

Savanna Fire Ignition Research Experiment

"SavFIRE"

Effects of Point vs Perimeter Ignitions On Fire Mosaics

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Acknowledgements



- Working On Fire International
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OBJECTIVE

- Compare the *Fire Behaviour* and *Fire Mosaics* that develop with controlled burns applied as *Point* and *Perimeter* ignitions to areas of increasing size

HYPOTHESIS

- Fire Mosaics of Point & Perimeter Ignitions:
 - Significantly different - small areas
 - Similar - large areas

Reason:

With Perimeter Ignitions:

- Small areas - rising hot air coalesces into a single convection column
- Large Areas - rising hot air does not coalesce into single convection column
- Large Areas - fire around perimeter fragments into individual fires

MOTIVATION

- Generally accepted that biodiversity is improved and/or maintained when controlled fires are applied as Point Ignitions
- Result in different types and intensities of fires
- Cause a highly variable fire mosaic

MOTIVATION

- Controlled burns applied as point ignitions are more difficult to control and are dangerous to life and property
- There are situations where for safety reasons it is preferable to use perimeter rather than point ignitions for controlled burns

PROCEDURE

- Apply point & perimeter ignitions simultaneously to paired areas:
 - 500 ha
 - 1000 ha
 - 2000 ha
 - 4000 ha
- Similar fuel and atmospheric conditions

