The Macaulay Institute

INDICATORS OF SUSTAINABILITY & SUSTAINABLE TOURISM: SOME EXAMPLE SETS

April 2006

White V., McCrum G., Blackstock K.L., and Scott A.

The Macaulay Institute
Craigiebuckler
Aberdeen
AB15 8QH

CONTENTS

1.	**Introduction**	**1**
2.	**World Tourism Organisation Indicators**	**2**
3.	**UN Commission on Sustainable Development- Indicators of Sustainable Development**	**6**
4.	**OECD Indicators of Environmental Sustainability**	**8**
5.	**European Environment Agency**	**12**
6.	**UK Sustainable Development Indicators**	**15**
7.	**Spanish System of Environmental Tourism Indicators**	**17**
8.	**English Tourism Council: National Sustainable Tourism Indicators 2002**	**18**
9.	**Scotland: '*Meeting the Needs'* - Indicators of Sustainable Development**	**19**
10.	**Green Globe 21: The Douglas Shire Community Working Group Experience**	**20**
11.	**Cairngorms National Park: Park Plan (Proposed) Indicators**	**21**
12.	**Cairngorms National Park: Sustainable Tourism Strategy**	**22**
13.	**Conclusion**	**23**

Abbreviations

CNPA	Cairngorm National Park Authority
FT/PT	Full-time; part-time
SD	Sustainable Development
ST	Sustainable Tourism
STI	Sustainable Tourism Indicator
ViSIT	Visitor Service, Information and Tourism

This work was part of a SEERAD funded project on Sustainable Rural Development (RO203909). The authors would like to acknowledge the input by Cairngorm National Park Authority staff and members of the ViSIT forum during the life of this project.

1 Introduction

The Cairngorms National Park has been awarded the 'European Charter for Sustainable Tourism in Protected Areas' and the CNPA is currently working towards adopting and applying a set of indicators. In support of this work, the Macaulay Institute has provided the CNPA with a report that provides a suggested approach to selecting and implementing indicators of sustainable tourism (see '*A Framework for Developing Indicators of Sustainable Tourism*'). The project aimed to support the CNPA and their ViSIT forum by providing a structure for thinking through the process of selecting indicators that encouraged transparency and deliberation by asking provocative questions, rather than providing 'answers'.

This document provides some example sets of indictors that may be usefully considered by the CNPA and the ViSIT forum. It consists of tables of existing indicators sets that may be appropriate for adoption or adaptation for the Cairngorms National Park. It is one of three supplementary documents to the Framework report. The others are:

- Indicators and Sustainable Tourism: Interview Findings.
- Indicators and Sustainable Tourism: Literature Review.

2 World Tourism Organisation (WTO) Indicators

Source: World Tourism Organisation (2005) 'Indicators of Sustainable Development for Tourism Destinations: A Guidebook' available to buy through: www.world-tourism.org

The WTO has developed baseline, 'universal', **tourism** indicators (shown below) that can be applied to all tourism destinations. More tailored indicator sets are presented over the page.

2.1 Baseline Issues and Baseline Indicators

Baseline Issue	Suggested Baseline Indicator(s)
Local satisfaction with tourism	➢ Local satisfaction level with tourism (Questionnaire)
Effects of tourism on communities	➢ Ration of tourists to locals (average & peak period/days) ➢ % who believes that tourism has helped bring new services or infrastructure (questionnaire-based) ➢ Number & capacity of social services available to the community (% which are attributed to tourism)
Sustaining tourist satisfaction	➢ Level of satisfaction by visitors (questionnaire-based) ➢ Perception of value for money (questionnaire-based) ➢ Percentage of return visitors
Tourism seasonality	➢ Tourist arrivals by month or quarter (distribution throughout the year) ➢ Occupancy rates for licensed (official) accommodation by month (peak periods relative to low season) and % of all occupancy in peak quarter or month) ➢ % of business establishments open all year ➢ Number and % of tourism industry jobs which are permanent or full-year (compared to temporary jobs)
Economic benefits of tourism	➢ Number of local people (& ratio men to women) employed in tourism (also ratio of tourism employment to total employment) ➢ Revenues generated by tourism as % of total revenues generated in the community
Energy management	➢ Per capita consumption of energy from all sources (overall, and by tourist sector- per person day) ➢ % businesses participating in energy conservation programs, or applying energy saving policy and techniques ➢ % of energy consumption from renewable resources (at destinations, establishments)
Water availability & conservation	➢ Water use (total volume consumed and litres per tourist per day) ➢ Water saving (% reduced, recaptured or recycled)
Drinking water quality	➢ % of tourism establishments with water treated to international potable standards ➢ Frequency of water-borne diseases: number/ % of visitors reporting water-borne illnesses during their stay
Sewage treatment (waste water management)	➢ % of sewage from site receiving treatment (to primary, secondary, tertiary levels) ➢ % of tourism establishments (or accommodation) on treatment system(s)
Solid waste management	➢ Waste volume produced by the destination (tonnes) by month ➢ Volume of waste recycled (m3) / Total volume of waste (m3) (specify by different types) ➢ Quantity of waste strewn in public areas (litter counts)
Development control	➢ Existence of a land use or development planning process, including tourism ➢ % of area subject to control (density, design, etc)
Controlling use intensity	➢ Total number of tourist arrivals ➢ Number of tourists per square metre of the site (e.g. at attractions), per square kilometre of the destination, - mean number/peak period average

2.2 Destination Applications

The WTO has suggested indicators for specific **destination** areas. Included here are the suggestions which could be relevant to the Cairngorms National Park: 'Parks and Protected Area'; 'Communities within or adjacent to Protected Areas'; and 'Natural and Sensitive Ecological Sites'. (*Italic indicates a 'Baseline Indicator')*

