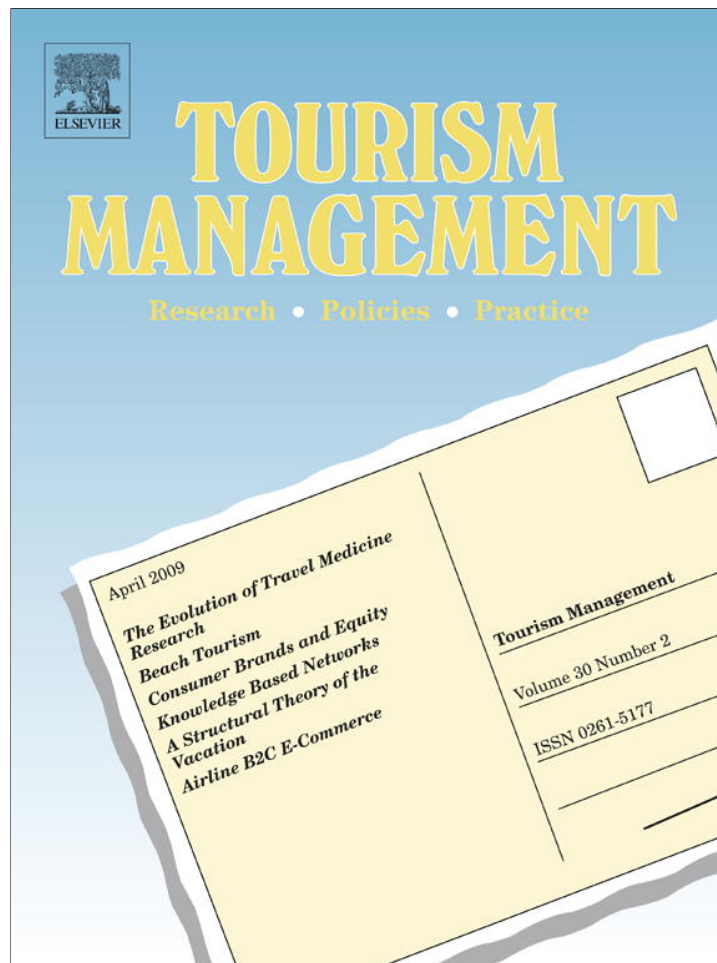




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An evaluation of priorities for beach tourism: Case studies from South Wales, UK

M.R. Phillips*, C. House

School of Built and Natural Environment, Faculty of Applied Design and Engineering,
Swansea Metropolitan University, Mount Pleasant Campus, Mount Pleasant, Swansea, Wales SA1 6ED, UK

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ABSTRACT

Seven Welsh beaches with environmental designations were assessed, using an established beach rating checklist comprising 50 physical, biological and human use factors. Weightings were subsequently established in response to priorities of three tourism markets: surfing, eco-tourism and family. Assessments showed physical factors scored significantly lower ($p < 0.01$) than both biological and human use factors and were seen as a specific location consequence. Physical factors dominated surfer responses; biological factors reflected conservation priorities and human use factors, especially safety, were family concerns. Common concerns related to beach litter and outfalls. However, there were some contradictions in interpretation, such as high numbers of waves in the breaker zone, being seen as positive for surfing but negative for family safety. Results showed weighting had changed overall ranking and assessment range in response to beach factors favoured by user group priorities. Analysis identified motivating factors behind the decision to visit and highlighted resource protection aspects for specific user group needs. The methodology supports development of sustainable beach management strategies, based on local characteristics and different tourism markets.

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1. Introduction

Travel and tourism comprise the world's largest industry (WTO, 2001) and beaches are considered the major factor in this tourism market (Houston, 2002; Lencek & Bosker, 1998). To benefit from this dynamic, most Mediterranean countries have developed proactive growth policies centred on a seaside model (Benoit & Comeau, 2005). However, although incomes and job creation were increased in Rimini (Italy) and Estartit (Spain), almost 60% of locals interviewed complained of badly controlled urban growth and degradation of landscapes (Benoit & Comeau, 2005). May (2004) found that geological and geomorphological features significantly increased visitor numbers at some coastal locations and therefore, degradation could ultimately affect tourism.

Pressure on water resources, widespread development, pollution, population growth and ecosystem destruction are highlighted consequences of the tourism industry (Benoit & Comeau, 2005). Therefore, to avoid degradation of the raw material which supports the tourism industry, Phillips and Jones (2006) emphasised the importance of sustainable coastal management. Perceptions of landscape/beaches not only vary among social groups and cultures (Kant, 1928), but also with time while, landscapes themselves can

be fashionable, as seen with eco-tourism. Although development often reduces beach scenic value (Ergin, Williams, & Micallef, 2006) and results in reduced amenity (Benoit & Comeau, 2005), it is necessary to provide infrastructure in support of the industry. According to Bramwell and Lane (2008), tourism–environment interrelations are vitally important and it has been widely recognised that sustainable tourism is essential for both the tourism industry and natural environment (Eagles, McCool, & Haynes, 2002; IUCN, 1994). Therefore, development should be focused to tourism markets while protecting beach landscapes. As part of this philosophy, it is important to understand what different user groups prefer when visiting a beach, so that priorities can be established. Using seven case study beaches, this paper evaluates beach tourism priorities for three beach user groups: surfers, which represent a growing area of recreational tourism; conservation interest groups, which reflect niche eco-tourism markets and; mothers, reflecting traditional family values. From derived weightings based on these priorities, beaches are ranked and assessed in line with user group preferences and beach management strategies suggested.

