

Management effectiveness: case study of an Australian remote coastal camping location

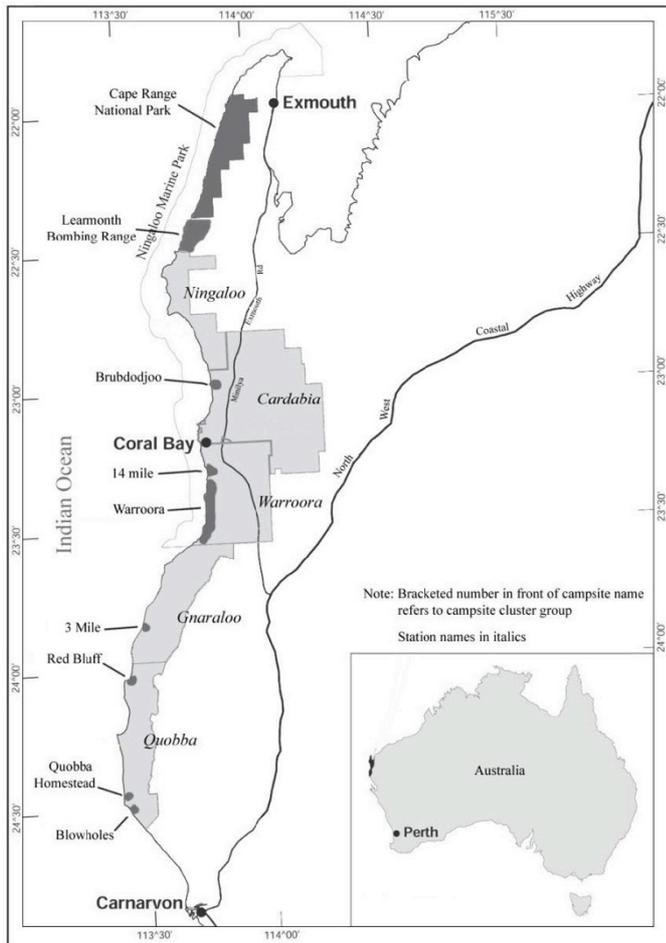
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Background

The World Heritage listed Ningaloo coast in Western Australia as a remote camping destination in which gradual environmental degradation is observable at numerous campsites. Campsites within this semi-arid region are all vehicle accessible to varying degrees. Multiple lessees manage land and camp areas along the Ningaloo coast. Globally, research on vehicle-accessible camping sites and their visitors in coastal protected areas is limited while empirical evaluation of management influence is scarce. The lack of baseline and current conditions data has limited management effectiveness, such as setting management priorities and selecting impact management strategies. Few studies on campsites in semi-arid coastal areas exist and include research in Baja (Monz 1998) and on Fraser Island, Queensland (Schlacher and Thompson 2009), of which the latter also contains campsites accessible via four-wheel drive vehicles. Within the international literature, research questions surrounding recreation impacts and management in wilderness areas were examined by Leung and Marion (2000), of which one was: How effective are visitor and site management actions? Research presented in this paper utilised an integrated biophysical-social science methodology in an attempt to answer this question for vehicle-accessible camping sites within a coastal protected area.

Study Area

To be incorporated into the study area, only those management areas deemed remote were considered. Criteria included their location being within or adjacent to the NMP within 200 metres of the beach, with no running fresh water or electricity provided and more than one hour drive from a regional centre. The study area comprises one national park, five pastoral (sheep/cattle) stations, one Federal air weapons range and one local government operated camp area. The Ningaloo Marine Park (NMP) boundary sits 40 metres inland past the mean high tide mark. As such, many coastal camping areas are officially under the jurisdiction of the State's Department of Parks and Wildlife despite being located on land owned or leased by other bodies. The local government operated camp areas have highest level of regulation, enforcing rules surrounding no dogs, no fires and a maximum stay of fourteen days in peak periods. Basic facilities include toilets, roads, paths, control devices and signing. A camp host is present at many of the sites to provide information and keep the site clean. The least regulated camp areas have no regulation and no facilities are provided.



Study area, showing the Nine Camp Areas and their Associated Clusters, Cluster 1 (least regulated) to Cluster 4 (most regulated). Map Adapted from Wood & Hughes (2006)

Method

The methods for this study were adapted from the international literature to suit the semi-arid Ningaloo environment. A quantitative combined survey approach utilising multiple indicator ratings and measures assessed the various environmental impacts at each site. Indices were adapted from the literature to determine the relationship between regulation and both vegetation loss and overall impact of campsites. Indices included the Coastal Vegetation Loss (CVL), Area of Coastal Vegetation Loss (ACVL) and Coastal Campsite Impact Index (CCII), which surmised eight different Indicators comprising: ‘campsite area’, ‘Coastal Vegetation Loss’ (CVL, an index), ‘barren core area’, ‘perimeter vegetation damage’, ‘number of fire pits’, ‘number of social trails’, ‘sum of social trail widths’, and ‘number of litter items’.

In total, 225 initial impact assessments were undertaken. Data collection procedures were adapted to semi-arid, coastal environments comprising both undesignated and designated remote campsites. For analysis, camp areas were grouped into four statistically similar Clusters, categorised by management oversight, facilities, prices, access against which the data are compared. Regulation level through management oversight was also a key differentiator between the Clusters. The null hypothesis was that there is no significant difference between the Clusters with regard to campsite impacts. Factors, which influence magnitude of impact, were analysed through correlation coefficients.

Results

The differences between management Clusters in regard to impact variables and impact indices were measured in order to test the null hypothesis that there is no significant difference between the Clusters with regard to campsite impacts. The findings from the three indices rejected the null hypothesis that no significant differences in environmental impact exist between the Clusters through strong correlations between regulation level and campsite impact. All three indices were found to decrease with an increase in regulation. This supports Smith's (2003) findings from a study in the Eucalypt forests of Western Australia's south-west which found that designated campsites experienced significantly fewer adverse impacts than did the informal ones. However, that despite these general correlations, all Clusters contained variables on which they scored well and on which they could improve. For example, the lesser-regulated sites had challenges with campsite spread, whereas the higher regulated areas had challenges with litter. Whilst visitation levels varied at each Cluster, some management practices were shown to be more effective than others. For example, one camp area handed out large rubbish bags with check-in and collected rubbish daily which resulted in very little litter. There were no Clusters that exhibited no adverse environmental impacts.

Factors found to reduce magnitude of impact included management presence, campsite containment, campsite boundaries and vegetation type, whilst the provision and extent of rubbish bins were found to not necessarily reduce the presence of litter. Reducing campsite area spread and the presence of livestock should be areas of management focus in the less regulated locations. Indirect management presence through volunteer camp hosts also reduced social impacts such as litter.

Additional impacts viewed offsite, which may affect campsite impacts, include prevalent use of four-wheel drive vehicles, which damages surrounding vegetation. By understanding each Cluster's specific characteristics and vulnerabilities, adverse environmental impacts may be ameliorated through equally specific management initiatives. Individual campsite impacts should also be considered.

Conclusion

The research provides valuable baseline data and management recommendations on this topic for the vulnerable and World Heritage listed Ningaloo coast. The relationships identified between management variables and impact and use variables contribute significantly to conceptual understanding in recreation ecology and recreation sciences. This research also addresses a major research questions for vehicle-accessed remote campsites within a coastal, semi-arid environment.

References

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