Ecological Paradigms and Landscape Plantings Along Freeways - A Case Study From Melbourne, Australia
Kristin J. Gade, School of Life Sciences, Arizona State University

Melbourne, Victoria (Australia)

-3 million people in Melbourne
-5 million in state of Victoria
Typical roadside view:

Plant migration and personal preferences – How are they connected?
• Design and maintenance of roadside landscaping affects plant habitat
• Direct link between landscaping decisions and extant plant communities
• => coupled social-ecological system

Design Q-sort Factors

Factor Descriptions

Group 1: “Natural”
• 14 of 26 subjects fit type (Environmental offshoots, ecologists)
• Positive
  - Native vegetation
  - Positive
  - “Desert” designs
  - Negative
  - “Garden” designs
  - Regular spacing
  - “Sparsely”
  - “Space for weeds”
• Neutral
  - Groundcover type
  - “Garden” designs
  - “Desert” designs
• Negative
  - Random

Group 2: “Designed”
• 2 of 26 subjects fit type (landscape architects)
• Positive
  - “Desert” designs
  - Native Melbourne plants
  - “Garden” designs
• Neutral
  - “Spare”
• Negative
  - Gravel
  - “Space”
  - “Species diversity”

Group 3: “Gravel Haters”
• 4 of 26 subjects fit type (Project managers, 1 ecologist)
• Positive
  - Native Melbourne plants
  - “Desert” designs
  - Grass
  - “Regular spacing”
• Neutral
  - “Atmosphere”
• Negative

Group 4: “Easy Maintenance”
• 2 of 26 subjects fit type (environmental offshoot, Project manager)
• Positive
  - Native Melbourne plants
  - “Desert” designs
  - Grass
• Neutral
  - “Gravel”
  - “Species diversity”
• Negative
  - “Dense” designs
  - “Atmosphere”

Individuals
• Factors 2 and 4 each had one negative defining case

Correlation Between Factor Scores

<table>
<thead>
<tr>
<th>Factor Characteristics</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Reliability</td>
<td>0.975</td>
<td>0.923</td>
<td>0.941</td>
<td>0.923</td>
</tr>
<tr>
<td>S.E. of Factor Scores</td>
<td>0.156</td>
<td>0.277</td>
<td>0.240</td>
<td>0.277</td>
</tr>
<tr>
<td>Total Variance Explained</td>
<td>37%</td>
<td>18%</td>
<td>18%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Acknowledgments
• Scott Watson, VicRoads design
• Rodney van der Ree and Mark McKeon, Australian Research Centre for Urban Ecology

Consensus Items
Photos that did not distinguish between ANY pair of factors.
• Most liked mulch with shrubs and trees (11 to 5)
• Most liked gravel with desert-type trees and shrubs (2 to 1)
• Didn’t like gravel with desert-type trees and shrubs (2 to 1)
• No one liked the plain gravel (-3 to -4)

Results
What Does It Mean?
• Transportation professionals have very different training and preferences
• Each group manages a separate phase
• Ultimate results don’t meet goals
• Greater collaboration may help maximize benefits

Next Steps
• Analysis of plant Q-sorts
• Analysis of NEP results
• Check for correlations between Q-sort results, demographic data, and NEP Likert scale

Future Research
• Interviews with Arizona subjects
• Comparison of Arizona and Victoria results
• Ecological design and maintenance with ecological data collected around Phoenix

Q-Methodology
• Qualitative method for analyzing subjective opinions and preferences
• Consider individuals as subject rather than individual measurements ("bits of a person")
• Most common method is the Q-sort, where subjects are given a set of statements to arrange in order of degree of agreement

Overall Design
• Q sorts of photos of plants and landscape designs (landscape designs shown here)
• New Ecological Paradigm Likert scale (range 1 to 5) of 15 statements
• Basic demographic data
• Personal interviews, group and mail surveys
• 26 Subjects:
  - VicRoads environmental officers, landscape designers, and project managers
  - Ecologists at Australian Research Centre for Urban Ecology

Concourse
• The set of statements or photos in a sort is called the concourse
• I modified a picture of a mainly bare roadside with a garden program to create the set of landscape designs
• Variables included:
  - Vegetation density
  - Plants native to Melbourne, or exotic
  - Known weeds

Factor Analysis of Q-sorts
• Statistically analyze people’s subjective opinions and preferences
• The factors group people with common preferences
• Use interview information to interpret the factors
• I used Principal Components Analysis (PCA) with manual rotation to extract four factors with eigenvalues >1