2. Physical background

The South Wales coastline has the second highest tidal range in the world and the seven study beaches, included four on Gower, the

* Corresponding author. Tel.: +44 1792 481106; fax: +44 1792 651760.
E-mail addresses: m.phillips@smu.ac.uk, c.house@smu.ac.uk (M.R. Phillips).

first UK Area of Outstanding Natural Beauty (AONB) and two on the Glamorgan Heritage Coast (Fig. 1).

This coastline has long been recognised for its scenic beauty (Robinson & Millward, 1983). All are tourist orientated beaches and popular surfing destinations. Llangennith, located on north Gower (Ordnance Survey OS Ref: SS414900), is approximately 2 km of sandy beach bounded by coastal islands Worms Head to the west and Burry Holmes to the east. The spring tidal range is 7.9 m (SBCEG, 1999) and as the beach picks up any swell, it is popular for surfing. Port Eynon (OS Ref: SS472848), spring tidal range 8.1 m (SBCEG, 1999), gained Blue Flag (FEE, 2007) beach status in 2004. It is a wide (>100 m), easily accessible sandy beach, popular for water sports including boating but for surfing requires a big swell to generate waves. Caswell (OS Ref: SS591874), another southwest facing Gower beach was awarded Blue Flag beach status in 2002. It has a spring tidal range of 8.3 m (SBCEG, 1999) and is popular throughout the year with surfers and visitors. It is a bay backed by cliffs on three sides and proximity to an urban fringe results in the beach frequently being overcrowded in summer. The beach has a lifeguard station which is manned between May and September and there are seawalls along the back-beach. Langland (OS Ref: SS606871), situated at the eastern boundary of Gower, has a spring tidal range of 8.4 m (SBCEG, 1999). The beach is sandy with rock outcrops both sides and achieved Blue Flag beach status in 2002. It picks up a southwest swell and because centrally located rocks create a small reef, offering sand bars and reef break, it is popular with surfers.

Rest Bay (OS Ref: SS800780), has a spring tidal range of 8.9 m (SBCEG, 1999) and is approximately 1.5 km of sandy foreshore with cobble back-beach and low lying cliffs. It is a southwest facing beach and resulting swells from prevailing winds, make it an ideal surfing location. In 2004, it was awarded Blue Flag beach status and has historically been recognised as a family beach. Southerndown

(OS Ref: SS883730), is on the Glamorgan Heritage Coast and has spectacular Lias Limestone cliff faces. Due to geological significance of viewable faults and deformation folds, the eastern part of the bay has been designated a Site of Special Scientific Interest (SSSI) (SBCEG, 1999). The southerly facing sandy beach with steeply sloped pebble back-beach has a spring tidal range of 9.1 m. The beach is popular with families and surfers and in 2004, was awarded Blue Flag beach status. Llantwit Major (OS Ref: SS955673), part of the Glamorgan Heritage Coast, has a spring tidal range of 9.6 m (SBCEG, 1999). The beach itself has limited sand and is mostly rock platform with pebble covering. It is prone to significant erosion from storms and high waves and there are substantial sea defences protecting a Surf Life Savers Club and cafeteria. Due to beach shape, topography and coastal processes, good surfing waves are generated but it is difficult to access and has yet to achieve Blue Flag status.

3. Methodology

3.1. Beach rating checklist

The seven beaches (Fig. 1) were assessed using an established beach rating checklist (Leatherman, 1998; Williams, Leatherman, & Simmons, 1993; Williams, Morgan, Özhan, & Ergin, 2000), based on three categories: physical, biological and human use factors (Table 1).

This involved assessment of 50 factors and attributes for each was allocated a score between 1 and 5 on a measurable semi-quantitative basis (Table 2).

Some responses were qualitative, such as Factor 15: colour of sand while others were quantitative, such as Factor 1: beach width at low tide. A grand total for each beach was obtained from the summation of their scores within each of the subheadings;

