



FINDINGS FROM THE U.S. BOOK INDUSTRY

# environmental trends and climate impacts

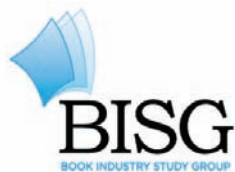
A Research Report Commissioned by  
Book Industry Study Group and  
Green Press Initiative

Prepared by Borealis Centre for  
Environment and Trade Research

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# Foreword

At the end of 2006, I invited the members of the Book Industry Study Group to suggest areas to which I ought to give priority when planning the organization's research activities in 2007 and beyond. Among the many replies I received, one theme stood out prominently: the environmental impact of the book industry. Having worked on the report published here for more than a year, I now see that our members' views reflected a wider interest among the U.S. book industry in environmental issues, and extensive activity in many companies to reduce the negative impact they have on the environment.

This report uncovers many interesting findings and paints a picture of the U.S. book industry in which many companies—publishers, booksellers, printers, and manufacturers—are deeply committed to improving the impact they have on the environment and are taking innovative and creative steps to realize that commitment. However, the report is only a first step. More work is needed to complete the picture and to provide guidance to the many businesses that would like to implement effective change. I hope this report stimulates discussion on the issues it covers and prompts book businesses in all sectors and of all sizes to review their procedures and policies, so that we see in the years ahead even more progress than is detailed in these pages.

—Michael Healy, *Executive Director,  
Book Industry Study Group, Inc.*

When it comes to environmental responsibility, the U.S. book industry has much to be proud of and much work to continue to do. The good news is that businesses in nearly every facet of this sector are taking concrete steps to improve their social and environmental impacts. That this report came to be and was sponsored and guided by a diverse group of business leaders is a testament to the level of commitment at play. The report contains a wide range of interesting findings and trends related to the book industry's carbon footprint and impacts on forests, shifts in recycled fiber and certified fiber use, reader attitudes, environmental policy development, and much more. I was pleasantly surprised to see how recycled and certified fiber use is increasing, and I was fascinated by the calculations related to the industry's carbon footprint, among many other findings. Our hope is that this information will help to inform, inspire, and guide the next steps in this ever-evolving transformation.

—Tyson Miller, *Founder and Director,  
Green Press Initiative*



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# Introduction: Summary and Highlights

This study of the U.S. book industry is the first of its kind; it seeks to help the industry understand its environmental impacts, assess possible areas for improvement, and make specific recommendations about improving its ecological footprint. The Book Industry Study Group and Green Press Initiative invited their respective constituents involved in all segments of book production to take part in the 2007 Environmental Benchmarking Survey. Invitations to participate were sent to over 1,000 stakeholders including book publishers, retailers, distribution companies, and paper mills. The response rate included 13 printers representing 24.6% of market share as measured by revenue; six paper mills representing 17% of market share as measured by the quantity of paper produced; and 76 publishers representing more than 45% of market share by revenue.

The study tracks a wide variety of environmental indicators, including energy use by all participants of the book industry in all segments, environmental policy development, transportation of books, resource consumption, the certification and conservation of forests, and the production, disposal, and recycling of paper.

## The Industry's Climate Impact

A carbon footprint assessment found that the entire book industry, through all steps of production, retail, and publishing activities, emits a net 8.85 pounds per book or 12.4 million metric tons of car-

bon emitted for the entire U.S. book industry each year. The majority of the climate impacts are connected to loss of carbon storage capacity from a heavy reliance on wood fiber for paper and from the energy requirements for producing paper. The decomposition of books in landfills, book distribution, and energy consumption at the retail level were the next largest carbon impact areas, as described in Table I.

The carbon footprint model used to calculate the book industry's climate impacts is comprehensive and grounded in science. However, it accounts for forest carbon loss due to harvest, a factor that many existing models have yet to attempt. This issue and the many complex layers connected to it are explored in-depth later in the report in the section. The Climate Impact of the Book Industry and Its Carbon Footprint, starting on page 23.

## Impacts on Key Forests

The sourcing of forest fiber still poses risks for the book industry. Several regions where book paper fiber is procured have areas of Endangered or High Conservation Value Forests that are not yet protected. Impact areas include the forests of the southeastern United States and large areas of wilderness forests in Canada, Indonesia, and northern Europe, as well as smaller areas of rare or disappearing forest ecosystems in the western United States, Brazil, Chile, and Russia. A list of studies of

**TABLE I** Carbon Impact Areas for the U.S. Book Industry

Segments of the Industry	Share of Carbon Emissions	Notes
Forest and Forest Harvest Impacts	62.7%	Harvest and transport of fiber to the mill constitute only 1.52%; the remainder, 61.22%, is removals of biomass from the forest. A portion of the latter is offset by storage in books, recycling of books, and energy recovery.
Paper Production, Printing Impacts	26.6%	Paper production at the mill constitutes 22.4%; the remainder, 4.16%, is printing and binding.
Landfill Releases (methane)	8.2%	Methane releases from landfilled books.
Distribution and Retail Impacts	12.7%	Distribution is for books to the market; retail is energy consumed in stores.
Publishers' Impacts	6.6%	Publishers' impacts are energy used in offices, internal paper consumption, and business travel.
Carbon Storage in Books and Energy Recovery	-16.8%	Books store a portion of the carbon from biomass in the products themselves; incinerating waste, although it has some of its own environmental risks, recovers some energy.

these forest areas is provided as a resource for purchasers to understand where the risks are for book paper sources.

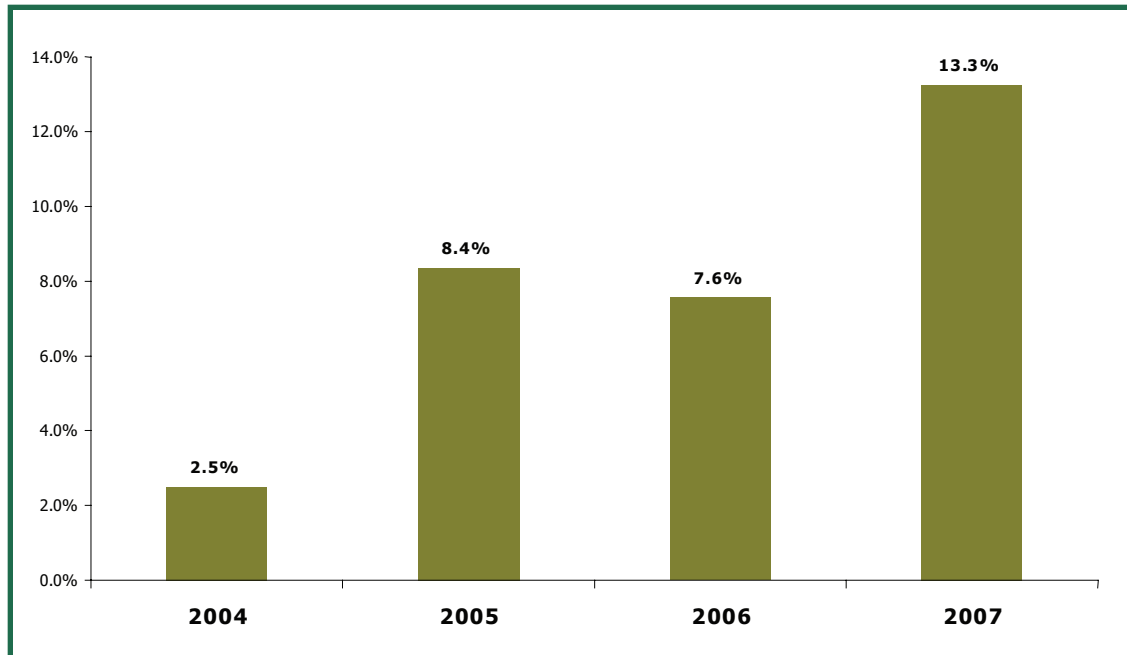
## Key Trends

Key trends in the book industry according to the surveys include:

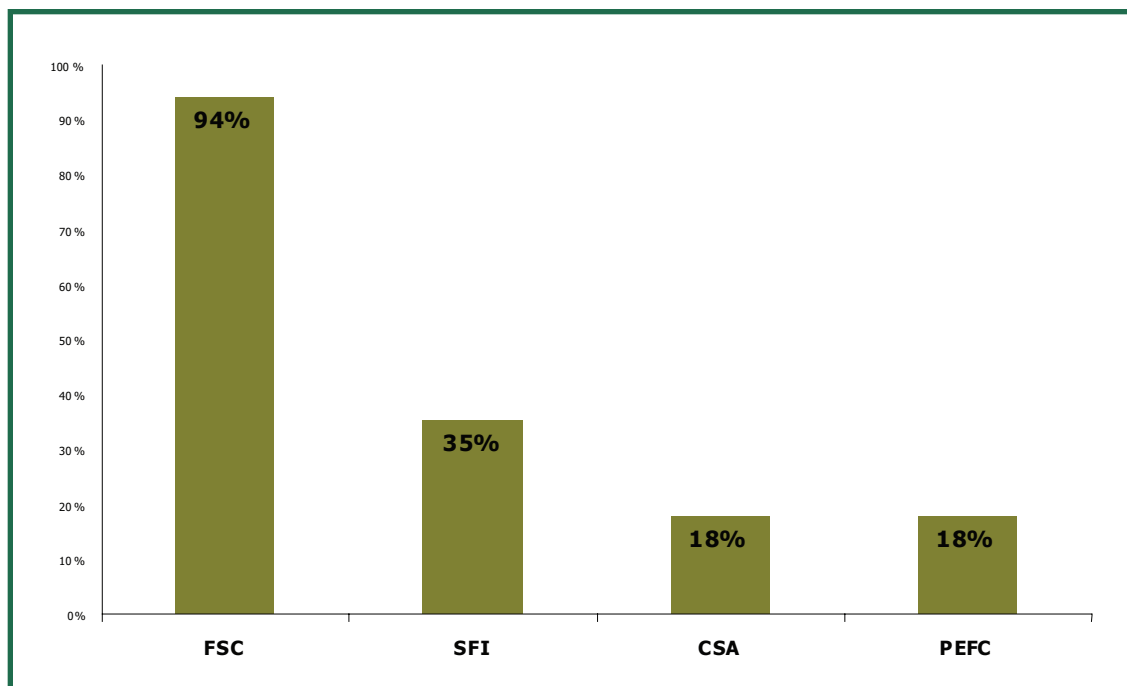
- There is a significant shift toward the use of post-consumer recycled fiber for books (see Figure 1).

- A significant proportion of companies involved in book publishing and retailing have environmental policies covering a spectrum of issues, from energy use and transportation to the use of environmentally responsible paper.
- The use of certified virgin fiber is increasing, as is and industry support for certified fiber through environmental policies is also increasing, with the Forest Stewardship Council (FSC) certification as the most preferred certification system (see Figure 2).

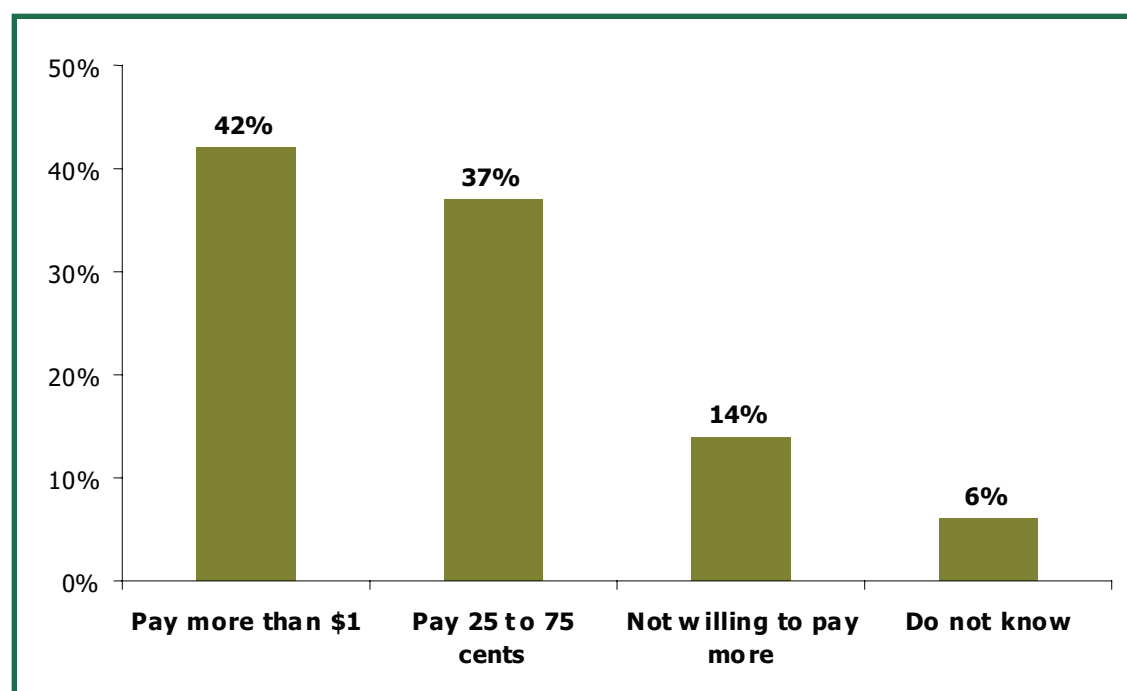
**FIGURE 1** Post-Consumer Content in Book Papers: As Reported by Mills.



**FIGURE 2** Survey Response: Preference of Certification among Publishers and Printers. (FSC = Forest Stewardship Council; SFI = Sustainable Forestry Initiative; CSA = Canadian Standards Association; PEFC = Programme for the Endorsement of Forest Certification.)



**FIGURE 3** Willingness to Pay for Books on Recycled Paper.



- Support for the *Book Industry Treatise on Responsible Paper Use* also demonstrates strong support for increasing recycled and certified fiber. It has been endorsed by 150 publishers, 10 printers, 4 paper manufacturers, and 75 other industry stakeholders.
- Reader support for industry innovation is strong. A poll commissioned by *Book Business* magazine and Green Press Initiative—the results of which are shown in Figure 3—demonstrated readers’ willingness to pay more for books with a higher environmental profile.

## Success Models and Next Steps

The report ends with positive case studies and recommendations for the industry, including:

- Reducing overproduction, ensuring the pulping of any unsold books, and increasing the use of recycled fiber in books.
- Maximizing the use of recycled and FSC-certified or equivalent fiber in paper.
- Moving to lower basis-weight papers where possible to reduce paper use.
- Adopting energy-saving measures and certified sustainable building plans, and purchasing renewable energy, especially in the retail sector.
- And much more.



# Survey Methodology

The Book Industry Study Group (BISG) and Green Press Initiative (GPI) invited over 1,000 constituents involved in all segments of book production to take part in the 2007 Environmental Benchmarking Survey between August 2 and November 2. Invitations to participate were sent to book publishers, retailers, printers, distribution companies, and paper mills. Stakeholders were offered an online survey and a spreadsheet questionnaire as options to respond. The online survey was a nearly exhaustive study on a wide range of environmental attributes while the spreadsheet questionnaire was a focused subset of questions. There was a total of 104 respondents. Respondents break down as follows by production segment:<sup>1</sup>

- 13 printers, 22% response rate by number of respondents, or 24.6% of market share as measured by revenue
- 6 paper mills, 22% response rate by number of respondents, 17% of market share as measured by the quantity of paper produced.
- 76 publishers, 13% response rate, greater than 45% of market share as measured by revenue
- 8 distribution companies
- 3 book retailers

<sup>1</sup>The total number of companies responding broken down by segment does not match the total number of companies responding, since several companies are active in more than one segment.

## Survey Limitations

The reach of the study was limited by the market participants and contacts known to those who created the survey participation invitation list. There is also likely a self-selection bias—companies that are currently undertaking environmental initiatives or have an environmental policy may have been more likely to respond to the survey. These issues aside, the participation rate and diverse company profiles do provide a solid foundation for reporting on environmental trends within the industry.

## Carbon Footprint Model

To assess the impact of the U.S. book industry on climate change, we have constructed a model of the book production, distribution, and retail process to determine where there are significant emissions of greenhouse gases to the atmosphere. The model includes all steps of the book-publishing process from forest management, to harvest, through paper and book production, distribution, retail, and waste disposal and recycling. The impacts discussed in this report are assessed for the books produced for the U.S. market, although many of the impacts, such as forest and plantation harvest, printing, and distribution may occur outside of the United States.

Our model is built on the example of the Carbon Trust, an organization in the United Kingdom that has been developing a “Carbon Footprint Mea-

surement Methodology.”<sup>2</sup> This methodology has been developed to determine the carbon footprint of specific products. Our own methodology has had to add to this in appropriate ways to capture the production for the entire process for the book industry in the United States.

The data for the carbon assessment depend on information provided from three sources: (1) the surveys and questionnaires submitted by book industry publishers, mills, retailers, distributors, and producers for which the information is complete; (2) published industry averages; and (3) studies estimating any data missing from the first two sources.

## Environmental Indicators

The indicators of environmental performance used in this report were developed by the report sponsors, a diverse Environmental Committee (chaired by BISG and GPI), and based on the indicators as developed by the advocates for a sustainable paper industry. The indicators consider energy use by all participants of the book industry in all segments, environmental policies of companies, transportation of books, inputs into the book manufacturing process during printing, resource consumption among publishers, the certification and conservation of forests, and the production, disposal, and recycling of paper. Given the prominence of the issue of climate change, energy use and the release of greenhouse gases play a prominent role in the analysis for this study. The *Book Industry Treatise on Responsible Paper Use* also provides a number of indicators.

<sup>2</sup>Please see the Glossary for a discussion of the term carbon footprint. The term is shorthand for the total greenhouse gas emissions (and potentially sequestration) from an activity and includes the other greenhouse gases such as nitrous oxide and methane. All the emissions are translated into carbon dioxide equivalents.

In September 2007, the Environmental Paper Network (EPN) released *The State of the Paper Industry: Monitoring the Indicators of Environmental Performance*,<sup>3</sup> which outlines what the EPN defines as the goals and best practices for a socially and environmentally responsible paper industry. The report develops proposals of measurement of the paper industry from the Network’s *Common Vision*, in which the EPN has advocated change: increasing collection and use of recycled paper, improving paper use efficiency and reducing overall consumption, responsibly sourcing virgin fiber, and clean technology.

The *State of the Paper Industry* report outlines the areas that the EPN believes the paper industry must reform to achieve sustainability. The following list, derived from the EPN report, is a set of measures relevant to book industry members for achieving a sustainable paper cycle.

### MINIMIZING PAPER CONSUMPTION

- Total paper consumption by the book industry
- Return rate

### MAXIMIZING RECYCLED CONTENT

- Share of post-consumer and total recycled content in books
- Amount of books that are recycled, incinerated, or sent to landfill

### SOURCING FIBER RESPONSIBLY

- The use of Endangered Forest or High Conservation Value Forest fiber in book paper
- The protection of Endangered Forests and High Conservation Value Forests in regions where book paper fiber is sourced

<sup>3</sup>[www.environmentalpaper.org/stateofthepaperindustry/index.htm](http://www.environmentalpaper.org/stateofthepaperindustry/index.htm)

- The share of book paper fiber that is certified for forest management
- The number of certificate holders along the book production supply chain
- The share of books with a certification logo that reach consumers
- The use of alternative fibers in book paper production

## EMPLOYING CLEANER PRODUCTION PRACTICES

- Use of materials: wood, water, chemicals, calcium carbonate

- Emissions from paper-making: greenhouse gases, sulfur dioxides, particulate matter, nitrogen oxides, volatile organic compounds, total reduced sulfur, mercury, other hazardous air and water pollutants
- Bleaching processes and the share of bleached pulp used in book paper

This report attempts to assess as many of these indicators as possible, or to provide information about how that information can be developed in the future with the participation of book industry members if it is not available today.

# Findings and Results of the Survey

The surveys provided important insights about the environmental policies and impacts of the book industry in the United States. We were able to estimate the overall climate impact of the industry (see Table II): the 4.15 billion books produced a carbon dioxide equivalent net emission of around 12.4 million tons and a net emission of 8.85 pounds *per book reaching the consumer*. The surveys also indicate a number of important trends under way in the industry about the use and procurement of paper for books. There are significant changes in the sourcing of certified fiber, attention to impacts in forests considered highly important from a biodiversity perspective, and energy use in most segments of the industry.

The results of the survey can be divided into two categories. First, there is a subset of responses sufficient to derive industry-wide averages. Second, there is a large number of responses to questions that are informative but anecdotal—

that is, there was not a sufficient number of responses to that set of questions to state with any certainty that they reflect an average for the industry.

## Environmental Policies

The first section of the survey was a set of questions for all companies regarding the company’s environmental policies. The survey covered whether companies have formal environmental policies, what the contents of the policies are, whether goals or targets were quantified or measured in some way, and how the policy is to be implemented and reviewed.

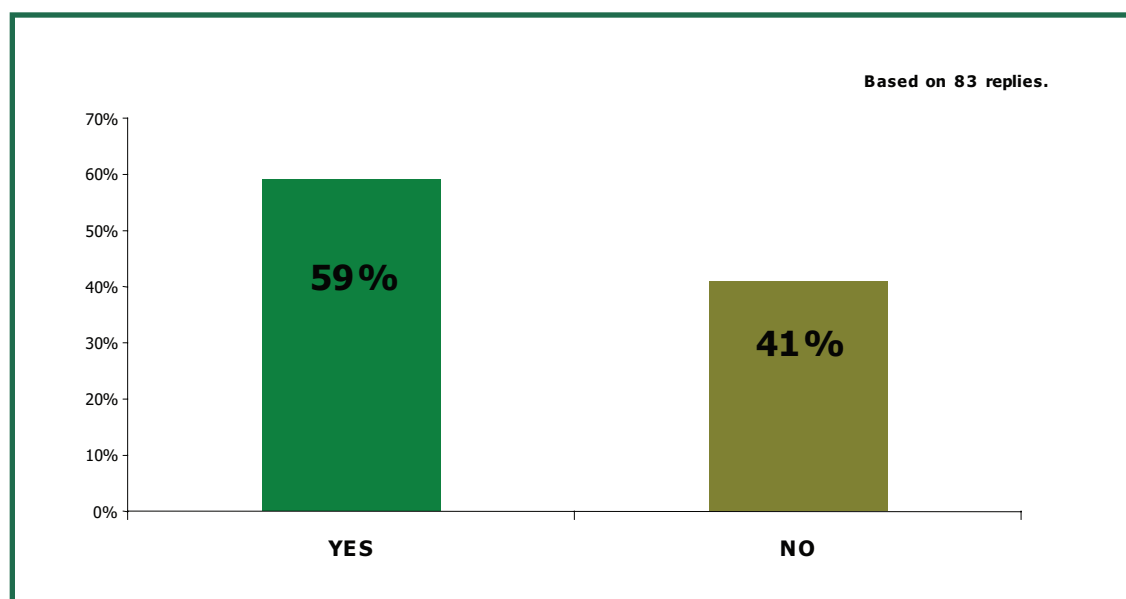
As a first step in meeting new challenges with environmental issues, many publishers, printers, and other companies in the book industry have developed company-specific environmental poli-

**TABLE II** Carbon Footprint and Key Figures, 2006

Number of books sold:	3.086 billion
Number of books produced:	4.15 billion
Paper consumed for books:	1.6 million metric tons
Returns/unsold books:	25%
Recycled Paper In Books*:	5%
Carbon Footprint/Book:	8.85 lbs. CO <sub>2</sub> equivalent
Total Carbon Footprint:	12.4 million metric tons

\*Estimated average for the printing and writing sector.

