ECOLOGICAL FOOTPRINT STANDARDS 2009

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PURPOSE AND SCOPE

Introduction

These *Ecological Footprint Standards 2009* are designed to ensure that Footprint assessments are produced consistently and according to community-proposed best practices. The Standards cover both Footprint analysis and communication and are designed to apply to all sub-national Footprint studies, including sub-national populations, products, and organizations.

What can be certified?

These Standards can be used to certify Reports, defined as discrete documents that include Ecological Footprint data and/or interpretation. The Standards enable consistent evaluation of the accuracy, completeness, and transparency of these documents. In their current form, the Standards are not intended to certify or validate analytical methods, tools, or software. The final Reports that result as outputs from these methods or tools, however, can be reviewed under the scope of these Standards.

Comparability of Analyses

The extent to which Ecological Footprint assessments can be compared is dependant upon the availability and quality of data used in each assessment, the analytical methods and tools that have been applied, and the way in which the findings are reported. The *Ecological Footprint Standards 2009* aim to ensure that assessments are conducted and communicated in a way that is accurate, transparent, and does not misrepresent the results of the assessment. Consequently, they are intended to provide sufficient information for competent Ecological Footprint practitioners to determine the extent to which any two or more assessments may be compared. It should however be noted that compliance with the current Standards does not guarantee that Ecological Footprint calculations presented in two Standards-compliant Reports will be fully comparable.

STANDARDS DOCUMENT

Intended Audience

The Standards document is intended for use by experienced practitioners in Ecological Footprint assessment and communication. It does not provide extensive, introductory material on analysis or communication.

Format

The Standards are divided into five sections, each containing sets of requirements that are mandatory for Standards-compliance and Guidelines that represent suggested best-practices. Section 1 includes analytical Standards that apply to all Reports that include novel calculations of Ecological Footprint data. Sections 2, 3, and 4 include additional analytical Standards applying only to Reports that include Ecological Footprint calculations for sub-national populations, products, or organizations, respectively. Section 5 includes communication Standards that apply to all Reports.

Supporting Information

Further guidance and explanatory material can be found in Appendix A. A list of allowable non-conventional elements for Footprint analysis can be found in Appendix B. Additional information on Ecological Footprint assessment and philosophy can be found in the references at the end of this document and in the associated guidance notes to be found at www.footprintnetwork.org.

All important terms and phrases used in this Standards document are defined in Global Footprint Network's Glossary, available at www.footprintstandards.org.

IMPORTANT CHANGES SINCE THE 2006 EDITION

The *Ecological Footprint Standards 2009* includes a number of substantial revisions to the previous 2006 Edition. Five of the most important updates are noted here:

First, new Standards are now provided to address Ecological Footprint assessments for products and organizations (Sections III and IV).

Second, the sub-national population Standards (Section II) have been updated to more explicitly incorporate guidance on the use of input-output analysis in Ecological Footprint accounting.

Third, an Appendix has been included to provide additional clarification on individual Standards, guidance on boundary setting for organizational Footprints, and general communication principles.

Fourth, a Standard has been explicitly added to address the appropriate use of units in product Footprint analysis (Pr-1). A discussion of appropriate units in Ecological Footprint accounting is provided briefly below and in more detail in Appendix A.

Fifth, the Standards have expanded to allow for the use of non-conventional elements in Ecological Footprint analysis (A-3). The intent of this revision is to encourage innovation from the research community while maintaining a single set of commonly accepted practices.

In summary, the Ecological Footprint is a measure of consumption which is correctly understood as an amount of biological service consumed per unit time. As an analogy, a productive land base can be thought of as a capital stock (i.e., a bank account), biocapacity measures the revenue stream produced by that capital

(i.e., interest received per month) and the Ecological Footprint represents continuous use of the revenue stream and/or capital stock (i.e., payments per month).

These revenue or payment streams, representing biocapacity and Ecological Footprint, are assigned the units of global hectares. Global hectares thus are the appropriate unit to represent the Ecological Footprint of populations and organizations, which are entities that make a continuous stream of "withdrawals" from the biosphere. Products, however, are correctly understood as a one-time expense that embodies the biological services of a certain number of global hectares for a specified period of time. Product Footprints are thus calculated as the product of a flow of biological services (measured in global hectares) and an amount of time, leading to the appropriate unit for a product Footprint of global hectare * years.

ABBREVIATIONS

CLUM	Consumption Land Use Matrix (which displays table that shows a person's Ecological Footprint by land use type as well as by consumption category)
EEIO-LCA	Environmentally Extended Input-Output Life Cycle Assessment
IO	Input-Output
LCA	Life Cycle Assessment
P-LCA	Process-Based Life Cycle Assessment

I. General Analytical Standards

Standards A1-A5 apply to all Reports presenting Ecological Footprint calculations.

Standard A1: National Footprint Accounts Edition Year

A1.1   The National Footprint Accounts edition referenced in any Report (or used in any analysis included in a Report) is no more than two years old at the time of the Report's publication (e.g., a report released in 2008 must use data no older than the National Footprint Accounts 2006 Edition). It is permissible to use data from a historical year as calculated using the latest edition (e.g., data for the year 1980 as calculated in the National Footprint Accounts 2008 Edition).