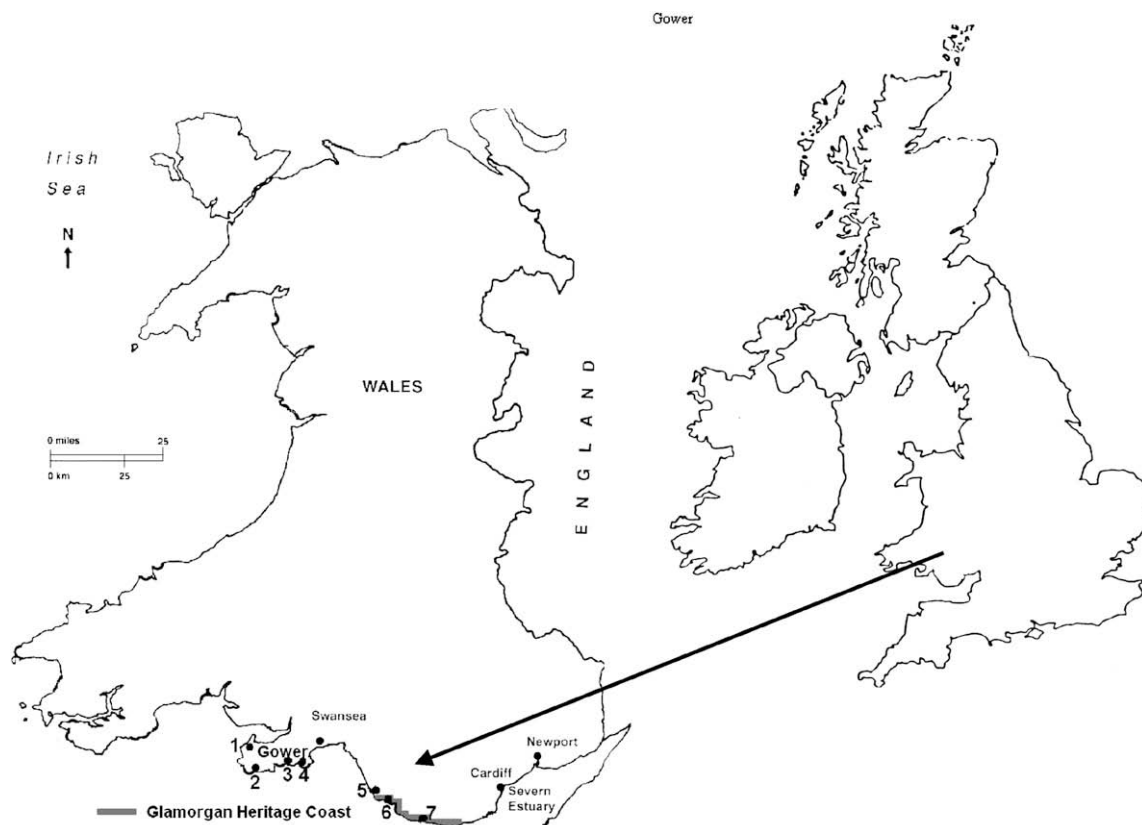


Fig. 1. Location of beaches. Key: 1 Llangennith; 2 Port Eynon; 3 Caswell Bay; 4 Langland Bay; 5 Rest Bay; 6 Southerndown; 7 Llantwit Major.

Table 1
Beach rating checklist (Leatherman, 1998; Williams et al., 1993, 2000)

