Holiday Footprinting

A Practical Tool for Responsible Tourism

WWF-UK, March 2002

Project Collaborators

WWF-UK Business and Consumption Unit
The mission of WWF is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity;
- ensuring that the use of renewable resources is sustainable; and
- promoting the reduction of pollution and wasteful consumption.

WWF-UK's Business and Consumption Unit works with industry to create practical tools and solutions that promote both business success and sustainable lifestyles. For further information, contact **business@wwf.org.uk**

START
Steps Towards Responsible Tourism (START) is a joint project by IIED, Tearfund and WWF-UK. It comprises a suite of linked activities addressing corporate social responsibility in tourism including this footprinting tool. For further information, contact **tourism@wwf.org.uk**

Thomson Holidays
Thomson Holidays is the leading tour operator for UK inclusive holidays. In 2001, it took approximately four million people on holiday. Provision of data for this analysis is gratefully acknowledged.

Best Foot Forward
The footprint analysis and tool were prepared for WWF-UK by Best Foot Forward – an independent consultancy specialising in natural resource accounting techniques such as ecological footprinting. The executive summary, conclusions and recommendations were prepared by WWF-UK and START. For further information, contact Craig Simmons at **holidays@bestfootforward.com**

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Holiday Footprinting

Holiday Footprinting is a practical tool that enables tour operators to calculate the environmental impact, or ecological "footprint", that a holiday product has on the environment in terms of resources used. It also gives an estimate of the relative environmental sustainability of a product, and helps to identify opportunities for footprint reduction and cost savings.

Holiday Footprinting is also a useful communication tool with which to convey information about a range of environmental issues associated with tourism. If the Earth is regarded as a reserve of natural capital, each year producing interest in the form of renewable natural resources, then environmental sustainability requires that humanity lives off the interest rather than eat into the underlying capital. Footprinting assesses the Earth's available resource, or annual interest, made up of productive land and sea, and quantifies it as a single measurable unit, or currency, known as the "area unit". An area unit corresponds to one hectare of world average bioproductive space. At present there are around two area units available per person on the planet. This is an individual's "earthshare". Holiday Footprinting quantifies the area units required for a particular holiday, and measures multiple environmental impacts through this single aggregated indicator. It then calculates the percentage of an individual's earthshare accounted for by that holiday, allowing an estimate of environmental sustainability to be made.

Report

This report presents an ecological footprint analysis of two typical summer package holidays, each of two weeks duration, to two Mediterranean destinations – Majorca and Cyprus. It is based on data provided by Thomson Holidays. An estimate of the environmental sustainability of the two holidays is made in the context of available per capita earthshare. Scenarios for footprint reduction are outlined, and recommendations for more responsible tourism are made.

Tool

A "live" footprint tool is available on the *Holiday Footprinting* disk (together with other information on responsible tourism). This software is a simple practical tool that allows tour operators to input their own data, and to estimate the footprint of their particular products, as well as making an assessment of their relative environmental sustainability. It is hoped that the tool will be used by tour operators in the pursuit of more responsible tourism, and within the context of sustainability reporting. It provides a useful means of quantifying environmental impacts as well as identifying opportunities for cost savings, and Holiday Footprinting accounts for a range of diverse environmental impacts in a single easily understandable indicator.

Headline results for Majorca and Cyprus holidays

Assuming an average two-week holiday, the ecological footprint of the Majorca package holiday is 0.03 area units per bed night, and 0.07 area units per bed night in Cyprus. The total impact per guest is 0.37 area units for Majorca and 0.93 area units for Cyprus.

In the context of available per capita earthshare of approximately two area units, the Majorca and Cyprus holidays currently account for 20 per cent and 50 per cent of earthshare respectively. Returning to the financial analogy, this is equivalent to a person spending 20 per cent or 50 per cent of their annual income in a two week period!

By far the largest component of the ecological footprint of the two holidays is the return flight. This has a severe environmental impact and accounts for 56 per cent and 46 per cent of the Majorca and Cyprus holidays respectively, though the relative impact is nearly two times larger for the Cyprus holiday, owing to the greater distance travelled. Waste is responsible for 25 per cent of the Majorca holiday's footprint, and just over 35 per cent of the Cyprus holiday's footprint. For the Majorca holiday, food consumption is the third largest contributor, responsible for 9 per cent of the footprint. In contrast, excursions are the third largest component of the Cyprus holiday footprint, accounting for 6 per cent.

In short, going on a holiday abroad is an expensive proposition in terms of individual environmental sustainability. Not surprisingly, further consumption throughout the remaining 50 weeks of the year often results in an average annual per capita footprint greater than the available two area unit earthshare. The average UK citizen's annual footprint, for example, amounts to around 6.8 units, exceeding available earthshare by more than three times. On a global scale, humanity is currently eating into the Earth's capital, annually consuming around one third more resource than the Earth produces. These are unsustainable situations.

It should be stressed, however, that while the average earthshare is a useful environmental sustainability benchmark, it represents an average global target. Similarly, there is nothing in the ecological footprinting method which sets a target for how much of an individual's footprint should, or could, be "used up" by a holiday. Assessment of an individual's overall footprint also requires consideration of activity and consumption outside the holiday period. If a person seeks to live in an environmentally sustainable manner, it is up to them as to how they choose to allocate their available earthshare.

Improvement scenarios

Scenario improvement options designed to reduce the overall footprint of the holidays to Majorca and Cyprus, target the components with the largest footprint: air travel, waste, food, and hotel energy.

Air travel is one of the most difficult footprint components to reduce without radically changing the nature of the holiday business. Aircraft taking Thomson holidaymakers to Majorca and Cyprus fly full, or nearly full, in most cases, with seat occupancy rates of 91 per cent and 97 per cent respectively. However, even small changes can have a significant effect given the large environmental impact of flying. Although it is impossible to fill all seats on all flights, increasing both occupancy rates to 98 per cent should be possible. It is recognised that such an ambitious target is likely to be of greater significance to tour operators or airlines other than Thomson or Britannia Airways, where occupancy rates are currently lower. UK national average occupancy rates for international flights stand at 72.6 per cent (scheduled) and 89.2 per cent (non-scheduled). Scenarios for air travel also include improvement in the efficiency of air traffic control: Britannia Airways estimate that indirect routings and holding delays account for around 8 per cent of total fuel used.