Destination: Parks & Protected Areas Suggested Indicators	
Issues	**Indicators**
Visitor numbers	➢ *Total number of visitors to the Park and to key sites* ➢ *Peak numbers (peak day, month)* ➢ Length of stay ➢ *Use intensity on key sites (persons per km2)* ➢ Revenue from paid visitors ➢ Number of guides/operators permitted to use park ➢ % of all visitors who are in controlled/guided visits
Integrity of key protected systems	➢ Number of sites/ecosystems/assets considered to be damaged or threatened (% of all defined systems/assets in protected area) ➢ Indicators of health related to key plant & animal species ➢ % of park hardened for visitor or other use ➢ % of protected area subject to different levels of control
Damage attributable to visitor activity	➢ % of protected system in degraded condition (where possible classified due to cause) ➢ % trails & routes (length) in damaged condition ➢ Cost of repair to damaged systems (annually) ➢ % of park area affected by unauthorised activities (hunting, tree cutting, poaching etc) ➢ Number of incidents of poaching identified
Level of visitor control and monitoring	➢ Number of human/animal contacts reported involving injury or risk of injury ➢ Number of crimes against tourists ➢ Number of incidents of vandalism ➢ % visitors who do not pay for entry (where entry fee is charged) ➢ Number of wardens or control staff (and number per tourist)
Marketing	➢ Amount spent on marketing the protected area
Management	➢ Number of park officials (wardens, managers, maintenance etc) ➢ Number of enforcement personnel per visitor ➢ Cost of protection ➢ Number of public/community meetings held with stakeholders including local periphery communities ➢ Ratio of revenues to costs for Park operations
Destination: Communities within or adjacent to Protected Areas Suggested Indicators	
Impacts of community activity on the park-management & protection	➢ Number of incidents regarding violation of park rules by local residents
Impacts of the park on community residents	➢ Opinion of the value/relationship of the protected area to the community (questionnaire based) ➢ Number of complaints to park management
Degree to which co-planning & management is done	➢ Existence of a participatory process to community and protected area collaboration in planning & management ➢ Degree of/frequency of participation in participatory processes ➢ Alternative tourism programmes in adjacent communities promoted or organised at the park (number and capacity, participation, tourist satisfaction with programmes)
Level of co-operation between the protected area and park community	
Destination: Natural and Sensitive Ecological Sites Suggested Indicators	
Ecological Value	
Representativeness	➢ No. of species typical of the area present at the site (& no. individuals)

(whether the resource has characteristics typical of the ecosystem)	➢ No. of unique or rare species present at the site (& no. of individuals)
Uniqueness (rarity of the site relative to group (e.g. wetland, desert)	➢ % of site area occupied by rare or unique species ➢ No. of individuals in the population or rare and unique species ➢ % of endemic species at the site
Level of site protection	➢ *% of area subject to control* ➢ Recognition by international programmes
Tourism Value	
Fragility	➢ No. of species and endemic species ➢ No. of species and endemic endangered species ➢ Populations of every species ➢ Temporal rate of variation of species
Tourism feasibility (access, traditional uses, management capacity, economic viability restoration costs, operation & maintenance costs)	➢ *Level of acceptance of the tourism activity by the local community (% positive)* ➢ Inventory of attractions (distinguished natural features, including flora & fauna, landscapes) ➢ No. of observations of fauna or flora per circuit and per season ➢ No. of days of observation of natural features per season (e.g. wildflowers in bloom, migratory birds) ➢ Profitability of tourism activity at the site (% return on investment, net incomes) ➢ Management capacity: presence of a management body; plan; site restoration & regeneration programmes (% of site covered) ➢ Cost of acquisition/protecting/restoration of the site ➢ Estimated time to full restoration of the site (for degraded sites)
Educational-interpretive value: (value of the site for educating & awareness raising-natural sciences, history & local traditions)	➢ No. of opportunities for interpretation and education at the site (existence of guided visits, printed self-explanatory materials, trails, educational itineneries, etc) ➢ Natural & educational value given to the site by educators, NGOs, tour operators.
Accessibility: refers to ease with which the place can be visited	➢ No. of access routes in good condition for tourism (paths, motorised, airstrips etc) ➢ % site accessible to those with disabilities
Attractiveness : include parameters of an aesthetic, emotional or perceptual nature	➢ Aesthetic/perceptual evaluation by the visitor ➢ Presence of key ecological features of the site in media & tourism promotional material
Tourism carrying capacity of the site: site's capability to serve as the venue for tourism/recreation	➢ No. of visitors acceptable, according to the perception of visitors themselves ➢ No. of visitors acceptable according to the capacity of equipment & facilities of the site (depends on capacity studies establishing limits) ➢ No. of visitors acceptable, re capacity estimates ➢ No. of visitors / no. of individuals per species
Site management	
Tourism management plan for the site	➢ *Existence of a tourism management plan for the site (also % site covered by plan)*
Regulation of the site	➢ Existence of rules to regulate construction, hunting, fishing, extraction of natural resources at the site (& % of key resources included) ➢ % of site with regulated zoning/controls, extent of tourism zones
Use Intensity	➢ *No. and origin of visitors to the site per season (day, month)* ➢ Average length of stay ➢ No. of tour operators with permit to operate at site
Tourism management capacity	➢ Annual expenditure on management and control ➢ % of resources actually assigned /resources requested by the administration for management of the site
Tourism's contribution to site conservation	➢ Visitor fees ➢ Concession fees ➢ Donations from visitors and tour operators ➢ Fees from guiding & other services ➢ In-kind contributions (e.g. equipment, volunteers) ➢ Sale of goods (e.g. informative materials, handicrafts, equipment)
Management of spaces for tourism use	
Trails and paths	➢ % soil loss on trails ➢ No. of soil erosion points along trails and vehicle paths

	➢ % of protected area in eroded or degraded state ➢ Vehicular congestion (average travel times on main access routes during high/low season
Camping areas and accommodation	➢ Area or campsites per tent ➢ No. of campfires allowed for camping areas ➢ No. of erosion points in camping areas ➢ Total density of camping use (persons per m2 in peak season) ➢ No. of campers per toilet ➢ No. of beds (other accommodation) ➢ % of occupancy of camping sites and accommodation
Community Participation	
Local community participation	➢ % of local products and service consumed by tourism (at least 70% of goods and services acquired for tourism operation of the site from local enterprises or individuals) ➢ Employment of local residents in site management and tourism operations (numbers, income levels) ➢ Level of satisfaction of residents regarding tourism development in the area- particularly regarding that targeting natural systems ➢ Level of assistance to local environmental awareness: no. of local awareness-raising actions (courses, meetings, promotion of content in the curriculum of local educational system, etc)
Ecosystem Management	
Water quality	➢ Water quality: contaminants in surface water and ground water ➢ Turbidity of streams
Air, noise pollution	➢ Noise pollution due to motors: visitors perceiving annoying motor noises (cars, launches, motorcycles, planes, generators) in natural areas
Impacts on flora and fauna	➢ Biodiversity index of flora and fauna ➢ Population sizes of key species ➢ No. of introduced species (exotic fauna and/or flora) (% of total) ➢ Level of illegal hunting & fishing at site during high season (loss of animals, number of incidents) ➢ Loss of species due to use as tourism souvenirs ➢ No. fauna run over by traffic (road kills) during high season (ratio to low season) ➢ % increase in infectious diseases to flora and fauna of site ➢ Frequency of species census ➢ % variation of species
Aesthetics	➢ Amount of litter in natural areas (seasonality of waste can relate to tourist numbers) ➢ Presence of visual barriers, visual pollution ➢ Existence of viewpoints ➢ Scenic valuation by tourists (perception- questionnaire)
Visitor satisfaction	
Visitors	➢ Level of satisfaction of visitors
Intermediaries	➢ Opinion of local Tour Operators (% with favourable opinion) ➢ Opinion of foreign tour operators (% with favourable opinion)

