# State of the States

## A new perspective on the wealth of our nation

Global Footprint Network

# Which states need to start managing their ecological budgets?

**All of them.** Why? Although the United States is one of the richest nations in the world in terms of natural capital, it is running an ecological deficit. U.S. citizens demand twice the renewable natural resources and services that are available within our nation's borders. Yet the economic vitality of our nation depends on these valuable ecological assets.

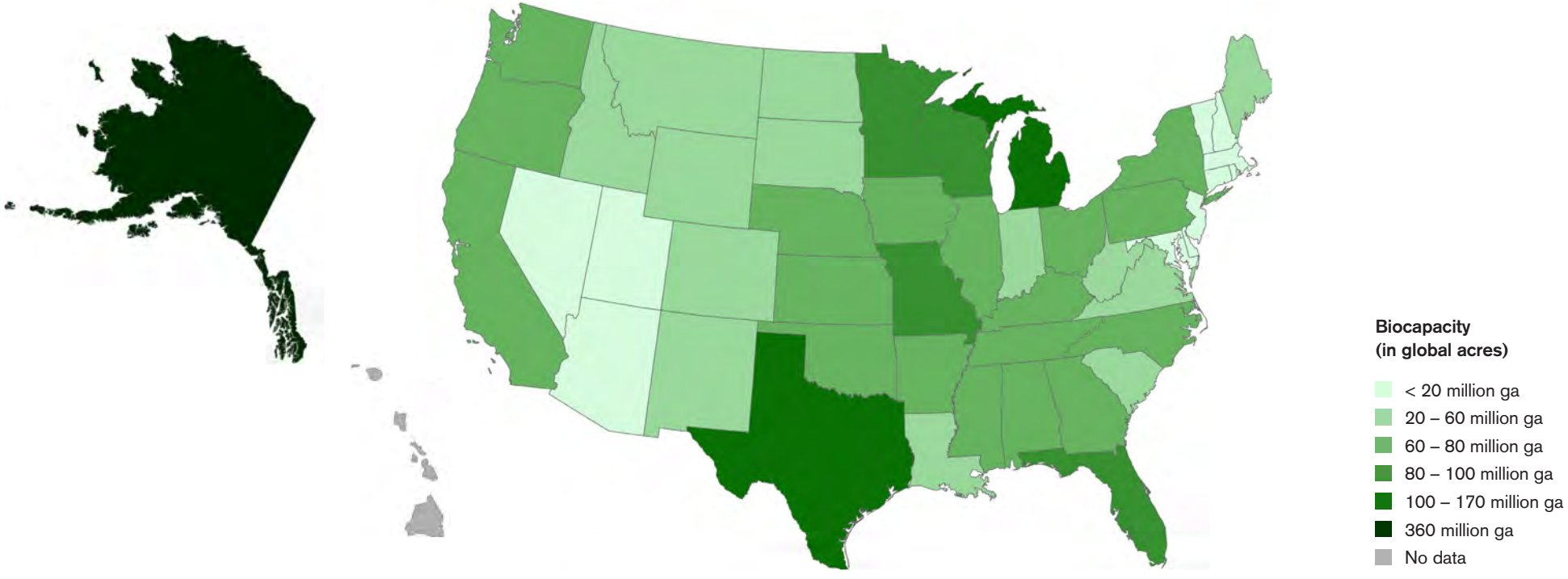
Because our economic system developed during a time when these resources were abundant, decisions were made without considering the explicit contribution of nature to economic activity. As these resources are becoming increasingly scarce worldwide, we need new tools to manage them more effectively.

# In 2015, Ecological Deficit Day landed on July 14.

**U.S. Ecological Deficit Day** marks the date when the United States has exceeded nature's budget for the year. The nation's annual demand for the goods and services that our land and seas can provide — fruits and vegetables, meat, fish, wood, cotton for clothing, and carbon dioxide absorption — now exceeds what our nation's ecosystems can renew this year. Similar to how a person can go into debt with a credit card, our nation is running an ecological deficit.

# The richest country?

**Almost.** The United States is the third-richest country in the world, based on biocapacity,[1] a measure of the biological productivity of its ecosystems. Brazil ranks first and China second. Within the United States, biocapacity varies widely by state.




[1]For a complete glossary of terms related to the Ecological Footprint and biocapacity, visit www.footprintnetwork.org/glossary.

# Measuring ecological wealth

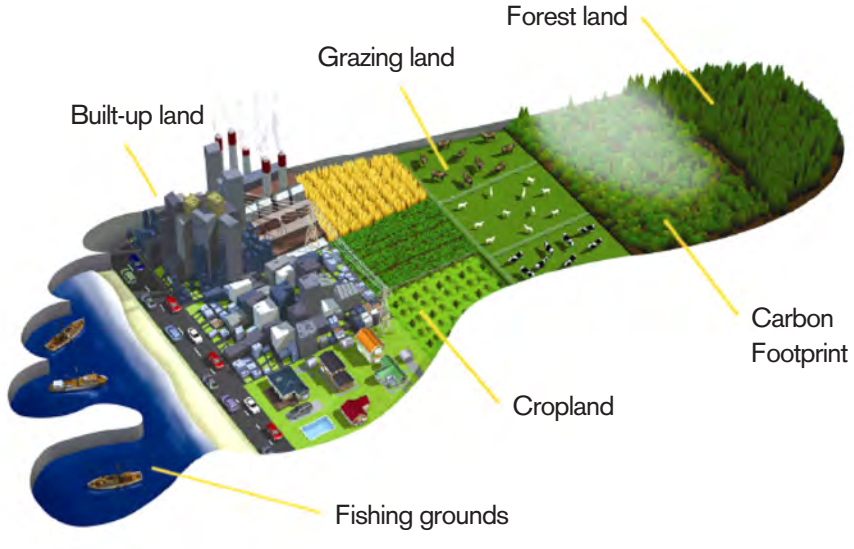
**Just as a bank statement** tracks income against expenditures, Global Footprint Network measures a population's demand for and ecosystems' supply of resources and services.

On the supply side, a city, state, or nation's biocapacity represents its biologically productive land and sea area, including forest lands, grazing lands, cropland, fishing grounds, and built-up land.

On the demand side, the Ecological Footprint measures a population's demand for plant-based food and fiber products, livestock and fish products, timber and other forest products, space for urban infrastructure, and forest to absorb its carbon dioxide emissions from fossil fuels.

Both measures are expressed in global acres — globally comparable, standardized acres with world average productivity.

Each city, state, or nation's Ecological Footprint can be compared to its biocapacity. If a population's demand for ecological assets exceeds the supply, that region runs an ecological deficit. A region in ecological deficit meets demand by importing, liquidating its own ecological assets (such as overfishing), and/or emitting carbon dioxide into the atmosphere.