Physica factors	Categories				
	1	2	3	4	5
1. Beach width at low tide	☐ Narrow < 10 m	☐ 10–30 m	☐ 30–50 m	☐ 50–100 m	☐ >100 m Wide
2. Beach material	☐ Cobbles	☐ Sand/cobbles	☐ Coarse sand	☐	☐ Fine sand
3. Beach condition or variation	☐ Erosional	☐	☐ Stable	☐	☐ Depositional
4. Sand softness	☐ Hard	☐	☐	☐	☐ Soft
5. Water temperature	☐ Cold/hot	☐	☐	☐	☐ Warm (70–80 °F)
6. Air temperature (midday)	☐ <60 °F	☐	☐	☐	☐ 80–90 °F
7. Number of sunny days	☐ Few	☐	☐	☐	☐ Many
8. Amount of rain	☐ Large	☐	☐	☐	☐ Little
9. Wind speeds	☐ High	☐	☐	☐	☐ Low
10. Size of breaking waves	☐ High/dangerous	☐	☐	☐	☐ Low/safe
11. Number of waves/width of breaker zone	☐ None	☐ 1–2	☐ 3–4	☐ 5	☐ 6+
12. Beach slope (underwater)	☐ Steeply sloping bottom	☐	☐	☐	☐ Gently sloping bottom
13. Longshore current	☐ Strong	☐	☐	☐	☐ Weak
14. Rip currents present	☐ Often	☐	☐	☐	☐ Never
15. Colour of sand	☐ Grey	☐ Black	☐ Brown	☐ Light tan	☐ White/pink
16. Tidal range	☐ Large (>4 m)	☐ 3–4 m	☐ 2–3 m	☐ 1–2 m	☐ Small (<1 m)
17. Beach shape	☐ Straight	☐	☐	☐	☐ Pocket
18. Bathing area bottom conditions	☐ Rocky, cobbles, mud	☐	☐	☐	☐ Fine sand
Biological factors					
19. Turbidity	☐ Turbid	☐	☐	☐	☐ Clear
20. Water colour	☐ Grey	☐	☐	☐	☐ Clear
21. Floating/suspended human material (sewage, scum)	☐ Plentiful	☐	☐	☐	☐ None
22. Algae in water (amount)	☐ Infested	☐	☐	☐	☐ Absent
23. Red tide	☐ Common	☐	☐	☐	☐ None
24. Smell (e.g. seaweed, rotting fish)	☐ Bad odours	☐	☐	☐	☐ Fresh salty air
25. Wildlife (e.g. shore birds)	☐ None	☐	☐	☐	☐ Plentiful
26. Pests (biting flies, ticks, mosquitoes)	☐ Common	☐	☐	☐	☐ No problem
27. Presence of sewage/runoff outfall lines on/across the beach	☐ Several	☐	☐	☐	☐ None
28. Seaweed/jellyfish on the beach	☐ Many	☐	☐	☐	☐ None
Human use and impacts					
29. Trash and litter (paper, plastic, nets, ropes, planks)	☐ Common	☐	☐	☐	☐ Rare
30. Oil and tar balls	☐ Common	☐	☐	☐	☐ Rare
31. Glass and rubble	☐ Common	☐	☐	☐	☐ Rare
32. Views and vistas Local scene	☐ Obstructed	☐	☐	☐	☐ Unobstructed
33. Views and vistas Far vistas	☐ Confined	☐	☐	☐	☐ Unconfined
34. Buildings/urbanism	☐ Overdeveloped	☐	☐	☐	☐ Pristine/wild
35. Access	☐ Limited	☐	☐	☐	☐ Good
36. Misfits (nuclear power station; offshore dumping)	☐ Present	☐	☐	☐	☐ None
37. Vegetation/trees (nearby)	☐ None	☐	☐	☐	☐ Many
38. Well-kept grounds/promenades or natural environment	☐ No	☐	☐	☐	☐ Yes
39. Amenities (showers, chairs, bars, etc.)	☐ None	☐	☐	☐	☐ Some
40. Lifeguards	☐ None	☐	☐	☐	☐ Some
41. Safety record (deaths)	☐ Some	☐	☐	☐	☐ None
42. Domestic animals (e.g. dogs)	☐ Many	☐	☐	☐	☐ None
43. Noise (cars, nearby highways, trains)	☐ Much	☐	☐	☐	☐ Little
44. Noise (e.g. crowds, radios)	☐ Much	☐	☐	☐	☐ Little
45. Presence of seawalls, riprap, concrete/rubble	☐ Large amount	☐	☐	☐	☐ None
46. Intensity of beach use	☐ Overcrowded	☐	☐	☐	☐ ample open space
47. Off-road vehicles	☐ Common	☐	☐	☐	☐ None
48. Floatables in water (garbage, toilet paper)	☐ Common	☐	☐	☐	☐ None
49. Public safety (e.g. pickpockets, crime)	☐ Common	☐	☐	☐	☐ Rare
50. Competition for free use of beach (e.g. fishermen, boats, water-skiers)	☐ Many	☐	☐	☐	☐ Few

physical, biological and human use. All factors have equal weighting (2%) and subsequently, scores were converted to percentages within each category and overall. This enabled the beaches to be ranked accordingly.

3.2. Differential weighting

Criticisms regarding absence of weighting in checklist methodologies (Cooke & Doornkamp, 1990; Leatherman, 1997), were addressed with three groups (surfers, conservation interest groups and mothers) reflecting different tourism markets. These three groups were chosen because they were clearly identifiable for

surveying purposes and predominantly represented local beach use. However, it is suggested that this methodology could be applied at other beach locations and to other user groups, such as walkers, kite surfers, etc.

Effects of differential weighting targeted to surfer requirements were investigated via structured interviews. These were undertaken with surfers ($n = 50$) at the seven beaches where they were asked to choose 10 of the 50 checklist factors (Table 1), which they considered most important for surfing amenity. Interviews were carried out during summer and winter months (2004–2005) to include surfers with varying commitment levels. Factor weightings were subsequently determined from surfer responses,

Table 2
Factor assessment (original checklist)

Factor	Llangennith	Port Eynon	Caswell Bay	Langland Bay	Rest Bay	Southerndown	Llantwit Major
1	5	5	5	5	5	5	5
2	5	3	4	4	4	3	3
3	2	1	4	3	4	4	2
4	4	3	4	4	4	3	3
5	2	2	2	2	2	2	2
6	4	4	4	4	4	4	4
7	3	3	3	3	3	3	3
8	2	2	2	2	2	2	2
9	3	3	3	3	3	3	3
10	3	3	3	3	2	2	2
11	3	3	4	3	4	3	4
12	5	5	5	5	5	5	5
13	3	4	3	3	3	3	2
14	3	4	2	2	4	2	1
15	4	3	4	4	4	4	3
16	1	1	1	1	1	1	1
17	2	4	3	3	1	3	2
18	4	2	4	3	4	3	2
19	3	4	4	4	3	3	3
20	4	4	4	4	4	4	4
21	5	5	5	5	5	5	5
22	5	5	5	5	5	5	5
23	5	5	5	5	5	5	5
24	5	5	4	4	4	5	5
25	3	2	2	3	2	3	2
26	5	5	5	5	5	5	5
27	5	5	4	5	4	5	5
28	3	2	3	3	3	4	4
29	3	1	3	4	3	4	3
30	4	5	4	5	5	5	4
31	5	5	4	5	4	5	4
32	5	5	5	5	5	5	5
33	5	5	5	5	5	5	5
34	4	3	3	2	3	5	4
35	4	4	4	4	4	4	4
36	5	5	5	5	4	5	5
37	3	3	5	3	3	4	4
38	4	4	4	5	4	5	4
39	3	2	4	4	3	3	3
40	1	3	5	5	5	5	5
41	4	4	4	4	4	3	4
42	4	4	3	3	4	4	3
43	5	5	3	4	4	5	4
44	5	5	4	4	4	5	4
45	4	5	3	3	4	4	2
46	5	5	3	5	3	3	4
47	5	2	5	5	3	5	5
48	5	5	5	5	5	5	5
49	4	4	3	4	4	4	4
50	5	5	3	5	3	3	4

