Report on a follow up visit to Kilto Station to investigate the invasiveness of *Chloris gayana* after good summer rain.

Background

The potentially invasive grass *Chloris gayana* is grown on many WA stations in the north as a fodder grass for a very lucrative beef export industry.

During October 2009 J. Naaykens and I were asked to investigate and prepare a report on the invasiveness of this grass on Kilto & Wooramel Stations by Rio Tinto Iron Ore. The results were handed to the company as a preliminary unpublished report with an understanding that results depicted the scenario at that time and under the then prevailing climatic and grazing conditions.

During this reporting time WA experienced some of its driest weather in many years and both stations were inspected before any good rains had fallen. Being a decreaser grass, *C. gayana* is actively targeted by herbivores and could not be found outside the perimeter of the pivots or in areas not disturbed, protected and well watered. The conclusion was that it is unlikely that *C. gayana* would escape from protected areas under the climatic conditions prevailing at that time (Hurter & Naaykens, 2011).

It was thus thought prudent to plan & execute a follow up visit to at least Kilto Station, where the grass had been grown the longest, after good rain had fallen. This follow up inspection was accomplished after the wet season in mid June 2011.

This report follows up on the first report, after a good rainfall season on Kilto Station near Broome in the Kimberleys.

Methodology

Very much the same methodology as set out in the first report was followed. In short, several transects were walked by two botanists, bearing away from Pivot one, the oldest pivot. With follow up band transects along creek lines and further spot checks made in all other areas visited on the first visit (Figure 1).

Results

It was immediately apparent that the sward had changed dramatically from the first visit. Several plants of *C. gayana* were found along the entrance road to the station as well as several plants along the haul road to P1.

Area A:
This area provided some source of concern during the first visit when specimens of *C. gayana* were first found growing in the haul road and directly on the verge. On this follow up visit, plants were initially found at the same spot as during the first visit. On

inspection along the paddock fence on the roads western boundary, several tussocks of *C. gayana,* not observed during the first visit, were found to have started invading the area between the creek line and the road. With a substantial area marked as a red polygon in Figure 1 & 3 having tens of plants in it.

Figure 1. Kilto Station fodder production area.

Area B:
Transects walking W from P1 initially provided no additional information already gathered on the first visit. However a substantial number of *Chloris gayana* plants started appearing along the transect lines where a drainage line was being crossed. A transect along the length of the drainage line quickly confirmed that *C. gayana* had established itself along the creek line some 250 to 300 m away from the P1 perimeter. The survey area numbered B on Figure 1, produced tens of *C. gayana* plants along the creek line. A substantial area marked as a red polygon had tens of plants invading mechanically disturbed and moist areas along the creek but also some meters away from the creek up to 350 m from the pivot (Figure 3).

Area C:
A survey of area C resulted in no *C. gayana* being found and is consistent with the results of the first survey. This area is some way from any of the production areas and appear to fall outside the prevailing wind directions.

Area D:
This area was previous found to contain *C. gayana* in areas where the fence provided protection from grazing and where mechanical disturbance had taken place. No plants were found within the paddock during the first visit. A survey transect, following the creek on the second visit resulted in several *C. gayana* being found along the drainage area marked as a red polygon. This survey also led to the discovery of several plants in the yellow polygon which is an area not investigated during the first survey (Figure 1 & 3).

Area E - access road:
During the first visit no *C. gayana* were found on the access road leading up to the station offices with only a few plants being found within the office area perimeter.

On the follow up visit it was immediately apparent that *C. gayana* was extensively but sparsely distributed all along the road, especially in the vicinity of drainage lines (Figure 3).

Discussion

The first visit occurred before the wet season and after a particularly dry season in WA. It was also apparent that the station area around the fodder production area and homesteads were heavily grazed.

Only a few "excursions" of *C. gayana* were found outside the direct influence of the pivots. All being in protected or fenced areas where some moisture and mechanical disturbance provided the necessary conditions for the grass to flourish. These small observed "excursions" of the grass are depicted in Figure 2 and it is clear that the surrounding natural environment had not been invaded.

This picture changed dramatically on the second visit and the areas where *C. gayana* was found are presented as comparison in Figure 3.

It is clear that *C. gayana* seed blown from the production area had become established along the first and all moist disturbed and protected areas outside the influence of the pivot area.

It appears as if severe grazing pressure prior to the first visit had probably selectively removed previously established *C. gayana* and had thus effectively eliminated them.

It is not clear what the stocking rate or grazing pressure was during the last visit but no recent grazing pressure by cattle or horses could be noticed. Several Red Kangaroos were found in this paddock and their characteristic browsing marks were found on much of the natural vegetation.

