An ecological footprint analysis of

Isle of Wight 1999 - 2003

- South East -

Prepared for

The Isle of Wight Council

Prepared by

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Executive Summary

The main aim of the Isle of Wight ecological footprint project was to evaluate the environmental sustainability of the lifestyle of Isle of Wight residents by investigating trends in the ecological footprint between 1999 and 2003. *Island State* (BFF, 2000) was the first footprint study carried out for the Isle of Wight. This award-winning report forms the basis of the current analysis. The ecological footprint measures the resources consumed in order to sustain the current lifestyles of, in this case, Isle of Wight residents. Alongside this, global and local biocapacity has also been calculated to compare the ecological footprint with the available supply of resources, indicating the environmental sustainability of the island.

These calculations of the island's ecological footprint and biocapacity used the most recent official published sources, typically 2003 data, supplementing these with information from Isle of Wight Council as well as a variety of government departments. Isle of Wight Council supplied over 80% of the data required for the calculations. The *Island State* (BFF, 2000) report contained all the historic consumption data (1999), which was re-calibrated to ensure the two footprints were comparable.

Data availability was generally good although gaps were found. Where consumption data was not available it was estimated using official regional (South East) data published by the UK Government. The consumption data used to calculate the ecological footprint and biocapacity of the region is set out in full in this report. This includes:

- Direct energy
- Materials and waste
- Food
- Personal transport
- Land use

The ecological footprint of the Isle of Wight is first broken down into constituent components and compared with United Kingdom (UK) figures. The ecological footprint of an average Isle of Wight resident was found to be 5.10 gha per person in 2003. Although this compares favourably to the UK figure of 5.45 gha per person, since 1999 the island's average footprint has increased by 10% from 4.63 gha per person.

However, as with the UK, the Isle of Wight's ecological footprint exceeds the average sustainable 'earthshare' of 1.8 gha per person. If everyone on the planet consumed as much as the average Isle of Wight resident we would require over two and a half planets to sustainably support global resource consumption.

The ecological footprint of the Isle of Wight is also compared to its biocapacity. The limited supply of high quality land on the island, combined with a high population density (358 people per km^2), results in a local biocapacity similar to the UK average. The total biocapacity of the Isle of Wight is 1.37 gha per person, compared with a resident's ecological footprint of 5.10 gha per person. This can be compared to the UK's population density of 244 people per km^2 (ONS, 2005a; DEFRA, 2005b) and a local biocapacity of 1.53 gha per person (Loh & Wackernagel, 2004). In conclusion, the Isle of Wight is not large enough to sustain local consumption patterns, and in theory the island would need to be 3.2 times larger to do so.

For the Isle of Wight's 1999 ecological footprint calculation to be comparable to this footprint calculation (2003), consumption data from the original *Island State* (BFF, 2000) report had to be recalibrated using the latest conversion factors. The data available was of good quality and complete.

The ecological footprint of the Isle of Wight has increased from 4.63 gha per person in 1999 to 5.10 gha per person in 2003. Every single component of the island's footprint has increased, with the food footprint increasing by 19% (from 1.10 gha to 1.31 gha per person) and materials and waste increasing by 11% (from 1.42 gha to 1.58 gha per person).

Biocapacity of the island also changed between 1999 and 2003. It appears that the biocapacity of the Isle of Wight has decreased from 1.38 gha per person to 1.37 gha per person despite an increase in population. This is mainly a result of improved land management.

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Sustainable Development

National and International

The UK Government was one of 178 governments that adopted a declaration at the Earth Summit in Rio de Janeiro in 1992, committing them to making development sustainable. A number of initiatives has arisen out of this Rio Summit at both the national and international levels. Since Rio de Janeiro, improvements have been monitored and sustainable development was again brought to the forefront during the World Summit on Sustainable Development in Johannesburg in 2002.

In March 2005 the UK Government published *Securing the Future* (DEFRA, 2005a), its latest strategy for achieving sustainable development. This strategy follows on from the Government's last strategy in 1999 (*A Better Quality of Life*), taking into account changes in the government's structure and legislation. More emphasis is placed on delivering successful sustainable development strategies at a local level. At the same time further research on ecological footprinting is encouraged by the strategy.

To support the exercising of these new powers, the Audit Commission has published a local set of *Quality of Life* indicators (Audit Commission, 2002). These form part of a reporting mechanism for Local Strategic Partnerships (LSPs). The Audit Commission is currently planning to publish a revised version of its quality of life indicators in 2005, with emphasis on ecological footprint as an indicator of sustainable development. There is a clear movement towards adopting the ecological footprint as an aggregated indicator of environmental sustainability, with the devolved Welsh National Assembly and Greater London Authority (GLA) already doing so.

At the European level, the EU Commission has established a common set of 11 regional sustainability indicators. To date, these have been partially incorporated into the Audit Commission's set of indicators. They include the ecological footprint as an aggregated indicator of environmental impact.

The Regional Stepwise™ ecological footprint methodology, used in this report, is entirely compatible with the EU common indicators approach (see Appendix C). It has been adopted by the European Commission as part of their European Common Indicators Project

and is likely to be adopted by the UK Audit Commission (2002) as part of their *Quality of Life Indicator* set.

Sustainable development in the South East and the Isle of Wight

'World leaders acknowledged that only by all of the world's communities acting locally, can we ever succeed in bringing about sustainable development…and that only by empowering those communities can we achieve (this)…'

(IoW, 2001)

In response to the UK Government's 1999 sustainable development strategy, the South East produced a Regional Sustainable Development Framework, *A better quality of life in the South East* (SERA, 2001). The South East of England Development Agency (SEEDA), the Government Office for the South East (GOSE), the Environment Agency and the NHS, published this document in 2001. The Regional Sustainable Development Framework was updated in 2004 by the Integrated Regional Framework (IRF), setting out a vision for the South East along with a series of objectives and indicators in order to improve and monitor the quality of life in the region.

