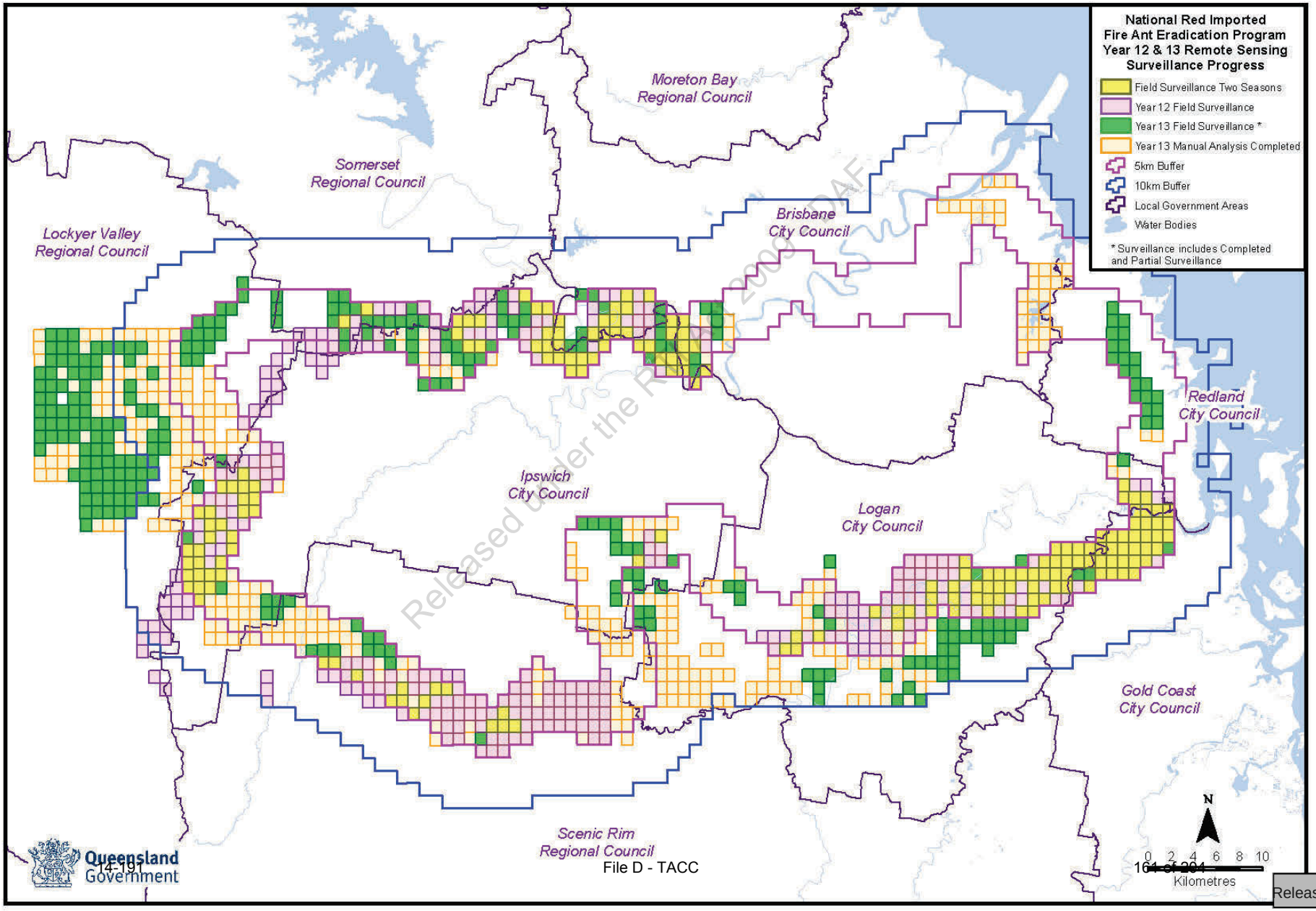
Operational Progress to date

•Hectares achieved since commencement

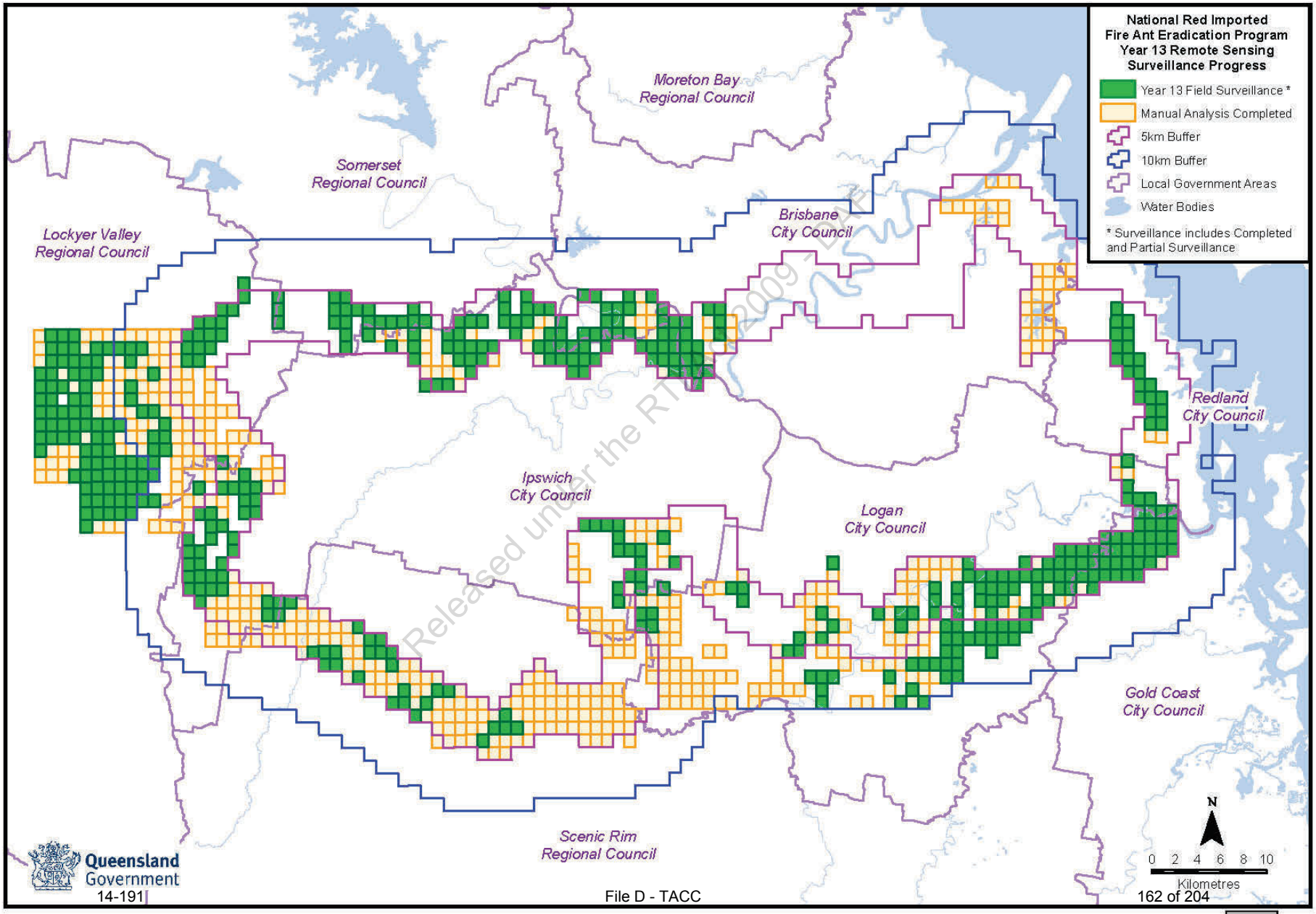
•Current progress S13 – approx 50% of work in progress or already completed

Season	Ha's
2011	7,000
2012	85,500
2013	104,000

Remote Sensing Surveillance Progress – Y12 and Y13



Remote Sensing Surveillance Progress – Y13 in progress



Findings / Results

- Wouldn't be conducting surveillance if not expecting to detect RIFA
  - Expect to detect RIFA in these RSS zones/areas not in the core zone
- 10 POI's on 8 sites were found to be RIFA from POI surveillance
- 5 sites where CP's were not identified as a POI and not found through RSS
  - Public reporting post field surveillance
- Reasons
  - Known limitations of RSS

Results where Remote Sensing has detected RIFA

- Findings – RIFA detected as a PoI

- 8 sites where RIFA was detected
  - Munruben
  - Jimboomba
  - Harrisville
  - Mt Walker
  - Warril View
  - Laidley
  - Logan Village
  - Muirlea

- Broad land use / terrain type

Results where Remote Sensing has NOT detected RIFA

- Findings – RIFA not detected
- 5 sites, with RIFA mound ranging from 15 m to 100+ m from PoI
    - Difficulties assessing data to ascertain algorithm or manual analysis identification

