

May 2008 ■ RFF IB 08-01

ISSUE BRIEF

# Don't Measure, Don't Manage

*GDP and the Missing Economy  
of Nature*

---

James Boyd

1616 P St. NW  
Washington, DC 20036  
202-328-5000 [www.rff.org](http://www.rff.org)



## **Contents**

<b>Our Existing National Economic Accounts .....</b>	<b>2</b>
<b>What is GDP and What is the Problem? .....</b>	<b>3</b>
<b>First Steps .....</b>	<b>5</b>
<b>Where Do Accounting Efforts Stand Today?.....</b>	<b>6</b>
<b>The Data to Build Environmental Accounts .....</b>	<b>8</b>
<b>Conclusion .....</b>	<b>10</b>
<b>References.....</b>	<b>11</b>

© 2008 Resources for the Future. All rights reserved. No portion of this paper may be reproduced without permission of the authors.

Issue Briefs are research materials circulated by their authors for purposes of information and discussion. They have not necessarily undergone formal peer review.

## **Don't Measure, Don't Manage: GDP and the Missing Economy of Nature**

James Boyd\*

We live amidst two economies: the measured, market economy and the unmeasured, non-market economy. The former is what we usually think of as “the U.S. economy.” It comprises the products and services—cars, hamburgers, haircuts—we buy and sell every day. But the latter is just as important. The nonmarket economy is composed of the goods and services we don't buy and sell. Examples include household labor, open-source software such as Linux, and many of nature's products and services. We don't pay for clean air, most of the water we consume, flood protection provided by coastal wetlands, the species and habitats on which our food web depends, open spaces—the list goes on. This is the natural economy.

Our market economy increasingly disturbs the non-market, natural economy. Accelerated land development, water diversions for irrigation, and carbon emissions pose growing risks to the natural economy and its ability to provide for future human wellbeing. Given these risks, it is disturbing how little attention we pay to the condition of the natural economy. Without a way to evaluate its condition, we may miss important warnings and opportunities to improve our economic and non-economic wellbeing.

Here I will argue for creating an accounting system to monitor the condition of the natural economy. Nature can be thought of as an economy of its own because it delivers goods and services that are valuable to us, both as ends in themselves (clean air and drinking water) and as inputs (irrigation, soil quality, timber) to the market economy. Most nations have accounting systems for their market economies that track economic success and failure, provide vital information to businesses, and hold leaders accountable for the health of their economic systems.

For these reasons, we should also immediately begin to account for the health of our natural economy. If the natural economy is threatened and important to our wellbeing, then the failure to systematically account for its condition is foolish, if not suicidal. So it is remarkable

---

\* Visiting Professor at Stanford University and Senior Fellow at Resources for the Future. Contact: 202.321.6470 or drjwboyd@gmail.com.

that the U.S. government *prohibits* the development of such an accounting system by the keeper of our economy's books, the Bureau of Economic Analysis (BEA).

The United States will spend upward of \$11 billion on the 2010 Census. For a small fraction of that, we can begin developing environmental good and service accounts that will switch on the light and help illuminate the health of our environmental services.

It will not be easy to create such an accounting system. But if we believe nature contributes substantially to our wellbeing, accounting is crucial. Its absence will doom us to surprises, an inability to experiment and learn, and poor public accountability. The United States should lead global environmental accounting efforts—as we have led the development of economic accounts—rather than actively stifle this effort.

### **Our Existing National Economic Accounts**

The U.S. national accounts are a triumph of our political and economic system. The accounts allow systematic, objective measurement of the health of local, regional, and national market activity. They are extensive, detailed, and independent scorecards. They describe the current economic landscape, warn us of problems, foster economic experimentation and innovation, and help hold our leaders accountable. They are a significant social accomplishment.

Managers in the private sector rely on these accounts to plan business activity and manage their enterprises. A clear indication of their value is that markets move on the information delivered by the accounts. For instance, Wall Street anticipates and immediately acts on the latest GDP, consumer price index, labor market, and other reports that are derived from the accounts.

Governments use the accounts to plan fiscal policy and detect strength or weakness in local and national markets. And average citizens, with the help of the media—even if they don't know what GDP is exactly—can rely on the accounts to give a “thumbs up” or “thumbs down” review of our economic health.

The success and influence of the accounts is due largely to the correct perception that they are objectively derived, based on principles and practices that have been vetted for decades, and difficult to manipulate politically. They are consistent, not ad hoc. They do not serve the politics of the day but rather the long-term interests of the public.

Spurred in part by wartime planning needs, the national accounts have been an official government activity and responsibility since 1945. Today, accounts are constructed and

administered by BEA, which is part of the Commerce Department, using data and analysis from the Labor Department, Internal Revenue Service, and other governmental sources. Even after 60 years, the accounts are continually being improved and made more accurate.