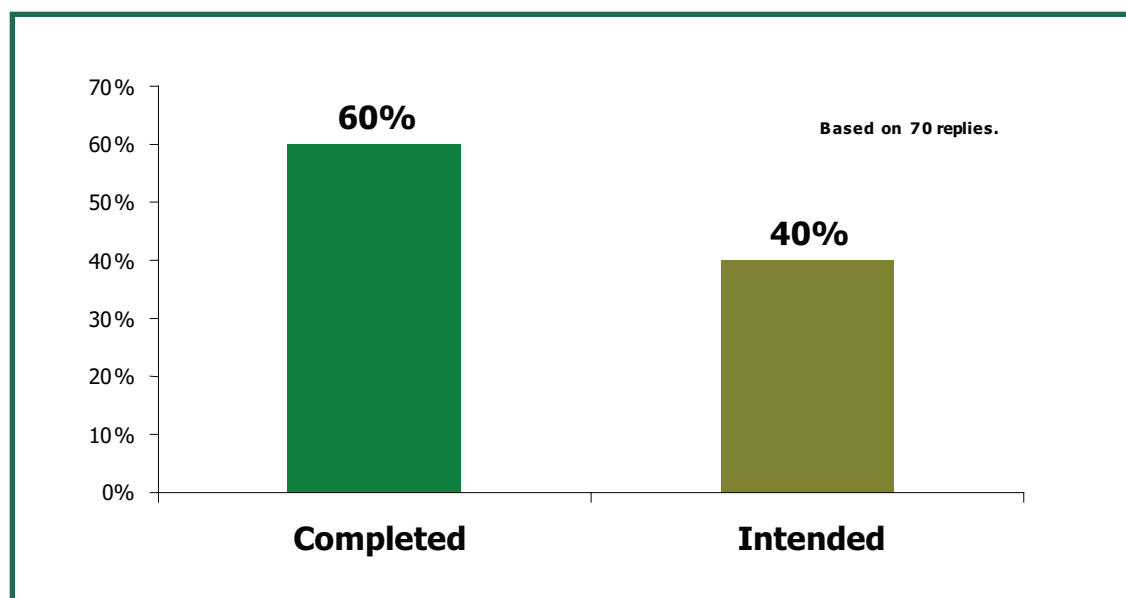
**FIGURE 4** Survey Response: Companies with Completed or Intended Environmental Policies.



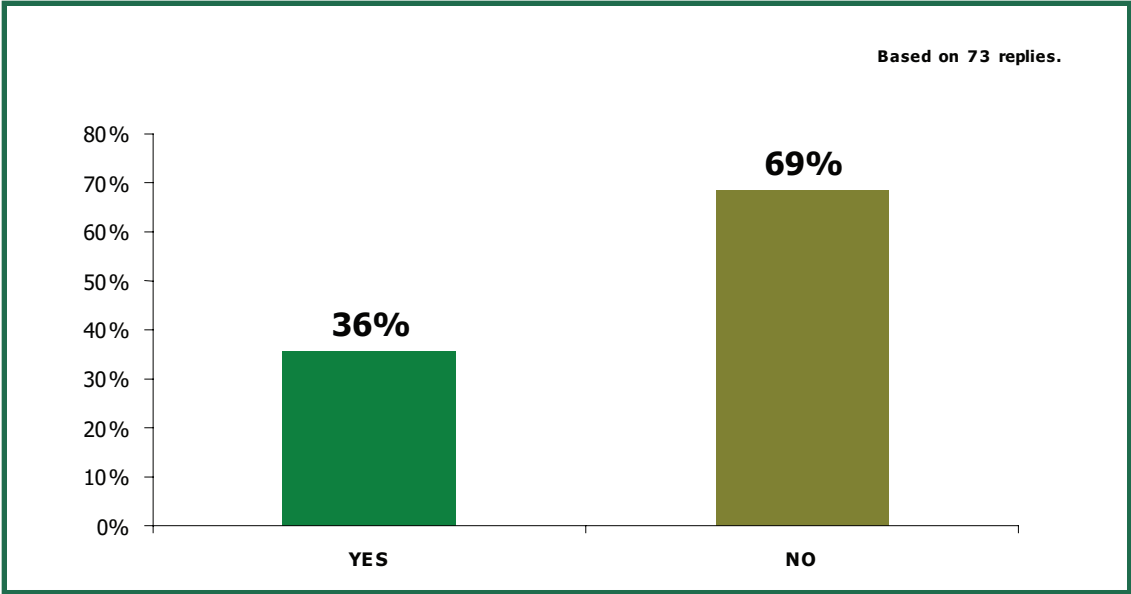
cies (see Figures 4 to 6). According to our survey responses, a solid majority, 59%, have completed or are developing environmental policies; this number is likely higher, given the spectrum of ways to interpret the term *environmental policy*.

For example, many publishers and some printers have signed the *Book Industry Treatise on Responsible Paper Use*, an environmental agreement adopted by 150 publishers, 10 printers, and 4 paper companies (see Figure 7). However, some

**FIGURE 5** Survey Response: Environmental Policy Completion Status.



**FIGURE 6** Survey Response: Environmental Policy Requires Implementation Action Plan.

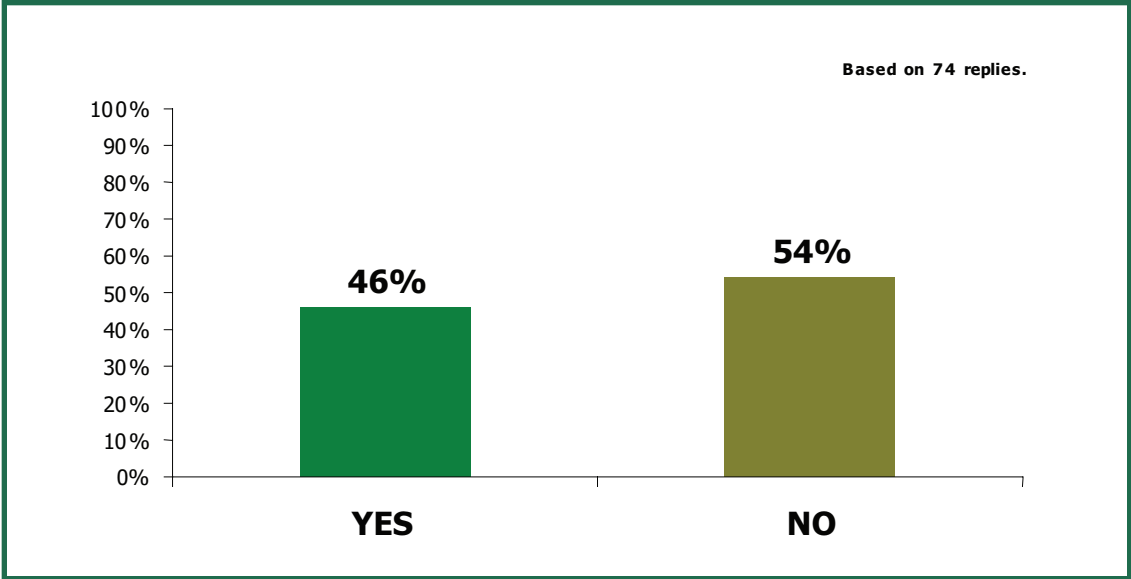


don't include their endorsement of this agreement as adherence to a policy, whereas others do. Moreover, a number of companies have environmental policies in development, as demonstrated in Figure 5.

**General Findings for All Companies**

Six companies stated that they have an annual review process, and three companies review every two years. Fifteen companies stated that they do

**FIGURE 7** Companies That Have Signed the *Book Industry Treatise on Responsible Paper Use*.



have environmental targets and policies, or intend to revisit them on an as-needed or target-by-target basis. Five companies reported having incentives in place for employees to meet environmental targets or goals. The incentives include days off and gift certificates for participating in carpooling; free public transportation vouchers; inclusion in personal development plans; and encouragements to work from home.

Certification of books and the paper for books has been growing in the United States and around the world, as publishers, printers, and the reading public seek assurances that forests are managed according to the highest standards. Figure 8 shows those publishers and printers that stated a preference for a certification system. Some companies stated a preference for more than one system, and therefore the percentages add up to more than 100%.

Respondents were asked to state whether their policies addressed the following issues:

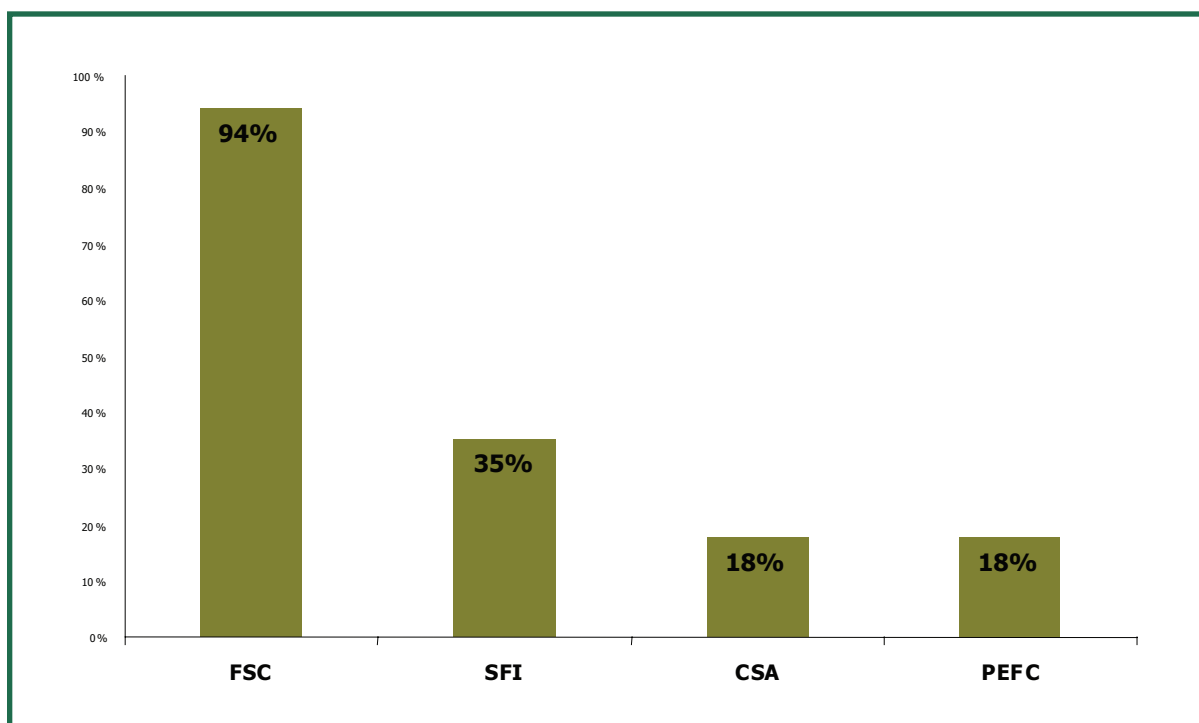
- Increasing recycled paper purchases
- Limiting sourcing from Endangered or High Conversation Value Forests
- Preference for Processed or Totally Chlorine Free paper (PCF or TCF)
- Reducing paper consumption

They were also asked whether the policies include quantitative targets to reach the goals stated in the policy (e.g., 30% recycled content by 2012). The policy section did not attempt to ascertain performance per se, but merely the contents of the policies and issues addressed.

The responses are shown in Figures 9 to 12.

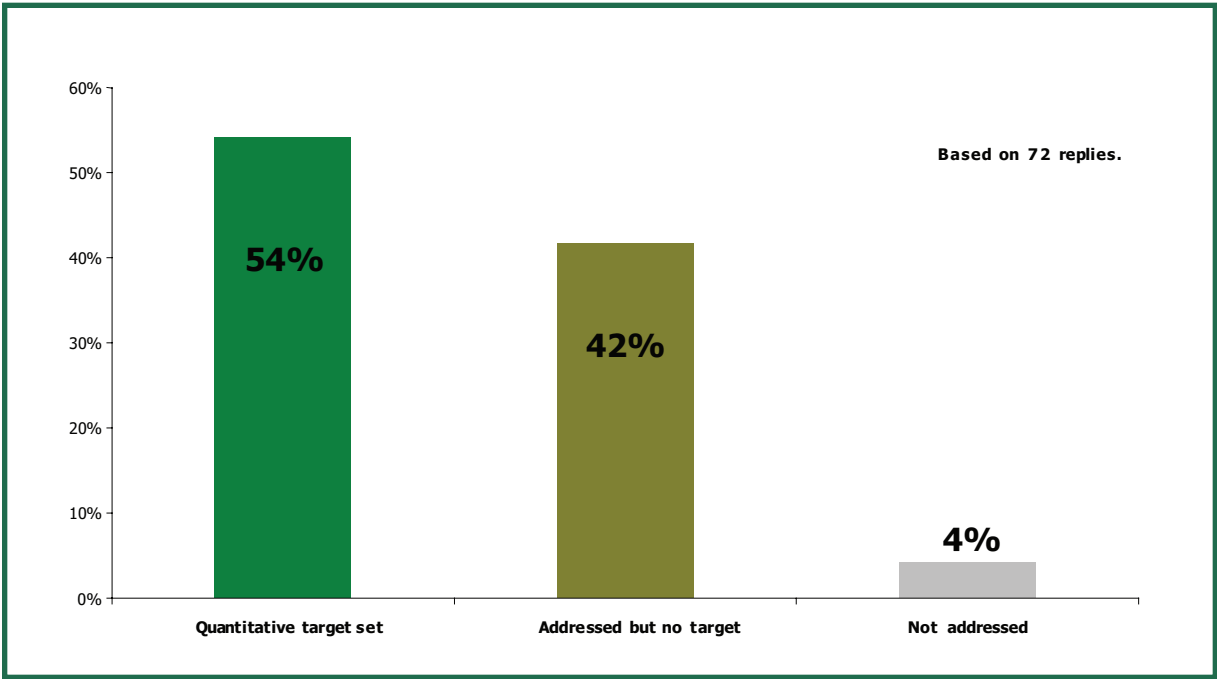
As these figures illustrate, the majority of companies responding to the survey have either set

**FIGURE 8** Survey Response: Preference of Certification among Publishers and Printers.

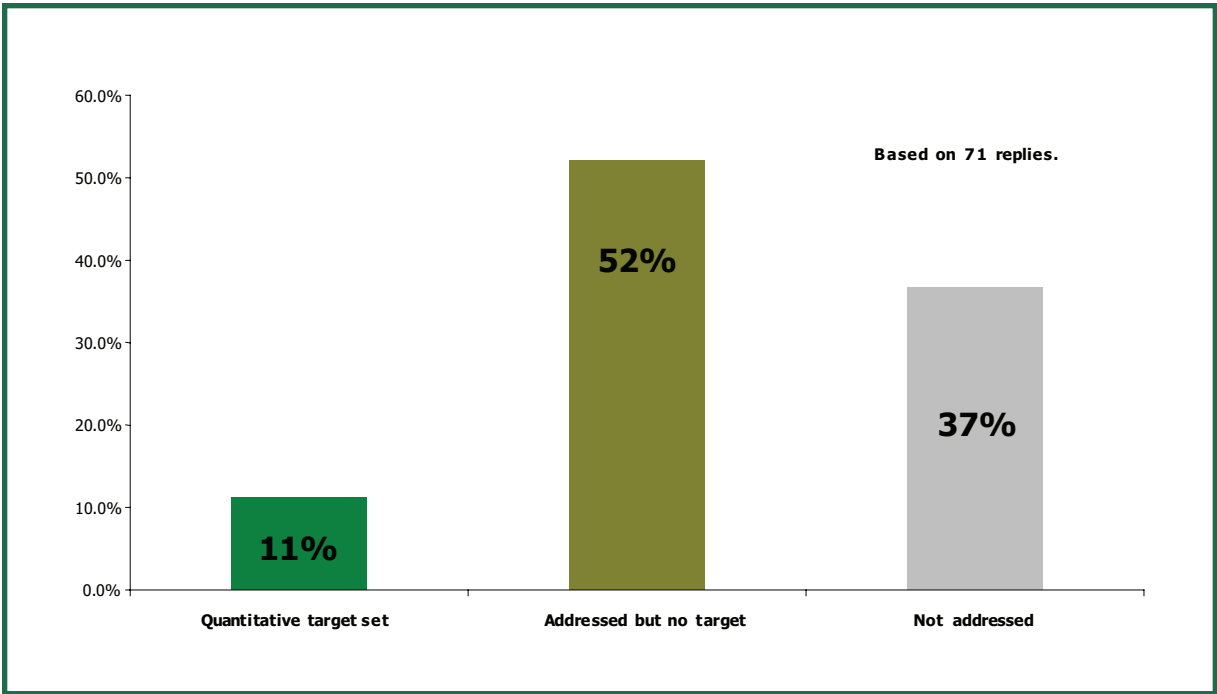




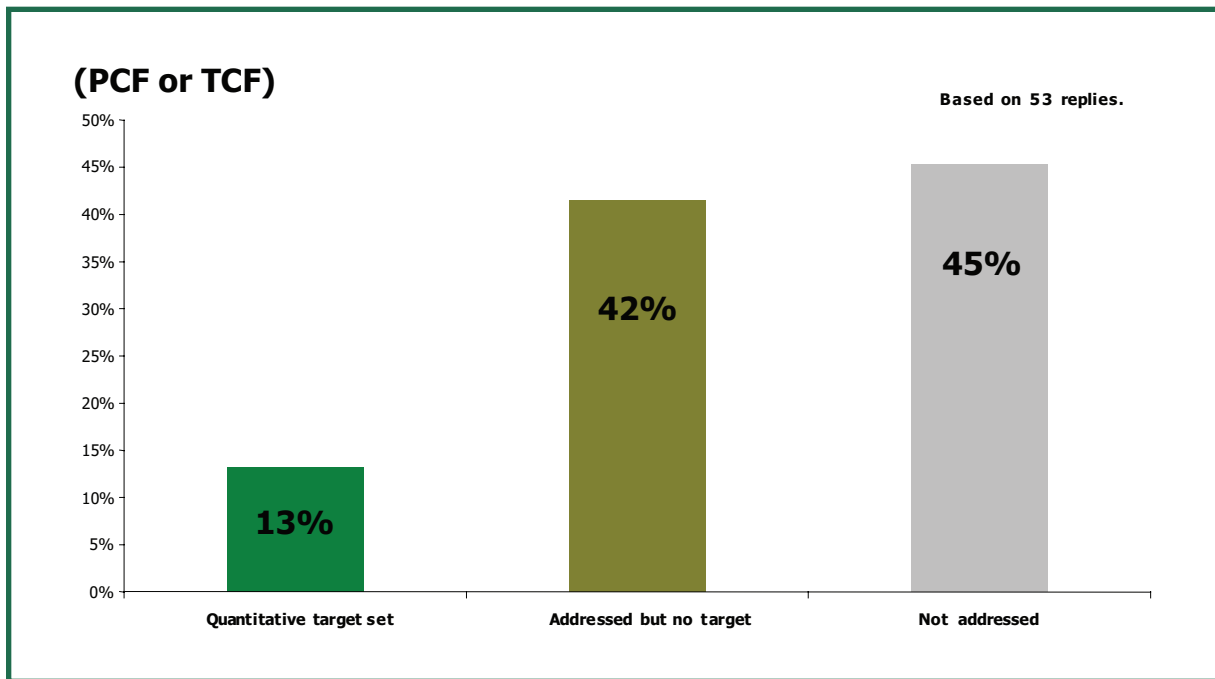
**FIGURE 9** Survey Response: Publishers’ Policies Require Increasing Recycled Paper Purchases.



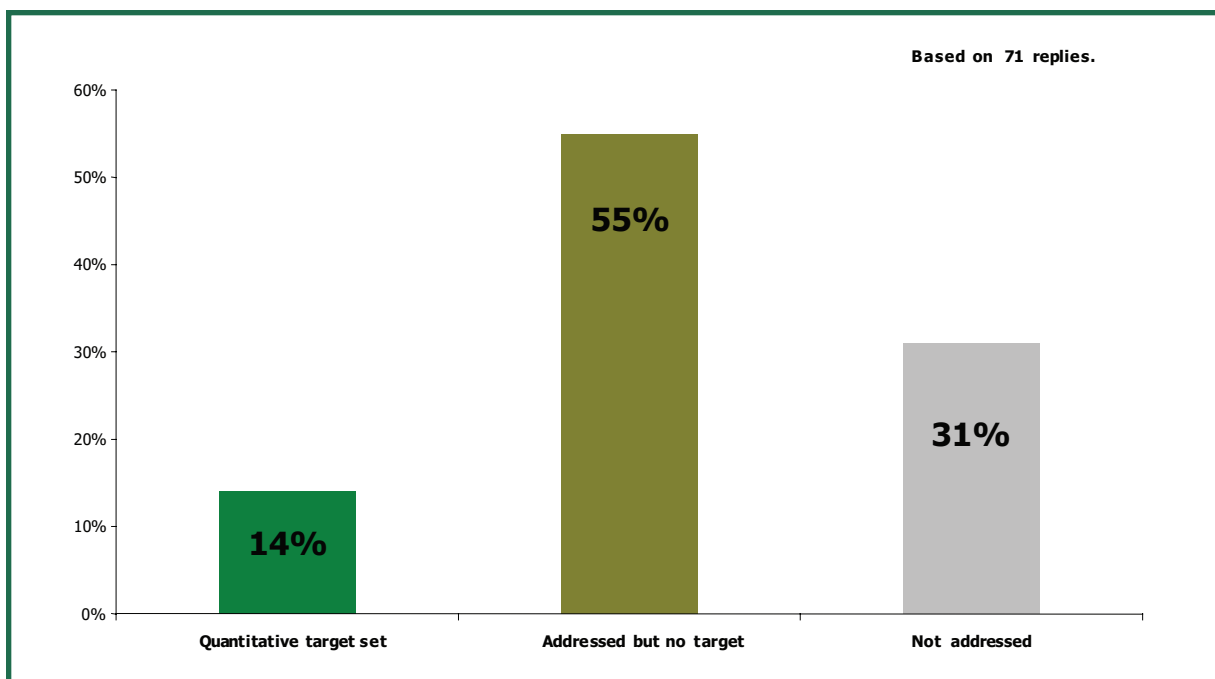
**FIGURE 10** Survey Response: Policies Limit Sourcing from Endangered Forests or High Conservation Value Forests.



**FIGURE 11** Survey Response: Companies' Policies State a Preference for Processed or Totally Chlorine Free Paper (PCF or TCF).



**FIGURE 12** Survey Response: Companies' Policies Advocate Reduction of Paper Consumption.



quantitative targets or have at least addressed the major issues of increasing their use of recycled fiber, ensuring that more unsold books are recycled (see Figure 13), ensuring fiber is not sourced from sensitive forests, or reducing consumption of paper in their own operations.