The four main objectives drawn up by the South East's Integrated Regional Framework are:

1. Social progress which recognises the needs of everyone
2. Maintenance of high and stable levels of economic growth
3. The effective protection of the environment, and
4. Prudent use of natural resources.

Ecological footprinting is mentioned as one of the main indicators adopted by SEEDA to measure and monitor resource consumption in the South East (Objective 4).

On a local level, one of the agreements during the Earth Summit in Rio was for Local Authorities to adopt objectives of Agenda 21 and develop strategies implementing and encouraging sustainable development locally. This led to the development of Local Agenda 21, illustrating how sustainable development can only be achieved successfully if tackled at a local level.

In 2001 the Isle of Wight published *The Agenda 21 Strategy for the Isle of Wight* (IoW, 2001) as a direct response to the government's call for sustainable development at a local level.

The Isle of Wight has set out a vision of sustainable development which includes:

- A sustainable economy
- Sustainable transport plans
- Protecting and enhancing the islands natural environment, and
- Ensuring that the island's natural resources are managed sustainably.

The island's Local Agenda 21 goes on to mention areas of priority that need tackling, including the identification and measurement of sustainability indicators.

Building on the initial base-line study of the island's footprint (*Island State*), this report will look at how the Isle of Wight's ecological footprint has changed over time.

Aim of the Isle of Wight Council Ecological Footprint Project

Commissioned by the Isle of Wight Council, the aim of the Isle of Wight's Ecological Footprint project was to undertake the second Ecological Footprint study of the island, following *Island State* (BFF, 2000), and illustrate the changes that have occurred to the Isle of Wight's ecological footprint and biocapacity over time.

Specific study aims were to:

1. Undertake secondary data research using official data sources
2. Utilise these to calculate the main components of the region's ecological footprint (the impact on the environment)
3. Re-calibrate 1999 consumption data from the *Island State* report using the latest methodology and data
4. Determine the locally available biocapacity (supply)
5. Illustrate the changes that have taken place in the Isle of Wight's ecological footprint since its initial footprint study (*Island State*)

Outputs include:

1. A report which:
    a. Describes the results of the component-based ecological footprint analysis
    b. Describes both the resource 'demand' (the ecological footprint) and regional 'supply' (the biocapacity), and
    c. Assesses the sustainability of the Isle of Wight
2. An interactive spreadsheet tool which presents the component results

This project was completed by Best Foot Forward Ltd, Oxford, to budget. It satisfies all the above requirements.

Isle of Wight Council Profile

The Isle of Wight (IoW) is one of the eight County Councils (one of which is a unitary authority) in the South East. The island lies on the south coast of England, slightly to the west of the city of Portsmouth and directly to the south of Southampton.

The island covers some 380 square kilometres and in 2003 its population was 136,000. The IoW is predominantly a rural island with the principal town of Newport as its centre and a number of other towns each playing a role in the economy of the island. Much of the island is covered by UK or European Union (EU) landscape designations. Approximately 50% of the IoW has been designated as Areas of Outstanding Natural Beauty, and 45 kilometres of the total 104 kilometres of coastline is designated as Heritage Coast (IoW, 2005a).

The IoW attracts over 2.7 million visitors per year with approximately 1.5 million people staying every year. Tourism accounts for 20% of employment on the island and 24% of the Gross Domestic Product (GDP) (IoW, 2005a).

There are over 4,000 businesses on the IoW employing some 41,000 people. Small and medium sized enterprises (SMEs) represent 95% of firms on the island, employing less than 25 people each. The key employment sectors on the IoW are retail/hotels (31%), finance and business services (8%) and manufacturing (17%) (IoW, 2005a).

Resource Consumption

This section reviews and summarises the available data on the energy and materials consumption of IoW residents. Such data is required to perform the ecological footprint calculations. Data assumptions are presented in Appendix B.

Data Availability

This project relies on existing data obtained primarily from government departments, such as the Office for National Statistics (ONS), the Department of Trade and Industry (DTI) and/ or via personal communications with the IoW Council (Mrs. Wendy Perera). Sources are referenced in the relevant data sections below.

Where local data was not available, estimates of consumption were made by proxying regional and national data (as appropriate), and adjusting for population size.

The use of such proxy data does tend to mask regional differences in consumption and this should be kept in mind when considering the figures presented here. In future analyses it is hoped that the use of proxy data could be reduced either by undertaking more primary research or by drawing on improved official data sources.

For the analyses, data for the year 2003 was used where possible. However, where this was not feasible, the most recent data was used. The *Island State* (BFF, 2000) report was used to extract 1999 historical data. Consumption data is presented below, under the following categories:

- Direct energy
- Materials & waste
- Food
- Personal transport
- Built land

Direct Energy

Available and estimated domestic and service sector energy data are presented in Table 1, and where available with fuel types. IoW domestic energy consumption was assembled from several sources, while service sector energy consumption was based on regional (South East) spend data. (See Appendix B for assumptions and notes).

Table 1: Energy consumption in the Isle of Wight for 1999 & 2003.

	IoW 1999	IoW 2003
Fuel type	**Per person consumption (KWh/yr)**	**Per person consumption (KWh/yr)**
Domestic energy	**10,361**	**10,990**
Of which…		
Electricity	2,087	2,088
Natural gas & LPG	7,222	7,849
Heating Oil, Kerosene & Gas Oil	651	651
Coal	346	346
Renewables (off grid)	55	57
Other	0	0
Services energy	**3,892**	**3,892**
Of which…		
Hotels & Restaurants	661	661
Health & Education	1,057	1,057
Community, Social, Personal	691	691
Office & Administration	761	761
Commerce	722	722
Total	**14,252**	**14,882**

Sources: BFF, 2000 & DTI, 2005.

Materials & Waste

Waste data was provided by the IoW Council (IoW, 2005b) for 2003 while historic 1999 waste data was extracted from the *Island State* (BFF, 2000) report. The data on domestic waste arisings and management, which was utilised in this report, is set out in Table 2. (See Appendix B for assumptions and notes).

Table 2: Isle of Wight domestic waste, by management type for 1999 & 2003.

