Nature is the basis of our well-being and our prosperity. Biodiversity has declined globally by around 30 per cent between 1970 and 2008; by 60 per cent in the tropics. Demand on natural resources has doubled since 1966 and we are currently using the equivalent of 1.5 planets to support our activities. High-income countries have a footprint five times greater than that of low-income countries. Areas of high biodiversity provide important ecosystem services such as carbon storage, fuel wood, freshwater flow and marine fish stocks. The loss of biodiversity and related ecosystem services particularly impacts the world’s
Poorest peoples who rely most directly on these services to survive. “Business as usual” projections estimate that we will need the equivalent of two planets by 2030 to meet our annual demands. Natural capital – biodiversity, ecosystems and ecosystem services – must be preserved and, where necessary, restored as the foundation of human economies and societies. WWF’s One Planet Perspective proposes how to manage, govern and share natural capital within the Earth’s ecological limits. We can reduce our footprint by producing more with less, and consuming better, wiser and less.
Women cutting grass, Khata, Nepal.
We are all familiar with the stark array of graphs that detail how we are sapping the Earth’s resources and resilience. This 2012 edition of the Living Planet Report tells us how it all adds up – the cumulative pressure we’re putting on the planet, and the consequent decline in the health of the forests, rivers and oceans that make our lives possible.

We are living as if we have an extra planet at our disposal. We are using 50 per cent more resources than the Earth can provide, and unless we change course that number will grow very fast – by 2030, even two planets will not be enough.

But we do have a choice. We can create a prosperous future that provides food, water and energy for the 9 or perhaps 10 billion people who will be sharing the planet in 2050.

We can produce the food we need. Solutions lie in such areas as reducing waste; using better seeds and better cultivation techniques; bringing degraded lands back into production; and changing diets – particularly by lowering meat consumption in high income countries.

We can ensure there is enough water for our needs and also conserve the healthy rivers, lakes and wetlands from which it comes. Smarter irrigation techniques and better resource planning, for example, can help us use water more efficiently.

We can meet all of our energy needs from sources like wind and sunlight that are clean and abundant. The first imperative is to get much more out of the energy we use – increasing the efficiency of our buildings, cars and factories can cut our total energy use in half.

These solutions, and others articulated within this edition of the Living Planet Report, show that we all need to play a role in keeping this a living planet – with food, water and energy for all, and the vibrant ecosystems that sustain life on Earth.

Jim Leape
Director General
WWF International
Within the vast immensity of the universe, a thin layer of life encircles a planet. Bound by rock below and space above, millions of diverse species thrive. Together, they form the ecosystems and habitats that we so readily recognize as planet Earth – and which, in turn, supply a multitude of ecosystem services upon which people, and all life, depend.

Ever-growing human demand for resources, however, is putting tremendous pressure on biodiversity. This threatens the continued provision of ecosystem services, which not only further threatens biodiversity, but also our own future security, health and well-being.

At our current rate of consumption, the Earth needs 1.5 years to produce and replenish the natural resources that we consume in a single year. The Living Planet Report 2012 reports an alarming rate of biodiversity loss – in total 28 per cent global reduction between 1970 and 2008. The Living Planet Report highlights that current trends can still be reversed, through making better choices that place the natural world at the centre of economies, business models and lifestyles.

**Living Planet Report 2012**

*This booklet provides a summary of the ninth edition of WWF’s Living Planet Report (LPR) – a biennial publication that documents the “state of the planet”: the changing state of biodiversity, ecosystems and humanity’s demand on natural resources; and explores the implications of these changes for biodiversity and humanity. The full report, and its far more comprehensive treatment of the subject matter, can be downloaded from wwf.panda.org/lpr*
The Living Planet Index reflects changes in the state of the planet’s biodiversity, using trends in the size of 9,014 populations of 2,688 mammal, bird, reptile, amphibian and fish species from different biomes and regions. Changes in abundance across a selection of species can be used as one important indicator of the planet’s ecological condition.

The Living Planet Index continues to show a 28 per cent global decline in biodiversity health since 1970 (Figure 1). The tropical Living Planet Index declined by more than 60 per cent from 1970 to 2008, while the temperate Living Planet Index increased by 31 per cent over the same period (Figure 2). Recent average population increases do not necessarily mean that temperate ecosystems are in better state than tropical ecosystems.