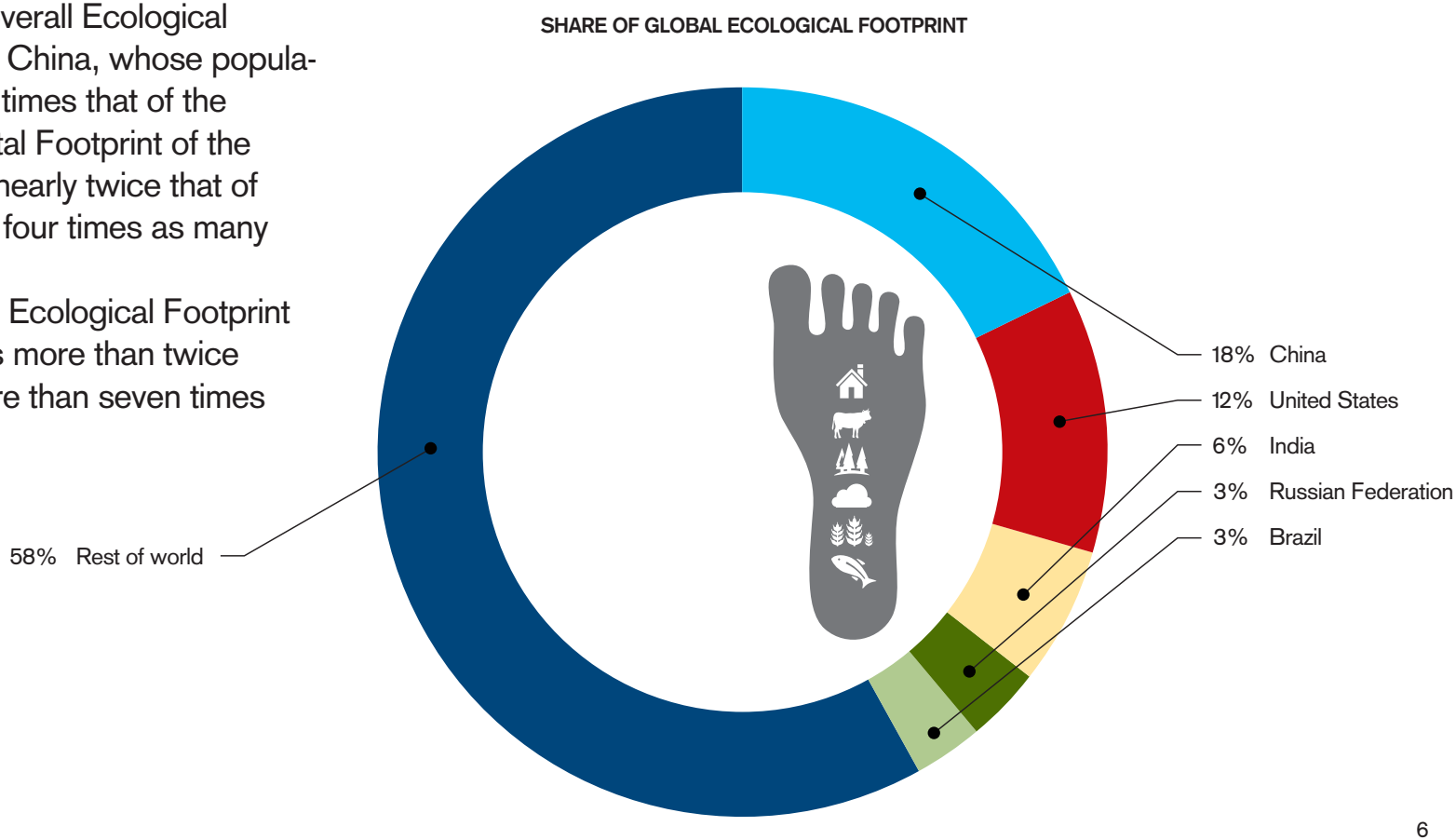



For a more technical explanation of the calculations in this report, visit www.footprintnetwork.otrg/statestechnical.

# Big Footprint

**The United States** has the second-largest share of the world's overall Ecological Footprint, trailing only China, whose population is more than four times that of the United States. The total Footprint of the United States is also nearly twice that of India, although nearly four times as many people live in India.

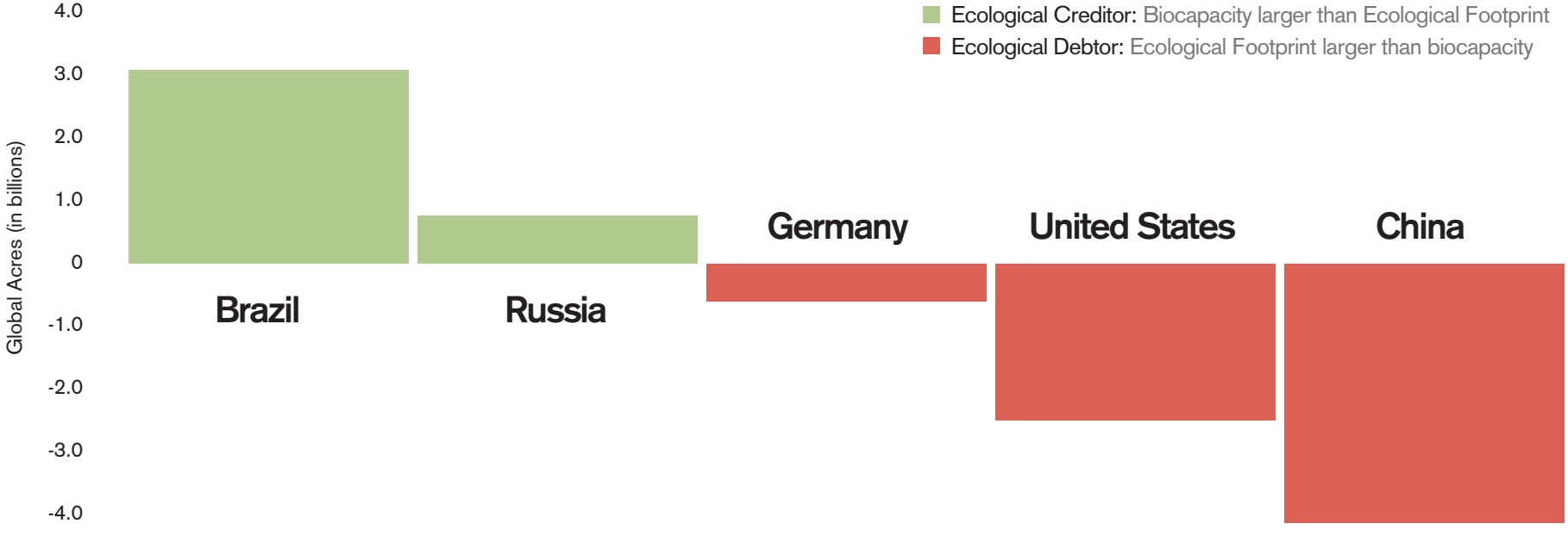
The per-person Ecological Footprint in the United States is more than twice that of China and more than seven times that of India.