	IoW 1999		IoW 2003	
Waste management	**%**	**Waste per person (kg/yr)**	**%**	**Waste per person (kg/yr)**
Domestic Waste	**100%**	**464**	**100%**	**563**
Of which…				
Landfilled & incinerated	80%	369	73%	413
Composted	14%	63	17%	97
Recycled	7%	31	10%	54

Source: BFF, 2000 & IoW 2005b.

Food

Food consumption data specific to the IoW was not available. It was estimated using South East and UK proportions. Data is shown in Table 3. (See Appendix B for assumptions and notes).

Table 3: Isle of Wight domestic food consumption for 1999 & 2003.

	IoW 1999	IoW 2003
Food type	**Per person consumption (kg/yr)**	**Per person consumption (kg/yr)**
Domestic food	**913**	**961**
Of which…		
Animal-based	274	289
Plant-based	639	673

Sources: DEFRA, 2000; DEFRA, 2004 & ONS, 2005b.

Personal Transport

Personal transport data for IoW residents was incomplete for 2003. On the other hand the *Island State* (BFF, 2000) report had recorded the number of cars on the island in 1999 as well as the average annual mileage and occupancy rates. For the remaining transport modes (ferry, bus and train) private transport companies were contacted individually and they provided travel data except for air travel where South East averages were used instead.

Based on regional (South East) historical transport data from the Department for Transport (DfT, 2002 & 2005) it was possible to see how transport use (pass-km per year) has changed between 1999 and 2003. These changes in transport were applied to the original travel data from the *Island State* (BFF, 2000).

A breakdown of personal transport data is shown in Table 4. (See Appendix B for assumptions and notes).

Table 4: Isle of Wight personal transport, by mode for 1999 & 2003.

	IoW 1999	IoW 2003
Transport mode	**Per person travel (Pass-km/yr)**	**Per person travel (Pass-km/yr)**
Personal transport	**10,169**	**10,310**
Of which…		
Car	7,035	6,853
Bus & coach	64	84
Rail, tram & metro	12	13
Waterborne	761	836
Air	2,020	2,218
Motorbikes or scooters	278	306

Sources: DfT, 2002; DfT, 2005 & ONS, 2005b.

Land Use

Accurate land use data was available for the IoW, therefore estimates based on regional or national data were not necessary. The IoW land area is 380 km^2 (IoW, 2005b). Land type and area are given in Table 5 below. (See Appendix B for assumptions and notes).

Table 5: Isle of Wight land use, by type.

Type	%	Land area in km^2
Total land area	**100%**	**380**
Of which…		
Built Land	27%	104
Arable & bare fallow	23%	89
Pasture/grazing/rough grazing	34%	130
Forest and woodland	8%	32
Other (incl set aside)	7%	26

Sources: BFF, 2000 & IoW, 2005b.

Isle of Wight's Ecological Footprint Results

The ecological footprint of the IoW in 2003 was

693,795 gha

or 5.10 gha per person

Table 6 and Figure 1 summarise the ecological footprint of IoW residents by component. Figure 2 shows the same data aggregated into fewer categories reflecting the European Common Indicator Programme (ECIP)[1] component definitions – this is useful for comparative purposes. Ecological footprints of some EU residents and a world average resident are compared with the IoW results in Figure 3.

Table 6 also provides comparative UK data, and shows that based on available 2001 national data, the average IoW resident's ecological footprint is lower than the UK average. This difference is primarily due to a lower materials and waste ecological footprint (1.58 gha per person, compared to 1.92 gha per person), which reflects the lower waste production throughout the island and higher recycling rates. The IoW generated 563 kg of domestic waste per person, compared to the UK's 590 kg per person. This, combined with a higher recycling and composting rate (27%) in the county compared to the UK (12%), is the main driver behind a lower ecological footprint overall.

The IoW's personal transport footprint (0.71 gha per person) is lower than that of the UK (0.93 per person). This is mainly because IoW residents travel over 50% less by car than the average UK resident. Bus and rail travel on the island was only a fraction of UK averages per year (11% and 6% respectively). Rail travel is insignificant because the Island Line rail service is the UK's smallest operator, running a route 12.5 kilometres long between Ryde and Shanklin. Similarly, bus travel is rather restricted with the majority of the bus services run by a single company, Southern Vectis (BFF, 2000).

The domestic energy footprint for the IoW (0.80 gha per person) was higher than the UK (0.69 gha per person). This is because IoW residents consumed more electricity (2,088 kWh/yr per person) than the average UK resident (1,901 kWh/yr per person).

[1] See Appendix C for more information about ECIP.

The food ecological footprint for the IoW (1.31 gha per person) was also slightly higher than for the UK (1.28 gha per person). Although IoW residents consumed more food (961 kg/yr per person, compared to 950 kg/yr per person), less of this food was animal based. From an ecological footprint perspective, animal-based food requires more resources to produce than plant-based food

The services energy footprint is lower in the IoW (0.26 gha per person) than in the UK (0.30 gha per person), reflecting how IoW residents spend approximately 38% less on goods and services than the UK average. This may reflect the economic conditions on the island, where a greater proportion of the population is over 60 and unemployment is higher (4%) than the UK average (1.8%). The average wage on the Isle of Wight is 22% lower than the national average (IoW, 2005a).

Finally, the IoW residents had a significantly higher built land ecological footprint (0.44 gha per person) compared to the UK (0.34 gha per person).

The IoW's ecological footprint has increased by 10% from 4.63 gha per person in 1999 to 5.10 gha per person in 2003. Every single component has seen an increase over the 4 years but food (an increase of 19% gha per person) and materials and waste (an increase of 11% gha per person) were the most significant.

Table 6: The ecological footprint of the Isle of Wight, by component.

	IoW 1999	IoW 2003	UK
Component	**Per person footprint (gha)**	**Per person footprint (gha)**	**Per person footprint (gha)**
Ecological Footprint	**4.63**	**5.10**	**5.45**
Of which…			
Domestic Energy	0.76	0.80	0.69
Services Energy	0.24	0.26	0.30
Materials & Waste	1.42	1.58	1.92
Food	1.10	1.31	1.28
Personal Transport	0.68	0.71	0.93
Built Land	0.42	0.44	0.34

Figure 1: The ecological footprint of the Isle of Wight, by component.