There is also much room for improvement in waste management. There are large differences between the two holiday hotels. Waste tonnage is much larger for Cyprus than for Majorca. In addition, the Majorca hotel recycles 13 per cent of its waste, but the Cyprus hotel appears to recycle nothing. Options are therefore to reduce waste by 25 per cent, and to increase recycling by 25 per cent, achieving a 50 per cent diversion.

Options for food include switching 20 per cent of food tonnage from meat to dairy, fruit, vegetables, seafood and fish, as well as eliminating the use of internationally sourced food. At present, the footprint resulting from the production of a tonne of meat is around five times that of a tonne of grain. Transport impacts involved in sourcing food internationally also constitute a significant part of the footprint.

In both hotels, the largest energy impact arises from the consumption of fossil-fuel derived electricity suggesting opportunities to make use of solar technology. Savings are often cost effective as well as environmentally beneficial, reducing greenhouse gas emissions. Options are to reduce overall consumption by 20 per cent and, in addition, to switch 20 per cent of current fossil-based electricity use to renewable sources. Though few examples exist of hotels converting to renewable energy, in Cyprus the installation of solar panels on hotels is now a requirement.

Combining these scenarios would result in footprint reductions of 18 per cent for Majorca and 17 per cent for Cyprus. Returning to the financial analogy once more, this would be equivalent to saving around £70 on a £400 holiday – a worthwhile reduction. The potential percentage uptake of available earthshare for the two holidays would then be reduced to 16 per cent for Majorca (vs. 20 per cent pre-scenario), and 42 per cent for Cyprus (vs. 50 per cent pre scenario).

1. Introduction

Overview

The analysis in this report quantifies the environmental impact, or ecological "footprint", of two typical UK package holidays in the Mediterranean, offers an assessment of their overall environmental sustainability, and suggests a series of modular scenarios for each of them as a means of identifying practical steps that could be taken to reduce this footprint.

A "live" version of the holiday footprint model used in this analysis is also available on the *Holiday Footprinting* disk (see Section 7 "Live" Holiday Footprinting Tool).

What is footprint analysis?

The Ecological Footprint is the sum of the biologically productive area required to produce food, wood and water, provide space for built infrastructure, and absorb waste products associated with a particular activity or set of activities. It offers a *"conservative estimate of human pressure on global ecosystems"* (WWF, 2000) and acts as an aggregated indicator of resource consumption using "area units" to express the magnitude of this consumption. An "area unit" corresponds to one hectare of world average bioproductive space.

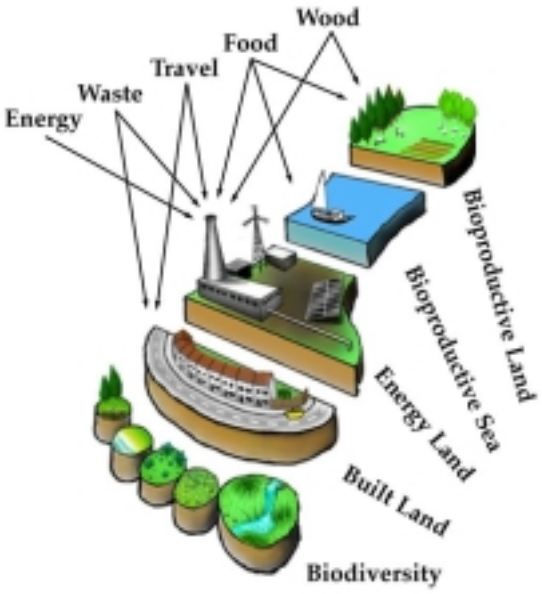


Figure 1: The land and sea types and components making up an Ecological Footprint

Although Ecological Footprint Analysis only gained widespread publicity in 1995, it is now in common use in many countries such as Australia, Canada, Italy, Mexico, the Netherlands, Norway, Sweden and the US. Applications range from the assessment of global and national sustainability (cf. WWF, 2000) to the measurement of the impact of disposable nappies (cf. Chambers *et al*, 2000). The methodology has been adopted by numerous private sector organisations, educational establishments, local authorities and NGOs to illustrate and inform many different audiences about sustainable development.

For the purposes of the Ecological Footprint calculation, land and sea area is divided into four basic types (Fig. 1): bioproductive land, bioproductive sea, energy land (forested land required for the absorption of carbon emissions) and built land (buildings, roads, etc.). A fifth type indicates the space that would need to be set aside to preserve biodiversity (see Appendix).

The following two examples illustrate how an ecological footprint is caused by human activity.

1. A cooked meal of fish and rice requires bioproductive land for the rice, bioproductive sea for the fish, and forested "energy" land to re-absorb the carbon emitted during the processing and cooking.

2. Driving a car requires built land for roads, parking, and so on, as well as a large amount of forested "energy" land to re-absorb the carbon emissions from petrol use. In addition, energy and materials are used for construction and maintenance.

Once a total Ecological Footprint for a product or service is calculated, it can be benchmarked in several ways and/or used to investigate future scenarios. For example, component parts of the ecological footprint can be compared with each other or the total can be employed in calculating an estimate of a product's sustainability.

The most commonly used sustainability benchmark is available fair earthshare. This is the average amount of productive area available to each person. The earthshare is calculated by dividing the total amount of productive land and sea on the planet by the global population. The most recent studies estimate the average per capita earthshare to be about two area units (WWF, 2000).[1]

Globally, the average per capita Ecological Footprint was 2.85 hectares in 1996 – about 30 per cent more than the available earthshare – suggesting that humanity is using more natural resources than can be sustained in the longer term.

Average ecological footprints vary by region. Typically those in richer countries consume a disproportionate share of the world's resources. The footprint of the average Briton, for example, is 6.3 area units (more than three times the sustainable level) whilst the average Indian has a footprint of just 1 area unit (half the earthshare). Of course, these averages mask massive variations within national populations.[2]

Limitations – social and economic impacts

Holiday Footprinting addresses environmental impacts only. Sustainable development is generally recognised as comprising three "pillars" – social, economic and environmental. While the pursuit of a reduced ecological footprint is a laudable goal for the tourism industry, this needs to be complemented by action aimed at maximising the positive social and economic impacts of tourism in destinations. In addition, Holiday Footprinting focuses on tourism *practice* only. It says nothing about tourism *development* (e.g. the planning and building of hotels) for which there are a range of sustainability issues (e.g. location and impacts on biodiversity and local people) that would need to be addressed in the pursuit of wholly sustainable tourism.

[1] The figure of 2 area units includes a modest allowance of 10 per cent for other species. However, population increases since 1996 have reduced the earthshare to around 1.9 area units, still allowing 10 per cent for other species.

