

## WARM UP

# Take nothing but pictures, leave nothing but footprints...?

P McCrory

Since the United Nations Conference on Environment and Development in 1992, population growth and increases in consumption in many parts of the world have added to humanity's ecological burden on the planet without a corresponding increase in the Earth's natural resources. The World Wildlife Fund's Living Planet Report 2004 noted that humanity's ecological footprint grew to exceed the Earth's biological carrying capacity by 20%.<sup>1</sup>

Based on the relationship between humanity and the biosphere, an ecological footprint (EF) is a measurement of the land area required to sustain a population of any size. This methodology was first described in 1992 by Drs William Rees and Mathis Wackernagel at the University of British Columbia in Canada.<sup>2</sup>

Under prevailing technology, an EF measures the amount of arable land and aquatic resources that must be used to continuously sustain a population, based on its consumption levels at a given point in time. This measurement incorporates water and energy use, use of land for infrastructure and different forms of agriculture and forests, and all other forms of energy and material "inputs" that people require in their day to day lives. It also accounts for the land area required for waste assimilation. Obviously, the size of an EF will vary depending on the natural resources consumed by a population, which in turn will depend on lifestyle choices, income levels and technology.

EFs can be measured at an individual level, for cities, regions, countries, or the entire planet. A number of websites allow you to estimate your individual EF; for example, see <http://www.carbonfootprint.com/>.

At a city level, the impact can be dramatic. For example, London (UK) has an EF 120% of the area of the city itself. For a typical North American city with a population of 650 000, it would require 30 000 km<sup>2</sup> of land to meet domestic needs alone without even including the environmental demands of industry. In comparison, a city of a similar size in India would require 2800 km<sup>2</sup>. At a national level, calculations of EFs involve complex modelling.<sup>3</sup>

EF analysis can also be used for specific activities, or to measure the ecological requirements of producing specific goods or services. One area where this technique has been applied is in sporting events.

Professor Andrea Collins of Cardiff University in the UK and her colleagues looked at the EF of the 2004 soccer Cup final, held at Cardiff's Millennium Stadium.<sup>4-6</sup> Energy consumption was converted into the area of forest needed to soak up the carbon dioxide generated in its production, and food consumption was represented as the amount of farmland needed to make it. This method gave the match an EF of 30 000 hectares. More than half of the EF was due to transport. The 73 000 supporters collectively travelled nearly 42 million km to reach the stadium. Fewer than half travelled by car, but cars generated 68% of the transport footprint; if all fans had travelled by bus instead, the footprint would have been 19 hectares smaller. Air travel was the second largest contributor, weighing in at 13 000 hectares for the 36 500 snacks consumed. This could potentially be reduced: for example, substituting all the beef with chicken would have taken 428 hectares off the footprint. The impact of waste disposal, at 146 hectares, was low, and recycling would have trimmed the EF by a further 39 hectares.

The footprint is a useful management tool to assess the effect of activities and, it is hoped, may highlight the need to instigate measures to reduce the impact. Although there are problems related to the assumptions used to calculate EFs, nevertheless the principle would appear to be useful.

Ever since the 1994 Winter Olympics in Lillehammer, the organisers of major sports events have been challenged to reduce the harmful environmental effects of their events.

The 2006 FIFA World Cup in Germany is an example where EFs are used, and various energy efficiency and carbon offset schemes are being put in place to minimise this effect. FIFA are to be congratulated on leading the way forward for sport on this issue.

Owing to the size and scope of the 2006 FIFA World Cup, the emissions

estimate is that approximately 250 000 tonnes of greenhouse gases will be produced. Each World Cup game will also use between 2 and 3 million kilowatt hours of energy, and each match will generate 5 to 10 tonnes of waste. By comparison, some estimates indicate that the 2004 Athens Olympic Games generated half a million tonnes of greenhouse gases, most of which would normally have been generated.