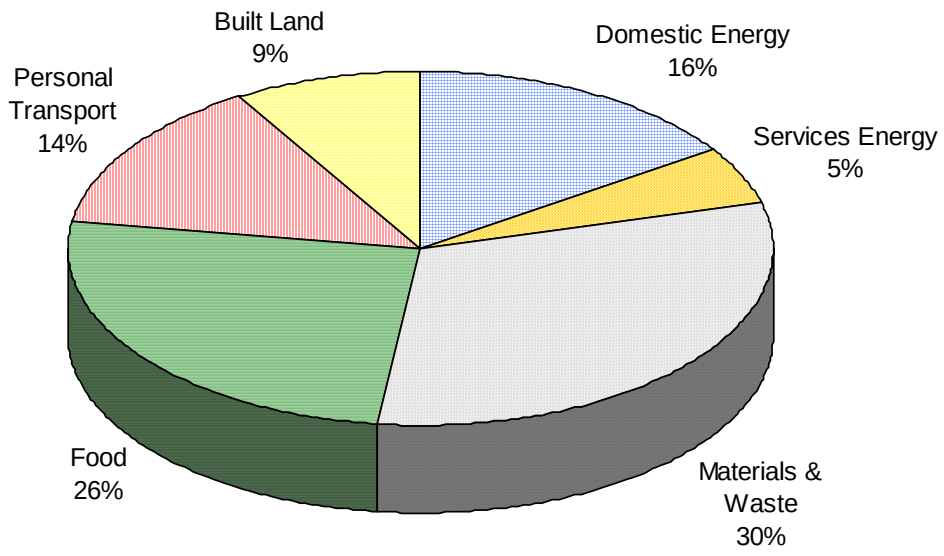


Figure 2: The ecological footprint of the Isle of Wight, by ECIP components.

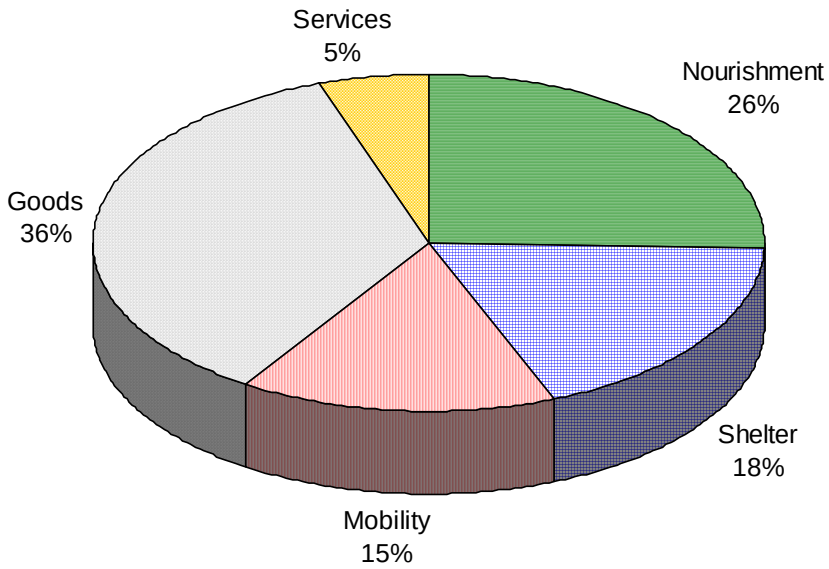
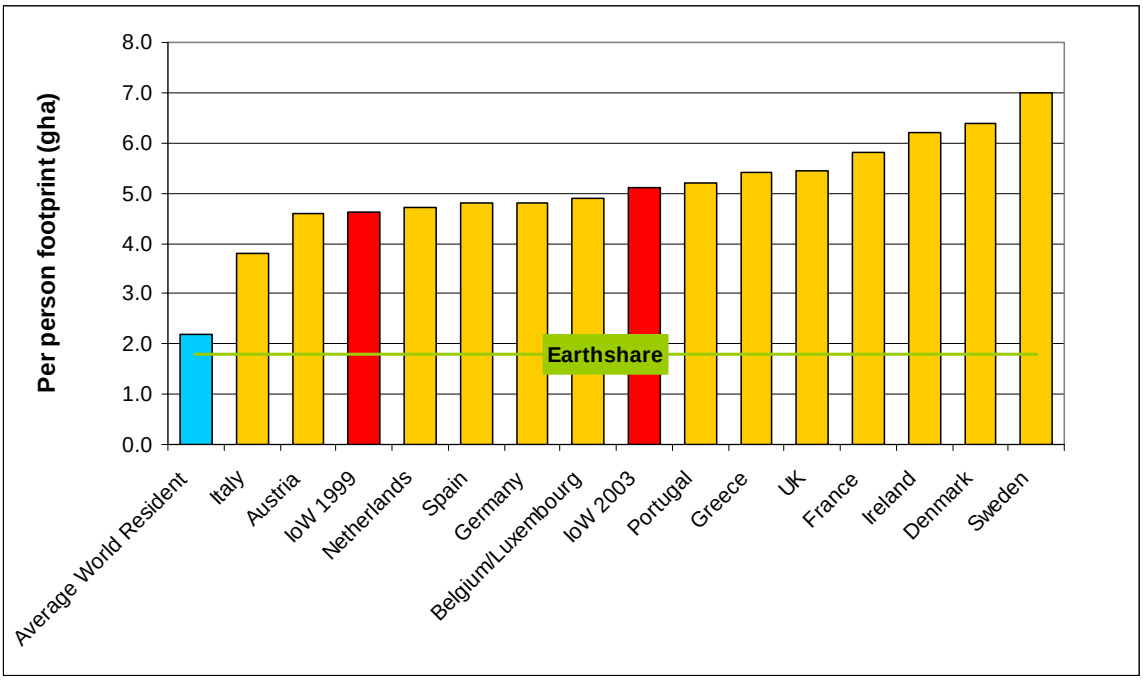


Figure 3: Isle of Wight footprints compared to EU countries and the world average.