[2] These calculations are based on 1996 data as used in the WWF's *Living Planet Report 2000*. More recent estimates by Best Foot Forward indicate that the average UK footprint had increased to 6.8 area units by 2000.

2. The Holidays

Package holidays generally include flights, coach transfers and accommodation (ranging from full board to self-catering). Additional options available cover car rental, excursions, sports facilities, and so-on. This report examines two Thomson holidays, chosen as being illustrative of the Mediterranean summer range offered by the company. One holiday is in Cyprus and the other in Majorca. Both destinations are reached by aircraft from Gatwick airport in the UK.

Majorca: Family, Aparthotel Bonaire, Cala Bona

The Aparthotel Bonaire complex is located in the eastern seaboard town of Cala Bona on the island of Majorca. It is a four-star Thomson Superfamily property catering for families, especially those with young children.

Awarded a Thomson Gold Medal for achieving high customer approval rating, the hotel comprises 208 apartments. All have a kitchenette fitted with standard electrical appliances, as well as bathroom, television, telephone and air-conditioning. Linen is changed once a week and towels changed five times a week. Apartments are self-catering, although buffet-style meals and snacks are available in the complex. Buses and a mini-train take residents into the local resort centre or to the larger resort of Cala Millor. Local attractions, such as a beach and small harbour, are within walking distance of the hotel. The hotel itself includes a variety of entertainment facilities, including two swimming pools and a multi-purpose sports pitch. Daytime and evening entertainment for the family is offered by Thomson during the week.

Cyprus: Couples, Atlantica Bay, Limassol

Atlantica Bay is a four-star Thomson Gold hotel 10 kilometres from the resort of Limassol, the second largest town on the island and a popular summer holiday destination, located in southern Cyprus.

The hotel has 200 rooms and caters mainly for couples. All rooms are air-conditioned, and have an en-suite bathroom, television, telephone, radio, mini-bar and additional electrical appliances, such as hairdryers. The hotel provides a change of bedding and towels three times a week. A variety of meals are included in the holiday, including buffet, à la carte and room service options. A variety of entertainment facilities, such as a tennis court, a gym and two swimming pools, are also provided within the hotel complex. Thomson offers excursions to areas of local interest. Nearby facilities and destinations include Yermasoyia, a busy tourist centre, and a private sandy beach within walking distance.

3. The Holiday Footprints

For an explanation of the approach used to derive the footprint conversion values for holiday components (i.e. flights, food, etc.), see the Appendix to this report.

Summary results of the holiday footprint calculations are shown in Table 1. The Cyprus holiday was found to have an ecological footprint some two and a half times greater than the Majorca holiday. Not surprisingly the impact of flying to Cyprus is greater than that of flying to Majorca, due to the increased distance. However, the difference in footprint remains even when this travel component is excluded. This can be attributed to the higher resource consumption at the Atlantica Bay Hotel. This hotel produces more waste, requires more food, consumes more energy and has higher impact excursions than the family-oriented Aparthotel Bonaire. Reference to the data tables in the Appendix shows, for example, that despite having fewer guests, the Atlantica Bay hotel generates about three times as much waste as Bonaire and purchases 25 per cent more food. Hotel energy use is similar for both destinations, but the electricity supply in Cyprus is thought to originate from a more polluting source, hence its higher footprint. The information provided by the resorts also indicates that the Cyprus guests go on longer excursions than the visitors to Majorca. In addition, the modes of transport used in Cyprus are less environmentally-friendly, with a higher proportion of trips by car, taxi and jeep.

Table 1: Summary Ecological Footprints for the Majorca and Cyprus hotels
(Double counted elements excluded)

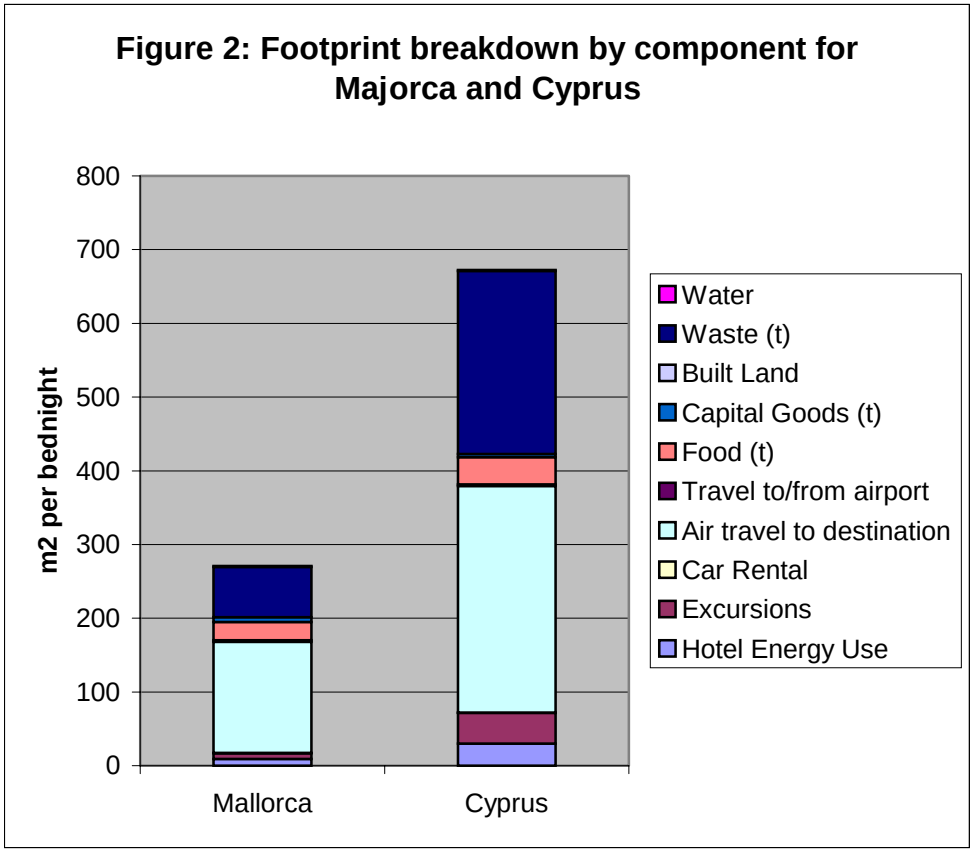
	Annual package footprint (HA)	Footprint per bednight (HA)
Majorca	3,904	0.03
Cyprus	8,107	0.07
Majorca (without flights)	1,667	0.01
Cyprus (without flights)	4,372	0.04

The individual component footprints are shown in Table 2, and graphically represented in Figure 2. The table shows the components in approximate order of magnitude. Together, air travel, waste and food account for more than 90 per cent of the footprint for both holidays. Not surprisingly, air travel alone constitutes approximately half the footprint.