3 UN Commission on Sustainable Development- Indicators of Sustainable Development

Source: http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/table_4.htm

The UN Commission on Sustainable Development, in accordance with chapter 40 of Agenda 21 which calls on countries and the international community to develop indicators of **sustainable development**, have proposed a core set of 58 indicators, set within 15 themes, 38 sub-themes and organised under the headings of 'the four primary dimensions of sustainable development'. This structuring resulted from comprehensive testing and consultation and has its roots in the 'driving force- state- response' framework. The 58 core indicators, as shown by ( ), represent the 'priority issues for countries and the international community'. For full details of their process of indicator development please refer to the website:
(http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/isd-ms2001isd.htm)

SOCIAL		
Theme	**Sub-theme**	**Indicator**
Equity	Poverty (3)	Percent of Population Living below Poverty Line
		Gini Index of Income Inequality
		Unemployment Rate
	Gender Equality (24)	Ratio of Average Female Wage to Male Wage
Health (6)	Nutritional Status	Nutritional Status of Children
	Mortality	Mortality Rate Under 5 Years Old
		Life Expectancy at Birth
	Sanitation	Percent of Population with Adequate Sewage Disposal Facilities
	Drinking Water	Population with Access to Safe Drinking Water
	Healthcare Delivery	Percent of Population with Access to Primary Health Care Facilities
		Immunization Against Infectious Childhood Diseases
		Contraceptive Prevalence Rate
Education (36)	Education Level	Children Reaching Grade 5 of Primary Education
		Adult Secondary Education Achievement Level
	Literacy	Adult Literacy Rate
Housing (7)	Living Conditions	Floor Area per Person
Security	Crime (36, 24)	Number of Recorded Crimes per 100,000 Population
Population (5)	Population Change	Population Growth Rate
		Population of Urban Formal and Informal Settlements

ENVIRONMENTAL		
Theme	**Sub-theme**	**Indicator**
Atmosphere (9)	Climate Change	Emissions of Greenhouse Gases
	Ozone Layer Depletion	Consumption of Ozone Depleting Substances
	Air Quality	Ambient Concentration of Air Pollutants in Urban Areas
Land (10)	Agriculture (14)	Arable and Permanent Crop Land Area
		Use of Fertilizers
		Use of Agricultural Pesticides
	Forests (11)	Forest Area as a Percent of Land Area
		Wood Harvesting Intensity
	Desertification (12)	Land Affected by Desertification
	Urbanization (7)	Area of Urban Formal and Informal Settlements

Oceans, Seas and Coasts (17)	Coastal Zone	Algae Concentration in Coastal Waters
		Percent of Total Population Living in Coastal Areas
	Fisheries	Annual Catch by Major Species
Fresh Water (18)	Water Quantity	Annual Withdrawal of Ground and Surface Water as a Percent of Total Available Water
	Water Quality	BOD in Water Bodies
		Concentration of Faecal Coliform in Freshwater
Biodiversity (15)	Ecosystem	Area of Selected Key Ecosystems
		Protected Area as a % of Total Area
	Species	Abundance of Selected Key Species
ECONOMIC		
Theme	**Sub-theme**	**Indicator**
Economic Structure (2)	Economic Performance	GDP per Capita
		Investment Share in GDP
	Trade	Balance of Trade in Goods and Services
	Financial Status (33)	Debt to GNP Ratio
		Total ODA Given or Received as a Percent of GNP
Consumption and Production Patterns (4)	Material Consumption	Intensity of Material Use
	Energy Use	Annual Energy Consumption per Capita
		Share of Consumption of Renewable Energy Resources
		Intensity of Energy Use
	Waste Generation and Management (19-22)	Generation of Industrial and Municipal Solid Waste
		Generation of Hazardous Waste
		Management of Radioactive Waste
		Waste Recycling and Reuse
	Transportation	Distance Traveled per Capita by Mode of Transport
INSTITUTIONAL		
Theme	**Sub-theme**	**Indicator**
Institutional Framework (38, 39)	Strategic Implementation of SD (8)	National Sustainable Development Strategy
	International Cooperation	Implementation of Ratified Global Agreements
Institutional Capacity (37)	Information Access (40)	Number of Internet Subscribers per 1000 Inhabitants
	Communication Infrastructure (40)	Main Telephone Lines per 1000 Inhabitants
	Science and Technology (35)	Expenditure on Research and Development as a Percent of GDP
	Disaster Preparedness and Response	Economic and Human Loss Due to Natural Disasters

4 OECD Indicators of Environmental Sustainability

Source: http://www.oecd.org/dataoecd/7/47/24993546.pdf

The OECD **environmental** indicators are organised into several categories, each corresponding to a specific purpose and framework. The Core Environmental Indicators (CEI) are designed to help track environmental progress, covering issues that reflect the main environmental concerns in OECD countries and are classified following the P-S-R Model. The Key Environmental Indicators (KEI) are a reduced set of the core indicators, aimed at informing the general public and providing key signals to policymakers. In addition to the CEI's and KEI's, there are Sectoral Environmental Indicators (SEI), designed to help integrate environmental concerns into sectoral policies; 'indicators derived from environmental accounting', designed to help 'integrate environmental concerns into economic and resource management policies'; and Decoupling Indicators (DEI), to 'measure the decoupling of environmental pressure from economic growth'. Included here are the CEI's and KEI's- please refer to the website for full details on these final 3 categories.

4.1 Core Environmental Indicators (CEI)

(✓ = identical/ similar indicator proposed in UNCSD set provided on pages 4 - 5)

Issue	Core indicators	Short, medium, or long-term
Climate change	*Pressures* **Index of greenhouse gas emissions**✓ ➢ CO2 emissions ➢ CH4 emissions ➢ N2O emissions ➢ CFC emissions *Conditions* **Atmospheric concentrations of greenhouse gases;** **Global mean temperature** *Responses* **Energy efficiency** ➢ Energy intensity✓ (total primary energy supply per unit of GDP or per capita) ➢ Economic and fiscal instruments (e.g. prices and taxes, expenditures)	 M S S/M S/M S/M S M/L S S/M
Ozone layer depletion	*Pressures* **Index of apparent consumption of ozone depleting substances (ODP)** ✓ ➢ Apparent consumption of CFCs/ and halons *Conditions* **Atmospheric concentrations of ODP** **Ground level UV-B radiation** ➢ Stratospheric ozone levels Responses *Responses* **CFC recovery rate**	 M S/M S/M M
Eutrophication	*Pressures* Emissions of N and P in water and soil ➔ **Nutrient balance** ➢ N and P from fertilizer use✓ and from livestock *Conditions* **BOD/DO in inland waters, in marine waters**✓ **Concentration of N & P in inland waters , in marine waters** *Responses* **Population connected to biological and/or chemical sewage treatment plants**	 L S S/M M/L

