

Campsite impact monitoring in the temperate eucalypt forests of Western Australia: An integrated approach

By

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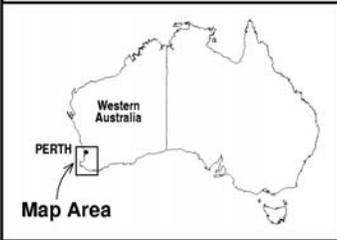
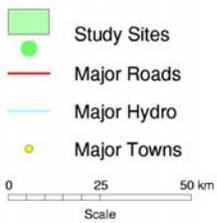




Background

- ◆ Demand for natural area recreation and tourism is increasing.
- ◆ Social and biophysical impacts of camping in the eucalypt forests of southwestern Western Australia were assessed
- ◆ Integrated study examining both biophysical and social impacts in designated, developed and informal recreation areas used for camping

LOCALITY MAP









Choosing indicators

- ◆ Specific rather than general conditions
- ◆ Objective, reliable and repeatable
- ◆ Reflect recreation site attributes
- ◆ Reflect the relationship to the amount and/or type of use occurring
- ◆ Related to user concerns
- ◆ Responsive to management control
- ◆ Accurate, and time and cost efficient
- ◆ Reflect changes caused by the recreational activity of interest
- ◆ Be sensitive to change



Inventory and impact indicators

◆ Inventory indicators

- characterise conditions on the campsite

Distance to main track/road (metres)

[] 1-30m

[] 31-60m

[] 61-90m

[] >90m



Impact indicators

◆ Impact indicators

- Define the impacts resulting from recreation use

Root exposure on campsite (number of trees _____)

- none** (other than natural causes)
- slight** (the tops of many of the major roots expose or severe exposure on 1 or 2 major roots)
- moderate** (tops & sides of many of the major roots exposed or very severe exposure on only 1 or 2 major roots)
- severe** (tops, sides and undersides of any of the major roots exposed)