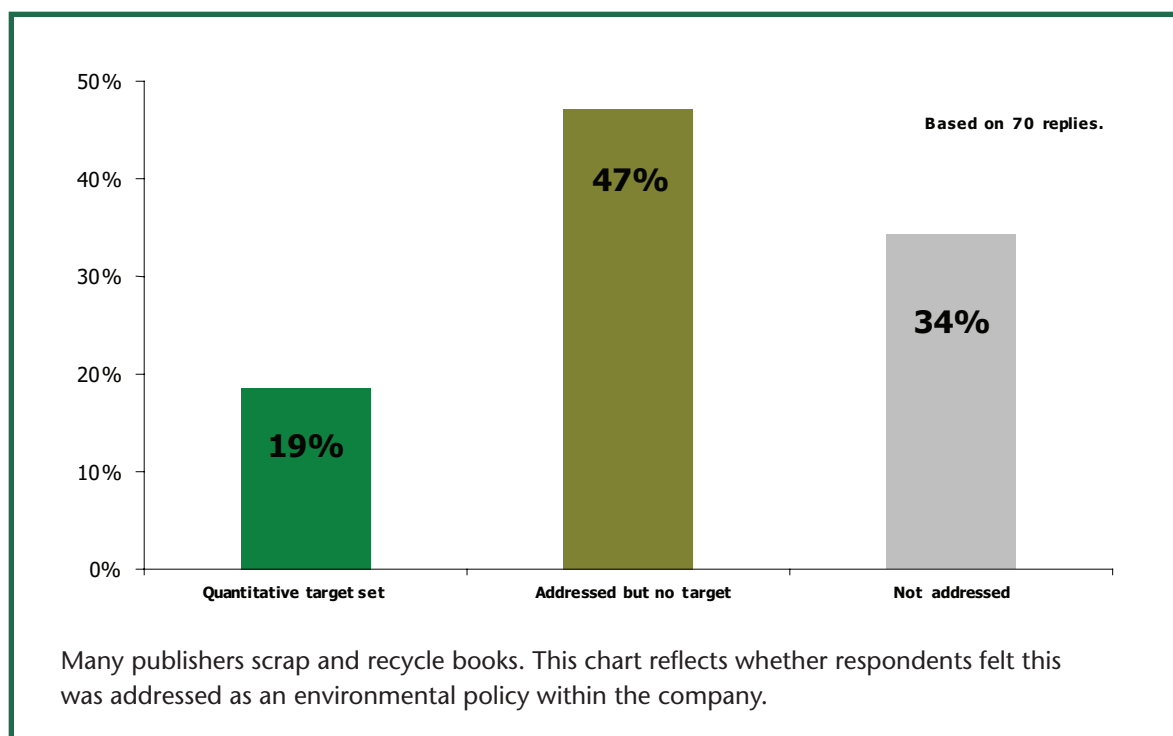
Energy consumption and the use of renewable energy were less prominent than paper sourcing and use among survey respondents' environmental policies. A majority of companies have addressed the issue of electricity consumption (Figure 14), but a minority have addressed purchasing renewable energy (Figure 15) or other strategies for reducing impacts of energy use (Figure 16).

Not all companies stated how their environmental policies would be communicated to the company's staff (see Figure 17). This may indicate a need for improved action plans to realize the goals of the policies, since staff participation is necessary for success.

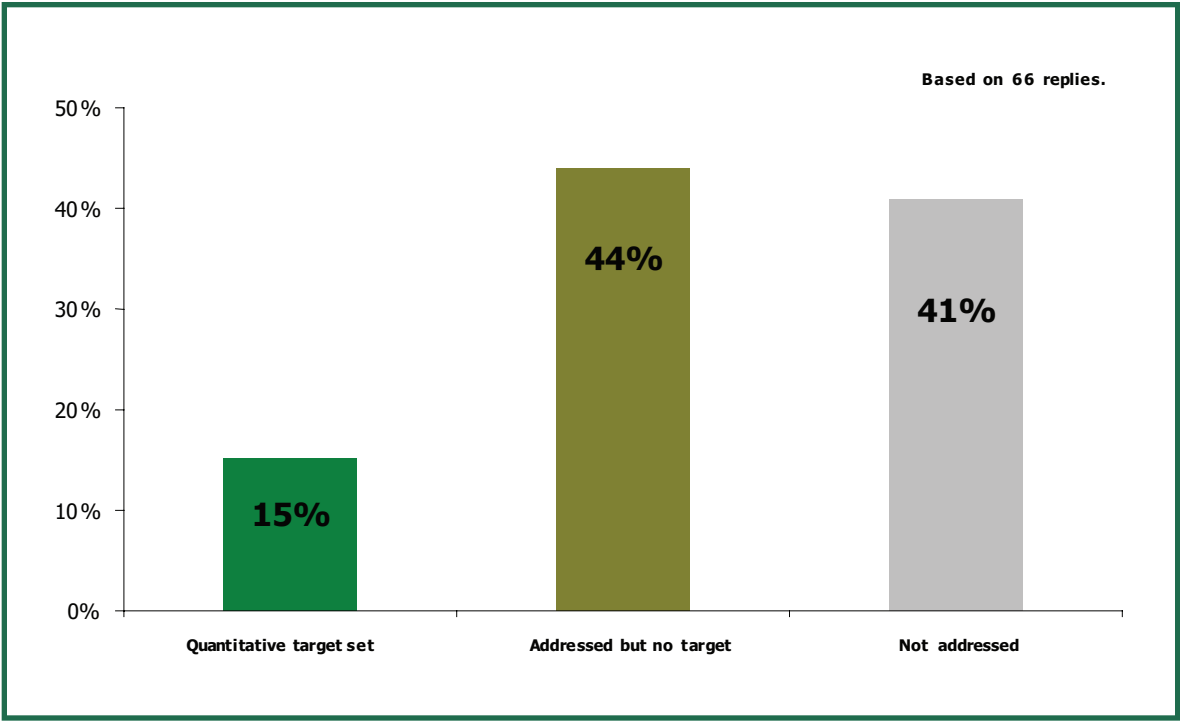
## Shifts in Fiber Use

As this report later demonstrates, changing the paper inputs into the book production process can have the greatest impact on improving the environmental profile of the industry. To that end, some publishing companies have begun to change their fiber use by increasing their purchase of recycled paper, increasing the amount of FSC and other certified fiber in books. They are finding ways to ensure any virgin fiber is not originating in forests that should be protected from industrial use because of social or biodiversity issues. Reports from mills and printers demonstrate increases in certified fiber use and the use of recycled paper. Mills reporting in the survey showed an increasing trend of post-consumer recycled content, as shown in Figure 18. For the six mills reporting to the survey, an increase from 2004 to 2007 demonstrates a rise from an average

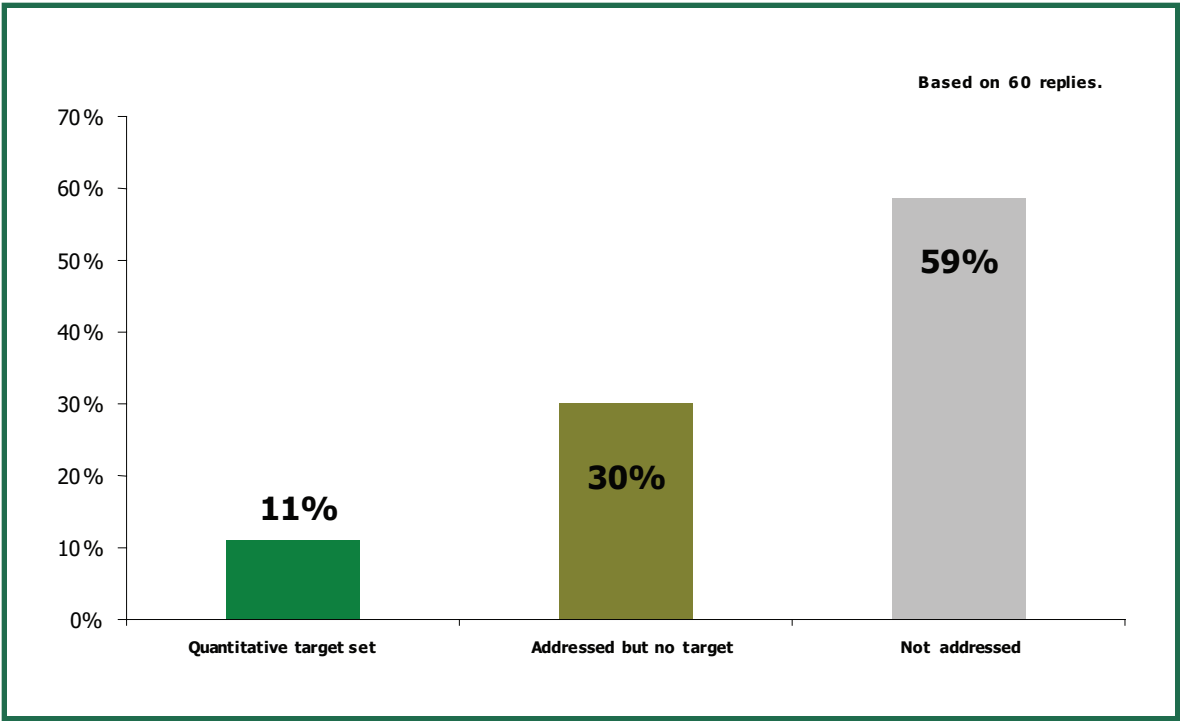
**FIGURE 13** Survey Response: Policies on Book Recycling.



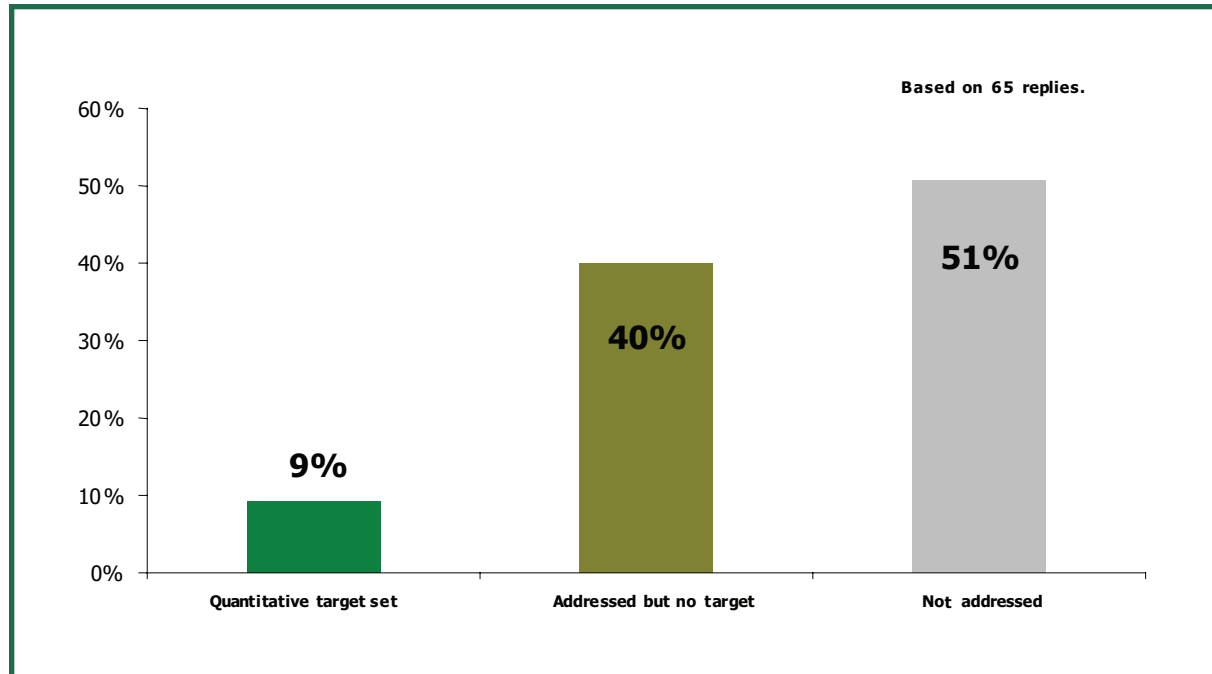
**FIGURE 14** Survey Response: Policies on Reducing Electricity Consumption.



**FIGURE 15** Survey Response: Policies on Sourcing Renewable Energy.



**FIGURE 16** Survey Response: Policies on Addressing Other Energy-Saving Technology.



2.5% post-consumer recycled content to 13.3%—more than a fivefold increase, or a 10% increase as a share of all paper. Although we do not have information for all the mills supplying paper to the book industry, we believe that the overall post-consumer waste content is lower than reported by our survey.<sup>4</sup> Later in this report, we assume a 5% post-consumer content for book papers which is close to the industry average for printing and writing papers.

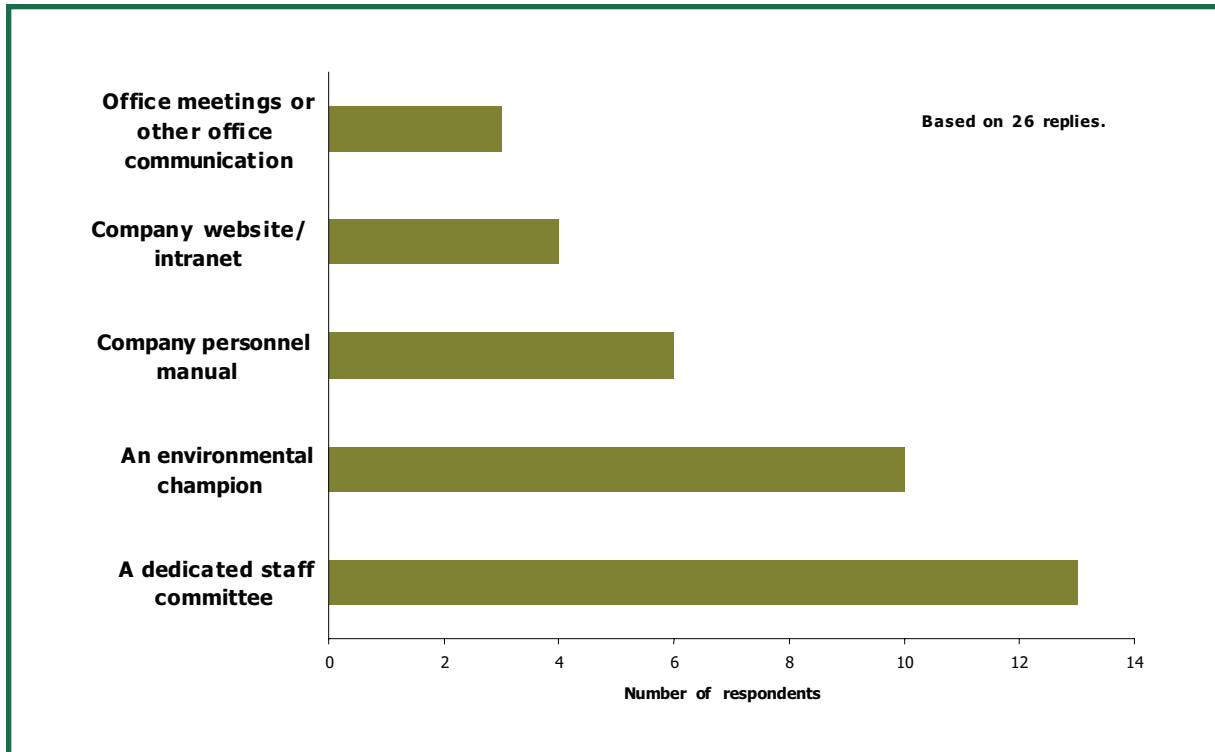
Printers also reported a strong increase in the use of post-consumer recycled fiber (Figure 19). In fact, there was nearly a tenfold increase in the amount of post-consumer waste recycled fiber use between 2004 and 2006. The overall figures are further increased when pre-consumer recycled fiber is factored in. From the 2004 usage of

2,038 short tons, post-consumer recycled fiber usage increased nearly tenfold by 2006 to 19,145 short tons.

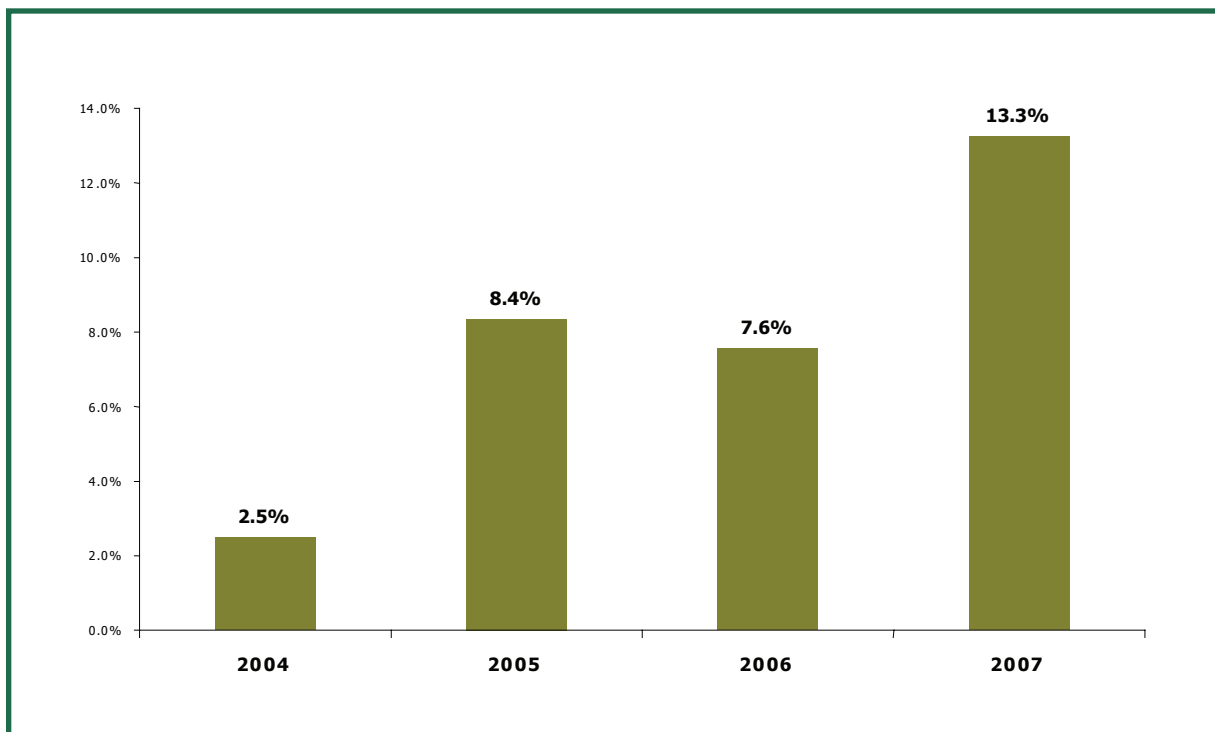
Certified fiber use in papers as reported by the paper mills is a less clear picture. Due to only partial reporting for 2007, reports of percentages are more reliable than total production numbers, and therefore total increases in certified fiber use through 2007 cannot be reliably calculated. Figure 20 shows increases in the use of certified fiber at six different mills for the two prominent certification systems in the United States and Canada. All six mills tracked one or both systems. Two mills used Sustainable Forestry Initiative (SFI) fiber exclusively and 100% of the fiber in these mills was reported as SFI certified. Three mills did not track SFI certified fiber and one mill showed a decrease in usage. Four mills showed an increase in Forest Stewardship Council (FSC) use for book papers, while two (the two mills that report using only SFI fiber) did not report any use of FSC fiber.

<sup>4</sup>As discussed in the section on methodology, there is a likely reporting bias in the surveys; some of the data may overstate environmental gains and activities in some areas.

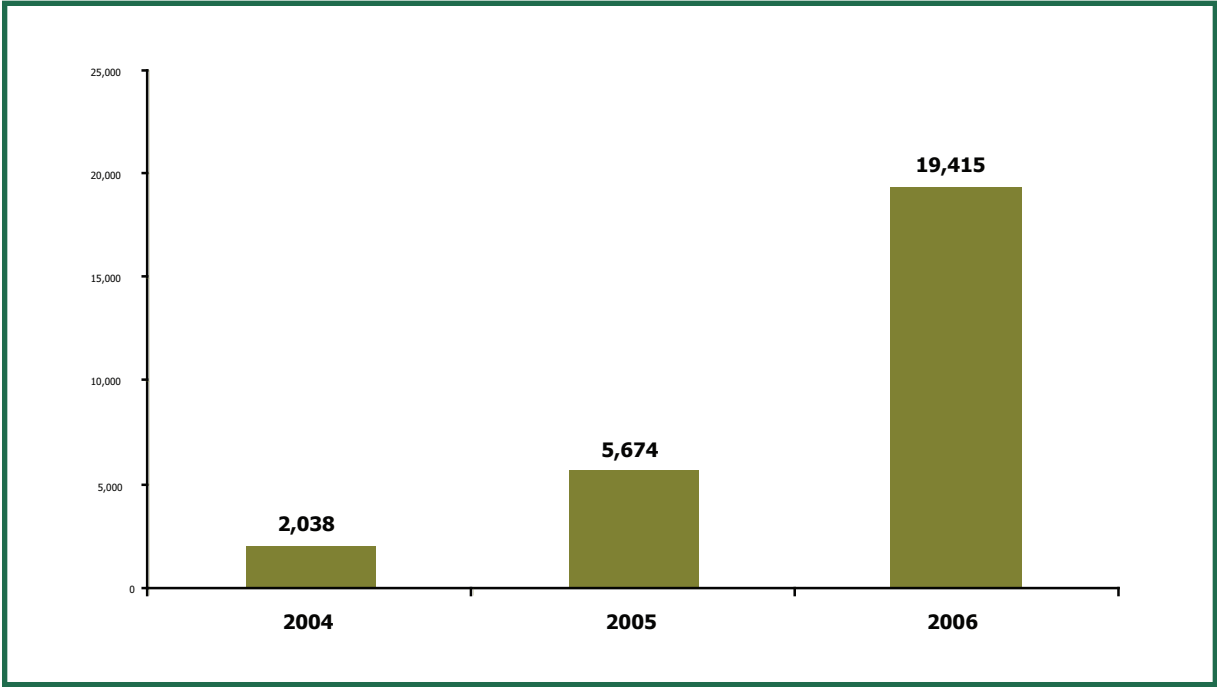
**FIGURE 17** Survey Response: Communication of Environmental Policy to Staff.



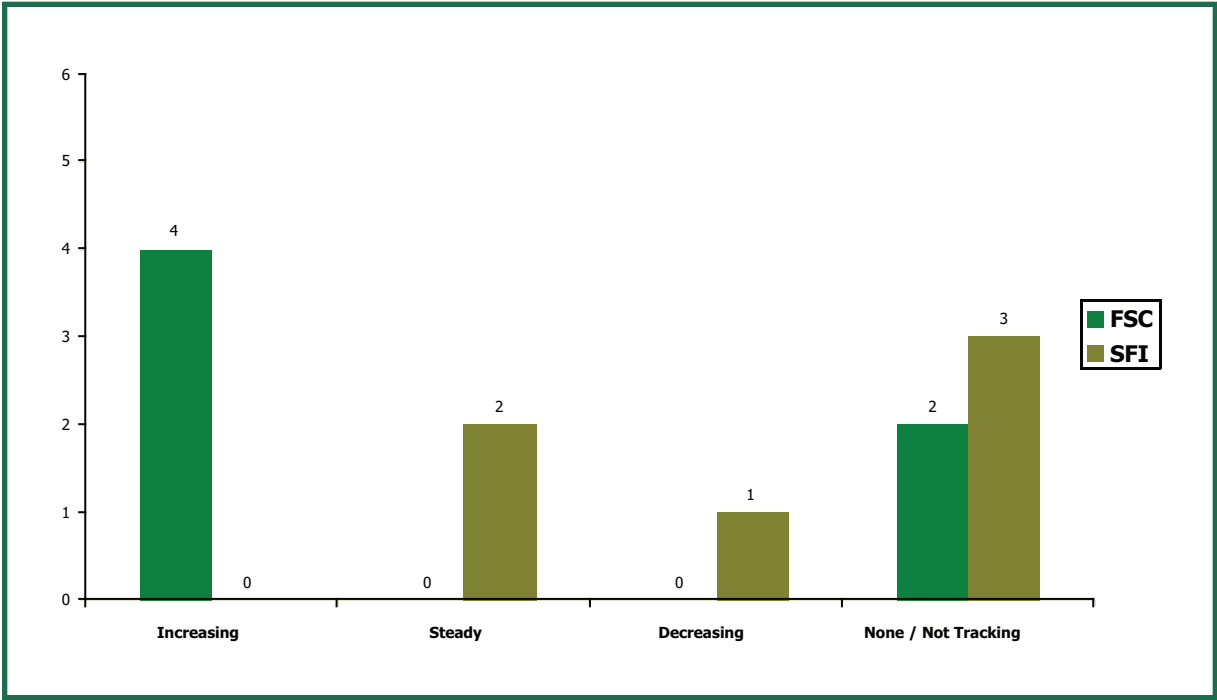
**FIGURE 18** Post-consumer Content in Book Papers: As Reported by Six Mills/Paper Suppliers.