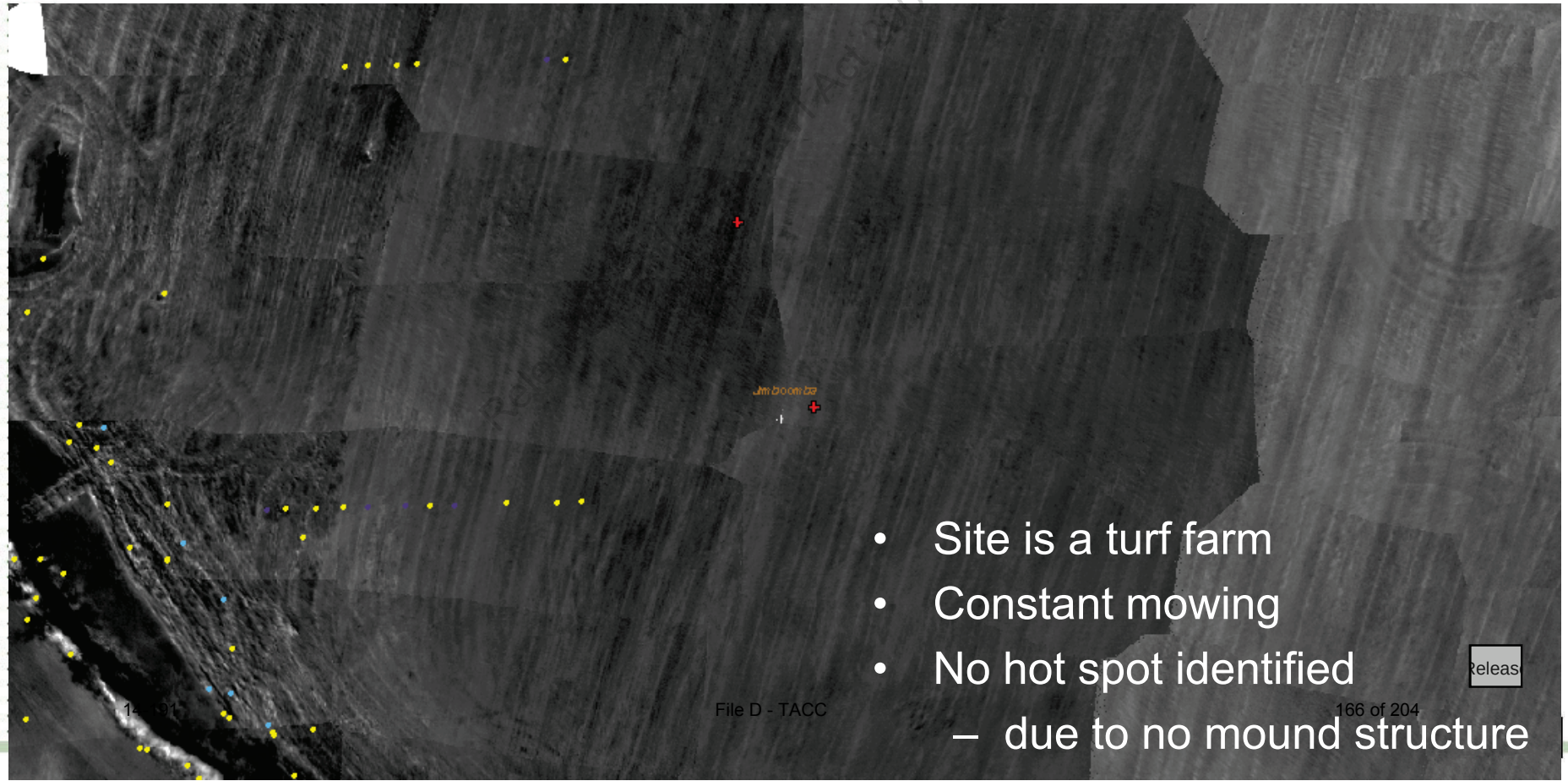
- Sites included
  - Jimboomba turf farm
  - Plainlands pumpkin crop
  - Flagstone Rise (Earthmoving new estate development)

- Investigation as to reasons
  - Constant cultivation
  - Vegetation covering
  - Disturbed nest

- Known limitations to RSS

Jimboomba – Not detected

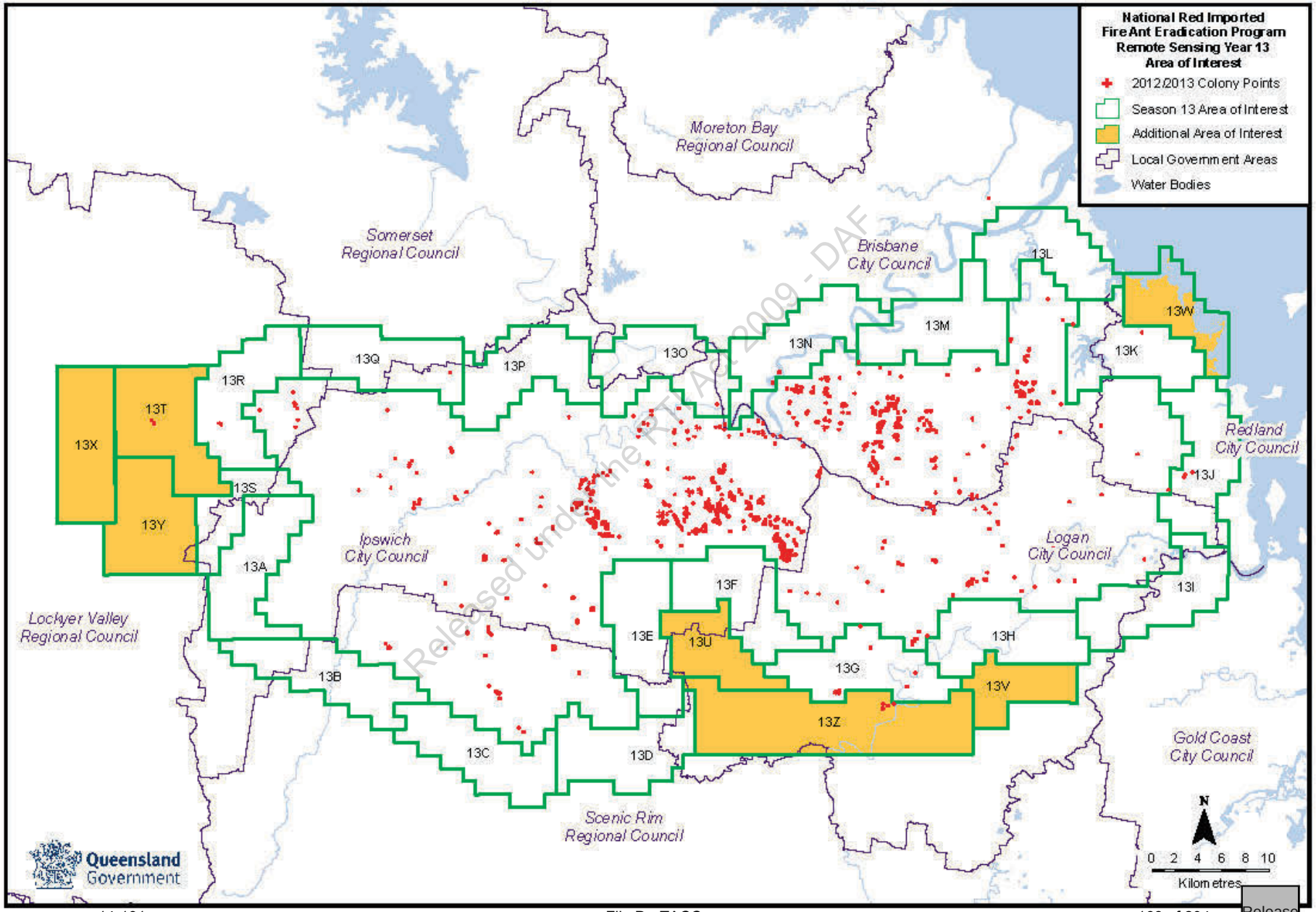
- Thermal Imagery legend:
  - Light blue PoI's – Field verification required
  - Yellow PoI's – MA = No
  - Purple PoI's – Science Review = No
  - Closest POI to CP = 50 meters