Direct Energy

Direct energy use by residents at home and for services consumed amounted to 21% of the total IoW resident's ecological footprint in 2003, with domestic energy being the larger component (16%) of the two. Looking at the domestic supply, natural gas & LPG produced the largest footprint followed by electricity.

Although the IoW's direct energy footprint has increased since 1999, the actual proportions of energy use have hardly changed. In 1999 the IoW's domestic energy footprint accounted for 22% of the island's total footprint, and again in 2003 domestic energy use was the largest component at 16%. The main difference appears to be a slight increase in the use of gas and services energy. Table 7 provides a breakdown of the direct energy footprint by energy type.

Table 7: Isle of Wight's direct energy ecological footprint.

	IoW 1999	IoW 2003	UK
Fuel type	**Per person footprint (gha)**	**Per person footprint (gha)**	**Per person footprint (gha)**
Domestic energy	**0.76**	**0.80**	**0.69**
Of which…			
Electricity	0.28	0.28	0.25
Natural gas & LPG	0.41	0.44	0.36
Heating Oil, Kerosene & Gas Oil	0.05	0.05	0.05
Coal	0.03	0.03	0.03
Services energy	**0.24**	**0.26**	**0.30**
Of which…			
Hotels & Restaurants	0.03	0.03	0.04
Health & Education	0.06	0.06	0.06
Community, Social, Personal	0.04	0.05	0.06
Office & Administration	0.04	0.05	0.06
Commerce	0.06	0.07	0.08
Total	**1.00**	**1.06**	**0.99**

Materials & Waste

The total footprint of materials and waste for the IoW residents was 1.58 gha. This is 31% of the total footprint and therefore the largest component (or 'big hitter'). Using UK trade proportions, this equates to 0.33 gha per person attributable to net traded goods and 0.75 gha per person attributable to UK-produced goods (here referred to as nationally-produced goods).

Although the IoW's materials and waste ecological footprint has increased from 1.42 gha per person in 1999 to 1.58 gha per person (11%) in 2003, it still remains significantly lower than the UK average of 1.92 gha per person. Most components' ecological footprint only saw a slight increase over the four years, the consumption of nationally produced goods appears to have increased the most, and thus had the largest footprint increase, 14% (from 0.66 to 0.75 gha per person). Table 8 shows the breakdown of the materials & waste footprint.

Table 8: Isle of Wight materials & waste ecological footprint.

	IoW 1999	IoW 2003	UK
Categories	**Per person footprint (gha)**	**Per person footprint (gha)**	**Per person footprint (gha)**
Materials & waste	**1.42**	**1.58**	**1.92**
of which …			
Construction*	0.28	0.28	0.28
Net traded goods +	0.29	0.33	0.41
Nationally-produced goods +	0.66	0.75	0.94
Plant-based (excl. wood products)**	0.08	0.09	0.11
Other wood and paper products	0.12	0.14	0.17

Notes: *energy & construction timber **crop land +energy only

Food

The estimated ecological footprint for foodstuffs consumed by IoW residents was 1.31 gha per person in 2003, an increase of 19% from 1.10 gha per person in 1999. The amount of food consumed per year by the average IoW resident has increased by 48 kilograms between 1999 and 2003, an increase of 1.3% per year. At 26 %, food was the second largest component of the overall footprint. The proportion of plant-based to animal-based food has also slightly changed. In 1999 29% of food consumed was animal-based, while in 2003 this proportion had increased to 30%. The original 1999 food data collected for the *Island State* (BFF, 2000) report may have underestimated household food consumption.

Table 9 shows the breakdown of the food ecological footprint. The largest component in the food ecological footprint was animal-based food (see Appendix B for assumptions and notes).

Table 9: Isle of Wight's domestic food ecological footprint[2].

	IoW 1999	IoW 2003	UK
Food	**Per person footprint (gha)**	**Per person footprint (gha)**	**Per person footprint (gha)**
Food category	**1.10**	**1.31**	**1.28**
Of which…			
Animal-based	0.64	0.84	0.84
Plant-based	0.35	0.37	0.33
Unharvested cropland	0.10	0.10	0.10

Personal Transport

The ecological footprint of personal transport in the IoW was 0.71 gha per person in 2003, up from 0.68 gha per person in 1999, an increase of 4%. Personal travel constituted 14% of the total footprint, while in the case of the UK, transport accounts for over 17% of the total footprint. This illustrates how personal transport is significantly lower on the island, particularly car and air travel.

Table 10 shows the breakdown of the personal transport ecological footprint. The largest component was car travel (0.33 gha per person), followed by air travel (0.27 gha per person). Bus and rail travel are so low that their impact is negligible.

Table 10: Isle of Wight personal transport ecological footprint.

	IoW 1999	IoW 2003	UK
Transport mode	**Per capita footprint (gha)**	**Per capita footprint (gha)**	**Per capita footprint (gha)**
Personal transport	**0.68**	**0.71**	**0.93**
Of which…			
Car	0.34	0.33	0.51
Bus & coach	0.00	0.00	0.02
Rail, tram & metro	0.00	0.00	0.02
Waterborne	0.09	0.09	0.01
Air	0.25	0.27	0.37
Motorbikes or scooters	0.01	0.01	0.00

[2] The ecological footprint is a combination of consumption and impact per consumption unit. Because meat products are higher up the food chain and thus embody many more resources than plant based products, their impact per consumption unit is much higher. For example, the UN Population Fund (2001) state that it takes 4-5kg of feed to produce 1kg of meat. Therefore, even though animal-based food consumption is lower (see table 3), the impact of that consumption is greater than that for plant-based products.

Built Land

The footprint of built, or degraded land, increased by 4% from 0.42 gha per person in 1999 to 0.44 gha per person for the IoW as a result of new commercial and transport-related construction (see Appendix B for more detail). Table 11 below provides an ecological footprint of built land use for IoW in more detail.