**FIGURE 19** Post-consumer Waste Recycled Fiber Use 2004–2006: As Reported by 13 Printers.



**FIGURE 20** Trends in Certified Content of Book Papers 2004–2007: As Reported by Mills.





## Paper Suppliers / Mills

Six paper producers responded to the survey. The respondents represent approximately 17% of the market share of book paper production for the U.S. market. Four of the six paper suppliers have a current environmental policy, while two have a policy under development. None of the suppliers was a signatory to the *Book Industry Treatise*, although two companies have the policy under consideration.

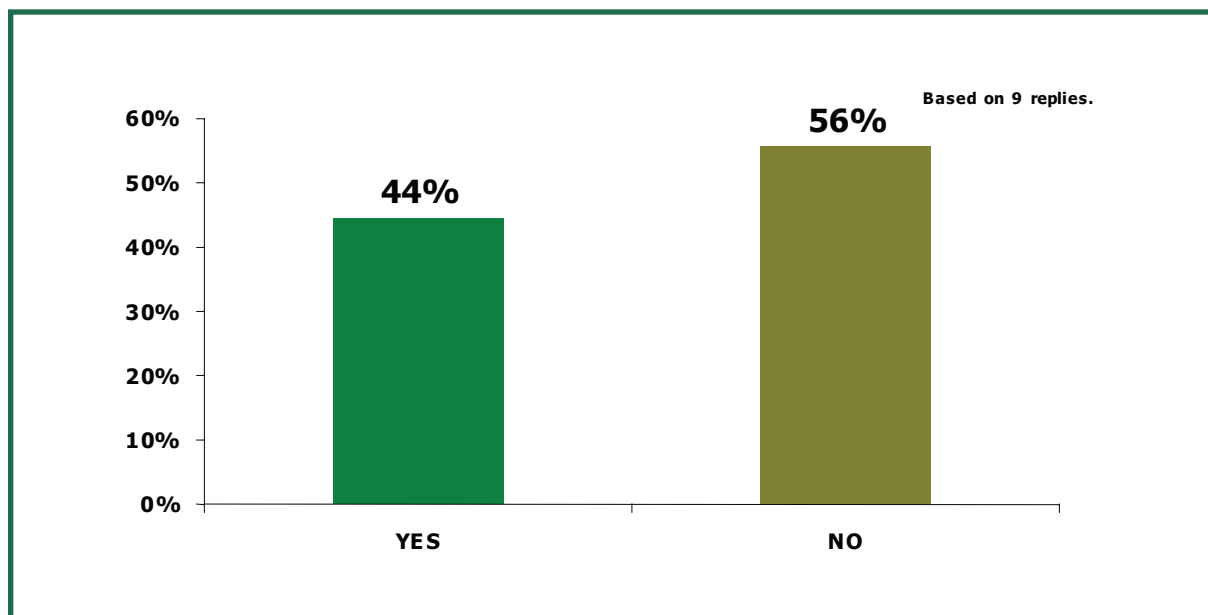
## Printers

Thirteen printers responded to the online survey. Six of those supplied additional information in a short survey of trends in environmental paper use. Eight of the printers have an environmental policy, while five do not. Of the five printers that responded in detail, all the companies have ad-

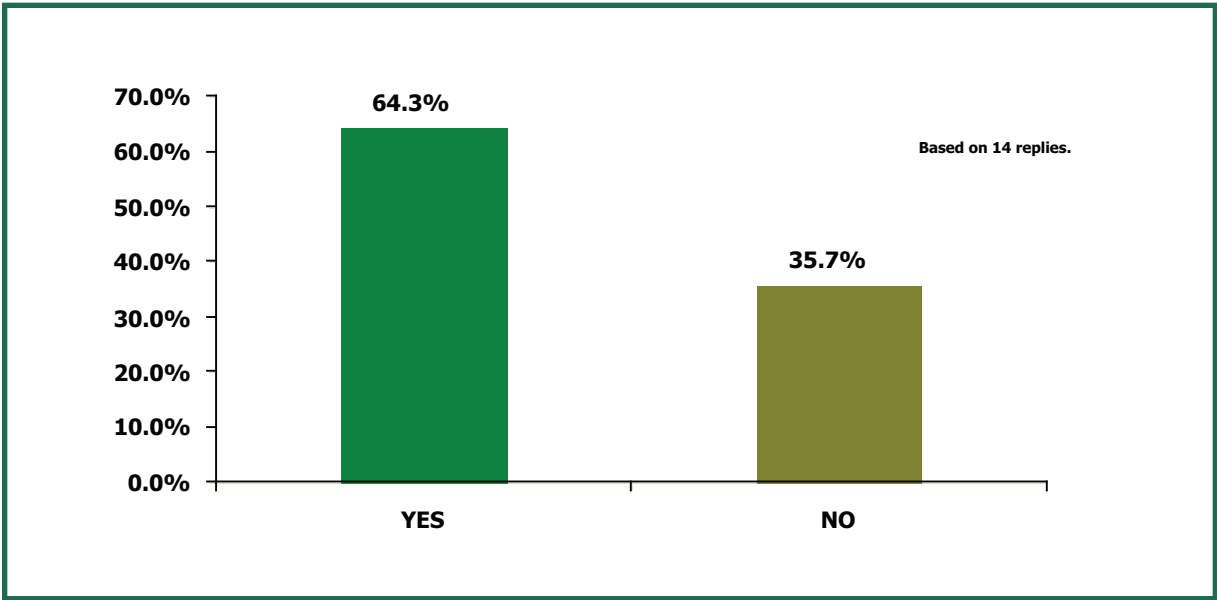
ressed some aspect of energy use in their facilities, such as reducing energy consumption or fuel use or sourcing alternative energy. One printer is investigating the use of geothermal power for a new facility. All five of the companies also have policies or quantitative targets for internal recycling at the print facility, increasing the use of post-consumer recycled material in book production, reducing office paper use or packaging, and recycling office paper. Two printers' environmental policies express interest in using alternative fibers or agricultural waste fiber in printing papers. Four of the printers have policies to increase the use of either Totally Chlorine Free (TCF) or Processed Chlorine Free (PCF) paper.

Of printers that detailed their environmental policies, all reported addressing aspects of certification and the elimination of certain types of paper, such as paper made with fiber from Endangered Forests or fiber resulting from the conversion of natural ecosystems. Four printers reported prefer-

**FIGURE 21** Survey Response: Printers That are Signatories to the *Book Industry Treatise* for Responsible Paper Use.



**FIGURE 22** Survey Response: Printers with Completed or Intended Environmental Policies.



ences for certified fiber. All four stated a preference for FSC-certified paper, while one of those four stated a preference for the Sustainable Forestry Initiative (SFI), Canadian Standards Association

(CSA), and Programme for the Endorsement of Forest Certification (PEFC) as well. Only one company reported having a policy promoting sustainable travel for employees.

# Readers' Poll and Other Environmental Polls

We believe there is clear evidence of a greenward shift in the market for forest products. . . . The shift is real, buyers believe it will continue, and it will have a negative impact on forest regions and producers that do not respond to it. The shift is however also just starting.

*IBM Business Consulting Services, 2002*

*"A Greenward Shift in the Market for B.C. Forest Products: Real Change or 'Smoke & Mirrors'?"*

The book industry at large recognizes that it should be sensitive to and understand the interests of the reading public—its customers. In a poll done for the BBC/GlobeScan/PIPA internationally,<sup>5</sup> the American public showed remarkable interest in taking action on the issue of climate change. Fifty-nine percent of survey respondents said that it was “necessary to take major steps soon” to reduce climate change, 33% said it was necessary to take modest steps in coming years, only 6% said it was not necessary to take any action, and 2% were unsure. Another poll commissioned by the World Public Opinion<sup>6</sup> group found that 80% of Americans favor taking action on climate change, with 43% stating that the issue was “serious and pressing” and justified significant cost expenditures, and 37% stating that the problem

was a gradual one and that more gradual and less costly steps were warranted.

Protection of biodiversity is also important to Americans. The Biodiversity Project tracks Americans' attitudes to biodiversity issues.<sup>7</sup> Its 2002 poll found:

Americans believe that protecting biodiversity is the right thing to do: Preserving species and habitat is right in line with the values of a large majority of Americans. By overwhelming margins, poll respondents strongly agreed that we have a “personal” or “moral” responsibility to “protect plant and animal life” (69% and 65% respectively strongly agreed in a split sample). Respondents also saw protecting the environment for future generations (58%) and respecting “God’s creation” (56%) as “extremely important reasons” to protect the environment.

What readers and the general public want from the book industry in terms of the actual product is also important. A February 2006 study commissioned by *Book Business* magazine and the Green Press Initiative showed “nearly 80 percent of consumers are willing to pay more for books and magazines printed on recycled paper.”<sup>8</sup>

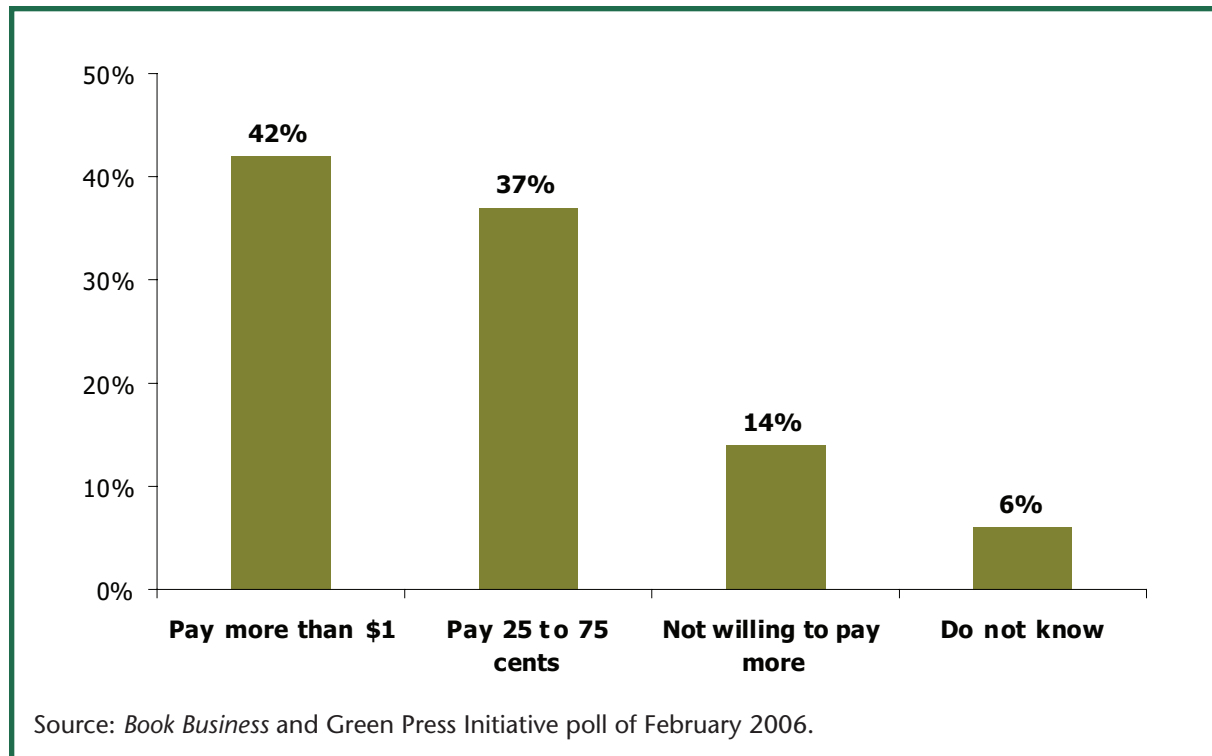
<sup>5</sup>See [news.bbc.co.uk/1/hi/world/7075759.stm](http://news.bbc.co.uk/1/hi/world/7075759.stm) for an article on the poll and links to results.

<sup>6</sup>[www.worldpublicopinion.org/pipa/articles/home\\_page/329.php?nid=&id=&pnt=329&lb=hmpg1](http://www.worldpublicopinion.org/pipa/articles/home_page/329.php?nid=&id=&pnt=329&lb=hmpg1)

<sup>7</sup>See [www.biodiversityproject.org/bpemergingtrendspaper.doc](http://www.biodiversityproject.org/bpemergingtrendspaper.doc) for more about this poll and the Biodiversity Project.

<sup>8</sup>Opinion Research Corporation poll of 1,000 U.S. readers commissioned by Green Press Initiative and Book Business magazine.

**FIGURE 23** Willingness to Pay for Books on Recycled Paper.



A large minority of readers (42%) showed a significant interest in paying more for books with recycled content—a dollar more per book (see Figure 23). Thirty-seven percent in the same poll said they would be willing to pay between 25 cents and 75 cents more per book. Only 14% said they would not be willing to pay more for books with recycled content, and 6% did not know. Variation in the responses was not great between

respondents of different genders, income levels, and education levels, although there was some drop-off in willingness to pay among older people.

Several publishers have noted that they have offset higher material costs, when they exist, by passing that slight increase on to the reader and marketing it effectively without any impact on sales projections.

# The Climate Impact of the Book Industry and Its Carbon Footprint

One of the key measures of the sustainability and improvement in environmental performance of an industry is its carbon footprint. The analysis in this report calculates the total known impact of the book industry to assess the footprint. To judge performance of the book industry in the United States, we calculate the total emissions attributable to all books produced, through every step of the process, where we have reliable information, and divide by the total number of books that reach consumers (i.e., books sold). The total carbon footprint for the industry's 4.15 billion books produced is 12.4 million metric tons CO<sub>2</sub> equivalent. For each book sold in the United States in 2006, 8.85 pounds of greenhouse gases in CO<sub>2</sub> equivalent were released.

A carbon footprint measures the overall greenhouse gas (GHG) emissions or removals of an industry, a business, a person, or an activity. It is called a *carbon* footprint for two reasons: the end result of the method measures all GHG impacts in terms of carbon dioxide equivalents, and carbon dioxide is the most prominent greenhouse gas. Emissions constitute any flow, or flux, of greenhouse gases to the atmosphere from a terrestrial source. Carbon removals, also known as sequestration, are the fluxes from the atmosphere primarily to forests and the oceans. There is also storage of carbon in products that moves carbon from forests to books, which is accounted for in this analysis. Greenhouse gases that are relevant to the book industry are carbon dioxide (CO<sub>2</sub>),

methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). These gases differ in their potential to warm the atmosphere, known as Global Warming Potential. The carbon footprint presented here is reported, as is done in other industries, in carbon dioxide (CO<sub>2</sub>) equivalents.<sup>9</sup>

<sup>9</sup>The United States is not a signatory to the Kyoto Protocol to the United Nations Framework Convention on Climate Change. However, the methodology of the Kyoto Protocol is the international standard for measuring greenhouse gas emissions and removals and the most sound science for achieving reductions. The Kyoto Protocol requires signatories in industrialized nations, where the vast majority of emissions occur, to reduce emissions of greenhouse gases against a baseline year of 1990. Industrialized countries have the option to not account for emissions from land-use change and forestry. Effectively, this has meant that countries with net removals of greenhouse gases from land-use change and forestry (such as the United States) account for the sector in their target totals, while those that have net emissions do not (such as Canada). The Protocol also allows for some emissions reductions action in developing countries under the rules of Clean Development Mechanism as offsets that can be counted toward emissions reduction targets in industrialized countries.

In terms of our carbon footprint analysis for the book industry, the most important factor of the Kyoto Protocol is to understand the baseline for measuring emissions. The baseline is measured as the total emissions in a single year, 1990, and targets for reduction measured against that year. The baseline does not take into account any projections into the future or speculation, however well founded, about what emissions may be under different scenarios. The baseline is simply the net of the actual, observed emissions or removals in 1990. An actual, observed baseline as adopted removes gamesmanship and speculation from the process.

The carbon footprint for the book industry should include measurements of as much of the flux to and from the atmosphere as possible to quantify the impact of the industry and to help it understand how to reduce any negative impact. The book industry needs to determine where the real impacts are to know where action can be taken in the short and long terms to reduce its carbon footprint.

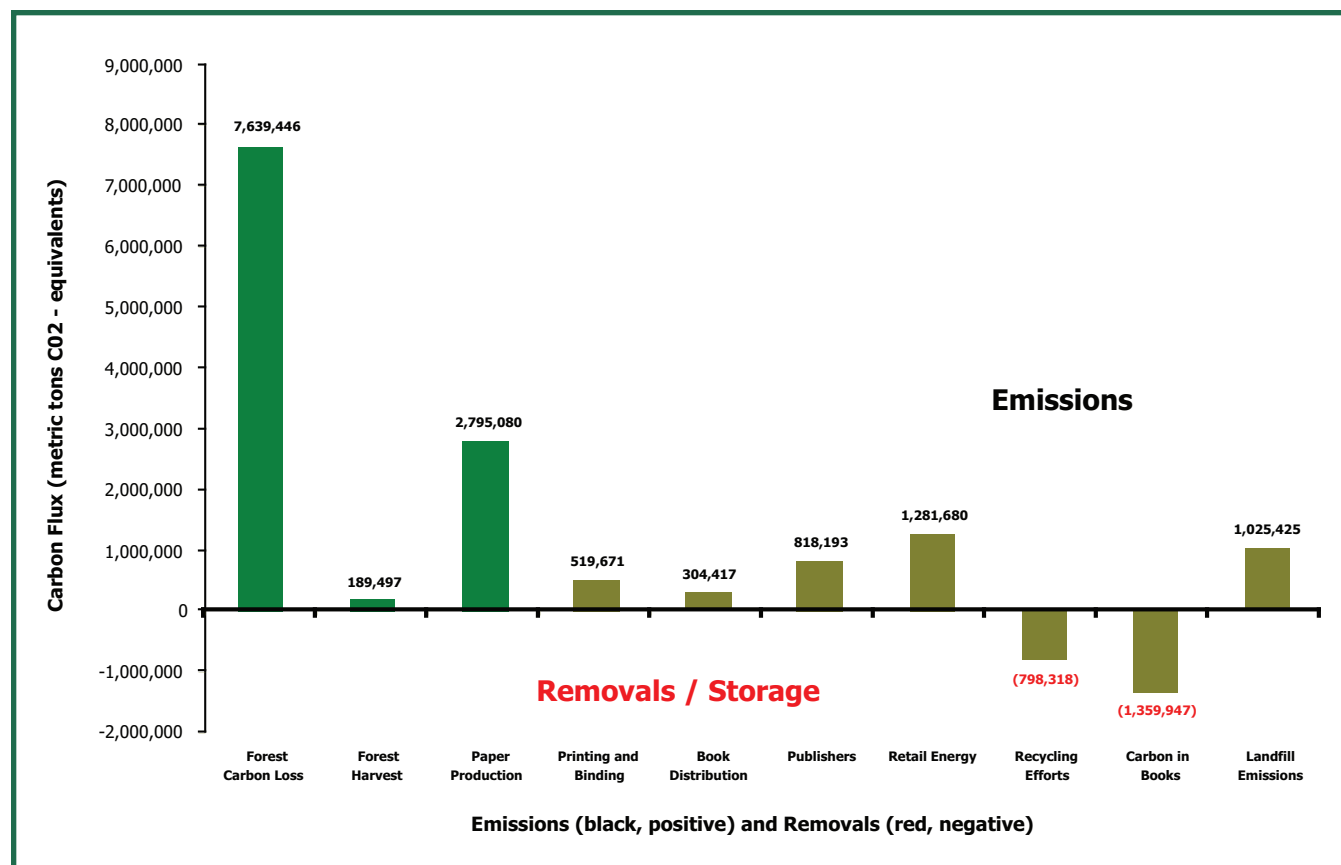
The information gathered through our book industry survey allows us to make some estimates of the carbon footprint of the average book. We have added some industry averages to our survey information where information is lacking. Figure 24 shows the emissions and removals in the book production process, indicating where the greatest emissions occur and where the book industry can take action efficiently to reduce its overall impact.

The methodology for calculating the emissions and removals in each segment is detailed below.

Figure 24 also shows the climate impacts of the book industry at various stages of production, sale, and disposal or recycling. Each stage is detailed in the text following the chart. This assessment, while preliminary, allows us to understand where the greatest impacts are in the industry and effectively address the major impacts. Recommendations based on this analysis can be found at the end of the report in the recommendations section.

The entire figure is given in carbon dioxide equivalents. Green bars are carbon from forests through books, while brown bars are emissions from nonforest fiber sources and waste. Detailed descriptions of the estimates given here and how they were derived follow in the text. This is a summary:

**FIGURE 24** Carbon Footprint for the U.S. Book Industry, 2006.



- **Forest Carbon Loss.** The amount of carbon (in CO<sub>2</sub>-equivalent) taken from the forest and delivered to the pulp/paper mill. In national accounting of greenhouse gases, this is recorded in the Land-use, Land-use Change, and Forestry sections rather than under energy to avoid double-counting. There is a great deal of debate about how to account for changes in forest and plantation carbon; details of our analysis of the importance of this emissions source are found in a later chapter. Source: Wood use is from Environmental Defense/The Paper Calculator. This carbon is offset by carbon stored in books, unsold books returned for pulping, and energy recovery.
- **Recycling Efforts.** Books that are recycled each year. Source: U.S. EPA for 2006 book recycling data.
- **Carbon in Books.** Carbon storage for books in CO<sub>2</sub>-equivalent based on total paper used for books minus books recycled and books incinerated.
- **Fiber Harvest and Transport.** Virgin fiber collection. This includes:<sup>10</sup> harvesting of trees, transporting of logs (or chips) to the mill, debarking and chipping, and waste collection and transport. Source: Environmental Defense/The Paper Calculator.
- **Paper Production.** Greenhouse gas emissions from the paper-making process only at the mill. Source: Environmental Defense/The Paper Calculator.
- **Printing and Binding.** Energy emissions from the printing and binding process as derived from the survey results.
- **Book Distribution.** Transportation emissions from the shipment of books and energy used in book storage as derived from the survey results. Calculated using data from publishers and estimating the total number of miles by air, ship, and truck emissions per mile, and the share of books in any transport; and electricity and natural gas emissions in warehouses.
- **Publishers.** Building energy, office paper use, and company transport as derived from the survey results.
- **Retail Energy.** Retail building emissions as derived from the survey results and extrapolated for the industry using a standard coefficient for emissions per kWh.
- **Landfill Emissions.** Methane (CH<sub>4</sub>) emissions from landfills for book paper. Based on estimated book paper entering landfills from U.S. EPA.
- **Energy Recovery (not shown in figure).** Energy derived from the incineration of book paper after disposal, based on an estimated 110,000 metric tons of books incinerated and standard coefficients.
- **Recycling Emissions (not shown in figure).** Constituting only 5% of the total fiber furnish, recycling emissions make up only 0.2% of the total process for books. This includes “material collection; transport; pre-processing at material recovery facilities (MRFs); residuals management and disposal; and transport of processed recovered material to the remanufacturing site.” Source: Environmental Defense/The Paper Calculator.