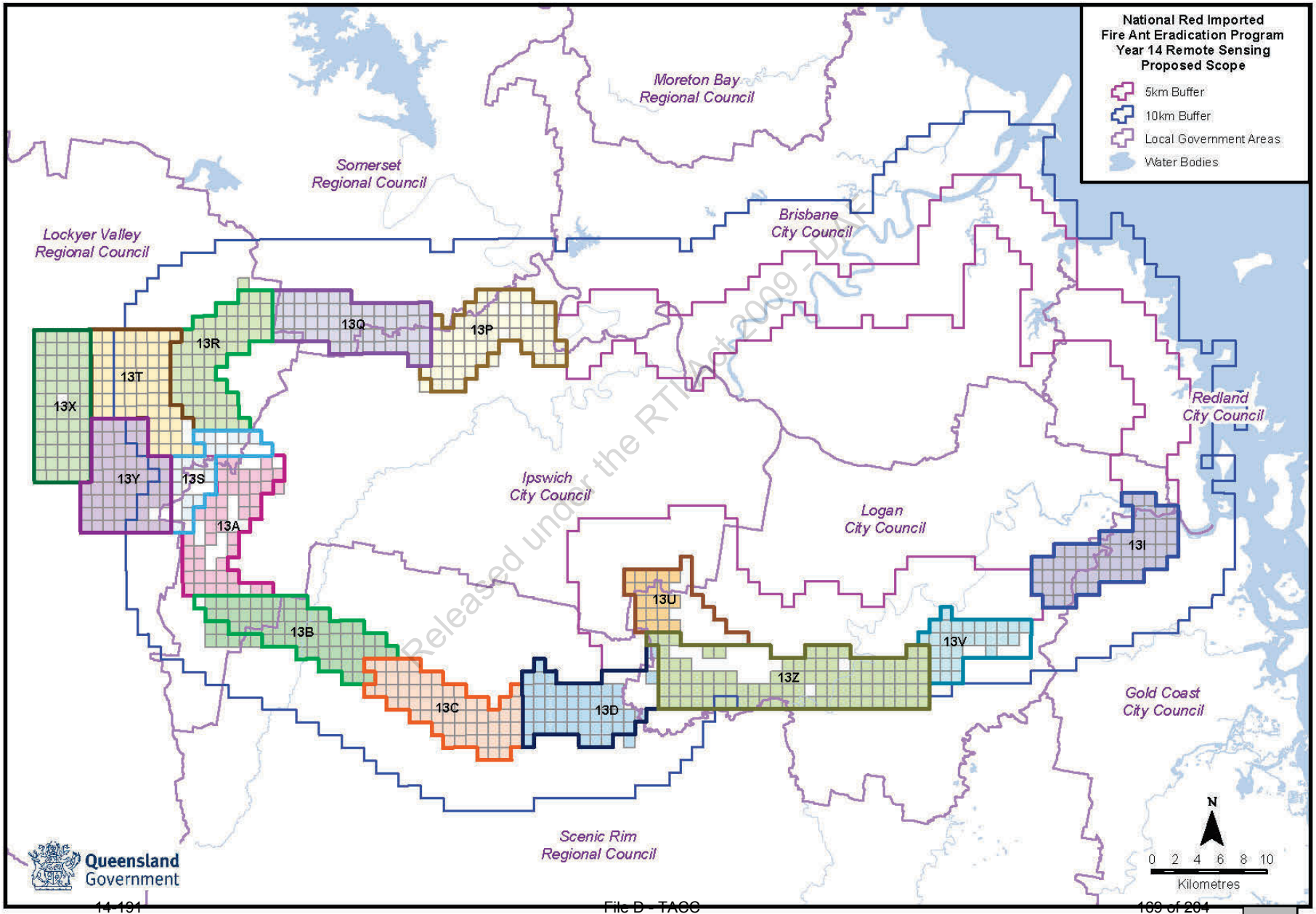


- Site is a turf farm
- Constant mowing
- No hot spot identified
  - due to no mound structure

Current Season Planning

- Amended scope for S13 as a result of detections throughout season 13
- These amendments also incorporated into S14 scope
- Further contingency to incorporate results throughout season with approx 111 cells (12,000ha) unallocated
- Exclude cells with greater than 90% of area identified as unsuitable by the Fire Ant Habitat model
- Prioritising areas on west and south extents
- 61.5% of blocks will receive a second pass
- System testing prior to commencing season on 01 May to incorporate site relocation, system development





Expected Outcomes for Season 14

- Detections in Remote Sensing areas

- Previous results finding 8 sites with infestation
  - All infestation has been single or small number of mounds
  - No large clusters detected;

- Could expect to detect a further 8 sites of infestation

Questions

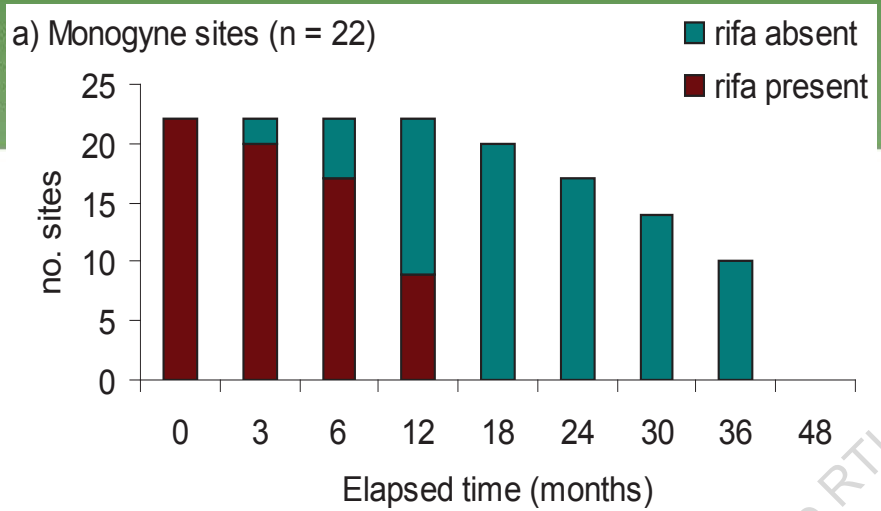
- ?

NRIFAEP Current Strategy

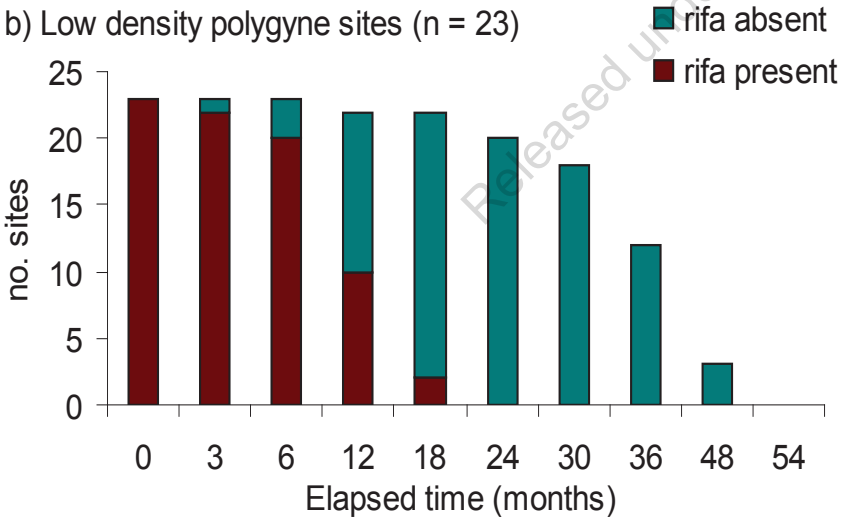
What are the risks?

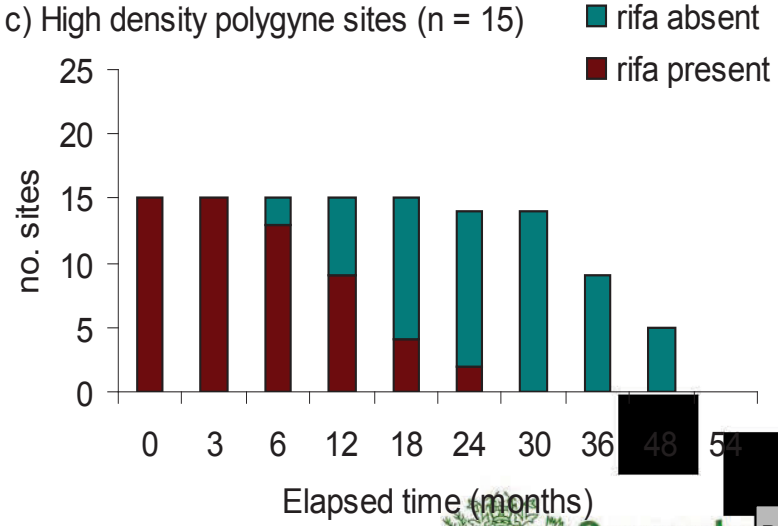
- Roush Review in January 2010 concluded that eradication would not be feasible using current techniques
- NMG subsequently agreed to a program of aggressive containment and suppression, with a view to eradication, while key research was completed
- The main research components were:
  - Bait efficacy and ant biology
  - Genetics
  - Disturbance and habitat modelling
  - Invasion ecology
  - Remote sensing

RIFA trends on sites monitored from 2001 to 2006



Multiple treatments with insect growth regulators and a toxicant





Native ants

- Most local ants impacted by fire ants at high densities but not at low densities
- Most local ants not seriously impacted by the treatment
- *Pheidole* was only genus affected and came back after treatment
- Local ants survive to provide some biotic resistance to fire ants

Genetics

Population assignment – used to determine whether a colony belongs to an existing population or is a new incursion e.g. present Yarwun find not related to previous infestation or to the Brisbane populations

Colony assessment – how many colonies?

Relatedness between colonies – can indicate number of generations and route of spread

Bottleneck analysis – investigates the level of genetic instability. Brisbane population is showing reduction in genetic diversity, inbreeding and splintering attributed to pressure exerted by the eradication program

Geographical source of incursion – Yarwun incursion likely originates from southern US