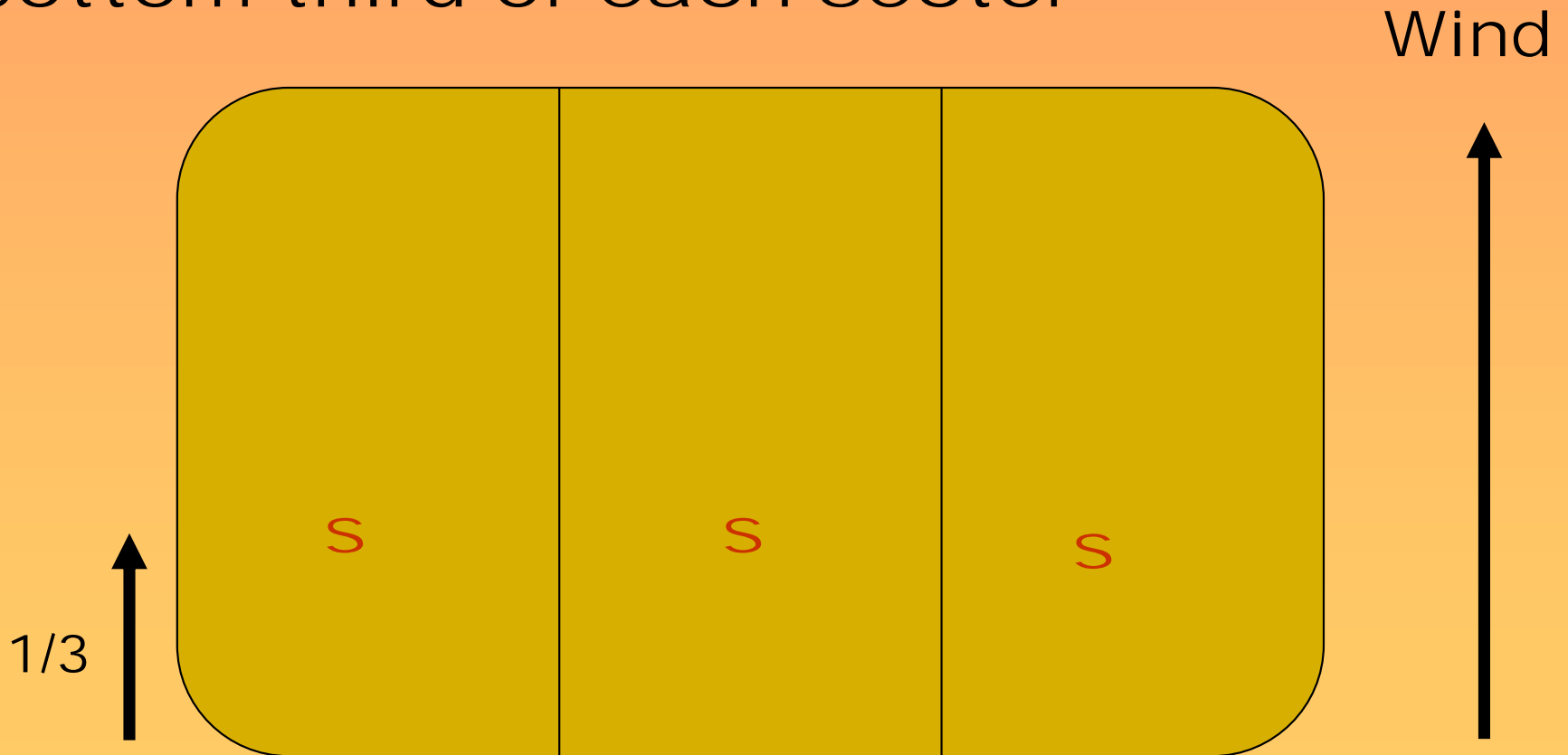
PROCEDURE

Replicate SavFIRE in different vegetation landscapes:

- Lowveld Sour Bushveld – Pretoriuskop
- Knoppiesdoringveld – Satara
- Mopane Veld – Mopane/ Shingwedzi

POINT IGNITIONS

- Divided burn area into thirds;
- Ignited 20m length fire fronts in bottom third of each sector



BURNING CRITERIA

- Fuel Conditions

Fuel Loads - > 4000kg/ha

Fuel Moisture - fully cured

- Atmospheric Conditions

Temperature - < 30°C

Relative Humidity - > 50%

Wind - 10 - 15km/h

FDI - <50 Green/Yellow

SavFIRE 2006

- Conducted “trial run” in Mopane Veld from 23rd – 30th October, 2006
- Applied two sets Point & Perimeter Ignitions