Standard A2: Consistency with National Footprint Accounts

Unless allowed under Standard A3, a Standards-compliant study will use conventional practices consistent with the National Footprint Accounts.

A2.1   The Report expresses Footprint results using global hectares (or global acres) as calculated using equivalence and yield factors consistent with the National Footprint Accounts.

A2.2   Land use types used in the Report are consistent with the National Footprint Accounts, both for Footprint and biocapacity.*

A2.3   The assessment calculates the Footprint of carbon dioxide emissions (e.g., converts tonnes of carbon dioxide into global hectares) using the same methods as the National Footprint Accounts.

A2.4   The source data for a sub-national population, product, or organizational Footprint assessment must be consistent with the National Footprint Accounts. This includes the national Footprint of production, imports, exports, and consumption and the biocapacity for each land use type.

Standard A3: Use of Non-Conventional Elements in Footprint Analysis

The inclusion of an analysis that uses a non-conventional practice (methodology or data set) will not automatically disqualify a Report from Standards certification provided that the Report also includes a version of the analysis with the conventional methodology or data set.*

The inclusion of non-conventional elements are encouraged where they enhance or extend the methodology or adjust the conventional methodology or data to better meet policy or application requirements or help address research questions aligned with the goal of the Footprint methodology.

Examples of this include:

- Substitution of local and/or more recent data to better align the results with national statistical sources;

- Adjustments to the National Footprint Accounts to reflect production, trade, or consumption not currently captured by the Accounts--for example, allocation of international tourism to country of origin;

- The use of an alternative calculation method for a component of the Ecological Footprint--for example, biomass-substitution for carbon Footprint calculations; and

- The use of an alternative calculation method that fundamentally changes the Footprint of consumption--for example, multi-regional input-output analysis to approximate physical trade flows.

In order for a report with a non-conventional element to be Standards-compliant the non-conventional element must be accepted as 'allowable' by a Working Group of Committee Members (a comprehensive list of allowable non-conventional elements is maintained in Appendix B). The intent is not to unreasonably constrain the inclusion of non-conventional elements subject to compliance with conditions A3.1-A3.4. Researchers are encouraged to submit qualifying non-conventional elements for consideration in future National Footprint Accounts.

A3.1   The Report explicitly identifies any non-conventional practices used in analysis.

A3.2   The Report provides or references documentation of the calculation method used for non-conventional practices.

A3.3   The Report presents the results of analysis with and without non-conventional practices, so that a more direct comparison of conventional results to other conventional studies can be made.

A3.4   Non-conventional elements that are not relevant to the Footprint methodology research questions are not allowable. An example would be non-conventional

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elements which seek to incorporate measurements such as noise or happiness.

Standard A4: Appropriate Units

An Ecological Footprint reported in global hectares measures the demand for a continuous flow of biological services. Products, which are stocks, represent a flow of biological services over a finite period of time.

Further explanation of appropriate units in Ecological Footprint accounting is provided in the Introduction and Appendix A.

A4.1   The Report expresses the Footprint of populations and organizations in units of global hectares.

A4.2   The Report expresses the Footprint of products in units of global hectare years, not global hectares.

Standard A5: Error Estimates

Guidelines:

A5.g1   Final results of Ecological Footprint calculations should be presented with an estimated error margin.

A5.g2   An estimate of the following types of uncertainty should be given separately:

- Input parameters (e.g., uncertainty inherent in data gathered from other sources)

- Proportionality assumptions (e.g., uncertainty associated with the assumption that changes in one type of data reflects changes in another, such as assuming that monetary flow through the economy represents flows of physical goods)

- Category errors (e.g., the assumption that the properties associated with a group of items apply equally to all of the individual items)

- Incomplete or partial coverage

A5.g3   For each major error type, the Report indicates whether the error is believed to be random or to produce a systematic bias in the final results. The direction of known probable biases should be indicated.

A5.g4   A description of how the error estimates were derived is included.

II.   Sub-National Populations

Standards P1-P6 apply to Reports presenting an analysis of the Ecological Footprint of sub-national populations. Common examples of sub-national populations include regions, states, provinces, prefectures, cities, socio-economic groups, households, and individuals. More precisely, an Ecological Footprint of a person is the Ecological Footprint of all the activities associated with providing for the final consumption by that person, whether the consumption is paid for by households, government, or business investments. The business investments refer to the apportioned fraction of resources used through Gross Fixed Capital expenditures by businesses stemming from investments in the production chain of that person's consumed products and services.

Standard P1: Top-Down Methodology

Historically, two methods have been used to construct sub-national population Ecological Footprints. Early "bottom-up" (or "component") methods counted the Ecological Footprint of all of the individual products consumed by the sub-national population and summed these together. Such analyses were detailed and flexible, but suffered from widespread under-counting (as not all activities and products could practically be measured or included), double-counting (as it was difficult to ensure that the boundaries of the Ecological Footprints of the individual products did not overlap), and miscounting (the exact Footprint intensity of each item would need to be known to produce a reliable assessment).