	➢ Population connected to sewage treatment plants ➢ User charges for waste water treatment ➢ Market share of phosphate-free detergents	S M S/M
Acidification	*Pressures* **Index of acidifying substances** ➢ Emissions of NOx and SOx *Conditions* **Excedance of critical loads of pH in water & soil** ➢ Concentrations in acid precipitation *Responses* **% of car fleet equipped with catalytic converters** **Capacity of SOx and NOx abatement equipment of stationary sources**	 M/L S M/L S S/M M/L
Toxic contamination	*Pressures* **Emissions of heavy metals** **Emissions of organic compounds** ➢ Consumption of pesticides ✓ *Conditions* **Concentration of heavy metals & organic compounds in env. media & in living species** ➢ Concentration of heavy metals in rivers *Responses* **Changes of toxic contents in products and production processes** ➢ Market share of unleaded petrol	 M/L L S/M L S/M L S
Urban environmental quality	*Pressures* **Urban air emissions (SOx, NOx, VOC)** Urban traffic density Urban car ownership Degree of urbanisation (urban population growth rates, urban land) ✓ *Conditions* **Population exposure to air pollution, to noise** ➢ Concentrations of air pollutants✓ **Ambient water conditions in urban areas** *Responses* **Green space** (Areas protected from urban development) **Economic, fiscal and regulatory instruments** ➢ Water treatment and noise abatement expenditure	 M/L M/S S S/M L/M S M/L M/L M S/M
Biodiversity	*Pressures* **Habitat alteration and land conversion from natural state** to be further developed (e.g. road network density, change in land cover, etc.) *Conditions* **Threatened or extinct species as a share of total species known**✓ **Area of key ecosystems**✓ *Responses* **Protected areas as % of national territory and by type of ecosystem** ➢ Protected species	 L S M S/L S
Cultural landscapes	Indicators to be further developed e.g. presence of artificial elements, sites protected for historical, cultural or aesthetic reasons	

Waste	*Pressures* **Generation of waste (municipal, industrial, hazardous, nuclear)** ✓ ➢ Movements of hazardous waste *Responses* **Waste minimisation** (to be further developed) ➢ Recycling rates✓ ➢ Economic and fiscal instruments, expenditures	 S S L S/M M
Water resources	*Pressures* **Intensity of use of water resources**✓ (abstractions/available resources) *Conditions* **Frequency, duration and extent of water shortages** *Responses* **Water prices and user charges for sewage treatment**	 S M/L S/M
Forest resources	*Pressures* **Intensity of forest resource use**✓ (actual harvest/productive capacity) *Conditions* **Area✓, volume and structure of forests** *Responses* **Forest area management and protection** (e.g. % of protected forest area in total forest area; % of harvest area successfully regenerated of afforested)	 M S/M M/L
Fish resources	*Pressures* **Fish catches**✓ *Conditions* **Size of spawning stocks** *Responses* **Fishing quotas**	 S M S/M
Soil degradation (desertification & erosion)	*Pressures* **Erosion risks: potential and actual use of land for agriculture** ➢ Change in land use *Conditions* **Degree of top soil losses** *Responses* **Rehabilitated areas**	 L S M/L M/L
Material resources (new issue)	**Intensity of use of material resources**✓ (Indicators to be developed, link to Material Flow Accounting)	
Socio-economic, sectoral and general indicators *(not attributable to specific environmental issues)*	*Pressures* **Population growth & density**✓ **Growth and structure of GDP**✓ **Private & government final consumption expenditure** **Industrial production** **Structure of energy supply**✓ **Road traffic volumes;** **Stock of road vehicles** **Agricultural production** *Responses* **Environmental expenditure** ➢ Pollution abatement and control expenditure ➢ Official Development Assistance✓ (indicator added on the basis of experience with environmental performance reviews) **Public opinion**	 S S S S S S S M/L S/M S S

4.2 Key Environmental Indicators (KEI)

POLLUTION ISSUES		**Available Indicators***	**Medium Term Indicators****
1	Climate change	CO2 emission intensities	Index of greenhouse gas emissions
2	Ozone layer	Indices of apparent consumption of ozone depleting substances (ODS)	Same, plus aggregation into one index of apparent consumption of ODS
3	Air quality	Sox & NOx emission intensities	Population exposure to air pollution
4	Waste generation	Municipal waste generation intensities	Total waste generation intensities. Indicators derived from material flows accounting
5	Freshwater quality	Waste water treatment connection rates	Pollution loads to water bodies
NATURAL RESOURCES & ASSETS			
6	Freshwater resources	Intensity of use of water resources	Same plus sub-national breakdown
7	Forest resources	Intensity of use of forest resources	Same
8	Fish resources	Intensity of use of fish resources	Same plus closer link to available resources
9	Energy resources	Intensity of energy use	Energy efficiency index
10	Biodiversity	Threatened species	Species and habitat or ecosystem diversity Area of key ecosystems
		** indicators for which data are available for a majority of OECD countries and that are presented in this report*	*** indicators that require further specification & development (availability of basic data sets, underlying concepts & definitions).*

5 European Environment Agency (EEA) Set of Indicators

Source: http://themes.eea.europa.eu/indicators/

The European Environment Agency have developed a set of 37 core **environmental** indicators with the aim of: providing 'a stable and manageable basis for indicator reporting by the EEA'; prioritising improvements in data quality from countries to European level; and 'streamlining contributions to other indicator initiatives.