Table 2: Ecological footprint by component
(All figures are in area units. Due to the inclusion of double counting impacts, part of the footprinting methodology, figures in this table do not total to the same as Table 1)

	Majorca	Majorca %	Majorca % (without air travel)	Cyprus	Cyprus %	Cyprus % (without air travel)
Air travel to destination	2237	56%	-	3735	46%	-
Waste (tonnes)	1014	25%	57%	3017	37%	68%
Food (tonnes)	368	9%	21%	451	6%	10%
Hotel Energy Use	134	3%	8%	363	4%	8%
Excursions	117	3%	7%	509	6%	11%
Capital Goods (tonnes)	95	2%	5%	54	1%	1%
Travel to/from airport	28	1%	2%	23	0%	1%
Water	15	0%	1%	16	0%	0%
Car Rental	4	0%	0%	6	0%	0%
Built Land	1	0%	0%	0	0%	0%
TOTAL area units/%	4012	100%	100%	8174	100%	100%

Figure 2: Footprint breakdown by component for Majorca and Cyprus



4. Environmental Sustainability Assessment

The concept of the average available earthshare (see Section 1 Introduction) allows an assessment of the sustainability of the two holidays at a personal level within the context of the average UK citizen's annual footprint.

Assuming a two-week holiday, the impact per guest can be calculated (Table 3) and a comparison made with the average earthshare. The percentage share that the holidays would contribute to the current footprint of the average UK citizen is also shown.

In short, taking a holiday abroad is an expensive proposition in terms of individual environmental sustainability. Not surprisingly, further consumption throughout the remaining 50 weeks of the year results in an average annual per capita footprint which is greater than the available two area unit earthshare. In the UK, for example, this footprint currently amounts to around 6.8 units, exceeding available earthshare by more than three times.[3]

It should be stressed, however, that while available earthshare is a useful environmental sustainability benchmark, it represents an average global target. Similarly, there is nothing in the ecological footprinting method which sets a target for how much of an individual's footprint should, or could, be "used up" by a holiday. Assessment of an individual's overall footprint also requires consideration of activity and consumption outside the holiday period. If a person seeks to live in an environmentally sustainable manner, it is up to them as to how they choose to allocate their available earthshare.

It is also worth noting that the footprint for the average UK citizen is calculated using national trading accounts. Thus resources consumed overseas, such as when holidaying, are not included. This is partly compensated for by the consumption in the UK of resources by overseas visitors. However, as the UK has a net outflow of tourists (British people spend more time holidaying overseas than vice versa) the UK average footprint is likely to be an under-estimate, in reality standing somewhere between 6.8 and 6.8 plus the impact of any holiday(s) taken. Moreover, the holiday footprint calculation takes no account of the resources saved at home while a person is consuming abroad, though consumption rates on holiday are generally higher than those at home. The share of the average UK footprint accounted for by a holiday is therefore likely to be an over-estimate. However, this situation has no impact on the calculation of the footprint of individual holidays as a proportion of available earthshare. Estimates of overall environmental sustainability are therefore accurate.

Table 3: Ecological footprint per guest

	Ecological footprint per guest (area units)	% of current average UK footprint	% of per guest available earthshare
Majorca	0.37	5%	20%
Cyprus	0.93	14%	50%
Majorca (without flights)	0.16	2%	8%
Cyprus (without flights)	0.50	7%	27%

[3] The *Living Planet Report 2000* (WWF, 2000) gives the average UK footprint as 6.3 area units per capita based on 1996 data. Best Foot Forward estimate that the UK average footprint in 2000 was 6.8 area units.

5. Scenarios

The following section identifies a number of opportunities for reducing the footprint of the two holidays. Reduction options are considered individually for air travel, waste, food and hotel energy use components, before the combined effect of these on the holidays as a whole is examined.

Air travel

Air travel, the component with the biggest environmental impact, is also one of the most difficult to reduce without radically changing the nature of the holiday business. However, even small changes can have a significant effect given the scale of the impact of flying. Two options are considered here (see also Section 6: So What?).

Option 1: Increasing aircraft load factors

The available data suggests that aircraft taking Thomson holidaymakers to Majorca and Cyprus fly full, or nearly full, in most cases with seat occupancy rates of 91 per cent and 97 per cent respectively. Nationally published data indicates that these figures are well above the average. For example, the DTLR gives occupancy rates for international flights as 72.6 per cent (scheduled) and 89.2 per cent (non-scheduled) (DTLR, 2001). Although it is impossible to fill all seats on all flights, the difference in load factors between Majorca (91 per cent) and Cyprus (97 per cent) indicates some further room for improvement. The assumption made is that both occupancy rates can be increased to 98 per cent. It is recognised that such an ambitious target is likely to be of greater significance to tour operators or airlines other than Thomson, where occupancy rates are currently lower.

Option 2: Improving efficiency of air traffic control

Britannia Airways (Thomson's own airline) estimates that indirect routings and holding delays account for around 8 per cent of total fuel used. The assumption here is that this wastage can be halved to 4 per cent.

Table 4 indicates the effects of adjusting the air travel footprint component as suggested above.

Table 4: Options for reducing air travel footprint (all figures are in area units)

	Current air travel footprint	Option 1 load factors	Option 2 air traffic control	Options 1 & 2 combined
Majorca	2,237	2,077	2,147	1,988
Cyprus	3,735	3,697	3,586	3,548

Waste

There is much room for improvement in waste management. Waste minimisation and reuse and/or recycling are both well-established methods of reducing the ecological impacts of materials consumption and disposal.

There are large differences between the two holiday hotels. Waste tonnage is much larger in Cyprus than in Majorca. In addition, the Aparthotel Bonaire, Majorca recycles 13 per cent of its waste, the remainder being incinerated, but the Atlantica Bay, Cyprus, appears to recycle nothing, all of its waste being landfilled.

Waste diversion targets of 50 per cent have already been achieved elsewhere in the hospitality industry (cf.**www.epa.nsw.gov.au/waste/wg-71.htm**). This can be achieved through various combinations of minimisation and recycling efforts. Two options are suggested which combine to achieve a 50 per cent diversion.