as follows. The total number of responses were 500 (50×10) plus the original checklist (50) which made a possible score of 550. If no surfer chose a particular factor, it was given a converted percentage, that is, $1/550 \times 100\%$ or 0.18% rounded up to 0.2% (e.g. Factor 4, sand softness: Table 3). If 19 surfers chose a particular factor as important, this was similarly converted into a percentage: $(19 + 1)/550 \times 100\%$ or 3.6% (e.g. Factor 49, public safety: Table 3). The process was repeated for all factors which ultimately provided a surfer weighting (Table 3). This was applied to the original checklist, to determine beach ranking in response to surfer input.

To assess whether the methodology and resulting beach ranking had any correlation with perceptions of natural environment amenity, structured interviews were undertaken with conservation workers ($n = 50$). This group was also asked to choose 10 of the 50 checklist factors (Table 1) that they considered most important for conservation. Interviews were carried out during summer and winter months (2004–2005) and similar to the methodology adopted for surfer responses, results were used to provide a conservation weighting (Table 3). This was again applied to the original

checklist, to determine whether conservation input affected beach ranking.

The final group interviewed was mothers of children up to the age of 11 years ($n = 50$). This age limit was chosen, as it is when children in the UK finish primary education. Mothers were asked to identify the 10 factors from the original checklist (Table 1) that they considered most important when choosing a suitable family beach. This enabled assessment of traditional family priorities on beach selection and interviews were undertaken at various times during 2006. As for the other user groups, a family priority weighting (Table 3) was calculated and applied to the original checklist, to determine changes in beach ranking.

4. Results

Semi-quantitative beach assessments for the seven beaches (Fig. 1) are detailed in Table 2. These were subsequently converted into percentages for physical, biological, and human use factors, as well as for the overall beach assessment. For example, considering Llangennith (Table 2), the sum for physical factors 1–18 inclusive was 58 out of a possible 90 (18×5), equal to 64% (Table 4). Similarly, biological factors (19–28 inclusive) totalled 43 out of a possible 50 (86%; Table 4); human use (29–50 inclusive) totalled 92 out of a possible 110 (84%; Table 4). Overall (1–50 inclusive) the beach scored 193 out of a possible 250 (77%; Table 4). Results for the other six beaches were similarly determined (Table 4).

4.1. Analysis of original checklist

Beach rating results for the seven beaches (Table 4) showed Langland Bay and Southerndown (78%) as joint best with Llantwit Major (72%) the worst. The small range (6%) is explained by beach similarities and equal weighting of all factors, reinforced by the overall standard deviation ($\pm 2.3\%$; Table 5). For example, all have wide beaches consequent of a high tidal range (Factor 1; Table 1); six are located in scenically designated areas and five have achieved Blue Flag status. However, physical factors were significantly lower than both biological and human use factors (Table 4): $t = 11.495$, $df = 12$, $p < 0.01$ (biological) and $t = 9.706$, $df = 12$, $p < 0.01$ (human use). Allocation of minimum scores to physical factor checklist attributes such as, 'size of breaking waves' (Factor 10; Tables 1 and 2) and 'tidal range' (Factor 16; Tables 1 and 2), probably contributed to this significance. Furthermore, similar analysis of biological and human use factors showed no significant difference ($t = 1.525$, $df = 12$, $p > 0.05$), which again reflected beach similarities.

4.2. Analysis of surfer priorities

Results from surfer interviews identified 16 factors (32%) considered important for surfing amenity (Table 3). Physical factors dominated in both number and importance (9), followed by human use (5) and biological (2) categories. Application of surfer weighting (Table 3) to factor scores (Table 2) changed beach assessment and ranking (Table 4). Caswell Bay (74%) was now top rated and although Llantwit Major (56%) was still lowest, the overall range had increased to 18%, reflected in the increased standard deviation ($\pm 6.0\%$; Table 5). Surfer perspective also identified notional contradictions to checklist allocations of minimum score 1, for factors such as 'size of breaking waves' and 'large tidal range'. For surfing amenity, they argued these are beneficial and should receive the maximum score 5. Furthermore, significant weighting of these factors (Tables 3 and 4) impacted on beach rating and relative change (Fig. 2), as lower physical factor assessments reflected contribution to surfing amenity. Caswell Bay and Port Eynon scored highest in the physical category, which contributed to their first and second ranking compared with fourth and fifth, when applying the