Table 11: Isle of Wight built land ecological footprint.

	IoW 1999	IoW 2003	UK
Land type	**Per capita footprint (gha)**	**Per capita footprint (gha)**	**Per capita footprint (gha)**
Built land	**0.42**	**0.44**	**0.34**
Of which…			
Housing land	0.13	0.13	0.10
Transport-related land	0.06	0.07	0.05
Commercial/industrial land (incl. hydro)	0.23	0.24	0.19

The Biocapacity of the Isle of Wight

Biodiversity

In accordance with *Living Planet Report 2004* (Loh & Wackernagel, 2004), the main findings of this study are presented excluding biodiversity. However, in an attempt to account for the biocapacity requirements of non-human species in the area an estimate is made below.

Ecologists estimate that non-human species may require between 10% (Loh, 2000) and 75% (Noss & Cooperrider, 1994) of the bioproductive resources of the planet. The Brundtland Commission (WCED, 1987) estimated that this requirement was 12%. This estimate has been adopted for calculating the ecological footprint of the IoW biodiversity.

To gauge the biodiversity responsibility of each IoW resident, the amount of land to be 'set-aside' for biodiversity is relative to the ecological footprint; so that the bigger your ecological footprint the bigger your responsibility for biodiversity.

The biocapacity of the Isle of Wight is

186,869 gha

or 1.37 gha per person

The actual geographical size of IoW is 38,014 hectares (380 km^2) (IoW, 2005b). The biocapacity of the IoW is derived from the bioproductivity of this land and the UK sea area. Bioproductivity is expressed here in global hectares for comparability with the ecological footprint. 'Actual' hectares are converted to global hectares by adjusting for land type and quality. Given that land in the IoW is much more productive than the global average, the biocapacity of the island – expressed in global hectares – is over five times that of the actual land area. Sea area is assumed to be of average UK size (per person) and average UK productivity. This gives a sea biocapacity of 0.24 gha per person.

Sustainability Assessment

Comparing the ecological footprint of the resident population with the biocapacity of the region, it is possible to estimate regional sustainability, i.e. how many IoWs would be needed to sustain current IoW residents' lifestyles. Looking at the bigger picture, one can compare the ecological footprint and the globally available average biocapacity or 'earthshare' to determine how many planets would be required if everyone lived like an IoW resident.

As can be seen in Table 12, the ecological footprint of the IoW residents exceeds both local and global average sustainable supply. In addition, note that if IoW residents lived within the IoW biocapacity, they would also be living within their global earthshares.

Table 12: Isle of Wight's ecological footprint, excluding biodiversity, shown against local biocapacity and the global earthshare.

Average earthshare (gha per person)	**Biocapacity of The IoW** (gha per person)	**Ecological footprint of The IoW** (gha per person)
1.8	1.37	5.10

If everyone in the world lived like the average IoW resident we would require 2.8 planets to sustainably support consumption

This assessment indicates that the 'average' IoW resident is using 283% of the average earthshare, compared to the 'average' UK resident using 303%.

Since 1999 the IoW's biocapacity has slightly decreased from 1.38 gha per person to 1.37 gha per person in 2003. IoW residents were using 257% of the average earthshare in 1999, and we would have required 2.6 planets to live in a similar fashion.

Appendix A: Ecological Footprint Analysis

What is Ecological Footprint Analysis?

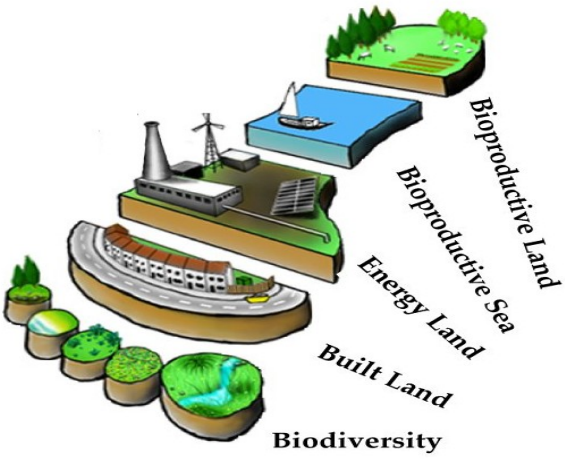
Co-originated in the early 1990's by Professor William Rees and Dr. Mathis Wackernagel, ecological footprint analysis[3] has rapidly taken hold and is now in common use in many countries at national and local levels; for example, the UK, Mexico, the United States, Canada, Holland, Denmark, Sweden, Norway, Italy, Spain and Australia. The ecological footprint of a region or community can be said to be the bioproductive area (land and sea) that would be required to sustainably maintain current consumption, using prevailing technology.

Imagine a glass dome over the IoW. What area would this dome have to cover to ensure that the population could maintain their current lifestyles using only the bioproductive space within the dome?

For the purpose of the ecological footprint calculation, land and sea area is divided into four basic types; bioproductive land, bioproductive sea, energy land (forested land required for the absorption of carbon emissions) and built land (buildings, roads etc.). A fifth type refers to the area of land and water that would need to be set-aside to preserve biodiversity (see Figure 4).

[3] Those wishing to go beyond the outline given in this report are recommended to read *Sharing Nature's Interest* by Chambers, Simmons and Wackernagel, 2000, www.ecologicalfootprint.com

Figure 4: Land types used for ecological footprint analysis.



Example 1: A cooked meal of fish and rice would require 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.

Example 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 region is calculated, this figure can be used in verious ways. For example, by comparing the use of bioproductive area by an 'average' IoW resident with the available average ‘earthshare’, one can estimate ecological sustainability. The earthshare is calculated by dividing the total amount of productive land on the planet by the population. Loh & Wackernagel (2004) estimate the average 'earthshare' to be about 1.8 gha. This earthshare can be considered as the maximum, equitable footprint allowance, without depriving either future generations or those now living.

