

# Invasive alien plant clearing along the Sabie River in and adjacent to KNP



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# MOTIVATION

- National project: “**Ecosystem Repair**” – initiated and funded by “*WfW*”
- 1 Hons, 4 MSc’s, 1 PhD
- 3 biomes – Fynbos, grasslands, savanna
- AIMS:
  - Assess current levels of repair
  - Establish achievable targets for repair
  - ID limiting factors of ecosystem recovery
  - Develop protocols to incorporate into management programmes
- **Working for Water**: monitoring
- **KNP** – contribute to established research objectives

# INTRODUCTION

## Invasive alien plants in KNP

- IAS impact biotic and abiotic environments  
(Gordon 1998, Enright 2000, Le Maitre *et al.* 2000, Richardson & Van Wilgen 2004).
- IAS greatest threat to biodiversity in KNP
- 370spp. – 121 invader status
- Riparian zones – 40 invader taxa alone – most invaded
- 30% alien infestation of riparian zones across park, Isolated stands up to 90%;
- Riparian areas major priority for clearing  
(Foxcroft & Richardson 2003)

# Working for Water in KNP

- WFW – clear IAP + poverty alleviation
- WFW launched in KNP in 1997
- Major component of invasive plant management in KNP
- Little follow up monitoring with regards to WFW and clearing practices.



Photo L. Foxcroft

# AIMS

Understand factors responsible for varying levels of post-clearance ecosystem recovery

Investigate the response of alien and indigenous vegetation to IAP clearing.



# OBJECTIVES

1. Assess the short term efficacy of Working for Water
2. Assess the long term efficacy of Working for Water (Work in progress)
3. Assess effects of environmental factors and management factors of clearing regimes on response of both exotic and indigenous vegetation

# Methods

- 12 sites – Sabie River, KNP.
- Data collections (April '06 & March '07)



# Methods cont.

## 1. Environmental variables

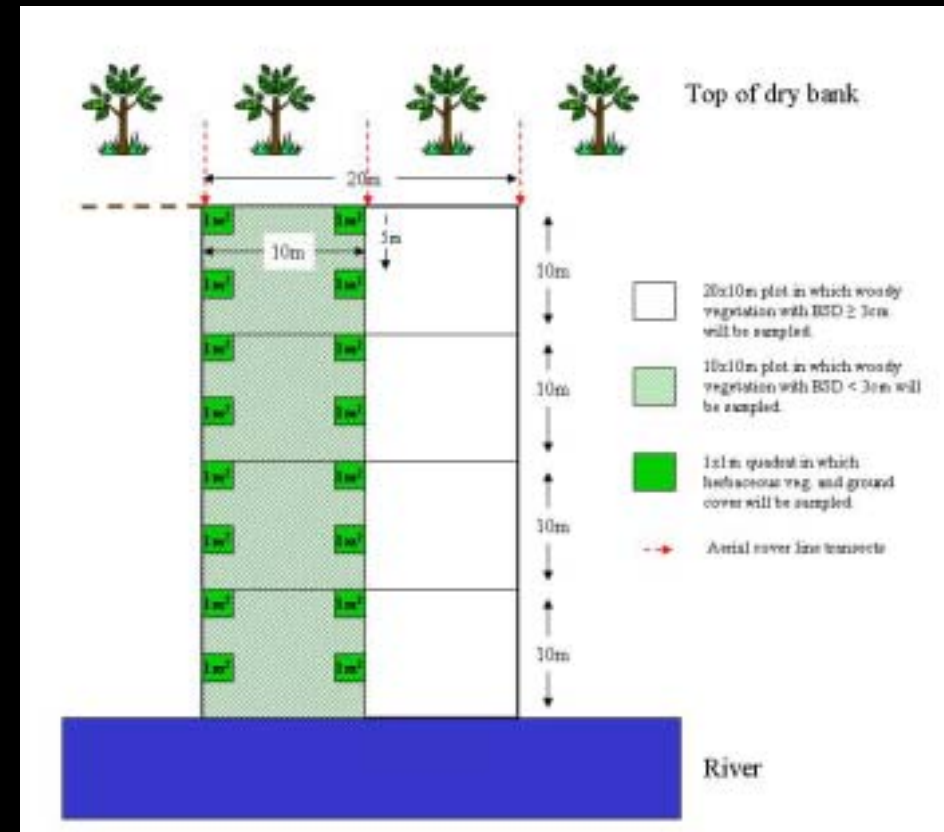
- Channel type
- Distance along the river and closest distance to Western border

## 2. Management variables

- Nbal size  $\approx$  initial intensity
- No. follow-up treatments
- Season
- Months elapsed since last treatment

## 3. Vegetation sampling

- Belt transects perpendicular to river  
IDed, counted (density), BSD, Height class, growth form, regeneration status.
- Ground cover 1m<sup>2</sup>
- Aerial cover – line intercept method.