Table 3
Weighted percentages for beach user priorities

No.	Parameter	Original checklist	Surfer weighting	Conservation weighting	Family weighting
1	Beach width at low tide	2	9.3	0.2	0.8
2	Beach material	2	9.3	2.8	0.8
3	Beach condition or variation	2	0.2	0.2	1.4
4	Sand softness	2	0.2	1.8	1
5	Water temperature	2	4	1.3	1
6	Air temperature (midday)	2	0.2	0.2	0.6
7	Number of sunny days	2	0.2	1.3	1.6
8	Amount of rain	2	0.2	1.3	0.2
9	Wind speeds	2	0.2	1.3	0.8
10	Size of breaking waves	2	9.3	0.2	1
11	Number of waves/width of breaker zone	2	9.3	1.3	0.2
12	Beach slope (underwater)	2	9.1	1.3	2.4
13	Longshore current	2	4.4	1.3	0.2
14	Rip currents present	2	0.2	1.3	1.2
15	Colour of sand	2	0.2	1.3	0.6
16	Tidal range	2	9.3	1.3	0.2
17	Beach shape	2	9.3	1.3	0.8
18	Bathing area bottom conditions	2	0.2	1.8	2.4
19	Turbidity	2	0.2	1.9	0.2
20	Water colour	2	0.2	2.8	0.5
21	Floating/suspended human material (sewage, scum)	2	0.5	7.2	6
22	Algae in water (amount)	2	0.2	1.9	2.4
23	Red tide	2	0.2	1.3	0.1
24	Smell (e.g. seaweed, rotting fish)	2	0.2	3.3	2.6
25	Wildlife (e.g. shore birds)	2	0.2	4.1	0.2
26	Pests (biting flies, ticks, mosquitoes)	2	0.2	2.8	4
27	Presence of sewage/runoff outfall lines on/across the beach	2	1.1	6.6	3.4
28	Seaweed/jellyfish on the beach	2	0.2	0.2	2.4
29	Trash and litter (paper, plastics, nets, ropes, planks)	2	0.2	6.6	8.4
30	Oil and tar balls	2	0.2	3.3	6.6
31	Glass and rubble	2	0.2	2.8	8.4
32	Views and vistas Local scene	2	0.2	3.3	0.8
33	Views and vistas Far vista	2	0.2	1.9	0.5
34	Buildings/urbanism	2	0.2	3.3	0.2
35	Access	2	1.6	1.9	4.4
36	Misfits (nuclear power station; offshore dumping)	2	0.2	2.8	2.2
37	Vegetation/trees (nearby)	2	0.2	1.2	0.6
38	Well-kept grounds/promenades or natural environment	2	0.2	1.9	2.2
39	Amenities (showers, chairs, bars, etc.)	2	0.2	0.2	1.8
40	Lifeguards	2	4.5	0.2	5.2
41	Safety record	2	0.2	0.2	3.4
42	Domestic animals (e.g. dogs)	2	0.2	0.2	2.8
43	Noise (cars, nearby highways, trains)	2	0.2	3.3	0.5
44	Noise (e.g. crowds, radios)	2	0.2	1.3	1
45	Presence of seawalls, riprap, concrete/rubble	2	0.2	1.3	0.8
46	Intensity of beach use	2	0.7	5.3	1.4
47	Off-road vehicles	2	0.2	0.2	3.2
48	Floatables in water (garbage, toilet paper)	2	0.2	4.1	5.2
49	Public safety (e.g. pickpockets, crime)	2	3.6	0.2	1
50	Competition for free use of beach (e.g. fishermen, boats, water-skiers)	2	8.5	1.3	0.6

original checklist (Table 4). This was attributed to physical factor influence and indicated correlation between surfer priority and beach rating.

4.3. Analysis of conservation priorities

Results from structured interviews identified 39 out of the 50 factors (78%) considered to varying degrees, as important for conservation (Table 3). Biological factors dominated in importance while human use factors perceived important to conservation, e.g. 'litter and floatables in the water', also received high weighting. Table 4 shows that conservation weighting increased all beach scores and the largest increase, was seen at Llangennith (6%; Table 4). This is the most natural and undeveloped of the seven beaches and although all case study beaches are in environmentally designated areas, it is argued that user group priorities appropriately modified results. Conservation weighting provided the lowest user group standard deviation ($\pm 3.0\%$; Table 5) evidenced by Fig. 2

which illustrates the lowest relative change in comparison to the original checklist. The tourism industry is well established at Port Eynon, Caswell Bay and Rest Bay, which showed checklist weighting, had increased variance and range, to the benefit of less developed beaches.