# Net biocapacity

**Different parts of the world** are endowed with different resources and consume resources at different rates. In a globalized world, countries meet their demand for resources through trade. As resources become increasingly limited, countries running an ecological deficit can be exposed to economic risk if the costs of imports rise.

In addition to trade, countries can fall into ecological deficit if they emit more carbon dioxide than their own ecosystems can absorb. Countries in this situation are more exposed to the risks of fossil fuels and carbon emissions from burning fossil fuels becoming more expensive.



# Net biocapacity by state

**With an abundance of resources, lower Ecological Footprints, and/or smaller populations, only 16 states are currently living within the means of their natural resources.**

Each state's Ecological Footprint was calculated by adjusting the national average Ecological Footprint by the state's relative consumption level. State biocapacity was estimated by allocating the U.S. biocapacity proportional to each state's relative land productivity.

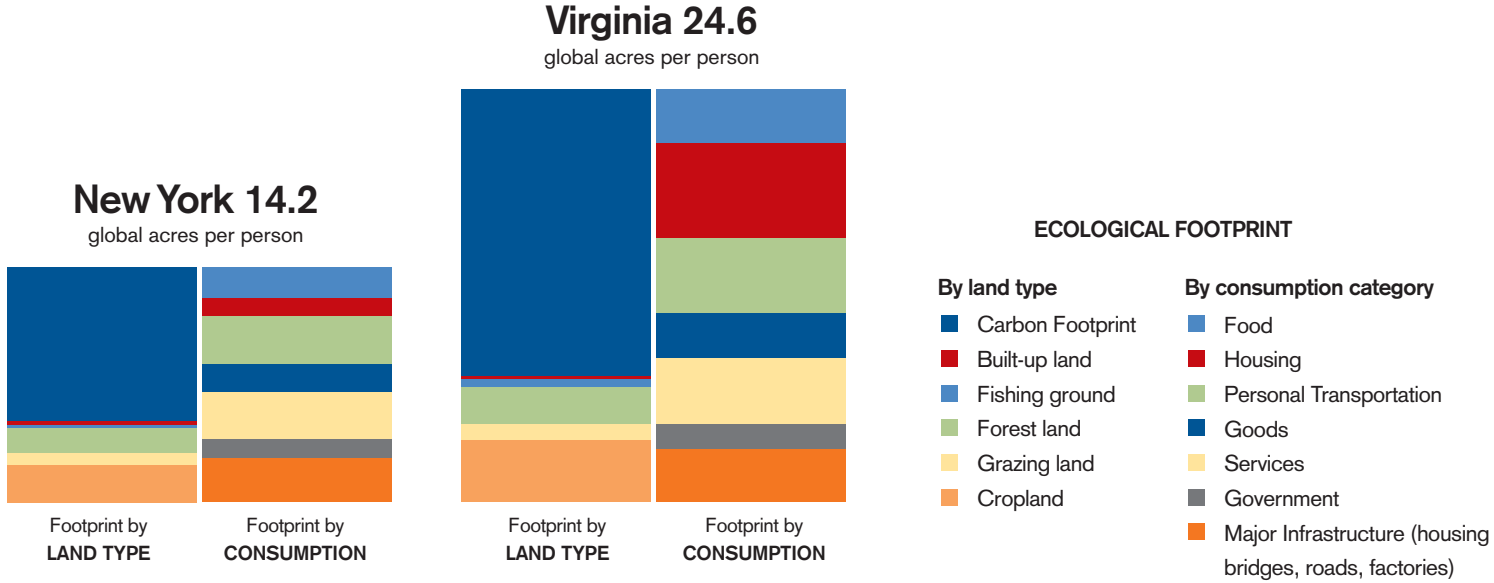
Each state is unique, and states can easily trade resources with each other. But there can be economic impacts associated with such trade, such as food price increases. Consequently, states that manage their resources carefully may be better positioned for a future in which natural capital becomes increasingly scarce and more valuable. States (as well as cities and regions) have substantial autonomy to set policy within their borders to manage their resources and influence their population's Ecological Footprint. Examples include establishing renewable energy goals, offering tax incentives to consumers, adopting policies to protect public land, and investing in public transportation systems.

# Urban vs. suburban

**Comparing New York,** the state with the lowest Ecological Footprint per capita, and Virginia, the state with the highest, exposes striking differences.

Breaking down the Ecological Footprint by land type shows that New York's carbon footprint per person is nearly half that of Virginia, driven in part by the higher density of New York City, which enables greater public transit use. In addition, Virginia produces and consumes substantially more coal than New York.[2]