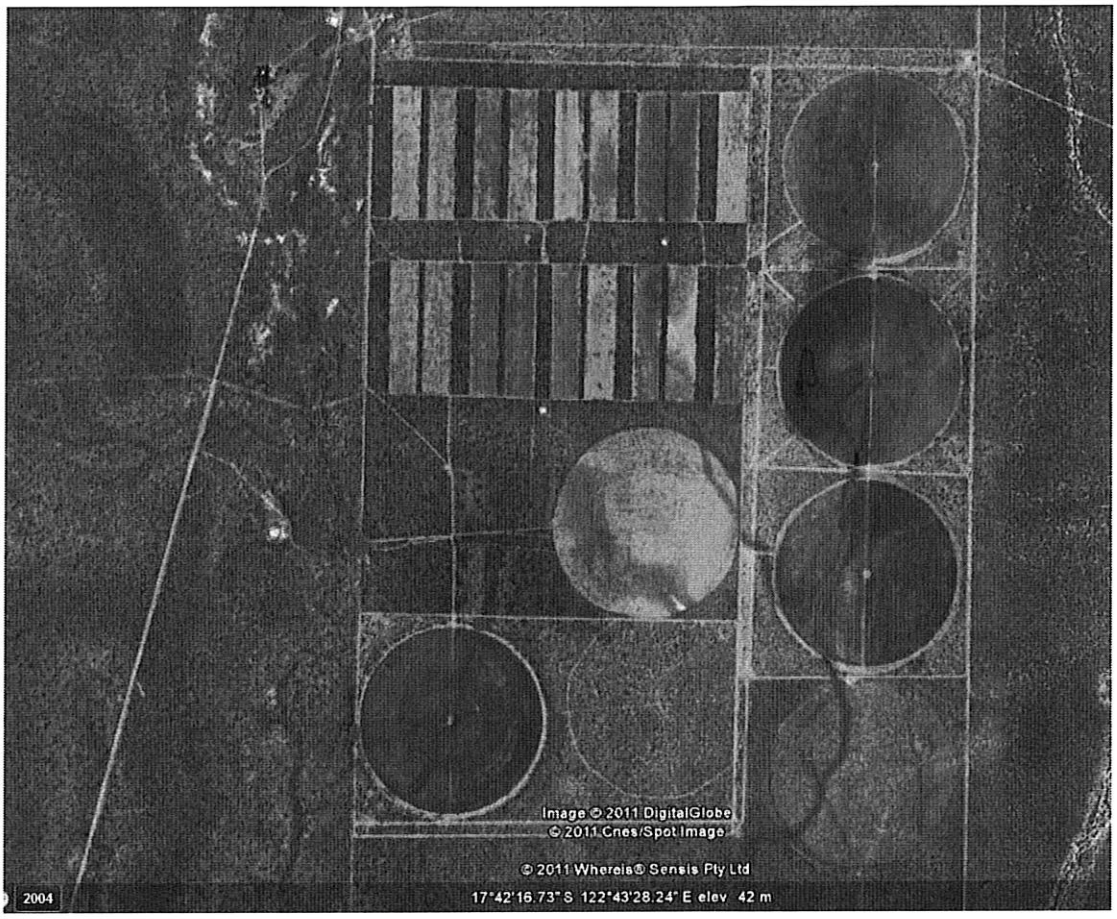

Figure 2. Distribution of observed *Chloris gayana* "excursions" (red polygons) on Kilto Station in October 2010.

A clear impression from the second visit was that prevailing winds had carried *C. gayana* seeds from the production area too where the seed had lodged in areas around the previously mechanically disturbed (by cattle) drainage line. It was clear that when observations from both visits are examined that this could be a cyclic occurrence but that the established sward of *C. gayana* was being actively and selectively removed by cattle during drier periods or when grazing pressure was increased and that it was also apparently affected by the dominant and competitive *Chrysopogon fallax* S.T.Blake, which appeared to overshadow young established plants of *C. gayana* and prevent excessive stoloniferous growth in *C. gayana.*