Later "top-down" (or "compound") approaches began with Ecological Footprint data calculated at the national level, in the National Footprint Accounts and derive sub-national Footprints based on apportioning the total national Footprint between sub-national populations. Only "top-down" sub-national Ecological Footprint analyses are Standards-compliant. Modified top-down approaches that apply unique local or regional data along with National Footprint Accounts data are permitted under the requirements of Standard A3.3.

P1.1   The study calculates sub-national Footprints through a "top-down" approach that apportions data from the National Footprint Accounts to sub-national populations. Sub-national population Footprints may not be calculated by summing the Footprints of the individual products that the sub-national population consumes.

A scenario calculation in which a "top-down" sub-national Footprint is calculated as a baseline and then modified by adding or subtracting additional products, however, is permitted.

Standard P2: CLUM Structure and Format

Many methods for calculating sub-national Footprints employ a consumption land use matrix (CLUM) as part of the analysis. CLUMs are tables populated with per-capita Ecological Footprint values, showing consumption categories (e.g., food, housing) as rows and Ecological Footprint land use types (e.g., cropland, forest) as columns. CLUMs may be created and displayed at the national or the sub-national level.

CLUMs may be constructed using process-based or input-output methods. Both methods are Standards compliant, as are hybrid methodologies combining the two.

This Standard applies only to those Reports in which a CLUM is used or displayed.

P2.1   The CLUM contains non-overlapping and clearly defined consumption categories and a list of the detailed sub-components that are aggregated into any overarching consumption categories is provided.

P2.2   The individual consumption categories are defined and displayed in such a way that they can be aggregated, if desired, into five major consumption categories: Food, Housing, Mobility, Goods, and Services. It is not necessary that the Report itself provide this aggregation.

P2.3   The CLUM displays Ecological Footprint in per-capita values.

P2.4   If the CLUM is at the national level, the sum of per-capita Footprint values across all rows (e.g., consumption categories) and all columns (e.g., land use types) equals the National Footprint Accounts national results for Footprint.

Guidelines:

P2.g1   It is strongly encouraged that CLUMs use internationally standardized lists of consumption categories, such as the United Nations COICOP categorization.

Standard P3: Construction of a Process-Based National CLUM

Process-based CLUMs are constructed by gathering data from various sources to determine what percentage of the national per-capita Footprint of each land use type is associated with each consumption category. In general, process-based CLUMs are flexible and can take advantage of specific, detailed data sets, but because of their flexibility they generally cannot be constructed in a systematic and replicable manner.

This Standard applies only to those Reports that display the results of a sub-national population analysis in which a process-based national CLUM is used. Hybrid CLUMs created from both process-based and input-output methods must also comply with this Standard.

P3.1   Per-capita Ecological Footprint data at the national level must be drawn from the National Footprint Accounts.

P3.2   All data sources used to distribute the per-capita Footprint of each land use type amongst consumption categories must be referenced.

P3.2   Any proxy assumptions (e.g., using one data set, such as a percentage of meat served in restaurants, to provide a breakdown for a second related data set, such as the percentage of vegetable food served in restaurants) must be clearly documented and explained.

Standard P4: Construction of an Input-Output-Based National CLUM (and Hybrids)

Input-output-based CLUMs are constructed by extending a physical or monetary input-output table with Ecological Footprint data to obtain a breakdown of the Ecological Footprint associated with the output of each economic sector. A relationship between a household's consumption and purchases from various sectors is used to calculate the Ecological Footprint of each consumption category. This process is repeated for each land use type to obtain a national CLUM.

This Standard applies only to those Reports that display the results of a sub-national population analysis in which an input-output-based national CLUM is used. Hybrid CLUMs created from both process-based and input-output methods must also comply with this Standard.

P4.1   The Ecological Footprint data used to extend a national input-output table, such as the national total Footprint of production for each land use type, must be drawn from the National Footprint Accounts.

P4.2   Sources and data years for the national input-output table and the correspondence table linking sectoral output to household consumption must be referenced.

P4.3   The Ecological Footprint of final consumption should be presented separately for Households, Government, and Gross Fixed Capital. If Gross Fixed Capital is internalized within the input-output table, or if Gross Fixed Capital is internalized as part of the analysis, the method for internalization must be documented.

Standard P5: Scaling National CLUMs to Sub-National CLUMs

Many Reports calculate a sub-national population Footprint by scaling a national CLUM to create a sub-national CLUM based on differences in per-capita average consumption between residents of the nation and residents of the sub-national region.

This Standard applies only to those Reports that display the results of a sub-national population analysis in which national CLUMs are scaled to create sub-national CLUMs.

P5.1   Scaling values are calculated such that if sub-national CLUMs were created for all non-overlapping sub-national populations, the sum of all sub-national population results would equal the National Footprint Accounts national result for Footprint.

Guideline:

P5.g1   Scaling values may be based on physical or monetary data. The use of physical data is strongly encouraged for consumption categories that contain products for which the Footprint per-unit price varies substantially, such as housing or electricity.

Standard P6: Non-CLUM Input-Output-Based Sub-National Calculations

Sub-national population Footprints may also be calculated through the use of linked national and sub-national input-output tables without the use of a CLUM.