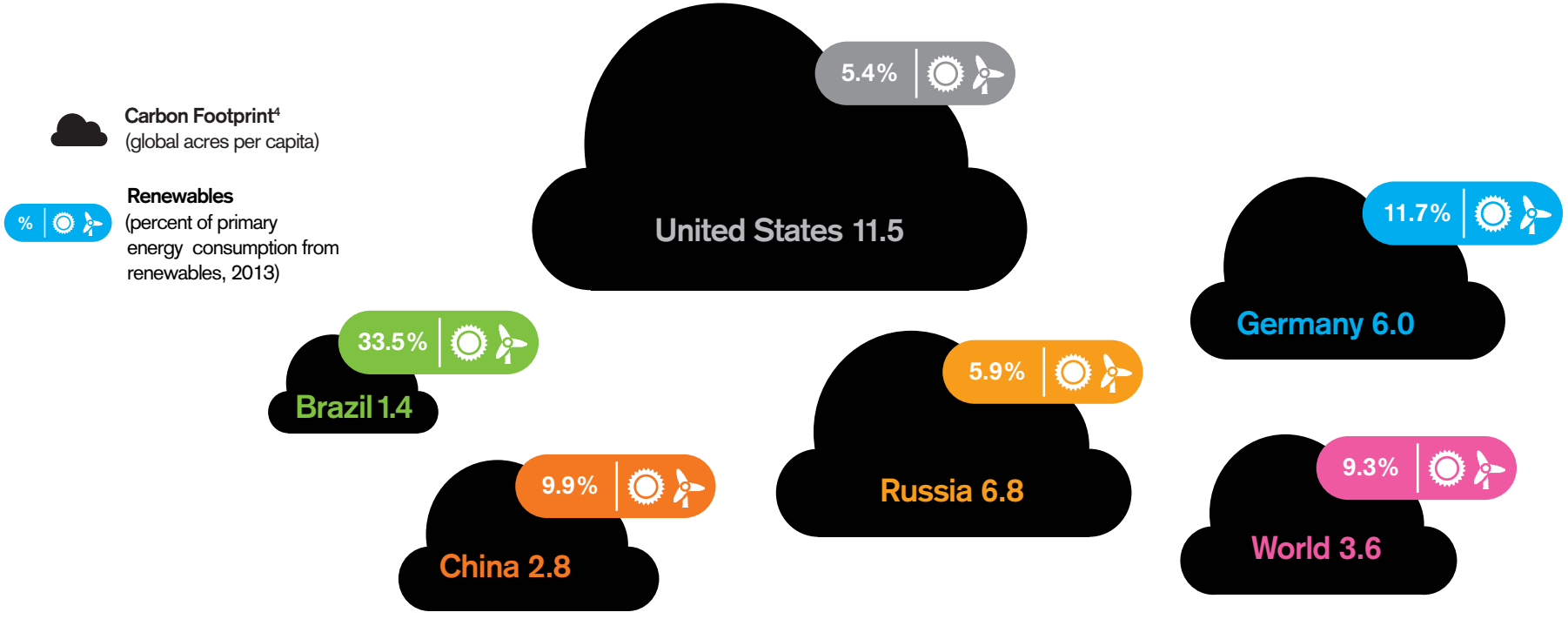
Another breakdown of the Ecological Footprint, by consumption category, reveals housing and transportation are driving Footprint differences in New York and Virginia. Housing comprises a larger portion of Virginia's Footprint than in New York, in part, because the average house in Virginia is larger than in New York.[3] Transportation demand is higher in Virginia because the state is less compact than New York.




[2, 3] U.S. Energy Information Administration.

# Our addiction to fossil fuels

**The carbon footprint** comprises 67 percent of the Ecological Footprint of the entire United States, up from 53 percent in 1961. The United States' unusually high per person carbon footprint — 8th highest in the world — exposes the nation to more risk should fossil fuels become less available, more expensive, or even obsolete in the future.



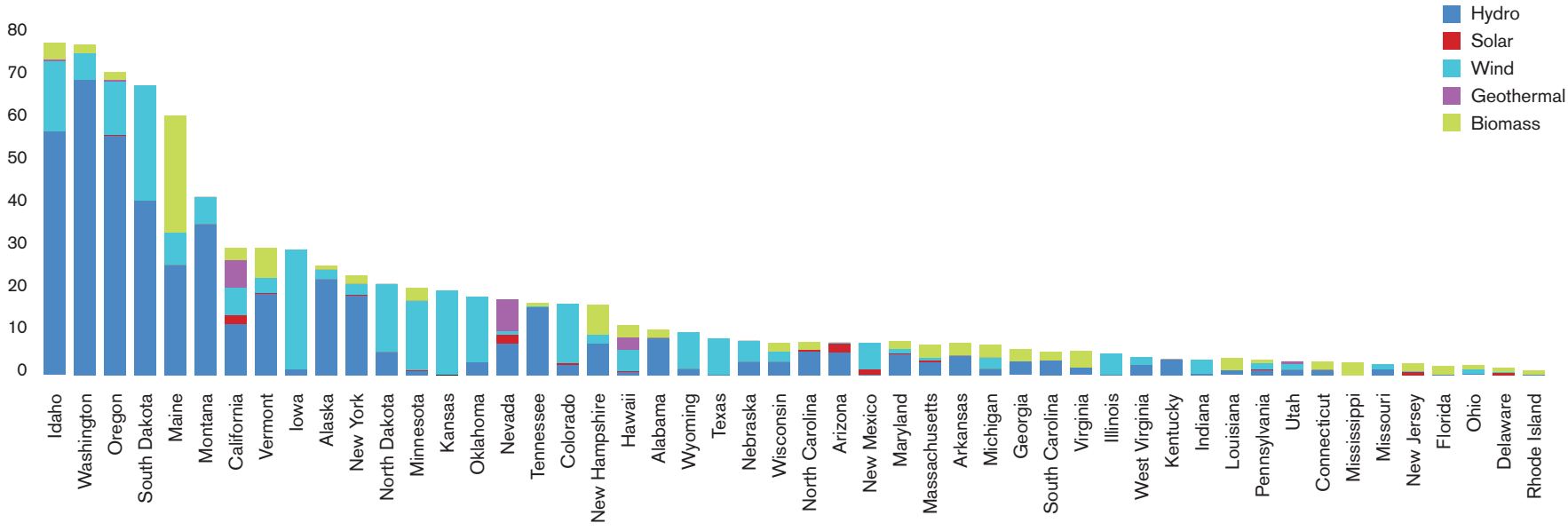

[4] One global acre of forest can absorb 1.4 tons of carbon dioxide.

Source: BP. June 2015. BP Statistical Review of World Energy.

# States on a cleaner path

**Transitioning to renewable energy** is one of the most powerful ways for a state and nation to lower its Ecological Footprint. While California became the first state to generate more than 5 percent of its electricity from utility-scale solar earlier this year, six states are farther ahead in overall renewable energy dependence. However, the majority of the renewable energy in those states comes from hydropower, which is already well-exploited and very geographically specific. Still, the United States is clearly preparing for a future in which sustainable energy plays a much larger role,[5] and most states still have substantial opportunity to tap into solar and wind energy[6] to reduce the carbon intensity of their economies.

