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‘Stacks of Fire - Implementing a Fire Management Program Mount Isa Mines’

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How does a mine site environmental advisor convince a mine manager to let them light a fire within a few hundred meters of two fresh air intakes of an underground mine, a 320 man camp and a massive crushing facility construction project? Letting them play with a drip torch helps but getting it right with the right project planning and people and then not disrupting production is the best method. The 66 640km² Mount Isa Inlier bioregion in north western Queensland is typified by rugged red rocky hills, low open woodland of spinifex and snappy gum and is the location of the Xstrata Mount Isa Mines copper, lead and zinc open cut and underground mining and processing/smelting operations. A biodiversity assessment conducted in 2009 identified that wildfire was a significant threat to the biodiversity of the 32,000ha Mining Lease. Other research including habitat and distribution surveys of the fire sensitive Carpentarian and Kalkadoon grasswrens found that wildfires were extensive across the bioregion and threatening these species. Xstrata Mount Isa Mines developed a lease wide Fire Management Plan with the inclusion of neighbouring pastoral properties to implement hazard reduction and infrastructure protection. The first round of the on ground burning program was successfully completed in March 2012 with six strategic burn areas. Parameters that attributed to the high rate of success with this program included no mine shut downs or production interference during the burns and a high degree of stakeholder involvement including neighbouring pastoral property managers; scientifically sound burning techniques including weather conditions for cool burns and ratio of area burnt / unburnt allowing for increased habitat regeneration and retention.

Key words:- planning, communication, controlled burning

Introduction

The Xstrata Sustainable Development Framework Standard 10 is based around implementing scientifically sound technologies and procedures are developed and implemented for the effective management and conservation of biodiversity and landscape functions.

Fire is the key threat to the integrity of the biodiversity on the mining Lease and Xstrata is responsible for managing the Lease land. In the last seven years several moderate to large fires have occurred in the areas surrounding the lease (Figure 1). The fire patterns show fires stop in spinifex areas which have been recently burnt as it takes several years for the fuel load to carry a fire. The most recent large wildfire in the north-west included an area of “Of concern” Silver ironbark shrubland. Many areas have been long unburnt whilst of benefit to fire sensitive flora and fauna the risk of wildfires is enhanced.

