Weed control in EMRC

Risk and cost reduction through a non-chemical approach
Agenda

- Your current situation
- Challenges you face – risks and costs
- How you can mitigate risk
- Our recommended approach
- 7 steps
- Next step
Your current situation

- EMRC is covers an area 2,100km$^2$.
- It is now home to a population of around 358,700 (2014)
- Approx 43% are younger than 19 or older than 65.
- It is home to chemically sensitive areas such as schools, pre-schools, child care facilities, playgrounds, parks, sports facilities, dog exercise reserves, pools, council operated golf courses, major hospitals, shopping precincts, outdoor restaurant areas and aged care facilities.
- Councils maintains parks, gardens and foreshore areas, which includes high value bushland and waterways adjacent to nature reserves and national parks.
Your current situation

Guided by Regional Environmental Strategy
A region supporting healthy ecosystems and habitats for flora and fauna, where the air, land and waterways are clean..........

Duty Care for councils to employ a precautionary principle
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
Your current situation

- Conservation of biological diversity and ecological integrity
  In all situations, conservation of biological diversity and ecological integrity should be a fundamental consideration.

- Improved environmental valuation, pricing and incentives
  The true costs of environmental impacts should be included in the valuation of assets and services.
Your current situation

• Herbicide Use
  o Pesticide Use policies typically include
    • Council adopts an integrated pest management approach..... Ensures....pesticide use is implemented as a last option.
    • The majority of pesticide use consists of applying herbicides for weed control.......  
    • Non-programmed low impact pesticide namely Roundup (Glyphosate) is widely used as required, along with 2-4-d Amicide (according to website)

  o Probably relies on APVMA chemical schedule for glyphosate.
  o Disconnect between current scientific knowledge the outdated schedule review by APVMA and your policies.
Conventional Australian practice

Correct PPE rarely used because it alarms the community

Spray by stealth

No PPE & spraying in immediate proximity to food outlets

Excessive overspray to reduce contractors grass cutting costs
Orge watershed sampling
2007-2008

Annual glyphosate load:
• Urban catchment contributes 95x more glyphosate than agriculture.
• Maximum concentrations detected just after rainfall events reflecting urban runoff.
Environmental risk from using glyphosate on hard surfaces

According to Ramwell (2006):

- Glyphosate is removed easily from asphalt and concrete.
- Glyphosate losses were about 35% of the applied chemical.
- 80% of loss occurs in the first few millimetres of rainfall.
Our bodies contain Flora

According to Samsel and Seneff (2013):
• Glyphosate toxicology effects mammalian gut flora, those trillions of living bacteria that extract energy from your food contributing to your health and vitality.
As a result

- The World Health Organisation has reviewed the toxicological evidence of glyphosate. Glyphosate is now declared probably carcinogenic to humans.
2015 Adelaide university study has shown that Roundup is more toxic to human reproductive cells than glyphosate alone, as it was shown to be an endocrine disruptor.

You may be at risk of:

- Off target damage and litigation
- Tarnished public image
- Herbicide resistance
- Public safety
- Increased admin and resource management costs
- Increased employee OH&S risk
- Storm and potable water contamination
- Habitat, ecosystem, and threat to pets and wildlife
Issues relating to herbicide use

• Off target herbicide application cause loss of feature plantings.
How you can mitigate risk

• Therefore, EMRC needs a weeding solution that:
  o Is chemical free;
  o Is safe to use around sensitive areas such as schools, hospitals, wildlife habitats;
  o Has no spray drift;
  o Does not harm operators;
  o Can be effectively operated in all weather conditions;
  o Reduces the amount of complaints from residents; and
  o Complies with State regulations.
Thermal methods

Thermal Weed Control

- Flame
- Hot Air
- Saturated steam and boiling water
- Steam
- Hot water
- Hot water and insulating foam

Dry thermal
Hydro thermal
Dry thermal weed control

- Hot air
- Open flame
- Radiant heat
- Flame
Flame Weeding in Australia!
Hydrothermal weeding

- Hot water
- Insulating foam
- Saturated steam
- Hot water

- Versatile
- Environmentally-friendly
- Proven efficacy
Thermal shock or lethal heat

- Weeds can be killed quickly with high temperature of 100°C for 0.1 sec = thermal shock.
- Or they can be killed slowly with lower temps of 58 - 98°C = lethal heat.
- The sudden increase in temperature of thermal shock causes more cell damage, increasing efficacy.
Hot water – Lethal Heat

Hot water weed control, Netherlands

Hot water and foam, UK
Saturated steam and boiling water – thermal shock

Central Median

Bondi Beach Car Park
What does thermal shock do?