As any economist will tell you, the national accounts are decidedly imperfect measures of our wellbeing. Simon Kuznets, arguably the inventor of GDP, reminded Congress in 1934 that “...the welfare of a nation [can] scarcely be inferred from a measure of national income.” The national accounts have serious limitations, even in the way they measure the market economy. For example, changes in the quality of products over time are poorly captured. Prices are not always a good measure of the benefits we receive from goods and services. And the accounts do a poor job of accounting for the depletion of non-renewable resources such as oil, natural gas, and subsoil minerals.

Most other governments have their own national accounts though the quality, procedures, and institutional independence of international accounts vary widely. Since 1953, the United Nations has helped establish global accounting standards through its System of National Accounts. Today, the International Monetary Fund, OECD, European Union, and World Bank contribute to this global standard-setting activity.

What gets measured gets managed, goes the saying. Our ability to meaningfully manage, debate, and evaluate our global market economy would be impossible without these accounts.

### **What is GDP and What is the Problem?**

While national economic accounts are a significant achievement, their limitations are growing more and more obvious. GDP is designed to measure something very specific: the market value of final goods and services the market economy produces (and that we consume). While a gross over-simplification, GDP essentially does the following: it counts all the final market goods sold (how many cars, loaves of bread, etc.), weights those quantities with the prices we pay for them, and then adds up the result. When we produce and consume more of these quantities, GDP goes up.

This would be fine if we counted all of the things that matter to us. But we don't. The natural economy—the value of goods and services provided by the commons—is not counted. Also, we don't count the impact of our current consumption on future consumption of goods and services.

GDP unambiguously goes *up* the more energy we consume, the more land we develop, and the more fish we take from the sea. But this can't be right. Energy consumption creates

carbon emissions and other pollutants. Where do those costs appear in the accounts? Conversion of land to commercial agriculture limits the land's ability to produce biodiversity, carbon sequestration, and other public benefits. Where do those costs appear in the accounts? Commercial fishing increasingly depletes global marine populations, which reduces the future productivity of our oceans. Where do those costs appear? In all of these cases, the answer is "they don't."

Ask any accountant and they will tell you this state of affairs is potentially disastrous. The point of accounting is to guide decisions, after all. If your accounting measure tells you things are good (GDP is going up) when in fact things are getting worse, that is a pretty flawed system. Our current economic accounts passively encourage over-consumption by not revealing many of the environmental costs of the consumption that is measured.

In terms of what we really care about—the productivity of our market economy and our broader wellbeing—we are hugely dependent on conditions outside the boundaries of the market economy. When we fail to account for those conditions, we get a distorted view of economic trends and our ability to predict and respond to emerging problems is limited. It may not have been a problem when our market behavior had only a small effect on the natural economy. But that is no longer the case.

We should begin to account for our natural public goods. Public goods and services are those that are shared and thus resist ownership and market exchange. Are they less important than market goods? Absolutely not. They are just more difficult to measure.

Consider a piece of undeveloped land. In general, land produces both private and public goods. For example, commercial timber harvests are private goods. Timber is bought and sold. The quantity and price of timber is used in GDP and its contributions to consumption duly noted. But the land on which the timber is grown also produces shared, public goods that are not traded in markets. That same piece of land will provide water and air quality improvements, open space, recreational opportunities, and biodiversity preservation that are public goods. Because these goods and services are not bought and sold in stores, they do not appear in GDP.

In 1995, Congress explicitly directed BEA to abandon its explorations of environmental accounts. It is unclear why they did so. Though clearly, environmental accounting won't make everyone happy. Who benefits from the status quo? Presumably, parts of our economy with the largest unmeasured environmental footprint. To this day, Congress has failed to appropriate a single dollar to support the activity.

**Recommendation:** Congress should encourage, rather than discourage, the creation of environmental accounts and appropriate funds to explore their development.

## First Steps

To a limited extent, we monitor environmental public goods already. However, there is an important difference between monitoring and accounting. Accounting involves collecting data, explicitly weighting goods and services enjoyed, and aggregating the data according to accounting rules. Accounts are more than an ad hoc collection of indicators: they are derived from economic principles and aggregated, according to accounting rules that prevent things like double counting.

The first step toward green GDP or environmental satellite accounts is to develop and debate the accounting objectives and rules to be applied to natural public goods. The details of this debate may seem arcane, but they are fundamental to the ultimate success of such a system. Our existing accounts benefit greatly from a century-long intellectual debate over how to appropriately measure the market economy.

**Recommendation:** Aspire to and develop an accounting system, not just environmental indicators.

The influence and power of our existing national accounts owe a great deal to BEA's political independence. Political interference in national accounts has occurred in other countries (Argentina recently) with disastrous consequences for the accounts and their future legitimacy in the eyes of the public and private sector.