Population assignment

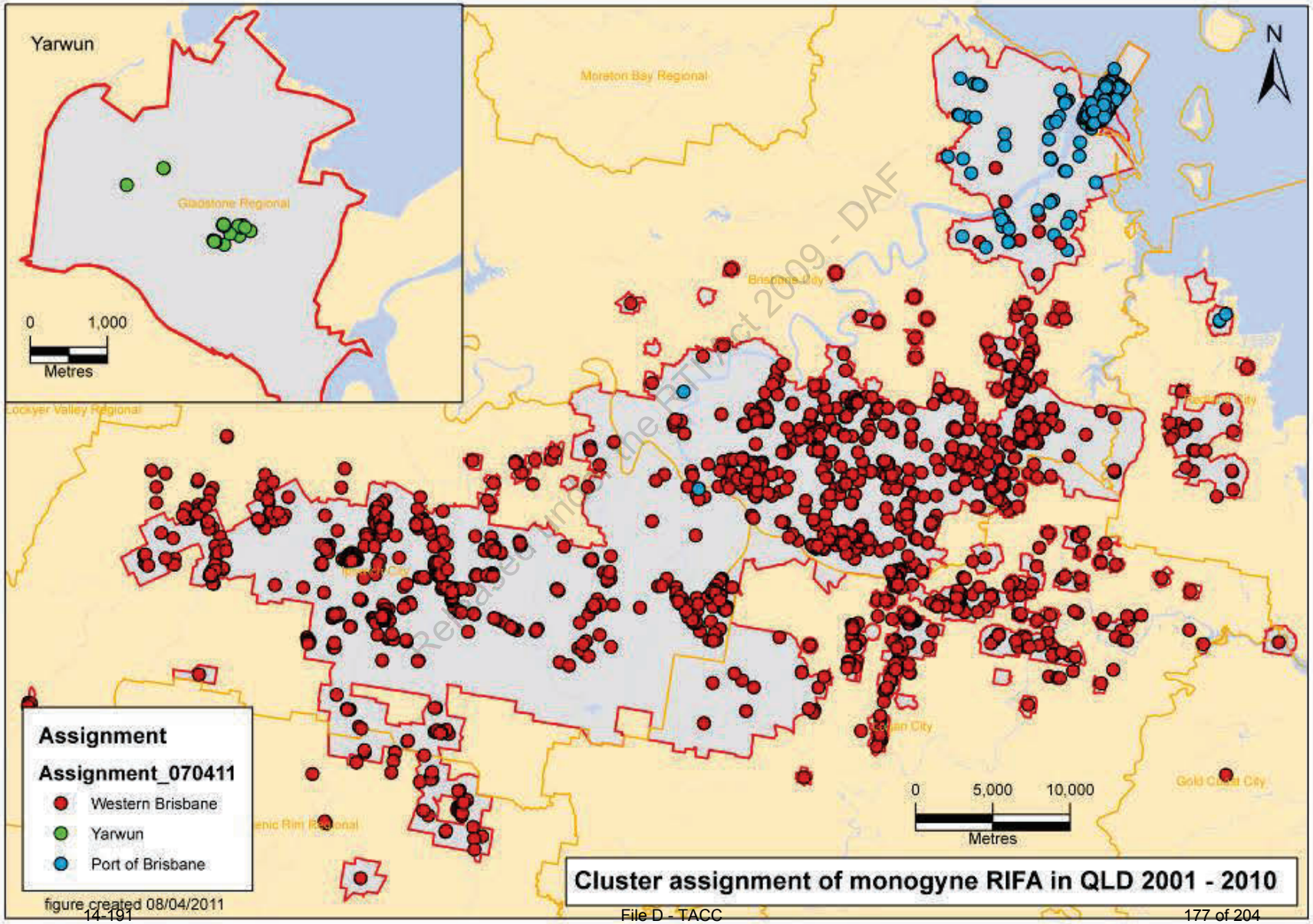
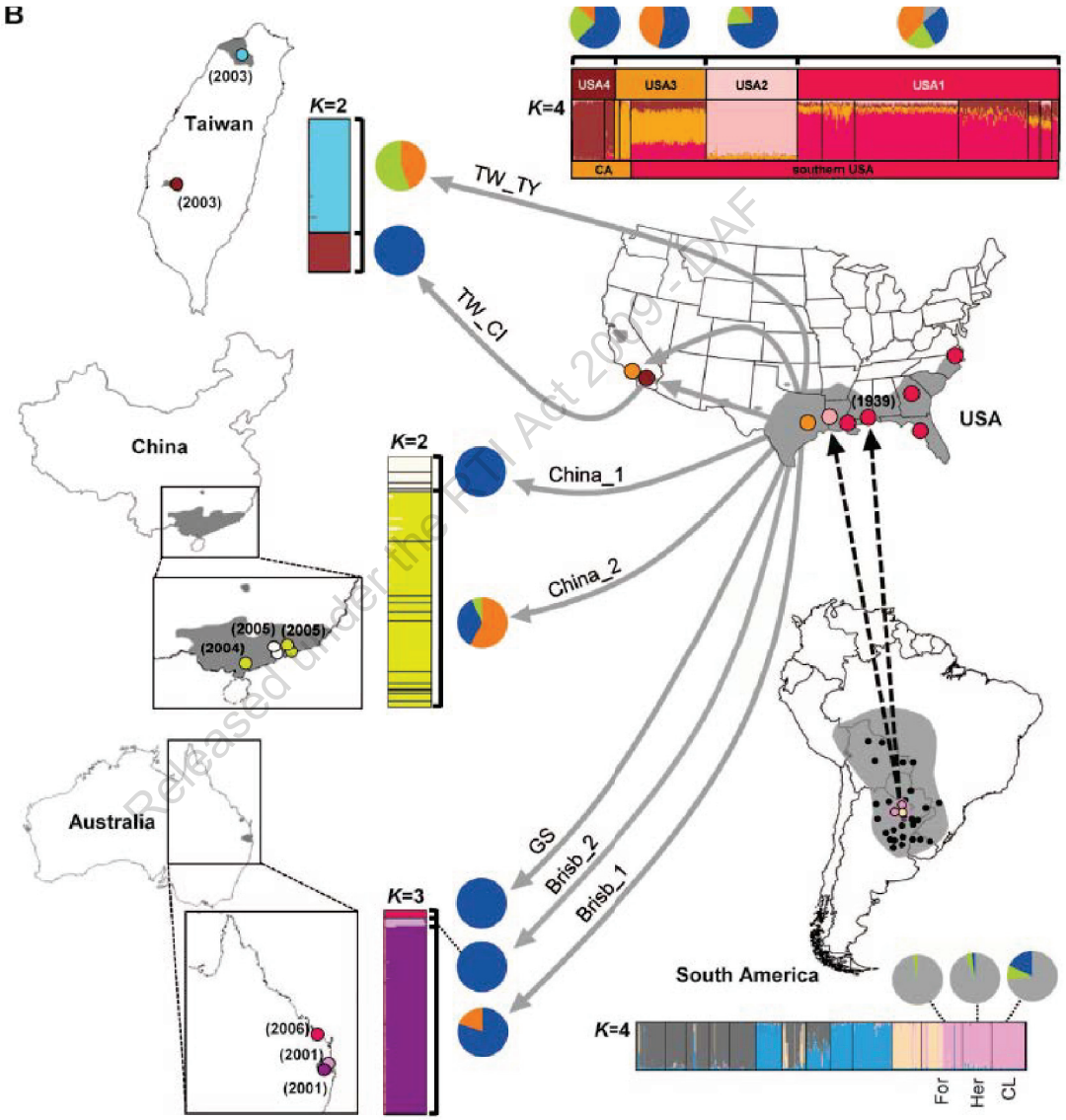


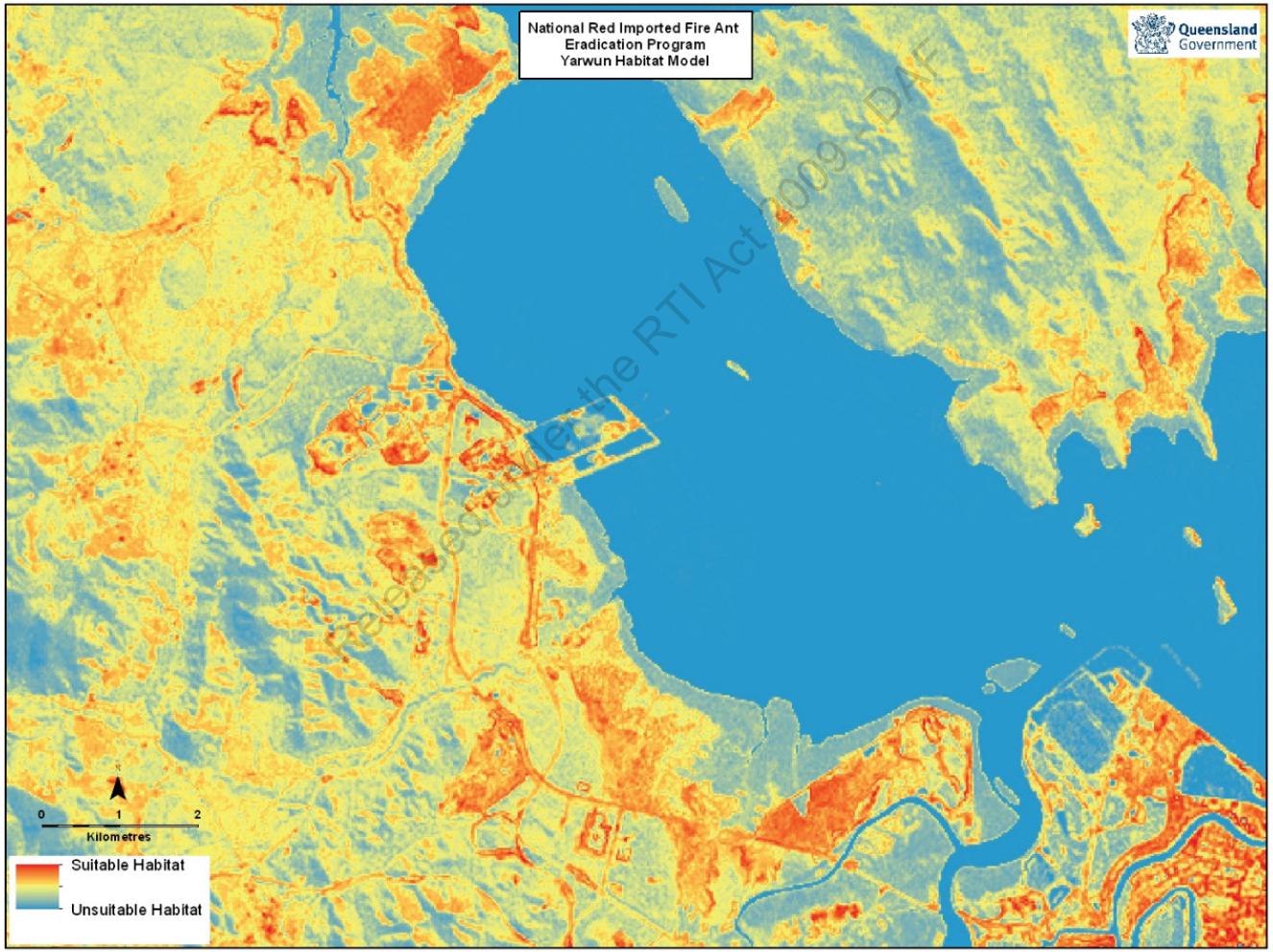
figure created 08/04/2011

Genetics



Release

Habitat model



Disturbance model

New Surveillance Tools

Image Analysis

Quantum GIS 1.7.4-Wroclaw - Harrisville

File Edit View Layer Settings Plugins Raster Database Vector Help

Layers

- Harrisville_Mapping
  - High
  - Medium
  - Low
- Harrisville_GC
- NewNest
  - NewNest
- Redbank_WGS84
- Harrisville_GridC
- Harrisville_GridF
- 001_0_B_RGBMosaic
- 001_0_B_NIRMosaic
- 001_0_A_NIRMosaic

0 2e-05 1 Degrees

© QGIS 2012

Coordinate: 52.6609803,-27.7988705 Scale 1:35 Render EPSG:4326

MirrorMap #0

Render

MirrorMap #1

Render

Risks associated with the Revised Response Plan as presented to TACC in April 2013

"The major risk is that the time before eradication is declared is likely to be longer".

