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Effects of adjacent land tenure on visitor use of Ningaloo Marine Park, Western Australia

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Abstract

Although many marine parks are located adjacent to coastlines with a variety of tenures, the influence of this tenure on visitor use is poorly known. Ningaloo Marine Park in Western Australia adjoins the coast along its entire 300 km length and is accessed via several land tenure types that encapsulate a suite of attributes (i.e. services, facilities and management controls). The effect of tenure on visitor and visit characteristics, and recreational activities, was investigated using 1208 visitor surveys. Visitor origin and length of stay varied significantly among tenures, while repeat visitation and site fidelity were high, especially on pastoral leases. Although a wide range of recreational activities occurred in the Marine Park adjacent to all tenures, the percentage of respondents involved in activities such as fishing, sailing sports and snorkelling varied among tenures. These results highlight the influence of a mix of tenures, and accompanying attributes, on visitor use of an adjacent marine park. Although this provides a challenge for managers of marine parks with an extensive coastal interface in achieving the dual objectives of conservation and recreation, it also contributes to a diversity of visitor experiences.

Keywords: Ningaloo Reef, tourism, recreational activities, marine protected area

Introduction

In Australia and elsewhere, marine parks are a well-documented tool for conserving biodiversity (Roberts et al. 2001), mitigating anthropogenic impacts (Gray et al. 2010) and providing equitable access to visitors who wish to participate in a range of recreational pursuits (Newsome et al. 2002). Many marine parks adjoin the coast, and the tenure (or ownership) of adjacent lands has important consequences for achieving park objectives, especially if they are administered by different management authorities with non-aligned purposes (Francour et al. 2001; Cicin-Sain & Belfiore 2005). For example, a marine park may adjoin an area with a designated use not compatible with conservation, which may result in negative environmental impacts (e.g. via runoff of pollutants from industry or agriculture) (Keller & Causey 2005; Gordon 2007). Tenure arrangements can also form a mosaic of overlapping and competing interests that may lead to confusion or conflict regarding the various rights and responsibilities of land owners (Pike et al. 2010).

Public access to the landward edge of a marine park can be restricted (or unrestricted) by tenure arrangements, and has consequences for managing the distribution of visitors and their associated impacts, e.g. trampling of coastal dune systems (Davenport & Davenport 2006). The types of visitors, and their participation in recreational activities, will also vary depending upon the biophysical, social and managerial characteristics of these lands (McCool et al. 2007; Manning 2011). Moreover, unlike terrestrial parks, facilities (i.e. toilets, carparks and boat ramps) required by visitors to marine parks are usually located on adjacent lands, and it may therefore be difficult for managers to

43 provide such amenities. The strategic placement of marine parks adjacent to existing
44 terrestrial protected areas has been discussed as an option for maximising the
45 conservation of biodiversity (Stoms et al. 2005) and increasing financial viability by
46 reducing costs of management, enforcement and monitoring (Klein et al. 2008) while
47 also assisting with the provision of visitor facilities.
48
49 Although a range of tenures may be challenging for management, a mix of access,
50 services, facilities and management controls, provides for a diversity of recreational
51 experiences for visitors. Benefits of such diversity were first discussed by Wagar (1974)
52 and has evolved into the recreational opportunity spectrum that has been widely
53 implemented on publicly administered lands (Newsome et al. 2002; McCool et al.
54 2007). This spectrum has not previously been used to understand activities occurring on
55 lands adjacent to marine parks, although it has been successfully applied to recreation
56 within marine parks (Shafer & Inglis 2000; Gray et al. 2010).
57
58 Given that the potential effects of land tenure on the recreational use of neighbouring
59 marine parks are large (Cicin-Sain & Belfiore 2005; Gordon 2007), it is essential to
60 understand these relationships. Although the effects of urbanisation and agriculture on
61 biodiversity of coastal marine parks have been studied (Keller & Causey 2005; Gordon
62 2007), this has not extended to investigating the linkages between land tenure, visitors
63 and recreation in adjacent marine parks. Such knowledge is also limited in the terrestrial
64 environment, with previous studies being focused on differences in vegetation between
65 tenures (Kakembo 2001; Franklin et al. 2008) or contrasting visitor behaviour and fee

structure within land units of the same tenure type (national parks) (Buckley 2003; Tanner et al. 2008).

This article explores the influence of the tenure on visitors to a marine park abutting the Western Australian coastline. In this context, tenure is a term which encapsulates a suite of attributes (i.e. ownership, access, services, facilities and management controls) and is used as a basis for describing and analysing visit characteristics (i.e. length of stay, repeat visitation), visitor characteristics (i.e. origin, age) and participation in recreational activities. The article concludes with comments on what the increased understanding of the effects of tenure on visitor use brings to management of coastal marine parks.