Option 1: Waste minimisation - reducing waste by 25 per cent

Option 2: Increase recycling to 25 per cent

Table 5 indicates the effects of adjusting the waste footprint component as suggested above. The mix of recycled materials is based on the Majorca data.

Table 5: Options for reducing waste footprint (all figures are in area units)

	Current waste footprint	Option 1 minimisation	Option 2 recycling	Options 1 & 2 combined
Majorca	1,013.72	760.29	959.96	706.53
Cyprus	3,017.46	2.263.09	2,811.41	2,057.04

Food

Due to a lack of data, it is impossible to provide accurate scenarios on food choices. However, one way to reduce the food footprint is to consume fewer meat products: at present the footprint resulting from the production of a tonne of meat is around five times that of a tonne of grain (Chambers *et al*, 2000).

Sourcing food more locally is another means of reducing the food footprint, as less energy is used in transporting it to the hotel. However, it should be recognised that a high proportion of food already originates at the regional or national level, being produced on the individual islands or mainland Europe. Two options are therefore suggested.

Option 1: Switching 20 per cent of the food tonnage from meat to dairy, fruit, vegetables, seafood and fish
Estimates based on the Cyprus data suggests that around 44 per cent of food tonnage purchased is meat, 27 per cent dairy, 16 per cent fruit, 8 per cent vegetables and 4 per cent seafood and fish. This option assumes that meat is reduced to 24 per cent of the total tonnage with the other categories increasing by 5 per cent to compensate for the decrease in meat consumption.

Option 2: Eliminating internationally sourced food
In Majorca, internationally sourced food currently accounts for 17 per cent of food tonnage, in Cyprus it accounts for 20 per cent.

Table 6 indicates the effects of adjusting the food footprint component as suggested above.

Table 6: Options for reducing the food footprint (all figures are in area units)

	Current food footprint	Option 1 reduce meat products	Option 2 reduce food miles	Options 1 & 2 combined
Majorca	367.67	261.05	365.49	258.86
Cyprus	450.91	320.15	447.85	317.09

Hotel energy use

The largest energy impact in both hotels arises from the consumption of fossil-fuel derived electricity. Much has been written on energy efficiency options within hotels and studies suggest that savings are often cost effective as well as environmentally beneficial in terms of reduced greenhouse gas emissions (cf. DoE, 1994).

Electricity consumption is very high compared with similar UK establishments, no doubt due to the greater use made of air-conditioning and the lower uptake of gas. Caution is therefore necessary when suggesting efficiency savings and making comparisons between different destinations. However, even allowing for such discrepancies, it seems that the electricity consumption in both hotels is below "best practice". In other words, it could be more efficient. (DoE, 1993).

The Aparthotel Bonaire, Majorca, uses a considerable amount of renewable energy, from an unknown source, but the Atlantica Bay, Cyprus, uses none. In both Majorca and Cyprus, there are considerable opportunities to make use of solar technologies in particular.

Two scenario options are therefore suggested.

Option 1: Reducing overall energy consumption by 20 per cent
Case studies suggest energy saving between 20 and 50 per cent are achievable.

Option 2: Switching 20 per cent of current fossil-based electricity use over to renewable sources
Though few examples exist of hotels converting to renewable energy, it is understood that in Cyprus the installation of solar panels on hotels is now a requirement (WTTC, 2001).

Table 7 indicates the effects of adjusting the hotel energy footprint component as suggested above.

Table 7: Options for reducing the hotel energy footprint (all figures are in area units)

	Current energy footprint	Option 1 20% energy conservation	Option 2 20% renewable energy	Options 1 & 2 combined
Majorca	133.77	107.01	112.71	90.17
Cyprus	363.09	290.47	304.62	243.70

Applying air travel, waste, food and hotel energy scenarios in combination

The effect of summing all the footprint savings identified in the air travel, waste, food and hotel energy scenarios outlined above can be seen in Table 8. Figure 3 compares the two holidays before and after the application of the reductions. Table 9 provides revised sustainability assessments. Combining scenarios would result in footprint reductions of 18 per cent for Majorca and 17 per cent for Cyprus. The potential percentage uptake of available earthshare for the two holidays would then be reduced to 16 per cent for Majorca (vs. 20 per cent pre-scenario), and 42 per cent for Cyprus (vs. 50 per cent pre scenario).

Table 8: Combining reduction options (all figures are in area units except where indicated)

	Current package footprint	Savings identified				Reduced package footprint	Reduction (%)
		Air travel	Waste	Energy	Food		
Majorca	3,904	249	307	43.60	109	3,195	18%
Cyprus	8,107	187	960	119.39	134	6,706	17%

Figure 3: Footprints (in area units) per guest before and after reduction options

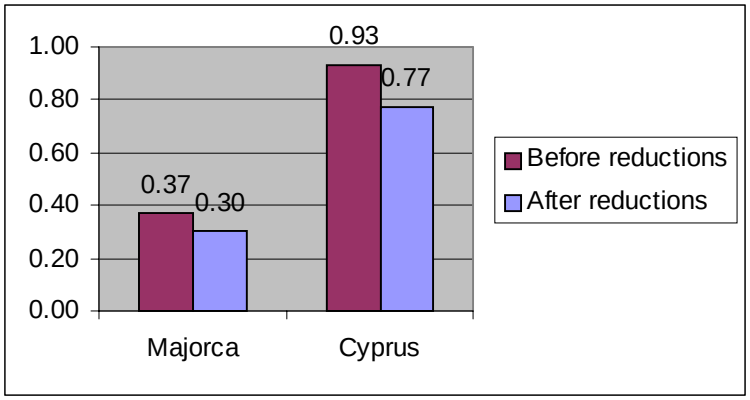


Table 9: Revised earthshare calculations using scenario data from Table 8
(all figures are in area units)

	Footprint per guest	% of current average UK footprint	% of per guest of available earthshare
Majorca	0.30	4%	16%
Cyprus	0.77	11%	42%

6. So What?

WWF conclusions

The Majorca and Cyprus holidays considered here, before scenario improvement, at present account for 20 per cent and 50 per cent respectively of available per capita earthshare of two area units. On a purely environmental level, it appears that the holiday to Majorca is a "better" choice than the holiday to Cyprus, leaving the holidaymaker with more earthshare left to "spend" at home during the rest of the year.[4] Both holidays currently rest within the limits of individual environmental sustainability with the proviso that the holidaymaker leads a much lower impact existence for the rest of the year. However, because of the greater amount of air travel involved, long-haul holidays (not considered here), whether all-inclusive or independent, are likely to fall outside the budgetary constraints of available per capita earthshare. Moreover, overall levels of consumption in the UK result in an average annual per capita footprint that is more than three times available per capita earthshare.