## Opposing Views

It should be noted that within the environmental committee established for the purposes of this report, there was one opposing view related to the car-

<sup>10</sup>Paper Task Force, White Paper 3. [www.environmentaldefense.org/pdf.cfm?ContentID=1618&FileName=WP3%2Epdf](http://www.environmentaldefense.org/pdf.cfm?ContentID=1618&FileName=WP3%2Epdf)



bon footprint model that was developed. As can be seen in Figure 24, the largest CO<sub>2</sub> emissions connected to the book industry stem from the loss of carbon in the forest from trees harvested to make paper. The opposing perspective maintains that the model does not account for regrowth for forests after they are harvested and as such is flawed.

Forest carbon storage from regrowth was not calculated because, according to data sources cited in this report, any carbon storage from replanted trees is counterbalanced or negated by the fact that trees that are left standing would continue to sequester carbon. This important issue will be further researched in future reports. To learn more about this opposing view, go to [www.malloy.com/carbonanalysis](http://www.malloy.com/carbonanalysis).

## Net Carbon Emissions by Segment

### FOREST CARBON LOSS CARBON FOOTPRINT

For this study, we estimate carbon loss in forests using the content of carbon in the wood used in paper production. According to our estimates of the different grades of paper, the Environmental Defense Paper Calculator estimates total wood use at 4,200 metric tons. The estimates of carbon content in paper and wood are taken from the International Applied Systems Analysis and two studies by Tellus and Alter.<sup>11</sup> The total carbon content of wood entering the pulp mills for book paper production is 2.1 million metric tons, and

the CO<sub>2</sub> equivalent of that wood is 7.6 million metric tons.<sup>12</sup> Part of the carbon from forests and plantations is stored in products or recycled; a portion is used as an energy source when books are incinerated; and another portion is lost in the paper-making process when it is burned for energy or lost through decay. We have tracked the carbon taken from forests either to storage as carbon or to its release to the atmosphere as carbon dioxide.

This study was unable to estimate several other emissions from forests that are likely to be significant, but for which data was limited or not available:

- Amount of burned slash and decay, post-harvest. Emissions would include CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O from combustion of organic matter.
- Emissions from the use of chemicals and fertilizers in forest management.

In addition, there are a number of variables with regard to the dynamics of forest growth that we do not consider in this analysis. The U.S. EPA developed methodology to calculate the savings of forest carbon through source reduction (i.e., using less paper) and recycling. A memorandum detailing this methodology states:

When paper products are source reduced or recycled, trees that would otherwise be harvested are left standing. In the short term, this results

<sup>11</sup>Kubeczko, Klaus. "Austrian Carbon Database: Production and Waste. Materials Flow Based on Carbon Accounting for 1990." International Institute for Applied Systems Analysis. [www.iiasa.ac.at/Publications/Documents/IR-01-028.pdf](http://www.iiasa.ac.at/Publications/Documents/IR-01-028.pdf).

Alter, H., et al. (1974). "Chemical Analyses of the Organic Portions of Household Refuse: The Effect of Certain Elements on Incineration and Resource Recovery," *Solid Wastes Management* 64 (12): 706-712. Tellus Institute, *Assessing the Impacts of Production and Disposal of Packaging and Public*

*Policy Measures to Alter Its Mix*, prepared for the Council of State Governments, the U.S. Environmental Protection Agency, and the New Jersey Department of Environmental Protection and Energy, May 1992, Report #4, "Impacts of Production and Disposal of Packaging Materials: Methods and Case Studies," Chapter 2.

<sup>12</sup>To calculate carbon dioxide equivalents from carbon we multiply by the standard coefficient 3.6667.

[www.iuep.org/RFP2006/commonconversionfactors.php](http://www.iuep.org/RFP2006/commonconversionfactors.php)

in a larger amount of carbon remaining sequestered—in effect, resulting in “negative emissions”—because the standing trees continue to store carbon, whereas paper production and use tends to release carbon. . . . Working with U.S. Forest Service staff, who generated outputs from Forest Service models, we estimated that recovering one metric ton of paper results in incremental forest carbon sequestration of 0.81 metric tons of carbon equivalent (MTCE). This estimate includes changes in carbon storage in trees and understory, and excludes changes in the forest floor and soil.

This finding of additional carbon stored in forests helps us understand that forests that are harvested for paper store less carbon than forests that are not harvested. This finding is also supported by the recent agreement in Bali by the signatory nations of the United Nations Framework Convention on Climate Change, which agreed to study and include mechanisms to avoid deforestation in future negotiations over international climate change policy. Although the focus of the negotiations is on deforestation in tropical countries, the implication for forestry in industrialized countries is similar: logging forests reduces carbon storage in forests, and leaving forests standing helps combat climate change. As a result of these findings, we track the carbon that is stored in paper (books) in this report. The remainder is emitted to the atmosphere as carbon dioxide when it is used to make energy for the paper-making process.

Different analyses account for forest carbon in different ways. Some advocates for the paper industry believe that growth in all forests should be credited to the forest products or paper industry. This analysis ignores the growth that would occur in forests if there was no harvest and the reduced total carbon storage and absorption that the paper industry affects negatively. There are a number of

different factors that we cannot take into account in this carbon footprint analysis due to the complexity of the data, as well as the speculative nature of the dynamics of land-use decisions:

- Changes in the rate of forest carbon accumulation between harvested and nonharvested forests. Most moderately aged forests accumulate carbon at a faster rate than very young forests or plantations.<sup>13</sup> Harvesting thus causes a slowing of carbon accumulation in many forests.
- The difference between total forest growth and net forest growth in harvested in nonharvested forests.

Here are some of the factors we cannot consider in this analysis:

- Gross carbon accumulation in forests or net carbon accumulation in forests. Including either is speculative in a number of ways, although some estimates would be possible.
- The different carbon-storage rates under different management regimes. More sustainable forest-management techniques tend to store more carbon, since sustainable forestry leaves more trees and dead wood in the forests as well as encourages growth rates that are faster than harvest rates.

For this analysis and carbon footprint, we believe that using the forest carbon removed from forests is the most straightforward means of accounting for forest carbon emitted to the atmosphere, balanced by carbon stored in books.

<sup>13</sup>Carbon accumulation or forest growth is largely a function of photosynthesis and thus leaf area, which is how trees change carbon dioxide in the atmosphere into carbon in the trees themselves and oxygen.

## FIBER TRANSPORT AND HARVEST CARBON FOOTPRINT

Environmental Defense's Paper Calculator accounts for the transport and harvest of fiber for virgin fiber. It includes harvesting of trees and transport of logs (or chips) to the mill, debarking, and chipping.

The Fiber Transport and Harvest segment thus accounts for all transport and harvesting emissions, but not for impacts in the forests from slash burning and decay, road building (which can contribute to permanent loss in the system as long as the forest is under management), and the reduction in storage potential from management.

## RECYCLED FIBER COLLECTION AND MANAGEMENT CARBON FOOTPRINT

Given the 5% average use of the post-consumer recycled content in book papers, the total recycled collection system for the book industry was small—approximately 0.2% of the total emissions, as calculated in Environmental Defense's Paper Calculator. The Paper Task Force considers the following in its estimate of recycling emissions:

For the recycled fiber-based system, we have examined: used paper collection, transport of the recovered paper to a material recovery facility (MRF), processing of the material at the MRF, transport of processed recovered material to the manufacturing site, manufacturing of pulp and paper using recovered fiber, and disposal of residuals from MRF operations and paper manufacturing.

The emissions resulting from the collection of recycled fiber were so small compared to other segments that we did not include them in the chart. It should be noted that all participating mills were asked to provide data related to total number of miles required to transport recycled fiber versus virgin fiber to the mill. A lack of substantive re-

sponses prevented any further analysis beyond the averages determined by Environmental Defense's Paper Calculator.

## PAPER PRODUCTION CARBON FOOTPRINT

The Paper Calculator accounts for all energy use and other emissions in the paper production system itself. Energy use is reported as "purchased energy" in the output from the calculator. However, energy used at paper mills (and considered in the Paper Calculator) includes the on-site use of fossil fuels such as oil and coal, the burning of tires, and also some renewable sources such as wind and hydro power. Energy from biomass (black liquor—a byproduct of chemical pulping of trees and parts of trees) is not accounted for in the Paper Calculator, nor is it recorded in national greenhouse-gas reporting as energy use, but it is accounted for in the changes in forest carbon levels. This report separates these two elements as well. Paper production accounted for 2.8 million metric tons of CO<sub>2</sub> equivalent greenhouse gases. This analysis assumes a 60/40 split between freesheet and groundwood content in book paper, and thus 59% of the total impact estimated by the Paper Calculator (which excludes a number of impacts from the book industry as a whole).

## PRINTING AND BINDING CARBON FOOTPRINT

To properly assess the carbon footprint for the book printing segment of book production, we should consider:

- Emissions from the energy consumed in printing facilities
- Emissions from the energy consumed for material inputs for the book-printing process such as inks, packaging, print plates, glues, and cover materials
- Emissions from delivery transport for inputs, as listed above and for paper

The surveys provided some significant information for these inputs and energy consumption from printers.

The five printers that provided sufficient information to answer the question purchased electricity averaged at 0.22 kilowatt hours per book. Total electricity used for printing and binding books at printers was extrapolated to the entire industry at 848,650 Megawatt hours (MWh). Additional, natural gas for heating dryers at printing facilities add 14,219 MWh of energy consumption.

The survey results did not present sufficient information for the following inputs to calculate the carbon footprint:

- Industry-wide, coated book covers averaged 0.39 square feet per book and paper-backed cloth averaged 0.01 square feet per book.
- Glues and adhesive consumption was 0.01 pounds per book.
- Aluminum printing-plate consumption was 0.01 pounds of plates per book.
- Packaging cartons were 0.03 pounds per book. Packaging cartons were reported to be corrugated cardboard ranging between 7% and 100% recycled.

## DISTRIBUTION OF BOOKS CARBON FOOTPRINT

Our estimate of the emissions from the distribution of books from printers to warehouses and retail outlets was based on limited data from the surveys. This estimate includes data for transportation and storage of books. Transport of books by truck constituted 54% of the total impact of distribution. We took the total number of miles shipped by truck provided by three companies and divided by the number of books those companies shipped. That gives us a per-book coefficient (not miles shipped for a book) that we can apply to the total number of books produced and shipped by the entire industry.

The result found that shipments of books by truck totaled just over 210 million miles. Emissions factors used for trucking were taken from the Climate Trust. Average fuel economies were taken from the Energy Information Agency and *Fleet Maintenance* magazine. We assumed that light delivery vehicles and heavy trucks both constituted 50% of transportation miles by truck.

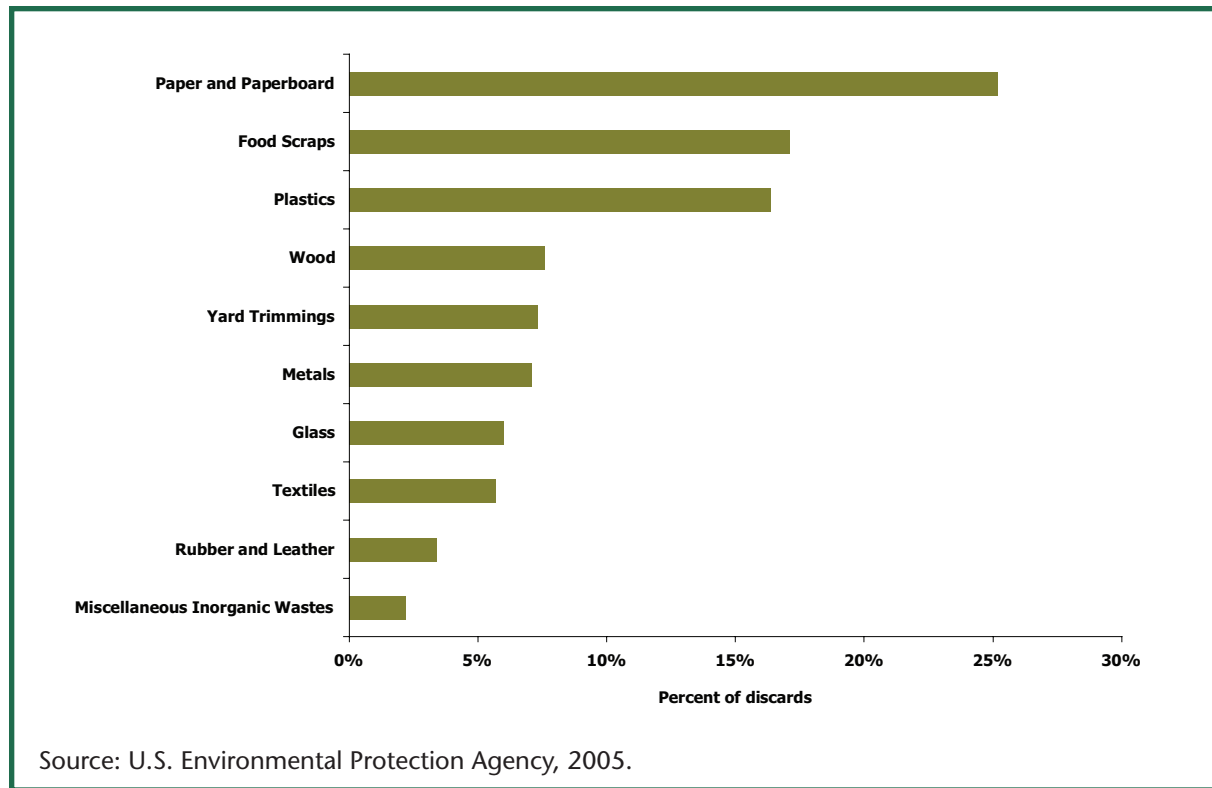
We calculated a per-book coefficient for air and water shipments from one company that provided us with detailed information on this aspect. With air and water shipments, total shipments of books totaled 1.25 billion miles. Air and ship miles and emissions factors were based on the calculations of one publisher only, but account for 4% of the total emissions for this segment. Distribution of paper to printers and pulp to paper manufacturers was not included due to a lack of data and should be included in future studies.

Energy used in the storage of books was calculated from four distributors. Total energy use for gas and grid electricity amounted to approximately 200 million kilowatt hours, or 128,000 metric tons of CO<sub>2</sub> equivalent emissions. Natural gas emissions are less than 10% of the total emissions from energy use for storage.

## LANDFILL EMISSIONS CARBON FOOTPRINT

When paper, wood, and other organic materials enter a landfill, they begin to emit methane as they break down in what are known as anaerobic conditions (i.e., lacking oxygen). Landfill emissions are the largest portion (34%) of the United States' total emissions of methane—a greenhouse gas with a Global Warming Potential (GWP) 21 times that of carbon dioxide. According to the U.S. Environmental Protection Agency (EPA), paper is the largest contributor to municipal waste and landfills, where it comprises 26% of the content of landfills, and a much larger proportion of organic materials that create methane (see Figure 25). The

**FIGURE 25** Municipal Waste.



World Resources Institute states that methane from landfills constitutes 55% of emissions from the waste stream in the United States.

We calculated landfill emissions for the book industry differently from the Paper Calculator, since fewer books enter the Municipal Solid Waste stream than the average for paper. According to the U.S. EPA, books accounted for 672,000 metric tons of paper in Municipal Solid Waste. We assumed that for Municipal Solid Waste, 80% is landfilled, 20% incinerated. Emissions from the landfilled portion (610,000 tons) are based on the 3,364.1 lbs. of CO<sub>2</sub> equivalent emissions per short ton of books entering landfills.

### PUBLISHERS' CARBON FOOTPRINT

This analysis includes three elements for which enough information was available to make an estimate: energy use in publishers' offices, internal office paper use by publishers, and publisher

business travel. Publisher business travel was based on data given in the surveys, while office energy and paper use were national averages based on the number of employees as given by the U.S. Department of Energy and General Services Administration. The total emissions for the publishing segment of books accounted for 6.56% of the total impact, or 818,000 metric tons of CO<sub>2</sub> equivalent.

### CARBON STORAGE IN BOOKS

Harvested wood products store carbon in the products themselves until they either break down or are incinerated. The U.S. Forest Service Forest Products Laboratory estimates the half-life of paper products to be approximately one year.<sup>14</sup> From their

<sup>14</sup>[www.fpl.fs.fed.us/documnts/pdf2004/fpl\\_2004\\_skog001.pdf](http://www.fpl.fs.fed.us/documnts/pdf2004/fpl_2004_skog001.pdf)



calculations, it is estimated that 55.8 teragrams (one million metric tons) of carbon are stored annually in wood products. The storage includes both accumulations of carbon and loss to the atmosphere annually. Of that amount, one quarter is paper products. This includes paper that is “stored” in landfills as it slowly decays into methane.

Our estimate for the carbon stored in books begins with the total carbon dioxide equivalent of books produced in 2006 (2.4 million metric tons) minus books recycled (800,000 metric tons) and books incinerated (224,000 metric tons), or 1.4 million metric tons of CO<sub>2</sub> equivalent.

## RETAIL EMISSIONS CARBON FOOTPRINT

Retail outlets use energy for lighting, air conditioning, and heating. Retail sales account for nearly 60% of all book sales.<sup>15,16</sup> Although our sample from the survey is small, retail energy use from the grid, also called “purchased electricity,” is largely responsible for the result in this analysis. Emissions from online or direct-to-consumer sales and most storage was not included in this analysis due to a lack of information about the entire impact, and therefore this segment should be considered only as a preliminary result that requires further research. The results from this study are derived from the electricity consumption in kilowatt hours multiplied by the EPA’s estimate for carbon release through the grid nationally.

The average of energy consumption per book in retail sales was 1.089 kilowatt hours per book (accounting for the amount of each retail location dedicated to book sales), for a total of approximately 2 billion kilowatt hours. The number was derived by taking total kilowatt hours per book from our survey, multiplied by the factor for por-

tion of retail space devoted to books, and multiplied by the factor for retail sales of books as a percentage of total books.

## Carbon Footprint—Methodology

### OVERALL METHODOLOGY

The carbon footprint starts from estimates of the weight and volume of books and paper used to produce books. BISG reported in 2007 that the number of books sold in the United States in 2006 was 3,098,000,000, or approximately 10.3 books per U.S. resident. The surveys provided limited data on the return rate of unsold books. We have used a conservative return rate of 25%. That brings the total number of books produced for the U.S. market to 4.15 billion. The carbon footprint of the average book for this report is based on the total production process of the book industry (the total number of books produced, sold, and unsold) divided by the number of books that reach the consumer (i.e., sold). Responses in the survey allow us to estimate the average book weight at 0.89 pounds.<sup>17</sup> The total tonnage of books (in metric tons) from these estimates is 1,634,000. This estimate is approximately 90,000 tons less than the RISI estimate for book-paper usage in 2005 (1.72 million metric tons). Other estimates of the total tonnage for book paper have been lower than the estimate derived by the methodology adopted here.

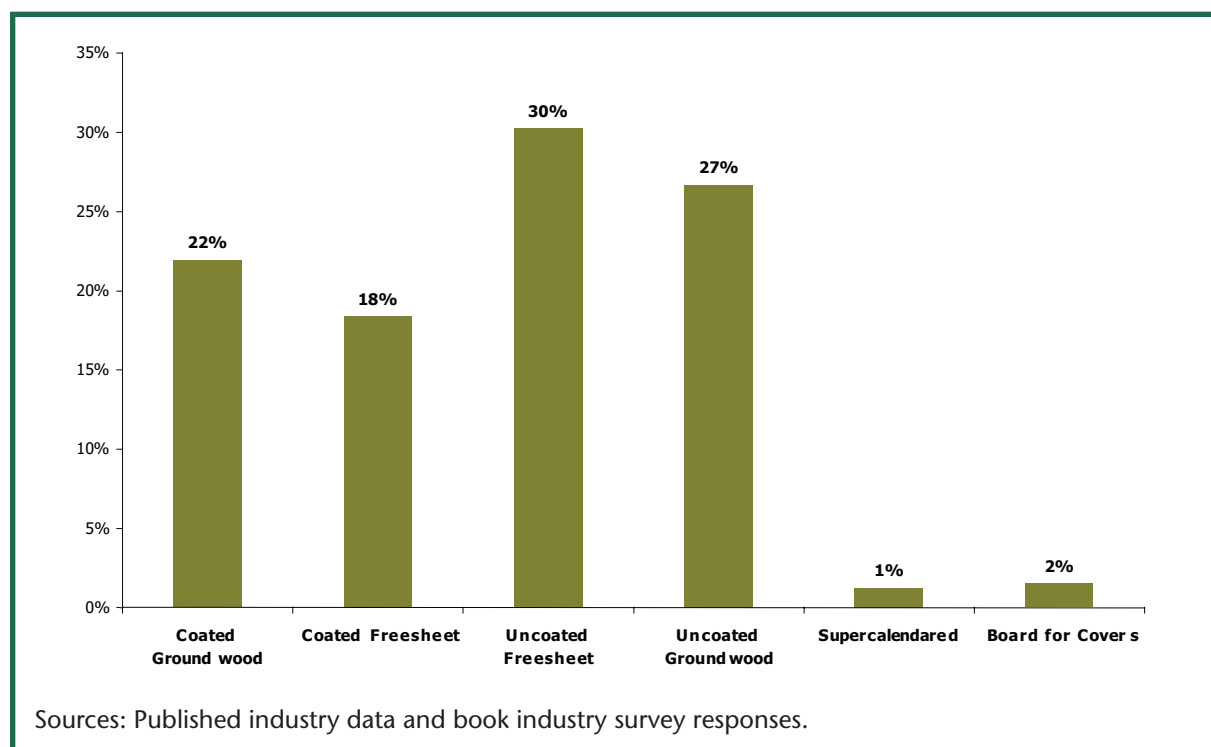
Environmental Defense’s Paper Calculator, developed under the Paper Task Force, remains one of the best sources for determining the greenhouse gas emissions and other paper production impacts for certain segments of the paper industry at large. This study uses the Paper Calculator for the esti-

<sup>15</sup>[www.nytimes.com/2007/06/17/technology/17ecom.html?\\_r=1&oref=slogin](http://www.nytimes.com/2007/06/17/technology/17ecom.html?_r=1&oref=slogin)

<sup>16</sup>Book Industry TRENDS 2007. Book Industry Study Group.

<sup>17</sup>We used six average book weights from publishers to establish the average book weight. More data points would allow us to determine the average weight of a book more exactly.

**FIGURE 26** Paper Grades Used in Book Papers. For this report, coated grades 1, 2, and 3 are considered freesheet, 4 and 5 are considered groundwood.



mate of the emissions in paper production (purchased and produced energy only), harvesting of virgin fiber, methane releases from landfills, and other emissions or removals. We assumed a 60/40 split between freesheet and groundwood content for virgin fiber and 5% post-consumer average in all paper. The resulting Paper Calculator estimate breakdown is:

- paper production, 59%
- virgin fiber harvest and transport, 4%
- methane release from landfills, 40%
- recycling fiber collection, 0.2%
- energy recovery through incineration, -3%

The Paper Calculator does not report on biomass used in the paper-making process for energy as emissions. However, the total wood use is estimated accurately, which helps us determine the

carbon taken from forests and accounts for this energy source.

One of the survey respondents made the following observation: “A very positive attribute of the printed book is the fact that it is made from a renewable resource which draws CO<sub>2</sub> from the atmosphere and captures it in the final product. However, claiming this as a positive attribute assumes that there is adequate assurance that this resource (trees) is, in fact, being renewed. FSC and SFI chain of custody certification provides that assurance.” Clearly, some of the paper (and the carbon it contains) that becomes books is stored in the final product for a certain period. The storage of carbon in books is dealt with below and included in the production segment analysis. According to the baseline rules described above, however, we must also determine whether the biomass used as an energy source in paper production

or other loss or decay of carbon from biomass removed from forests is in fact recaptured in the trees, or if this carbon (or a portion of it) is in the atmosphere as CO<sub>2</sub>.