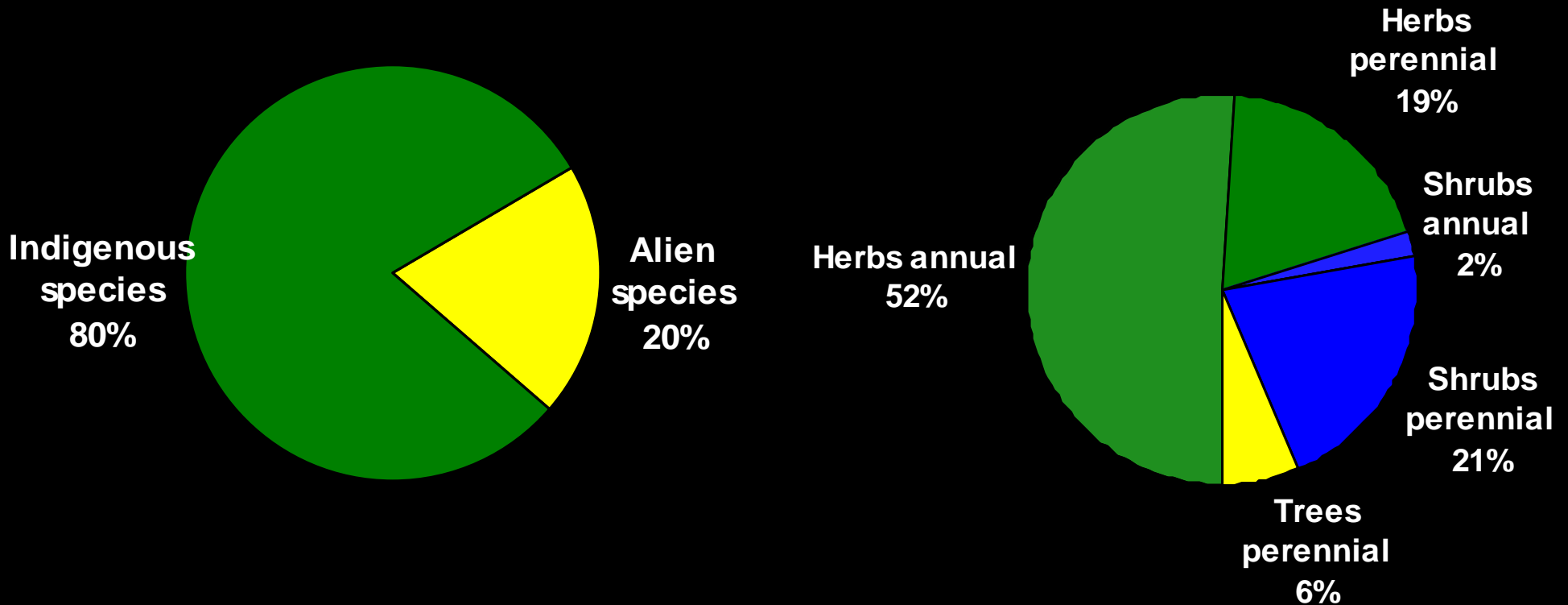


# RESULTS

## Pre-clearance

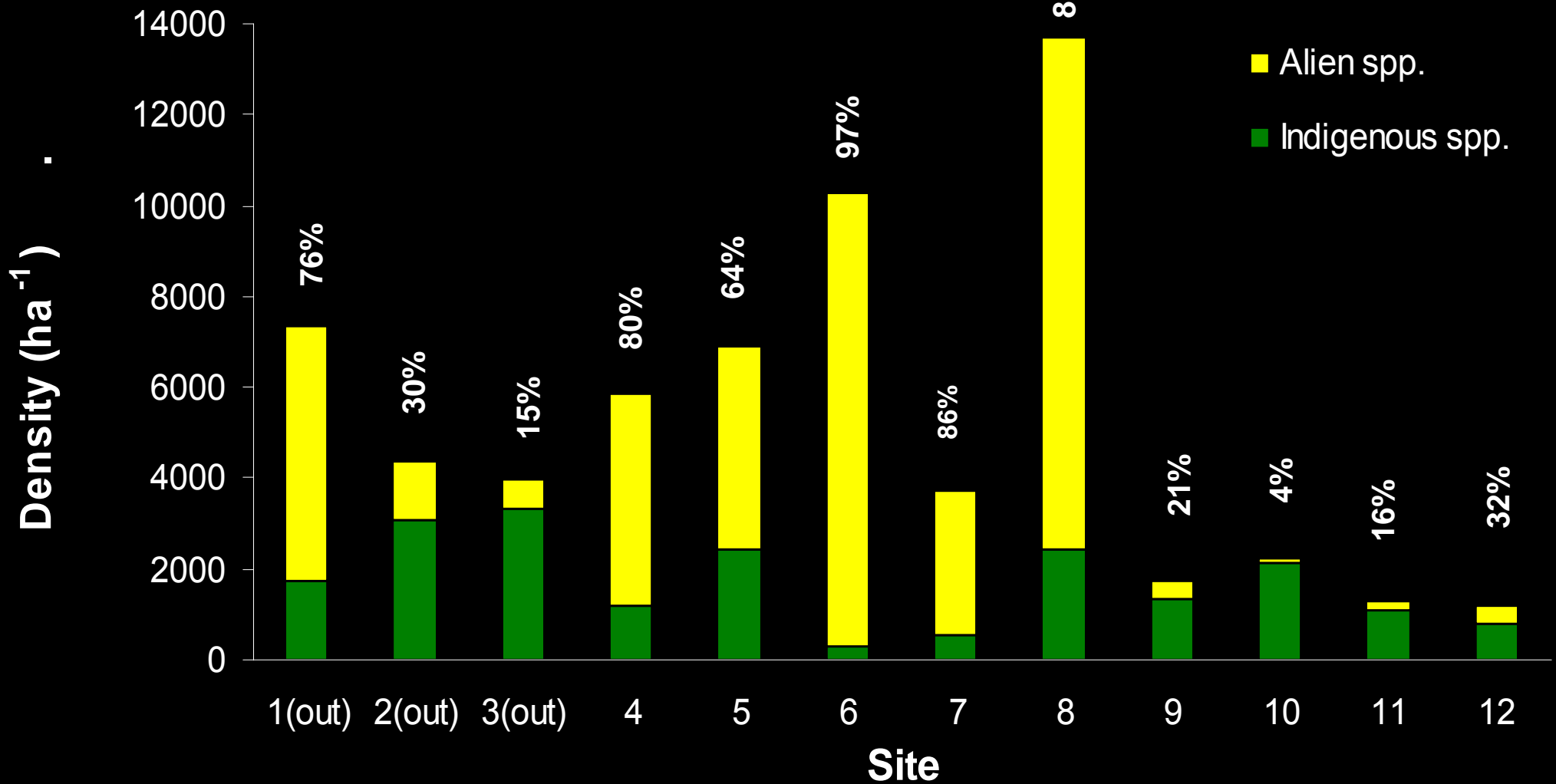


# Species Description

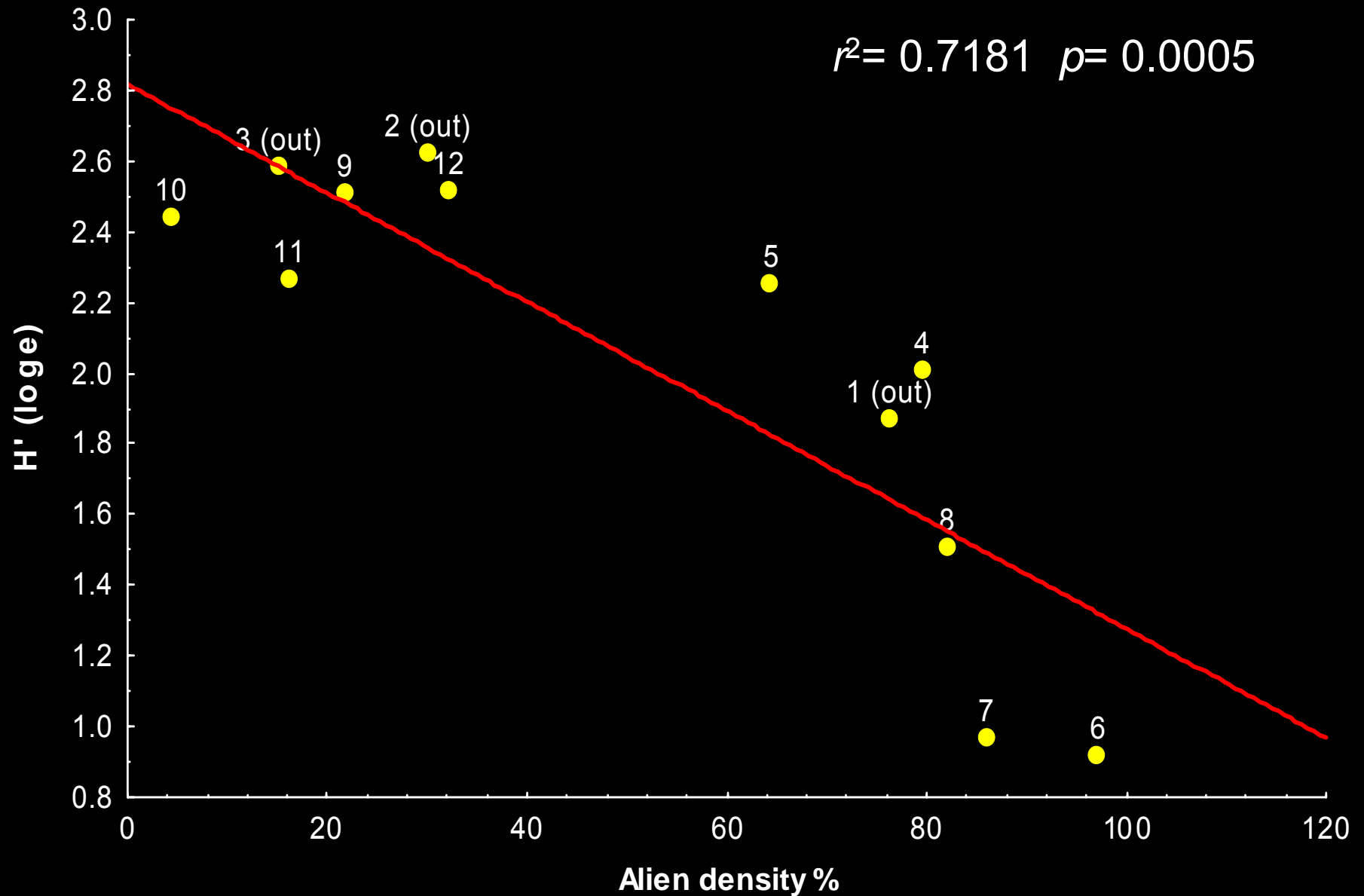