This Standard applies only to those Reports that display the results of a sub-national population analysis that does not use or display CLUMs.

P6.1   The Ecological Footprint data used to extend a national input-output table, such as the national total Ecological Footprint of Production for each land use type, must be drawn from the National Footprint Accounts.

P6.2   Sources and data years for the national input-output table and the correspondence table linking sectoral output to household consumption must be referenced.

P6.3   The Ecological Footprint of final consumption should be presented separately for Households, Government, and Gross Fixed Capital. If Gross Fixed Capital is internalized within the input-output table, or if Gross Fixed Capital is internalized as part of the analysis, the method for internalization must be documented.

Guideline:

P6.g1   It is suggested that Reports that do not use a CLUM
         for sub-national Footprint analysis still create and
         display a CLUM for pedagogical purposes.

III.   Products

Standards Pr1-Pr3 apply to Reports presenting an analysis of the Ecological Footprint of products.

The Ecological Footprint of a final product is defined as the sum of the Footprint of all of the activities required to create, use and/ or dispose of that product. The Ecological Footprint can also be calculated for an intermediate product, which would include the activities up to a point in the value chain of the intermediate product. However, if the Ecological Footprint is calculated for an intermediate product, it would have to be declared as such (e.g., "the Ecological Footprint of rubber pellets").

Since the production and use cycles of products are typically intricate and long, any assessment will be a simplified representation of these cycles. Therefore, any assessment needs to include a definition of the "life cycle" that is being considered for the product, including a list of the activities associated with this life cycle. For example, the Footprint of a product up to the point of purchase would at least include all activities required to extract the raw materials for the product, manufacture the product, and ship the product to the point of purchase.

There are two widely used approaches to calculating the Ecological Footprint of a complex finished product: process-based life-cycle assessment (P-LCA) and environmentally extended input-output life-cycle assessment (EEIO-LCA). P-LCA has the advantage of detail, as individual product types and even brands can be analyzed, with the general disadvantage of lacking complete upstream coverage of the production chain (e.g., truncation error). EEIO-LCA has the advantage of full upstream coverage but the disadvantage of generality, as input-output tables typically do not disaggregate down to the level of individual product types (e.g., homogeneity assumption).

Both P-LCA and EEIO-LCA product analyses are Standards -compliant, as are hybrid methods combining the two.

Standard Pr1: LCA Boundaries

In the context of these Standards, a product's "life cycle" may refer to the entire life cycle of a product, from creation to disposal, or it may refer to only a subset of the product's life cycle (e.g., only from creation to purchase). All definitions of a product "life cycle" are permitted so long as they are clearly declared in the Report.

Pr1.1   The Report clearly states the boundaries of all of the activities (e.g., the boundaries of the product "life cycle") that are included in the product's Footprint analysis.*

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* indicates that further explanation can be found in **APPENDIX A: Explanatory Notes to Selected Standards**

Standard Pr2: Process-LCA Product Footprints

This Standard applies to Reports that display P-LCA Ecological Footprint results as well as hybrid analyses that incorporate P-LCA data.

Pr2.1   If the analysis uses P-LCA data from an outside source to disaggregate a finished product into its primary product equivalents, the source of the P-LCA data must be referenced.*

Pr2.2   If the analysis includes a novel calculation of P-LCA data that disaggregates a finished product into its primary product equivalents, it must comply with the ISO LCA Standards 14040 and 14044.

Pr2.3   The primary product equivalents embodied in a finished product must be translated into Ecological Footprint values (e.g., global hectares) using primary conversion factors drawn from the National Footprint Accounts. In the event that no relevant primary conversion factor is available for a primary product, an original primary conversion factor may be calculated and is treated as a non-conventional element (Standard A3).

Pr2.4   The Report must discuss the truncation errors and potential for double counting common in P-LCA, their likely effects on final results of the analysis, including the direction of any biases and any efforts the analysis took to mitigate these errors.

Standard Pr3: Extended Input-Output-LCA Product Footprints

This Standard applies to Reports that display EEIO-LCA Ecological Footprint results as well as hybrid analyses that incorporate EEIO-LCA data.

Pr3.1   The Ecological Footprint data used to extend a national input-output table, normally at least the national total Ecological Footprint of production for each land use type, must be drawn from the National Footprint Accounts.

Pr3.2   Sources and data years for the national input-output table must be referenced.

Pr3.3   The Report must discuss the aggregation assumptions common in EEIO-LCA for individual products, their likely effects on final results of the analysis including the direction of any biases, and any efforts the analysis took to mitigate these errors.

IV.   Organizations

Standard O1 applies to Reports presenting Ecological Footprint analyses for organizations.

The Ecological Footprint measures the demand for biological services that is associated with specific human activities. Defining the Ecological Footprint of an entity requires specifying the activities that are associated with that entity. For example, the Ecological Footprint of a country includes the productive area demanded to provide the food, housing, mobility, goods, and services demanded by all people within the sovereign borders of that nation. More broadly, the Ecological Footprints of individual people and populations are widely understood to be uniquely defined as all of the activities that demand biological services associated with the behavior of those people.

