Application of the ecosystem approach for the management of
_Eucalyptus globulus_, an invasive non-native species, in Quito – Ecuador

Juan Gabriel Lincango Vega

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DECLARATION

This dissertation entitled:

Application of the ecosystem approach for the management of *Eucalyptus globulus*, an invasive non-native species, in Quito – Ecuador.

was composed by me and is based on my own work. Where the work of others has been used, it is fully acknowledged in the text and in captions to tables and illustrations.

Sign:

Juan Gabriel Lincango Vega

Date: 30 September 2016
ABSTRACT

Invasive non-native species (INNS) are one of the main factors responsible for environmental change and their negative impacts on biodiversity and ecosystems (ecosystem services) have been generating severe socioeconomic problems around the world. In addition, among the most challenging and poorly studied INNS are the invasive non-native trees (INNT).

Such is the case of Eucalyptus globulus, an INNT widely introduced for commercial purposes and whose negative impacts have gone unnoticed. In Ecuador E. globulus have become an integral part of the ecosystem and landscape due to the benefits or ecosystem services (ES) (e.g. recreation, pure air and protection against volcanic eruptions) that local population is receiving from Eucalypt invasions, to the extent that are considered native forest.

The aim of this research is to develop a strategy for the management of Eucalyptus globulus in Quito – Ecuador, by adopting the ecosystem approach. In order to achieve this aim an outline management plan was proposed which was elaborated by carrying out an empirical spatial analysis. For this purpose satellite images and maps of Quito were obtained from Google Earth®. These images were processed with ArcGIS®, in order to generate several maps of the study area (orientation, land cover and land use map). Furthermore, the factors influencing on the main features of the study area were exposed.

Even though eradication have been recommended as the best option for the management of INNS, in this case it is not possible to apply it for two reasons: a) the study area is located inside of an Area of Ecological Intervention (AEI), and b) because the public opposition will be a difficult barrier to overcome. Thus, the results obtained suggest that instead of eradication the most appropriate management option for the study area is to become a recreational park.

However, it is recommended that due to the deleterious effects of E. globulus in the soil of the invaded ecosystem, eradication should be focused on ravines and watersheds. In addition, an analysis of soil quality as well as an assessment of the seed bank should be carried out.
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CONTENTS

1. Introduction 1
2. Literature review 1
   2.1. What are a 'native' and 'non-native species'? 4
   2.2. What is an invasive species? 6
   2.3. A different perspective for non-native species invasion in America 8
   2.4. Invasive non-native trees: problems and consequences 10
   2.5. Controlling invasive non-native species: Australia’s biosecurity and the Great Britain risk assessment approaches 12
      2.5.1. Biosecurity in Australia 12
      2.5.2. Great Britain risk assessment approach 13
   2.6. Environmental change: when do non-native species become naturalised and an integral part of the ecosystem? 14
   2.7. Ecosystem services delivered by forests (Ecuadorian case) 16
   2.8. Eucalyptus globulus, an invasive non-native tree occurring in Ecuador: forests, naturalized formations or invasions? 18
   2.9. Case studies – Rationale for selection 21
      2.9.1. Case study 1– Australian acacias (Acacia spp.) 21
      2.9.2. Problematic 22
      2.9.3. Management 24
      2.9.3.1. Legislation 24
      2.9.3.2. Eradication 25
      2.9.3.3. Utilisation 25
      2.9.4. Case study 2 – Mesquites (Prosopis spp.) 25
      2.9.5. Problematic 26
      2.9.6. Management 27
      2.9.6.1. Legislation 27
      2.9.6.2. Eradication 28
      2.9.6.3. Utilisation 29
   2.10. Research questions 29
3. Methods 30
   3.1. Evaluation of case studies 30
   3.2. Outline management plan 30
4. Results 31
   4.1. Critical evaluation of case studies 31
      4.1.1. Legislation and policy 31
      4.1.2. Eradication 31
      4.1.3. Utilisation 32
   4.2. Outline management plan 32
      4.2.1. Legislation and policy 32
      4.2.2. Description of the study area 34
         4.2.2.1. Location 34
4.2.2.2. Land cover and land use 37
4.2.2.3. Surrounding area 40
4.2.2.4. Climate and weather 40
4.2.2.5. Lack of information 40