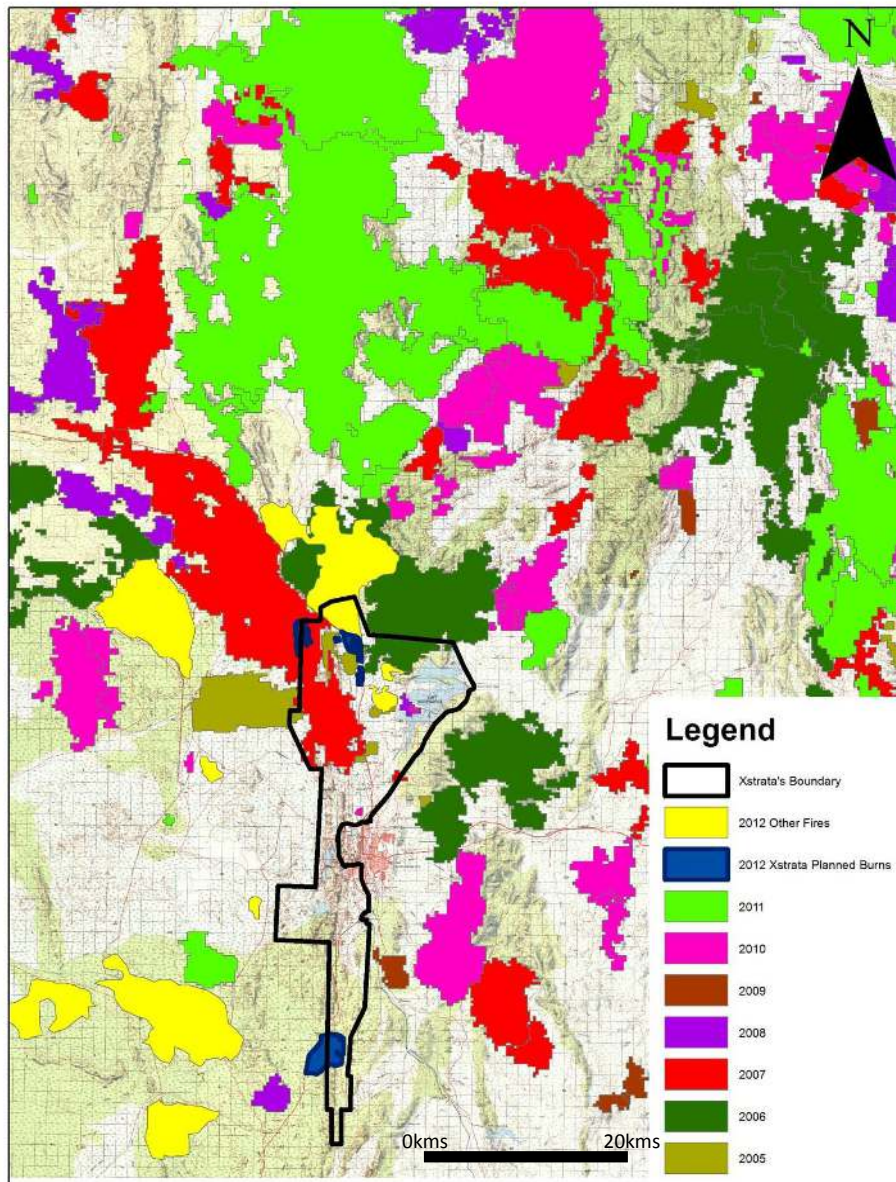


Figure 1: Recent fires on and near the Lease. (North Australian Fire Information, and on-ground mapping)

The Lease is within the Mount Isa Inlier bioregion (Figure 2); a rugged landscape of complex geology and infertile shallow soils. The dominant vegetation is a low open woodland of trees and shrubs namely Eucalyptus, Corymbia and Acacia, with *Triodia* spp. ground cover. On the sandy and alluvial plains areas of gidgee (*Acacia cambagei*) along with grasses:- black spear; kangaroo; buffel occur. There are 18 ecosystems which are split into fire management groups:- open woodlands; open woodlands on rocky outcrops and ridges; gidgee and riparian forest (fire sensitive). Repeated and extensive fire in an area of gidgee is showing signs of damage while maintenance is ideally achieved through patchiness of time since last burn especially in snappy gum. Rare fauna such as the Carpentarian grasswren prefers dense spinifex which develops after long fire-free intervals.

The region is a warm to hot throughout the year semi-arid climate with strong seasonal wet-dry pattern and average annual rainfall of 477mm which can be highly variable between years.

