The prioritisation of invasive alien plant control projects using a multi-criteria decision model informed by stakeholder input and spatial data

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Introduction
Progress with areas cleared
Progress with species cleared
Method
Convene expert workshops
Setting goal and objectives

Goal: To manage the negative impacts of IAPs to conserve water resources and ecosystem services and to promote wise land use and socio-economic development

- **Water resources** (G: .50612)
  - Surface water resources (G: .44285)
    - Yield (MAR) (G: .34240)
    - Water quality (G: .03882)
    - Stress from human demand (G: .06163)
  - Ground water resources (G: .06326)
    - Recharge protection (G: .04485)
    - Yield (sustainable abstraction) (G: .01130)
    - Stress from human demand (G: .00712)
- **Biodiversity protection** (G: .22886)
  - Threatened terrestrial vegetation types and critical biodiversity areas (G: .15257)
  - Threatened, intact and free flowing rivers; and wetlands (G: .07629)
- **Ecosystem services** (G: .16440)
  - Natural resource utilisation (G: .04246)
    - Forage for grazing and browsing in natural rangelands (G: .03185)
    - Useful, harvestable natural products (G: .01062)
  - Tourism and cultural routes and sites (G: .01722)
    - Game, bird and flower watching (G: .01435)
    - Hunting and fishing (G: .00287)
  - Regulating Services (G: .10472)
    - Soil stability (G: .09163)
    - Flood regulation (G: .01309)
  - Invasive alien plants (G: .06142)
    - Current invasions (species weights) (G: .01024)
    - Potential invasions (species weights) (G: .05119)
    - Socio-economic (poverty) (G: .03921)
**Pair-wise comparison of alternatives**

**Numerical Assessment**

<table>
<thead>
<tr>
<th>Improve the integrity of the water resource</th>
<th>Value of the catchment for biodiversity</th>
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<tbody>
<tr>
<td>Improve the integrity of the water resource</td>
<td>5.0</td>
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<tr>
<td>Value of the catchment for biodiversity</td>
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</tr>
<tr>
<td>Potential veld utilisation</td>
<td>(5.0)</td>
</tr>
<tr>
<td>Capacity to maintain the gains</td>
<td>(3.0)</td>
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<tr>
<td>Potential to spread</td>
<td>1.0</td>
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compare the relative importance with respect to: Goal: To contain, reduce, control and ultima

**ExpertChoice**

expert choice
Collating existing relevant spatial datasets

Water resources criteria
Biodiversity protection criteria
Ecosystem services criteria
Invasive alien plant criteria
Socio-economic criteria
Results & Discussion
Generic synthesis model result
Western Cape regional model result

Western Cape region
2012/13 budget = R100m

Legend
- WW Western Cape region projects
- Top 10% (Year 1 cost = R111m)

CSIR Western Cape prioritisation (GS)
Priority class
- Very low
- Low
- Medium
- High
- Very high

0 25 50 100 150 200 Kilometers
Data shortcomings

Comparative water use studies

Impacts on groundwater

Evapotranspiration
Eucalyptus use large amounts of water

Some incoming precipitation is intercepted by the plantation canopy and evaporated back into the atmosphere.

Plantations use more water than grassland and natural forest.

Precipitation
Commercial forestry occurs in moist areas of South Africa that generally receive in excess of 800 mm of rain/year

Water use by trees depends on:
- Species of tree
- Size and age of trees
- The density of trees
- The soil conditions - texture, type, depth and nutrients

Evapotranspiration by indigenous forest is less than pine and eucalypt plantations

Evapotranspiration by grassland is less than by trees

Comparison of riparian & non-riparian invasions

Impacts on water quality

Effects of alien plant density on water use
References


[www.environment.gov.za](http://www.environment.gov.za)  
(Working for Water/Planning)