Major events can harm the environment by, among other negative effects which may not necessarily be reflected in an EF analysis:

- changes in land use and the destruction of natural environments through building construction, transportation, and other forms of physical development;
- the consumption of non-renewable resources;
- emissions to soil, air, and water, and the generation of large amounts of waste;
- contributing to ozone depletion, global warming, and air pollution;
- diminishing biodiversity.

There is now overwhelming evidence and justification for the need for all negative impacts to be examined and either eliminated, reduced, or, in relation to carbon emissions, offset.<sup>7</sup> Examples of good and best practices in a variety of situations, both sporting and otherwise, are now plentiful. Developing nations for whom technology or finance may be a barrier, such as South Africa where the 2010 World Cup Football competition will be staged, should receive the necessary financial assistance from global public and private donors to ensure that this occurs.

*Br J Sports Med* 2006;**40**:565.  
doi: 10.1136/bjism.2006.029231

## REFERENCES

- 1 World Wildlife Fund. *Living Planet Report 2004*, [http://www.panda.org/news\\_facts/publications/key\\_publications/living\\_planet\\_report/index.cfm](http://www.panda.org/news_facts/publications/key_publications/living_planet_report/index.cfm) (accessed 1 Jun 2006).
- 2 Wackernagel M, Rees W. *Our ecological footprint: reducing human impact on the earth*. Gabriola Island, BC: New Society Publishers, 1996.
- 3 Lenzen M, Murray SA. A modified ecological footprint method and its application to Australia. *Ecol Econ* 2001;**37**:229-55.
- 4 Collins A, Flynn A, Munday M, et al. Exploring the environmental consequences of major sporting events: the 2003/04 FA Cup Final. *Theoretical Advances in Tourism Economics* 18-19 Mar 2005. Portugal: University of Evora.
- 5 Collins A, Flynn A. The ecological footprint and the FA Cup Final. Presented at SPRU-CENTRIM Freeman Centre Seminar Series 6 May 2005, Sussex University, Brighton.
- 6 Copley J. Sports fans leave a giant footprint. *New Sci* 16 Apr, 2005:11.
- 7 Chambers N, Simmons C, Wackernagel M. *Sharing Nature's interest: ecological footprints as an indicator of sustainability*. London, Earthscan, 2000 (see also <http://www.ecologicalfootprint.com/>).

## ***Retraction: Take nothing but pictures, leave nothing but footprints...?***

McCrory P. Take nothing but pictures, leave nothing but footprints...?. *Br J Sports Med* 2006;40:565.

This article has been retracted due to plagiarism of the following material:

Producing environmentally sustainable olympic games and 'greening' major public events. Available: <https://www.globalurban.org/GUDMag06Vol2Iss1/Roper.htm> [Accessed Mar 2006]

What is an ecological footprint?. Archived copy - What is an ecological footprint? (Archived). Available: <https://www.gdrc.org/uem/footprints/what-is-ef.html> [Accessed Dec 2003]

Sports events leave a giant 'ecological footprint' | New Scientist. Available: <https://www.newscientist.com/article/dn7274-sports-events-leave-a-giant-ecological-footprint/> [Accessed 16 Apr 2005]

We would like to acknowledge the preliminary work of Nick Brown in investigating publications by Dr Paul McCrory and thank him for bringing these concerns to our attention.

During 2021 and 2022 there was an investigation by *British Journal of Sports Medicine* and BMJ which found that some of McCrory's work was the product of publication misconduct. *British Journal of Sports Medicine* published a summary of the investigation.<sup>1</sup>

### **References**

1. Update on the investigation into the publication record of former BJSM editor-in-chief Paul McCrory *Br J Sports Med* doi: 10.1136/bjsports-2022-106408

© Author(s) (or their employer(s)) 2022. No commercial re-use. See rights and permissions. Published by BMJ.

*Br J Sports Med* 2022;0:1. doi:10.1136/bjsm.2006.029231ret