4.4. Analysis of family priorities

Survey priorities from interviews with mothers showed dominance of human use factors, both in number and importance (Table 3). Indeed, nine of the highest weightings came in this category and the tenth, 'presence of sewage/runoff outfall lines on/across the beach' (Factor 27; Tables 1 and 3), could be interpreted as a human impact. Overall, family priorities identified 43 factors (86%), as having some degree of relevance in beach choice. Application of family weighting (Table 3) to factor assessment (Table 2), once again changed beach score and ranking (Table 4). As with the original checklist, Langland Bay (87%) and Southerndown (87%)

Table 4
Beach ratings and ranking

Method	Parameter	Llangennith	Port Eynon ^a	Caswell Bay ^a	Langland Bay ^a	Rest Bay ^a	Southerndown ^a	Llantwit Major
Original checklist	Physical	64	61	67	63	66	61	54
	Biological	86	84	82	86	80	88	86
	Human use	84	81	79	85	78	87	81
	Overall	77	74	75	78	74	78	72
	Rank	3	5	4	1	5	1	7
Surfer interests (weighted)	Physical	61	66	73	61	57	60	48
	Biological	77	62	80	81	85	78	70
	Human use	66	84	76	76	66	80	81
	Overall	63	70	74	65	60	65	56
	Rank	5	2	1	3	6	3	7
Conservation interests (weighted)	Physical	66	60	66	63	66	59	53
	Biological	90	88	83	89	81	90	88
	Human use	86	80	76	87	77	88	80
	Overall	83	79	76	82	76	82	77
	Rank	1	4	6	2	6	2	5
Family interests (weighted)	Physical	70	63	72	68	72	66	57
	Biological	95	92	89	92	89	97	97
	Human use	79	76	81	90	81	89	81
	Overall	81	77	81	87	81	87	80
	Rank	3	7	3	1	3	1	6

^a Blue Flag beaches.

were joint top rated, although their scores increased due to high assessment of human use factors (Table 4). Interestingly, these beaches were equally ranked, whichever weighting system was used (Table 4). Conversely, Port Eynon was ranked last and this was a function of relatively low assessment of human use factors (Tables 3 and 4). Family weighting provided the highest mean (82%) and standard deviation ($\pm 3.7\%$; Table 5) illustrated by Fig. 2, and in comparison to the original checklist, resulted in the highest positive change.

5. Discussion

These three groups represent different tourism markets and identified aspects considered important in beach choice. All three user groups identified sewage treatment and regular removal of persistent marine debris, as common priorities (Table 3). Fig. 3, produced from Table 4 showed that surfers scored all beaches lower than average and families scored them higher. This was consequent on user priorities being focussed on physical and human use factors, respectively. As a result, Caswell Bay and Port Eynon were ranked first and second by surfers due to the physical amenity these beaches offered while due to low human use factor scores, Port Eynon was ranked last by families (Table 4). Llangennith, with no visible human development, was ranked the best conservation beach, but behind the dune system there is a holiday park and associated facilities, which also resulted in a high family beach ranking.

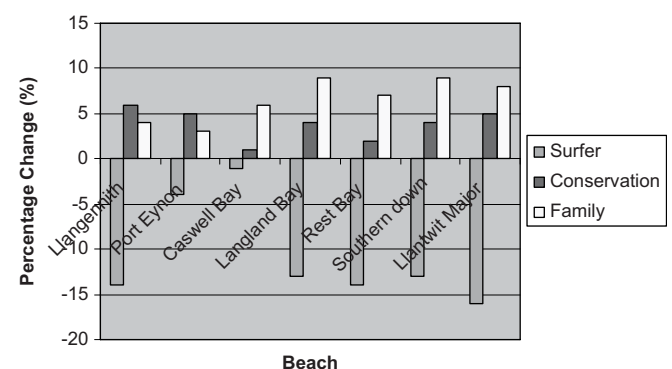
The importance of ecosystems to landscape is clear (Leopold, 1969) and was recognised by conservation workers when they selected important factors. Conservation checklist weighting changed beach ranking and gave Caswell Bay and Rest Bay the lowest conservation scores (76%; Table 4). These two beaches have developed urban hinterlands resulting in low human use scores. Therefore, if

beach management can include a conservation dimension to ameliorate tourism and development pressures, it could also result, as argued by May (2004), in a significant form of niche tourism.

Further analysis of surfer responses showed that although not affecting surf quality, a weak longshore current was preferred. Strong currents cause surfers to drift along the bathing zone and away from locations which support the best wave. Gentle slopes were considered preferable to steep slopes but opinion was split regarding beach material within the breaker zone. Most surfers preferred a sand covered bottom, but others liked rock or cobble, which often offered a more challenging reef break. There was also diversity in beach shape choice. Straight and pocket beaches offer different experiences which sometimes govern surfer choice. Some beach shapes offer shelter from the wind which keep waves 'clean' and result in better rides. Identified biological factors were sewage related but mainly of little concern to interviewed surfers. Historically, Surfers Against Sewage (SAS) had campaigned for cleaner coastal waters but since the introduction of the Bathing Water Directive (76/160/EEC) and Urban Waste Water Treatment Directive (91/271/EEC), water quality has improved, evidenced by increased numbers of Blue Flag beaches. Blue Flag awards (FEE, 2007) relate to beaches that are well managed, promote environmental education and comply with the Bathing Water Directive guideline water quality. However, results showed no correlation between beach awards and beach ranking (Table 4).