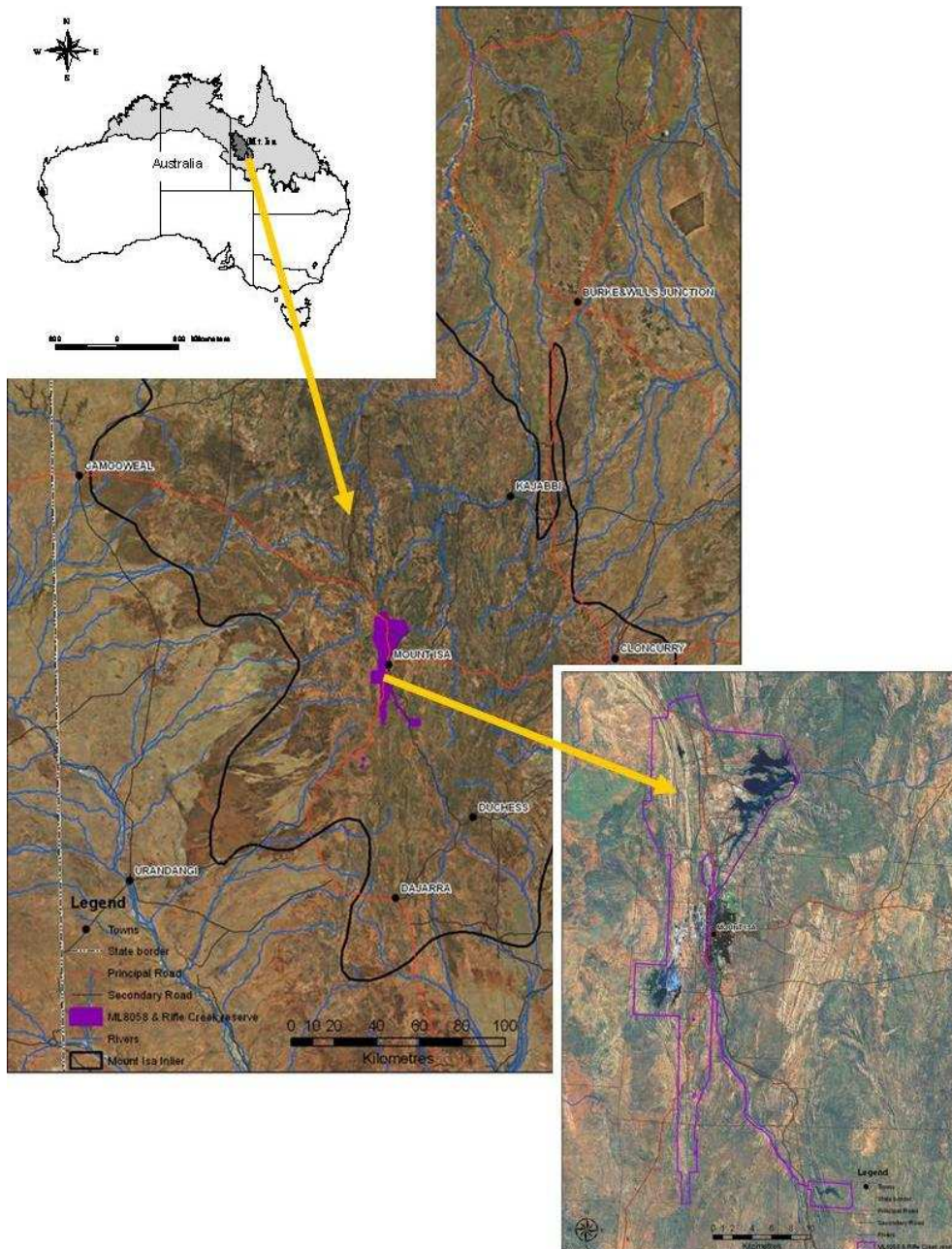


Figure 2: Location of the Mount Isa Inlier and the Lease

Background

In 2010 a five year Lease wide fire management plan was developed using the Lease vegetation and fauna information and extensive engagement with stakeholders:- Xstrata utilities and emergency services departments; Southern Gulf Catchments; Kalkadoon Community; Rural and Metropolitan Fire Brigades; neighbouring stations (Figure 3); the airport; Queensland Government; Bureau of Meteorology, Mount Isa Water Board; Main Roads, Ergon Energy and the Mount Isa City Council to identify fire management needs.

Fire management plan aims:-

- Protect life and property by creating a burnt break in the north-west, Indigenous cultural sites;
- Ensure the long term conservation of native species and communities

This is achieved by:-

- Mitigating the risk of wildfire by creating a mosaic of recently burnt and long unburnt patches;

- Engaging with surrounding properties on ecological, cultural and pastoral requirements of fire strategies;
- Establishing monitoring sites to measure success



Figure 3: Overlay of Mount Isa Mining Lease 8058 on pastoral leases

Methods

Burn Management Areas are established based on tracks and watercourses for containing fires, infrastructure and ecosystem arrangement. These are further defined with Burn Implementation Plans. Burning is conducted during the wet season and only after decent rain, in low wind and high humidity conditions to ensure a slow cool burn of 40-80% of the area. Ignition is done by aerial incendiary (condys crystals filled pingpong balls injected with glycol) or by drip torch onground.