**Figure 1: The Global Living Planet Index**
The index shows a decline of around 30% from 1970 to 2008, based on 9,014 populations of 2,688 species of birds, mammals, amphibians, reptiles and fish. Shading on this, and all Living Planet Index figures represents the 95% confidence limits surrounding the trend; the wider the shading, the more variable the underlying trend (WWF/ZSL, 2012).

**Key**

- Global Living Planet Index

**Figure 2: The Tropical and Temperate Living Planet indices**
The global tropical index shows a decline of around 61% between 1970 and 2008. The global temperate index shows an increase of around 31% over the same period (WWF/ZSL, 2012).

**Key**

- Tropical Living Planet Index
- Temperate Living Planet Index
Figure 2: The Tropical and Temperate Living Planet indices

The global tropical index shows a decline of around 61% between 1970 and 2008. The global temperate index shows an increase of around 31% over the same period (WWF/ZSL, 2012).

Monitoring biodiversity

A wide variety of monitoring techniques are required to gather information on wildlife population trends. The Living Planet Index includes data collected in a wide variety of ways, ranging from counting individuals in a population to camera trapping, to surveys of nesting sites and monitoring animal traces such as footprints.
The Ecological Footprint tracks humanity’s demands on the biosphere by comparing the renewable resources people are consuming against the Earth’s regenerative capacity, or biocapacity: the area of land actually available to produce renewable resources and absorb CO2 emissions.

Both the Ecological Footprint and biocapacity are expressed in a common unit called a global hectare, in which one gha represents a biologically productive hectare with world average productivity.

The Ecological Footprint shows a consistent trend of overconsumption (Figure 3). In 2008, the Earth’s total biocapacity was 12.0 billion gha, or 1.8 gha per person, while humanity’s Ecological Footprint was 18.2 billion gha, or 2.7 gha per person. The amount of forest land needed to sequester carbon emissions, is the largest component of the Ecological Footprint (55 per cent).

This discrepancy means that we are in an ecological overshoot situation: it is taking 1.5 years for the Earth to fully regenerate the renewable resources that people are using in a single year. Instead of living off the interest, we are eating into our natural capital.

If all of humanity lived like an average resident of Indonesia, only two-thirds of the planet’s biocapacity would be used; if everyone lived like an average Argentinean, humanity would demand more than half an additional planet; and if everyone lived like an average resident of the USA, a total of four Earths would be required to regenerate humanity’s annual demand on nature.

**Figure 3: Global Ecological Footprint by component, 1961-2008**

The largest component of the Ecological Footprint is the carbon footprint (55%) (Global Footprint Network, 2011).
THE COMPONENTS OF THE ECOLOGICAL FOOTPRINT

**Cropland**
Represents the amount of cropland used to grow crops for food and fibre for human consumption as well as for animal feed, oil crops and rubber.

**Carbon**
Represents the amount of forest land that could sequester CO2 emissions from the burning of fossil fuels, excluding the fraction absorbed by the oceans which leads to acidification.

**Grazing Land**
Represents the amount of grazing land used to raise livestock for meat, dairy, hide and wool products.

**Forest**
Represents the amount of forest required to supply timber products, pulp and fuel wood.

**Built-up Land**
Represents the amount of land covered by human infrastructure, including transportation, housing, industrial structures and reservoirs for hydropower.

**Fishing Grounds**
Calculated from the estimated primary production required to support the fish and seafood caught, based on catch data for marine and freshwater species.
DIFFERENT COUNTRIES, DIFFERENT FOOTPRINTS

On a global scale, both population and the average per capita footprint have increased since 1961. However, the relative contribution of each to the overall increased Ecological Footprint is different in different regions. The available biocapacity per person nearly halved in the same time (Figure 5).

Since the 1970s, humanity’s annual demand on the natural world has exceeded what the Earth can renew each year. Similar to overdrawing a bank account, eventually the resources will be depleted. At current consumption rates some ecosystems will collapse even before the resource is completely gone.

**Figure 4: Ecological Footprint per country per person**
This comparison includes all countries with populations greater than 1 million for which complete data are available (Global Footprint Network, 2011).