In certain respects, holidays abroad typify the unsustainable nature of current developed country consumption patterns. If everyone in the world took an annual holiday similar to the Cyprus break, an extra half-planet would be required to support the additional consumption involved in holidaying alone! It is unlikely, therefore, that holidays involving air travel will ever be wholly sustainable, but they can be made more "responsible". It is therefore more useful to think about "responsible tourism" within the context of a wider sustainable development strategy.

Sustainable development asks that social and economic needs are also accounted for. In many instances, tourism also has negative social and cultural impacts in destinations, and economic benefits may not be evenly distributed. Nevertheless, tourism undoubtedly has great potential to support economic development and is an important element of many countries' economies. It also has the potential to inform people about sustainable development and conservation. WWF is not in the business of trying to stop tourism, or of advocating that people should not go on holiday abroad, but rather of working with the tourism industry to make its operations more responsible. It is important to ensure that tourism is controlled and, where it is championed as a driver of sustainable development, that it is part of a diversified economy, both at national and local levels.

Present consumer behaviour suggests that people do not take environmental impacts into account when buying a holiday. They are influenced more by price, and health and safety issues, rather than by some notional limit informed by an equitable or available per capita earthshare. However, a MORI survey for ABTA in 2000 found that around 80 per cent of package holidaymakers felt that it was important that their holiday did not damage the environment. Rather than making explicit demands about sustainability, because they are simply unaware of the real impacts that holidays can have, it is possible that there is an implicit assumption on the part of consumers that their holidays do *not* damage the environment. In meeting this assumption, the challenge for tour operators is to bring health, safety and sustainability together within a quality offer. This may ultimately require a radical rethink of core business, but there are a number of practical steps that

[4] It should be noted, however, that in order to judge the overall sustainability of specific holidays to particular destinations, it would be necessary to take into account the current state of the environment in each destination, as well as the effects of tourism as a whole on both local communities and on local and national economies. Moreover, all-inclusive package holidays and independent holidays are likely to impact in different ways. While, for example, package holiday flights may be more efficient in terms of per capita emissions than scheduled flights used by independent travellers, they may be less supportive of local economies where food or labour are imported or where tourists spend less money on local goods and services.

tour operators can take that will help to reduce the footprint of holidays without affecting the existing nature of the product.

Encouraging contracted or owned hotels to benchmark their environmental performance, for example, will result in reduced resource use and cost savings. The hotel benchmarking tool (**www.benchmarkhotel.com**) developed by WWF and IHEI (International Hotels Environment Initiative) is an excellent means of doing this. To a great extent, the key to achieving more sustainable tourism, rests in the *development* phase of tourism rather than the *practice* (i.e. holiday) phase. Holiday footprinting addresses tourism *practice* and, in estimating the environmental impact of a hotel, takes no account, for example, of whether that hotel has been built in an ecologically sensitive area or not. However, in so far as tour operators have influence in destination development, being seen to prefer resorts or hotels that use renewable energy sources and that are built in a manner sensitive to local communities and the environment, is one way of sending a signal to developers that sustainability should be a fundamental part of quality tourism in the 21st century rather than an optional extra. Tour operators can also seek to reduce the footprint of holidays by investing in renewable energy projects to offset the greenhouse gas emissions of air travel. Alternatively, Climate Care (**www.co2.org**) and Future Forests (**www.futureforests.com**) both offer schemes that enable tour operators to give their customers the option of investing in such offset projects themselves.[5]

Footprinting needs to be seen in the wider context of the corporate social responsibility agenda. In addition to reducing environmental impacts, the potential social and economic benefits that tourism can bring to destination communities, as well as raised awareness about environmental and cultural issues amongst holidaymakers, also need to be maximised. Footprinting is a single tool, and one that addresses environmental impacts only. It needs to be complemented by a range of other approaches such as benchmarking, supply chain management, sustainability reporting and certification. The tourism industry also needs to inform holidaymakers in a more comprehensive way not only about the nature of its operations, but also about what behaviour is appropriate in particular destinations, and what people can do as customers and consumers to promote more responsible tourism.

[5] It should be noted that WWF does not view carbon sequestration (planting trees to sequester carbon dioxide from the atmosphere) as a long-term viable option for offsetting greenhouse gas emissions, but where offset schemes offer investment in renewable energy projects, this is acceptable.

START recommendations

Making holidays more responsible and moving them towards environmental sustainability requires footprint reduction through a combination of the use of more renewable energy sources and "clean" technologies, radically increased resource use efficiency, and waste reduction. In addition to reducing environmental impacts, the potential social and economic benefits that tourism can bring to destination communities, as well as raised awareness about environmental and cultural issues amongst holidaymakers, need to be maximised.

In terms of environmental sustainability, START (see Project Collaborators) recommends that tour operators take these first steps:

- use the holiday footprinting tool (see next section) to assess the environmental impact of holiday products and take action to reduce this footprint;
- encourage contracted or owned hotels to become more efficient by promoting use of the WWF/IHEI benchmarking tool (**www.benchmarkhotel.com**);
- report on progress according to tourism-specific guidelines for sustainability reporting being produced by the Tour Operators Initiative (**www.toinitiative.org**) and the Global Reporting Initiative (**www.globalreporting.org**).

Further guidance and advice on responsible tourism and sustainability can be obtained from the Tour Operators Initiative (**www.toinitiative.org**).

7. 'Live' Holiday Footprinting Tool

A "live" version of the holiday footprint model used in this analysis is available on the *Holiday Footprinting* disk. Based on Excel, this software is a simple practical tool that allows tour operators to input their own data, estimate the footprint of their particular products, and make an assessment of their relative environmental sustainability. It also contains the Majorca and Cyprus holiday analyses and scenarios as examples. It is hoped that the tool will be used by tour operators in the pursuit of more responsible tourism and within the context of sustainability reporting. It provides a useful means of quantifying environmental impacts as well as identifying opportunities for cost savings. Full instructions for its usage are set out below. The disk also contains a number of other relevant publications on responsible tourism by WWF.

It should be emphasised that the tool on the enclosed disk allows only a first pass analysis. For guidance on how to carry out a more detailed analysis, and the development of scenarios for footprint reduction tailored to a particular holiday product, contact Craig Simmons at Best Foot Forward (**holidays@bestfootforward.com**).