Campsite Data Form



Date: ____/____/____

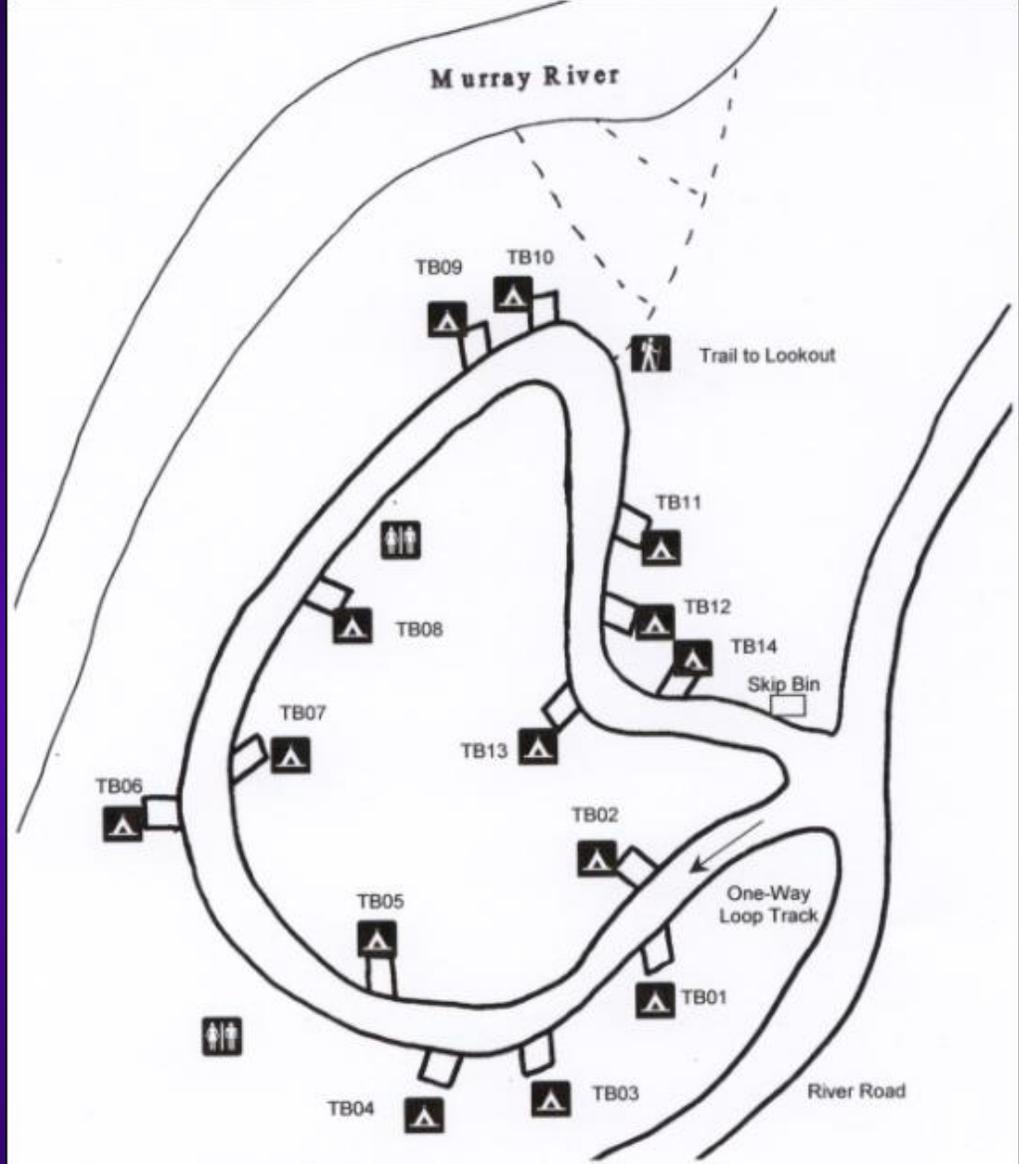
Name of recorder: _____

Human damage to trees (eg. Axe marks, initials) _____ (other than natural causes)

- none
- slight (nails, nail holes, small branches cut off or broken, small superficial trunk scars)
- moderate (large branches cut off or broken, trunk scars & mutilations)
- severe (trunk scars that total $>0.09\text{m}^2$, large branches cut of or broken, extensive mutilations)

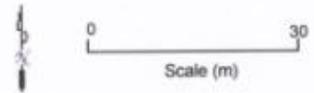
Cleanliness – Presence of human sourced litter

- none
- 1-3 pieces of rubbish
- 4-6 pieces of rubbish
- >6 pieces of rubbish



**LANE POOLE RESERVE
TONY'S BEND**

-  Campsite
-  Formal Walk Trail (DCLM designed)
-  Toilet



Combined Monitoring System

- ◆ Multiple indicator ratings
 - For example:

Estimated total area of campsite

[] $<50\text{m}^2$

[] $50\text{-}200\text{m}^2$

[] $201\text{-}500\text{m}^2$

[] $>500\text{m}^2$



Combined Monitoring System

- ◆ **Multiple indicator measures**

- **For example:**

- Penetrometry to measure soil compaction
 - Counting number of trees with damage

Methods overview

- ◆ **Impact Indicators**
 - Campsite area
 - Human damage to trees



Human damage to trees



Slight



Moderate



Severe

Methods overview

◆ Impact Indicators

- Campsite area
- Human damage to trees
- Root exposure



Root exposure



Slight



Moderate



Severe

Methods overview

◆ Impact Indicators

- Campsite area
- Human damage to trees
- Root exposure
- Impact to mineral soil



Methods overview

◆ Impact Indicators

- Campsite area
- Human damage to trees
- Root exposure
- Impact to mineral soil
- Tent ditching/drainage channels