World average Ecological Footprint per person was 2.7 gha in 2008
The consequences of excess greenhouse gases that cannot be absorbed by vegetation are already being seen, with rising levels of atmospheric CO2 causing increased global temperatures, climate change and ocean acidification. These impacts in turn place additional stresses on biodiversity and ecosystems and the very resources on which people depend.

*Figure 5: Ecological Footprint by geographic grouping, 1961 and 2008*

Change in the average footprint per person and population for each of the world’s regions. The area within each bar represents the total footprint for each region (Global Footprint Network, 2011).

**Key**

- **Biocapacity available per person in 1961 (3.2 gha)**
- **Biocapacity available per person in 2008 (1.8 gha)**

<table>
<thead>
<tr>
<th>Region</th>
<th>Ecological Footprint (gha per capita)</th>
<th>Population (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern America</td>
<td>0.5</td>
<td>2000</td>
</tr>
<tr>
<td>EU</td>
<td>0.7</td>
<td>1000</td>
</tr>
<tr>
<td>Other Europe</td>
<td>1.0</td>
<td>2000</td>
</tr>
<tr>
<td>Latin America</td>
<td>1.5</td>
<td>3000</td>
</tr>
<tr>
<td>Middle East/Central Asia</td>
<td>2.0</td>
<td>4000</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>2.5</td>
<td>5000</td>
</tr>
<tr>
<td>Africa</td>
<td>4.0</td>
<td>6000</td>
</tr>
</tbody>
</table>
Some countries with high biocapacity do not have a large national footprint. Bolivia, for example, has a per capita footprint of 2.6 gha and a per capita biocapacity of 18 gha. However it is worth noting that this biocapacity may well be being exported and utilized by other nations. For example, the Ecological Footprint of a citizen of United Arab Emirates (UAE) is 8.4 gha, but within the country there is only 0.6 gha of biocapacity available per person. The residents of UAE are therefore dependent on the resources of other nations to meet their needs. As resources are becoming more constrained, competition is growing; the disparity between resource-rich and resource-poor nations is highly likely to have strong geopolitical implications in the future.

Scramble for land: Food and fuel

Throughout the developing world, external investors are scrambling to secure access to agricultural land for future food production. Since the mid-2000s, it is estimated that an area almost the size of Western Europe has been transferred in land allocation deals. The latest rush for farmland was triggered by the food crisis of 2007-08, but long-term drivers include population growth, increased consumption by a global minority and market demands for food, biofuels, raw materials and timber.

DIFFERENT COUNTRIES, DIFFERENT BIOCAPACITIES

<table>
<thead>
<tr>
<th>Country</th>
<th>Biocapacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>15.4%</td>
</tr>
<tr>
<td>China</td>
<td>9.9%</td>
</tr>
<tr>
<td>United States of America</td>
<td>9.8%</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>7.9%</td>
</tr>
<tr>
<td>India</td>
<td>4.8%</td>
</tr>
<tr>
<td>Canada</td>
<td>4.2%</td>
</tr>
<tr>
<td>Australia</td>
<td>2.6%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.6%</td>
</tr>
<tr>
<td>Argentina</td>
<td>2.4%</td>
</tr>
<tr>
<td>Congo, Democratic Republic of</td>
<td>1.6%</td>
</tr>
<tr>
<td>Rest of the world</td>
<td>38.8%</td>
</tr>
</tbody>
</table>

Figure 6: Top 10 national biocapacities in 2008

Ten countries accounted for over 60 per cent of Earth’s total biocapacity in 2008. This includes five of the six BRIICS countries: Brazil, Russia, India, Indonesia and China (Global Footprint Network, 2011).
The per capita Ecological Footprint of high-income nations dwarfs that of low- and middle-income countries (Figure 7).

The Living Planet Index for high-income countries shows an increase of 7 per cent between 1970 and 2008 (Figure 8). This is likely to be due to a combination of factors, not least of which being that these nations are able to purchase and import resources from lower-income countries.

In stark contrast, the index for low-income countries has declined by 60 per cent. This trend is potentially catastrophic, not just for biodiversity but also for the people living in those countries. While everyone depends ultimately on ecosystem services and natural assets, the world’s poorest people feel the impact of environmental degradation most directly. Without access to land, clean water, adequate food, fuel and materials, vulnerable people cannot break out of the poverty trap and prosper.