Study Area

The world heritage listed Ningaloo Marine Park is 300 km in length and extends three nautical miles offshore (Figure 1). As it was designed to encompass a fringing coral reef system, the Marine Park adjoins the coastline along its entire extent and attracts 200,000 visitors per annum (CALM & MPRA 2005). The fringing reef crest creates a sheltered lagoon in which boat-based recreational activities are often undertaken, while the close proximity of the coral to the beach (<100 m) enables easy access for shore-based activities (Smallwood et al. 2011). Visitors are also attracted to the wide diversity of fish and megafauna (i.e. whalesharks and manta rays) (Sleeman et al. 2007). Visitation is highly seasonal, with peak visitor months during the mild winter months from April – October (Smallwood et al. 2011), while the remaining months have fewer visitors due to high temperatures and occasional cyclones.

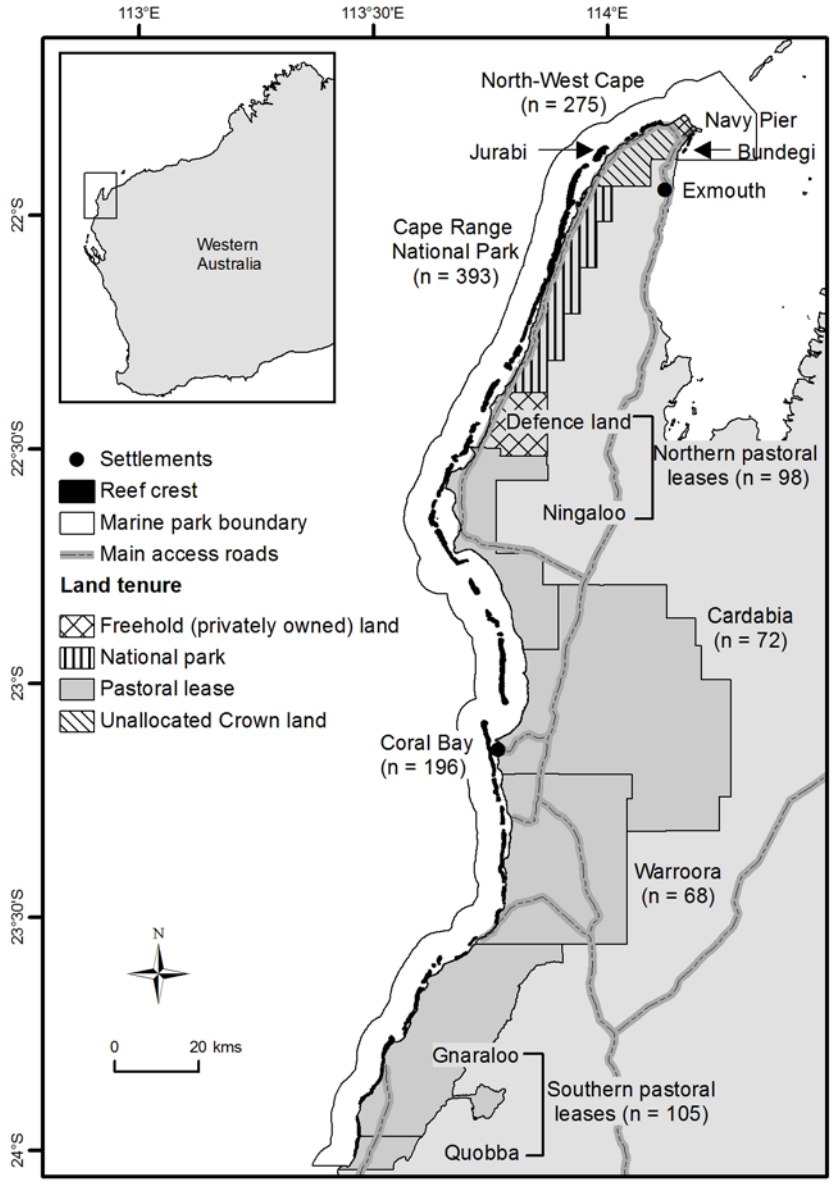


Figure 1 Ningaloo Marine Park and adjacent land tenure (n = number visitor surveys).

Several land tenures adjoin the landward boundary of the Marine Park, including freehold land, local government reserve, unallocated Crown land, national park, pastoral lease and settlement (Figure 1; Table 1). Differences in access, accommodation options,

services and facilities as well as management controls are evident between the various tenure types.

The two areas of freehold land in the north of the study area are owned by the Commonwealth Government (Table 1). The Navy Pier is one of the few places along the Ningaloo coast where road access is restricted, but the beach can still be accessed on foot. No services or facilities are provided for visitors on Commonwealth freehold lands, although camping was permitted on Defence land at the time of this study.

