

9th Annual Caribbean Sustainable Tourism Conference

Recreational Carrying Capacity

Graham C Barrow



What is Recreational Carrying Capacity?

- It's not about fixing absolute numbers of visitors/tourists that cannot be changed
- The carrying capacity concept is essentially a decision-making framework, informed by the regular measurement of agreed indicators of quality

Crowded beaches



Car parks



Erosion of dunes



Footpath erosion



Damage to coral reefs



Disturbance to wildlife



Crowds at heritage sites



Crowded visitor centres



Situations where visitor numbers are an issue

- Planning a new site to be opened to the public for the first time
- Managing a site which is showing signs of negative impact from visitors
- Designing the size of a critical new facility such as a car park or a visitor centre
- Increasing visitor numbers without causing damage or deterioration to the environment or the recreational experience

Carrying Capacity

- Origins in ecology, animal grazing and agriculture. Balance between grazing animals and their food supply and the ability to sustain a population.
- Applied to recreation in the 1960s and 70s as recreational carrying capacity



Limits of acceptable change

- Origins in US wild land management
- Aims to get a consensus between stakeholders concerning an acceptable quality of the environment
- Recognises that it is possible to trade environmental quality against recreational use
- Requires agreed, measurable factors and thresholds to be identified

Carrying capacity, limits of acceptable change and sustainability indicators

- There are quality standards that can be chosen and agreed upon
- There are factors that can be measured to indicate quality

There must be a balance between costs of measuring things and the value of the answers

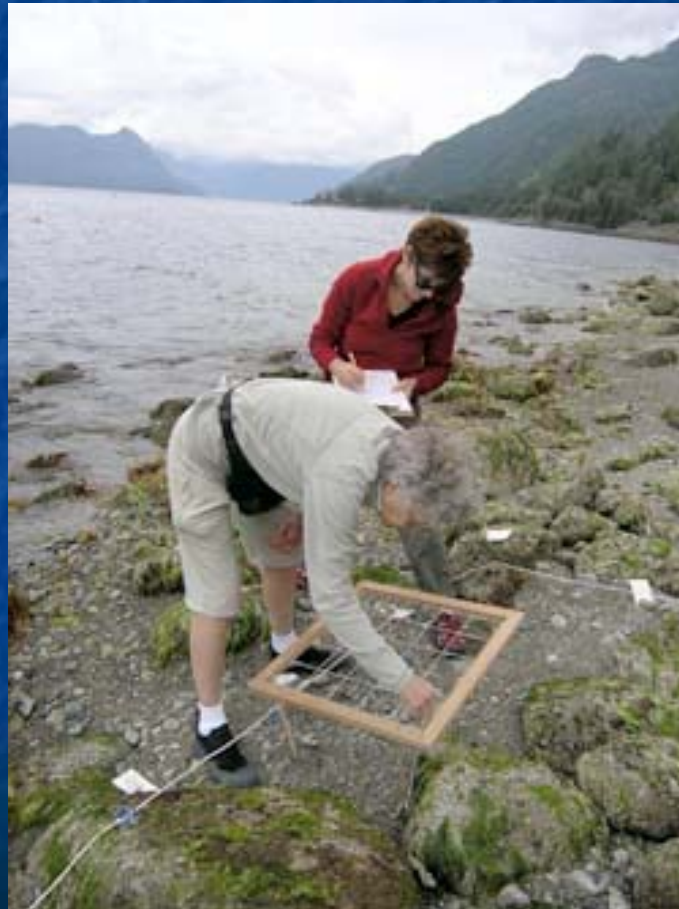
Difficulties with applying the theory

- Any site is unlikely to be uniform in character
- Stakeholders will have a different view of what is “acceptable” and “quality”
- The visitors views are not going to be uniform either!
- The “recreational capacity” of a site or area can be changed through management and is a function of judgement and clear objectives
- Monitoring requires resources

Recreational Carrying Capacity Components

- Physical capacity - (space)
- Psychological capacity - (overcrowding and interaction between visitors and their activities)
- Environmental capacity - (unacceptable change to flora, fauna, and habitat)

From theory to practice



The methodology is based on experience with

- An upland and a dune nature reserve in Wales
- A popular beauty spot in the Lake District National Park in NW England
- Charles Darwin's historic home and the surrounding countryside in the London Green belt
- The planning of a new visitor centre at a sensitive archaeological site
- The Milford Haven estuary in South West Wales











Background Issues

1. Gaining acceptance of the need for a systematic approach
2. Stakeholder participation and decision making structures
3. Staff time and resources to follow a systematic planning and management approach
4. Resources for regular data gathering
5. Methodological issues regarding the assessment of "quality"
6. Setting clear objectives is central to the process

Steps in the Process

1. Forming a stakeholder group
2. Defining the boundaries of the area
3. Zoning the area
4. Assessing quality (environment and recreation)
5. Setting standards (thresholds)
6. Considering different recreational activities
7. Regular monitoring and decision making

Getting Started

Jumping in at the deep end?