Including 18 declared weeds/invaders and two proposed

# Pre clearance Alien Density (April 2006)

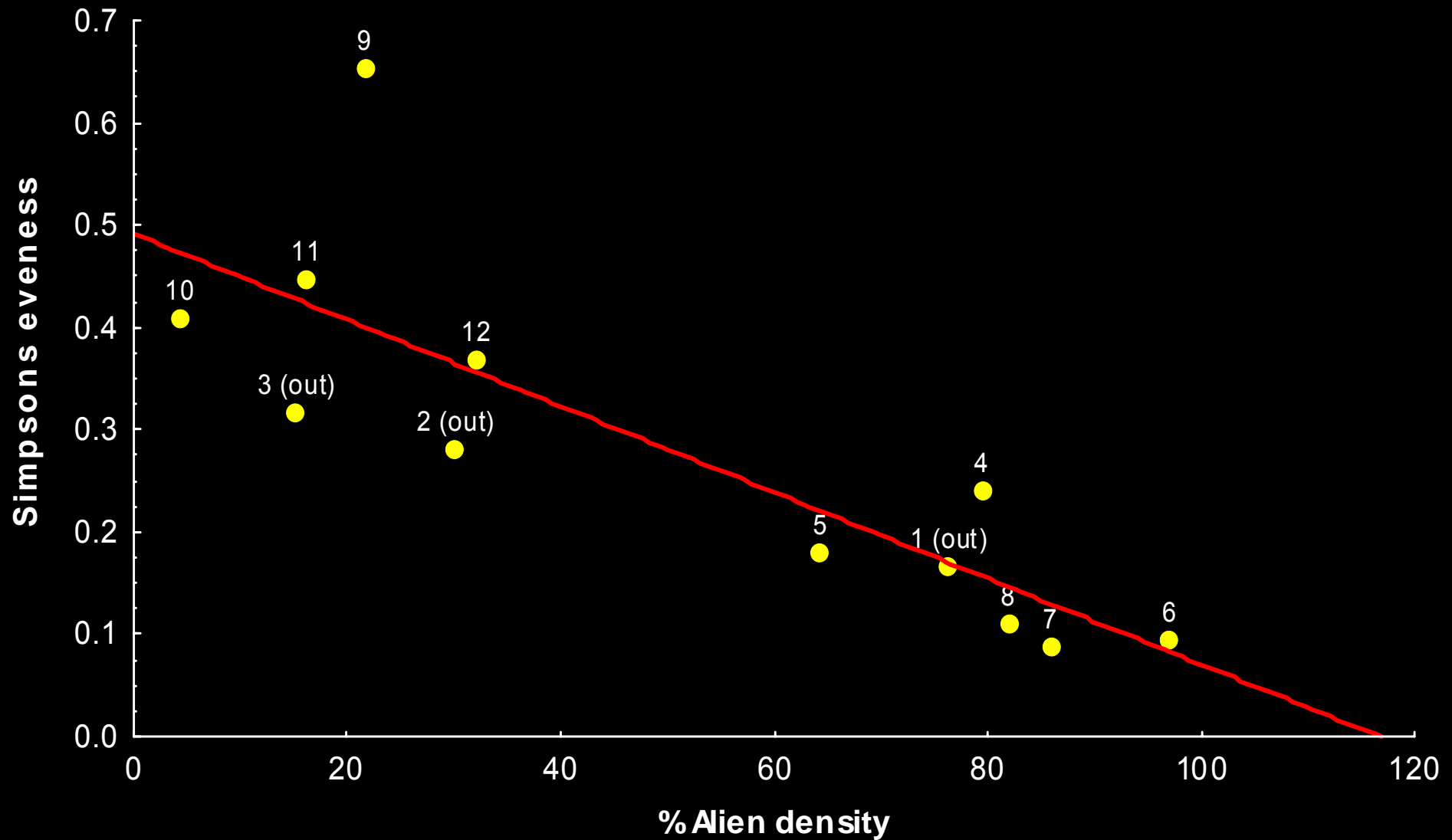


# % alien density effect on diversity (Shannon's)

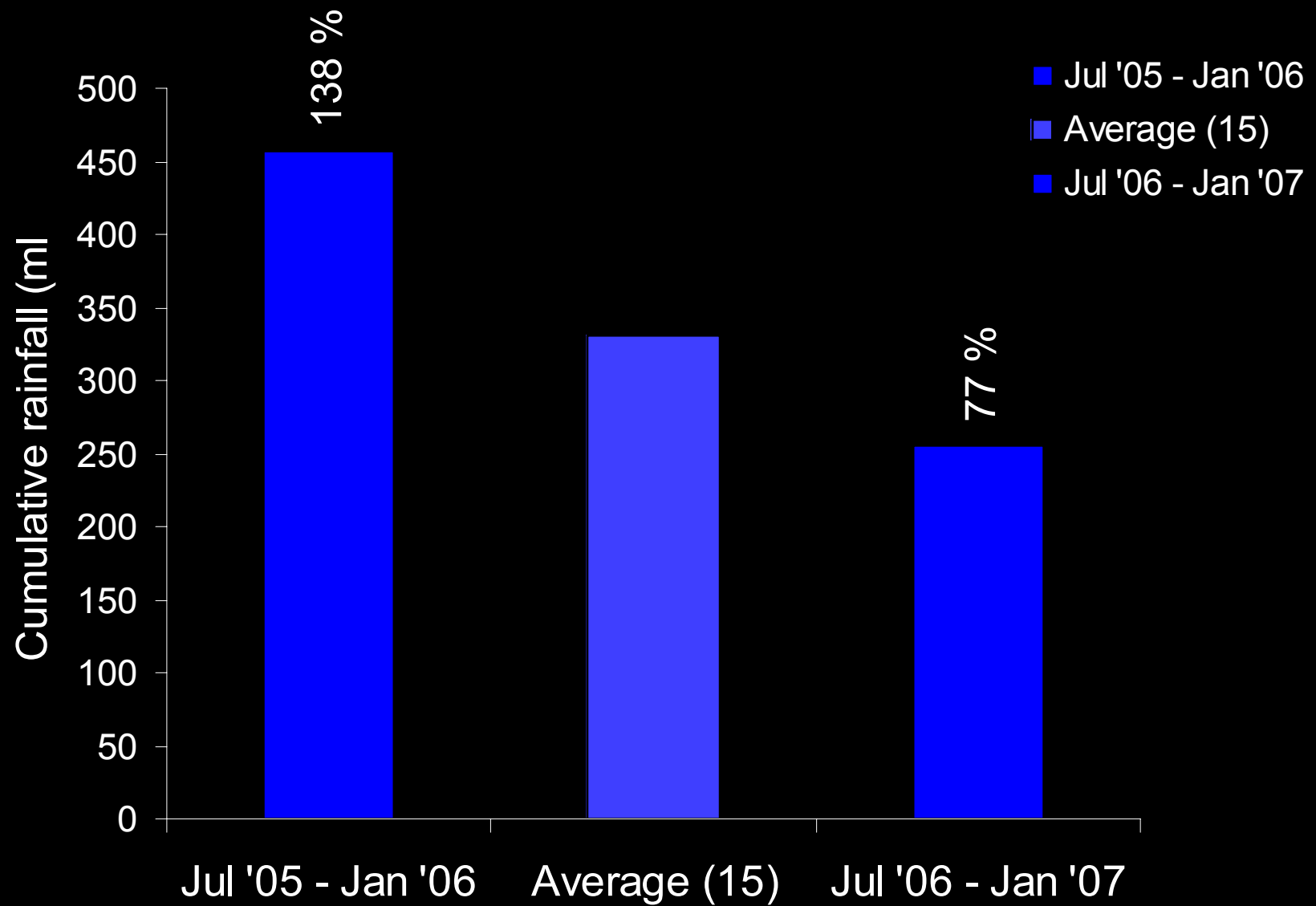