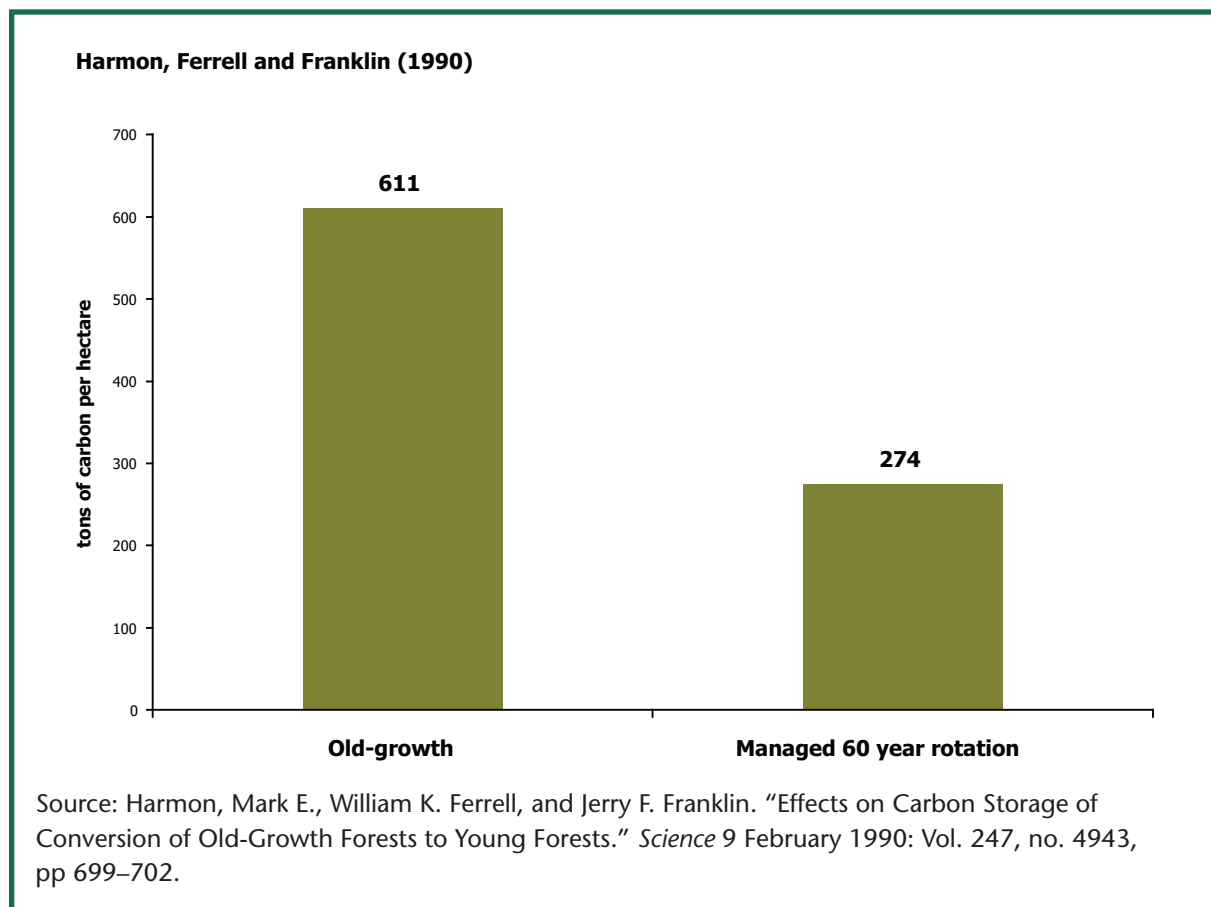
### FOREST MANAGEMENT AND CARBON LOSS IN PAPER-MAKING—CHANGES IN FOREST AGE AND MANAGEMENT AND RELATED CARBON STORAGE

Several studies have measured the amount of carbon stored in forests under different management

regimes. Some of these studies include the carbon that accumulates in products or landfills. Figures 27 to 29 demonstrate the results.

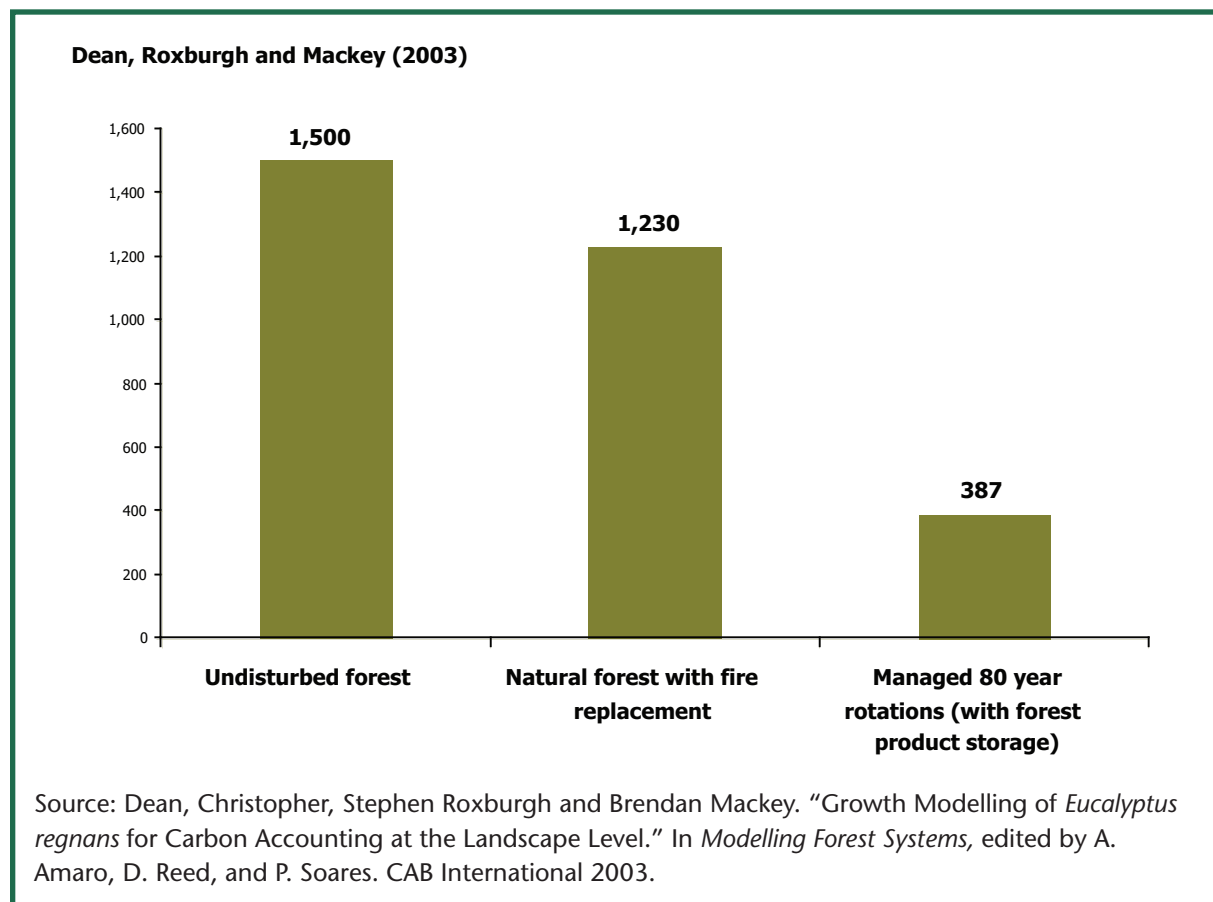
All three studies demonstrate that natural or undisturbed forests contain more carbon over time on average than forests managed for forest products. These studies include assessments that take into account the accumulation of carbon in forest products. We must also consider that paper has a lower lifetime in useful products than most wood products used in construction and other uses. Fig-

**FIGURE 27** Storage of carbon in an old-growth forest in the Pacific Northwest compared to a managed 60-year rotation forest. All forests can vary in their carbon storage over time due to natural factors, but the average storage across the landscape is the important factor when making decisions about management regimes and their relationship to protecting against climate change. Managed forests in this context store less than half the carbon of natural forests.





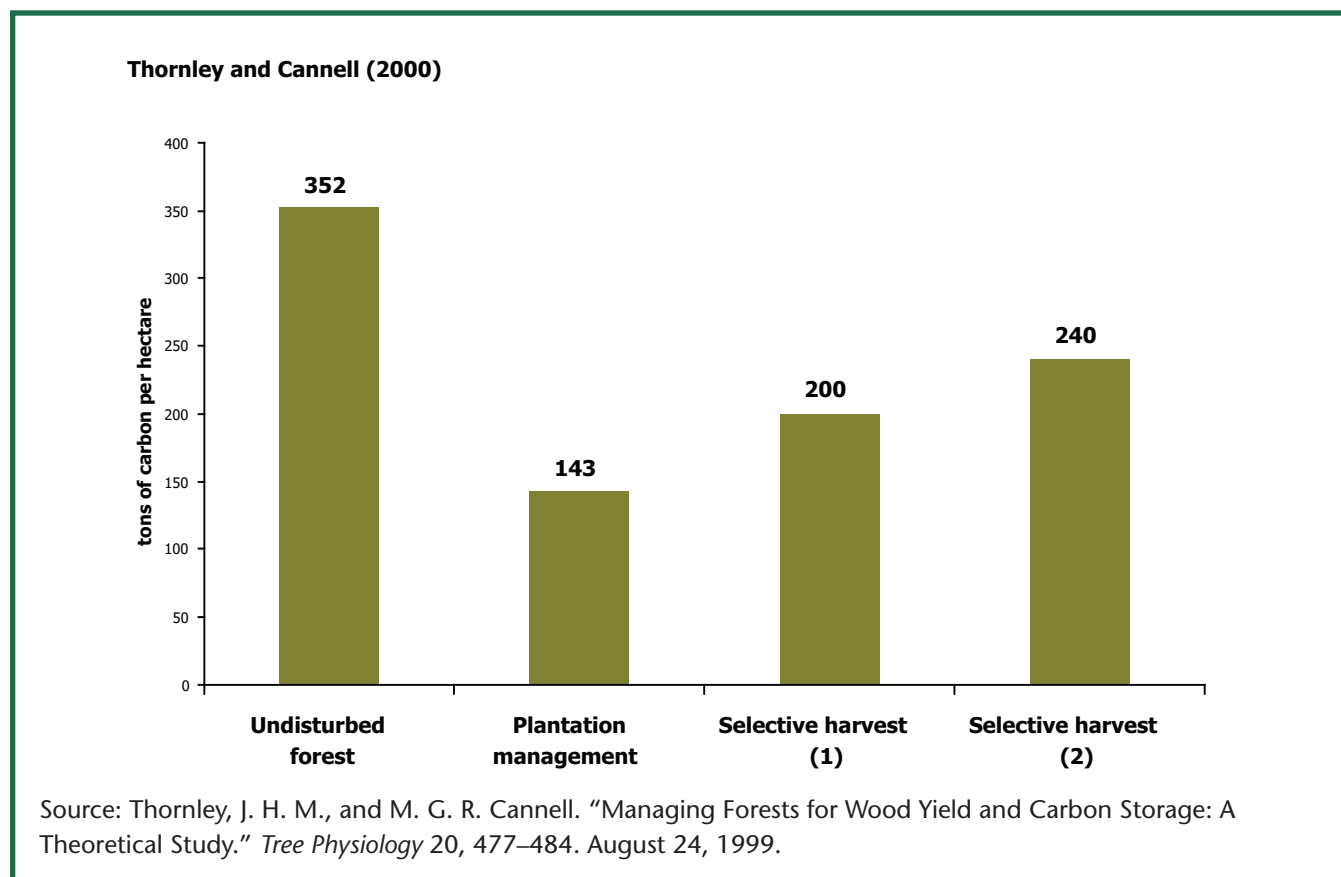
**FIGURE 28** Three different scenarios measured in Australia. Undisturbed forests store the greatest amount of carbon even when natural fires are permitted. Forests managed for wood products and paper contain less than a third of the carbon of undisturbed forests in this study, including storage in forest products.



ure 30 demonstrates a hypothetical forest's carbon-storage trajectory. The two areas, gray and brown, together indicate the amount of carbon that is stored on site in an old-growth forest over the course of 100 years. The top line shows the forest varying in carbon storage over time, sometimes gaining carbon, and at other times losing carbon due to disturbance. The brown area alone indicates the carbon stored when the forest is harvested on a 40-year rotation basis. The initial harvest causes a sharp decrease in carbon storage, which is recaptured over time. The gray area alone, then, indicates the amount of carbon lost to harvest in forests.

Let's consider the case of a second-growth forest that is already under a harvest-management system (see Figure 31). A system of regular harvest will maintain a relatively steady state of carbon in the forests and plantations under consideration and we could assume an average for this area of forests. However, without harvesting, the forest has the potential for significant regrowth over time. It is important to note that these forests will recover the biomass (and therefore the carbon) on the scale of many decades and centuries, much longer than the rotation age of forests managed for industrial uses. That is,

**FIGURE 29** Analysis under four different scenarios of a northern European forest. While undisturbed forests again proved the most effective in storing carbon, different regimes of selective harvest showed the potential for increased average storage while allowing for forest product harvest. Currently, however, the vast majority of management for wood and paper products is in plantation management and clear-cutting. Scenarios 1 and 2 are the range of 10% and 20% of biomass removed each year. Plantation management was modeled on a 60-year clearcut and replanting management strategy.

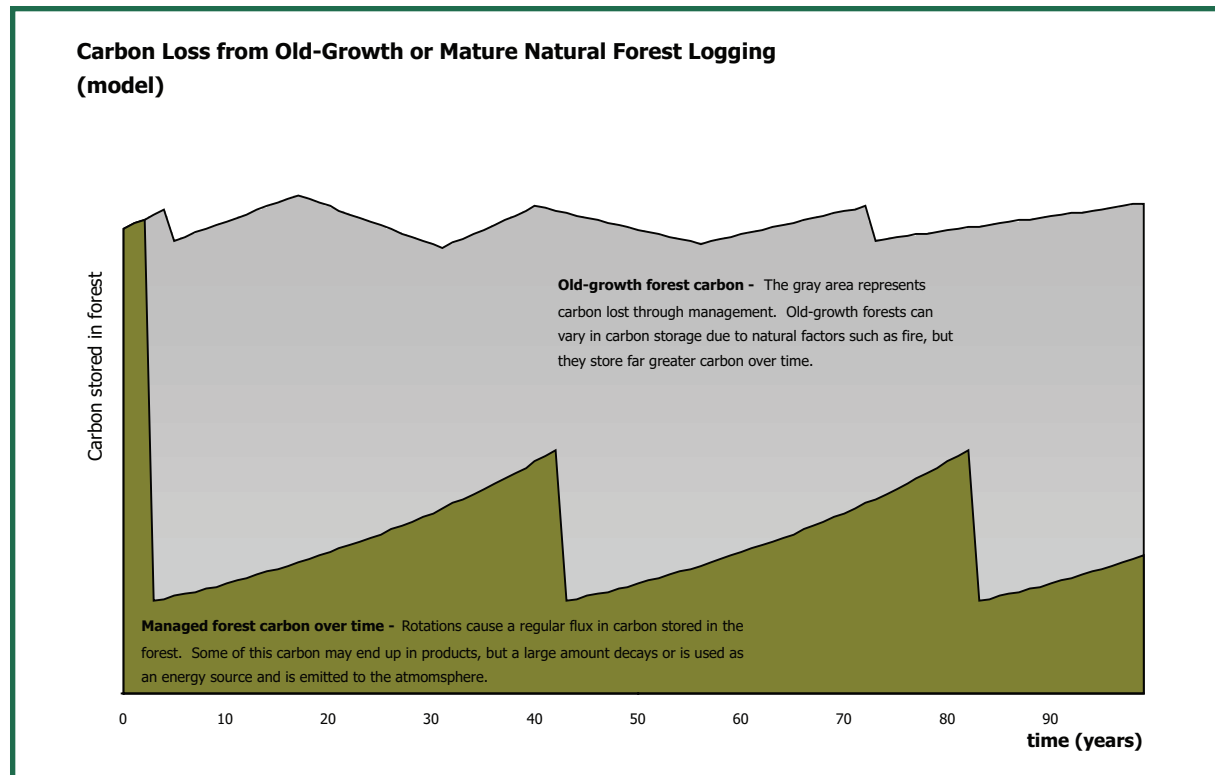


forests would continue to capture carbon from the atmosphere whether or not the forests are harvested, in most cases.

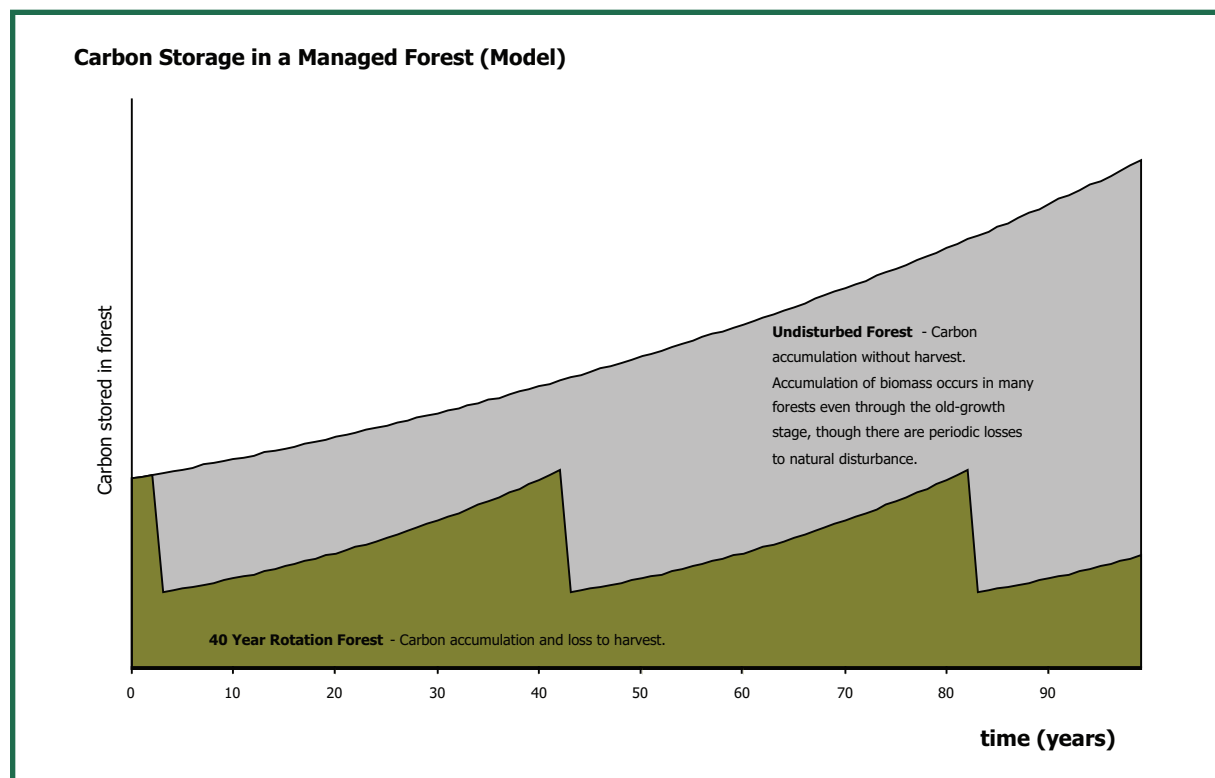
These figures, and the data in the studies that underlie them, demonstrate quite clearly that only a portion of the carbon is stored in the forest over time on average. Over larger areas dedicated to the harvest of wood for paper, the total carbon storage

is reduced on a large scale. The question we must ask from this is, Where is the carbon? The answer is rather straightforward. After accounting for the storage in products, any remaining carbon was released to the atmosphere as carbon dioxide when it was used as an energy source for the pulp and paper mills themselves, or lost to decay and other release.

**FIGURE 30** Carbon Loss from Old-Growth or Mature Natural Forest Logging (model).



**FIGURE 31** Carbon Storage in a Managed Forest (model).



# Endangered Forest Risk Assessment for the Book Industry

Biodiversity impacts from the harvesting of raw materials are clearly a major issue for book publishers and the paper industry in general. There is a variety of pathways through which fiber from Endangered Forests enters the paper-manufacturing cycle for paper in general and book paper specifically. The fiber for paper at various stages comes in the form of roundwood (cut trees), wood chips, sawdust, and pulp and wood chips from sawmills. Purchasers of paper products must track the origin of their paper fiber back to the forest to ensure that no unsustainable fiber enters the paper. The book industry sources paper from throughout the United States and Canada, as well as parts of Asia and Europe. In addition, wood chips, pulp, and roundwood for paper mills in these regions are procured from South America, Tasmania, and Indonesia.

The parallel concepts of High Conservation Value Forests (HCVFs) and Endangered Forests mean that the correct application of HCVFs in certification credibly ensures that fiber is being procured sustainably. The maps and studies in this section can be used as a guide to key fiber-procurement zones for book paper and the risks in sourcing from those regions. Working with stakeholders and book-paper suppliers, printers, and publishers can work to identify the forests of origin and to eliminate any unsustainable fiber sources.

Appendix Figure 1 and Appendix Table I offer studies and areas that are known to contain forests of particular conservation value and where trees

may be harvested for the book industry. Appendix Table I also states how these forests may enter the fiber supply for the book industry.

## Definitions of Endangered Forests and High Conservation Value Forests

Endangered Forests are the most valuable forests on the globe, to which industrial resource extraction would cause irreparable harm. These forests compose a large proportion of the world's remaining old-growth, primary, and ancient forests in tropical, temperate, and boreal zones. According to many conservationists and the signatories of the Environmental Paper Networks' *Common Vision*, these forests should be protected from industrial-scale resource extraction to provide the many goods and services available in their natural state and to maintain biological diversity in forest ecosystems. The definition of Endangered Forests was developed as a tool and guidance for consumers and producers of wood and paper products to inform decision makers and purchasers, as well as to help guide international and regional conservation efforts, especially in connection with forest-management certification.

HCVF definitions were developed by the Forest Stewardship Council for use in the certification of forest management. When a forest-management certificate is issued, the certifying body judges whether the forest manager has given due consid-

eration to the High Conservation Values in the forest under consideration for the protection of those values. The High Conservation Value Network ([www.hcvnetwork.org](http://www.hcvnetwork.org))—including leading companies, conservation organizations, and intergovernmental bodies—has been formed to help develop and refine methodologies for identifying these forests and ecosystems. High Conservation Values are consistent with the concept of Endangered Forests. The two differ in the recommendations for conservation activities: Endangered Forests are forests where any industrial activity will diminish their values, while HCVFs require specific action (e.g., a lower rate of harvest or leaving specific types of trees in place), even where industrial forest management or harvesting takes place, to maintain the value (see Figure 32).

High Conservation Values are:

HCV1. Areas containing globally, regionally, or nationally significant concentrations of biodiversity values (e.g., endemism,<sup>18</sup> endangered species, refugia<sup>19</sup>).

*For example, the presence of several globally threatened bird species within a forest region.*

HCV2. Globally, regionally, or nationally significant large landscape-level areas where viable populations of most, if not all, naturally occurring species exist in natural patterns of distribution and abundance.