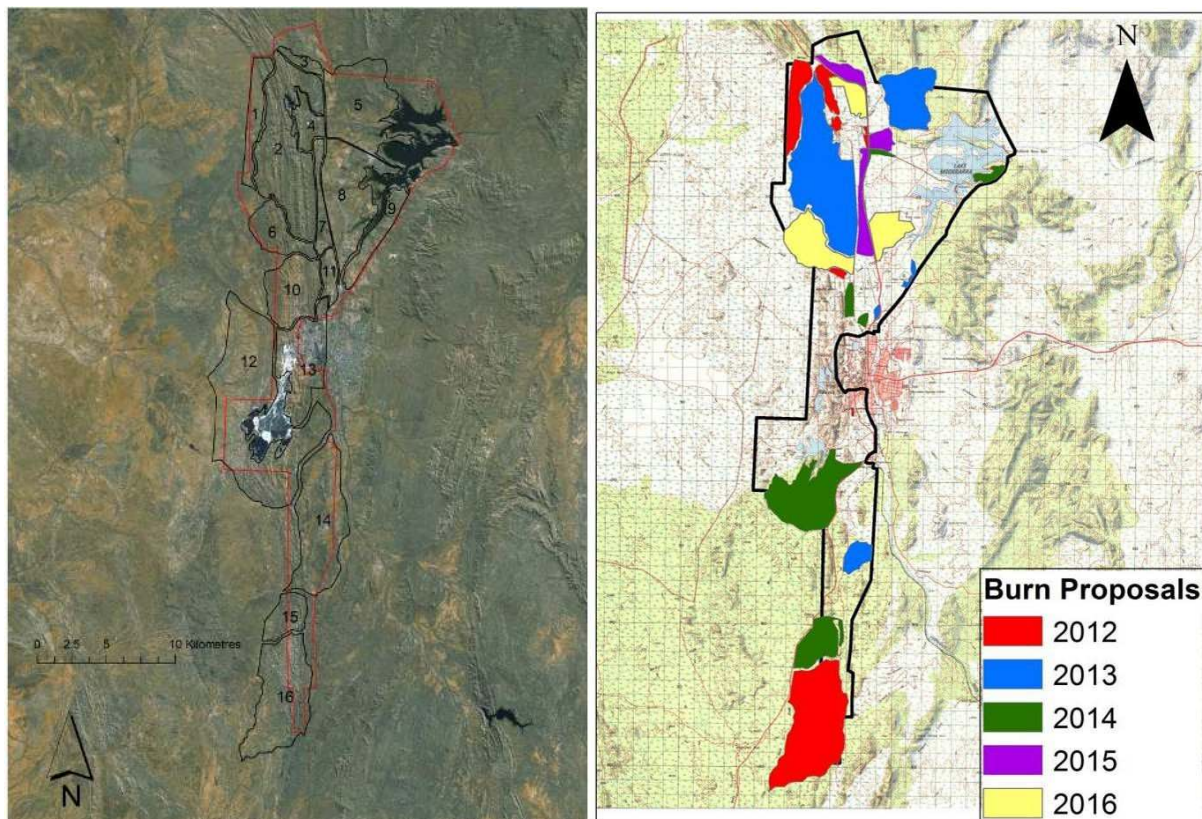


Figure 4: Burn management areas (L) and suggested 5 year burn program (R)

The program for the 2011/2012 wet season was six burns.