**High Income Countries Make Disproportionate Demands**

The index shows a 7% increase in high-income countries, a 31% decline in middle-income countries and a 60% decline in low-income countries between 1970 and 2008 (WWF/ ZSL, 2012).

**Figure 7: Changes in the Ecological Footprint per person in high-, middle- and low-income countries between 1961 and 2008**

The black line represents world average biocapacity in 2008 (Global Footprint Network, 2011).

**Figure 8: Living Planet Index by country income group**

The index shows a 7% increase in high-income countries, a 31% decline in middle-income countries and a 60% decline in low-income countries between 1970 and 2008 (WWF/ ZSL, 2012).
Biodiversity is vital for human health and livelihoods. Living organisms – plants, animals and microorganisms – interact to form complex, interconnected webs of ecosystems and habitats, which in turn supply a myriad of ecosystem services upon which all life depends. Although technology can replace some ecosystem services and buffer against their degradation, many cannot be replaced.

Understanding the interactions between biodiversity, ecosystem services and people is fundamental to reversing the trends outlined in the previous pages and so safeguarding the future security, health and well-being of human societies.

All human activities make use of ecosystem services – but can also put pressure on the biodiversity that supports these systems. In large part, threats stem from human demands for food, water, energy and materials, as well as the need for space for infrastructure. These demands are largely met by a few key sectors: agriculture, forestry, fisheries, mining, industry, water and energy. Ensuring these sectors understand the importance of making sustainability a core pillar of their business is vital, if we hope to set the world back on a trajectory that allows consumption to fall within our planetary boundaries.

The five greatest direct pressures are:

- **The loss, alteration, and fragmentation of habitats** – mainly through conversion of natural land for agricultural, aquacultural, industrial or urban use; damming and other changes to river systems for irrigation or flow regulation.
- **Overexploitation of wild species’ populations** – harvesting of animals and plants for food, materials or medicine at a rate higher than they can reproduce.
- **Pollution** – mainly from excessive pesticide use in agriculture and aquaculture, urban and industrial effluents, mining waste and excessive fertilizer use.
- **Climate change** – due to rising levels of greenhouse gases in the atmosphere, caused mainly by the burning of fossil fuels, forest clearing and industrial processes.
- **Invasive species** – introduced deliberately or inadvertently to one part of the world from another, they then become competitors, predators or parasites of native species.
CAUSAL FACTORS

INDIRECT DRIVERS

DIRECT PRESSURES ON BIODIVERSITY AND ECOSYSTEMS

STATE OF GLOBAL BIODIVERSITY

ECOSYSTEM SERVICES

The benefits that people obtain from ecosystems

- **Provisioning services**
  - food
  - medicine
  - timber
  - fibre
  - bioenergy

- **Regulating services**
  - water filtration
  - waste decomposition
  - climate regulation
  - crop pollination
  - regulation of some human diseases

- **Supporting services**
  - nutrient cycling
  - photosynthesis
  - soil formation

- **Cultural services**
  - enriching
  - recreational
  - aesthetic
  - spiritual
Forests: Important for Carbon Storage and Climate Stabilization

The carbon storage service provided by the world’s forests is vital for climate stabilization. The amount of carbon stored in different forests varies: Tropical forests store the most carbon. Almost half of this above-ground carbon is in the forests of Latin America, with 26 per cent in Asia, and 25 per cent in Africa.

The vast northern boreal conifer and broadleaved forests are also important carbon stores. Temperate forests have been decimated over the centuries, but are now expanding in Europe and the United States, and so are building carbon stores. In some parts of the world, forests grow on peatlands, where there can be more carbon in the soil than in the forest.

Europe and the United States aside, however, the world’s forests are being cleared and degraded through human activities, releasing greenhouse gases, especially CO2, into the atmosphere. Globally, around 13 million ha of forest were lost each year between 2000 and 2010. Deforestation and forest degradation currently account for up to 20 per cent of global anthropogenic CO2 emissions – the third-largest source after coal and oil. This makes forest conservation a vital strategy in global efforts to drastically cut greenhouse gas emissions.
Freshwater ecosystems occupy approximately 1 per cent of the Earth’s surface yet are home to around 10 per cent of all known animal species. By virtue of their position in the landscape, these ecosystems connect terrestrial and coastal marine biomes. Rivers provide services vital to the health and stability of human communities, including fisheries, water for agricultural and domestic use, hydrological flow regulation, navigation and trade, pollution control and detoxification services. But numerous pressures, including land use change, water use, infrastructure development, pollution and global climate change, working individually and collectively, are impinging on the health of rivers and lakes around the world.