"*Surveillance risk* – Reduced surveillance in the 5 and 10 km zone (a reduction of 50000ha per annum) through the period of delimitation (to June 2015) will reduce confidence that all infestation has been detected and ultimately the confidence that the fire ant infestation has been delimited by 2015"

"*Treatment risk* – Reduced treatment in the core will potentially lead to an increased level of infestation that will need to be dealt with during the eradication phase. With an increased fire ant population there is a higher likelihood of spread by natural and human assisted means beyond the core.

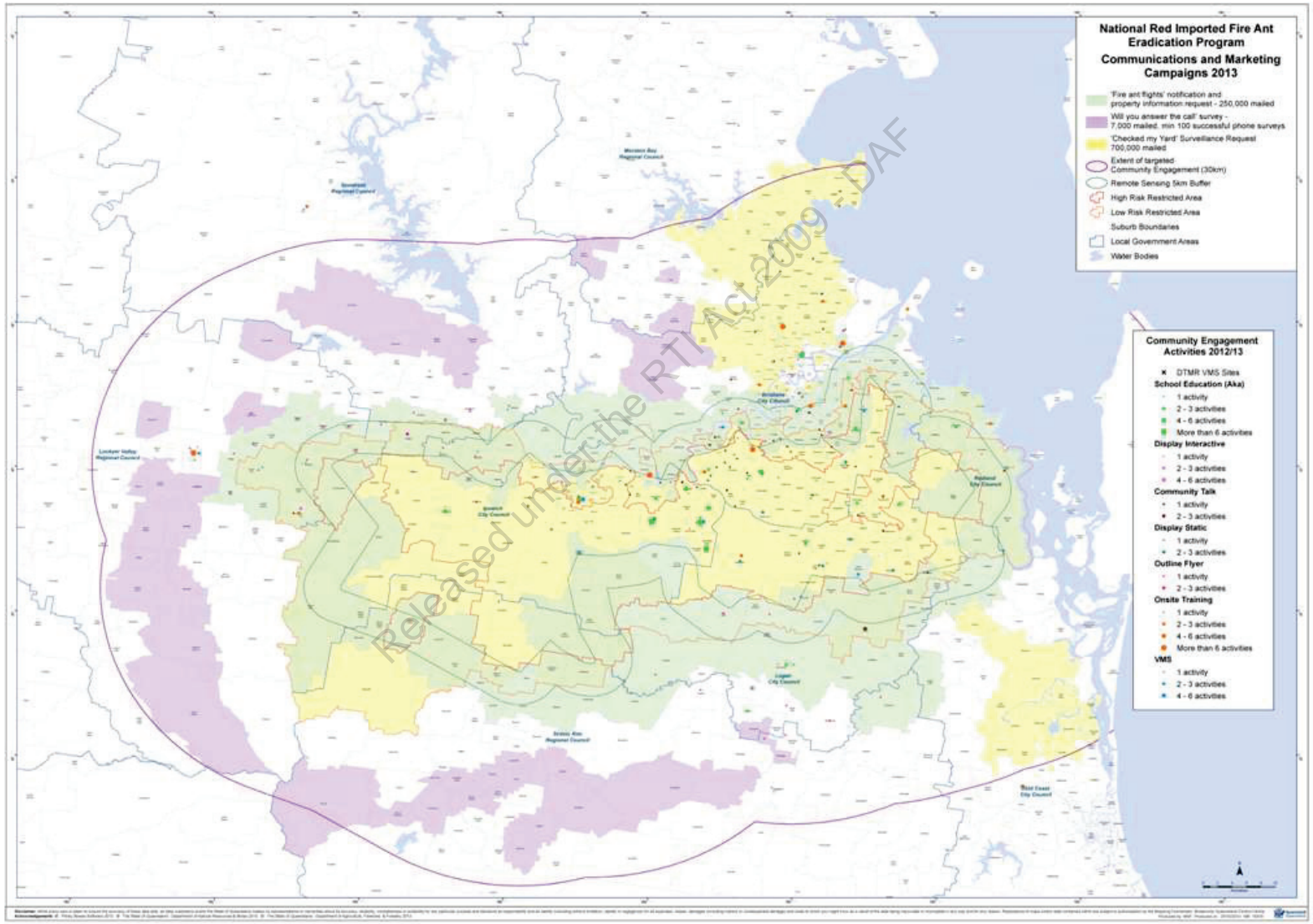
Treatment of disturbed land in the 5 km zone was planned as additional protection for this zone from reinfestation from the core. If this treatment is reduced or not completed then infestation may be found in the 5 km zone after delimitation surveillance is complete."

How is the program of suppression and containment faring?

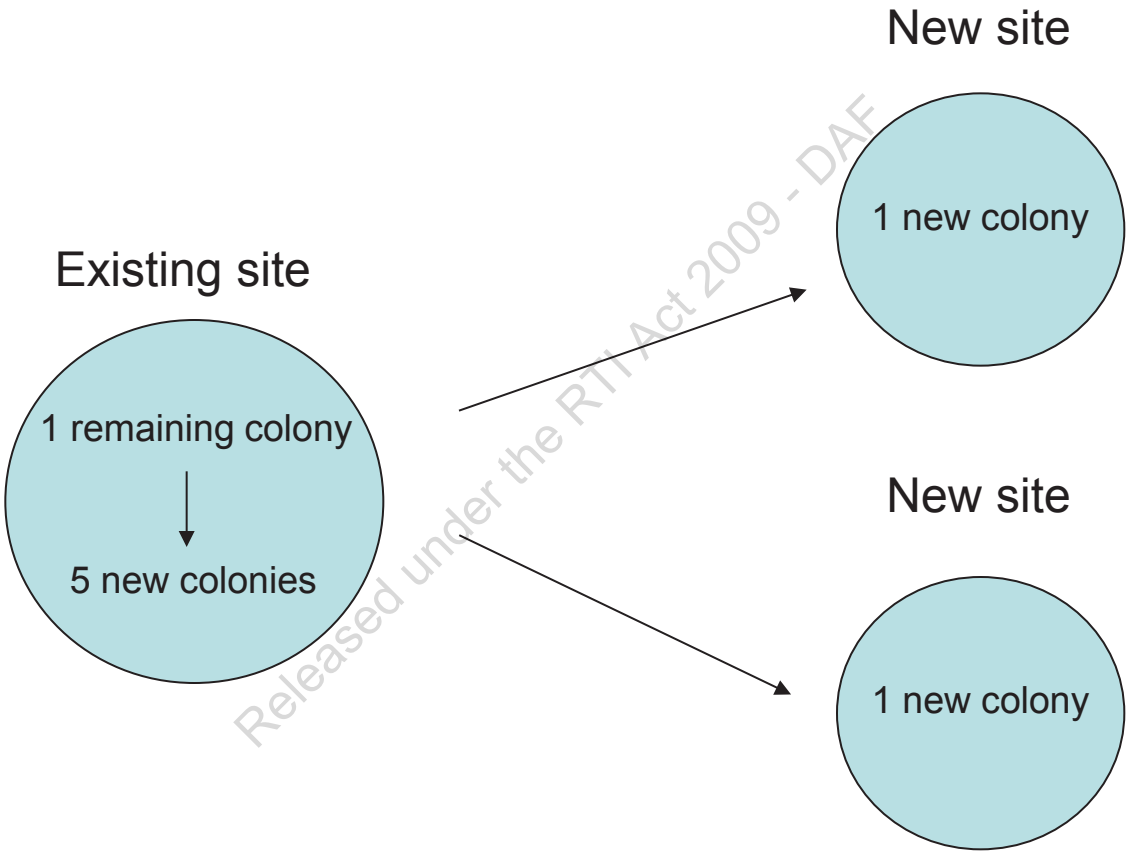
Difficult to accurately assess level of suppression in the core area

- Passive surveillance is main tool used. Structured surveillance is conducted around reported finds
- 2 treatments (3 recommended) on high density sites (10 or more colony points within 500 m of a colony point). Sites with <10 colony points being treated by DNI protocol (IGR bait to 50 m out)
- RIFA now being found in some suburbs where the ant has not been recorded since early in the program
- Area of new infestation is a measure of suppression but is influenced by intensity of surveillance effort
  - 2009-10 479 ha
  - 2010-11 561 ha
  - 2011-12 426 ha
  - 2012-13 784 ha
  - 2013-14 YTD 282 ha

Communications and marketing campaigns 2013



Model of intra-site growth and dispersal after 1 year



adapted from Schmidt et al. (2010)