Tent ditching/drainage channels



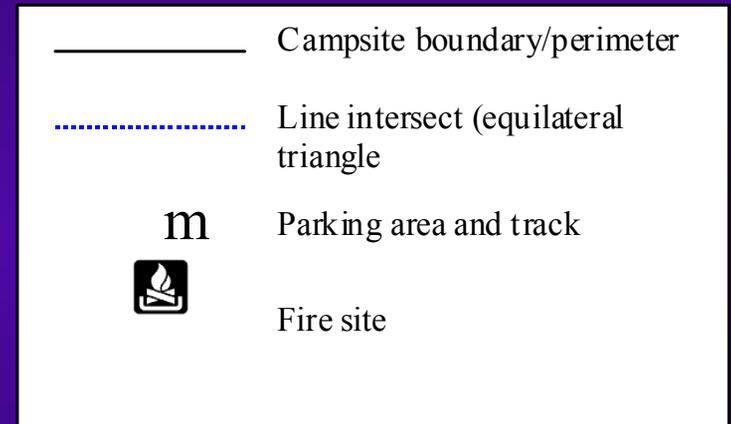
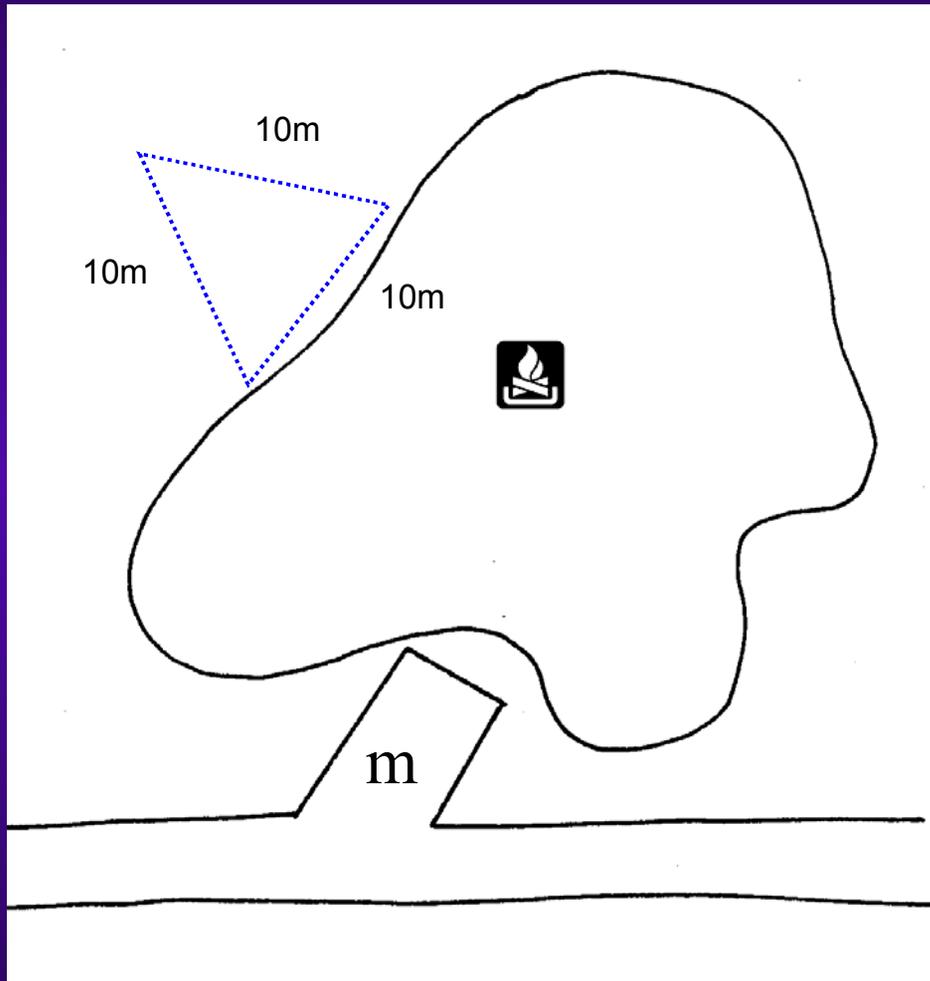
Methods overview

◆ Impact Indicators

- Campsite area
- Human damage to trees
- Root exposure
- Impact to mineral soil
- Tent ditching/drainage channels
- Cleanliness
- Number of social trails
- Tree seedlings
- Coarse woody debris quantities