Products and organizations, however, do not have a single widely agreed upon set of associated activities. The set of activities associated with a product Footprint is determined by the scope of the LCA used to determine that product Footprint. Organizational Footprints may be defined in many different ways (see Appendix A).

From an analytical perspective, the Ecological Footprint of an organization, regardless of scope, is conducted in a "bottom-up" manner based on a combination of individual product Footprints, selected according to the scope of the organizational study. Complying with the Organizational Footprint Standards thus also requires compliance with the Product Footprint Standards.

Standard O1: Defining the Scope of an Organizational Footprint

From a resource accounting perspective, there is no single way of defining an "organization." Any Ecological Footprint study for an organization must carefully and explicitly define the scope of the analysis (e.g., which activities are defined as associated with the organization and included in its Footprint).

O1.1   The Report does not state or imply that there is only one single way to define an organizational Footprint.

O1.2   The Report clearly defines the specific activities included of the organization (e.g., consumption of all office products as recorded as purchases by the finance office, the direct use of built-up land and emissions of fossil carbon associated with the organization's factories and fuel use, the end consumer use of the organization's products, etc.). The report describes, in method-independent terms, what activities are included in the analysis.*

O1.3   If there is a difference between the ideal list of activities that would be included (e.g., the Footprint of all products purchased in the past year) and the activities actually included in the analysis (e.g., the analysis only considers food and electricity), both lists are provided and the difference(s) between the two is clearly reported.

O1.4   The study clearly indicates whether the analysis (i) calculates a mutually-exclusive Footprint of the organization that can thus be summed with other organizations (e.g., if applied to all organizations, the sum of organizational Footprints under the method sum to the global total Footprint of consumption), or (ii) calculates an organizational Footprint that overlaps with other organizations and/or end consumers. In the case of mutually-exclusive allocation, the allocation principle must be clearly documented.

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* indicates that further explanation can be found in **APPENDIX A: Explanatory Notes to Selected Standards**

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V.   General Communication Standards

Standards C1-C8 apply to all Reports. In addition to the Standards found here, communication style suggestions can be found in Appendix A.

Standard C1: Glossary, Definitions, and Versions

C1.1   The Report references or includes a glossary or in-text definition for key terms.*

C1.2   The terms Ecological Footprint, biocapacity, and global hectares must be defined within the Report text.

C1.3   The glossary and definitions are consistent with the Global Footprint Network glossary available on the Standards Web site (www.footprintstandards.org)

Standard C2: Explanation of Link Between Sustainability and the Footprint

C2.1   The Report does not state or imply that the Footprint is a complete measure of sustainability.

C2.2   The Report explicitly states that the Ecological Footprint should be complemented by other measures to achieve a full picture of sustainability.

C2.3   The Report explicitly mentions the research question the Ecological Footprint addresses. For example the Report could say: The Ecological Footprint measures the demand of activities on the planet's biocapacity, or elaborate more on this statement.

Guidelines:

C2.g1   The Report explains that while Footprint analysis measures biocapacity, it does not itself determine how much biocapacity should be made available to meet human demand versus set aside for other species.

C2.g2   The Report makes clear that the Footprint is not a score card, but an accounting procedure, based on a clear research question. In contrast, a score card is a subjective collection of indicators with an assigned weighting to calculate a final score.

C2.g3   The Report declares that the Footprint measures a limited set of "environmental impacts": It focuses on biocapacity, not human health, landscape aesthetics, or risk.

Standard C3:   Separation of Analytical Footprint Results from Normative or Values-Based Interpretations

C3.1   The Report explicitly states that Ecological Footprint data, including the comparison of per-capita Ecological Footprint to globally or locally available biocapacity, does not prescribe any appropriate level of allocation of Ecological Footprint between individuals or activities.

C3.2   The Report makes clear that the Footprint is an ecological accounting tool and, as such, may inform choices but by itself neither advocates nor promotes any particular strategy, policy, or solution.

Specifically, any discussion that implies rights to, or limits on rights to, a given per-capita Footprint (e.g., phrases such as Fair share, Fair Earthshare, equitably allocating, etc.) is kept clearly distinct from the analysis and is not presented as a necessary conclusion of the methodology. Descriptive statements comparing per-capita demand to per-capita capacity do not violate this requirement, nor do any statements clearly identified as the opinion of the Report's authors. The discussion of rights or limits on rights that are codified in law does not violate this requirement.

Standard C4: Footprint Study Limitations

C4.1   The Report includes a statement of the limitations of any novel analysis presented in the Report and of the Ecological Footprint in general.*

C4.2   The Report discusses the factors affecting the accuracy and precision of the results and notes the direction of any likely biases.

C4.3   The Report displays results with a level of significant digits in line with the level of accuracy of the analysis. If more digits are published, it is stated in the Report that the number of digits do not suggest a level of accuracy but are displayed for identification purposes only.