Unallocated Crown land and local parks are jointly managed by local and State government. Access to the coast is via numerous roads at which there are some toilet facilities, while caravan parks offer accommodation and other limited services (i.e. groceries and fuel). Cape Range National Park (CRNP) is managed by the State government and has one of the longest coastal frontages onto the Marine Park. Toilet facilities are provided at every coastal camping area, and management controls include a maximum stay of 28 days (CALM & MPRA 2005).

112 **Table 1 Description of tenure features as well as associated services, facilities, infrastructure and management controls.**

Tenure features						Access		Accommodation						Services and facilities				Management controls			
Tenure group	Tenure type	Name	Management authority	Location Marine Park interface	Length Marine Park interface (%)	2WD vehicle	Boat launch area	Coastal camping	Caravan park	Self-contained	Safari tents	Hotels	Backpackers	Groceries	Fuel	Toilets	Freshwater	Maximum stay	Camping fee	Locked areas	Wood fires
North-West Cape	Freehold land	Navy Pier	Commonwealth government	LWM	0.3	✓R	×	×	×	×	×	×	×	×	×	×	×	--	--	--	--
	Unallocated Crown land	North-West Cape	Local, State government	HWM	3.6	✓	✓	×	✓	✓	×	×	×	✓	✓	✓	✓	×	✓	×	×
	Local park	Jurabi & Bundegi	Local, State government	HWM	9.2	✓	✓	×	×	×	×	×	×	×	×	✓	✓	--	--	--	--
Cape Range National	National park	CRNP	State government	HWM	18.4	✓	✓	✓	×	×	✓	×	×	×	×	✓	✓	✓	✓	×	×
Northern pastoral leases	Freehold land	Defence land	Commonwealth government	HWM	4.4	×	✓	✓	×	×	×	×	×	×	×	×	×	×	×	×	✓
	Pastoral lease	Ningaloo	Leaseholder	HWM + 40m	19.5	×	✓	✓	×	✓	×	×	×	×	×	×	×	×	✓	✓	✓
Central pastoral leases	Pastoral lease	Cardabia	Leaseholder	HWM + 40m	10.1	×	✓	✓	×	×	×	×	×	×	×	×	×	×	✓	×	✓
	Pastoral lease	Warroora	Leaseholder	HWM + 40m	13.6	×	✓	✓	×	✓	×	×	×	×	×	×	×	×	✓	×	✓
Southern pastoral leases	Pastoral lease	Gnaraloo	Leaseholder	LWM	17.6	×R	✓	✓	×	✓	×	×	×	×	×	✓	✓	×	✓	✓	✓
	Pastoral lease	Quobba	Leaseholder	LWM	2.6	×	✓	✓	×	✓	✓	×	×	×	×	✓	S	×	✓	×	✓
Coral Bay	Settlement	Coral Bay	Local government	HWM	0.7	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓	✓	×	--	--	--

113 R = restricted, S = site dependent, -- = not applicable**,** CRNP = Cape Range National Park, LWM = Low Water Mark, HWM = above High Water Mark.

Pastoral leases occupy the hinterland of much of the Marine Park (Figure 1; Table 1). This tenure type was originally established to address unauthorised land settlement in Australia and New Zealand whereby, instead of granting freehold tenure, the government retained control of land use and the primary purpose was restricted to the grazing of livestock (Holmes & Knight 1994). In recent years, increasing demand from the public for coastal access, has seen coastal camping, and other accommodation options, become more prevalent on pastoral leases along the Ningaloo coast. Few other facilities and services are provided and access to the coast is restricted at some locations. The boundary of the Marine Park extends to low water mark on the southern pastoral leases, but extends to 40 m above high water mark, on all other leases. This intertidal area cannot be included in the Marine Park without meeting obligations under the *Native Title Act 1994*, and it is proposed it will be added to the Marine Park when these are met (CALM & MPRA 2005). Indigenous Australians have a long history of utilising the resources of the Ningaloo coast (Morse 1993). The area continues to have ongoing significance to the Aboriginal community, who retain strong ties to specific cultural sites, and operate the Cardabia pastoral lease.

The settlement of Coral Bay is located at the midpoint of the Marine Park and offers the greatest diversity of accommodation types, services and facilities (Figure 1; Table 1). Similar diversity is also found in the settlement of Exmouth which visitors use as a base for day trips to the Marine Park (Northcote & Macbeth 2008) but, as it is not located adjacent to the Marine Park, it was not included in this study.

Methods

Visitor surveys were conducted along the coast of the Marine Park on 16 days per month from January – December 2007 (Smallwood et al. 2012a). Respondents were selected using quota and purposive sampling, both non-probability methods, to ensure that locations with highest use were sampled more frequently than those with low use, while also obtaining data on a wide spectrum of recreational activity types.