An annual *Footprint of Nations* study, published in summary form as part of the *Living Planet Report 2004* (Loh & Wackernagel, 2004), provides a national context for considering regional ecological footprints (see also Wackernagel *et al.*, 2000 and Lewan & Simmons, 2001). Based on 2001 data, the ecological footprint of the UK was 5.45 gha per person compared with a bioproductive capacity of just 1.5 gha per person.

Globally, the average ecological footprint was 2.2 gha per person in 2001, excluding biodiversity – as opposed to an available capacity of 1.8 gha - indicating that the human population is using, over time, more natural resources than can be sustained.

The Stepwise™ Methodology

The Regional Stepwise™ ecological footprint calculations in this report follow the Stepwise™ Methodology. This is compatible with the method used by the European Common Indicators Programme (ECIP) (www.sustainable-cities.org) to allow for benchmarking of cities and regions across Europe. The ECIP method is described in more detail in Appendix C (see also Lewan and Simmons (2001)).

The Stepwise™ methodology is an evolution of the EcoIndex™ Methodology (see Chambers *et al*, 2000), both developed by Best Foot Forward, and uses a 'component' (or 'bottom-up') approach to perform ecological footprint analysis. The Stepwise™ methodology is wholly standardised with the 'compound' (or 'top-down') approach used by the Global Footprint Network in the *National Footprint Accounts* (Global Footprint Network, 2004), which uses international trade statistics as a starting point.

The Stepwise™ Methodology, wherever possible, uses full life cycle impact data to derive ecological footprint conversion factors for key activities (the 'components'). For example, to calculate the ecological footprint of a car passenger travelling one kilometre, 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 13). This conversion factor is then applied to the number of passenger-kilometres travelled.

Table 13: An example analysis for the footprint of UK car travel (per passenger-km).

	Energy land	Built land
Carbon per pass-km (kg)	0.031	
Uplift factor*	145%	
Carbon responsibility**	71%	
World carbon absorption (tonnes C/ha/yr)**	1.00	
Direct land (total ha)		258,175
Land use (ha/car km)		0.0000006
Equivalence factor	1.38	2.19
Yield factor		2.32
Average occupancy (persons/car)		1.6
Total ecological footprint (gha/pass-km)	**0.000043**	**0.000002**

* The uplift factor represents the fuel equivalent used for manufacturing and maintenance, and comes from Wackernagel & Rees (1996). Other sources suggest the uplift factor can range between 11% (derived from Hill et al., 1995 & Teufel et al., 1993) and 93% (derived from Teufel et al., 1993).

** See Glossary

Sources: British Road Federation, 1998; DETR, 1997 and 1999; Global Footprint Network, 2004; Wackernagel & Rees, 1996.

A similar approach is used to derive a range of ecological footprint component values, representing the main categories of impact, before summing them to calculate a total ecological footprint for the IoW. The key components used in this study are:

- Direct energy
- Materials & waste
- Food
- Personal transport
- Built Land

Each of these key components is made up of smaller sub-categories. For example, Direct Energy is sub-divided into electricity, gas and domestic heating oil. Each of these sub-categories can be broken down further.

Using this component approach enables the calculation of ecological footprints at any level – for a product, organisation, activity or region.

Take only pictures - leave only footprints

It is important to note that ecological footprint analysis is a ‘snapshot’ methodology. It tells us how much bioproductive area would be required based on a specific data set - it does not attempt to predict future or past impacts.

It is likely that, due to technology changes and variations in material flows into the economy, the ecological footprint will change over time.

In the period for which data is recorded some of the input flow of materials will stay in the economy, as stock, and some will flow out as waste. In both cases these materials were considered to have been ‘consumed’.

Study Boundaries

Any study of resource consumption faces boundary issues - what to include and what to exclude. One approach is to include all consumption that takes places within certain geographical bounds. This is known as the 'geographical principle'. The other common approach is to consider only the consumption attributable to those living within a geographic area (the 'responsibility principle'). This latter approach is favoured by WWF in their *Living Planet Report 2004*(Loh & Wackernagel, 2004) and is the approach adopted in this report.

A further discussion of the geographical and responsibility principle can be found in Lewan and Simmons (2001).

Appendix B: Isle of Wight County Council Data Assumptions

Domestic Energy

Energy data for the IoW was collected from the Department of Trade & Industry *Energy Trends – December 2004* (DTI, 2005) report. Gas consumption data was available at the level of Government Office Region for the entire South East region, including the IoW. DTI's regional gas data covered average domestic consumption (kWh) per household, so the figures were divided by the number of residents per household to get a figure for gas consumption per person (ONS, 2004).

Electricity data was also obtained from the DTI's *Energy Trends* (DTI, 2005) report. Figures were specific to IoW, and as for gas data, a consumption figure per person was estimated using household numbers. Overall, the energy data obtained for the island was of good quality, with very little data manipulation necessary.

Although no renewable energy information was available, the UK average of 2.7% was assumed. This percentage of renewable energy was applied to the IoW's electricity consumption figures to estimate renewable energy consumption.

Services Energy

Energy consumption by service sector was not supplied or available for the IoW. Therefore UK average data was used and decreased by 38% reflecting the lower service spending levels in Isle of Wight (ONS, 2005).

The service sectors covered in this project are defined according to the Statistical Classification of Economic Activities in the EU (NACE Rev.1) (European Communities, 2002).

- Hotels & restaurants (NACE 55)
- Health & education (NACE 80, 85).
- Other community, social & personal service activities (NACE 90-93).
- Offices & administration (NACE 60-67, 70-75, 99).
- Commerce (NACE 50-52).

To apportion the impact of services, it was assumed that their usage is proportional to spending on services. Excluded from this calculation are those services that are normally provided from general taxation (education and health) and those that relate to other categories (food, goods and mobility). Service use was assumed to be evenly distributed throughout the area's population.

Service sector spending includes the following categories of spending:

- Communication
- Recreation & culture
- Restaurants & hotels
- Miscellaneous goods & services

It includes a fixed amount (UK average) to cover health, education and other services provided by the state. It excludes spending on food, drink, clothing, furnishings etc. because these are included in the materials waste.