# % alien density effect on evenness

$r^2 = 0.6828$   $p = 0.0009$



# Rainfall



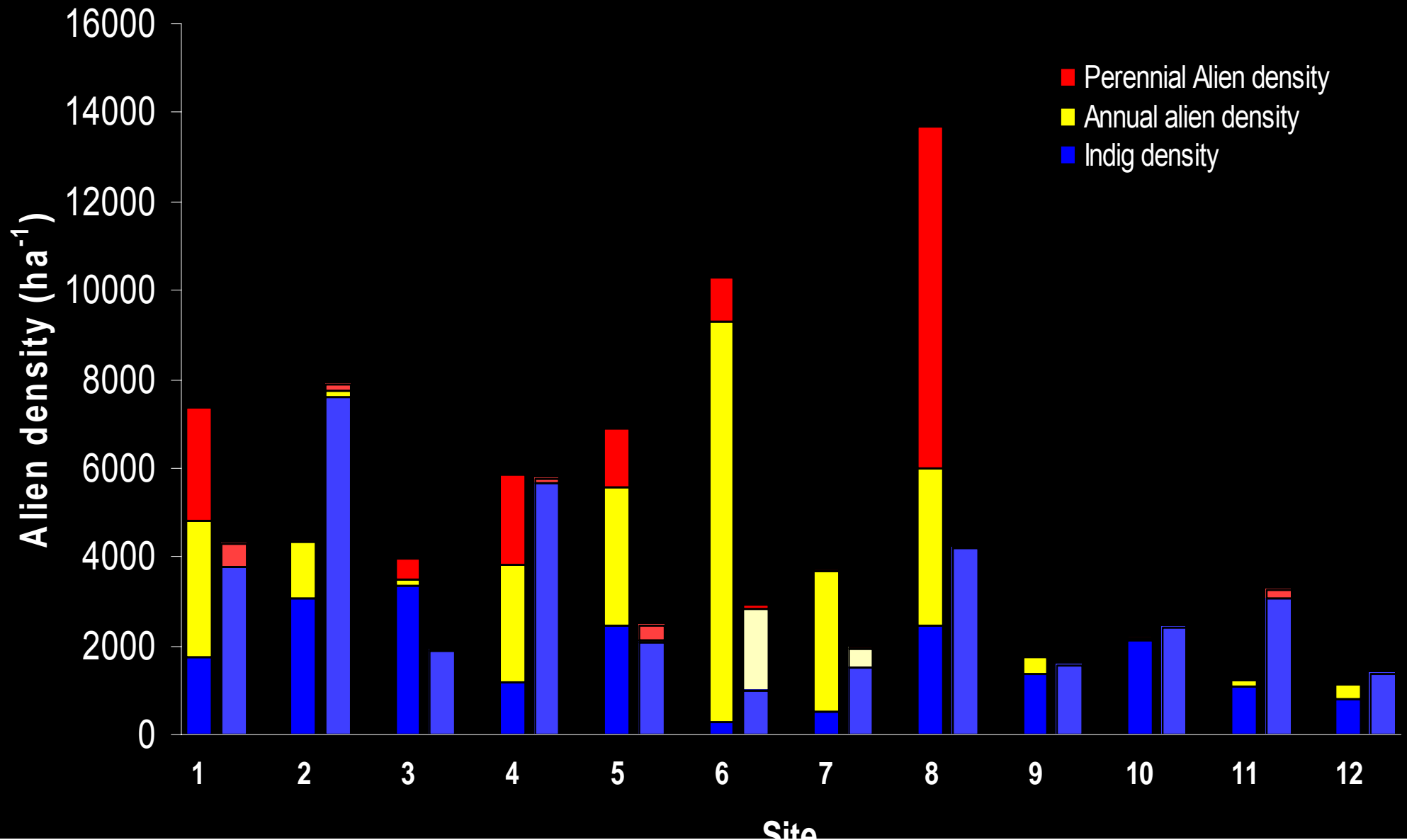
# RESULTS

## Post-clearance



# Pre- and Post-Clearance