During the study, 1208 respondents were intercepted either during, or at the completion of, their recreational activity, similarly to roving surveys of recreational fishers (Pollock et al. 1994). Visitor surveys were completed across all daylight hours (7.30 am – 6 pm) but were constrained to 5 – 10 surveys per day due to the long travel times and poor road conditions (i.e. corrugated tracks).

The questionnaire consisted of predominantly closed-ended questions to facilitate quantitative analyses. Questions on visitor characteristics included age and origin as well as classifying respondents as residents or tourists. A resident was defined as someone living permanently nearby, or adjacent, to the Marine Park, while tourists were those who had travelled away from their usual place of residence for leisure. About 2500 people reside in the settlements of Coral Bay and Exmouth (Northcote & Macbeth 2008). The main recreational activity that brought the respondent to the coast, and time spent there, were recorded, as were visit attributes such as place of accommodation, length of stay and whether the respondent had an off-road vehicle on their current trip. Patterns of previous visitation and the main reason for choosing a place to stay were

documented along with the level of participation in specific recreational activities during their current trip to Ningaloo, up until the time of interview.

People undertaking stationary activities, such as sunbaking, were more likely to be intercepted as they are on the coast for longer periods than respondents engaged in water-based activities, such as snorkelling. This phenomenon is known as length of stay bias and is well-documented in recreational fishing surveys (Pollock et al. 1994). To mitigate this bias, the current activity being undertaken was recorded, as well as the main activity for which the respondent came to the coast. Researchers made every effort to intercept people involved in a range of activity types, which is consistent with a purposive approach to group selection.

Lands adjacent to Ningaloo Marine Park were combined for analysis based on similarities in tenure (and accompanying attributes) as well as position along the coast (Table 1; Column 1). The neighbouring, publicly owned lands adjacent to the northern extent of the Marine Park (Navy Pier, North-West Cape and two local parks) were aggregated as ‘North-West Cape’. Defence land and neighbouring Ningaloo pastoral lease, with limited facilities, were grouped as the ‘northern pastoral leases’. The central pastoral leases (Cardabia and Warroora) were analysed separately due to their different access routes. The southern pastoral stations (Gnaraloo and Quobba) were aggregated based on similar facilities and services, and a shared access road. As a settlement, Coral Bay remained separate from the other tenures.

Chi-square tests (χ^2) determined the level of significance of each variable in relation to the tenure groups at 0.05 level and, if significant, Cramer's V identified the strength of this association. Values of Cramer's V can vary between zero (indicating little association) and one (indicating a strong association). If assumptions of homogeneity of variance were not met, the Kruskal-Wallis test, a non-parametric equivalent of analysis of variance, was used to test the significance for continuous variables (such as length of stay). Conversely, if these assumptions were met, then analysis of variance was used, and for variables with multiple factor levels, the Least Significant Difference (LSD) *post-hoc* test was used to identify the significant contributors to these effects.

Results

Respondents were intercepted throughout all tenures with the majority from high use beaches at North-West Cape, Cape Range National Park and the settlement of Coral Bay (Figure 1).

Visitor characteristics

Variables of gender, age, origin, group type and accommodation were all significant when related to the tenure where respondents were engaged in recreational activity (Table 2). The overall gender ratio (male: female) was 1:1.4 across the sample, while on tenures to the south of Coral Bay over 70 per cent of respondents were female. Respondents fell predominantly within the 25 – 54 year age categories, although Cape Range National Park and settlement of Coral Bay had much higher proportions of respondents who were under 34 years of age.

Half of the respondents were intrastate Australian visitors, whilst residents comprised 12 per cent of the sample and were more frequently recorded along North-West Cape, the closest tenure group to the settlement of Exmouth. Intrastate visitors were distributed in highest numbers on the northern pastoral leases. Respondents of international origin were found predominantly within Cape Range National Park and settlement of Coral Bay. The southern pastoral leases had more respondents travelling alone when compared to the remainder of the Ningaloo coast where couples, friends and families were dominant.

Table 2 Visitor characteristics of respondents participating in recreational activities within each tenure group (n = 1172).

Variable (%)	North-West Cape	Cape Range National Park	Northern pastoral leases	*Central pastoral lease (Cardabia)	*Central pastoral lease (Warroora)	Southern pastoral leases	Coral Bay
Gender	χ^2 (6) = 49.1, ρ<0.05; Cramer's V = 0.205						
M (41)	36	46	33	31	23	28	57
F (59)	64	53	67	69	77	71	42
Age (years)	χ^2 (24) = 94.5, ρ<0.05; Cramer's V = 0.142						
18-24 (7)	7	8	2	4	2	5	9
25-34 (27)	20	33	19	21	10	33	36
35-44 (28)	33	23	25	37	23	43	22
45-54 (21)	19	21	31	20	39	18	18
55+ (17)	21	15	23	18	26	1	14
Origin	χ^2 (18) = 253.6, ρ<0.05; Cramer's V = 0.465						
Resident (12)	27	6	13	6	5	11	6
Intrastate (51)	52	37	78	69	89	58	43
Interstate (13)	10	23	4	16	5	9	11
International (24)	12	35	5	10	2	23	40
Group type	χ^2 (24) = 66.3, ρ<0.05; Cramer's V = 0.238 ^						
Solo (16)	16	11	20	23	18	30	16
Couple (32)	30	38	30	34	31	16	25
Family (22)	23	23	19	17	21	20	21
Friends (27)	31	25	31	27	28	34	23
Tour group (3)	0	4	0	0	0	0	1

^ some expected cell frequencies <5; results should therefore be treated with caution.
* Although spatially adjacent these tenures were analysed separately due to their different access routes.

