Valuing Our Natural Wealth

When we ask how Canada is doing, and how well off we are as a society, we generally look at how fast our economy is growing. But we can grow the economy, at least temporarily, by depleting natural resources, by debt financing, and by spending more money dealing with sickness, crime, war, pollution and disasters. These are hardly indications that we are better off as a society.

This issue of Reality Check focuses on one of the fallacies of standard measures of progress: our failure to account for natural capital. Because Canada is a forest nation, with forests covering close to half our land mass, and because we are the largest exporter of forest products in the world, this issue of Reality Check highlights this vital resource. In a comprehensive Canadian index of wellbeing, natural resource accounts tracking the state of our forests would be essential.

The story of our forests shows that the failure to account for the value of natural capital can send misleading and even dangerous signals to policy makers. Conversely, measuring and valuing forests and other natural wealth accurately can encourage better policies that change the way we harvest, market, and conserve our resources. In the following pages, we point to practical models that show a new way forward.

Although our enormous natural wealth makes us much richer as a nation than standard economic measures show, good natural resource accounting is only in its infancy in Canada. The statements, conclusions, and recommendations in this issue of Reality Check are necessarily tentative and approximate, but they raise questions that are essential to pursue in assessing our natural wealth accurately.

The next issue of Reality Check will take a parallel look at the health of Canadians – as vital an element of our human capital as forests are of our natural capital. Properly valuing our human capital, and accounting accurately for the health of Canadians, will shift policy and budgetary allocations from an almost exclusive concern with disease treatment to a greater emphasis on disease prevention and health promotion. Together, these two issues of Reality Check demonstrate that what we measure shapes policy and even determines what issues make it onto the policy agenda.

Counting the True Value of Our Forests

The more trees we cut down, and the faster we cut them down, the more the economy grows, and therefore, the more prosperous we think we are.

We have made that mistake before – with catastrophic consequences. Right up to the eve of the Atlantic groundfish collapse, the fishing industry appeared to be booming. Because we mistakenly relied on economic growth measures like the Gross Domestic Product (GDP) to tell us how well off we were, we record fish landings fooled policy makers, if not fishermen, into thinking the fishery was healthy.

GDP measures the total value of all goods and services produced in the market economy, and the total money earned and spent. GDP only values natural resources when they are harvested and sold. It makes no difference to the GDP what is growing in the forests when they are harvested and sold.

The GDP counts an increase in fish exports and timber sales as growth, but ignores what harvesters leave behind in the sea and the forests. What’s left behind is the natural capital on which these industries depend. Counting only the timber sales is akin to a factory owner selling off his machinery, or capital, and counting the sale as profit. We need a better way to value our natural wealth.

New measures of wellbeing in Canada value our natural resources as natural wealth, giving us a more accurate picture of how we are doing as a society. If we tend natural resources carefully, we can pass them on to future generations in good condition. If we degrade and deplete our forests, fisheries, soils, and other resources, we create a debt our children will inherit.

Timber harvest levels in Canada have risen 60% over the past 30 years, contributing to GDP growth. But vast areas of our forests can no longer perform their vital functions as effectively as they once could. Much of the timber they yield isn’t as valuable as it could be if we had conserved older forests composed of more valuable species.

Increased efficiency in mills and harvesting equipment means that expanding timber harvests have not produced commensurate increases in jobs.

Over the past 30 years, the ratio of forest industry jobs to wood harvested has dropped from 2.16 jobs per 1000 cubic metres in 1970 to 1.82 jobs per 1000 cubic metres in 1999.

Canada’s job-to-harvest ratio of about 2.0 jobs for every 1000 cubic metres of wood harvested, compares to 2.6 in the United States and 3.0 in Sweden.

Nor is our forest industry creating as much money as it could. We generate about $163 for every cubic metre of wood harvested here, while Sweden generates about $178, New Zealand $247, and the United States $318. In other words, we don’t add much value to the wood we harvest.

If we value our forests properly we’ll get a more accurate picture of the state of our natural forest wealth. We can then design incentives to harvest sustainably, conserve resources, and enhance the value of our forests.
Old forests are more than trees

The value of Canada's forests goes well beyond timber. From protecting against drought and flood to regulating the constituents of the air we breathe and securing wildlife habitat, old forests provide vital services to most living beings.

In the long run, these non-market services have direct economic value. For example, healthy wildlife habitat also serves the tourism industry and the recreational needs of Canadians, and produces spending on nature and wildlife-related activities.

The World Resources Institute says Canada's forests are home to roughly two-thirds of the country's estimated 140,000 species of plants, animals and microorganisms. Forests of all ages are equally important.