Instructions for using the Holiday Footprinting tool

1. Open the Excel file as normal.
2. When asked, choose 'enable macros'.
3. There are three worksheets in the file. The first you will see is entitled 'Intro'. The other two are the tool itself and a copy of these instructions.
4. Adjust the 'percentage view' if the hammock picture is either too small or too big for your screen size.
5. Once you have admired the picture, choose the 'Footprint' worksheet by clicking on the tab at the bottom of the Excel window.
6. You will now see the Footprinting tool. This gives an estimate of the environmental impact of holiday products based on assessing five parameters (flight, waste, energy, food, other).
7. Click on the button entitled 'Case Study: Cyprus'. Having done this, the initial data set and results that you will see will be those relating to the Cyprus holiday analysed in building the tool. The pies and bar charts give results as indicated. Under these are three headline results for the footprint of the holiday, the last of which indicates the percentage of available per capita earthshare that this particular holiday accounts for. For an explanation of the significance of this, please refer to the *Holiday Footprinting* report.
8. Press the button entitled 'Cyprus scenario' and the results change through the application of hypothetical adjustments in the five parameters. Again see the *Holiday Footprinting* report for a detailed explanation of how the footprint of this holiday product might be reduced.
9. Repeat steps 6-10 using the Majorca buttons to explore another holiday product.
10. Measure the footprint of your own holiday products by entering the data for them in the appropriate fields.
11. Do this by hovering the cursor over the red triangles (17 in total) for an explanation of what data to include and how to do it. Begin with the two red triangles in the top left of the tool console relating to the holiday hotel (number of nights and number of guests).
12. Finally explore your own scenario options by altering (reducing) the data inputs as far as realistically possible.
13. Print out your results for inclusion in reports and brochures, and on your website.
14. Contact Best Foot Forward to engage in a more detailed footprint assessment of your products.

References

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Wackernagel, M. & Rees, W.E. (1996) *Our Ecological Footprint: reducing human impact on the earth*, New Society: Canada

WTTC (2001) *The Tourism Industry – a report for the world summit on sustainable development*, compiled by WTTC with IFTO, IH&RA and ICCL. Facilitated by UNEP and WTO

WWF (2000) *Living Planet Report 2000*, **www.panda.org**

Further Information

This section contains contact details for those organisations or initiatives consulted in the preparation of this report from whom further information can be obtained. This list is not exhaustive, and there are many other parties currently addressing the issue of responsible tourism.

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Appendix

Calculating the Ecological Footprint

Ecological Footprint values are calculated using Best Foot Forward's EcoIndex Methodology ™ – an innovative development of the Ecological Footprint concept originated by Wackernagel & Rees (1996), based on a "bottom-up" life-cycle approach termed Component Footprinting. The approach is compatible with that used in WWF's *Living Planet Report 2000*. Necessarily, though, different data sources are used reflecting the different level of analysis. The data and assumptions underlying the footprint calculations in this report are set out below.

In the EcoIndex ™ Methodology, wherever possible, full Life Cycle impact data is used to derive Ecological Footprint conversion factors for key activities or components. For example, to calculate the Ecological Footprint of a car, passenger-kilometre life cycle data is collected for fuel use, materials and energy for manufacture and maintenance of the vehicle, and the share of UK roadspace appropriated by the car are accounted for (Table 10). This conversion factor is then applied to the distance travelled.

Table 10: An example analysis for the footprint of UK car travel (per passenger km)

Component	Inputs	Co_2 emissions	Built-upon land	Footprint
Petrol	0.094 litres	0.22kg		0.000031[ii] area unit-yrs
Maintenance & Manufacture	0.0423 litres equivalent	0.10kg		0.000014[iii] area unit-yrs
Road Space	258,175ha		[a] 817,043 (Note 1)	
Car Road Share	[b] 86%			
Car kms	[c] 362,400,000,000			
Calculation				i+ii+iii
FOOTPRINT			0.000001[i] area unit-yrs	0.000046 area unit-yrs/pass-km

Note 1: All hectare figures have been converted to area units

Data collection

Consumption data for the two package holidays was provided by Thomson or its agents. In a few cases it was necessary to derive consumption data indirectly from Best Foot Forward's EcoIndex Methodology ™. All data provided was the most up to date available covering the year 2000 season.

Despite some data gaps, it is felt that the assumptions made in the current study are fairly robust. The tendency has been to be conservative with the assumptions – omitting certain impacts where these are unknown. This has led to the size of certain components, most notably water and capital goods, being under-estimated in the footprint analysis.

Basic assumptions

Suitable information was provided by both destinations on the occupation rate of their hotels (Table 11). To calculate the number of guests staying at each destination, the number of bed nights was divided by the typical length of stay – for both destinations this was assumed to be two weeks. Of course, shorter vacations are possible but it was felt necessary to standardise the length of stay to ensure some degree of comparability.

The marketing of, and accommodation at, the destinations makes it clear that the Aparthotel Bonaire, Majorca is targeted at families while the Atlantica Bay Hotel in Cyprus is aimed at attracting couples. It is therefore assumed that the average party size for the former is four people and the average for the latter two people. As it can be assumed that parties of whatever size travel together it was only necessary to use this assumption for estimating car rental use.

Table 11: Basic assumptions about annual occupancy

	Majorca	Cyprus
Number of bed nights	148,172	121,554
Average length of stay (days)	14	14
Number of guests	10,548	8,682
Party group size	4	2

Hotel energy use

Annual energy consumption data was readily available from the destinations. However, the nature of the supply was more difficult to determine (Table 12).

Majorca derived a portion of its energy from renewable sources and it was assumed that this was in addition to the standard grid electricity used. No information was available on the electricity supply mix for either hotel but it is known that an increasing portion of Majorca's demand for energy is met by gas turbine installations (**www.endesa.es/english/documentacion/memoria2000/RL0.3.pdf**). It was therefore assumed that the carbon content of grid electricity is similar to that in the United Kingdom (UK) – which has a large portion of its energy now produced by gas. It should be noted, however, that all new tourist accommodation in Cyprus is required to have solar panels (WTTC, 2001).

Cyprus' economy is oil-based (**http://europa.eu.int/scadplus/leg/en/lvb/e14111.htm**). It has therefore been assumed that all the hotel energy was generated using oil-fired power stations.

The renewable energy was assumed to have been derived from a mix of sources.