*For example, large areas of the Canadian Boreal forest are intact forests that contain all of their original, preindustrial species and natural forest distribution.*

<sup>18</sup>Endemic species are those species that are found in only one geographic region.

<sup>19</sup>Refugia are those places where species persist in limited geographic regions after the loss of that species more widely.

HCV3. Areas that are in or contain rare, threatened, or endangered ecosystems.

*For example, patches of a regionally rare type of forest ecosystem in the southern United States where conversion to agriculture, plantations, and urban areas is high.*

HCV4. Areas that provide basic ecosystem services in critical situations (e.g., watershed protection, erosion control).

*For example, forest on steep slopes with avalanche risk above a town.*

HCV5. Areas fundamental to meeting basic needs of local communities (e.g., subsistence, health).

*For example, key hunting or foraging areas for communities living at subsistence level in a forest.*

HCV6. Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic, or religious significance identified in cooperation with such local communities).

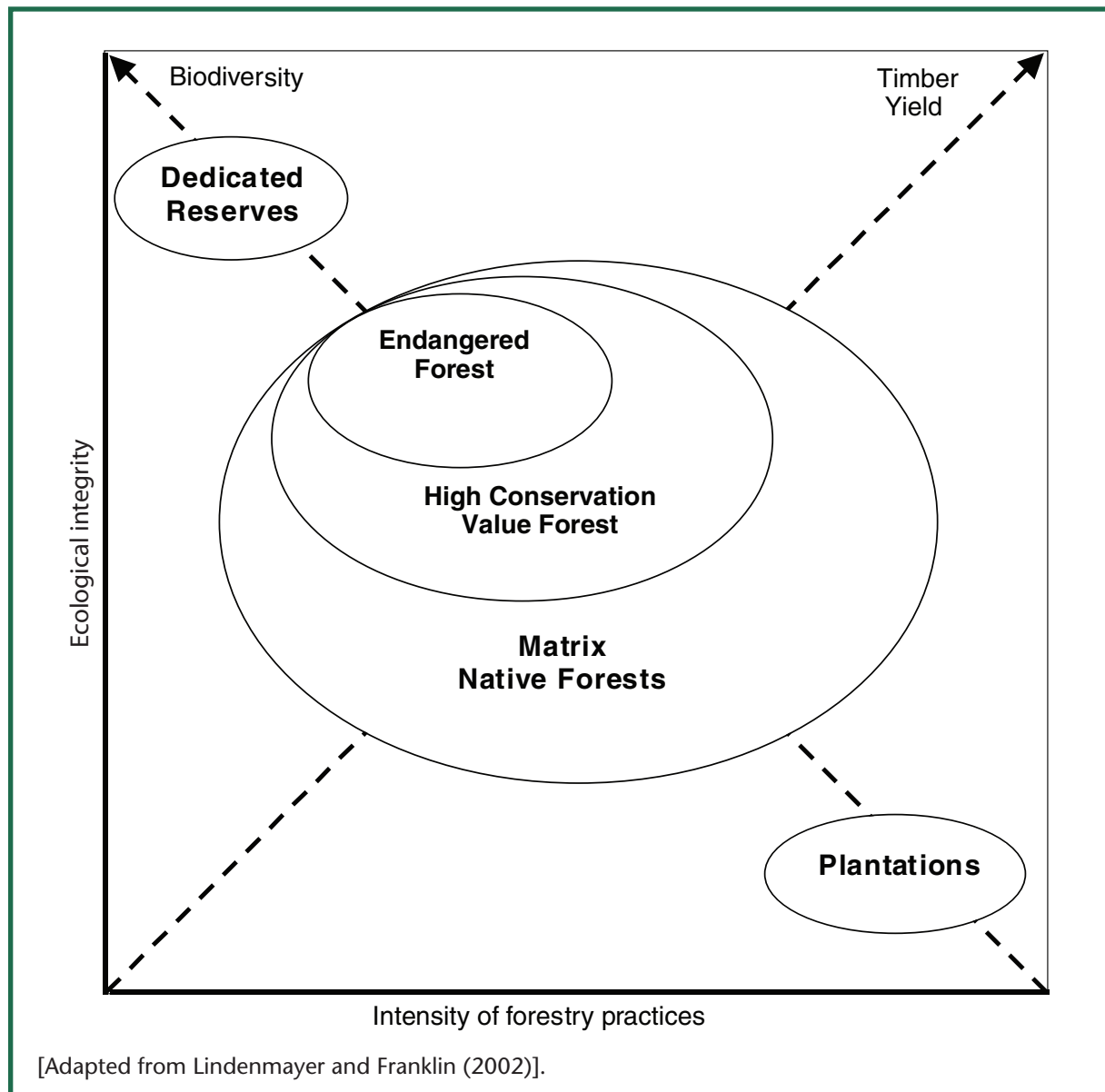
*For example, sacred burial grounds within a forest management area in Canada.*

## Identifying Endangered Forests

Endangered Forests are identified by the following values or attributes:

- Wilderness forests and intact forest landscapes
- Remnant and restoration values
- Forests that are ecologically critical for the protection of biological diversity, such as naturally rare forest types, high endemism, or the habitat of focal conservation species

**FIGURE 32** Diagram showing the relationship of Endangered Forests and High Conservation Value Forests in relation to the intensity of forest management continuum, timber yield, and biodiversity protection.



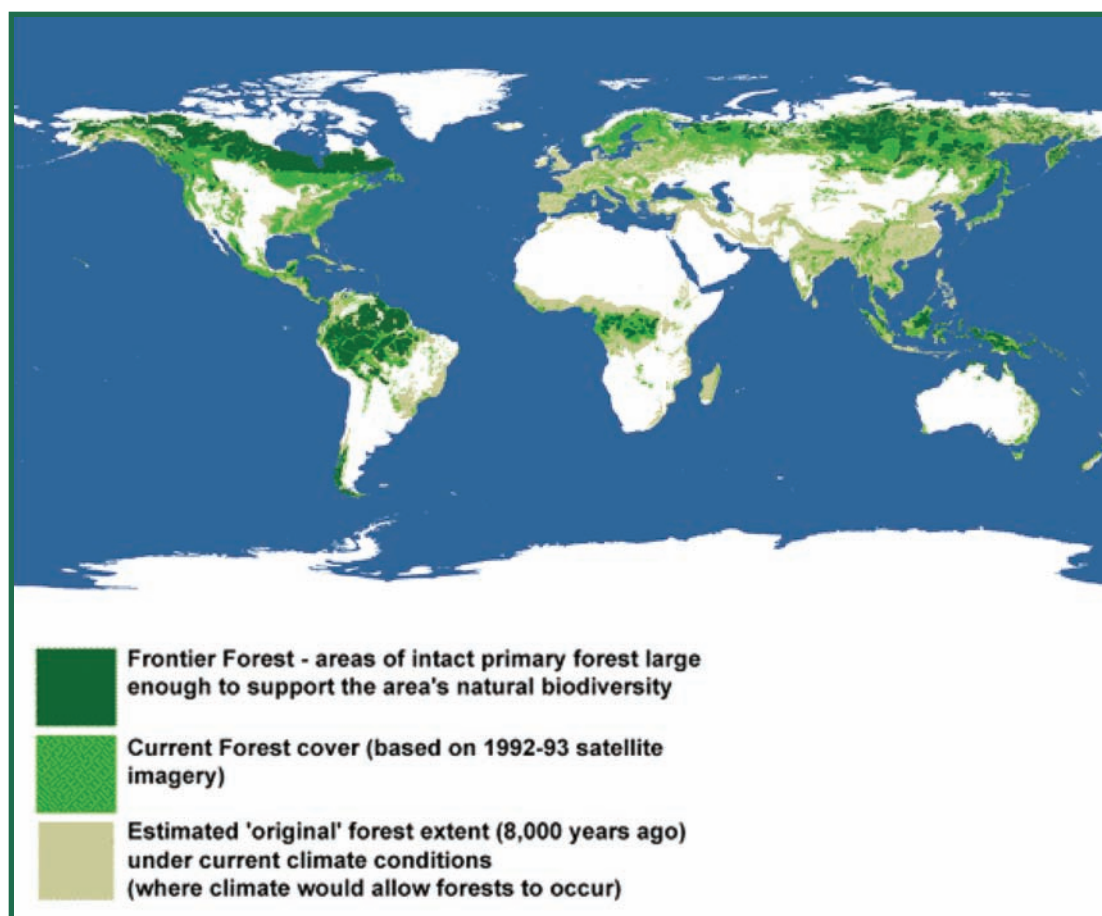
Effectively, with the information that we have available, we need to look at two different scales to identify where those forests are. The first of the two scales begins from the larger, intact forests, which we can also call wilderness. One of the first studies of these forests globally is the World Resources Institute's report *The Last Frontier Forests: Ecosystems and Economies on the Edge*. The map of these

forests is reproduced here as Figure 33. Further work since 1997, when *Frontier Forests* was released, has expanded our knowledge of these forests.

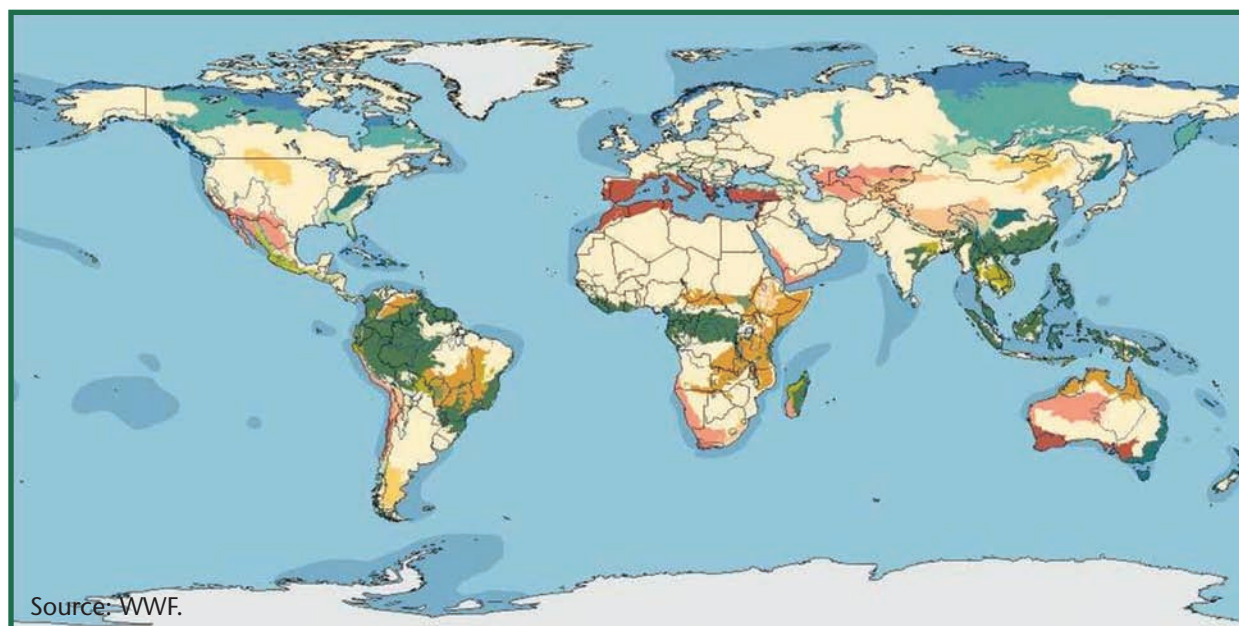
The second of the two scales is best identified through the identification of more local biodiversity values, best exemplified by the World Wildlife Fund's (WWF) ecoregional studies and analyses (see Figure 34). After dividing the world's ecosys-



**FIGURE 33** Frontier Forests (i.e., wilderness or intact forest landscapes) by the World Resources Institute



**FIGURE 34** WWF Global 200 Ecoregions.



tems into coherent regions, WWF assigned values to the various characteristics and the threats to these characteristics and came up with 200 ecosystems, known as the Global 200, that should receive particular attention from conservationists.

Finally, Conservation International's Biodiversity Hotspots<sup>20</sup> also characterizes some regions where the book industry sources fiber as conservation priorities. These are the Valdivian Rainforests of Chile, the Atlantic Rainforest of South America, and, to a lesser extent, the California Floristic Province.

## Endangered Forests around the World

Endangered Forests have been identified in most forested regions of the world. While some regions have undergone extensive conservation efforts and programs, the work remains unfinished in most. A large area of unprotected frontier and near-frontier forests—that is, large areas of undeveloped forests that retain their natural functioning—remain in regions where fiber for the book industry is procured (see Figure 35): Canada (25% of all frontier and near-frontier forests), Russia (26%), Chile (1%), Tasmania (less than 1%), and Indonesia (4%). Several of WWF Global 200 ecoregions also overlap with book industry fiber-sourcing regions.

The “interior temperate rainforest” (British Columbia, Canada) and the native *siempre verde* forests of Chile are examples of naturally rare forests. Anthropogenically rare forest types (i.e., forest types that have been significantly reduced in their natural range by human activity) predominate in the United States and many other highly populated regions of the world. Examples include remaining natural areas of longleaf pine and Mississippi Lowlands Forests and the Mid-Atlantic Coastal Forest of the southeastern United States.

<sup>20</sup>[www.biodiversityhotspots.org](http://www.biodiversityhotspots.org)

Only the areas of greatest ecological and social value according to the values in the examples above are the Endangered Forests of these regions. Currently, environmental organizations, scientists, and innovative forest products companies are working to map and identify the Endangered Forests within these regions. Until this process is completed, it is suggested that purchasers use their market leverage to support companies that are working in partnership to map, identify, and protect Endangered Forests. Since many forests have been accessed by humans for industrial purposes, many of these forests can maintain their values with good management, such as Forest Stewardship Council–certified, or equivalent, logging.

## Examples of Endangered Forest Risk to the Book Industry

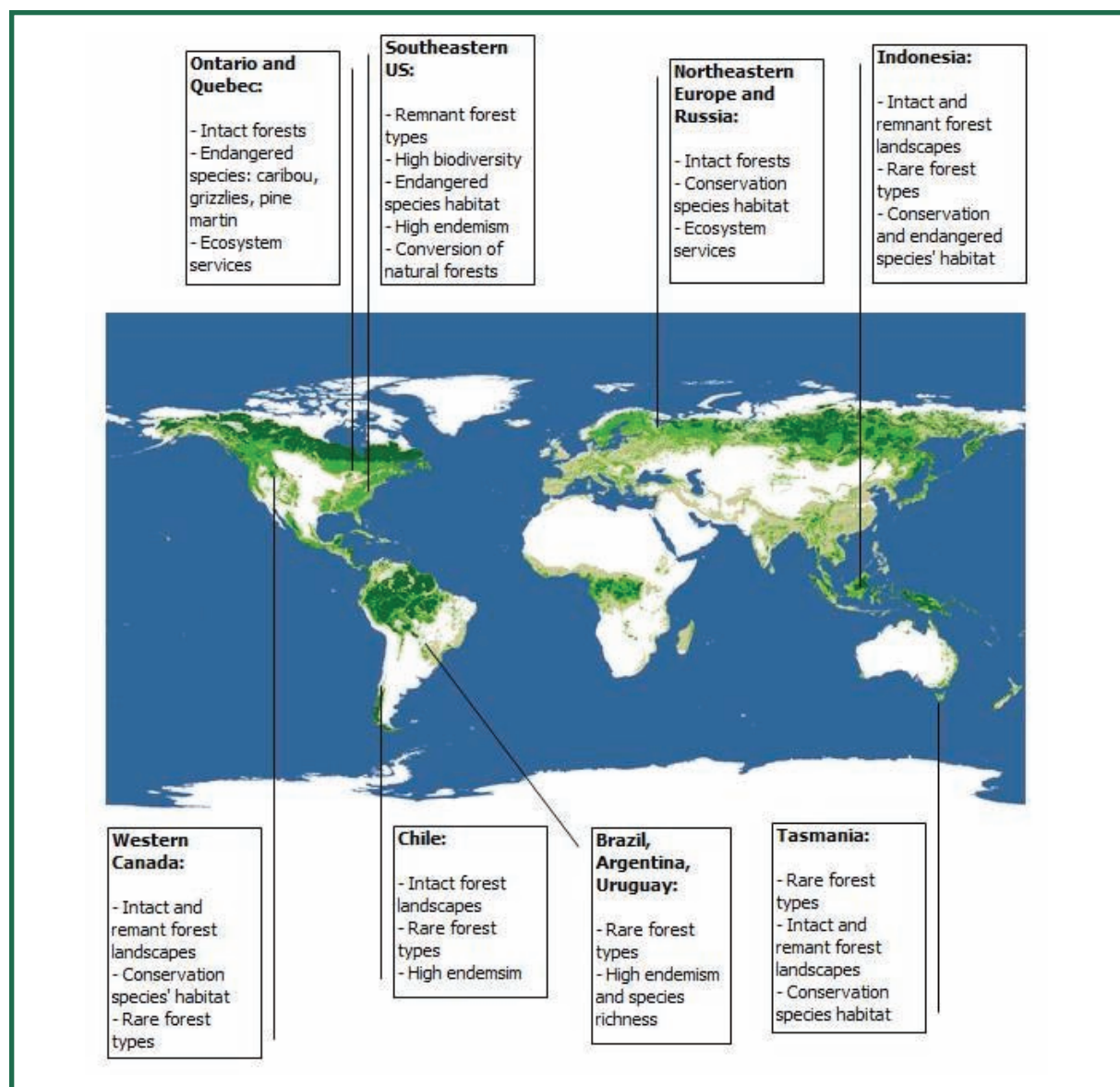
Two examples of different forest regions where the book industry procures fiber helps illuminate the risk to the book industry. These two regions—from the southern United States and northern Canada—highlight the different risks and different forest types that the book industry is affecting through its sourcing of paper fiber.

The southern United States is a highly biodiverse region that has suffered from a high degree of fragmentation and conversion historically. Conversion of native hardwood and longleaf pine forest ecosystems to pulpwood pine plantations has resulted in the loss of millions of acres of native forest loss in the region.<sup>21</sup> Currently, the area has also become the world's largest “fiber basket” for wood products, especially paper. Some of the ecoregions there are counted among WWF's Global 200 of

<sup>21</sup>Southern Forest Resource Assessment. USDA Forest Service Southern Research Association et al. Accessed 14 January 2008. [www.srs.fs.fed.us/sustain/report/timbr1/timbr1.htm](http://www.srs.fs.fed.us/sustain/report/timbr1/timbr1.htm)



**FIGURE 35** Select Unprotected Forest Values Supplying the Book Industry.



highly valuable yet threatened ecoregions. A recent and still unpublished report by the Conservation Biology Institute has documented specific areas of HCVFs that remain unprotected in the region and are currently or may soon be subject to harvest for paper fiber.<sup>22</sup>

<sup>22</sup>Conservation Biology Institute. "High Conservation Values in the Middle Atlantic Coastal Forests Ecoregion." October 2007.

The study considers the Atlantic coastal region of the southern United States, which is a major source of fiber for several mills that supply paper to the book industry. Only 4.3% of the region is formally protected for nonindustrial uses, and only 2.7% could be classified as intact natural ecosystems. At the same time, the region is rich in biodiversity, in terms of species richness and in species that only occur there (i.e., endemic species). Some quotes from the study demonstrate

the biological value of the Mid-Atlantic coastal region:

The southeast is clearly the hotspot for tree diversity and endemism, with the Middle Atlantic Coastal Forests ecoregion ranked just a few classes below the neighboring ecoregions where richness and endemism are a little higher.

The Middle Atlantic Coastal ecoregion contains very high levels of native terrestrial diversity, but it is in the freshwater aquatic world where the region scores extremely high.

The region in and around the Green Swamp in North Carolina is an obvious hotspot of endangered species.

Given the high value of the natural systems in the region, the corresponding protections should be high. However, the region is under pressure from industrial uses, including the logging and paper industry, and few efforts are underway to ensure the protection of these values. Those sourcing paper from the region should consider this a high risk to the reputation and environmental profile of their products. A few more quotes from the study point to the need for greater effort in the region:

It has been estimated that the majority (approximately 90 percent) of the ecoregion has had its natural ecosystems either converted or degraded in some way. The largest fundamental changes and losses in natural systems have come from conversion of native forests to plantation forests, draining of wetlands, and urban development.

Various ecosystem types are becoming exceedingly rare throughout the ecoregion.

Bottomland or wetland forests historically dominated the ecoregion with species such as

Atlantic white cedar, bald cypress, and swamp tupelo. Logging interests for many decades targeted forests dominated by bald cypress and Atlantic white cedar, and few old-growth forests of this type remain.

The longleaf pine communities of the uplands have been almost entirely replaced by plantation forests. Once covering more than 60 million acres of the southeast, longleaf pine communities occupy less than 3 million acres today with many of these acres highly fragmented and degraded.

The region's remaining high conservation value areas need to be identified and formally acknowledged. Many of these areas should be protected while other areas are strategically restored in and around the remaining cores natural areas.

Unlike the highly fragmented southern United States, northern Canada has extensive areas of intact forest. According to the World Resources Institute, "The vast extent of Canadian forests represents one tenth of the world's forested area, one quarter of the world's temperate rainforests, and more than one third of the world's boreal (i.e., northern, conifer-dominated) forests."<sup>23</sup> Natural forests where all the major preindustrial ecosystem functions and species still occur have been reduced to only 20% of their original extent, according to the World Resources Institute. These are some of the world's last great wilderness forests. These forests are also highly important to the indigenous peoples of northern Canada for hunting and fishing.

And yet, not a great extent of these forests is protected from industrial use. A recent report by Global Forest Watch Canada detailed the impact of this lack of protection in northern Ontario, a region

<sup>23</sup>World Resources Institute. [www.wri.org/publication/canadas-large-intact-forest-landscapes-2006-update](http://www.wri.org/publication/canadas-large-intact-forest-landscapes-2006-update)

**FIGURE 36** Grassy Narrows youth blockade of logging trucks near Kenora, Ontario.



that supplies a large amount of paper to the book industry: “The results of a survey of logging, road building and other human disturbances in Ontario’s northern forests reveals that the region is being rapidly impacted by logging and associated roads.”<sup>24</sup> This Global Forest Watch study demonstrates the equally high risk from logging in areas where intact forest remains, as in more fragmented forest regions. The forests of northern Canada are also the home to many of its indigenous peoples, and land tenure and rights for these communities are the source of contention about paper and timber industry fiber sourcing to this day.<sup>25</sup> The struggle of the Grassy Narrows First Nation in Ontario is a good example of this persistent problem that relates directly to the book industry (see Figure 36).<sup>26</sup>

<sup>24</sup>Global Forest Watch Canada. “Recent Anthropogenic Changes within the Boreal Forests of Ontario and Their Potential Impacts on Woodland Caribou.” [www.globalforestwatch.ca/change\\_analysis/change-analysis-NON-lowres.pdf](http://www.globalforestwatch.ca/change_analysis/change-analysis-NON-lowres.pdf)

<sup>25</sup>Global Forest Watch Canada. *Aboriginal Peoples in Forest Regions in Canada: Disparities in Socio-Economic Conditions*. 10 November 2003. [www.globalforestwatch.ca/aboriginal/download.htm](http://www.globalforestwatch.ca/aboriginal/download.htm)

<sup>26</sup>For more information about Grassy Narrows, see the article at: [www.firstnationsdrum.com/Spring2003/CovGrassy.htm](http://www.firstnationsdrum.com/Spring2003/CovGrassy.htm)

Book industry segments that are responsible for paper-procurement decisions need to consider these issues and carefully choose sources of paper to eliminate risk from these unsustainable practices. At the same time, many paper buyers have played a very positive role in ensuring these forests receive greater protections, and other industry participants should carefully consider playing a proactive role by engaging stakeholders from the paper industry and nongovernmental organizations (NGOs) working to protect these forests.