Visit characteristics

Coastal camping and caravan parks were the favoured accommodation types (Table 3). Coastal camping was dominant on all of the pastoral leases, except Cardabia, where many respondents undertook day trips from the neighbouring settlement of Coral Bay. Respondents within North-West Cape, Cape Range National Park and Coral Bay displayed the highest diversity of accommodation types due to the greater number of options available in the nearby settlements.

The shortest mean lengths of stay occurred in Cape Range National Park, Cardabia pastoral lease and the settlement of Coral Bay while the remaining tenures had mean lengths of stay of more than 20 days (Table 3). Overall, more than 60 per cent of respondents reported they were staying at only one location on their current visit, which increased to more than 70 per cent for the pastoral leases. Pastoral leases also had the highest percentages of respondents with off-road vehicles, as corrugated tracks restricted access to 4WD vehicle only.

Table 3 Visit characteristics of respondents participating in recreational activities within each tenure group (n = 1172).

Variable (%)	North-West Cape	Cape Range National Park	Northern pastoral leases	Central pastoral lease (Cardabia)	Central pastoral lease (Warroora)	Southern pastoral leases	Coral Bay
Accommodation			χ^2 (36) = 844.6, ρ<0.05; Cramer's V = 0.348 ^				
Coastal camping (34)	3	38	98	13	92	82	1
Caravan park (35)	4	32	0	72	5	0	59
Backpackers (3)	1	2	0	1	0	0	16
Self-contained units (7)	7	7	0	6	0	10	12
Safari tents (1)	0	1	0	0	0	0	0
Hotels (9)	11	14	1	6	2	0	8
Private residence (11)	33	7	1	3	2	8	4
Length of stay (days)			H(6) = 117.3, ρ<0.05[a]				
Mean (15)	22	11	24	14	21	20	8
Std. error. (0.7)	34	15	34	2	20	27	10
Stay at one location on this trip			χ^2 (6) = 79.0, ρ<0.05; Cramer's V = 0.285				
Yes (61)	70	43	73	72	75	76	67
No (39)	30	57	27	28	25	24	33
Have a off-road vehicle on their current trip			χ^2 (6) = 182.1, ρ<0.05; Cramer's V = 0.394				
Yes (62)	67	50	99	83	95	73	36
No (38)	33	50	1	17	5	27	64
Have visited Ningaloo on a previous occasion			χ^2 (6) = 129.2, ρ<0.05; Cramer's V = 0.332				
Yes (55)	72	38	71	554	80	75	41
No (45)	28	62	29	46	20	25	59
Stay at the same location on every trip			χ^2 (6) = 38.8, ρ<0.05; Cramer's V = 0.263				
Yes (44)	39	24	58	49	47	59	52
No (56)	61	76	42	51	53	41	48

[a] Kruskal-Wallis test

241

242 Repeat visitation was determined by asking if respondents had visited the Marine Park
243 on a previous occasion, and 55 per cent responded in the affirmative (Table 3). The
244 highest repeat visitation was at North-West Cape and on the pastoral leases. Of those
245 respondents who were repeat visitors, 44 per cent indicated they always stayed at the
246 same location, indicating high site fidelity. A total of 39 per cent of tourists had visited
247 the Marine Park only once in the previous 12 months, while 90 per cent of residents had
248 visited over 11 times.

249

250 The main reason for choosing an accommodation location was ascribed to one of 13
251 categories (Table 4). The most frequent responses were that the location was
252 recommended or based on activity preferences. Significant differences in these reasons
253 were also identified by tenure (χ^2 (72) = 461.7, ρ<0.05; Cramer's V = 0.265) and a clear
254 association was found among the southern pastoral leases and respondents who had
255 selected activities as their main reason for choosing an accommodation site.