5.1 Core Set of Indicators

Indicator		Definition/ Measure
Air pollution and ozone depletion		
1	Emissions of acidifying substances	Anthropogenic emissions of acidifying substances: nitrogen oxides, ammonia, and sulphur dioxide, weighted by acidifying potential. (ktonnes)
2	Emissions of ozone precursors	Anthropogenic emissions of ozone precursors: nitrogen oxides, carbon monoxide, methane and non methane volatile organic compounds, weighted by tropospheric ozone-forming potential. (ktonnes)
3	Emissions of primary particles and secondary particulate precursors	Emissions of primary particulate matter less than 10 micro m (PM_{10}) and secondary precursors, aggregated according to the particulate formation potential of each precursor considered. (ktonnes)
4	Excedance of air quality limit values in urban areas	Fraction of the urban population that is potentially exposed to ambient air concentrations of pollutants in excess of the EU limit value set for the protection of human health
5	Exposure of ecosystems to acidification, eutrophication and ozone	Ecosystem or crops areas at risk of exposure to harmful effects of acidification, eutrophication and ozone as a consequence of air pollution, and shows the state of change in acidification, eutrophication and ozone levels of the European environment
6	Production and consumption of ozone depleting substances	Production and consumption of ozone-depleting substances (ODS) in Europe
Biodiversity		
7	Threatened and protected species	How many species present in Europe and assessed as globally threatened are protected by European instruments
8	Designated areas	Proportion of a country designated total area that is protected under either the EC Birds and/or Habitats Directives, or by national instruments, or by both
9	Species diversity	Birds: farmland, woodland, park and garden birds- abundance variation trend over years. Arthropods: butterflies- distribution variation trend over 20-25 years
Climate Change		
10	Greenhouse gas emissions and removals	Anthropogenic GHG emissions in relation to the EU and Member State targets.
11	Projections of greenhouse gas emissions and removals	Projected trends in anthropogenic greenhouse gas emissions in relation to the EU and Member State targets, using existing policies and measures and/or additional policies and/or use of Kyoto mechanisms.
12	Global and European temperature	Annual average global and European temperature and European winter/ summer temperatures (all compared with the 1961-1990 average).
13	Atmospheric greenhouse gas concentrations	Measured trends and projections of greenhouse gas concentrations
Terrestrial		
14	Land take	Increase in the amount of agriculture, forest and other semi-natural and natural land taken by urban and other artificial land development.
15	Progress in management of contaminated sites	Number of sites for which each of the five steps (1) site identification/ preliminary study; 2) preliminary investigation; 3) main site investigation; 4) implementation of remediation measures; 5) measure completed) has been completed as a percentage of the total number of sites to be processed.
Waste		
16	Municipal waste generation	Municipal waste generation, expressed in kg per person, and the method of treatment (recycling, composting, landfill and

		incineration), expressed as a percentage of total municipal waste treatment.
17	Generation and recycling of packaging waste	Total packaging used in EU Member States in kg per capita and recycling of packaging waste as a share of packaging used in EU Member States.
Water		
18	Use of freshwater resources	Water exploitation index (WEI) is the mean annual total abstraction of freshwater divided by the mean annual total renewable freshwater resource at the country level, expressed in percentage terms.
19	Oxygen consuming substances in rivers	Biochemical oxygen demand (BOD)
20	Nutrients in freshwater	Concentrations of orthophosphate and nitrate in rivers, total phosphorus and nitrate in lakes and nitrate in groundwater bodies.
21	Nutrients in transitional, coastal and marine waters	Winter nitrate and phosphate concentration (microgram/l), and N/P ratio in the regional seas of Europe
22	Bathing water quality	Changes over time in the quality of designated bathing waters (inland and marine) in EU Member States in terms of compliance with standards for microbiological parameters (total coliforms and faecal coliforms) and physicochemical parameters (mineral oils, surface-active substances and phenols) introduced by the EU Bathing Water Directive (76/160/EEC).
23	Chlorophyll in transitional, coastal and marine waters	Trends and geographical distribution in mean summer surface concentrations of chlorophyll-a (microgram/l) in regional seas of Europe.
24	Urban waste water treatment	Percentage of population connected to primary, secondary and tertiary wastewater treatment plants
25	Gross nutrient balance	Balance between nitrogen added to an agricultural system and nitrogen removed from the system per hectare of agricultural land. (kg/year)/(ha)
26	Area under organic farming	Share of organic farming area (sum of existing organically farmed areas and areas in process of conversion) as a proportion of total utilised agricultural area (UAA).
Energy		
27	Final energy consumption by sector	Energy supplied to the final consumer's door for all energy uses
28	Total energy intensity	Ratio between the Gross Inland Consumption of Energy (or total energy consumption) and the Gross Domestic Product calculated for a calendar year.
29	Total energy consumption by fuel	Sum of the gross inland consumption of energy from solid fuels, oil, gas, nuclear and renewable sources
30	Renewable energy consumption	Ratio between the gross inland consumption of energy from renewable sources and the total gross inland energy consumption calculated for a calendar year
31	Renewable electricity	Ratio between the electricity produced from renewable energy sources and the gross national electricity consumption calculated for a calendar year
Fisheries		
32	Status of marine fish stocks	Ratio of the number of over-fished stocks to the total number of commercial stocks per fishing area in European seas.
33	Aquaculture production	Quantifies the development of European aquaculture production by major sea area and country as well as the contribution of aquaculture discharges of nutrients relative to the total discharges of nutrients into coastal zones.
34	Fishing fleet capacity	Measure of the size and capacity of the fishing fleet, which in turn is assumed to approximate to the pressure on marine fish resources and the environment.
Transport		
35	Passenger transport demand	Volume of passenger transport relative to GDP and percentage share of transport by passenger car in total inland transport
36	Freight transport demand	volume of freight transport relative to GDP and modal split share of freight transport (percentage share of road in total inland transport)
37	Use of cleaner and alternative fuels	Share of regular, low and zero sulphur fuels in total fuel consumption for road transport and percentage of final energy consumption of biofuels for transport in the total combined final energy consumption of gasoline, diesel and biofuels for transport.

5.2 Sectoral Indicators: Tourism Theme

Source: http://themes.eea.eu.int/Sectors_and_activities/tourism/indicators

In addition to the core set of indicators, the EEA has developed 'other', **sectoral** indicators:

Indicator	**Policy Issue**
Household expenditure for tourism and recreation	What causes the growth in tourism?
Tourism eco-labelling	Is the tourist industry adopting eco-labels?
Tourism intensity	Are maximum 'carrying capacities' being reached in some regions?
Tourism travel by transport modes	Is tourism's contribution to transport demand slowing?

6 UK Sustainable Development Indicators

Source: http://www.sustainable-development.gov.uk/performance/indicatorsindex.htm

To support the UK Government's Sustainable Development Strategy, '*Securing the future'*, (March 2005), there is now a suite of 68 national **Sustainable Development** Indicators. These include **20** UK Framework Indicators, shared by the UK Government and the devolved administrations in Scotland, Wales and Northern Ireland. The remaining 48 indicators highlight additional priorities relevant to the UK Government Strategy.