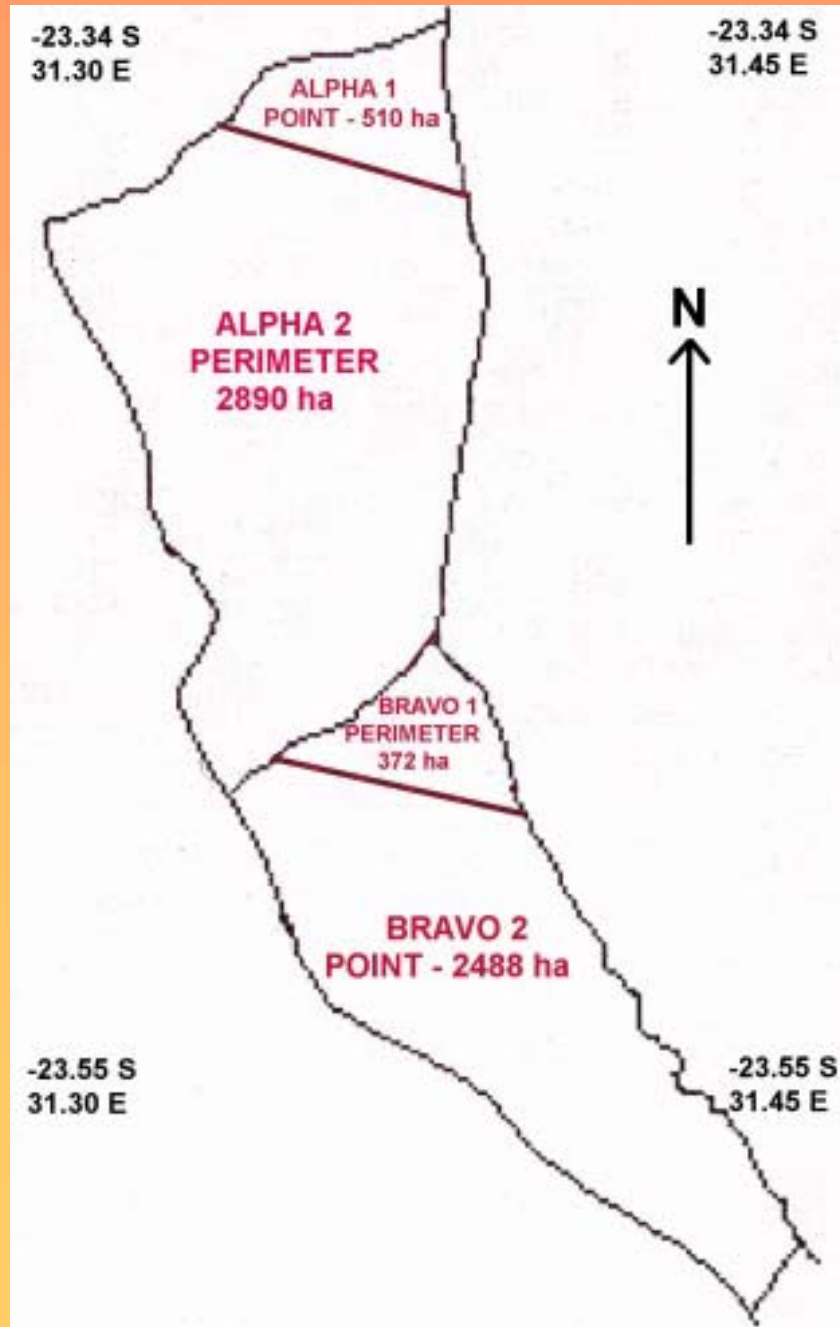
24th October

- ALPHA 1 Point Ignition – 510 ha
- BRAVO 2 Perimeter Ignition – 372 ha

28th October

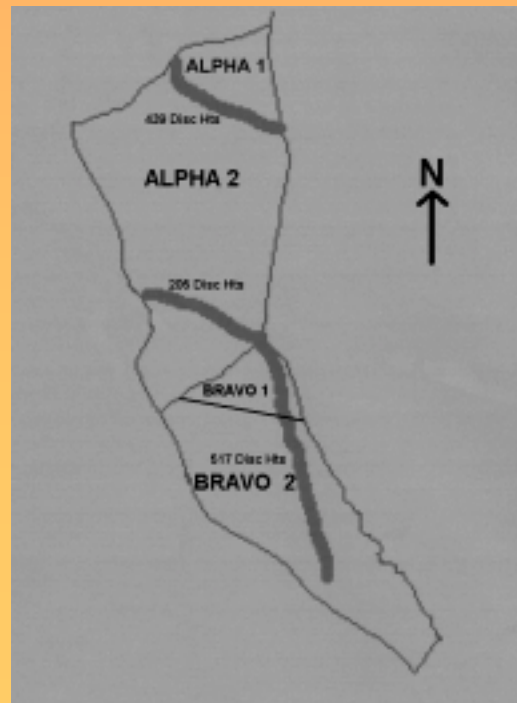
- ALPHA 2 Perimeter Ignition – 2890 ha
- BRAVO 2 Point Ignition – 2488 ha

BURN BLOCKS



MEASUREMENTS BEFORE CONTROLLED BURNS

- Botanical composition and structure of vegetation obtained from veld condition sites
- Grass Fuel loads estimated with Disc Pasture Meter – 1161 DPM readings – 24km