4.2.3. Evaluation
4.2.3.1. Site analysis 40
4.2.3.2. Vision 47
4.2.3.3. Site objectives 47
4.2.3.4. Action plan 47

5. Discussion 48
6. Conclusions and recommendations 51
7. References 52
8. Appendices 63
List of Tables

Table 4.1. Climatic and weather conditions of Quito (TWC, 2016). 40
Table 4.2. Factors influencing the features of the study area. 46

List of Figures

Figure 1.1. Eucalyptus globulus (photo by Australian National Register of Big Trees). 3
Figure 1.2. Ecuador in South America. 3
Figure 2.1. Metropolitan park (Eucalyptus globulus invasion) in Quito – Ecuador (photo by Ecuavisa). 19
Figure 2.2. Anonymous historical photography of Cuenca – Ecuador (probably taken between 1919 and 1939) where a family posing in the middle of a road lined by young Eucalypts is observed (photo by Historical Archives of the Central Bank of Ecuador). 20
Figure 2.3. Individual of Acacia dealbata. 22
Figure 2.4. Individual of Prosopis glandulosa (photo by pinterest). 27
Figure 4.1. The four natural regions of Ecuador. 34
Figure 4.2. Map of Quito. 35
Figure 4.3. Study area (orientation map). 36
Figure 4.4. Land covers of the study area. 38
Figure 4.5. Land uses of the study area. 39
Figure 4.6. Grassland among Eucalypt invasion in the study area (photo by C. Lincango). 41
Figure 4.7. Grassland (photo by C. Lincango). 41
Figure 4.8. Power lines private properties, presence of cattle (photo by C. Lincango). 42
Figure 4.9. Private properties and presence of cattle (photo by C. Lincango). 42
Figure 4.10. Footpaths used for local people for recreation and mobility (photo by C. Lincango). 44
Figure 4.11. Secondary road (photo by C. Lincango). 44
Figure 4.12. Map of Quito parishes and Areas of Ecological Intervention. 45

List of Appendices

Appendix 1. General plan of territorial development of the Metropolitan District of Quito 2005 (ecological protection areas). 64
Appendix 2. Political-administrative division of the Metropolitan District of Quito. 65
Appendix 3. Metropolitan District of Quito land use map. 66
### Glossary (abbreviations)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AEC</td>
<td>Anthropogenic environmental change</td>
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<td>AEI</td>
<td>Area of Ecological Intervention</td>
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<td>CSB</td>
<td>Conservation and Sustainable Use of Biodiversity Act</td>
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<tr>
<td></td>
<td>Department of Agriculture and Food of Western Australia</td>
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<tr>
<td>DAFWA</td>
<td>Australia</td>
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<tr>
<td>DEFRA</td>
<td>Department for Environment, Food &amp; Rural Affairs</td>
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<td>DLM</td>
<td>Development and Land Management Plan of Quito</td>
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<td>DPSIR</td>
<td>Drivers Pressures State Impact Response</td>
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<td>EC</td>
<td>Environmental change</td>
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<td>EMA</td>
<td>Environmental Management Act</td>
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<td>ES</td>
<td>Ecosystem services</td>
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<td>FA</td>
<td>Forestry Act</td>
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<td>FESP</td>
<td>Framework for Ecosystem Service Provision</td>
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<td>MA</td>
<td>Millennium Ecosystem Assessment</td>
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<td>MDQ</td>
<td>Metropolitan District of Quito Council</td>
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<td>NNIS</td>
<td>Non-native invasive species</td>
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<tr>
<td>NNIT</td>
<td>Non-native invasive trees</td>
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<tr>
<td>NNS</td>
<td>Non-native species</td>
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<td>NTFP</td>
<td>Non-Timber Forest Products</td>
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<td>RA</td>
<td>Risk assessment</td>
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<td>USGS</td>
<td>United States Geological Service</td>
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