**What kind of foot print do events want to leave**

**on ‘our beach’?**

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**Abstract**

The seasonal demographics of many coastal communities’ means public events are prominent features in their socio-economic calendars and these need empirical assessment to facilitate strategic coastal management in Europe. This study adapted a carbon footprint calculator developed by Krause to assess the environmental impact of participants in coastal events in Mumbles, South Wales. The methodology included semi structured interviews with event organisers and local businesses both pre and post event. Additionally on the day of the event, 100 ecological footprint questionnaires were completed structured on the following themes: household details; waste; food and drink; transport and travel. The calculated results showed a carbon footprint mean of 293.7. Travel was the major factor but a standard deviation of 36.4 indicated considerable variability in its contribution to the scores. Food and drink was the other important contributor especially in the 18-25 age range. From the results a check list for coastal managers in Europe has been proposed to act as a tool for improving the strategic management of public events particularly in tourist areas such as the Mediterranean. Future work needs to test empirical mechanism for measuring the environmental impact of public events so that the coastal zone can be physically, socially and economically sustained.

**Introduction**

Travel and tourism is now the world’s largest industry (WTO, 2001) and migration to the coast is putting stress on finite resources (Leatherman, 2001). These stresses are clearly demonstrated and at their most pressing in the Mediterranean Basin (Benoit & Comeau, 2005). The seasonal and migratory demographics of many coastal communities means micro scale events are prominent features in their socio-economic calendars and yet limited empirical assessment of the sustainability of these events has been undertaken. This article uses an ecological footprint methodology to examine the impact of micro scale events (less than 10,000 patrons) in the coastal tourist destination of Mumbles, south Wales so that the findings can be considered for further study in the Mediterranean basin. It is proposed that this tool could be used for developing sustainable and responsible coastal management of micro scale events.

Globalisation means that our coastal communities are a product of and contributors to global trends which mould and are moulded by the amalgam of small scale events. The ubiquitous ‘act local think global’ phrase can be reconfigured to say global environmental problems are a product of many local and individual events. Coastal communities are an integral component of this trend and the events that occur in coastal communities are global phenomena in their combined form. This is exacerbated in the Mediterranean Basin due to the physical geography and the preponderance of tourism which led to some abuse of the coastal environments which needs to be reversed for future sustainable coastal development (Ozhan, 2005). Hence coastal managers require mechanisms to measure local coastal issues for the impact to be predicted and preferably quantified so that local characteristics can be accommodated in coastal management plans (Phillips & House, 2009). Ecological footprinting is such a tool that is now moving very clearly into the policy formulator and implementer tool bank and although methodological debates continue its ability to communicate the complexity of the environmental debate is its principal strength (Aall & Norland, 2005).

***Ecological Footprint***

Ecological footprinting aims to compare sustainable living to reality (Global Footprint Network, 2008) and it produces,

“an aggregated indicator of resource consumption and waste generation. It provides an indicator of how global, national, regional or local consumption relates to globally available resources and, through this means, acts as an index of sustainable consumption within a global context.”

(Birch, 2007: 1)

Furthermore, Wackernagel and Rees (1996:9) state the ecological footprint is:

“An accounting tool that enables us to estimate the resource consumption and waste assimilation requirements of a defined human coastal population or economy in terms of a corresponding productive land area.”

Ecological footprint studies have focused on the macro scale, with studies based on international footprint comparisons (WWF, 2008) for example, within the Mediterranean Basin (Benoit & Comeau, 2005). Furthermore, large scale events (Collins et al.,2007) and individual comparative footprints have been evident in the research literature. Recently there has been a rapid rise in “non-traditional” ecological footprint studies (Birch, 2007), with examples including analysis of businesses, sports events, different diets, specific products, age and food consumption. Sub-national analysis is also becoming prominent and being used for policy considerations, for example in Siena, Italy (Bagliani et al, 2008) and it is being used for policy formulation in for example, Cardiff Council (Collins & Flynn, 2007). However, coastal ecological footprint and micro event research are not addressed by the literature even though coastal communities are at the forefront of many environmental problems. In addition, localised micro scale events occur throughout coastal communities almost on a daily basis varying by season, locality and charitable status. Sporting events, fares, regattas, carnivals, music and religious festivals are all evident in such communities, but these events have been neglected for this kind of research although their combined impact is considerable. There are limited studies along with relevant data on local micro events with the possible exception of National Trust Scotland, (2007). In addition, these events often have charitable status and hence inherently should demonstrate social and environmental responsibility.