The rapid development of water management infrastructure – such as dams, dykes, levees and diversion channels – have left very few large rivers entirely free flowing. Of the approximately 177 rivers greater than 1,000km in length, only around a third remain free flowing and without dams on their main channel. While clearly this infrastructure provides benefits at one level, such as hydropower or irrigation, there is often a hidden cost to aquatic ecosystems and the wider ecosystem services that they provide.

In order to sustain the wealth of natural processes provided by freshwater ecosystems – such as sediment transport and nutrient delivery, which are vital to farmers in floodplains and deltas; migratory connectivity, vital to inland fisheries; and flood storage, vital to downstream cities – it is imperative to appreciate the importance of free flowing rivers, and developing infrastructure with a basin-wide vision.

**Figure 9: Trends in number of global free-flowing rivers greater than 1,000 km in length**

Trends from pre-1900 to the present day and estimated to 2020 (line), in comparison with the number of rivers dammed over time (bars).
Fisherman hanging nets to dry. Papua New Guinea.
The world’s oceans supply fish and other seafood that form a major source of protein for billions of people, and provide seaweed and marine plants used for the manufacture of food, chemicals, energy and construction materials. Marine habitats such as mangroves, coastal marshes and reefs form critical buffers against storms and tsunamis and store significant quantities of carbon. Some of these habitats, especially coral reefs, support important tourism industries. Ocean waves, winds and currents offer considerable potential for creating renewable energy supplies. These services have a huge value: for food production, as a source of income, and preventing loss and damage to property, land, human life and economic activities.

However, the health of oceans is threatened by overexploitation, greenhouse gas emissions and pollution. Over the past 100 years, the use of our oceans and the services they provide has intensified: from fishing and aquaculture to tourism, and from shipping to oil and gas extraction and seabed mining.

The consequences of increased fishing intensity have been dramatic. Between 1950 and 2005, “industrial” fisheries expanded from the coastal waters of the north Atlantic and northwest Pacific southward into the Southern Hemisphere. One-third of the world’s oceans and two-thirds of continental shelves are now exploited by fisheries, with only inaccessible waters in the Arctic and Antarctic remaining relatively unexploited.

**Fisheries: impact on marine ecosystems**

A nearly five-fold increase in global catch, from 19 million tonnes in 1950 to 87 million tonnes in 2005, has left many fisheries overexploited. Catch rates of some species of large predatory fishes – such as marlin, tuna and billfish – have dramatically declined over the last 50 years, particularly in coastal areas of the North Atlantic and the North Pacific. Targeted fishing of top predators has changed whole ecological communities, with increasing abundance of smaller marine animals at lower trophic levels as a consequence of the larger species being removed. This in turn has an impact on the growth of algae and coral health.
Figure 10: The expansion and impact of world fishing fleets in (a) 1950 and (b) 2006

The maps show the geographical expansion of world fishing fleets from 1950 to 2006 (the latest available data). Since 1950, the area fished by global fishing fleets has increased ten-fold. By 2006 100 million km², around 1/3 of the ocean surface, was already heavily impacted by fishing. To measure how intensively these areas are fished, Swartz et al., (2010) used the fish landed in each country to calculate the primary production rate (PPR) of each region of the ocean. PPR is a value that describes the total amount of food a fish needs to grow within a certain region. In the areas in blue, the fleet extracted at least 10% of this energy. Orange indicates a minimum of 20% extraction and red shows least 30%, highlighting the most intensively and potentially overfished areas.

Key

- Blue: At least 10% PPR extraction
- Orange: At least 20% PPR extraction
- Red: At least 30% PPR extraction

PPR is a value that describes the total amount of food a fish needs to grow within a certain region.
Most people essentially desire the same thing: A life where needs are met; to be safe and healthy; to be able to explore interests and realize potential; and to improve well-being.