256

257 **Table 4 Main reason respondents chose to stay at a particular place of accommodation (n = 1095).**

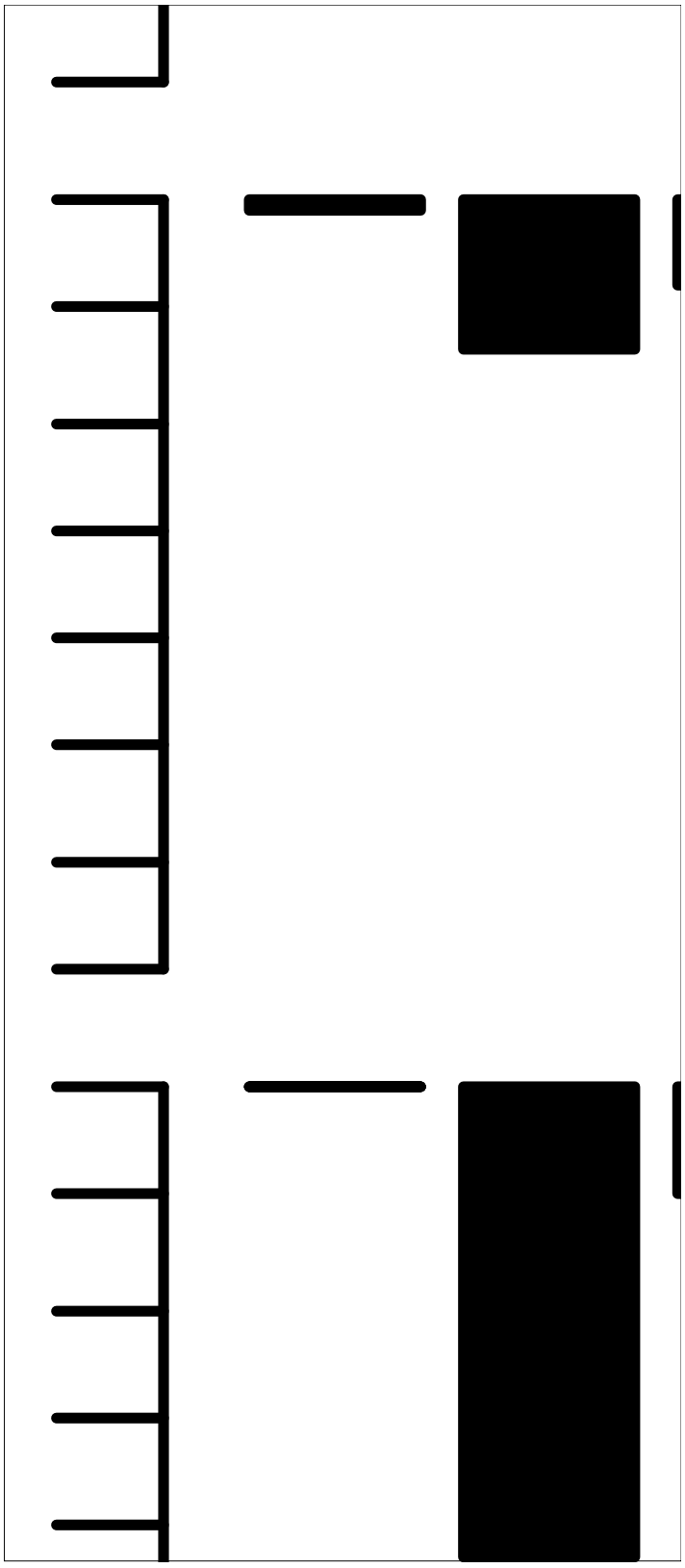
Category	Description	%
Recommended	Recommended by friends, travel agents or tour guides.	17
Activities	Recreation preferences, e.g. good windsurfing or fishing.	12
Location	Decision based on position of site, e.g. close to facilities.	10
Environment	Natural attributes, e.g. beach.	10
Availability	No vacancies available elsewhere.	10
Social	Social attributes, e.g. with friends, good for children, big group.	9
Facilities	Facilities, such as toilets, BBQ and showers, available.	7
Access	Transport linkages (e.g. 2WD) to access a particular location.	5
Financial	Cost of accommodation.	5
Previous experience	Decision affected by prior visit to Ningaloo	4
Ambience/crowding	Chose location because isolated, quiet and not crowded.	4
Management	Controls or restrictions, e.g. no generators allowed or fires.	4
Work/resident	Chosen because a resident or working in Ningaloo area.	3

258

Participation in recreational activities

Recreational fishing was the most frequently recorded activity along all parts of the coast, except the National Park and Coral Bay (Figure 2). Snorkelling was the dominant activity in the National Park, and while also the most frequently recorded activity in Coral Bay, relaxing and swimming also popular. The southern pastoral leases displayed a mix of recreational activities, with fishing and sailing sports (windsurfing and kitesurfing), equally dominant. Surfing was another popular activity on the southern pastoral leases, as well as at North-West Cape.