Guideline:

C4.g1   The Report specifically acknowledges that the Footprint does not directly address the following sustainability-related topics:

- Depletion of non-renewable resources, such as metal, mineral, or fossil fuel reserves;

- The release of long-lived toxic materials into the biosphere;

- Greenhouse gases other than carbon dioxide (may be included in future editions, or added as non-conventional elements);

- Impacts on human health; and

- Other aspects of sustainability, including social health, economic performance, or cultural vitality.

Standard C5: Footprint Scenarios

C5.1   The Report explains that Footprint and biocapacity accounts measure historical demand and supply, respectively, and cannot themselves predict future biocapacity and consumption.

C5.2   If any forward-looking scenarios or projections of future Ecological Footprints are included, the Report clearly distinguishes between Ecological Footprint accounting results which document past or present conditions and scenarios in the study that evaluate potential future conditions. Ecological Footprint and biocapacity outcomes based upon predicted data.

C5.3   The Report explains that Ecological Footprint accounts per se do not generate scenarios, but only translate into corresponding Footprint and biocapacity outcomes.

Standard C6: Comparison of Different Ecological Footprint Reports

The Ecological Footprint calculations of two sub-national regions, products, or organizations may be directly compared so long as the data sources, underlying assumptions and calculation methods are comparable. The analytical Standards in this document do not require all Reports and analyses to follow a single set of data sources beyond the National Footprint Accounts, assumptions, or methods and thus cannot themselves guarantee that any two Reports will produce comparable results.

This Standard applies only to those Reports that compare the Footprint of sub-national populations, products, or organizations.

C6.1   The Report clearly states whether or not the compared sub-national Footprint results were calculated using comparable data sets, assumptions, and methods. The details of the data sets, assumptions, and methods used for each calculation are provided or referenced.

C6.2   The Report describes, to the extent possible, any

substantial differences between the analyses and the directions of any known biases in either analysis that, if corrected, would make the results more comparable.

Standard C7: Citation of Sources and Description of Methods

C7.1   The Report references the National Footprint Accounts edition, version, and data year used in the analysis.

C7.2   The Report contains references to appropriate National Footprint Accounts reference papers, including but not limited to the most current version of the methodology paper available at www.footprintstandards.org.

C7.3   The Report appropriately references other relevant work that is used to support the analysis and conclusions.

Standard C8: Reference to Standards and Certifying Bodies

C8.1   The Report references the *Ecological Footprint Standards 2009*.

APPENDIX A

i.   Explanatory Notes to Selected Standards

A2.2   *Land use types used in the Report are consistent with the National Footprint Accounts, both for Footprint and biocapacity.*

For biocapacity, the major land use types are cropland, grazing land, forest land, fishing grounds, and built-up land.

For Ecological Footprint, the corresponding components are the cropland Footprint, grazing land Footprint, forest land Footprint, fishing grounds Footprint, carbon Footprint, and built-up land Footprint.

A3   *Use of Non-Conventional Elements in Footprint Practices*

An "analysis with the conventional methodology or data set" refers to the methodology described in the *Calculation Methodology for the National Footprint Accounts, 2008 Edition* and the National Footprint Accounts, 2008 Edition.

Pr1.1   *The Report expresses the Footprint of products in units of global hectare years, not global hectares.*

The need to use global hectare years can be seen through simple dimensional analysis using Ecological Footprint equations:

$$EFproduct = (\, Quantity \, / \, Yield \,) * Yield \, Factor * Equivalence \, Factor$$

In units of

$$[gha * yr] = (\, [tonnes] \, / \, [tonnes \, ha^{-1} \, year^{-1}] \,) * [wha \, ha^{-1}] * [gha \, wha^{-1}]$$

This differs from the Ecological Footprint of a population or an organization (both entities that consume a certain flow of products), in which the quantity is expressed in units of [tonnes yr^{-1}] and the Ecological Footprint is correctly expressed in [gha]. [gha] stands for global hectare; [yr] for year; [ha] for hectare; and [wha] for world average hectare of a given land use type.

Pr2.1   *The Report clearly states the boundaries of all of the activities (e.g., the boundaries of the product "life cycle") that are included in the product's Footprint analysis.*

Most product Footprint analyses define the "life cycle" boundaries, e.g., the activities that are allocated to the product, as activities required to create the product

up to the point of purchase. Other possibilities include (i) purchase plus disposal, (ii) purchase plus the Footprint of consumer activities that use the product (e.g., the Footprint of creating a car plus the gas the average consumer purchases for it), or (iii) the Footprint of the societal infrastructure created as a result of consumers using the products (e.g., including the Footprint of road construction in the Footprint of a car).

See section below titled "Notes on Setting Appropriate Boundaries" for further discussion.

O1.2   *The Report clearly defines the boundaries according to the specific consumption activities and/or product Footprints included within the boundaries of the organization (e.g., all of the product purchasing as recorded by the finance office, the direct use of built-up land and emissions of fossil carbon associated with the organization's factories and fuel use, the end consumer Footprint associated with the use of the organization's products, etc.). The Report describes, in method-independent terms, what activities are included in the analysis.*

See section below titled "Notes on Setting Appropriate Boundaries" for further discussion.

C1.1   *The Report references or includes a glossary or in-text definitions for key terms.*

The official glossary can be found at: www.footprintstandards.org.