Indicator	**Measure**
1. Greenhouse gas emissions*:	Kyoto target and CO_2 emissions
2. Carbon dioxide emissions by end user:	CO_2 emissions from industry, domestic, transport sectors (excluding international aviation and shipping)
3. Aviation and shipping emissions:	Greenhouse gases from UK-based international aviation and shipping fuel bunkers
4. Renewable energy:	Renewable electricity generated as a percentage of total electricity
5. Electricity generation:	Electricity generated, CO_2, NO_x and SO_2 emissions by electricity generators and GDP
6. Household energy use:	Domestic CO_2 emissions, domestic energy consumption and household spending
7. Road transport:	CO_2, NO_x, PM_{10} emissions and Gross Domestic Product
8. Private cars:	Private car CO_2 emissions, car-kilometres and household spending
9. Road freight:	Heavy Goods Vehicle (HGV) CO_2 emissions, kilometres, tonnes and Gross Domestic Product
10. Manufacturing sector:	Manufacturing sector CO_2, NO_x, SO_2, PM_{10} emissions and output
11. Service sector:	Service sector CO_2, NO_x emissions and output
12. Public sector:	Public sector CO_2, NO_x emissions and output
13. Resource use*:	Domestic Material Consumption and Gross Domestic Product
14. Energy supply:	UK indigenous energy production and gross inland energy consumption
15. Water resource use:	Total abstractions from non-tidal surface and ground water, leakage losses and Gross Domestic Product
16. Domestic water consumption:	Litres per person per day
17. Water stress:	*(to be developed to monitor the impacts of water shortages)*
18. Waste*:	Waste: (a) arising by sector (b) arising by disposal
19. Household waste per person:	(a) Arising (b) recycled or composted
20. Bird populations*:	Bird population indices (a) farmland birds* (b) woodland birds* (c) coastal birds* (d) wintering wetland birds
21. Biodiversity conservation:	(a) Priority species status (b) priority habitat status
22. Agriculture sector:	Fertiliser input, farmland bird population, ammonia and methane emissions and output
23. Farming and environmental stewardship:	Land covered by environmental schemes
24. Land use:	Area covered by agriculture, woodland, water or river, urban (contextual indicator)
25. Land recycling:	(a) New dwellings built on previously developed land or through conversions (b) all new development on previously developed land
26. Dwelling density:	Average density of new housing
27. Fish stocks*:	Sustainability of fish stocks around the UK
28. Ecological impacts of air pollution*:	Area of sensitive UK habitats exceeding critical loads for acidification and eutrophication
29. Emissions of air pollutants:	NH_3, NO_x, PM_{10} and SO_2 emissions and GDP
30. River quality*:	Rivers of good (a) biological (b) chemical quality
31. Flooding:	*(to be developed to monitor sustainable approaches to ongoing flood management)*
32. Economic output*:	Gross Domestic Product
33. Productivity:	UK output per worker
34. Investment:	(a) Total investment (b) Social investment relative to GDP

35. Demography:	Population and population of working age (contextual indicator)
36. Households and dwellings:	Households, single person households and dwelling stock (contextual indicator)
37. Active community participation*:	Informal and formal volunteering at least once a month in the last 12 months
38. Crime*:	Crime survey and recorded crime for (a) vehicles (b) domestic burglary (c) robbery
39. Fear of crime:	Fear of crime: (a) car theft (b) burglary (c) physical attack
40. Employment*:	People of working age in employment
41. Workless households*:	Population living in workless households (a) children (b) working age
42. Economically inactive:	Percentage of people of working age who are economically inactive
43. Childhood poverty*:	Children in relative low-income households (a) before housing costs (b) after housing costs
44. Young adults:	16-19 year-olds not in employment, education or training
45. Pensioner poverty*:	Pensioners in relative low-income households (a) before housing costs (b) after housing costs
46. Pension provision:	Proportion of working age people contributing to a non-state pension in at least three years out of the last four
47. Education*:	19 year-olds with Level 2 qualifications and above
48. Sustainable development education:	*(to be developed to monitor the impact of formal learning on knowledge and awareness of sustainable development)*
49. Health inequality*:	(a) Infant mortality: differences between socio-economic groups (b) Life expectancy: differences in average life expectancy between local authority areas
50. Healthy life expectancy:	Healthy life expectancy (a) men and (b) women
51. Mortality rates:	Death rates from (a) circulatory disease and (b) cancer, below 75 years and for areas with the worst health and deprivation indicators, and (c) suicides
52. Smoking:	Prevalence of smoking (a) all adults (b) 'routine and manual' socio-economic groups
53. Childhood obesity:	Prevalence of obesity in 2-10 year-olds
54. Diet:	Proportion of people consuming (a) five or more portions of fruit and vegetables per day and (b) in low income households
55. Mobility*:	(a) Number of trips per person by mode (b) Distance travelled per person per year by broad trip purpose
56. Getting to school:	How children get to school
57. Accessibility:	Access to key services
58. Road accidents:	Number of people and children killed or seriously injured
59. Social justice*:	*(social measures to be developed)*
60. Environmental equality*:	*(social measures to be developed)*
61. Air quality and health:	(a) Annual levels of particles and ozone (b) days when air pollution is moderate or higher
62. Housing conditions:	(a) Social sector homes (b) vulnerable households in the private sector in homes below the decent homes standard
63. Households living in fuel poverty:	Households living in fuel poverty containing (a) pensioners (b) children (c) disabled/long-term sick
64. Homelessness:	(a) Number of rough sleepers (b) number of households in temporary accommodation (i) total (ii) households with children
65. Local environment quality:	Assessment of local environmental quality
66. Satisfaction in local area:	Percentage of households satisfied with the quality of the places in which they live (a) overall (b) in deprived areas
67. UK international assistance:	Net Official Development Assistance (a) per cent of Gross National Income (b) per capita
68. Wellbeing*:	(wellbeing measures to be developed)
* An indicator within the UK's shared framework for SD 'One future - different paths' GDP, Gross Domestic Product, a measure of national economic output; GVA, Gross Value Added, a measure of sectoral economic output; CO2, Carbon dioxide, a greenhouse gas and the main contributor to global warming; NOx, Nitrogen oxides, contribute to acidification and local air pollution; SO2, Sulphur dioxide, contribute to acidification and local air pollution; PM10, Particulates, are airborne particulate matter that can be carried into the lungs	

7 Spanish System of Environmental Tourism Indicators

Source: http://www.oecd.org/dataoecd/60/18/34702872.pdf (pp 85-100); and http://destinet.ewindows.eu.org/policies_resources/fol955810/Spanish_Indicators_Conclusions.doc

A system of indicators has been developed for Spain by the OECD that allows the evaluation of the effect of **tourism** on the environment. The proposed System is set up using the model developed by the European Environment Agency, based on the model Driving Forces-Pressure-State-Impact-Response (FPSIR).

INDICATOR		MEASURE
1.	Average number of bedspaces in tourist accommodations per establishment	No. bedspaces/ total no. establishments
2.	Annual distribution of tourism inflow	Annual distribution by Autonomous Community
3.	Total annual tourism expenditure	Total annual tourism expenditure (Euro millions) by Autonomous Community
4.	Percentage employment in hotel and restaurant sector	No. employees in the sector / total no. employees
5.	Percentage of tourism population equivalent (PTE)	[(Total no. tourists (inc. Spanish & 2nd homes) / 365) / Total present population] x100 = PTE
6.	Collective accommodation establishments	Number per resident
7.	Potential pressure over natural habitats	No further information
8.	Tourist density in urban areas	PTE / Total urban area (ha)
9.	Tourist anthropisation factor	No further information
10.	Distance from airports to urban inhabited areas	Distance in km
11.	Presence of second-dwellings	No. second dwellings / each 100ha of municipal area
12.	Visitors to places of cultural and historical interest	No further information
13.	Interventions carried out by SEPRONA over tourism and sport activities in natural environments	No further information
14.	Equipped beaches	No. of equipped beaches per km coastline
15.	Moorings offered in sport harbours	No. moorings per km of coastline
16.	Tourism urban waste generation	(Annual waste generation / total present population) x PTE
17.	Tourist consumption of urban drinking water supplies	No further information
18.	Electric power consumption due to tourism	No further information
19.	Modal distribution of tourist arrivals	No further information
20.	Degree of naturality of the environment	% of area of Sites of Community Interest over total Autonomous Community area
21.	Continental bathing water quality	No further information
22.	Marine bathing water quality	No further information
23.	Wastewater purification capacity per tourism population equivalent in main tourist towns	No further information
24.	Percentage of protected areas having controlled accesses and itineraries	No further information
25.	Hotel establishments certified according to environmental management regulation systems	No further information
26.	Selective collection of containers generated by tourism activities	No further information
27.	Incorporation of environmental criteria to tourism and territorial planning and legislation	No further information