**Renewables** as percentage of electricity generation



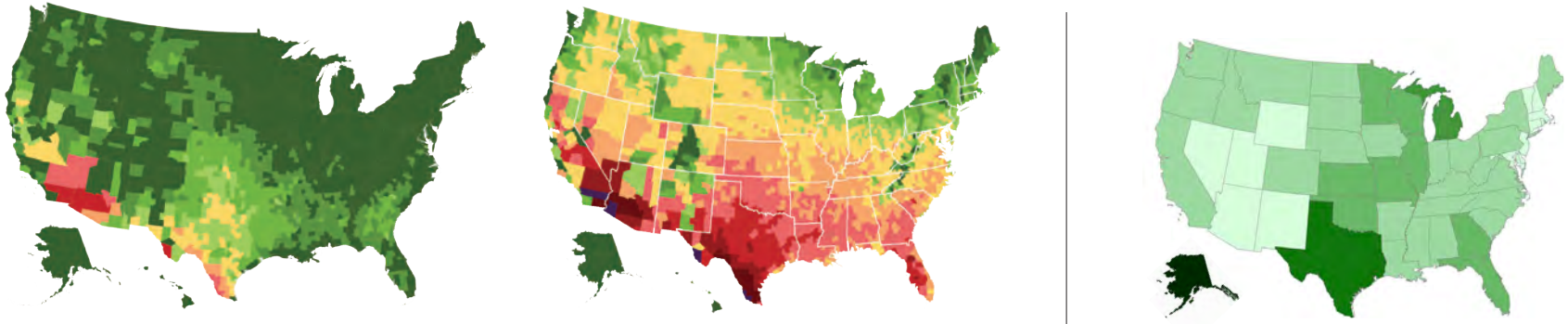



[5,6] Bloomberg New Energy Finance and the Business Council for Sustainable Energy, Sustainable Energy in America 2015 Factbook.

Source: U.S. Energy Institute Administration. Electric Power Annual 2013.

# Who is heating up?

**In a world of growing ecological constraints,** climate change puts our ecological wealth at risk, threatening crops and forests. By the middle of this century, the average American will likely see 27 to 50 days over 95°F each year — two to three times more than what we've seen over the past 30 years.[7] In Texas, for instance, such temperature increases will likely reduce crop yields, especially for cotton, the state's largest crop.[8] Extreme heat also has social costs, including higher mortality rates.




[7,8] Risky Business Project. 2014. Climate Change and the Economy: Texas.

Source: Risky Business/Rhodium Group, based on peer-reviewed climate science projections.

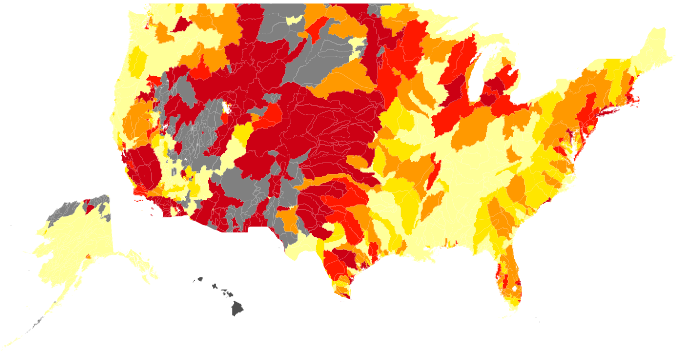
# Thirsty states

**Water scarcity** also threatens our ecological assets. Climate change is contributing to drought, particularly in California. Some states with the greatest natural capital wealth, including Texas and Michigan, are vulnerable to drought and water shortages, which then reduce the productivity of crop and grazing lands. An analysis of baseline water stress shows states in the western half of the United States are likely to face the greatest competition for water.

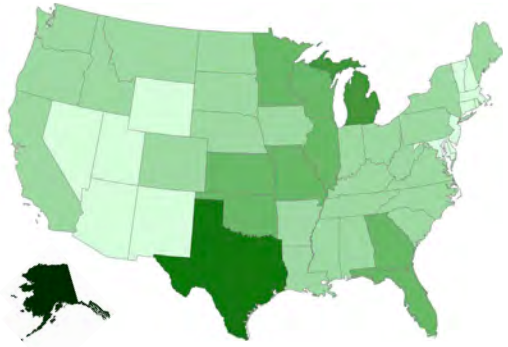
- Low (<10%)
- Low to medium (10–20%)
- Medium to high (20%–40%)
- High (40% – 80%)
- Extremely high (>80%)
- No Data

**Definition:** Baseline water stress measures the ratio of total annual water withdrawals to total available annual renewable supply. Higher values indicate more competition among users.

Source: World Resources Institute AQUEDUCT Water Risk Atlas.



**Water Stress**



**Biocapacity**

# How many Californias?

**It would take eight Californias** to support California residents' Ecological Footprint. California is running a significant ecological deficit, with its population using more than eight times the biocapacity available within the state.

On the supply side, California has a relatively low cropland biocapacity — only 3 percent of the total cropland biocapacity in the United States.[9] California's per capita biocapacity is also much smaller than that that of the United States, primarily due to its high population and the aridity of much of the state. Drought threatens to further decrease the state's biocapacity.

On the demand side, California's large population is a big factor contributing to the state's Ecological Footprint. The carbon footprint comprises 63 percent of California's Ecological Footprint. But the average Californian's carbon footprint is actually lower than that of the average American, thanks in part to a mild climate that requires less heating and cooling, energy efficiency measures, hydropower, and less coal use compared to other states.

As the seventh-largest economy in the world and a global center for innovation, California cannot ignore its growing risk exposure to resource constraints. This is made painfully clear as the state confronts its fourth year of drought.

California leaders have taken many pioneering steps to address sustainability: establishing the state's own gasoline standards, creating a cap-and-trade system to rein in emissions, and setting a goal to get 33 percent of electricity from renewable energy by 2020. Additional bold moves are needed to avoid social and economic risks.

[9] Global Footprint Network. 2013. The Ecological Footprint and Biocapacity of California.
[10] Data is for 2012, the latest year available from the U.S. Department of Agriculture.

# What if the future does not look like the past?

**The rules of the game have changed.** In the past, seemingly unlimited resources fueled our economies. Today, as populations grow and resources become scarcer, our ecological assets are facing mounting pressures from increasing human demand and climate change. Carefully managing our natural capital is imperative for a prosperous, resilient future.

Cities, states, and nations shape this future every time they spend taxpayer money, particularly on longer-term projects, such as energy and water infrastructure, transportation networks, housing, flood protection, and land conservation. Tools that recognize the value of ecological assets in the same way that we value infrastructure are needed to guide leaders at all levels of government. Cities, states, and nations can make investments that improve their citizens' well-being while maintaining the smallest Ecological Footprint and even expanding natural capital.

# Maryland leads the way

**With the support** of then-Governor Martin O'Malley, Global Footprint Network pioneered a new way of making capital investment decisions. Our Net Present Value Plus (NPV+) tool used a range of scenarios for future fuel prices and internalized environmental and social factors to evaluate which projects provide the best total return on investment. "In Maryland NPV+ helped guide critical investments we needed to make — from restoring the health of the Chesapeake Bay, improving mass transit, to reducing our government's carbon footprint. Government should be utilizing tools like NPV+ so that we can make better, more sustainable choices," O'Malley said.

## Fleet Vehicles

Depending on the future gasoline price scenario, the all-electric Nissan Leaf is either already cheaper to own, or will be within a few years, than a conventional gasoline Ford Focus, despite costing more than twice as much to buy as the Focus.