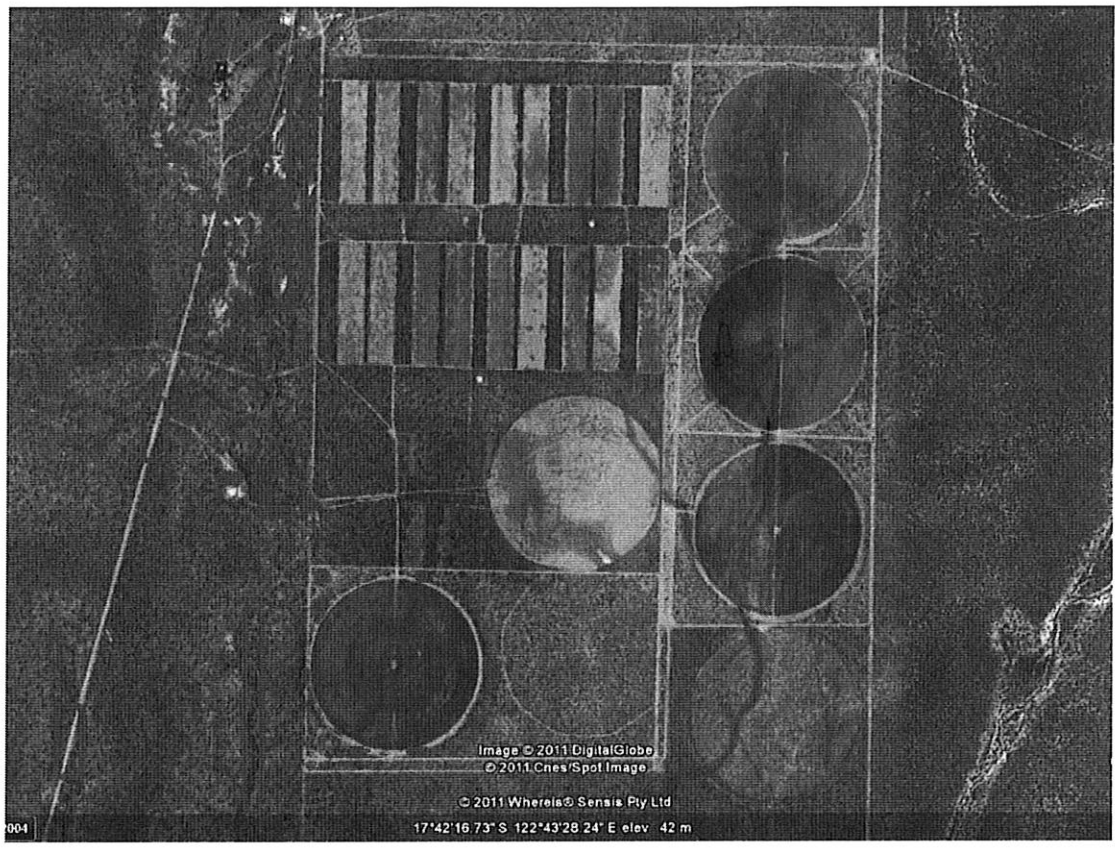

Figure 3. Distribution of observed *Chloris gayana* "excursions" (red polygons) on Kilto Station in June 2011.

Conclusion

It was clear from the follow up visit that *C. gayana* has the ability to disperse, establish and persist in a mesic environment along drainage lines, where mechanical disturbance takes place. This situation will be exacerbated in situations where the sward is not grazed by a cropping mega herbivore during dryer times and the stoloniferous nature of the grass could potentially, lead to it to persist and smother surrounding vegetation if not kept in check.

Suggestions made

It was strongly suggested to the Rio Tinto representative on the second visit that from a conservation point of view, *C. gayana* may not be a good fodder grass in close proximity to the iconic Pilbara gorges and especially in close proximity to Karajini National Park.

These gorges are much more protected and mesic than the surrounding landscape, are periodically mechanically disturbed and retain moisture for long periods of time. It is clear from the conclusion that should windborne seed of *C. gayana* become established in this mesic environment, the potential for persistence and further proliferation could potentially be devastating for a unique environment. This negative scenario would further effectively be enhanced by a lack of vegetative competitors in the gorges and a complete lack of mega herbivore like browsers in this environment.

It was also strongly suggested that alternative native grasses be investigated for use in the proposed irrigation scheme. Or that alternative uses to be found for excess water from the mining operation.

It was also suggested to the company representative that there could be a potential social and economic fall-out should *G. gayana* become established in the Pilbara gorges and that the name might change from Rhodes Grass to Rio's Grass and the significant financial impact of trying to remove a plant that can persist and reproduce like *C. gayana* in the iconic gorges of the Pilbara.

References

Hurter, J. & Naaykens, J. 2011. Report on the suspected invasiveness of the grass *Chloris gayana* on Kilto & Wooramel Stations in WA. *Unpublished Report Commissioned by Rio Tinto Iron Ore.*