Many of these species depend specifically on large trees and old forests to live. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) says that one quarter of all species at risk are dependent on old forests and related services.

With the cutting of old-growth forests—which has been happening since European colonization—the habitat of old-growth dependent plants and animals is disappearing.

Where the disappearance of habitat—such as large standing or fallen dead trees—comes the disappearance of species.

Most Canadian species at risk live in two areas that have undergone extensive clearing and fragmentation: the Carolinian Forest Region of southern Ontario. Roughly 60% of Canada's endangered forest-dwelling species inhabit the Carolinian Forest Region. The Canadian Forest Service lists 84 forest-dwelling species at risk—18 mammals, 17 birds, 39 plants, and 10 reptiles.

Protecting biological diversity—from microbes to animals such as pine martens—is an important step in maintaining ecosystem functions and services. Biodiversity not only affects the variety of life and all its processes, and includes the living organisms, their genetic differences, and the communities in which they naturally occur. Old growth forests, rich in biodiversity, house many different plants and animals that have specialized needs. As these patches get further apart, there are fewer and fewer places for forest-dependent animals to go. As such, these patches get smaller and smaller, there are fewer and fewer places for forest-dependent animals to go. As these patches get further apart, remaining populations are isolated from one another, and the risks associated with migrating from one patch to another increase.

Species at risk face a variety of threats. As patches of forest get smaller and smaller, there are fewer and fewer places for forest-dependent animals to go.

Despite government and industry initiatives to improve logging practices, Canada cuts more trees today than it did 30 years ago. In the early 1970s, we cut about 120 million cubic metres per year. By 1999, harvesting increased to more than 190 million cubic metres per year. In its 2000 report on Canada's forests, the World Resources Institute states that “under current management practices, harvesting rates appear unsustainable over the long term.”

Where have all our old forests gone?

Across the globe, frontier forests are shrinking. According to the World Resources Institute (WRI), just 20% of the earth's frontier forests remain. WRI defines frontier forests as “large, intact and functionally distinct natural ecosystems.” Old growth forests are defined more generally as ecosystems characterized by old, often large diameter trees, a multi-layered canopy, plenty of deadwood (both standing and on the ground), and many microhabitats.

Canada still has vast areas of frontier forest in the north, and threatened patches of frontier forest in every province except in the Maritimes, where none remain. However, Canada is still conducting substantial logging within old-growth forests. We are the world's biggest exporters of timber cut from such forests, and cutting leases on crown land are now expanding into the north. About 80% of all wood cut in 1999—the most recent year for which data are available—was clearcut, while 20% of the wood was cut using the more careful selective method. In 2000, British Columbia reduced its clearcutting from 87% to 60% of total harvests, which is the national average down to about 85% when new data appear.

Nova Scotia forests Over 80 Years Old as a percentage of total forest area, 1954 to 1995

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Of the nation's 10 major forest types, two have lost about 60% of forest cover and seven are severely fragmented, zig-zagged by logging roads over more than half their territory. This fragmentation threatens ecosystem integrity, and undermines the capacity of forests to perform their functions effectively. Provincial snapshots show varying degrees of forest loss. For instance, more than half the Canol forests are primary and outer forests bordering the prairies have been converted to farmland and residential land. The Pembina Institute estimates that Alberta's forests are getting burned or harvested faster than they are growing and replenishing themselves. In British Columbia—home of one-fifth of the earth's remaining temperate rainforest—more than 80% of forests are allocated to logging companies. Nova Scotia has lost almost all its remaining old forests in the last generation.

Indeed, Nova Scotia can act as a warning for other provinces, especially British Columbia, where significant old forests still remain. In 1958, a provincial government report estimated that Nova Scotia had already lost most of its valuable, original forest, with much of it replaced by young-age-classes, and low-value, short-lived species.

But even in 1958, nearly 60% of Nova Scotia's forests were more than 60 years old. Today, that number is just 12%. Forests 80 to 100 years old declined even more sharply, from about 16% of total area 40 years ago, to less than 1% by the mid-1990s. Even the remaining forest is the worst, dropping from 8% in 1958 to 0.18% today. Largely due to over-cutting, Nova Scotia's long-lived tree species have dwindled. Today, low-value, short-lived stands dominate. The premium-priced, large dimension, clear wood that comes from old forests has nearly disappeared.

The loss of old forests has also reduced Nova Scotia's forest carbon storage capacity by about 38% in the last 40 years alone. Climate change economists estimate that every tonne of carbon stored in our forests prevents $20 in potential damages due to climate change. By that reckoning, the degradation of Nova Scotia's forests over the last 40 years is predicted to cost the province $9.1 billion, or $3.1 billion in current dollars. Such changes in the composition and type of Canada's forests represent a real loss of natural capital—one that traditional measures of economic growth and wellbeing have missed.
Mechanization: does it really pay?