In order to reverse the declining Living Planet Index, bring the Ecological Footprint down to within planetary limits, avoid dangerous climate change and achieve sustainable development, a fundamental reality must be embedded as the basis of economies, business models and lifestyles: The Earth’s natural capital — biodiversity, ecosystems and ecosystem services — is limited.

WWF’s One Planet perspective proposes to manage, govern and share natural capital within the Earth’s ecological boundaries. In addition to safeguarding and restoring this natural capital, WWF seeks better choices along the entire system of production and consumption, supported by redirected financial flows and more equitable resource governance. All of this, and more, is required to decouple human development from unsustainable consumption (moving away from material and energy-intensive commodities), to avoid greenhouse gas emissions, to maintain ecosystem integrity, and to promote pro-poor growth and development.

The One Planet perspective reminds us that our choices are highly interdependent. Preserving natural capital, for example, will affect decisions and possible outcomes relating to the way we produce and consume. Financial flows and governance structures will similarly determine to a great extent whether production and consumption choices will actually contribute to biodiversity conservation, ecosystem integrity and, ultimately, food, water and energy security.
WWF’s One Planet Perspective proposes to manage, govern and share natural capital within the Earth’s ecological boundaries.

**Better Choices**

**From a One Planet Perspective**

**Preserve Natural Capital**
- Restore damaged ecosystems and ecosystem services
- Halt loss of priority habitats
- Significantly expand the global protected areas network

**Produce Better**
- Significantly reduce inputs and waste in production systems
- Manage resources sustainably
- Scale-up renewable energy production

**Consume More Wisely**
- Achieve low-footprint lifestyles
- Change energy consumption patterns
- Promote healthy consumption patterns

**Redirect Financial Flows**
- Value nature
- Account for environmental and social costs
- Support and reward conservation, sustainable resource management and innovation

**Equitable Resource Governance**
- Share available resources
- Make fair and ecologically informed choices
- Measure success beyond GDP

**Ecosystem Integrity**

**Biodiversity Conservation**

**Food, Water and Energy Security**
1. **Preserve natural capital:** 
   **Protect biodiversity**
   Efforts must particularly focus on protecting and restoring key ecological processes necessary for food, water and energy security, as well as climate change resilience and adaptation. The Earth’s diversity of species and habitats must also be preserved for their intrinsic value.

2. **Produce better**
   Efficient production systems would help lower humanity’s Ecological Footprint to within ecological limits – by significantly reducing human demand for land, water, energy and other natural resources.

3. **Consume more wisely**
   Living within the Earth’s ecological limits also requires a global consumption pattern in balance with the Earth’s biocapacity. The immediate focus must be on drastically shrinking the Ecological Footprint of high-income populations – particularly their carbon footprint. Changing dietary patterns among wealthy populations and reducing food waste are crucial.

4. **Redirect financial flows**
   In too many cases, the over-exploitation of resources and damage or destruction of ecosystems are highly profitable for a few stakeholders in the short term; while the long-term benefits of protecting natural capital are inadequately valued or not valued in an economic sense at all. Redirected financial flows that support conservation and sustainable ecosystem management are therefore an essential enabling condition for both preserving natural capital and for making better production and consumption choices – and ensuring that burdens are not passed on to future generations.

5. **Equitable resource governance**
   Equitable resource governance is the second essential enabling condition to shrink and share our resource use to keep within the regenerative capacity of one planet. Improved health and education standards, and viable economic development plans must exist within legal and policy frameworks that provide equitable access to food, water and energy, and be supported by inclusive processes for sustainably managed land use. Equitable resource governance also requires a changed definition of well-being and success that includes personal, societal and environmental health.
Arabian gulf view from space. © USGS
BIOCAPACITY

It takes 1.5 years for the Earth to regenerate the renewable resources that people use, and absorb the CO2 waste they produce, in that same year.

BIODIVERSITY

Biodiversity, ecosystems and ecosystem services – our natural capital – must be preserved as the foundation of well-being for all.

BETTER CHOICES

Living within ecological boundaries requires a global consumption and production pattern in balance with the Earth’s biocapacity.

EQUITABLE SHARING

Equitable resource governance is essential to shrink and share our resource use.