Coarse woody debris quantities

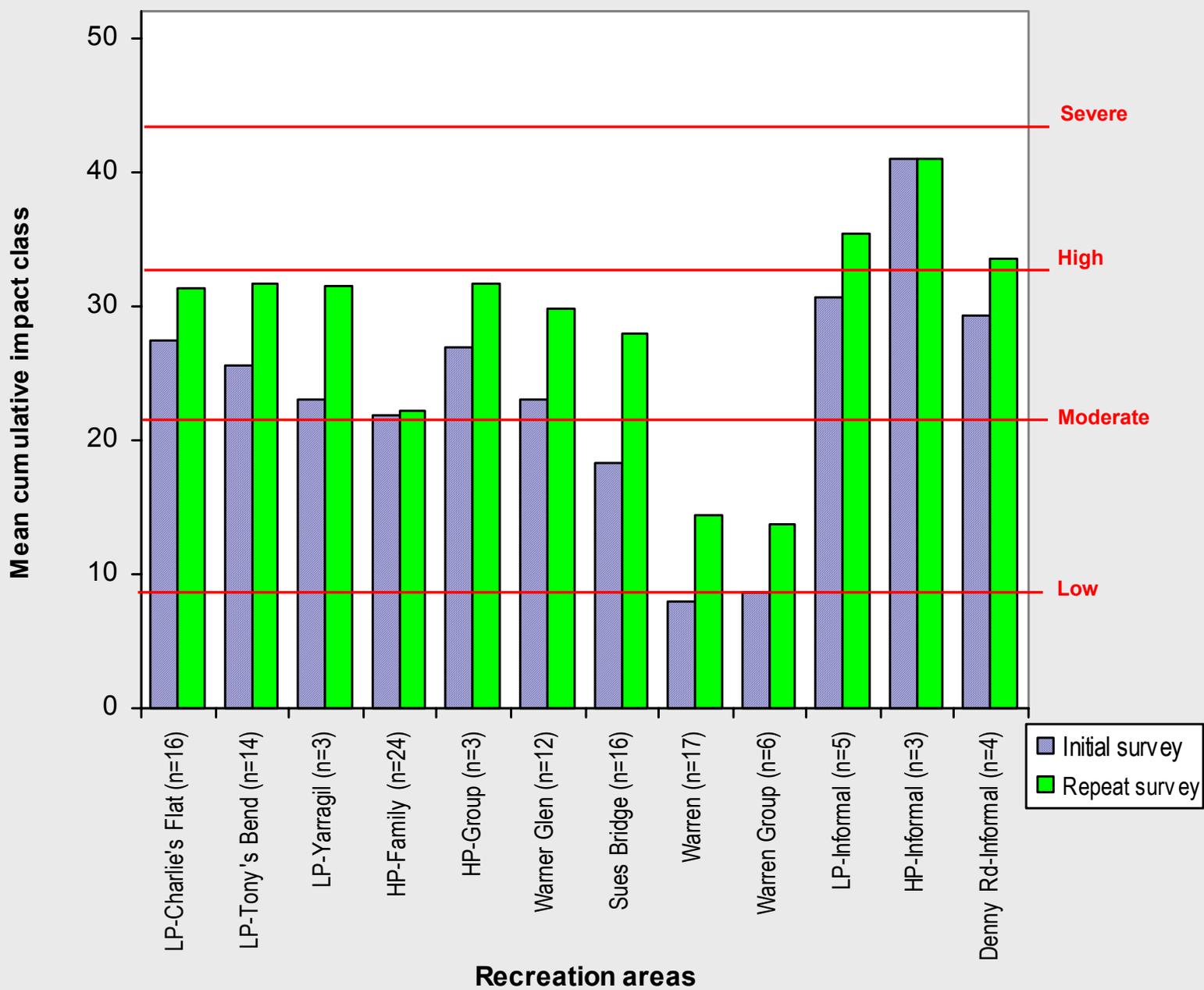


Criteria/Parameter	Rating	Weight
<i>Tree damage</i>	<ul style="list-style-type: none"> <li data-bbox="576 268 1302 311">(1) None (other than natural causes) <li data-bbox="576 319 1544 415">(2) Slight (nails, nail holes, small branches cut off or broken, small superficial trunk scars) <li data-bbox="576 424 1500 519">(3) Moderate (large branches cut off or broken, trunk scars & mutilations) <li data-bbox="576 528 1515 672">(4) Severe (trunk scars that total >0.09m², large branches cut off or broken, extensive mutilations) 	3
<i>Root exposure</i>	<ul style="list-style-type: none"> <li data-bbox="576 872 1302 915">(1) None (other than natural causes) <li data-bbox="576 923 1496 1068">(2) Slight (the tops of many of the major roots exposed or severe exposure on only 1 or 2 major roots) <li data-bbox="576 1076 1544 1220">(3) Moderate (the tops & sides of many of the major roots exposed or very severe exposure on only 1 or 2 major roots) <li data-bbox="576 1229 1563 1325">(4) Severe (tops, sides and undersides of many of the major roots exposed) 	2

Criteria/Parameter	Rating	Weight
<i>Human activities that contribute to soil erosion (Tent ditching, drainage channels)</i>	Depth and width of incision: mean depth (cm) x mean width (cm) (1) Negligible (<2cm x <25cm) (2) Low (2-5cm x 25-50cm) (3) Moderate (6-8cm x 51-100cm) (4) High (>8cm x >100cm)	2
<i>Cleanliness (Human sourced litter)</i>	(1) None (2) 1-3 pieces of litter (3) 4-6 pieces of litter (4) >6 pieces of litter	2

Criteria/Parameter	Rating	Weight
<i>Social trails radiating from campsite</i>	(1) One	3
	(2) Two	
	(3) Three	
	(4) \geq Four	
<i>Camp area</i>	(1) $<50\text{m}^2$	1
	(2) $50\text{-}200\text{m}^2$	
	(3) $201\text{m}^2 - 500\text{m}^2$	
	(4) $>500\text{m}^2$	

Impact Class: low (8-20), moderate (21-31), high (32-42), severe (43-52).



Results

- Designated campsites had an overall mean impact score of moderate
- Designated campsites were significantly more impacted than newly developed campsites
- The provision of designated campsites is an effective management strategy
- Designated campsites were significantly less impacted than informal campsites

Thank you for your time