The forest industry has come a long way from the two-man cross-cut saw and oxen of the 1870s. Today, one fellerman can do the job of nearly a dozen workers, cutting more wood and bringing in more profits in a shorter period of time. Across Canada, the volume of timber cut has steadily increased without a commensurate increase in jobs. Over the past 30 years, the proportion of forest sector jobs to wood harvested has dropped by about 15%, while harvest rates in British Columbia are up by 60%. Increasing mechanization may be desirable for a lumber company whose eye is on greater volumes and short-term profit margins. But from the viewpoint of a resource-dependent community, the wrong kind of mechanization can threaten jobs, deplete the resource those jobs depend on, and undermine the prospects of future generations.

The problem is not technology per se, but the type and purpose for which it is used. Technological innovation can be highly compatible with intelligent resource use, energy efficiency, environmental conservation, and economic savings. Emissions controls on vehicles and combined cycle power generation are two obvious examples. But mechanization aimed at felling more trees more quickly has actually made it harder for logging contractors to earn a modest living after paying all the bills. Pressure to pay for expensive machines means cutting night and day, working 80 to 100 hours a week, stopping only for breakdowns, and often carrying more than $1.5 million in debt. To run a harvester and a forwarder for a typical 10-hour work week can cost about $2,700 in fuel expenses alone, based on using 36 litres of diesel fuel per hour at $0.75 per litre. Maintenance of a tractor-trailer can cost at least $10,000/year. The chronic indebtedness and extremely long work hours of many logging contractors directly affects their quality of life, stress levels, and health. Statistics Canada reports that long hours of work may increase the risk of smoking, alcohol abuse, lack of physical activity, sleeplessness, poor eating habits, and other negative health outcomes.

There are other ways to harvest trees, using more appropriate technologes. The Menominee Tribe in Wisconsin has logged an 89,000-hectare forest for 147 years. The reservation has more wood of higher quality today than when it was established in 1854. The Menominee motto is to cut what the forest provides, and never modify a cut for the market. Even when wood prices are high, Menominee forest managers resist the temptation to cut more. Fifty per cent of the harvesting that takes place today is for timber, and the remaining 50% is for energy. The tribe sells wood to local industries as well as pulp mills and paper industries. The 14 percent of the harvest used for energy is converted into electricity, which represents thousands of pulp and paper mill workers, says the only way to avoid mill closures is “to influence investments [that] move the Canadian industry up the value chain.”

Jobs plus...or minus?

With more sustainable harvest practices, Canada’s forests could produce many more jobs. According to Natural Resources Canada, in 2001 the forest sector created about 35,000 full-time equivalent jobs – 16,500 in harvested product manufacturing, 110,500 in paper manufacturing, 56,600 in logging, and 24,300 in forestry services. More than 1,600 Canadian communities depend on forest industry jobs, 337 of them for more than half of their employment.

But the number of jobs alone tells us little about the long-term livelihood security of forest-dependent communities. To link viable employment with sustainable forestry management, we should be asking, “On an annual basis, how many jobs are created per volume of wood harvested?” Adding value to each unit of wood harvested should create more jobs per volume of wood harvested.

By this criterion, Canada’s forest industry doesn’t look quite so robust. Despite a 60% increase in wood harvested annually over the last 30 years, the ratio of jobs to wood harvested has remained static at 2 jobs for every 1000 cubic metres. That puts Canada well behind the U.S. at 2.62 jobs per 1000 cubic metres harvested, and Sweden, at 3 jobs for the same harvest.

In some provinces, the overall ratio of jobs per unit of wood harvested is actually decreasing. In Nova Scotia, for instance, the ratio of jobs per unit of wood harvested has declined by about 24% over the last two decades, while volumes of wood harvested have doubled. And in British Columbia, the volume of cut has nearly doubled – from roughly 40 million cubic metres per year in 1960 to 75 million cubic metres in 2000 – while the ratio of jobs to wood harvested has declined.

“Overall, poor jobs, lower quality wood. In fact, the opposite is happening in many parts of the country. Provinces such as Nova Scotia have seen the near-complete loss of older forests, along with a decline in valuable, high quality timber, resulting in fewer opportunities to manufacture a diverse array of wood products. Tending the forest better could produce better-quality timber that would produce more jobs.”