Alien Density

Wilcoxon:  $p = 0.0022$



# Objective 1 : Short term efficacy

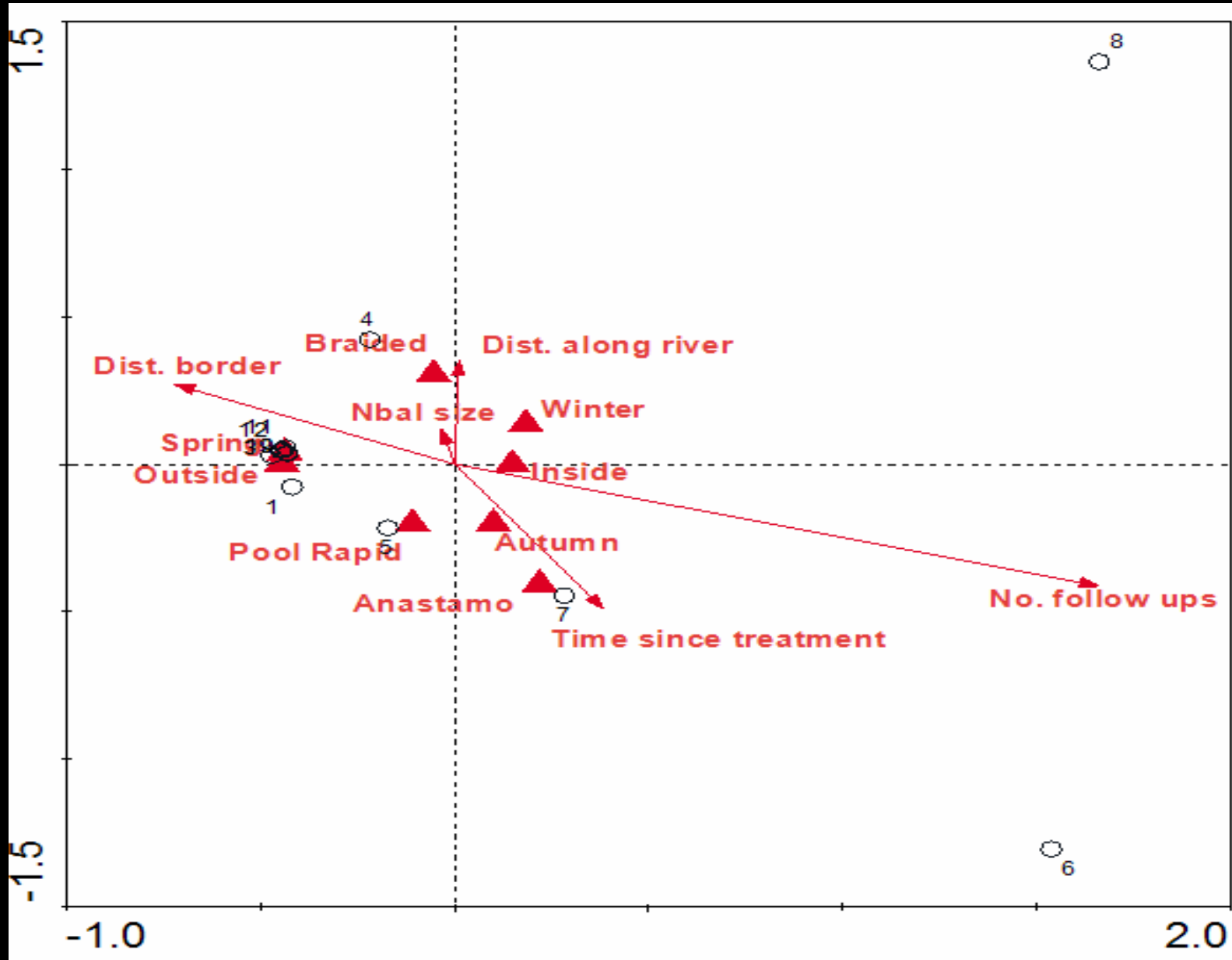
## Conclusions

- *WfW* – highly effective in short-term clearing even with abnormally high densities.
- No signs of negative impacts on non target species
- Positive – indigenous density increases post clearance – system of high integrity that shows strong resilience