Table 5
Checklist means and standard deviations

Checklist	Mean $\pm$ standard deviation (%)
Original	75.4 $\pm$ 2.3
Surfer weighting	64.7 $\pm$ 6.0
Conservation weighting	79.3 $\pm$ 3.0
Family weighting	82.0 $\pm$ 3.7

**Fig. 2.** User priority relative change.

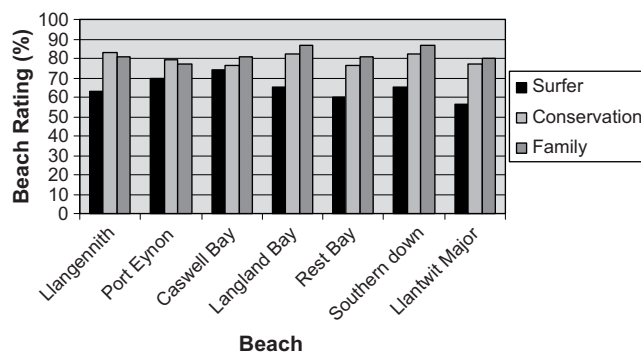


Fig. 3. Comparative beach rating.

Physical factors affect the type of waves produced on a beach and were considered central to surfer beach choice. Changes to sea defences which could, for example, alter sand bars or have adverse effects on coastal processes and surfing conditions, should be evaluated. Studies have shown that properly designed coastal protection and submerged breakwaters can improve surfing amenity (Jackson, Tomlinson, & D'Agata, 2002). Human use factors concerned access, lifeguards, beach use, safety and competition for use of the beach (Table 3). Competition for space was the most important non-physical factor, as popular beaches were perceived as overcrowded, especially during the summer when intensity of use is highest.

Bramwell and Lane (2008) argued that economic opportunity is integrally related to constraints imposed by supporting environments. Physical factors dominated surfer priorities and this group appeared the most focussed with only 16 factors considered important for surfing amenity (Table 3). All related either to surfing conditions, or security for their possessions when in the water. Furthermore, interviewed surfers gave more in-depth answers to questions than the other two beach user groups. Conservation priorities mainly focussed on biological factors and when either physical or human use factors were chosen by this group, they had conservation implications (Table 3). Human use factors, especially safety, were family priorities. Mothers identified 43 factors overall (86%), and this probably reflects diverse family holiday needs. Most important with this user group was safety and the highest weighted factors in all three categories included this imperative (Table 3). Therefore checklist weightings reflected user group and management needs.

Pan and Ryan (2007: 289) stated that “to develop an effective marketing strategy and sustainable management plan for any destination, it is important to identify and explore motivating factors that lead to the decision to visit.” Checklist weighting reflected motivating factors in user group beach choice and demonstrated how different tourism markets changed beach scores and ranking. Managers are challenged to provide high quality recreation opportunities and ensure the protection of resources from impacts associated with visitation (Cahill, Marion, & Lawson, 2008). Once again, checklist analysis identified natural environment characteristics which underpinned surfer experience and conservation value and highlighted important management considerations. Sustainable tourism should ensure viable, long term economic operations (de Sausmarez, 2007) and application of weighted checklists will support objective and value judgements to ultimately reduce beach tourism threats. Leopold (1969) identified checklists as being extremely helpful, and suggested they should be used as an aid to planning and decision making. The three user group requirements changed beach ranking for the seven case study beaches and showed that tourism development affected beach rating (Table 4). At these locations current planning and designation protection

prevent overdevelopment and loss of rural charm. This is important as society increasingly appreciates the value of natural landscapes and the need for conservation. Consequently, beach management strategies, based on local characteristics and environmental values, could represent different tourism markets and priorities.

6. Conclusions

Seven Welsh beaches with environmental designations were assessed, using an established beach rating checklist comprising 50 physical, biological and human use factors. Assessments showed physical factors significantly lower than both biological ($t = 11.495$, $df = 12$, $p < 0.01$) and human use ($t = 9.706$, $df = 12$, $p < 0.01$). Checklist weightings were subsequently established in response to priorities of three tourism markets: surfing, eco-tourism and family. In all cases, weighting increased the range between best and worst beaches. Physical factors dominated surfer responses although human use factors such as access, lifeguards, beach use, safety and competition were also considered important. Surfer perspective also identified notional contradictions to checklist assumptions of minimum/maximum scores allocated to factors. Biological factors reflected conservation priorities and weightings from this group, increased variance and range, to the benefit of less developed beaches. Human use factors, especially safety, were family concerns. Common concerns among all three groups related to beach litter and outfalls while no correlation was found between rating and beach awards. Overall, checklist weightings reflected user group needs and priorities modified overall ranking and assessment range. Analysis identified motivating factors behind the decision to visit and highlighted resource protection aspects for specific user group needs. This supports the development of beach management strategies based on local characteristics and different tourism markets.

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