“At one time” capacity

- Importance of peak time use
- Agreeing maximum acceptable numbers at a peak moment
- Relationship of “at one time capacity” to length of stay and peak day use

Steps in judging “at one time” capacity for a site, area or building

Initially if there is no data on impacts or agreed quality standards

- Divide area into zones of broadly uniform character
- Agree acceptable at-one-time peak use for each zone (could use a consensus approach)

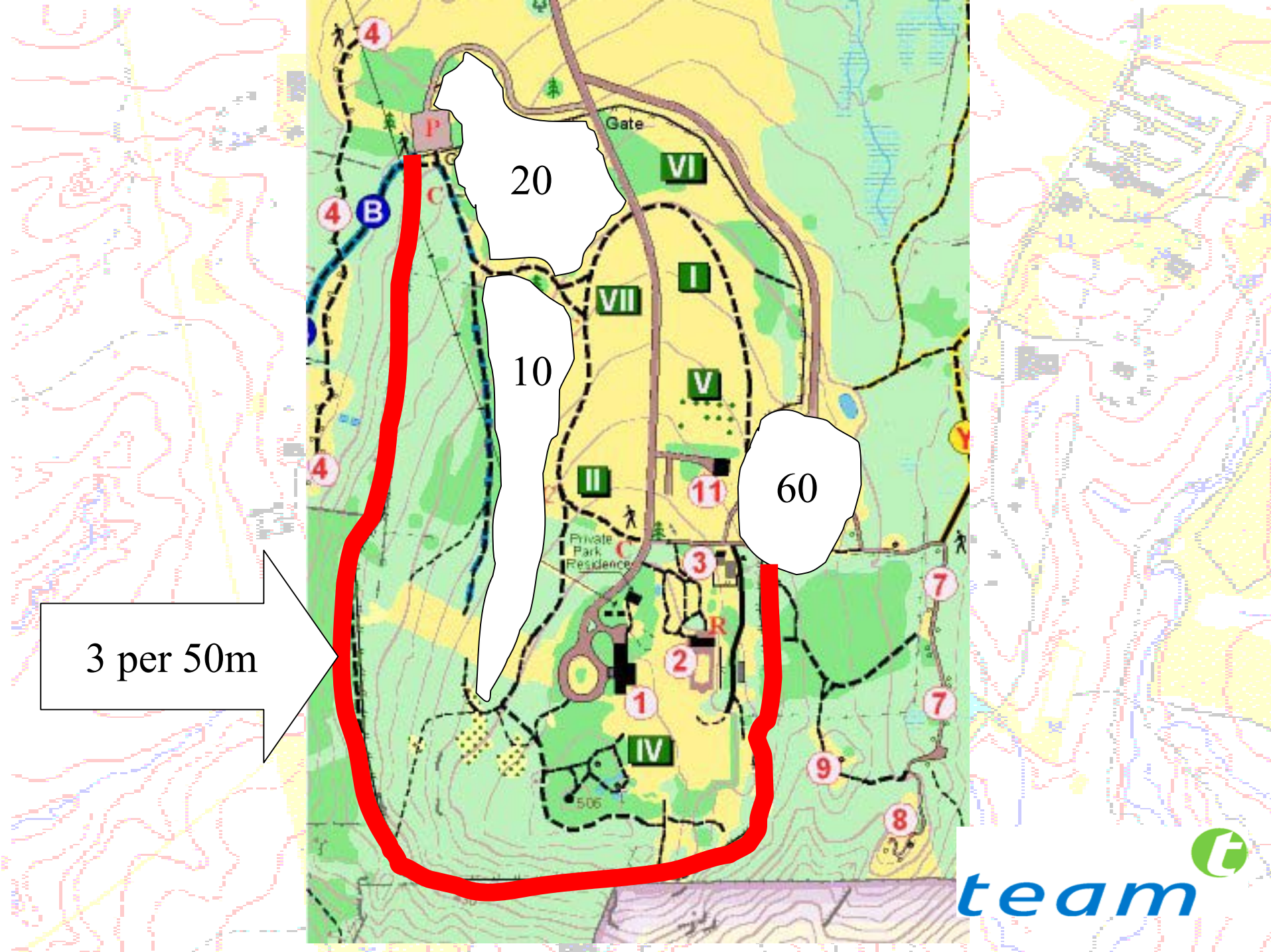
Zones could be areas of land/water or spaces in a building

Factors to help make a judgement about “at-one-time” peak numbers

- Physical size of recreational infrastructure
- Known impact of the present visitor levels on the environment
- Desired ambience of the site by the management organisation
- Any known attitudes of visitors
- Playing safe (the precautionary principle)