Instant cell destruction

Pattersons curse - 2 weeks
Blue stone

Immediately after treatment

2 days after
Spartina anglica

Before treatment

Treated area after 4 weeks
Wandering Tradescantia

During treatment

1 day after
Safe in tree pits

Tree roots not affected

Weeds eradicated
WSUD
Playgrounds, community gardens residential areas
How Weedtechnics can help

Participate in a pilot programme

• Expected outcomes of the pilot programme:
  o asses the efficacy
  o comparative cost and
  o value of benefits that the Weedtechnics system provides, i.e. biodiversity, sustainability, clean waters, reduction of chemical application complaints administration, positive PR, reduced Public Liability exposure, protection of Councillors Duty of Care.
Example pilot program

1. Bondi Beach Car park
   • Segmental common brick paving.
   • Deteriorating joints allowing weed growth.
   • Approx 2500m².
Issues related to herbicide use

• Bondi Beach is a high visibility tourist destination
• Sandy soils and paved surfaces allow drainage of chemicals into marine system
• Potentially high risk of exposure by users in bare feet.
• Many infants and children visit the area who are more susceptible to chemical exposure
• Anecdotal evidence suggests that there are numerous complaints when chemical weed control activities are undertaken.
Weeds on site at commencement - 20\textsuperscript{th} March

<table>
<thead>
<tr>
<th>Area 1</th>
<th>Scientific Name</th>
<th>Common Name</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Bidens pilosa  L</td>
<td>cobbler's pegs, farmer's friend</td>
</tr>
<tr>
<td>2</td>
<td>Cardamine hirsuta</td>
<td>Flick weed, Common bittercress</td>
</tr>
<tr>
<td>3</td>
<td>Conyza bonariensis (L.)</td>
<td>fleabane</td>
</tr>
<tr>
<td>4</td>
<td>Cyperus brevifolius Rottb</td>
<td>Mullumbimby couch</td>
</tr>
<tr>
<td>5</td>
<td>Eleusine tristachya</td>
<td>Crab Grass, crowsfoot</td>
</tr>
<tr>
<td>6</td>
<td>Hypochoeris radicata  L.</td>
<td>catsear, common catsear, flatweed,</td>
</tr>
<tr>
<td>7</td>
<td>Polycarpon tetraphyllum</td>
<td>fourleaf allseed, four-leaved allseed</td>
</tr>
<tr>
<td>8</td>
<td>Portulaca oleracea</td>
<td>Common purslane</td>
</tr>
<tr>
<td>9</td>
<td>Soliva sessilis</td>
<td>Bindi</td>
</tr>
</tbody>
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Weeds
Process and production data

2 methods used:

- Treatment 1 and 2 used SW800 with handheld Versitech closed head.
  - Utility/ truck mounted single operator.
  - Entire segmental paved area required treatment.
  - Treatment 1: Car park area 301m² / hour
  - Treatment 2: 326m² / hour
  - Treatment 1 path area, minimal obstructions: 384m²
  - Treatment 2: 563m²
- Treatment 3 undertaken using prototype Steaminator.
  - Production rate
    - Car park: 526m² / hour
    - Path area: 704m² / hour
  - Cost per m²:

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<tr>
<th>Location</th>
<th>Per treatment</th>
<th>Per annum (x5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpark</td>
<td>A$0.21</td>
<td>A$1.05</td>
</tr>
<tr>
<td>Pathway</td>
<td>A$0.16</td>
<td>A$0.80</td>
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</tbody>
</table>
Process and production data

Bondi Rd
- Isuzu 2 tonne truck with traffic control signage and lights, moving plant TCP.
- Driver / assistant ensures freedom of hose for operator and hand pulls larger weeds.
- Operator using Versitech open head VOH for intense treatment of cracks and crevices and accessibility around vehicles and obstacles.
- Footpaths 78% open to rain, 22% under shop awnings.
- Approx 80% asphalt or concrete.
- 20% segmental paving.
- Kerb + Gutter + 3.3m footpath.
- High presentation standard.
- 6 - 7 interventions per annum.
- Australia / NSW / Sydney / Bondi: micro-climate.
- A$0.06 per m² per treatment
- A$ 0.42 per m² per treatment
Blair St

- Isuzu two tonne truck with traffic control signage and lights, moving plant TCP.
- Driver/assistant ensures freedom of hose for operator and hand pulls larger weeds.
- Operator using Versitech closed-head VCH for intense treatment of weeds, encapsulating heat under stainless steel cover. Seed stratification can be expected after first and second treatment.
- First treatment carried out with two weeks of intense herbicide spray. Mainly treating germinating seed bank.
- Production rate
  - Treatment 1 844 m² / hour
  - Treatment 2 443 m² / hour
  - Treatment 3 570 m² / hour
- Recommended 6-8 treatments per annum for high presentation. Combine with mulching and replanting of open areas.
- Treatment cost A$0.25 per m² per treatment
9 steps to chem free

1. Categorise value and risk of the weeds
2. Identify the source
3. Design weeds out
4. Design and plan for prescribed presentation standards
5. Identify ‘no spray’ catchment zones
6. Identify ‘no spray’ socially and environmentally sensitive areas
7. Adopt a variety of modes of action
8. Keep records to manage methodology
9. Sustainable management requires whole of life cycle and risk accounting
Need detailed information?

FREE DOWNLOAD PACKAGE
1. Full paper PDF
2. Presentation PDF
3. Full Methodologies Matrix
4. Pilot program details and enquiry form

http://go.weedtechnics.com/weedsnetwork/