Bureaucratic independence is also essential. While it may seem natural to put the U.S. Environmental Protection Agency (EPA) in charge of environmental accounts, this would in fact be a bad idea. EPA, after all, is a trustee agency—along with the National Oceanographic and Atmospheric Administration, Army Corps of Engineers, and U.S. Forest Service—charged with protecting the environment. It is highly desirable to separate the management and trustee function of our federal agencies from the measurement of performance. Also, the federal environmental agencies have no existing environmental or economic accounting capability.

**Recommendation:** Environmental accounts should be designed and administered by an institution that does not have environmental management responsibilities (not EPA, for example).

Another recommendation is that national environmental accounts be developed as “satellite” accounts. Satellite accounts stand alone and are not fully integrated into the existing system of accounts. Over the longer term, the appropriate aspiration is to fully integrate our natural public accounts with our market accounts so that we will have an integrated “Green GDP.”

But constructing a natural public good account will be extremely difficult, from both a theoretical and measurement perspective. A great deal of experimentation and debate has to occur first. The point of a satellite account is to test development of a GDP-like account that could eventually be integrated with GDP itself. In the meantime, however, the appropriate venue for experimentation and debate is a satellite account.

**Recommendation:** In the near term, focus on developing an environmental satellite account, rather than an integrated “Green GDP.”

Note that market goods usually come in conveniently pre-defined quantity units—the cars, washing machines, haircuts, and restaurant meals consumers buy every day. For natural capital, its many public, non-market goods and services are not defined, provided, and priced by markets. This means, of course, that we lack the market data—units sold, prices paid—so useful to accountants of the market economy. Figuring out how to measure the consumption of public goods is a very real challenge for any future environmental account.

The existing accounts are not to be modified lightly. They are too valuable in their existing state and users will resist modifications that have not proven themselves through substantial trial and error.

### **Where Do Accounting Efforts Stand Today?**

National environmental accounts are in an early stage of development. No practical example of any scale exists. In the United States, the history is confined to a small set of academic explorations and an occasional call for accounts from the National Academy of

Sciences or non-governmental organizations (like Resources for the Future and the International Union for Conservation of Nature). Recently, the Government Accountability Office has raised the issue as a subject for exploration.

More is going on internationally. In 2003, the UN produced a handbook describing their view of integrated environmental and economic accounts. Some countries, notably Norway and Canada, have experimented with certain kinds of accounts, though these efforts are in the beginning stages.

It should be noted that there is a range of opinions on the best way to pursue environmental accounts. Some advocate “material flow accounts” designed to track the physical use and movement of inputs such as timber throughout an economy. European accounting activities are largely focused here. Material accounts are useful and important but they are not the same thing as an economic product account. Material accounts are not analogous to GDP, for example.

Another strategy that is being pursued in Canada is the development of what can be called “near-market” accounts: these focus on things like timber, energy, water, and minerals that play important roles in the market economy. It is practical for accounting systems to focus on near-market assets, goods, and services because the near-market is where it is easiest to collect credible data on quantities consumed and price paid. The downside, of course, is that the scope of these accounting systems is relatively narrow. They “look under the lamp-post” rather than focus on the areas where we are most ignorant. In particular, they ignore the environment’s public, non-market goods and services.

Then there is China’s recent calculation of a so-called Green GDP for their economy. The Chinese effort is to be commended as a surprisingly forthright, courageous attempt to acknowledge the environmental costs of the country’s rapid economic development. However, the Chinese effort should not be thought of as an environmental accounting system and therefore the term “green GDP” is deceptive and inaccurate. In essence, the Chinese government made a one-off estimate of certain environmental damages and then subtracted those costs from their GDP estimate. The result is what can be called an “adjusted GDP” estimate. Specifically, their analysis of certain health and pollution remediation costs showed a \$63 billion annual cost to their economy. If this amount were subtracted from their GDP, it would amount to a three percent reduction in the reported amount.

This is the right idea, in the sense that China is attempting to determine the environmental costs of their material, market production. And, it should be noted that China’s efforts far

exceeds any corresponding U.S. activity in this arena. So why is China's "Green GDP" not environmental accounting?

First, the deduction of environmental costs was a one-off estimate rather than a system designed to consistently track environmental conditions and their economic implications over time. Tellingly, there are no plans to make similar adjustments in the future.

Second, accounting systems are constrained by their structure in a way other measurement systems are not. Accounting systems rely on rules to facilitate and discipline measurement. At the firm level, double-entry bookkeeping is an example. At the national level, so is the definition of GDP and the other National Income and Product Accounts. Accounting identities facilitate aggregation and comparison of the system's components in ways indicator systems or one-off adjustments do not.

Finally, China's effort suffers from the same "looking under the lamppost problem" as other near-market accounting efforts. For pragmatic reasons, no information about current or future ecological damage or damage to China's natural public goods is included in their GDP adjustment. Yet these are the most important damages to count because they are the damages most hidden from our current accounting systems.