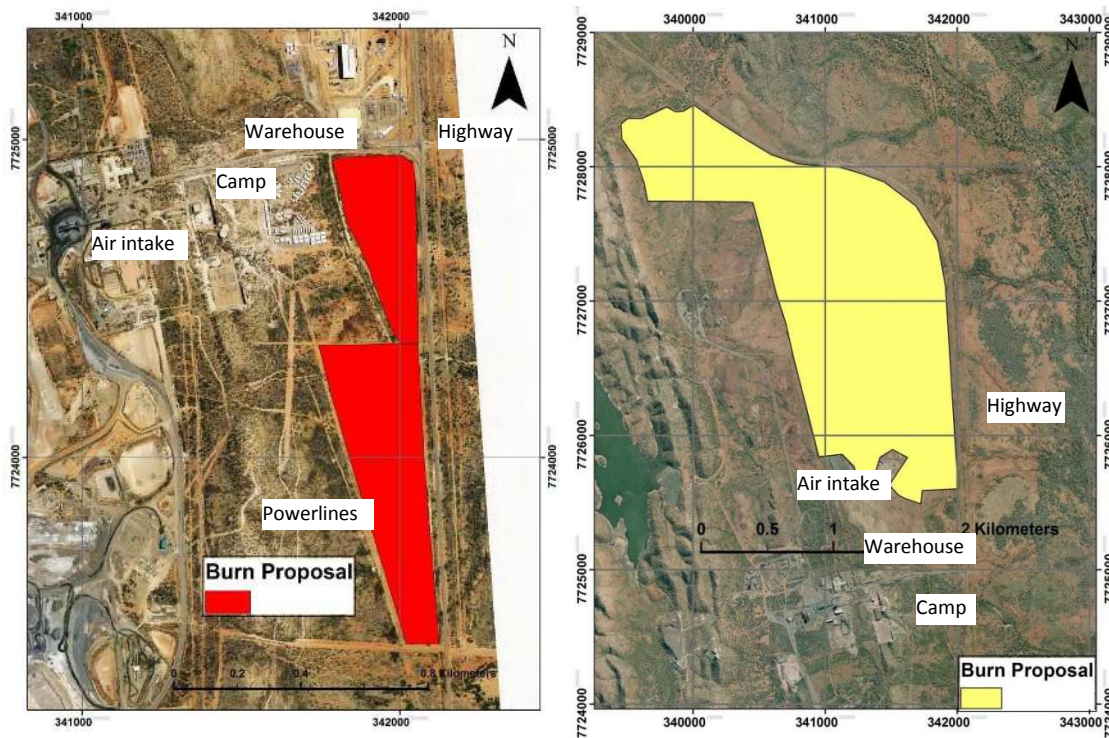


Figure 5: Burn Implementation areas 5 (L) and 4 within burn area 2. Infrastructure protection in long unburnt area

Both these burns are within close vicinity of infrastructure (warehouse, crushing plant, 320 man camp, several high voltage powerlines, highway) and underground mine fresh air intakes.

Implementation

- Onground with spot ignition drip torch against the wind
- Numerous meetings with operations managers to discuss the why and how managed and identify production issues (burning on weekends only)
- Grading of breaks and under powerline