## Weatherization

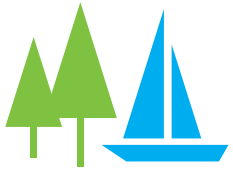
An investment of $18 million in more than 3,000 weatherization measures through Maryland's EmPOWER program will save a net $28 million to $69 million in avoided natural gas, electricity, and carbon emission costs over 20 years, depending on the discount rate.

## Land conservation

Using very conservative valuations, a $1 million state purchase of wetlands for conservation delivered between $6 and $16 in ecosystem benefits for every $1 spent over 30 years, depending on the discount rate.

# Valuing natural capital

**We know we pay for products from nature**, such as water, food and timber, but there are many other goods and services from nature that we take for granted. Healthy ecosystems provide vast economic value, and investing in this natural capital provides a high rate of return. For example, a growing number of government policy-makers are starting to measure the economic value of "ecosystem services." Such ecosystem service valuation can demonstrate the return on past or proposed investments in natural capital and objectively quantify trade-offs in development decisions.



## Washington:
## Does money grow on trees?

From skiing down a snow-covered mountain to sailing across a calm, blue lake, Washington state residents can enjoy the outdoors in countless ways. An economic analysis[11] of outdoor recreation found there were a total of about 446 million participant days a year spent on outdoor recreation in the state, resulting in $21.6 billion dollars in annual expenditures and 200,000 jobs. This analysis encouraged legislators to overwhelmingly vote for new funding to prevent park closures while many other states shut down parks during this time.

## Mississippi Delta:
## Economic engine, flood protection

The Mississippi River Delta is a vast natural asset and a basis for national employment and economic productivity. The most comprehensive economic valuation[12] of the Delta to date estimated between $330 billion and $1.3 trillion in benefits, including hurricane and flood protection, water supply, recreation, and fisheries. The Army Corps of Engineers recognized the benefit of wetlands in mitigating flooding and storm surge and already has shifted $500 million toward restoration.

[11] Earth Economics. January 2015. Economic Analysis of Outdoor Recreation in Washington State.
[12] Earth Economics. 2010. Gaining Ground: The Value of Restoring the Mississippi Delta.

# Beyond agriculture in Pennsylvania

**Any farmer will tell you** fertile soil, clean water, and a stable climate are as crucial to the business as a tractor. These natural services can be viewed as capital assets — just like the land or the tractor.

The natural capital in Lancaster County, Pennsylvania, provides a robust flow of essential economic goods and service benefits, including food, water, clean air, natural beauty, climatic stability, storm and flood protection, and recreation. Agricultural lands make up over 65% of the ecosystem in Lancaster County, which is the number one non-irrigated county in the United States for crop production and first county in the nation to reach 100,000 acres in farmland preserved (in 2013). This milestone was the result of four decades of strategic efforts of the county and the Lancaster Farmland Trust.

An economic analysis[13] helped Lancaster County value its natural capital provided by farmland preservation and estimated $676 million in annual economic benefits. If treated like an asset, the value of Lancaster County ecosystems is $17.5 billion at a 4% discount rate.

[13]Earth Economics. March 2015. Beyond Food: The Environmental Benefits of Agriculture in Lancaster County, Pennsylvania.

# Menu of tools

**You can't manage what you can't measure.** Ecological Footprint accounting can help cities, states, and nations more accurately measure their natural capital surplus or deficit, identify key challenges and opportunities, and forecast the impact of different policies. Our resilience tool, called Net Present Value Plus (NPV+), can help government agencies at all levels manage their capital investments in a fiscally responsible and sustainable way.

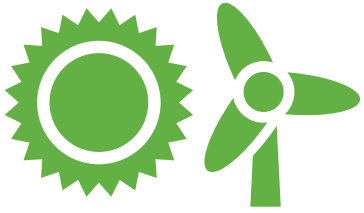
| | | | | |
|---|---|---|---|---|
| **Ecological Footprint**<br>Are we using more resources than we have? | **Early warning:**<br>The Ecological Footprint can help identify which issues need to be addressed most urgently to generate political will and guide policy action. | **Headline and Issue framing:**<br>The Ecological Footprint can improve understanding of the problems, enable comparisons across countries and raise stakeholder awareness. | **Policy development:**<br>With the identification of Footprint "hot-spots," policy makers can prioritize policies and actions, often in the context of a broader sustainability policy. | **Monitoring:**<br>Footprint time trends and projections can be used to monitor the short- and long-term effectiveness of policies. |
| **Net Present Value Plus**<br>Will our investment reduce our exposure to limited resources? | **Investment analysis:**<br>NPV+ helps governments and public agencies more accurately measure the long-term value of their investments in infrastructure and natural capital. | **Future scenarios:**<br>NPV+ uses multiple scenarios to create a more realistic view for capital decisions and more fully assess risks and opportunities. | **Policy orientation:**<br>By understanding where the best long-term value is, policies can be reoriented toward better outcomes. | **Building resilience:**<br>Sound investments build wealth, avoid stranded assets and leave a better legacy for future generations. |

# Opportunities

**Living well and within the means of nature** is not out of our reach. We see the greatest opportunities for improving sustainability in the United States in three areas: cities, energy, and food.

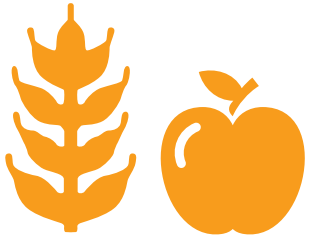
## Cities

By 2050, 80% of the world population is expected to live in urban areas. Consequently, how local governments plan and build our cities is instrumental to shaping citizens' behavior patterns and determining the amount of natural capital available to meet a population's demand. For instance, are houses built so that they require little energy? Is public transportation adequate?