On average, three different recreational activities were undertaken by respondents during their stay up until time of interview. However, significant differences were found between the number of activities undertaken within each tenure group ($F_{(4, 1160)} = 6.3$, $\rho<0.05$). *Post-hoc* testing revealed that North-West Cape was significantly different from the remainder of the Ningaloo coast due to many respondents only undertaking one activity by the time of interview (predominantly fishing or walking on the beach). Conversely, pastoral leases were significantly different as respondents from these areas had participated in the greatest diversity of recreational activities.



277

Figure 2 Percentage of respondents participating in each activity type within each tenure group. Note: this uses the main activity type for which the respondent came to the beach on the day of interview.

Across all tenures, the mean time spent at the beach for shore-based recreational activities was 3 hours (SE ± 0.1), while respondents undertaking activities from boats spent a mean of 2 hours (SE ± 0.3) out on the water. Respondents on the northern and southern pastoral leases spent significantly longer on the beach than those interviewed along other parts of the coast ($F_{(1, 6)} = 14.7$, $\rho<0.05$). Respondents on the southern pastoral leases were also likely to arrive at the beach later in the day (12 noon) when compared to other areas (10 am). Such a trend is reflective of the strong afternoon onshore breezes that dominate this section of the coast (BOM 2011), and allow participation in wind-dependent activities such as kitesurfing. These breezes occur predominantly in the spring and summer months, which also results in higher participation during these seasons.

Discussion

Significant differences in visitor and visit characteristics were revealed among land tenures adjoining Ningaloo Marine Park. Pastoral leases exhibited different characteristics to tenures such as Cape Range National Park and the settlement of Coral Bay, especially with respect to visitor origin, length of stay, repeat visitation and site fidelity. A diversity of recreational activities was also recorded across all tenures, although the dominant types varied. Such findings highlight the usefulness of tenures,

and their associated attributes, in providing a greater understanding of visitor use of a coastal marine park, which has several implications for management.

Pastoral leases had more intrastate Australian visitors when compared to Cape Range National Park and the settlement of Coral Bay, which had a larger proportion of international visitors. Road quality is likely to be a factor in the concentration of international visitors in these tenures, with sealed roads providing easy access for 2WD vehicles; the dominant vehicle type amongst overseas respondents. Coastal access is also restricted within some tenures and this also has implications for the distribution of visitors to the Marine Park. Restricting vehicle access has several environmental benefits (i.e. protecting fragile dune systems) and has been successfully implemented in Australia (Priskin 2003) and South Africa (Celliers et al. 2004).

Residents were most frequently intercepted along North-West Cape, which was closest to the settlement of Exmouth. They also visited the Marine Park more frequently than tourists, and the high levels of repeat visitation indicated they are returning to replicate their recreation experience. A similar pattern was identified by Tunstall & Penning-Rowsell (1998) who found that residents viewed the beach as a local resource (with regular and routine use) while for tourists such beach visitation is a more isolated experience, that may be repeated annually. However, high levels of repeat visitation and site fidelity were also identified amongst visitors to the pastoral leases and North-West Cape, suggesting satisfaction with the services, facilities and management setting. Repeat visitation and site fidelity are rarely quantified. Exceptions are previous research in Cape Range National Park (Moore & Polley 2007) and in northern Australia (Ryan et

al. 2000), with repeat visitation of 33 per cent and 20 per cent, respectively; much lower than the 55 per cent recorded in the current study. Repeat visitors have different characteristics to first-time visitors (Arnberger & Brandenburg 2007) and often form strong place attachments (Ormsby et al. 2004).

Visitors to pastoral leases had longer lengths of stay when compared to other tenures, which is consistent with earlier research (Jones et al. 2009). Pastoral leases are the most difficult tenures to access along the Ningaloo coast due to the prevalence of corrugated sand or rocky tracks, and generally require visitors to be self-sufficient. Such increased lengths of stay can be linked with the increased time required by respondents to access these remote sites. Length of stay is an important choice for visitors (Decrop & Snelders 2004) and may also be influenced by other factors, including origin and familiarity with a destination (Gokovali et al. 2007). Interestingly, many of the accommodation sites on pastoral leases have high densities of camps (Smallwood et al. 2011) and indicates that visitors do not seek these locations for seclusion, but probably for other reasons such as cost and being part of the greater camping or caravanning community (Prideaux & McClymont 2006).