8 English Tourism Council (ETC): National Sustainable Tourism Indicators 2002

Source:
http://destinet.ewindows.eu.org/policies_resources/fol955810/English_Tourism_Council_National_Sustainable_Tourism_Indicators_2002

A set of headline indicators based around the ETC's three core objectives for the management of **sustainable tourism**: (1) to protect and enhance the built and natural environment; (2) to support local communities and their culture; and (3) to benefit the economies of tourism destinations.

INDICATOR		MEASURE
Group 1: Protect & enhance the built and natural environment		
1.	Number of businesses signed up to environmental management schemes	Number of businesses with e.g. David Bellamy Conservation Award, ISO14001, EMAS, GTBS, Green Lanterns etc.
2.	Number of English beaches with a Blue Flag and a Seaside Award.	Number of beaches, reported annually
3.	Carbon dioxide savings made by the hotel industry.	CO2 savings by hotels as a result of installing energy efficiency measures.
4.	Transport used on England holiday trips by UK residents.	% of trips by mode of transport (Public, private car, hired car, other)
5.	Local authorities with Tourism Action Plans.	% of Local Authorities with Tourism Action Plans
6.	Ratio of the land and historic buildings protected by national agencies against the amount of money spent on protection of these assets.	Ratio
Group 2: Support local communities and their culture		
7a.	Workforce employed in tourism.	% of total workforce
7b.	Average hourly earnings in tourism versus the average national hourly wage.	Ratio
8.	Local authorities with LA 21 strategies that include sustainable tourism elements.	% of Local Authorities
9.	Audit of community perceptions of tourism	No further information available
10.	English adults not taking a holiday of four nights or more.	% of English adults
11.	Accommodation registered as meeting National Accessible Scheme criteria for disabled people.	Percentage
12.	Local authorities with tourism strategies that incorporate cultural and heritage considerations.	Percentage of Local Authorities
Group 3: Benefit the economies of tourism destinations		
13.	Tourism accommodation enterprises in the tourism sector participating in Welcome Host training.	Number of tourism accommodation enterprises
14.	Accommodation registered with ETC, AA or RAC Quality Assurance Scheme.	Percentage of accommodation
15.	Extent of visitor satisfaction.	Survey with 6 point scale from 'not at all' to 'completely' satisfied.
16.	Domestic tourism spend by region.	No further information available
17.	Contribution of English tourism to UK economy.	Tourism contribution as a percentage of UK GDP
18.	Composition of tourism sector by business turnover	No further information available
19.	Trips to England by UK residents.	Total number of trips per month
20.	Net domestic holiday spend by UK tourists.	(English domestic holiday spend + Spent by other UK residents in England + Overseas' visitors spend in England) – Spend abroad on tourism by English residents = Net domestic inflow/outflow over time (£m)

9 Scotland: '*Choosing Our Future'*- Measuring Progress on Scotland's Sustainable Development Strategy

Source: http://www.scotland.gov.uk/Topics/SustainableDevelopment/7859 and http://www.scotland.gov.uk/Resource/Doc/921/0033440.pdf

The Scottish Executive has recently re-published its set of indicators aimed at measuring progress towards meeting the commitments of Scotland's sustainable development strategy ('Choosing our future'), and on **sustainable development** more generally.

Well Being	1.	**Health Inequality**: Life expectancy (by area) men/ women
	2.	**Air Quality**: Air Quality Management Areas (AQMAs)
	3.	**Economic opportunity**: 16-19 year olds who are not in education, training or employment
	4.	**Economic opportunity**: People of working age in employment
Supporting thriving communities	5.	**Community**: (a) Neighbourhood satisfaction (b) volunteering
	6.	**Crime**: Recorded crimes for (a) vehicles (b) domestic housebreaking (c) violence (d) anti-social behaviour
	7.	**Households**: (a) Childhood poverty: children in low income households (b) homeless households
Protecting Scotland's natural heritage and resources	8.	**Waste**: Municipal waste arisings (a) total and (b) recycled / composted
	9.	**Biodiversity**[1]: Composite indicator of bird populations
	10.	**Marine**: Fish stocks which are within safe biological limits
	11.	**River Quality**[2]: Kilometers of river identified as "poor" or "seriously polluted"
Scotland's global contribution	12.	**Climate Change**: Greenhouse gas emissions: total and net
	13.	**Sustainable Energy**: Electricity generated from renewable resources
	14.	**Sustainable Energy**: carbon emission indicator[3]
	15.	**Transport**[4]**:** Total vehicle kilometers
Learning	16.	**Learning**: Eco-schools uptake and number with Green Flag
Context	17.	**Economy**: Economic output: GDP per head
	18.	**Demography**: Age profile of population
Indicators in Development[5]	**Social justice:** new indicator being developed to support UK Framework	
	Environmental Equality: new indicator being developed to support UK Framework	
	Well-being: well being measures will be developed in support of UK Framework if supported by the evidence	

[1] Composite indicator on bird populations is in development with SNH, which will include breeding seabirds, wintering water birds, farmland and terrestrial birds. If the data is not available to support this, an indicator based on the UK Biodiversity Action Plans will be included.

[2] Under Water Framework Directive, SEPA is developing indicators of the status of water bodies in Scotland. It is expected that these indicators will supersede the current indicator of kilometers of river length of good water quality.

[3] Indicator being developed to measure the relative reduction in carbon emissions achieved through measures contained in the Energy Efficiency Strategy.

[4] Indicator to be reviewed following National Transport Strategy consultation.

[5] Indicators in development will be introduced into the set if applicable at the Scotland level.

10 Green Globe 21: The Douglas Shire Community Working Group Experience

Source: http://www.greenglobe21.com/Benchmarking_WhatIs.aspx and:
Douglas Shire Community Working Group (2001) Douglas Shire Sustainable Futures Draft Strategy. Sherlock, K. (Ed). Douglas Shire Council: Mossman.