Materials & Waste

Municipal waste data was supplied by the Isle of Wight Council (IoW, 2005b) for 2003/4. Total waste generated on the island was broken down by waste type as well as management method (landfill, recycled, composted and WDF). The data was complete and of good quality.

It should be noted that the method used assumes that the proportion of stock (those materials retained within the economy) is the same across regions. Evidence suggests that the vast majority of retained materials are used for construction (roads, housing and so on) and have a long lifespan.

Food

Food consumption data specific to the IoW was unavailable. Regional data for the South East was used instead. The main source of food consumption was two studies conducted by DEFRA: *Expenditure and Food Survey* (2004) and the *National Food Survey* (2000). These two reports have data on the amount of food consumed by residents (grams per week) at home and out in restaurants. The information covers over 100 different food

types, which are split into plant-based and animal-based food. According to the *Expenditure and Food Survey*, residents of the South East consume 1.1% more food than the UK average. This percentage was applied to the FAO UK average of 950 kgs (FAO, 2003), giving 961 kg per person for the IoW, assuming that they consume similar food products.

The *National Footprint Accounts 2001* (Global Footprint Network, 2004) identify unharvested cropland for the UK. The figure of 0.10 gha per person was used for the IoW.

Personal Transport

Personal transport data from the Department for Transport (DfT, 2004) only covered the South East region. When comparing the average distance (pass-km) travelled by south east residents to the 1999 IoW travel data published in *Island State* (BFF, 2000), the difference was so significant that it was decided that regional travel data did not reflect the island's travel trends. Instead, *Regional Travel Statistics* (DfT, 2001 & 2004) for the South East were used to calculate a % change in travel by mode between 1999 and 2003. This % change was applied to the 1999 travel data published in the *Island State* (BFF, 2000) report in order to estimate 2003 IoW travel trends.

Land Use

The IoW Council (IoW, 2005a) provided land use data by urban land, arable land, woodlands and pasture land (ha). The island covers an area of approximately 380 km^2.

The yield and equivalence factors used were those for the UK (Loh, 2002). Fishing grounds were assumed to be the UK per person average.

Appendix C: European Common Indicators Programme (ECIP)

The European Common Indicators Programme (ECIP) is a monitoring initiative focused on sustainability at the local level. A partnership of different organisations and levels are working together, in a joint effort to find comparable data and a better understanding of sustainability in local communities across Europe. Ten common local sustainability indicators were identified through a bottom-up process. Used in combination with other indicators and other evaluation methods, the European Common Indicators can contribute to a comprehensive local or regional monitoring strategy.

Over 100 local and regional authorities have so far signed the adoption agreement and are now testing the indicators, and refining the monitoring initiative based on practical experiences.

Support services are provided to participating authorities during the testing phase: technical support (scientific expertise, helpdesk, workshops, etc.), methodological development, pilot activities on the Ecological Footprint, good practice collection and exchange, dissemination activities, and evaluation, reporting, recommendations and guidelines.

For further information on the ECIP programme visit www.sustainable-cities.org/ or see Lewan and Simmons (2001).

Glossary

Biocapacity refers to the total of the biologically productive areas. See also 'biologically productive areas'.

Biologically productive areas are those areas of a country or region with quantitatively significant plant and animal productivity. Biologically productive areas of a country or region comprise its biocapacity. Arable land is potentially the most productive area.

Carbon Dioxide (CO_2) is a gas, which is naturally emitted by living organisms as well as during the combustion of fossil fuels. The latter is problematic since it leads to increased concentrations in the atmosphere.

Carbon Responsibility: Carbon dioxide (CO_2) emissions that are included in the ecological footprint. The *National Footprint Accounts* include 71% of the CO_2 emitted from fossil fuel combustion, and excludes the 29% absorbed by the oceans (Global Footprint Network, 2004).

Ecological footprint is the land and water area that is required to support indefinitely the material standard of living of a given human population, using prevailing technology. (Measured in global hectares).

Embodied energy of a commodity is the energy used during its entire life cycle for manufacturing, transporting, using and disposing.

Fossil fuels are coal, natural gas and fuels derived from crude oil (for example, petrol and diesel).

Global hectares (gha) One global hectare is equivalent to one hectare of biologically productive space with world average productivity.

Gross Domestic Product (GDP) is a measure of the total flow of goods and services produced over a specified time period. It is obtained by valuing outputs of goods and services at market prices.

Hectare one hectare (ha) is 10,000 square metres (100 x 100 metres). One hectare is equivalent to 2.47 acres.

Inert waste is chemically inert, non-combustible, non-biodegradable and non-polluting waste.

Natural capital refers to the stock of natural assets that yield goods and services continuously. Main functions include resource production (such as fish, timber or cereals), waste assimilation (such as CO_2 absorption, sewage decomposition) and life support services (UV protection, biodiversity, water cleansing and climate stability).

Net traded goods are net imports of goods, i.e. imports of goods minus exports of goods = net imports of goods. Net traded and nationally produced goods are products that do not embody (include) bioproductive land or sea resources. Energy and non-bioproductive landed are accounted for in the goods. However, only energy impacts are aligned in component-based ecological footprinting methodology.

Per person is a measure per person within a specific population.

Productivity is measured in biological production per annum and hectare. A typical indicator of biological productivity is the biomass accumulation of an ecosystem.

Proxy is normally used to compensate for a lack of raw data. It is an estimation derived from an existing data set using a statistical modifier. For example, deriving local water consumption data by using average per person consumption of a region in which the locality is part.

Recycling is the process of collecting, sorting, cleansing, treating and reconstituting materials that would otherwise become waste, and returning them to the economic stream as raw materials for new, reused or reconstituted products.

World Carbon Absorption: The capacity of world-average forests to sequester carbon. This capacity is based on FAO's Global Fibre Supply Model and corrected where better data are available from other FAO sources. Sequestration capacities change with both the maturity and composition of forests, and with shifts in bioproductivity due to higher atmospheric CO_2 levels and associated changes in temperature and water availability. (Loh & Wackernagel, 2004).

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