***Recommendation:*** The United States should learn from and engage with international environmental accounting efforts. However, we should not necessarily mimic the accounting strategies currently pursued by other governments.

## **The Data to Build Environmental Accounts**

Do we have the data to get started and how much would it cost? First, building environmental accounts involves more than simply collecting data. Environmental accounts require an institutional home, which could be within the BEA or in the early stages outside the government. But the first step is a period of focused intellectual deliberation over the accounting objectives and principles to be pursued. I noted earlier that there is a range of strategic options from near-market accounts such as those pursued in Norway, GDP adjustments as in the Chinese example, and true non-market accounts.

Second, once a strategy is decided upon, there are difficult economic and ecological questions surrounding what should be counted and then how what is counted should be weighted

in the overall account. As noted earlier, these issues are complex because we will lack the clearly-defined units (prices and quantities) available to accountants of the market economy. It took decades of intellectual debate and vetting to arrive at the structure and underlying principles of our market accounts. Environmental accounts will require a similar scale of effort.<sup>1</sup>

In terms of the data itself, the news is both bad and good. Bad, because the measurement of environmental conditions and features is very incomplete. As the recent Millennium Ecosystem Assessment put it:

“There are major gaps in global and national monitoring systems that result in the absence of well-documented, comparable, time-series information for many ecosystem features and that pose significant barriers in assessing condition and trends in ecosystem services. Moreover, in a number of cases, including hydrological systems, the condition of the monitoring systems that do exist is declining.”

This is as true of the United States as anywhere, as recent assessments have concluded (Heinz Center, GAO, 2005).

When data is collected, units are inconsistently defined and collection starts and stops depending on funding. Another problem is that data is often hoarded (or ineffectively shared). Today data is spread across numerous federal agencies (including EPA, National Aeronautics and Space Administration, NOAA, U.S. Geological Survey, the Fish and Wildlife Service, and Army Corps of Engineers), the states, and local administrative units such as water management districts. No existing government agency—even EPA—is as yet the focal point for collection and distribution of environmental information.

The good news is that there is a global information revolution underway that promises to remake the collection and presentation of environmental data. First, it gets cheaper and cheaper every day to monitor environmental features and conditions with remote sensing data. Second, freely available software innovations are transforming our ability to aggregate, manipulate, and visualize complex map-type data. Google Earth, NASA’s World Wind, and Microsoft’s Virtual

---

<sup>1</sup> The BEA’s annual budget is in the range of \$90 million. However, this should not be thought of as the full cost of our national economic accounts, since BEA relies on data collection and analysis from other agencies, such as the Census, Internal Revenue Service, and the Labor Department.

Earth are the front edge of this rapid transformation. These technologies will be a boon to environmental accountants.

National environmental accounts will benefit from the development of new mapping and global measurement technology. These technologies will lower the cost and empower the development of environmental accounts.

## **Conclusion**

The word “accounting” puts people to sleep. It is certainly not the sexiest way to engage a concerned American public. But accounts—whether of companies, households, or entire economies—are necessary to predict, manage strategically, and govern accountably. Put the other way around, failure to account for environmental goods and services is a good way to do nothing and deny our environmental problems.

At the root is a simple human truth: we need clear, simple goals or the world’s complexity overwhelms us. This is particularly true where the environment is concerned. We are presented with too many things to track and too many competing goals. Accounting is a time-tested tool for dealing with this exact problem: it helps us boil down complex factors into a few simple truths on which we can focus. The United States currently does *no* environmental accounting to speak of. The natural economy deserves the same seriousness we direct toward our market economy. Let us begin.

*For further reading from the author, more detailed descriptions of environmental accounts, and citations to the international literature on the subject see: [www.rff.org/greengdp](http://www.rff.org/greengdp).*

## References

- Heinz Center for Science, Economics and the Environment. 2006. Filling the Gaps: Priority Data Needs and Key Management Challenges for National Reporting on Ecosystem Condition. Washington, DC.
- Hecht, Joy E. 2000. Lessons Learned From Environmental Accounting: Findings from Nine Case Studies. IUCN – The World Conservation Union, Washington, DC.
- Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-Being: Synthesis. Island Press, Washington, DC.
- National Academy of Sciences. 1999. Nature's Numbers: Expanding the National Economic Accounts to Include the Environment. Washington, DC.
- United Nations. 2003. Handbook of National Accounting: Integrated Environmental and Economic Accounting. New York, NY.
- U.S. GAO. 2005. Status of Federal Data Programs that Support Ecological Indicators, GAO-05-376. U.S. GAO. Washington, DC.
- U.S. GAO. 2007. Measuring Our Nation's Natural Resources and Environmental Sustainability, GAO-08-127SP. U.S. GAO. Washington, DC.