Green Globe21 is the only global sustainability benchmarking and certification program for travel and tourism operations. Douglas Shire Council, North Queensland, Australia was invited to seek accreditation under Green Globe21 brand. The **sustainable tourism** indicators they developed, and problems identified, are listed below.

Indicator	Suggested Measure	Problems
Sustainability Policy	Develop policy	
Energy consumption	Total energy consumed/equivalent persons	Cities for Climate Change Programme (CCCP) model problematic, lack data; expensive to collect; how measure transport /energy purchased outside
Potable water management	Total water consumed/ equivalent persons	Total water use not measured; how to account for private sources?
Solid waste reduction	Total solid waste to land fill/ equivalent persons	Best estimate as not collected; also in cubic metres has to be converted to tonnes
Environmental investment*	Environmental expenditure/total council expenditure	Once assumptions/definition of 'environmental investment' agreed; just analysis of budget codes for Douglas Shire Council (DSC)
Resource conservation*	Use of eco-labels/total product used by lead agency	What to include? Speaks to broader issues regarding ethical or environmental purchasing policies.
Bio-diversity	Habitat conservation area/total area	Not in council control! Remote sensing/mapping data v. expensive. Use voluntary conservation agreements instead? Need to focus on whole landscape not just protected areas
Water quality	Number of tests meeting guidelines/total water tests	Surface, groundwater, coastal waters and effluent – who tests and what does pass/failure mean?
Soil quality	Number of sites on contaminated land register	Easy to prove; but does it really tell you much?
Carbon dioxide	Green house gas produced/ equivalent persons (Optional)	Reliant on CCP model and energy outputs
Community Measure	Number of enterprises certified by Nature and Ecotourism Accredited Program / all tours run in the Shire	Difficult to calculate total number of tour operators - does it really tell you much?
Equivalent persons	Total resident population plus visitors	Impossible to calculate permanent, temporary, tourists and day visitors!

11 Cairngorms National Park: Draft Park Plan (Proposed) Indicators

Source: http://www.cairngorms.co.uk/parkauthority/nationalparkplan/looking.php

The draft Park Plan (to be reviewed and finalised by December 2006) includes a set of **National Park** indicators. These are proposed by the CNPA in order to provide a snapshot of the overall 'health' of the Park at any given time and to feed into a review of the cumulative impact of the Plan on the Park.

No.	Indicator Theme	Potential Indicators
1.	Landscape Change	• Land-use cover change • Change in field boundary features (hedges and dykes)
2.	Affordable Housing	• Ratio of houses in priority need to number of annual social rented properties available • Level of private landlords' uptake of grants and other forms of assistance to provide affordable rented housing
3.	Population Profile	• Proportion of population of working age • Proportion of population under 25 years old
4.	Seasonal Employment Rates by Sector	• Employment rates by sector (full-time, part-time and seasonal)
5.	Agricultural Activity	• Total income from farming • Number and area of active farm units
6.	Biodiversity	• Wild Bird Populations • % of Local Biodiversity Action Plan Species in favourable condition • % of Local Biodiversity Action Plan Habitats in favourable condition
7.	Water Quality	• Ecological condition of river water • Conservation of hydromorphology
8.	Traffic Volumes and Modes	• Traffic volumes by modal split on selected routes • Levels of use of public transport
9.	Education and Learning	• Number and % uptake of available outdoor education places • Number of participants in the Land-Based Business Training Programme • Number of participants in the John Muir Award • Level of qualifications achieved
10.	Waste	• Total waste arising • % waste recycled • Access to kerbside recycling facilities
11.	Visitor Enjoyment of the Park	• Visitor numbers • Visitor spend • Duration of visits
12.	Cultural Heritage	• % of Listed Buildings and Scheduled Ancient Monuments at risk • Number of community heritage groups/museums • Number of cultural heritage events
13.	Business Health	• Levels of employment by business type
14.	Geographical Availability of Services	• Distance of services from households • Time taken to reach key services
15.	Community Vibrancy	• Levels of use of community meeting places • Levels of volunteering • Levels of participation in community council elections

12 CNPA Strategy for Sustainable Tourism: Suggested Indicators of Sustainable Tourism

Source:
http://www.cairngorms.co.uk/resource/docs/boardpapers/11032005/CNPA.Paper.700.Board.Paper.1.Annex.1.pdf

The Cairngorms National Park Authorities 'Strategy and Action Plan for Sustainable Tourism' sets out some *suggested* indictors, under six headings that could be used 'to monitor the performance and impact of **tourism** in the Park.

Volume and spread of tourism	
1.	Estimates of trips, nights and spending in the region
2.	Visitor numbers at attractions and main sites (monthly to get indicator or seasonality)
3.	Monthly occupancy at accommodation (see under enterprise performance)
4.	Traffic counts at main locations (monthly)
5.	Number of tourism development projects receiving planning permission (together with number of applications, number called in by CNPA & outcome)
6.	Proportion of attractions and activity providers open all year
Visitor satisfaction	
7.	Percentage of visitors satisfied in general and with types of facility / service
8.	Proportion of repeat visitors
9.	Number of complaints received
Tourism enterprise performance and satisfaction	
10.	Monthly accommodation occupancy rates and attraction visitor numbers
11.	Performance increase or decrease compared to previous year
12.	Number of jobs supported – full time, part time : all year, seasonal
13.	Proportion of enterprises with quality certification
14.	Number of enterprises using local produce
15.	Percentage of enterprises satisfied with CNPA
Community reaction	
16.	Proportion of residents surveyed saying they are happy with tourism levels
17.	Number of complaints received relating to tourism
Volume and spread of tourism	
18.	Estimates of trips, nights and spending in the region
19.	Visitor numbers at attractions and main sites (monthly to get indicator or
Environmental impact	
20.	Records of air and water quality
21.	Levels of litter in key sites
22.	Proportion of visitors arriving by public transport
23.	Number of enterprises in Green Tourism Business Scheme
24.	Number of enterprises taking environmental management measures such as recycling

13 Conclusion

Despite the multiplicity of existing indicator sets, it is important to note that only four of the eleven sets are specifically focused on tourism and only two of those actually target sustainable tourism. As far as the authors are aware, only one of these sets (Greenglobe21) has been implemented and critically reviewed in a tourism destination to date. The other indicator sets relate to sustainability or environmental management and these are likely to feature strongly in the management of tourism within the Cairngorms National Park. Whilst the sets help to illustrate how indicators can be expressed and allows the CNPA and ViSIT forum to build on existing knowledge, it is unlikely that any of these sets can be adopted as they stand. The purpose of the checklist provided in the *Framework for Developing Indicators of Sustainable Tourism* report is to allow a structured and transparent appraisal of existing indicators to ensure that those adopted are appropriate, cost-effective and will help to deliver truly sustainable tourism.