C4.1   *The Report includes a statement of the limitations of any analysis presented in the Report and of the Ecological Footprint in general.*

A lengthy discussion of many of these limitations and current efforts to address them can be found in:

Kitzes, J., Galli, A., Bagliani, M., Barrett, J., Dige, G., Ede, S., Erb, K-H., Giljum, S., Haberl, H., Hails, C., Jungwirth, S., Lenzen, M., Lewis, K., Loh, J., Marchettini, N., Messinger, H., Milne, K., Moles, R., Monfreda, C., Moran, D., Nakano, K., Pyhälä, A., Rees, W., Simmons, C., Wackernagel, M., Wada, Y., Walsh, C.,Wiedmann, T., in press. A research agenda for improving national ecological footprint accounts. Ecological Economics. doi:10.1016/j.ecolecon.2008.06.022.

ii.   Notes on Setting Appropriate Boundaries

Arguably the most difficult and important step in conducting an organizational Footprint is defining the purpose of an organizational Footprint analysis and the appropriate set of activities to be included. There is no single, correct perspective to take on an organization, as the diagram below illustrates for a hypothetical automobile manufacturer.
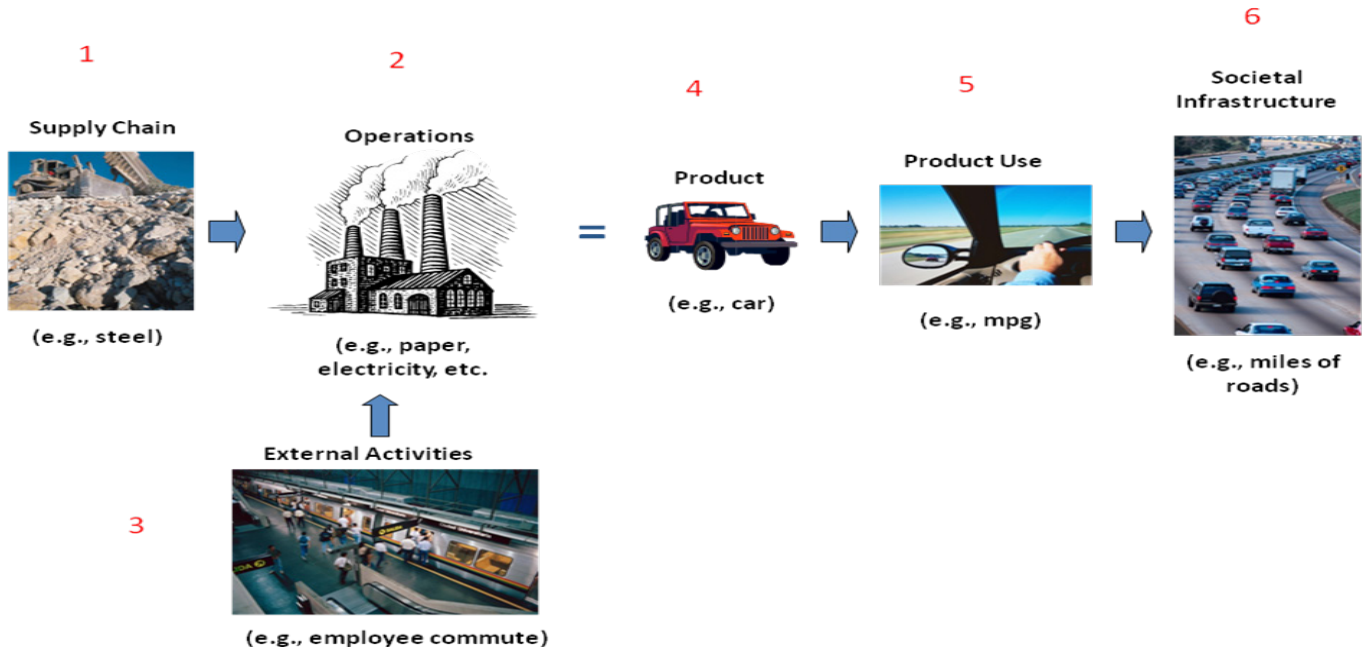
There are many purposes and scopes for which Ecological Footprints may be carried out for an organization. Each can provide useful information for the organization and may help it answer one or more specific questions relating to its environmental performance.

Some examples of purposes and scopes for which Ecological Footprints may be carried out for an organization include:

1.   Scope - The Supply Chain, or the Ecological Footprint of all materials used as inputs into the organizations production processes.
Purpose - To indicate the vulnerability of suppliers, and the raw material inputs into the organization's products, to resource scarcity. Will the organization be able to secure access to resources in the future? What might they do to switch to "lower risk" input streams?

2.   Scope - Operations, or the Ecological Footprint of all of the products and materials that are consumed within an organization's factories, offices, and other holdings to keep the organization "running".
Purpose: Same questions as The Supply Chain but focused on internal operations. To identify the organization's

opportunities to improve ecological efficiency and cut down on waste?

3.   Scope - External Activities, or the supporting consumption indirectly required for the organization to do business.

Purpose: To determine how much Ecological Footprint must the organization's employees take on to commute to work? Will the consumption that employees must take on in their own lives in order to work for the organization be sustainable for them?