Cape Range National Park was the only tenure with a maximum length of stay (28 days); a standard management strategy applied across all Western Australian national parks to maintain equity of access (DEC 2010). The mean length of stay in the National Park was less than most other tenures, while respondents often stayed on pastoral leases for longer than 28 days. Maximum stay limits (sometimes only 1-3 nights) are often

348 implemented within national parks to maintain access for increasing numbers of visitors
349 (Newsome et al. 2002).
350
351 A disparity in gender was evident on the pastoral leases to the south of Coral Bay. This
352 was most likely due to an imbalance in recreational activity participation rather than a
353 genuine imbalance. Sailing sports and surfing were popular on the southern pastoral
354 leases and males are traditionally more likely to undertake such activities (Wheaton &
355 Tomlinson 1998; Nickel et al. 2004) which makes them more difficult to intercept as
356 they spend limited time on the shoreline. Therefore, females participating in other, more
357 stationary, recreational activities on the beach were more likely to be interviewed.
358
359 As with many marine parks, a wide spectrum of recreational activities was undertaken
360 at Ningaloo. Visitors are attracted to these areas for recreation as they are generally
361 created in areas with a diversity of marine life (Hawkins et al. 2005) and geomorphic
362 features (Gurran et al. 2007). Within different tenures, however, the dominant activities
363 changed (i.e. fishing was dominant in the central and northern pastoral leases while
364 snorkelling was most popular in Coral Bay and Cape Range National Park) and this
365 could be useful for identifying areas which may be exposed to specific environmental
366 impacts such as coral damage from snorkelling or trampling of intertidal reef platforms
367 (Newsome et al. 2002).
368
369 These findings demonstrate that tenure may be useful for differentiating activity types
370 (and potential impacts) occurring within the Marine Park at a broad scale. Other factors
371 are also likely to influence this distribution, with activities such as surfing and

372 snorkelling dependent upon specific geomorphic characteristics and biodiversity, which
373 can change across fine spatial scales. The placement of sanctuary ('no-take') zones at
374 high use beaches adjacent to Coral Bay and Cape Range National Park probably
375 contributes to low levels of recreational fishing and high levels of snorkelling on these
376 tenures (Smallwood et al. 2012b).
377
378 Different types of land tenures, and their associated attributes, clearly affected visitor
379 use of the adjacent marine park which has the dual objectives of conservation and
380 equitable access for users. Achieving these objectives may be challenging for marine
381 park managers, especially if the primary uses of adjacent lands are incompatible with
382 conservation or there is little cooperation with surrounding tenures (Francour et al.
383 2001). Such challenges could also arise due to managers having limited control over
384 coastal access, the distribution of visitors and provision of facilities. Understanding the
385 linkages between marine and terrestrial systems is therefore important for conservation
386 (Cicin-Sain & Belfiore 2005; Halpern et al. 2009), and visitor management. A key
387 mechanism for addressing these issues is establishing good communication between
388 stakeholders, which will increase support for conservation management (Carmody &
389 Prideaux 2011). The development of simple and cost-effective management practices
390 has also been found to increase their uptake (Carmody & Zeppel 2009).
391
392 Identifying the patterns of visitation is an important element in understanding the effects
393 that new developments or changes in management may have on an adjacent marine
394 park. New developments which include a range of accommodation, facilities and 2WD
395 access are likely to increase the number of people who can undertake regular, and

396 frequent, visits throughout the year. Such changes have obvious flow on effects to the
397 adjacent marine park where visitor numbers are likely to increase, and may lead to
398 environmental impacts (Davenport & Davenport 2006). In this situation, greater
399 management input, such as ranger visits, signage and other interpretive material on
400 minimising environmental damage may be required.
401
402 The diversity of tenures associated with the Ningaloo coast also provides a good
403 example of the recreational opportunity spectrum. The pastoral lands, with their limited
404 vehicle access and development, as well as an expectation that visitors must be self-
405 sufficient, equate closely with the primitive or semi-primitive classes of the recreational
406 opportunity spectrum (McCool et al. 2007). The Coral Bay settlement, with sealed road
407 access, supermarket, hotel and backpacker's accommodation equates with the 'modern'
408 recreation opportunity class (McCool et al. 2007; Manning 2011). Through providing a
409 range of settings, visitors can select a location that best suits their needs, thereby
410 improving the quality of their experience.
411

412 ## Conclusion

413 Land tenure was used to encapsulate a suite of attributes (ownership, access, services,
414 facilities and management controls) located along the interface with a coastal marine
415 park. Differences in visit and visitor attributes were identified among tenures. Pastoral
416 leases had some clear differences from other tenures, with extended length of stay, high
417 repeat visitation and site fidelity. The effects of tenure were also evident on recreational
418 activity, with participation in fishing, snorkelling and sailing sports varying along the

coast. The diversity of recreational and tourism settings that can arise from such tenures can be important to maintaining a range of visitor experiences but may also be challenging for management.

Experiences in managing marine parks worldwide have continually demonstrated that collaborative and strategic planning will increase the likelihood of achieving the sustainable use and conservation of resources. Such approaches allow a diversity of recreational opportunities to be developed, or maintained, that will attract visitors to a destination, thereby benefiting all stakeholders. Sites which may be exposed to particular environmental impacts or high levels of visitor use can also be identified. Collaboration will also provide a forum for discussing strategies to mitigate the impacts of such visitation while also identifying opportunities for support, training and involvement in monitoring or compliance activities that will ensure the sustainable use of the marine park.

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