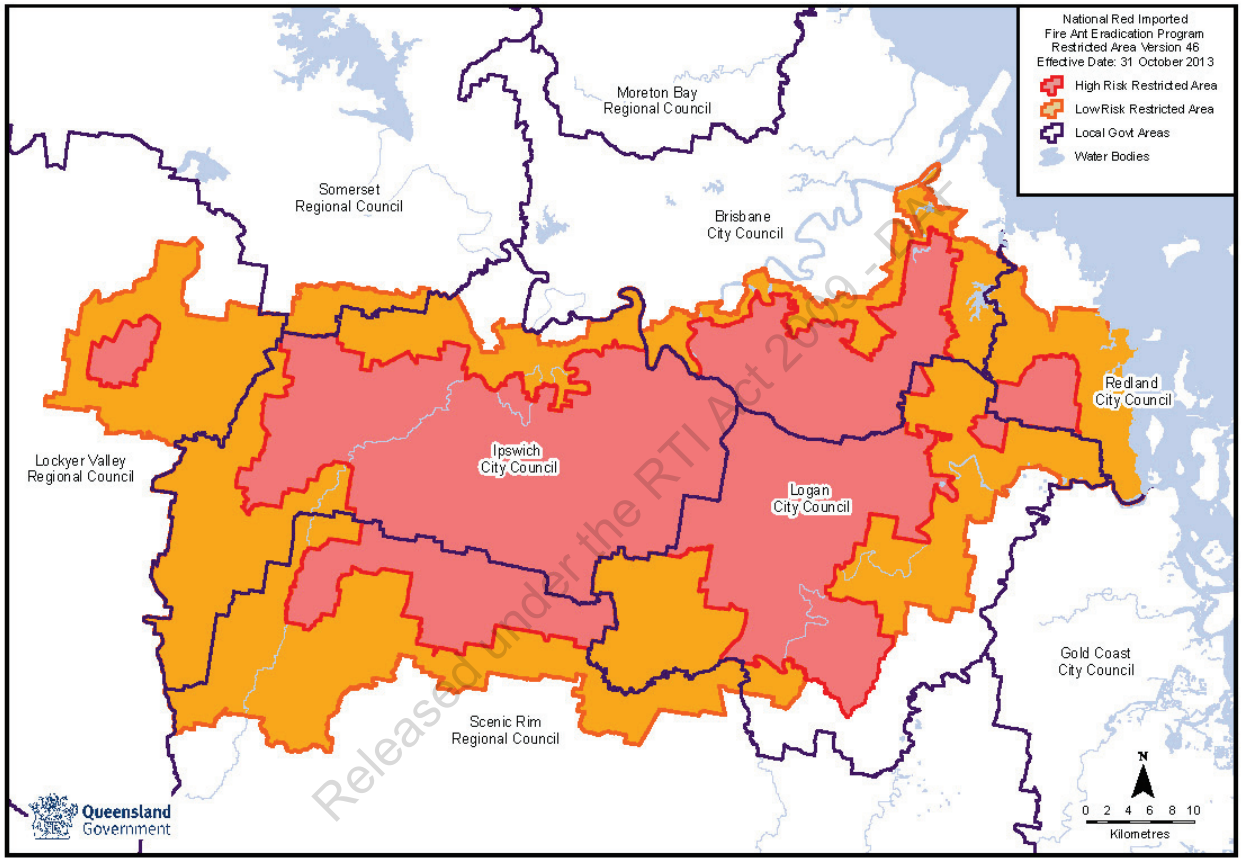
Confidence of treatment success over multiple rounds of treatment

Efficacy of treatment	Treatment Round					
	1	2	3	4	5	6
10%	10.000%	19.000%	27.100%	34.390%	40.951%	46.856%
20%	20.000%	36.000%	48.800%	59.040%	67.232%	73.786%
30%	30.000%	51.000%	65.700%	75.990%	83.193%	88.235%
40%	40.000%	64.000%	78.400%	87.040%	92.224%	95.334%
50%	50.000%	75.000%	87.500%	93.750%	96.875%	98.438%
55%	55.000%	79.750%	90.888%	95.899%	98.155%	99.170%
60%	60.000%	84.000%	93.600%	97.440%	98.976%	99.590%
70%	70.000%	91.000%	97.300%	99.190%	99.757%	99.927%
75%	75.000%	93.750%	98.438%	99.609%	99.902%	99.976%
80%	**80.000%**	**96.000%**	**99.200%**	**99.840%**	**99.968%**	**99.994%**
90%	90.000%	99.000%	99.900%	99.990%	99.999%	100.000%
100%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%

Treatment efficacy example with Schmidt growth model on area with unknown RIFA status

No. treatments per year	1	2	3
Efficacy	80%	96%	99.2%
Original number of mounds	100	100	100
Survival year 1 No. mounds	20	4	0.8
Schmidt growth model No. mounds after 1 year	160	32	
Survival year 2 No. mounds	32	1.28	
Schmidt growth model No. mounds after 2 years	256	10	

Restricted areas for RIFA in SE Qld

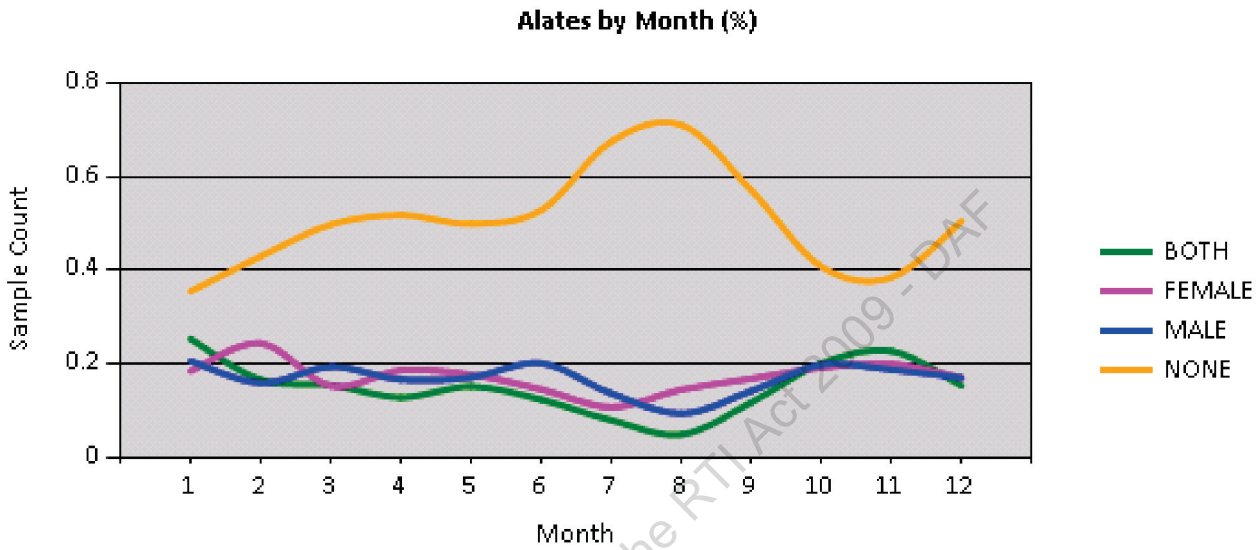


32 RIFA outlier detections (including Yarwun) since July 2010, all reported to TACC (0.03 to 9 km outside RA)

All had DNI, baiting and broadscale surveillance

12 of the 32 had reproductive potential

Presence of alates in detected colonies



N = 6250

Month	1	2	3	4	5	6	7	8	9	10	11	12	Total
Both	26%	17%	16%	13%	15%	12%	8%	5%	12%	21%	21%	15%	13%
Female	18%	24%	15%	19%	18%	15%	11%	14%	16%	21%	21%	18%	16%
Male	20%	15%	19%	17%	17%	20%	14%	10%	14%	21%	19%	11%	16%
None	36%	44%	50%	52%	50%	53%	67%	71%	58%	38%	39%	56%	55%

US – Qld comparison of infestation

- Brisbane east-west spread 46 km in 13 years (3.5 km/yr); north-south spread 16 km in 13 years (1.2 km/yr). Total footprint 150,000 ha
- Texas spread 58 km/yr. US total footprint 150 million ha

Conclusions

- Since the Roush Review in 2010 there have been significant scientific advancements which have provided a range of tools to find and kill RIFA
  - Confidence that the bait treatments work
  - Confidence that the baiting program is not reducing the biotic resistance to RIFA provided by native ants
  - Genetics to identify new incursions, origin, number of generations and routes of spread, and pressure of the program on genetic diversity
  - Knowledge of the sites the ants are most likely to colonise to enable prophylactic treatments
  - Remote sensing over large areas for delimitation

Conclusions

- Reduced treatment and surveillance over the last few years due to resource constraints do pose risk to the program if this were to continue
  - eradication will take longer to achieve and will be considerably more expensive
  - infestation in the core area will increase in density and extent, adding to costs and increasing the risk of spread beyond the core
  - reduced treatment of disturbed areas in the 5 km zone may result in additional infestation being found there beyond the proposed delimitation in 2015
  - reduced surveillance in the 5 km and 10 km zones while delimitation occurs will undermine confidence that all infestation has been found by 2015

Conclusions

- Within the various constraints and in the context of the situation in the US, China and Taiwan, the program's efforts to suppress and contain have been largely successful to this stage
- Eradication remains technically feasible and cost beneficial

TRAMP ANT CONSULTATIVE COMMITTEE	MEETING NUMBER:
	LOCATION:
	DATE:
AGENDA PAPER	ITEM:

SURVEILANCE GAPS AND NATIONAL ROLE OF THE RIFA ERADICATION PROGRAM

RECOMMENDATIONS

1. That the Tramp Ant Consultative Committee (TACC):

   (a) **NOTES** the gaps in surveillance for RIFA and other tramp ants and the impact that this has on the sustainability of the eradication objective;

   (b) **ADVISES** Plant Health Committee on the need for a national approach to monitor high risk ports and surrounding areas for RIFA;

   (c) **RECOMMENDS** that it be considered as a priority species for inclusion under the National Plant Health Surveillance Program;

   (d) **CONSIDERS** the role of the National RIFA Eradication Program where incursions occur in other jurisdictions and its relationship to the Coalition's election policy on biosecurity.