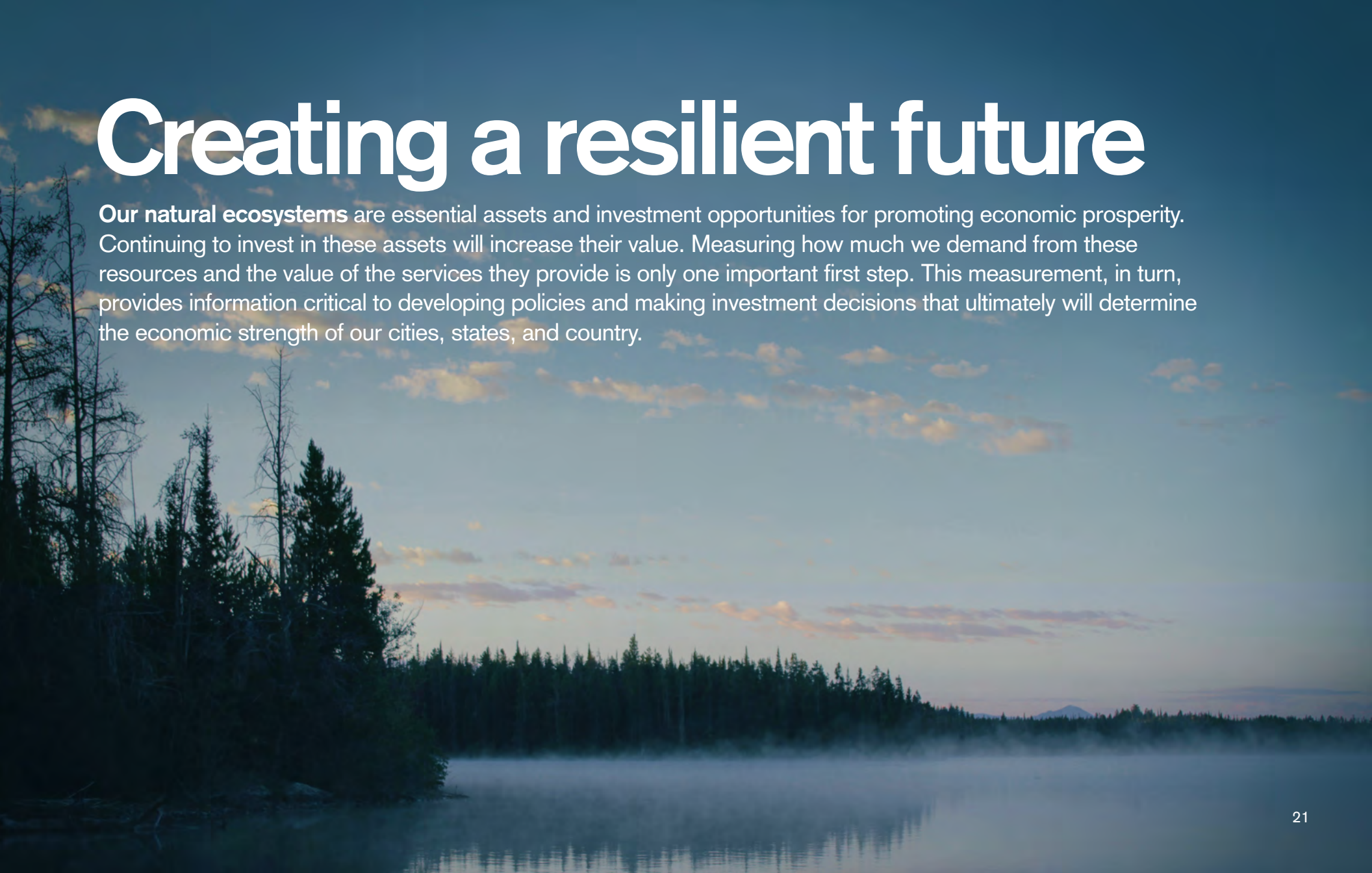
## Energy

As noted, a large part of the Ecological Footprint is driven by fossil fuel use. Cities, states, and nations can set policies to promote renewable energy adoption in a number of ways, including tax rebates, cap-and-trade-systems, subsidies, and even carpool lane privileges.



## Food

How we meet one of our most basic needs — food — is also a powerful way to influence sustainability. Eating food that comes from local sources, is not highly processed, and does not rely heavily on animal products can lower the Ecological Footprint.



# Creating a resilient future

**Our natural ecosystems** are essential assets and investment opportunities for promoting economic prosperity. Continuing to invest in these assets will increase their value. Measuring how much we demand from these resources and the value of the services they provide is only one important first step. This measurement, in turn, provides information critical to developing policies and making investment decisions that ultimately will determine the economic strength of our cities, states, and country.

# Appendix

| State | Population[1] | Gross Domestic Product, 2014 (chained 2009 dollars per capita)[2] | Life Expectancy at Birth[3] (years) | Human Development Index[4] | Carbon Ecological Footprint (global acres per capita) | Non-Carbon Ecological Footprint (global acres per capita) | Total Ecological Footprint (global acres per capita) | Biocapacity (global acres per capita) |
|---|---|---|---|---|---|---|---|---|
| UNITED STATES | 308,745,538 | 49,469 | 78.9 | 5.06 | 11.5 | 5.7 | 17.2 | 9.3 |
| Alabama | 4,779,736 | 37,593 | 75.4 | 4.04 | 11.2 | 5.1 | 16.3 | 14.8 |
| Alaska | 710,231 | 66,160 | 78.3 | 5.06 | 13.1 | 6.2 | 19.2 | 510.9 |
| Arizona | 6,392,017 | 38,743 | 79.6 | 4.89 | 10.3 | 5.4 | 15.8 | 1.1 |
| Arkansas | 2,915,918 | 37,334 | 76.0 | 3.91 | 10.6 | 4.8 | 15.4 | 24.8 |
| California | 37,253,956 | 54,462 | 80.8 | 5.40 | 10.5 | 6.0 | 16.5 | 1.9 |
| Colorado | 5,029,196 | 52,214 | 80.0 | 5.53 | 13.4 | 6.6 | 20.0 | 5.8 |
| Connecticut | 3,574,097 | 64,676 | 80.8 | 6.17 | 13.7 | 7.8 | 21.5 | 2.0 |
| Delaware | 897,934 | 60,551 | 78.4 | 5.22 | 16.6 | 6.8 | 23.4 | 3.4 |
| District of Columbia | 601,723 | 159,386 | 76.5 | 6.08 | 15.8 | 6.3 | 22.0 | 0.2 |
| Florida | 18,801,310 | 38,690 | 79.4 | 4.82 | 10.9 | 5.2 | 16.0 | 4.6 |
| Georgia | 9,687,653 | 43,131 | 77.2 | 4.62 | 11.6 | 5.4 | 17.0 | 8.2 |
| Hawaii | 1,360,301 | 49,686 | 81.3 | 5.53 | 11.3 | 5.8 | 17.1 | - |
| Idaho | 1,567,582 | 35,235 | 79.5 | 4.50 | 9.5 | 5.8 | 15.3 | 17.0 |
| Illinois | 12,830,632 | 52,827 | 79.0 | 5.31 | 11.3 | 5.8 | 17.2 | 5.9 |
| Indiana | 6,483,802 | 43,861 | 77.6 | 4.56 | 13.1 | 6.0 | 19.1 | 7.7 |
| Iowa | 3,046,355 | 49,075 | 79.7 | 5.03 | 13.9 | 6.6 | 20.5 | 21.0 |
| Kansas | 2,853,118 | 45,765 | 78.7 | 4.96 | 13.1 | 6.0 | 19.1 | 26.2 |
| Kentucky | 4,339,367 | 38,938 | 76.0 | 4.02 | 14.2 | 5.3 | 19.5 | 13.9 |
| Louisiana | 4,533,372 | 46,448 | 75.7 | 4.12 | 12.0 | 5.3 | 17.3 | 13.1 |
| Maine | 1,328,361 | 38,327 | 79.2 | 4.93 | 10.1 | 5.7 | 15.8 | 30.5 |
| Maryland | 5,773,552 | 53,759 | 78.8 | 5.94 | 16.9 | 7.4 | 24.3 | 2.5 |
| Massachusetts | 6,547,629 | 63,005 | 80.5 | 6.16 | 12.0 | 6.6 | 18.6 | 1.7 |
| Michigan | 9,883,640 | 42,110 | 78.2 | 4.76 | 11.2 | 5.5 | 16.6 | 11.8 |
| Minnesota | 5,303,925 | 52,801 | 81.1 | 5.69 | 12.4 | 6.4 | 18.8 | 16.9 |
| Mississippi | 2,967,297 | 31,551 | 75.0 | 3.81 | 10.7 | 4.9 | 15.6 | 21.7 |