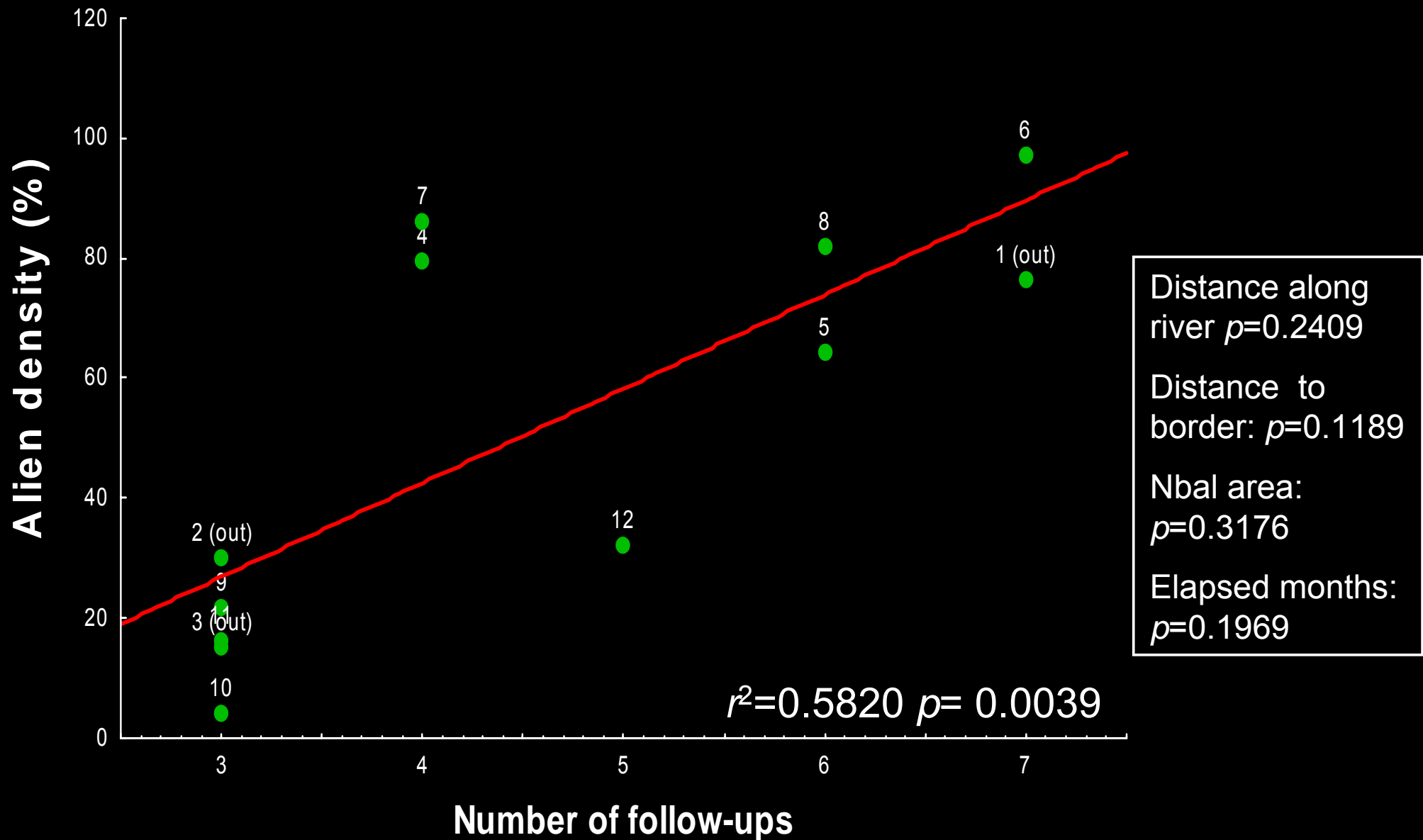
# Objective 3: Assessment of environmental and management factors