Ecological footprint studies have received a number of critiques with some academics even making the accusation that using environmental footprinting is nothing more than an attention grabbing tool (Moffatt, 2000). The footprint is criticised for being a quantitative measure that avoids considering some social and economic factors (Cranston et al., 2007). It is an aggregate indicator that shows environmental impact, it avoids social outcomes. This is due to the footprint initially being used as a tool for assessing sustainability and to help aid policy and decision makers. For this to be addressed facts and figures need to be present that show trends and differences that can be acted upon. Therefore, it sets out to simply obtain data and not rationalise its meaning. It can help to make links but is unable to present correlations that are not substantiated (Ross, 2006). A better option would be to combine social and economic factors as well as local data so that the ecological footprint would give a clearer picture of sustainable development. This study partially addresses this criticism through additional questions, interviews and collection of local data.

Despite these and other criticisms the ecological footprint still proves to be the leading indicator of environmental sustainability and is still believed to be the most comprehensive measure of environmental impacts available (York et al., 2003). With very few alternatives available and its sheer volume of use, the ecological footprint can be said to be an extremely efficient research tool for measuring environmental sustainability in the field of coastal management and developing future planning strategies.

***Case study***

Ecological footprint studies in Wales have been at the forefront of ecological footprint research and includes the assessment of the environmental damage caused by the 2003/2004 FA Cup Final (Collins et al.,2007), the effect caused by the 1999 Rugby World Cup (Jones & Munday, 2004), Cardiff’s International sports village (Collins & Flynn, 2005) and the method is now a headline measure of sustainable development in Wales (Dawkins et al, 2008).

In the south Wales region the stocktaking of ICZM has been an important part of recent coastal policy (Defra, 2004). The evaluation of implementation and application of ICZM in the region shows the developing independence of the Welsh approach to coastal management and the part it plays in the overall sustainable development strategy for the Welsh Assembly (Defra, 2006). The region deals with the ‘involvement of all parties’ through local government and coastal partnerships. The Severn Estuary forum/partnership highlight the need for cooperation, coordination and dialogue between interested parties and river, coastal and marine management (Burbridge, 2007). Hence ICZM in Wales is increasingly bottom up governance in nature and form (Barker & Benson, 2007) which leads itself to ecological footprint methodologies.

The case study for this research project was the 18th Jimmy Cracker Sevens Rugby Tournament taking place at Underhill Park, Mumbles, Swansea in August 2007. The event raised money for both Mumbles RFC (Rugby Football Club) as well as local charities. In 2007 the event supported both the Wales Air Ambulance Service along with the Swansea Gladiators RFC. The Jimmy Cracker Sevens is vital for this research project as it represents a micro scale charitable event in a coastal tourism location within South Wales. Attracting 1,000 to 1,500 people a year, it has the potential to cause a substantial local environmental impact and is organised for the August Bank Holiday to attract maximum visitors.

**Methodology**

The principal tool of many Ecological Footprint methodologies is a questionnaire based on environmental sectors of which four were selected for this study:

1. Home
2. Waste.
3. Food and Drink;
4. Travel and transport.

These four sectors also figure within other ecological footprint studies, with waste, travel, food and drink consumption linking closely to studies carried out on the home along with area based studies on particular villages, towns, cities and organizations (Onisto et al., 1998), (Gossling et al., 2002), (Carragher et al., 2007), (Hunter & Shaw, 2007) and (Frey & Barrett, 2007).

The local consumption data was obtained from the response of members of the public. However, Ross (2006) suggests that one significant drawback to this “bottom-up” approach is that in many instances local consumption patterns can be difficult to find and this is a limitation that needs to be considered in data evaluation. The majority of background research and data was collected prior to the event so that the event fieldwork was focused on the questionnaire data. Questionnaires enabled a representative sample and improved data comparability. Furthermore, semi-structured interviews were undertaken because of their ability to investigate motive and flexibility (Bell, 2005). The principal problem is that they are extremely time-consuming and hence no formal interviews were undertaken at the event. Interviews took place prior to the event when there were less time constraints and post event to gather consumption data.

***The design of the ecological footprint questionnaire***

The questionnaire that was designed for this research project was based on a questionnaire used by Eric Krause (2000) that was originated by Onisto et al (1998). The Krause (2000) footprint methodology was prepared for the purpose of carrying out an ecological footprint for the City of Toronto and the Recycling Council of Ontario, Canada. The questionnaire for this research was designed so that data could be gained on not only the ecological footprint but also that of environmental responsibility. The ecological footprint scores were subdivided into the environmental sectors to identify the reasons for the total ecological footprint scores. In addition, the data was analysed to compare ecological footprint results to trends of social responsibility.