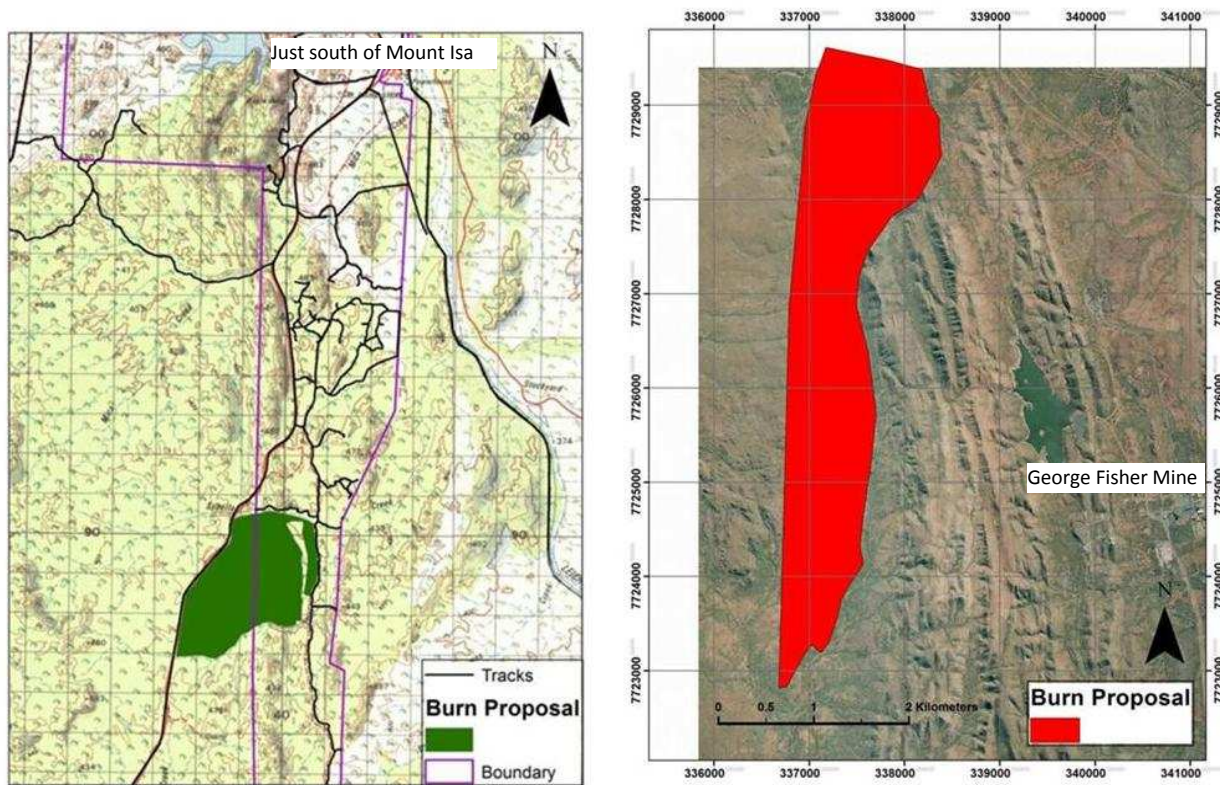


Figure 6: Burn Implementation Plans 7 (area 15) and 1 (Area 2). Ecosystem maintenance

Implementation

- Spot aerially incendiary
- Numerous meetings with landholders (both participated fully and conducted own other burns)

General

- Permit and notifying FireCom
- All staff notices and public notices in the paper of activities

Results

The burns were completed without suspending operations of the mine and the patchiness within the implementation areas was obtained and protection of infrastructure achieved due to reduction in fuel loads. The planned burns were conducted shortly after rain > 30% humidity and < 15 knot winds and spot ignition. Prior to the commencement of burns 4 and 5 a continuous line panic back burn was lit in >15knot wind, 43°C and 5% humidity in an attempt to stop a large wildfire heading south towards the mine.

This higher intensity panic back-burnt wildfire caused damage to the trees and consumed all of the grass layer and organic duff layer. Leaf litter and organic material ground cover declined from an average of 12% to 7%. Whereas the planned burns were patchy with less canopy scorch with in increased ground over from an average of 6% to 26%.



Figure 7: Transect 7 Snappy Gum (burn area 3) before panic burn (L) after the panic burn (R)



Figure 8: Transect 2 (burn area 4) Snappy Gum before the controlled burn (L) and after the controlled burn (R)

All fires increased the diversity of the grasses and herbs, by promoting seed germination. Herbs that were commonly promoted by fire were the legumes *Indigofera colutea*, *Senna notabilis* and *Tephrosia virens*. Native grasses promoted by fire include the annual *Sporobolus australasicus* and the perennial *Cymbopogon bombycinus*.

Conclusions

Engagement and planning is the key to the success of the first round of the fire management project on the Lease. Conducting burns in the right weather conditions is the ideally way to achieve the desired outcome of patchiness and improving the ecosystem.

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