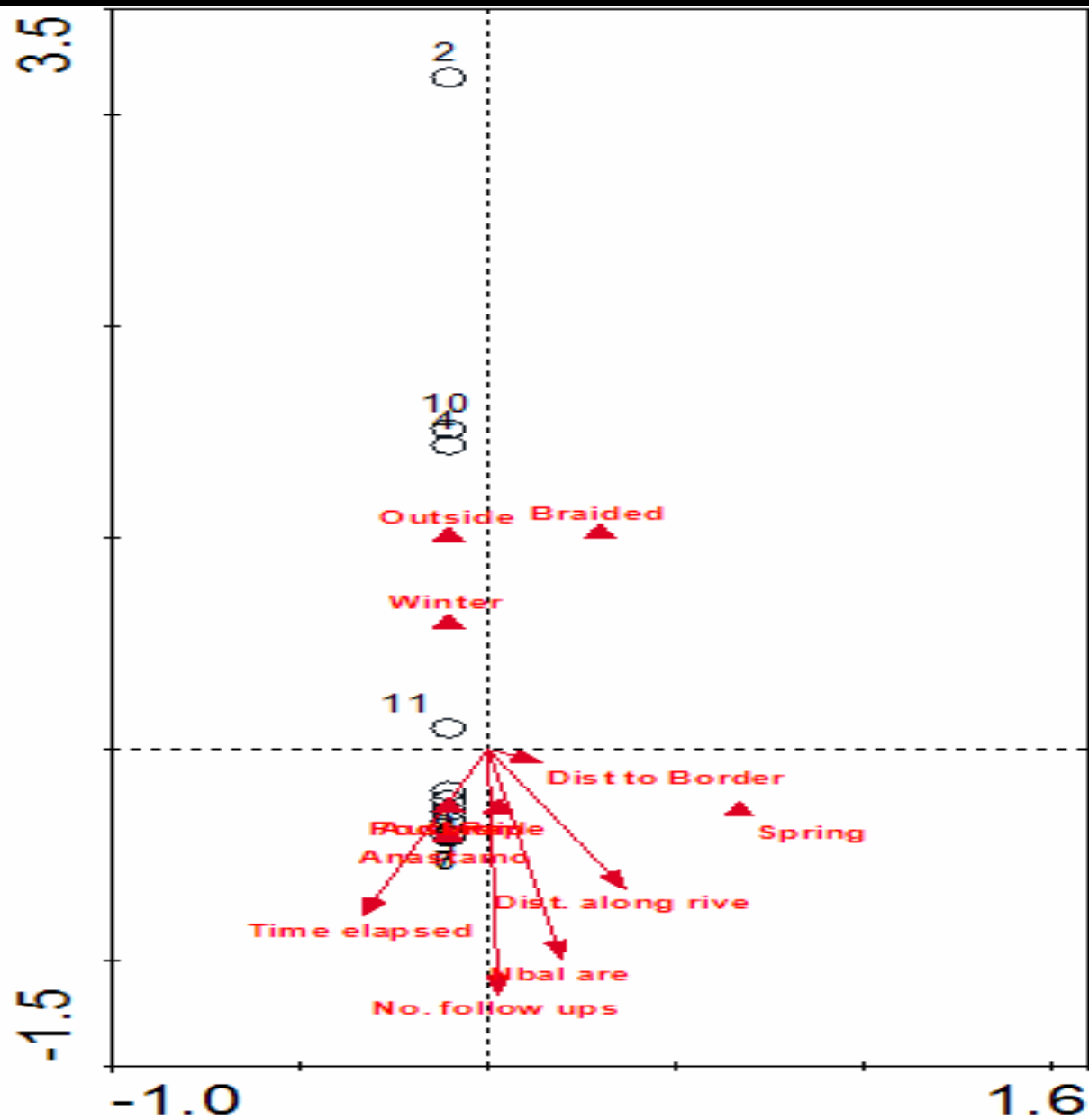
# Pre-clearance data - RDA



# % Alien density vs. environmental & management factors

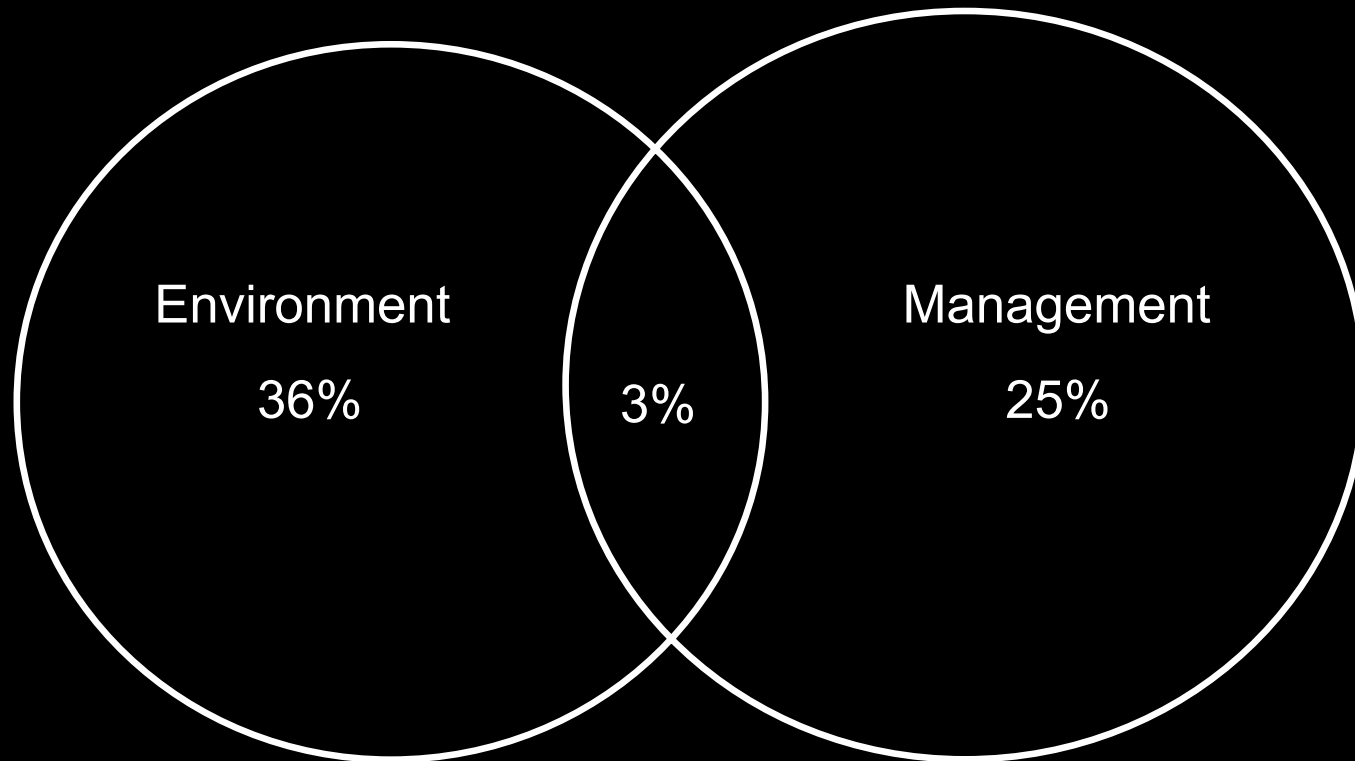


# Post-clearance CCA



# Partitioning of variables

Total variation = 64%



# Conclusions – Objective 3

- Variation in clearing regime has little influence on alien plants
- Study Beater 2006 – upper Sabie catchment – major conclusion – Follow ups are NB
- From pers obs – hope to be back up with long term data, Kruger WFW have been successful in reducing IAP to acceptable levels.
- The factor that seems most important in this success is continuous follow ups.
- KNP – good example of how cont. follow ups work to control levels of IAP.

# In terms of parties involved

- **Ecosystem repair** – levels of recovery are high – no further ecosystem repair is needed in systems of higher integrity such as Kruger.
- **WFW** – teams are effective in short term clearing and do not inflict harmful side effects on non-target species.
- **Kruger-**
  - Baseline data
  - Alien research objectives – aim to evaluate and quantify the:
    - Potential impacts of control on non-target (indigenous) species
    - Efficacy of control measures
    - Impacts / effects of control on specific areas under control and after control
- Help KNP Alien Biota management team to develop their own understanding of the effects of IAP control on both indigenous and exotic vegetation in order to enhance the long-term implementation of control programmes.
- Contribute to evaluating and further refining the alien plant TPC's.

# Acknowledgements



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- Working for Water
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- Field assistants: Chris Ndlovu & Simon Thomson
- Guin Zambatis – KNP herbarium
- “Riparian Restoration” team –esp Dr. Pat Holmes