Another reason there has been no increase in jobs per volume of wood harvested is that too few companies add significant value to the wood they buy. Additional processing, whether at a mill or in the field, produces more human effort, tools, and machines. Each additional step employs more people, and creates a product of higher value. One U.S. study found that over time, wood leaving loggers, which creates just 3 jobs for every million board feet harvested, while turning it into furniture parts creates another 20 jobs, for a total of 23 jobs for every 1000 cubic metres. By this criterion, Canada’s forest industry doesn’t look quite so robust. The pulp and paper industry, by contrast, creates just 1.4 jobs for every 1000 m³ of wood harvested annually, and a modern sawmill creates less than 1 job per 1000 m³ annually.

Adding value translates into dollars, too. Canada generates $653 per cubic metre of wood harvested, as opposed to $1813/m³ in the U.S. and $3501/m³ in Japan. Among the provinces, Ontario adds the most value to its harvested trees at $237/m³, followed by Quebec at roughly $240/m³ and Manitoba at $187/m³. British Columbia, which harvests almost as many logs as the U.S. puts together, creates just $110/m³, while Alberta creates $88/m³ and Nova Scotia creates an anemic $82/m³. These provincial figures are based on 1997 data. Instead of turning our forests into top wood products, we’re chopping them into cheap lumber and grinding them into pulp and paper. The Communications, Energy and Paperworkers Union, which represents thousands of pulp and paper mill workers, says the only way to avoid mill closures is “to influence investments that move the Canadian industry up the value chain.”

Reliance on pulp and paper exports to the U.S., and a relatively small domestic market for high quality finished wood products, have contributed to Canada’s low value-added performance. Recent job growth in wood products manufacturing may signal the beginning of a shift to greater value-added production. A switch from clearcutting to selective harvest practices, and also reduce more jobs. This is an example of how economic growth statistics, viewed in isolation, send misleading signals to policy makers. If Canadian governments were to encourage selection harvesting and value-added wood industries, the country could create far more jobs and wealth from its forest-based industries.
Clearcut. Slow-growing trees are cut, and the healthiest, tallest, and best-formed trees are left behind. Long-lived valuable tree species are favoured, and old-growth trees, live and dead, are left alone. When the stand is harvested again in 15-20 years, the quantity and volume of wood has improved. Ecological forest practices also protect forest soils from root damage, rains, and erosion. They also ensure that standing trees are not damaged during logging. They maintain a protective canopy of trees; protect significant wildlife habitat; and plan for the long-term health of the forest, ensuring that forest volumes do not exceed annual growth rates. At Windhorse Farm in southwest Nova Scotia, managers have shown what sustainable logging can do. Despite 162 years of continuous harvesting, the value of this hemlock-dominated woodland has steadily increased. Some trees are 450 years old, and trees over 80 years old dominate more than 90% of the forest, compared to just 1% in the province as a whole.

Pictou Landing: a forest with a future

In 1992, the forests of the Pictou Landing First Nation were similar to most forests in Nova Scotia—subject to more than 300 years of land clearing, cultivation, burning, clearcutting, and highgrading (taking the best-formed, most vigorous trees and leaving behind the poor quality trees). By the 1990s, the Pictou Landing forests had been badly degraded and were dominated by short-lived, low value tree species, such as alders, white spruce, balsam fir, white and gray birch, red maple, and poplar. More than 70% of the trees were between 40-80 years old. The large-sized, long-lived trees of the Acadian forest, such as white pine, red oak, and sugar maple, had all but disappeared from Pictou Landing. Across Nova Scotia, foresters usually log for speed and quantity, typically cutting and replanting short-lived, fast-growing coniferous trees. These trees are cut again in short order. By contrast, Pictou Landing practices “restoration forestry.” This method fosters the growth of many species, creating an opportunity for the development of an old-growth forest. It also provides a stable place for diverse populations of mammals, birds, reptiles, amphibians and micro-organisms. Restoration forestry requires knowledge and patience. The work of returning a forest to its “natural” state could take as long as 400-500 years—depending on the condition of the forest.

One way to allow restoration to occur is simply to leave a forest alone. In time the forest will heal itself. However, restoration can also be sped up a little bit, if done carefully. Benefits can be realized along the way. That’s what is happening at Pictou Landing. In March 2000, Pictou Landing was internationally recognized as a forest with a future. It became the first Forest Stewardship Council (FSC) certified forest operation in Nova Scotia, and one of only ten FSC certified forest operations in Canada. The FSC supports environmentally appropriate, socially beneficial, and economically viable management of the world’s forests. With this certification, all wood products from Pictou Landing can now be labelled with a ‘green’ sticker that guarantees they came from a certified well-managed forest.

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