Vetiver in California’s Mojave Desert
A Trial for Application in Ecological Restoration

Matthew Huffine
&
David S. Price (presenter)

The 6th International Conference on Vetiver ICV-6
Vetiver System
Empowering Sustainable Development

Time: 05 - 08/05/2015  Venue: DaNang University Of Technology, Viet Nam
Outline

- Setting: the Mojave Desert
- Vetiver utilization and trials
- Outcomes and challenges
Figure 1. The Mojave River drainage basin.
Phreatophytes

1) Deeply rooted vegetation thrives during long periods of low soil moisture while plants with shallow roots suffer water stress.

2) Woody vegetation with groundwater access helps support grasses through hydraulic lift.

3) “Islands of fertility” develop around springs formed by geologic features.

4) Gaining streams support a healthy riparian corridor with aquatic species.
Tamarisk
*Tamarix ramosissima*
Russian Olive

Elaeagnus angustifolia
Giant Reed

*Arundo donax*
Mojave Water Agency (MWA)

monitoring and management of watershed’s groundwater

Mojave Desert Resource Conservation District (MDRCD)

removal of invasive species

BUT!

no strategy or initiatives for replanting with natives
High Desert Tall Pot & Mojave River Native Plant Rehabilitation Project (HDTP & MRNPRP)

to restore the structure and function of parts of the riparian ecosystem after the removal of non-native invasive species by local authorities, and to replace them with phreatophytic native vegetation transplanted from HDTP & MRNPRP project nurseries
High Desert Tall Pot & Mojave River Native Plant Rehabilitation Project (HDTP & MRNPRP)

Mojave River Campus (MRC)
of Academy for Academic Excellence (K-12 charter)
Victorville
**TALL POT ISLAND DEMONSTRATIONS – LCER**

### PRIMARY (INITIAL) SHRUB LAYER

<table>
<thead>
<tr>
<th>COOL-SEASON</th>
<th>WARM-SEASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Planting</td>
<td></td>
</tr>
<tr>
<td>Fourwing saltbush</td>
<td>Qualibush</td>
</tr>
<tr>
<td>Desert needlegrass</td>
<td>Brittlebush</td>
</tr>
<tr>
<td>Creosotebush</td>
<td></td>
</tr>
</tbody>
</table>

| Late Winter / Early Spring Planting (recommended) |
| Desert saltbush | Screwbean mesquite |

### SECONDARY UNDERSTORY FORB/SHRUB LAYER

<table>
<thead>
<tr>
<th>COOL SEASON</th>
<th>WARM SEASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Planting</td>
<td></td>
</tr>
</tbody>
</table>
| Indian ricegrass | Alkali sacaton
| Desert needlegrass | Big galletgrass |
| Brittlebush | Desert broom |

| Late Winter / Early Spring Planting (recommended) |
| Evening primrose | Anderson wolfberry |
| Desert globemallow | Mojave buckwheat |

### TERTIARY OVERSTORY TREE LAYER

<table>
<thead>
<tr>
<th>COOL SEASON</th>
<th>WARM SEASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Planting</td>
<td></td>
</tr>
<tr>
<td>Fremont cottonwood</td>
<td>Honey mesquite</td>
</tr>
<tr>
<td>Goodding's willow</td>
<td>Black willow</td>
</tr>
</tbody>
</table>

| Late Winter / Early Spring Planting (recommended) |
| Desert willow | Blue palo verde |
| Arizona ash | |

### SUGGESTED PLANT PALETTE (ALPHA BY SCIENTIFIC NAME)

1. Indian ricegrass (*Achnatherum hymenoides*)
2. Desert needlegrass (*Achnatherum speciosum*)
3. Fourwing saltbush (*Atriplex canescens*)
4. Desert saltbush (*Atriplex polycarpa*)
5. Qualibush (*Atriplex lentiformis*)
6. Desert broom (*Baccharis sarothroides*)
7. Desert willow (*Chilopsis linearis*)
8. Bladderpod (*Cleome isomeris*)
9. Brittlebush (*Encelia farinosa*)
10. Mojave buckwheat (*Eriogonum fasciculatum*)
11. Arizona ash (*Fraxinus velutina*)
12. Creosotebush (*Larrea tridentata*)
13. Anderson wolfberry (*Lycium andersonii*)
14. Evening primrose (*Oenothera deltoides*)
15. Blue palo verde (*Parkinsonia florida*)
16. Big galletgrass (*Pleuraphis wrightii*)
17. Fremont cottonwood (*Populus fremontii*)
18. Honey mesquite (*Prosopis glandulosa*)
19. Screwbean mesquite (*Prosopis pubescens*)
20. Goodding's willow (*Salix gooddingii*)
21. Black willow (*Salix nigra*)
22. Desert globemallow (*Sphaeralcea ambiguus*)
23. Alkali sacaton (*Sporobolus airoides*)

1 Finer soil textures only.

Native species for revegetation
Native species for revegetation

Vetiver trials

- Shelter and protect nursery site from erosion
- In chevrons, providing nurse treatment for natives’ outplanting sites
Vetiver temperatures

-12°C (10°F)
Soil temperatures

Low of 7.5°C

Nowhere near freezing soil
Problems

- Perception as potentially invasive
Problems

- Perception as potentially invasive

US$120 billion / year

Problems

- Perception as potentially invasive
- Rare extreme cold winters
Problems

- Perception as potentially invasive
- Rare extreme cold winters
- Water availability for irrigation
• Water availability for irrigation

http://169.237.140.1/calludt.cgi/VWSTATIONDATA?MAP=8STN=VICTRYIL_A

45.179 mm
Acknowledgements

**LEAD Asia**
Richard Grimshaw

**David S. Price**
anura@wbt.org
+1 (714) 220-8896
www.LEADimpact.org

Senior Environmental Consultant
LEAD Asia