THE EFFECTS OF FIRE ON BUSH ENCROACHMENT (DÜSTERNBROOK FARM 2011-2012)

<u>Rationale</u>: To investigate the use of fire as a management tool to reduce bush encroachment thus, gain a better understanding of its effects.

<u>Study:</u> Four 2m x 50m belt transects were marked on four separate areas of Düsternbrook Farm (Table 1) during June 2011. Every individual tree within each transect was recorded, including its height and species. The data for each transect was then combined to give a total Bush Equivalents (BE) per ha. The quantity of seed/saplings per tree species of each transect was also combined and calculated per ha. In addition, the herbaceous yields of each transect was recorded according to three functional groups; Herbs and forbs, Annual grasses and Perennial grasses. Each yield was measured in Air-dry yield (g/10m²) and Dry Matter (DM) yield (kg/ha).

Table 1: Location of transects			
Transect Number	Location	General Location	Altitude (m)
Transect 1	22°12.896′S, 16°52.776′E	Close to Davidsdraai, between the power lines.	1,320
Transect 2	22°12.102'S, 16°52.903'E	On rise towards farm boundary.	1,357
Transect 3	22°11.698'S, 16°53.409'E	Parrellel to northern farm boundary.	1,335
Transect 4	22°13.353'S, 16°54.660'E	On southward road towards Kalkbrunn.	1,379

Transects 1, 2, and 3 were burnt in September 2011, whereas transect 4 remained fire free. The process of recording both the wood species and herbaceous yield of all four transects was replicated a year later in July 2012. The data from both years was then compared so that the effects of fire on bush encroachment could be analysed.

<u>Results:</u> The effects of fire on BE can be seen in Figure 1. BE has reduced in all four transects, although the reduction seen in Transect 4 is insignificant at only 1.3%. The three remaining transects, that were subjected to fire, have all seen a marked reduction in BE; Transect 1 = 12.8% reduction, Transect 2 = 20% and Transect 3 = 39.4%. When combining the results of Transects 1, 2 and 3 the average reduction of BE through the use of fire is = 28.4%.



Bush Equivalents (BE/ha)

Figure 1.

The effects of fire on the seedlings/ha of each transect can be seen in Figure 2. The results are mixed with the number of seedlings reducing in both Transect 1 by 85.7% and Transect 4 by 27.1%. However, the number of seedlings increased in Transect 2 by 33.3% and Transect 3 by 50%. This mixed result indicates that fire may not be the only element to have an impact on seeds/seedling.



The results of the herbaceous yield from all for transects can be seen in figure 3. In general Perennial grasses were subject to the highest level of reductions, ranging from a 57% reduction in Transect 1 to 98.6% in Transect 3. Herbs and forbs also saw a marked reduction in all transects ranging from 28.5% in Transect 2 to 78.5% in Transect 3. Annual grasses were the least effected in all transects, with Transect 3 seeing the lowest reduction of 5.9% to Transect 4 with the highest reduction rate of 46.6%.



Figure 3.