BACKGROUND

2. The nationally funded eradication program was established in response to the discovery of Red Imported Fire Ant (RIFA) in two areas of Brisbane in February 2001. An unrelated incursion of RIFA was discovered in Gladstone (Yarwun) in 2006 and was included in the eradication program.

3. Two of the infestations (Port of Brisbane and Gladstone) were eradicated but the larger south-west Brisbane outbreak persists.

4. The program is funded under an ad hoc NEBRA-like arrangement using a population-based model to apportion costs between the jurisdictions. This funding model implicitly assumes that all jurisdictions are equally at risk from the spread of RIFA.

5. National funding is based on the premise that it is in a jurisdiction's self-interest to eliminate the infestation by investing its funds in another state rather than facing a higher future cost to manage the pest when it spreads nationally. The funding is effectively an insurance against each jurisdiction having to deal with RIFA independently.

ISSUES

6. The recent discovery of a further incursion of red imported fire ants at Gladstone has highlighted gaps in our approach to the eradication of RIFA.

National Port Surveillance

7. The incursion at Gladstone highlights that eradication of RIFA from Australia will not be sustained unless there is a strategy to prevent future incursions from occurring and establishing.

8. This discovery was detected and reported, which indicates that the awareness program is working in Queensland. However, there is no structured national arrangement for surveillance of high-risk ports of entry to reassure jurisdictions that this problem won't simply reoccur.

9. The Commonwealth is responsible for quarantine at international ports, while surveillance outside these areas is a State responsibility. However, the boundary between the jurisdictional responsibilities is often unclear. Formalising the engagement and communication between regional quarantine and state operational staff may provide an opportunity to improve the surveillance arrangements at high risk ports of entry.

10. The TACC should consider the requirements for a system of port surveillance for RIFA and provide advice to Plant Health Committee so that this can be considered in context of other national insect pest surveillance activities.

11. The Australian Department of Agriculture funds the jurisdictions to undertake surveillance for high priority exotic pests through the National Plant Health Surveillance Program. Including RIFA under this program would improve capacity for early detection of new incursions.

National Role of the Eradication Program

12. The current response plan considers only the needs for the containment and eradication of RIFA in Brisbane. This is appropriate when this is the only infestation.

13. The current program is designed around the amount of funding approved by NMG to manage the Brisbane incursion, rather than the optimal requirement to run a national RIFA program. As a general observation, jurisdictional funding is not concerned with the location of the infestation; it is given as insurance against the spread of RIFA to other states.

14. As the recent outbreak happened to occur within Queensland, the tasks of surveying and eradicating the infestation fell within the purview of the agency managing the current eradication program. That the program responded rapidly and effectively to define, contain and treat the infestation is commended.

15. However, it has also highlighted that there is uncertainty around the role of the program where outbreaks occur outside of Brisbane and, particularly, the role of the program where incursions are found in other jurisdictions.

16. The nationally funded program has developed critical capacity, experience, technical and operational expertise, remote surveillance technology and other equipment necessary to eradicate infestations in other jurisdictions.

17. The TACC should consider possible roles and arrangements for the national program to be involved when incursions are found in other jurisdictions.

Coalition election policy

18. For noting, the Coalition's election policy for agriculture included a promise to strengthen Australia's biosecurity and quarantine capabilities with an investment of an additional $20 million in three key areas:

    (a) establishing a Biosecurity Flying Squad as a first response unit for urgent biosecurity issues;

    (b) strengthening biosecurity and quarantine containment; and

    (c) focussing on import risk analysis and quarantine arrangements that better integrate science in quarantine decisions and minimise the risk of exotic pest and disease incursions.

19. While the policy intent and implementation is not clear at this stage, this may provide an alternative model where the Commonwealth funds the first response once new incursions are discovered.

FINANCIAL IMPLICATIONS

20. Nil.

FOR DECISION

Prepared by Biosecurity SA

Tramp Ant Consultative Committee

Red Imported Fire Ants at Yarwun Teleconference No.21

DRAFT Minutes

20 August 2014

ATTENDEES

Members

Sally Troy, Chair
Enrico Perotti, Commonwealth
Gabrielle Vivian-Smith, VIC
Mike Ashton, QLD
Mark Ramsey, SA (joined teleconference about 2.45 pm)
Royce Holtkamp, NSW
Lionel Hill, TAS
John van Schagen, WA

Observers

Marc Widmer, WA
Oonagh Byrne, WA
s irrelevant informa NMG Secretariat, Commonwealth
73 irrelevant informatio, NMG Secretariat, Commonwealth
73 irrelevant informatio NMG Secretariat, Commonwealth
s.73 irrelevant information, NMG Secretariat
Marcelle O'Brien, QLD
Heather Leeson, QLD
Neville Cook, QLD

Secretariat

Cheryl Grgurinovic, Commonwealth
Martin Coates, Commonwealth

Apologies

Nigel Ainsworth, VIC
Andy Shepherd, CSIRO
Joanne Nathan, Environment, Commonwealth
Julie Quinn, Environment, Commonwealth

Other Invitees

Stephen Hughes, ACT
Anne Walters, NT
Sharne Gibbons, Media
Tom Aldred, Plant
Ben Hoffman, CSIRO

Purpose of the meeting
This meeting on the Red Imported Fire Ant (RIFA) incursion at Yarwun has been convened to: • review the eradication response activities to August 2014 and consider the recommendations in the agenda paper • consider the scheduling of the efficiency and financial audits and the choice of provider

- consider development of a National Biosecurity Management Group (NBMG) paper to request NBMG's agreement that salaries of staff employed by the National RIFA Eradication Program's south east Queensland eradication program who are undertaking work for the Yarwun eradication program are 'eligible costs' under section 3.1 of schedule 5 of NEBRA.

1. Opening of Meeting

Welcome and roll call

Participants were welcomed and names were recorded.

Confidentiality requirement

Participants were reminded that proceedings are to remain confidential, and that proceedings are recorded for minute taking purposes. No conflict of interest was declared.

Papers distributed prior to the meeting:

- Agenda
- Agenda paper on 'Update on response activities – August 2014', including:
  - attachment 1 (Annual report 2013-14)
  - attachment 2 (Report on operational activity July-August 2014)
  - A3 version of the map that is included as Attachment 1 to the NRIFAEP – Yarwun 2013 Report on Operational Activity – July-August 2014 (Attachment 2 to the Agenda Paper 'Update on response activities – August 2014'
- Agenda paper on 'Eligible costs and efficiency and financial auditing'.

Actions from previous meeting

- No outstanding actions from previous meetings.

2. Situation Update

QLD provided a summary of the agenda paper 'Update on response activities – August 2014', with the following information:

- All scheduled eradication response activities scheduled for 2013/14 have been completed with no review points triggered
- During the scheduled buffer, targeted and verification surveillance round in July 2014, fire ants were detected at five locations inside the 2 km Treatment Zone and at one location in the 2-4 km Surveillance Zone approximately 350 m south of the 2 km Treatment Zone boundary, triggering one of the review points listed in the Response Plan: Eradication of the red imported fire ant – Yarwun 2013 (as NOTED in Outcome (e)).
- All these nests have been direct injected and baited. All nests were examined before treatment by the National Red Imported Fire Ant Eradication Program's Science Manager, Ross Wylie. He concluded that all the nests within the treatment zone were bait-affected and in his opinion the ants in these nests would probably have died. The nest in the surveillance zone was not bait affected. Genetic analysis demonstrated that it is related to the 2013 incursion so it does not represent a new incursion
- The results of the second round of surveillance have given a high level of confidence that the infestation is delimited and that there is no infestation outside the 2-4 km Surveillance Zone
- QLD proposed two additional measures that are consistent with the strategy in the current eradication

Response Plan:

- an expansion of the current 2 km Treatment Zone and the restricted area (which aligns with the 2 km Treatment Zone) by 859 hectares and an expansion of the current 2–4 km Surveillance Zone by 599 hectares around the outlier detection
- the additional land included in the extension of the 2 km Treatment Zone will only receive four of the scheduled six bait treatments in the current eradication response plan, as two treatments were conducted in March and May 2014 in the current 2 km Treatment Zone:
    1. an alternative to this proposal would be to conduct a fifth and sixth treatment round only on the additional land in September 2015 and November 2015. However, each additional treatment round would cost approximately $56,000 and the timing of these treatments could potentially delay the proposed declaration of eradication and reinstatement of pest free area status in September 2016
    2. QLD proposed an alternate strategy to the additional area receiving six treatments, which is to undertake an additional round of buffer, targeted and verification surveillance in July 2015. This will provide a high level of confidence that there are no undetected remnant infestations and that there are no survivors from the treatments. QLD believes that this will also avoid the need to carry out the two additional rounds of bait treatment on the new area and will ensure that the trajectory of the program is known.

- The extension of the two zones and the additional round of buffer, targeted and verification surveillance in July 2015 would add a further $633,000 of cost-share funding to deliver the proposed additional eradication response activities, bringing the Program's total indicative budget to $3.929 million over the 2013-14 to 2016-17 financial years
- The proposed indicative budget (Attachment 5 of the paper) under the recommended strategy has incorporated savings and efficiencies: these efficiencies have included negotiating a zero buffer in the area that is being treated, meaning that on-ground bait treatment has been virtually eliminated and that all bait treatments will be conducted by air with savings of $90,000 over 2013/14.