Table 12: Hotel energy consumption

	Majorca	Cyprus
Electricity (kWh)	1,192,785	2,066,418
Gas (kWh)	170,398	24,947
Oil (litres)	726	89,950
Gas Oil (litres)	356	0
Electricity - renewable (kWh)	710,929	0

Excursions

Each destination was asked to supply information about the top tours taken by guests. The most frequently visited were shopping centres and souvenir shops. For each excursion estimates of distance, travel mode and frequency were provided. Annual figures were then estimated using guest numbers. A breakdown of the total distance travelled by type of excursion and mode is provided in Table 13.

When calculating the ecological footprint average occupancy rates were assumed for the various modes of transport.

Table 13: Annual distance travelled by excursion type and mode
(All figures are in passenger kilometres. Modes of transport which were not used have been excluded from the table)

Travel mode by excursion type	Majorca	Cyprus
Travel to "highlights"	5,334,192	13,044,481
By train	211,674	0
By bus/coach	4,868,509	8,751,888
by jeep	0	2,115,040
by boat	254,009	2,177,553
Travel to souvenir shop	423,349	1,041,891
by foot	423,349	0
by bus/coach	0	520,946
by car/taxi	0	520,946
Travel to shopping centre	127,005	659,865
by foot	127,005	0
by bus/coach	0	329,932
by car/taxi	0	329,932

Car rental

Accurate car rental data was available for Majorca but not for Cyprus – though an average mileage was stated for guests using hire vehicles. Data for Cyprus was therefore estimated using average figures for Majorca but adjusting for the smaller party size. Accordingly, it was assumed that vehicle occupancy rates for Cyprus would be lower than for Majorca. The Cyprus data should therefore treated with some caution.

All vehicle travel information was converted to fuel consumption using data provided by Majorca (Table 14). The vehicle descriptions would suggest that the Cyprus rental cars would have been less fuel-efficient than in Majorca but there was insufficient data to incorporate this into the footprint calculations.

Table 14: Annual fuel use for rental vehicles

	Majorca	Cyprus
Fuel use (litres)	4,803	8,209

Air travel

All guests arrive by aircraft landing at local airports on the islands. All travel is by Britannia Airways from the UK. The return distance to Cyprus is 7,142 km and Majorca 2,785 km. Aircraft load factors were available for both flights. Cyprus flights were, on average, fuller than those to Majorca with occupancy rates at 97 per cent and 91 per cent respectively.

Passenger kilometre estimates were calculated from distances travelled (Table 15) and guest numbers.

Emissions per passenger kilometre were calculated using official Boeing data provided by Britannia Airways for the 757-200 used to fly to both destinations.

Table 15: Air travel

	Majorca	Cyprus
Distance flown (passenger kms)	29,428,547	61,904,847

Travel to the airport

Return distances from the airport to the hotels were 140kms (Majorca) and 134kms (Cyprus). Approximate data was provided on the mode of transport used to travel to and from the airport. Most visitors travelled by coach - though some Majorca guests opted for private transport (Table 16).

Table 16: Travel to/from airport by mode of travel

	Majorca	Cyprus
Travel by hired car (vehicle kms)	18,522	0
Travel by taxi (vehicle kms)	18,522	0
Travel by bus/coach (passenger kms)	1,333,548	1,163,445

Food

The hotels were asked the type, origin and tonnage of food sourced for consumption within the hotel. Both hotels were able to supply tonnage information and estimates of the origin, but only limited information on food type was forthcoming. It was therefore decided to focus on "food miles" (Table 17).

The definitions of "local/regional", "national" and "international" were based on the geography of the destinations. For the purpose of calculating the Majorca footprint, "local/regional" was defined as food originating from the island, "national" from mainland Spain, and "international" from outside Europe. For Cyprus, "national was defined as food originating from the island and "international" from outside Europe. "Food mile" estimates were allocated according to these definitions.

Table 17: Tonnage of food consumed by category of origin

	Majorca	Cyprus
General Foodstuffs of which	148	182
Local/Regional	40	n/a
National	83	146
International	25	36

Capital goods

Data on capital purchases was very limited. Of course, they are, by their nature, items which are not purchased every year. It was therefore decided to pick only a selection of items where data was available for both destinations, such as: computers, mattresses, plastic buckets, shower curtains and televisions (Table 18).

Given the current practice at both hotels, capital goods are most likely to disappear into the general waste stream when disposed of. To avoid double counting of impacts, the footprint of these items is therefore subtracted from the waste component in the final analysis.

No explanation was provided for why Majorca purchased so many plastic buckets!

Table 18: A selection of capital goods purchased in 2000 season

	Majorca	Cyprus
Computers (items)	3	27
Mattresses (items)	784	485
Plastic Buckets (items)	16,425	225
Plastic Shower Curtains (items)	110	225
Televisions (items)	209	220

Built land

The hotels were able to provide details of the size of their estate and the extent of any built area. Only the area covered by the hotel structure is included in the figures presented here (Table 19) as no data was available on the additional built infrastructure (roads, poolside area, utility supplies and so on).

Table 19: Built area of hotels

	Majorca	Cyprus
Hotel built area (hectares)	0.35	0.15

Waste

Basic waste statistics were supplied for both hotels. Information was also available on waste management. The Atlantica Bay Hotel, Cyprus produced far more waste that the Aparthotel Bonaire, Majorca. 13 per cent of waste from Aparthotel Bonaire, Majorca was recycled with the remainder incinerated. All of the waste from Atlantica Bay Hotel, Cyprus, was landfilled. Tonnage is given in Table 20.

Table 20: Waste statistics

	Majorca	Cyprus
Total Waste (tonnes) of which	341	1,200
Landfill (tonnes)	0	1,200
Incineration (tonnes)	296.28	0
Recycled (tonnes)	44.44	0

Water

Both hotels consumed similar amounts of fresh water although no data was provided on how this water was used (Table 21). In considering the footprint of water, it is necessary to take into account the renewable freshwater supply available for consumption. As such data for Majorca and Cyprus was not available, figures for Spain and the Eastern Mediterranean were used respectively. These are likely to under-estimate the footprint of water consumption.

It is known that both Majorca and Cyprus have water supply problems. Some of the demand for water in both islands is met by the desalination of sea water (cf. **www.endesa.es/english/documentacion/memoria2000/RL0.3.pdf** and **www.pio.gov.cy/wdd/eng/scientific_articles/article01.htm**). This is a highly energy-intensive process which is not considered in the footprint due to a lack of data. Again, this leads to a conservative estimate of the impact of water usage.

Table 21: Water consumption

	Majorca	Cyprus
Fresh water consumption (litres)	28,829,234	32,819,580

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