4.   Scope - Product, or the total Ecological Footprint required for an organization to deliver a final product to their clients (this is the sum of items 1, 2 and optionally 3, if all products are analyzed).
Purpose: All purposes listed above, plus: to determine how the Ecological Footprint of an organization's product compares to that of its competitors. Is the organization at risk of negative publicity? How big is the market for a product considering global resource constraints? What does this mean for the organization's long-term market share? Which of the organization's markets are at risk? Where are the new opportunities? What does this mean for the organization's innovation, branding and business strategy?

5.   Scope - Product Use, or the additional Ecological Footprint that an organization's clients are

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required to take on as they use its product.
Purpose: To identify if an organization's product requires its clients to take on large additional Ecological Footprints. Will this always be easy or affordable for them? If they are pressured or forced to shrink their personal consumption, will the product be the one that's cut because it's too costly to use?

6.   <u>Scope - Societal Infrastructure</u>, or the Ecological Footprint that society creates at a large scale because of the popularity of an organization's product.
Purpose: To identify whether the very existence of the product that an organization produces could lead society into supporting unsustainable consumption for all its citizens. Would an organization's business be safer in the long term if it could provide a product or service that helped prevent ecological overshoot rather than causing it? Would there be a growing demand for this?

Of the examples given above, Set 2 is perhaps the most widely used. It is also the form most closely linked to organizational studies using other indicators (i.e., how carbon emissions are typically reported). Greenhouse Gas Protocol Scopes 1, 2 and 3 all loosely fall into this set.

Set 4 is a common definition of the Ecological Footprint of a product, as it follows most closely the common boundaries and principles of life-cycle assessment up until the point of purchase. Most commonly, Set 4 is calculated only as a sum of Sets 1 and 2 (with 3 only occasionally included).

Set 5 offers perhaps the most interest for expanding the scope of an Ecological Footprint analysis, as it is one that is rarely considered in traditional organizational analysis, but one that many clients agree is important once they are exposed to it.

As noted above, none of these scopes and/or purposes are "right" and none are "wrong". Analysts should first work closely with clients to determine what types of questions are important to the organization and structure the analysis according to the client's needs.

iii. Additional Voluntary Communication Principles

1. Avoid Acronyms. For example: Rather than EF, say Ecological Footprint; rather than GFN, say Global Fooprint Network or Footprint Network.
2. Choose descriptive, accessible names and labels: for example, when explaining Footprint components and sub-components, use names that are not ambiguous (for example, do not use "waste" as a category, but rather "waste management" or "disposable goods" or whatever is actually meant by the sub-component).
3. Keep things as simple and accessible as possible.
4. Avoid preachy, moralistic or judgmental tones: Be as descriptive as possible. Identify what is analysis and what is interpretation. Avoid unnecessary adjectives. Avoid terms such as "responsible" or "responsibility" (particularly if there is no legal context or code). Rather say, "can be attributed to" or "is associated with". It reduces credibility to be judgmental or heavy-handed, and moralistic.
5. Consider as main message: not "reduce your Footprint" but "secure your well-being and therefore safeguard ecological assets." Once readers recognize the importance of safeguarding ecological assets, they will choose/conclude themselves to reduce their Footprint. This is more powerful, lasting, respectful and empowering than telling them to reduce their Footprint.
6. Be clear about questions that are being answered. When offering results and answers, make sure there is clarity about what question is being answered. For instance, we need to make clear that Footprint is not a thing in itself but is shorthand for a particular research question, which is: How much of the biosphere do given activities occupy? Footprint is just one method for answering that question.
7. Use standard texts where possible. Avoid re-writes, use as much standard text as possible to increase consistency. This also saves on re-editing. Check www.footprintstandards.org for standard texts you can use in reports.
8. Be inviting: Make sure reader recognize that you are on his/her side and want to make their life better—"we are all in this together." Avoid criticism or blame. Emphasize the seriousness of the problem, but maintain a positive and empowering tone.
9. Avoid "should," "ought to," etc. Focus instead on clear results yielded by the method and let them speak for themselves. Generally choose language that has a positive rather than preachy tone. Be inviting.

APPENDIX B

i.   Allowable Non-Conventional Elements

A3.1   *The Report explicitly identifies any non-conventional elements used in analysis.*

Non-conventional elements include:

- Substitution of local and/or more recent data to better align the results with national statistical sources;

- Adjustments to the National Footprint Accounts to reflect production, trade, or consumption not currently captured by the Accounts; approved examples include:

  - Allocation of international tourism to country of origin;

  - Procurement of international services; and

  - Inclusion of greenhouse gases other than carbon dioxide (expressed in carbon dioxide equivalents).

- The use of an alternative calculation method for a component of the Ecological Footprint; approved examples include:

  - Biomass-substitution for carbon Footprint calculations.

- The use of an alternative calculation method that fundamentally changes the Footprint of consumption; approved examples include:

  - Use of multi-regional input-output analysis to approximate physical trade flows; and

  - Use of a local or physical hectare unit in addition to global hectares.