Allocating “at-one-time” capacity numbers

- Footpaths - group per length of path
- Open grassland or beach - people per area
- Open woodland and heath - people per area
- Water – number of people or craft per area
- Rooms in buildings – people per room
- Focal points - allocate comfortable number at that point



20

10

60

3 per 50m

Gate

Private Park Residences

506

VI

VII

I

V

II

IV

11

3

2

1

7

7

9

8

4

4

B

C

P

R

Daily and annual visitor calculations

- Estimate the length of stay at the site on peak days
- Calculate the total numbers of visitors on a peak day - based on the allocated at-one-time-capacity and the daily throughput. This gives likely peak day usage.
- Estimate the number of peak days per annum and the number of days at different percentages of the peak day. Base this on known distribution of daily, weekly and annual visitor patterns for the area/site.

Example

At-one time capacity	100	calculated from zones
Length of stay (Average)	1 hour	calculated from survey
Peak recreation day	7 hours	10.00 to 17.00
Total peak day visitors	700	

Example (contd.)

10 peak days at 700 per day	7,000
30 very busy days at 60% of peak (30 times 420)	12,600
50 busy days at 40% of peak	14,000
100 quiet days at 10% of peak	7,000
175 very quiet days at 2% of peak	2,450
ANNUAL TOTAL	43,050

Management and Stakeholder Issues

- Which stakeholders should be involved in making judgements about capacity?
- Conservation, recreation/tourism and local resident and business interests are all valid
- Need for all to agree monitoring system
- Need to all receive the survey information and make judgements together



Management and Stakeholder Issues (contd.)

- Thresholds agreed by the stakeholder group
- The monitoring of recreational use and impacts should take place regularly
- What level of resources will be allocated to this monitoring?
- Capacity figures can be changed in the light of monitoring and management actions

Possible Decision Making Group

- Site Manager
- Head-office representative
- Local community representatives
- Business interests
- Recreational user representatives
- Ecological and/or heritage interests
- Landowners
- Local authority

Regular Monitoring



questionnaire

	yes	no
1. was the animal dead when found?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. was the animal found in a vehicle?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. was the animal found in a field?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. was the animal found in a wooded area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. was the animal found in a meadow?	<input checked="" type="checkbox"/>	<input type="checkbox"/>



NPS PHOTO BY DAN RICHARDS

Visitor Surveys

Quality of Recreation

- Visitor numbers
- Length of stay on site
- Qualitative data from face-to-face questionnaires



Visitor Surveys

- Number of repeat visits
- Length of travel time to site
- Satisfaction levels with the visit experience
- Reactions to use levels at interview time
- Reactions to the quality of the site

Measuring the quality of the environment

Some indicators that could be measured

- State of vegetation and habitat
- Presence of indicator species
- Water and air quality
- Noise levels



Measuring the quality of the environment

- Breeding success of birds and mammals
- Amount of bare ground (erosion)
- Footpath widths and condition
- Litter (weight or number of items)



A simple visual estimate of environmental quality

- Select at least three expert surveyors
- Visit the site together and fix quality scores for heavily impacted zone and pristine zone
- Visit all zones and give scores without conferring
- Average scores of the surveyors for each zone

Impact scoring example

Zone	Surveyor 1	Surveyor 2	Surveyor 3	Averages
1	3	4	3	3.33
2	8	8	7	7.66
3	6	8	5	6.33
4	8	8	8	8
5	2	3	1	2
6	7	7	6	6.66
7	9	9	9	9
8	8	9	8	8.66
TOTAL	51	56	47	51.33 (6.42)

Related Issues

- Resurvey at same time of year
- Possibly calculate an overall site index from averaging all zone scores
- Agree threshold scores which if exceeded will trigger management responses

Threshold examples

Environmental

- width of paths
- % of bare ground
- presence of a key (indicator) species
- breeding success of a bird species

Recreation

- % of visitors feeling overcrowded
- number of complaints
- queuing times
- number of accidents

Crucial point

Management responses to thresholds being reached or exceeded need to be discussed (and hopefully agreed) in advance

Management responses to thresholds being reached

- Reduction of promotional activity
- Site/car park full signs at peak times
- Site closed at particular times to protect wildlife
- Timed tickets/advance booking only
- Price increases at peak times
- Closure of some paths or car parks at peak times
- Advance signing showing sites full
- Agreements on boat numbers
- Strengthening of key routes
- Increasing physical size of buildings/infrastructure
- Etc Etc

Conclusion

Consensus between stakeholders

Regular monitoring

Threshold quality standards

Agreed management responses

Thank You



Graham C Barrow

TEAM Tourism Consulting

and

Heritage and Tourism International