MEASUREMENTS BEFORE CONTROLLED BURNS



MEASUREMENTS DURING CONTROLLED BURNS

- Temperature, Relative Humidity, Wind Speed



MEASUREMENTS AFTER CONTROLLED BURNS

- Residual grass fuel



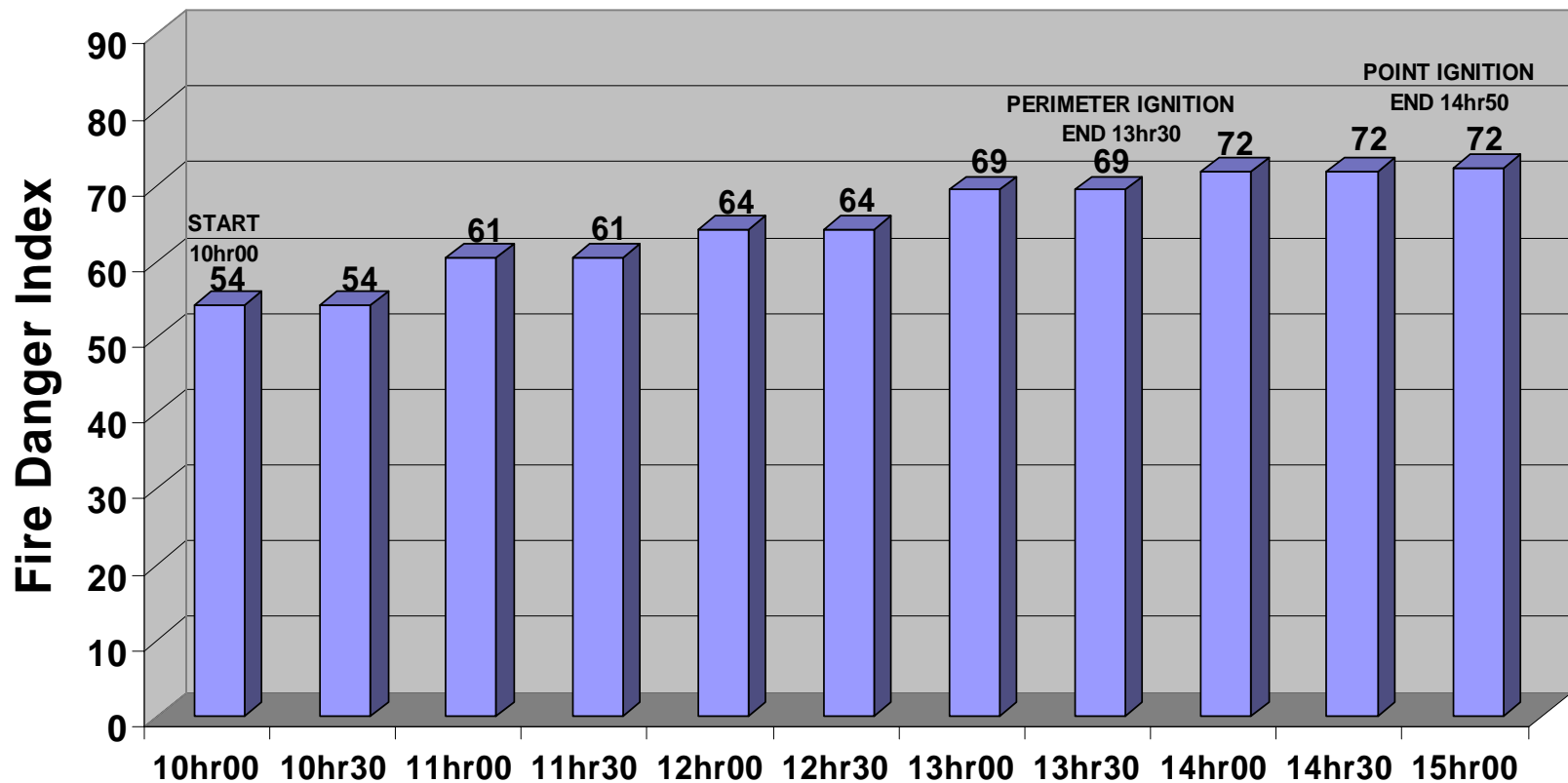
MEASUREMENTS AFTER CONTROLLED BURNS

- Satellite images of burnt areas

MEASUREMENTS DURING CONTROLLED BURNS

Weather Conditions:

- ALPHA 1 - Point Ignition
- BRAVO 1 - Perimeter Ignition

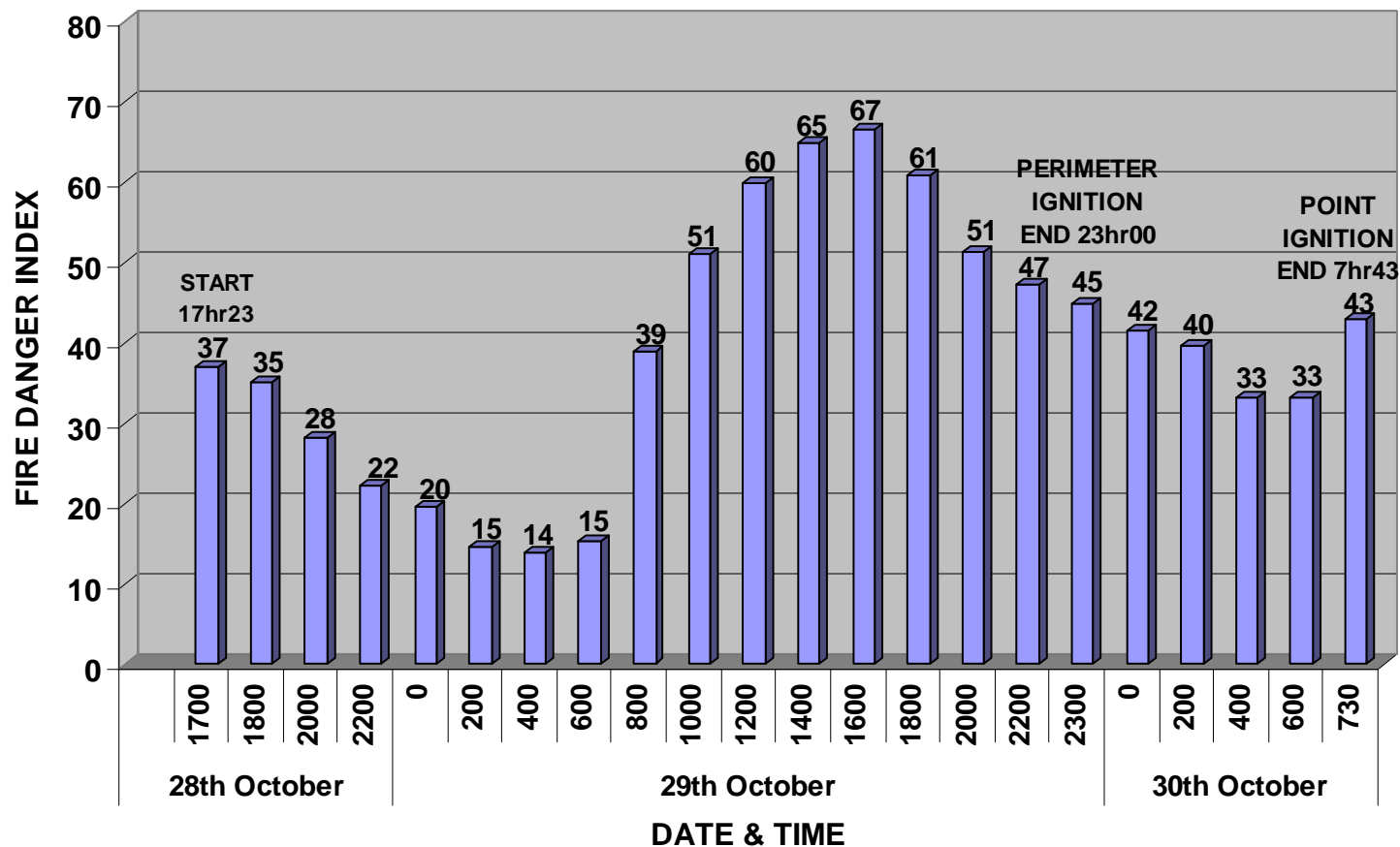


24th October 2006

MEASUREMENTS DURING CONTROLLED BURNS

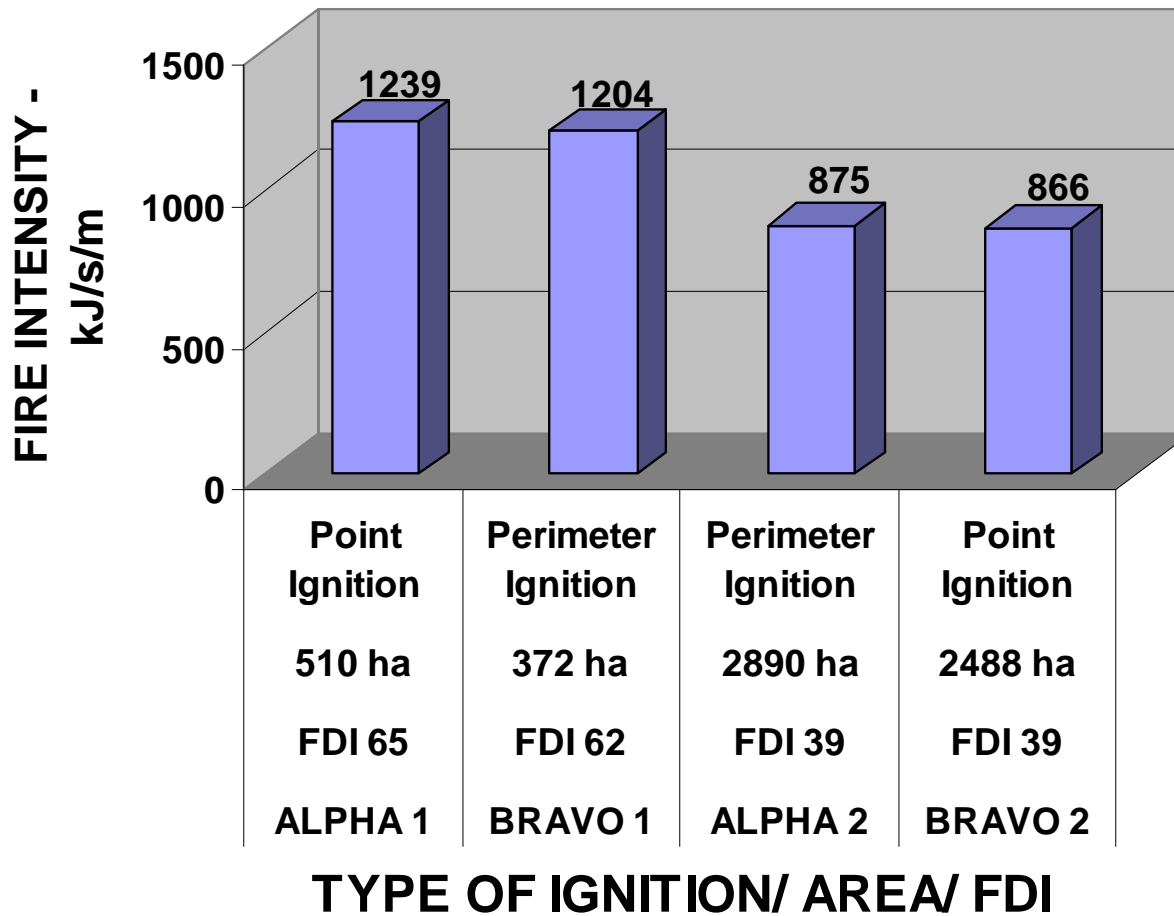
Weather Conditions:

- ALPHA 2 - Perimeter Ignition
- BRAVO 2 - Point Ignition



MEASUREMENTS DURING CONTROLLED BURNS

Fire Intensity



MEASUREMENTS DURING CONTROLLED BURNS



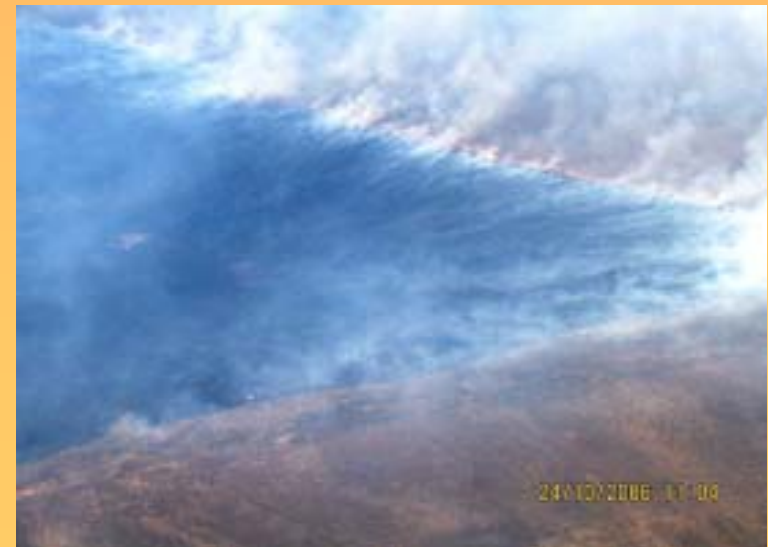
High FDI >60



ALPHA 1 Point Ignition

MEASUREMENTS DURING CONTROLLED BURNS

ALPHA 1 - Point Ignition



MEASUREMENTS DURING CONTROLLED BURNS

BRAVO 1 - Perimeter Ignition



MEASUREMENTS DURING CONTROLLED BURNS

ALPHA 2 - Perimeter Ignition



MEASUREMENTS DURING CONTROLLED BURNS BRAVO 2 – Point Ignition



GENERAL DISCUSSION & CONCLUSIONS

- Weather conditions fundamentally important in determining diverse fire mosaic – FDI <50
- Shape of Burn Block important in determining diverse fire mosaic – preferably square

Insufficient data to test hypotheses – results indicate its possible to apply Patch Mosaic Burning in relatively small areas - <3000 ha

GENERAL DISCUSSION & CONCLUSIONS

RESEARCH PRIORITIES:

- Determine relationship between Pyro-Diversity and Biodiversity
- Determine optimum Pyro-Diversity i.e. ratio and distribution of burnt vs unburnt areas

Thank You