***Sampling strategy***

The questionnaires were self completed and used a systematic sampling strategy at specific locations. Each of the 100 questionnaires was given to the subjects which enabled the distributor to explain the study and its purpose at the research location (Bell, 2005). The questionnaires were distributed by the team to people of both genders and different ages but no stratification of sampling was deemed necessary due to the orientation of the research objectives. Because questions were included on alcohol consumption, questionnaires were not given to persons under the age of 18.

***Ecological footprint analysis***

The data collected was applied to a footprint calculator using the REAP (Resource and Energy Analysis Program) (SEI, 2007). REAP is a sophisticated model developed by SEI (Stockholm Environment Institute) with CURE (Centre for Urban & Regional Ecology) and WWF, that measures the environmental pressure associated with human consumption. Barrett et al*.,* (2005: 351) explains it as; “a scenario-based integrated resource/energy-environment modelling system. It can be used at different scales and can model the impacts of different policies and create plausible scenarios of the future. These can then be set against targets or compared to alternative future based on selected trends or assumptions (Frey & Barrett, 2007).

It is argued that REAP is a shift away from “traditional” environmental concerns over localised problems like industrial air pollution or water quality, being instead a measure of the sheer volume resources that are consumed (SEI, 2007). Kitzes et al*.,* (2007)state that the majority of ecological footprint analysis is often performed using a calculated area method, where areas demand and areas supplied are calculated as the ratio of material extracted or produced to yield. Once the footprint has been calculated results can be used as an educational tool for the use of future events and thereby enable them to become far more sustainable and the Mediterranean coast is such an application. These would then be similar to those produced by WWF Cymru and WWF Scotland who published tips on their website for those supporters travelling to events. As well as event organisers it could be accommodated into local authority strategies and awareness-raising activities (George, 2007). Hence this was a suitable analytical tool for this research project.

**Results**

The overall mean for the sample was 293.7 which equates to the category 4.0-6.0 hectares required per person (Table 1). This is a large ecological footprint that indicates the significance of micro events in their contribution to local and global environmental problems in the coastal zone. Furthermore, table 1 demonstrates that the variability of footprint is high with a range of 280 and a figure of 41% in the 247-297 category. These figures indicate the environmental responsibility of individuals and their resultant behaviour is highly differentiated and the interview material supported this interpretation. However, the interviews also emphasised the lack of opportunity to be environmentally responsible at the event, with limited public transport information and lack of recycling facilities being highlighted by many respondents. Hence, events need to be corporately organised by coastal zone/event managers so that responsible behaviour can be encouraged and enforced.

**Table 1:** Categorisation of ecological footprint scores

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Score range** | **Percentage of respondents** | **Footprint (ha)** |
| 1 | 145-195 | 2 | 4.0-6.0 |
| 2 | 196-246 | 16 | 4.0-6.0 |
| 3 | 247-297 | 41 | 4.0-6.0 |
| 4 | 298-348 | 24 | 4.0-6.0 |
| 5 | 349-399 | 14 | 6.0-7.7 |
| 6 | 400-450 | 3 | 6.0-7.7 |
| **Mean** | **293.7** | **100** | **4.0-6.0** |

Further examination of the results demonstrates the environmental sectors on which the event management needs to focus to achieve more sustainable results (Table 2). A comparatively low standard deviation for Home and interviews with local government representatives indicates that local policies to improve sustainability in the area seems to be creating a narrowing and improvement in individuals environmental behaviour. Increases in the areas recycling rates, grants for energy efficient applications and awareness campaigns seem to be working and show that people will behave in a sustainable way if the encouragement and facilitates are easily available.

The results for waste showed a higher standard deviation (20.4) due to the lack of recycling facilities. Interviews with local council representative indicated that lack of manpower meant that no recycling facilities were provided for the event and the waste went straight to landfill. Attendees interviewed suggested a deficit of facilities was the main reason for them not recycling their waste and only 3% were willing to take their waste home to recycle. The results also demonstrated that there was a serious discrepancy between peoples recycling behaviour at home and on the day of the event. Nonetheless, the waste mean of 52.0 demonstrates that other environmental sectors were more important to the overall footprint and this should be emphasised in the planning of such events. Nonetheless, waste is an important environmental concern and the Mediterranean shows an “explosive increase in waste over the last 30 years” (Benoit & Comeau, 2005:227) and yet household waste reduction schemes are making an impact (Ozhan, 2005). These household based policies need to diffuse into other sectors if non legislative sustainability is to evolve.