[1]2010 U.S. Census [2]U.S. Bureau of Economic Analysis.
[3, 4] Measure of America Human Development Index (HDI) and Supplemental Indicators 2013–2014. The American HDI is a composite measure of health, education, and income indices.

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|---|---|---|---|---|---|---|---|---|
| Missouri | 5,988,927 | 42,854 | 77.5 | 4.60 | 13.4 | 6.1 | 19.5 | 16.2 |
| Montana | 989,415 | 38,539 | 78.5 | 4.54 | 10.9 | 5.2 | 16.1 | 54.3 |
| Nebraska | 1,826,341 | 52,724 | 79.8 | 5.11 | 13.5 | 6.7 | 20.3 | 38.1 |
| Nevada | 2,700,551 | 42,539 | 78.1 | 4.63 | 11.8 | 6.4 | 18.2 | 4.1 |
| New Hampshire | 1,316,470 | 49,951 | 80.3 | 5.73 | 13.6 | 7.8 | 21.4 | 8.8 |
| New Jersey | 8,791,894 | 56,405 | 80.3 | 6.12 | 11.9 | 6.8 | 18.7 | 1.3 |
| New Mexico | 2,059,179 | 40,081 | 78.4 | 4.52 | 11.3 | 5.5 | 16.8 | 11.9 |
| New York | 19,378,102 | 64,818 | 80.5 | 5.66 | 9.3 | 5.0 | 14.2 | 3.5 |
| North Carolina | 9,535,483 | 44,281 | 77.8 | 4.57 | 12.2 | 5.4 | 17.6 | 7.6 |
| North Dakota | 672,591 | 65,225 | 79.5 | 4.90 | 15.2 | 6.7 | 22.0 | 38.5 |
| Ohio | 11,536,504 | 45,887 | 77.8 | 4.71 | 12.4 | 5.8 | 18.3 | 5.5 |
| Oklahoma | 3,751,351 | 41,871 | 75.9 | 4.14 | 13.4 | 5.6 | 19.1 | 20.2 |
| Oregon | 3,831,074 | 51,329 | 79.5 | 4.86 | 9.8 | 5.9 | 15.7 | 17.4 |
| Pennsylvania | 12,702,379 | 47,637 | 78.5 | 5.07 | 10.4 | 5.4 | 15.8 | 4.9 |
| Rhode Island | 1,052,567 | 47,901 | 79.9 | 5.38 | 11.4 | 6.2 | 17.5 | 1.5 |
| South Carolina | 4,625,364 | 36,125 | 77.0 | 4.35 | 10.7 | 5.2 | 16.0 | 9.3 |
| South Dakota | 814,180 | 46,688 | 79.5 | 4.79 | 11.2 | 6.1 | 17.3 | 72.3 |
| Tennessee | 6,346,105 | 42,115 | 76.3 | 4.22 | 11.3 | 5.0 | 16.3 | 9.9 |
| Texas | 25,145,561 | 54,433 | 78.5 | 4.65 | 12.8 | 5.8 | 18.6 | 6.7 |
| Utah | 2,763,885 | 43,555 | 80.2 | 5.03 | 14.8 | 7.1 | 22.0 | 5.0 |
| Vermont | 625,741 | 43,354 | 80.5 | 5.31 | 10.2 | 6.5 | 16.7 | 19.5 |
| Virginia | 8,001,024 | 51,338 | 79.0 | 5.47 | 17.0 | 7.7 | 24.6 | 7.4 |
| Washington | 6,724,540 | 55,298 | 79.9 | 5.40 | 10.6 | 6.3 | 17.0 | 10.6 |
| West Virginia | 1,852,994 | 36,769 | 75.4 | 3.95 | 13.9 | 5.3 | 19.2 | 19.4 |
| Wisconsin | 5,686,986 | 46,665 | 80.0 | 5.16 | 12.9 | 6.3 | 19.2 | 14.1 |
| Wyoming | 563,626 | 64,309 | 78.3 | 4.83 | 13.9 | 6.5 | 20.4 | 39.8 |

[1]2010 U.S. Census [2]U.S. Bureau of Economic Analysis.
[3, 4] Measure of America Human Development Index (HDI) and Supplemental Indicators 2013–2014. The American HDI is a composite measure of health, education, and income indices.

# About

**Global Footprint Network** is an international think tank working to drive informed, sustainable policy decisions in a world of limited resources. Together with its partners, Global Footprint Network coordinates research, develops methodological standards, and provides decision-makers with a menu of tools to help the human economy operate within Earth's ecological limits. We work with local and national governments, investors, and opinion leaders to ensure all people live well, within the means of one planet.

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**Earth Economics** is a nonprofit, nonpartisan, economic research and policy organization located in Tacoma, Wash. We provide robust, science-based, ecologically sound economic analysis, policy recommendations and tools to positively transform regional, national and international economics, and asset accounting systems. Our goal is to help communities shift away from the failed economic policies of the past, towards an approach that is both economically viable and environmentally sustainable.

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**Authors:** Ronna Kelly, Susan Burns, Mathis Wackernagel

**Contributors:** Lola Flores, Earth Economics

**Researchers:** Katsunori Iha, Golnar Zokai, Chris Nelder

**Designer:** Bob Dinetz Design

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