TACC discussion of the situation update

QLD advised that the colonies detected in the surveillance zone are younger than those found in December 2013 on Fishermans Landing, suggesting they have resulted from spread from Fishermans Landing. The sensitivity of on ground surveillance is 80% and the nest in the surveillance zone may have been too small to have been detected earlier.

The chair sought clarification of the options and the budget rationale:

1. four bait treatments only to the additional areas, so the increase in budget is for treatment and the additional round of buffer, targeted and verification surveillance, or
2. two extra treatments of the additional area at $112,000 extra.

QLD clarified that the additional round of buffer, targeted and verification surveillance in July 2015 has been estimated to cost $291,000 of the $633,000. The remaining $342,000 partially covers the cost of treatment of the additional 859 hectares in the extended 2 km treatment zone, and the cost of the verification surveillance in July 2016 for the additional 599 hectares added to the 2-4 km surveillance zone. However, Queensland noted the proposed increase of $633,000 is offset by the savings and efficiencies that will be implemented over the remaining three financial years of the program.

There was discussion about the presentation of the budget. It was agreed that the budget needed more detail around its itemisation to assist NBMG's decision making.

NBMG Secretariat noted that there was an under spend of about $100,000 last financial year, and advised that NBMG would have to agree to the $100,000 being used in forward years. Queensland noted that there is no carry over under NEBRA, rather the jurisdiction seeks reimbursement of eligible costs after they have been incurred. The NBMG Secretariat noted that it is advisable to seek NBMG's agreement to using any underspend under the indicative budget for 2013/14 in forward years.

OUTCOMES

In relation to the eradication response activities, the Tramp Ant Consultative Committee (TACC):

a) **ENDORSED** the *National Red Imported Fire Ant Eradication Program – Yarwun 2013 Annual Report 2013-14*

b) **NOTED** the detection of red imported fire ant (fire ant) at six sites in Yarwun during scheduled surveillance in July 2014

c) **NOTED** that the fire ant detections in July 2014 were not unexpected

d) **NOTED** that one of the six fire ant detections was confirmed outside the 2 km Treatment Zone (350 m from the boundary)

e) **NOTED** that the detection outside the 2 km Treatment Zone has triggered one of the review points listed in the *Response Plan: Eradication of the red imported fire ant – Yarwun 2013* (Version 1.2, March 2014) (the response plan) — 'Confirmation of fire ant infestation outside the 2 km Treatment Zone, after approval of the response plan'

f) **NOTED** that the nests inside the 2 km Treatment Zone appeared bait affected while the nests found outside the 2 km Treatment Zone showed no sign of being bait affected

g) TACC **AGREED** that the red imported fire ant incursion at Yarwun remains technically feasible to eradicate

h) TACC **AGREED** that Queensland revise the response plan to include:

- the proposed expansion of the 2 km Treatment Zone by 859 hectares around the outlier detection
- the proposed expansion of the 2–4 km Surveillance Zone by 599 hectares around the outlier detection
- an additional surveillance round proposed for July 2015 (identical to the surveillance round conducted in July–August 2014) which will follow the sixth and final treatment round and precede the final verification surveillance scheduled for June 2016
- and **noted** that additional land included in the extension of the 2 km Treatment Zone will only receive four of the six rounds of treatment (two treatment rounds have already been conducted in March and May of 2014)
- and **noted** that it is proposed the current Gladstone Fire Ant Restricted Area (restricted area) be expanded to match the proposed 2 km Treatment Zone

i) **AGREED** to recommend a further $633,000 of cost-share funding to deliver the proposed additional response activities, bringing the Yarwun 2013 Eradication Program's total indicative budget to $3.929 million over the 2013-14 to 2016-17 financial years.

3. Eligible costs and efficiency and financial auditing

QLD provided a summary of the agenda paper 'Eligible costs and efficiency and financial auditing', with the following information:

- QLD sought jurisdictions input into its proposal on using existing trained personnel from the south east Queensland Red Imported Fire Ant eradication program (SEQ Program) to work in Yarwun when specialist expertise is necessary. This is an efficient alternative to using contractors which are an allowable expense under NEBRA but would be a more expensive option. As NEBRA permits the NBMG to make determinations about eligible costs, QLD proposed that it would develop an agenda paper requesting the NBMG's agreement that the salaries of staff employed by the SEQ Program are 'eligible costs' under section 3.1 of Schedule 5 of the NEBRA when those staff are undertaking work associated with implementing the Yarwun 2013 eradication program
- Jurisdictions supported this proposed action being put to NBMG for consideration and decision
- TACC members discussed timing of efficiency and financial audits. QLD advised that it would like to see them start in 2014-15, but not until resolution of the issue of eligible costs around using personnel from the SEQ Program for the Yarwun eradication response. Conducting these audits early in the eradication response will provide assurance that jurisdictions are comfortable with the way the eradication response is being delivered

- The Queensland Department of Agriculture, Fisheries and Forestry's (QDAFF) Internal Audit unit recommended an external provider, Protiviti, to undertake the initial efficiency and financial audits of the Yarwun 2013 Program. The company has provided similar services in the past; for example, audits on the Siam weed program in QLD. An initial estimate of $10,000 has been provided by Protiviti to complete the initial efficiency and financial audit
- QLD proposed that the initial efficiency and financial audits be done in the first half of 2014-15, with further audits possibly scheduled in 2015-16. The jurisdictions supported this.

OUTCOMES

In relation to Eligible costs and Efficiency and Financial Auditing, the TACC:

a) **NOTED** that the *Response plan: Eradication of the red imported fire ant – Yarwun 2013* is the first to be endorsed for cost-sharing under the National Environmental Biosecurity Response Agreement (NEBRA)

b) **AGREED** that TACC understands the rationale for the eligible costs' definition under NEBRA; however, in this situation TACC **AGREED** that the staffing and resourcing strategy as outlined in Section 11 of the current Response Plan provides efficiencies to the Yarwun 2013 Eradication Program by recognising and utilising the skills, experience and resources held within the SEQ Eradication Program. TACC **SUPPORTS** QLD's work to clarify that situation and to seek to secure these efficiencies through discussion with the NBMG

c) **AGREED** to recommend to NBMG the use of Protiviti as the external provider responsible for conducting the initial efficiency and financial audits of the Yarwun 2013 Eradication Program in accordance with section 7.14 of the NEBRA

d) **NOTED** that an initial estimate of approximately $10,000 has been provided to complete the initial efficiency and financial audits in the 2014-15 financial year

e) **AGREED** to recommend to the NBMG that the initial efficiency and financial audits be scheduled in the first half of 2014-15 once the issue of 'eligible costs' for the salaries of staff employed by the SEQ Eradication Program is resolved

f) **AGREED** that the text on page 59 of the response plan 'The efficiency auditor will provide a final report to the NBMG within 60 days of proof of freedom' be replaced with 'The efficiency auditor will provide the efficiency audit report to the NBMG within 60 days of the date of the completion of the audit'.

4. Discussions/Conclusions of TACC

Jurisdictions agreed that NBMG would be advised that TACC considers that the RIFA incursion at Yarwun remains technically feasible to eradicate. QLD advised that the triggers in the current response plan do not need to be amended for the revised eradication response plan.

OUTCOMES

ADVICE TO NBMG:

Queensland to:

- draft an NBMG agenda paper for the revised *Response Plan: Eradication of the red imported fire ant – Yarwun 2013* (Version 1.2, March 2014), including the revised budget, and provide this to TACC for endorsement out-of-session, with a TACC teleconference to be convened if deemed necessary
- draft an NBMG agenda paper about the timing of the efficiency and financial audits and the preferred supplier, and to seek agreement that the salaries of staff employed by the SEQ Eradication Program are 'eligible costs' when those staff are undertaking work associated with implementing the Yarwun 2013 Eradication Program.

5. Other business

QLD advised that the QLD government wants to make data available under its 'Open Data Project'. QDAFF has been asked to provide its data for 2013-15 on the remote sensing operational area for RIFA in south east QLD. TACC agreed that as jurisdictions had funded the acquisition of the data, QLD should approach all cost sharing parties for their agreement.

ACTIONS

1. Clarify the itemisation of the budget to provide clear rationale for the proposed $633,000 increase across the 4 years for the draft NBMG agenda paper 'Update on response activities – August 2014'.
2. Seek NBMG's agreement for reimbursement of eligible costs, with these eligible costs including the salaries of the staff from the South East Queensland Eradication Program (SEQ Eradication Program) when they are undertaking work associated with implementing the Yarwun 2013 Eradication Program.
3. Provide advice on wording of recommendation 'b' on eligible costs for the draft NBMG agenda paper seeking agreement that the salaries of staff employed by the SEQ Eradication Program are 'eligible costs' when those staff are undertaking work associated with implementing the Yarwun 2013 Eradication Program
4. Arrange a NBMG meeting for the week beginning 8 September 2014.
5. Write to all parties to seek their approval for data sharing in relation to the QLD government's 'Open Data Project'. The proposed shared data is the remote sensing operational area (i.e. areas in which remote sensing carried out 12/13, 13/14 and 14/15).
6. Revise the *Response Plan: Eradication of the red imported fire ant – Yarwun 2013* (Version 1.2, March 2014), and draft the NBMG agenda paper.

7. Next meeting

Date not set as next teleconference dependent on Out-of-session papers for NBMG.

8. Close

Meeting closed at 4 pm (AEST).