**Table 2:** Ecological foot print results

|  |  |  |
| --- | --- | --- |
| **Environmental Sector** | **Mean** | **Standard Deviation** |
| Home | 72.9 | 13.6 |
| Waste | 52.0 | 20.4 |
| Food & Drink | 97.6 | 20.5 |
| Travel | 71.9 | 36.4 |
| **Total** | **293.7** | **52.9** |
| **Mean Footprint (ha)** | **4.0-6.0** | **\*** |

Food and drink had a mean of 97.6 and a SD of 20.5 demonstrating its dominant contribution to the overall results. Closer examination of the questionnaires verified that the consumption of meat and fish from outside the local area had a major impact on the scores. Interviews with food retailers at the event showed the lack of local produce sold and the omission of any sustainable sourcing policy. This is an area to focus on in any micro event planning with an emphasis on local produce which will also improve the local economic multipliers of such events. Further evaluation of the results shows the disproportionately high contribution of alcohol consumption to the scores with local public houses having 500% increases in like for like sales on event day. The results confirmed that the principal contributors to this consumption were male 18-25 year olds and that the event was dominant in their weekly alcohol consumption. This increased individual scores dramatically due to the high processing and energy consumption in the production of commercial alcohol (Collins et al, 2007) but partially contradicts Haq et al (2007) findings that older generations have the greater ecological footprint.

Travel is a widely debated area of ecological footprint studies with it often being the largest contributor to total scores, for example Collins et al (2007). However, in micro scale events this sectors significance seems to be diluted due to the high proportion of local attendees, with 71% of respondents walking to the event which is probably linked to the party atmosphere associated with the relatively high alcohol consumption. Results of 71.9 and an SD of 36.4 showed the high variability of this sectors contribution therefore planning should be targeted at the attendees from beyond the local area. Research highlights the importance of careful travel planning for reducing ecological footprint scores (Barrett & Scott, 2003) and the difficulties of changing travel behaviour for the long term (Haq et al, 2008). In the Mediterranean the contradictions of transport development and environmental impact are evident and need to be carefully considered (Benoit & Comeau, 2005).

***Check list for coastal managers***

From these results a checklist to assist coastal zone managers with micro scale event organisation has been proposed to stimulate discussion for the development of a refined checklist based on further research (Table 3).

**Table 3** Check list for coastal managers organising micro scale events

|  |
| --- |
| 1. **Home**  * Local adverts and information highlighting the sustainability of event. * Emphasise pride in local event and potential local environmental impacts. * Use domestic schemes for familiarity e.g. green bag schemes.  1. **Waste**  * Prior to the event meet with coastal stakeholders to identify their concerns and solutions. * Provide full recycling facilities. * Reduced packaging using German model (Haq et al, 2007). * Display educational material on the impact caused by the event taking place, in addition to pointers on how event participants and visitors can help to minimise impact (site specific).  1. **Food and Drink**  * Consider buying local produce and minimise packaging (local multiplier). * Consider supplying organic food and air mile information on products. * Use biodegradable and/or recyclable packaging.  1. **Travel to the event**  * Encourage sustainable travel to the event either by foot, or public transport. Prior to event, display alternative ways to get too and from the event (i.e. bus times, best access to facilities, park and ride schemes etc.) all ways in which to reduce congestion, confusion during the event. * Consult WWF (2006) guidelines for sustainable travel and advertise travel opportunities. * Encourage/advertise car sharing and highlight limited parking facilities. * Implement pedestrian priority zones.  1. **Infrastructure of the event venue**  * Infrastructure design should incorporate sustainable travel, waste, food and drink. * Energy consumption and sourcing should be considered for certain events e.g. concerts.  1. **Other**  * Reiterate information before, during and after event. * Have an environmental code of conduct for companies working at the event. * Measure the events ecological footprint and use it to develop improvements for future events. Disseminate findings to other local event organisers. * Highlight coastal sustainability issues during event e.g. in opening and closing address. * Water management. * Consider impact on local coastal processes. |

**Conclusion**

The research indicates that environmental consciousness and behaviour are not always integrated and hence people at micro-scale events need to be guided towards sustainable practice by the coastal zone managers. In particular, home and waste environmental consciousness seems to be increasing but is dependent on the continued provision of facilities and information. The results also emphasised the importance of food and drink in the event footprints and hence the need to provide local produce policies which would have both environmental and local economic benefits. However, the travel results are more differentiated and highlight the need for group targeted policies.

The proposed checklist has been constructed to assist in the development of a more focused agenda in relation to environmental sustainability of micro scale events. It is presently based on the environmental sectors used in the ecological footprint methodology but it is envisaged this will become more flexible with research based revisions. It is crucial that case studies facilitate the development of base line data from which an applicable and practical model can be refined.

Finally, ecological footprinting is a methodology that can be used by coastal zone managers in areas such as the Mediterranean to measure, identify and develop sustainable strategies. It can be used to become the yardstick to which inter annual and regional micro scale events can be compared and developed to further the coastal sustainability strategy. This research demonstrates some of the frailties and power of this tool for change and it should be seriously considered by the coastal zone management community.

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