## Development of the Endangered Forest Definitions

Representatives of ForestEthics, the Natural Resources Defense Council, Greenpeace, the World Resources Institute, and the Rainforest Action Network consulted with a broad array of stakeholders and scientists to draft the first “Endangered Forest Definitions,” released in April 2001. A second version, titled “Ecological Components of Endangered Forests,” benefited from a long consultation process, more input from conservation biology scientists, and a peer review process that included scientists recommended by industry, NGO, and government representatives. Since that time, both the *Common Vision for Transforming the Paper Industry* for North America and its counterpart in Europe, and a multitude of concerned corporate paper customers, have endorsed the concept of Endangered Forests and called for their protection from industrial activities.

# Book Industry Treatise on Responsible Paper Use

Industry agreements can help set common standards and goals that influence environmental transformations on a sector-wide scale. The development of the *Book Industry Treatise on Responsible Paper Use* was chaired by the Green Press Initiative and took place over a six-month period with the guidance and active participation of 25 industry stakeholders. It is the first of its kind for any publishing sector and, when realized, has the potential to reduce significantly the environmental footprint of the book industry.

## Environmental Goals and Potential Benefits

**Goals:** The two tangible benchmarks in the *Book Industry Treatise* call for an increase in recycled fiber from a 2005 estimated average of 5% to a 30% average (majority post-consumer) by 2012, and the use of 20% FSC or equivalent certified paper by 2012. Other goals include supporting the increased use of renewable energy, reduced toxic inputs, and consensus-based solutions to social conflict in regions where industrial logging is impacting indigenous communities.

**Environmental Gains:** If the U.S. industry reaches the recycled-fiber goal in post-consumer recycled content, the result will be approximately 430,000 tons of recycled fiber replacing virgin fiber. If these gains could be translated into gains in

the use of post-consumer recycled fiber, it will result in an annual savings of more than 8.2 million trees, 1 billion pounds of greenhouse gases (equivalent to removing 100,000 cars from the roads annually), 2.5 billion gallons of waste water, and more than 500 million pounds of solid waste (see Figure 37).<sup>27</sup> Achieving the forest certification goal will provide support for Endangered Forest protections, ending the practice of forest conversion, and better forest management, among many other criteria. It should be noted that previous *Book Industry Treatise* conservation estimates were significantly less than those presented here, due to the fact that total paper consumption for the U.S. book industry had been conservatively estimated at between 50% and 60% less in terms of paper volume.

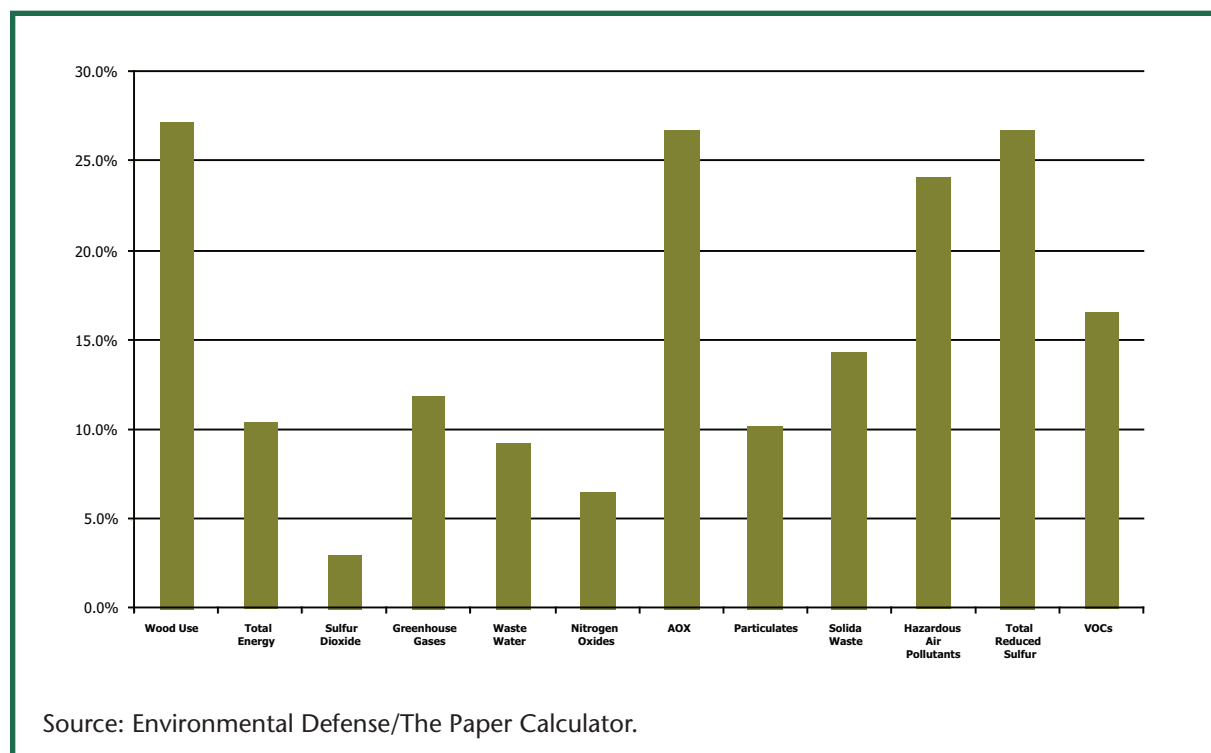
## Industry Support for the *Book Industry Treatise*

The *Book Industry Treatise on Responsible Paper Use* has been signed by approximately 150 publishers, 10 printers, 4 paper manufacturers, and 75 industry stakeholders. Once companies have signed the *Treatise*, they agree to finalize their environmental policies or develop plans for imple-

<sup>27</sup>The estimated environmental gains cited here differ from those cited in the *Book Industry Treatise* itself due to the difference in estimates of the amount of paper used in books and estimates of grades.



**FIGURE 37** Impact Reductions from a Move from 5% to 30% Average Post-Consumer Recycled Content in Book Papers. This figure assumes all the recycled content gains are post-consumer content. Note that it does not include impacts from the removal of biomass from forests and associated impacts, which would be large additional environmental gains.



menting the goals of the *Treatise* within six months. Most of the signatories are small to mid-sized. Many large and multinational publishers have developed paper policies with goals and benchmarks consistent with the *Treatise* but have yet to endorse it. In these instances, the *Treatise* has been an effective instrument for establishing a consensus-based standard that has influenced the industry-leading policies and practices of some of the largest-volume publishers, including Random

House Inc., Simon and Schuster, Scholastic, and many others whose policies are in process. In addition, it is a tool that publishing customers can use to differentiate between printers and paper manufacturers that may or may not have endorsed the *Treatise*. Endorsement of the *Treatise* is still an open process, and it is expected that many more stakeholders will endorse it over time.

**To learn more, visit: <http://www.greenpressinitiative.org/industrytreatise.htm>**

# Challenges to Improving Environmental Performance

## *Green Press Initiative*

Despite the successes mentioned earlier, there are still a fair number of companies that have yet to take concrete steps to innovate in this arena. For these companies, and even for those that are the innovators, the primary challenges in instituting sound environmentally and socially responsible business practices are as follows:

- The limits of a profit model that externalizes environmental and social costs versus incorporating those costs as a budget line item
- Overcoming inertia and taking action in the face of uncertainty
- Time and capacity constraints
- Lack of issue-specific understanding
- Unforeseen market constraints (e.g., availability of recycled or certified paper)
- Effective planning and communication

Fortunately, after scanning the list above, it is clear that these challenges can be overcome fairly easily through effort, collaboration, and the basic principles that successful businesses use every day.

The most successful leaders approach the challenge as an opportunity and they do it with enthusiasm. They set meaningful goals that they often exceed, and continually work to do better. They do not over think, over-debate, or spend much idle time. They embrace solutions and they act.

Corporate social responsibility can be a rapid force of change that has the potential to bring about unprecedented conservation and improve outdated modes of operation. There are many leaders that are doing what it takes to overcome the challenges and each positive step they make creates ripples that make it even easier for the momentum to continue.

# Recommendations for Improving Environmental Performance

## *Green Press Initiative*

As is reflected earlier in the report, the U.S. book industry is well on its way toward significantly reducing its ecological footprint. To continue to manifest positive outcomes that will reduce carbon output and use of natural resources, it is suggested that the following recommendations be implemented on an industry-wide scale. It should be noted that a Book Industry Environmental Council is in a development phase and will serve as an industry forum for addressing many of the strategies mentioned below.

## General

### **1. Develop a Standardized Data-Tracking Mechanism**

Develop a system for capturing the most relevant information about key environmental indicators for each segment of the industry. Disseminate this system to all industry participants to allow for tracking data and identification of areas for improvement. The tracking system should include the key indicators and impacts discussed in this report.

### **2. Increase Efforts to Eliminate Returns, Pulp Unsold Stock, Recycle Old Books**

From a financial standpoint, returns are probably the most vexing issue for the book industry. They also have a significant environmental impact. Reducing the rate of returns from its current estimated level of 25% is the most direct means of reducing the carbon and environmental footprint of a book.

Ensuring that all unsold books are pulped could add 100,000 tons of high-quality recycled material to the recycling system.<sup>28</sup> Although reduction at source provides the greatest potential efficiency gains through the supply chain, avoiding the land-filling of unsold stocks could produce the most dramatic improvements in the industry. In addition, it is recommended that a national book-recycling system be developed for books that have already been reused and are otherwise destined for a landfill.

### **3. Integrate Sustainable Principles into Office Buildings**

It is suggested that, where feasible, companies seek LEED (Leadership in Energy and Environmental Design) certification for both existing and/or new buildings. LEED buildings are designed to reduce the amount of energy consumed and create a healthier and more efficient environment for employees and customers. LEED is a program of the U.S. Green Building Council, which can be found at <http://www.usgbc.org>.

## Paper Use for the Entire Book Industry

Given the value of standing forests, and the fact that a book's carbon footprint associated with paper is an estimated 85% of all book-publishing

<sup>28</sup>However, the recycled material from returned books would not qualify as post-consumer waste.

impacts, it is recommended that industry stakeholders work to reduce the environmental impacts connected to the sector's use of paper. Below are recommendations:

### **1. Increase the Use of Recycled Fiber in Books**

As described elsewhere in this report, the use of recycled fiber has positive impacts on the carbon footprint of the industry, reduces the risk of purchasing or sourcing unsustainable fiber, and will improve the industry's image with the public and stakeholders. Therefore, it is suggested that key industry stakeholders work at a minimum to meet and ideally exceed recycled fiber goals consistent with the *Book Industry Treatise on Responsible Paper Use* [30% recycled fiber (majority post-consumer) by 2012].

### **2. Communicate Recycled Fiber Demand Projections**

In an effort to support continued investments in domestic recovered paper infrastructure, it is important for the largest corporate paper users to communicate goals for increasing recycled paper use to suppliers, waste haulers, government agencies, and others. Along with other publishing sectors, the book industry can play an important role in this process.

### **3. Maximize Use of FSC or Equivalent Certified Paper**

Given that sourcing areas for book-paper production include Endangered and High Conservation Value Forests and regions of social conflict, it is suggested that the industry work to increase its use of chain-of-custody certified paper. The Environmental Paper Network considers the Forest Stewardship Council (FSC) system to be superior to other certification systems because it protects Endangered Forests; it requires consensus solutions to social conflict; and it prevents forest conversion. Individual companies using other certification systems may be addressing these deficiencies;

however, to know that, paper buyers must carefully investigate the fiber-sourcing practices of their suppliers certified through other systems. It is suggested that paper users maximize the use of FSC or equivalent certified paper. The current industry standard is 20% by 2012 as reflected in the *Book Industry Treatise*. [Note: At such time as the *Environmental Paper Network* considers additional certification systems to be equivalent with FSC in the areas mentioned above, they should also be preferred when recognized by EPN as such.]

### **4. Reduce Paper Consumption and Overruns**

Many publishers have worked with suppliers to reduce the basis weight of the paper they use. It is suggested that continued efforts be focused in this area. It is also suggested that environmental attributes of lower basis-weight papers not be sacrificed to meet the lighter specifications. It is also suggested that publishers evaluate strategies for reducing overproduction and make use of production models that reduce the return rate to 15% or below.

### **5. Standardize Specifications**

It is suggested that more publishers and printers standardize paper specifications in an effort to develop economies of scale that will enable suppliers to reduce product costs and maximize operational efficiencies as they develop new grades with strong environmental specifications.

## **Transportation**

### **1. Maximize Transportation Efficiencies and Support Greener Options**

Maximize transportation efficiencies by:

- encouraging or using hybrid technologies, natural gas vehicles, and renewable fuels
- shipping directly from printer to store



- increasing domestic production
- reducing returns/unsold books

## 2. Offset Transportation Impacts

Given that the industry will always have a transportation impact, it is recommended that the book industry offset all or a portion of these impacts through the purchase of carbon offsets. Carbon offset credits that support the addition of new renewable energy infrastructure (such as through Native Energy and others) are preferred.

## Office Energy Consumption and Use of Renewable Energy

### 1. Reduce Office Energy Consumption

Given the opportunities to save money and reduce office energy consumption by up to 40% through lighting upgrades and changes in thermostat settings, it is suggested that all industry stakeholders work to set goals for energy consumption reduction that meet or exceed a 15% reduction target (from baseline levels) within a short time frame, such as one to two years.

### 2. Purchase Renewable (Wind, Solar) Energy or Energy Credits

Given the relative ease and low costs associated with purchasing wind and other renewable energy credits (RECs), it is suggested that stakeholders establish a budget line item for the purchase of renewable energy credits through third parties that support new renewable energy sources.

## Reduce Toxics

### 1. Prefer Processed Chlorine Free (PCF) and Totally Chlorine Free (TCF) Papers.

Despite the significant gains made with the widespread minimum mandated use of elemental

chlorine-free (ECF) bleaching, chlorine compounds are still used in the process and do pose a health risk to humans. Accordingly, it is recommended that Process Chlorine Free (PCF) or Totally Chlorine Free (TCF) bleaching processes be preferred. The EPN's Common Vision has a guide to the different bleaching technologies used by mills and the Paper Task Force has additional information. It is suggested that Enhanced Elemental Chlorine Free (EECF) processes using ozone bleaching and oxygen delignification be preferred over those using chlorine dioxide alone where TCF and PCF papers are not available.

**2. Increase efforts to find nontoxic raw materials and production processes in book manufacturing.** This includes the adoption or expansion of the use of low-emission (VOC, or volatile organic compound) vegetable-based and/or other inks of less than 5% VOC emissions.

## Retail Segment

**1. Improve in-store energy consumption through conservation efforts and technological improvements.**

### 2. Shift to renewable energy for retail outlets.

Retailers can purchase renewable energy credits, or they can install solar energy photovoltaic panels directly at their retail outlets.

### 3. Integrate Sustainable Principles into Retail Stores

We highlight this for retailers because of the large potential benefit in this particular sector, but see recommendation (3) in the general section on page 48.

**4. Ensure that all unsold books are recycled.**

## Conclusion

This report represents a significant effort on the part of many stakeholders—from sponsors and the many members of the committee that helped to inform the scope, to the reviewers and the many companies that took time out of their busy schedules to calculate the numbers, to the lead research partner. It is our hope

that this report informs and inspires and that it helps to identify areas for continued improvement. On the whole, the trends reflected offer a window into a multibillion dollar sector that is in the midst of a positive transformation. This is a strong foundation and future success will depend upon continued inquiry, action, collaboration, and the integration of stewardship and corporate prosperity.

# Case Studies: Improving Environmental Performance

## Aiming for a Tenfold Increase of Recycled Paper by 2010 and Much More

### RANDOM HOUSE

In 2006, Random House, Inc., released a paper policy to increase incrementally its aggregate recycled content level from a 3% baseline to 30% (majority post-consumer) by 2010. Its policy also includes priorities for eliminating fiber from Endangered Forests and preferencing FSC-certified paper. In 2007, Random House built on the previous year's environmental developments with the creation of a Green Committee.

The Green Committee is chaired by Random House's CEO with members from every sector of the company's operations to ensure that its envi-

ronmental policy is effectively implemented throughout the company nationwide. The committee has also taken simple yet effective steps to address the environmental impacts of the workplace. Examples of what it has achieved so far in its head office include replacing 4,000 60-watt bulbs with energy-efficient 25-watt bulbs, turning down the office thermostat by two degrees in winter and similarly raising the temperature in summer, switching to an energy provider that generates 15% of supplied electricity by wind power, and using Green Seal products to clean and maintain the company's New York headquarters.

This New York headquarters, 1745 Broadway, recently became the second existing building in the city to be certified a "Leadership in Energy and Environmental Design" (LEED) building by the United States Green Building Council. The fact that this is only the second building in New York City to achieve this status is a testament to the demanding criteria of this global independent third-party verification program. LEED requires buildings to meet requirements in five key areas, including water saving and sustainable site development, to determine that the building is a healthy place to work and environmentally responsible. The process can take years to complete, which makes Random House's designation within six months an impressive achievement.

Random House has also been an advocate within the industry, speaking at and hosting events as well as sponsoring and serving on the committee

The Environmental Committee at work  
David C. Thompson





for this report. The success of its Environmental Committee and its approach is evident, as by the middle of 2007 it was well on track to achieve its 2007 Paper Policy target of 10% recycled fiber content with no major additional cost implication for the company, and is now aiming at its target of 15% for 2008.

As Random House purchases approximately 120,000 tons of paper for book production per year, reaching its 30% target will mean that 80,000 fewer tons of timber (550,000 trees) are harvested and approximately 88 million fewer pounds of CO<sub>2</sub> will be emitted. The company anticipates that reaching this target without an increase in cost will be a challenge, and that a cost increase will perhaps be unavoidable, as the price of recycled fiber is creeping up due to increased demand.

Random House's concern over its greenhouse gas emission led the company to join the EPA Climate Leaders program and to undertake a carbon footprinting assessment for its office and publishing operations (including purchased paper and product transport) for the baseline year of 2006. This will now be a year-on-year process, facilitating the tracking, reporting, and ultimately reductions of its greenhouse gas emissions.

## Addressing Print Runs and an Innovative Pricing Scale

### THE CONTINUUM INTERNATIONAL PUBLISHING GROUP INC. (U.S. OPERATIONS)

#### Continuum Overview

Average print runs in:	2003:	2,000
	2007:	1,250
Market split:	Academic:	70%
	Trade:	30%
Number of titles produced in 2006 by US operations:		180
Percentage of US produced titles in 2006 with Recycled Content:		55%
Date recycled paper first used:		July 2003

In 2005 and 2006, Continuum met its environmental objective of keeping pace with the goals set by Green Press Initiative. The company is one of the signatories of the *Book Industry Treatise on Responsible Paper Use*, which acts as its formal environmental policy. Of its book titles in 2006, 55% mentioned the recycled content on the copyright page, and of those, about 25% included the Green Press Initiative logo as well.

By aiming to improve its environmental performance, Continuum has increased its efficiency and cut down on waste production. Two areas where the company has achieved the most noticeable success are returns rates through careful monitoring of print runs and the creation of a pricing scheme with a 30% PCW recycled paper as the baseline paper cost.

In 2003, the average print run was 2,000, and by 2007 Continuum had reduced this to 1,250. The conscious decision to cut down on waste and avoid the assumed large pulp and waste line in standard book production budgets was reached through a



combination of initiatives. The print run numbers are set very carefully according to sales analysis and past print runs; the company does not hold stock; and a conservative eye is kept on reprint numbers. Continuum has actively increased its digital and print-on-demand jobs. In 2003, 5% of titles were digitally printed, and in 2007, this had reached 15%. The effort has been made easier through sourcing a digital printer that specializes in short run-jobs for titles that Continuum knows will normally require a reprint, meaning only one setup cost is incurred. Waste has therefore dropped significantly.

Gabriella Page-Fort, the Publishing Services Supervisor, in 2005 managed the creation of a printing price scale that has a baseline of a 30% PCW recycled sheet built into the cost. Even though the recycled sheet often costs more than the virgin sheet, the recycled costs were set up as the base paper price in the printing scales, which

means the cost is accounted for from the outset of a book's life, and that any additional cost for using a recycled sheet is balanced by saving on another area of the book's costs. By removing the decision process regarding paper type, Continuum is "reversing the exception" of the choice presented to authors by the publishing industry. Continuum believes its good working relationship with its key printers has played an integral part in the success of this pricing scheme, which has allowed the company to consistently print the majority of its titles on recycled paper over the last four years.

The approach of combining good economic and environmental sense has worked well for Continuum. A review of its printing and distribution operations resulted in the company relocating its warehouse eight minutes away from its main printer.

Overall, Continuum has found that rather than pushing its supply chain, perseverance in asking suppliers difficult questions helped create the movement that enhanced its environmental success.

Gabriella Page-Fort, Publishing Services Supervisor, Continuum International Inc.



## Committed to 100% PCW Chlorine-Free Paper

### LANTERN BOOKS

#### Lantern Books Overview

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Average number of titles printed on 100% PCW chlorine-free paper in:		
	2003:	53%
	2007:	89%
Market split:	Hard back:	1%
	Trade:	99%
Number of titles printed in 2007:		28
Percentage of new titles in 2007 with an eco-audit:		100%

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Lantern Books has been able to take advantage of being just eight years old as a company to start life on a strong environmental footing. As a relatively small publisher, it is “committed to publishing as many books as possible on 100% post-consumer waste chlorine-free paper,” and currently 85% to 95% of its books meet this criterion. Lantern was the first publisher to sign the *Book Industry Treatise on Responsible Paper Use*, and the *Treatise* acts as its overriding environmental policy. Tracking its commitments and therefore being able to accurately report on its progress is increasingly important to Lantern Books.

Realizing this commitment has been due in part to the support received from the company’s two main printers. Lantern Books credits its main printer, Thomson Shore, with having helped significantly, due to the sheer volume of recycled paper that Thomson Shore stocks and its ability to offer competitive pricing. Equally, as the printers source the paper for Lantern, it does not incur storage charges for leftover paper stock.

One future sticking point hampering increasing the number of titles printed on 100% PCW

chlorine-free paper is the increasing demand to move to digital for short runs and reprints. Currently, only short runs and galleys are printed digitally, but if digital printers were to carry recycled or FSC paper, Lantern would be enthusiastic about using it. Other challenges include special trim sizes, weights, or finishes, which are not always available in recycled stock.

Through knowing its market, Lantern Books has achieved a returns rate of 10% and has no remaindered books. Its warehouse pulps unsold stock, so the issue of landfill versus recycling is out of its hands. As far as Lantern is aware, none of its books has entered landfills, as Lantern has never been charged a tipping fee.

Lantern Books’ environmental ethos runs right through its operations. It has approached the challenge by improving performance on any front that the company can directly affect. Beyond its paper-use commitments, office waste is composted, environmentally friendly cleaning supplies are used, and FSC-certified paper is also used. The wait is now on for the distribution and warehousing sectors to meet the high environmental standards expected by Lantern Books. The company believes that the next area of focus should be transportation: reduction of distance between printers and warehousing, and green warehousing and shipping practices. It acknowledges that shipping options are currently very limited, as well as distribution options for small publishers, and looks forward to the day when titles can be sent electronically anywhere in the world and printed by consumers at source.

In spite of its size, Lantern Books is advocating change within the industry by seeking out opportunities where its experiences can help others make a change for the better. Membership in the Treatise Leadership Council and active involvement in the Association of American Publishers Paper Working Group allows Lantern Books to

Kara Davis, Managing Director of  
Lantern Books



lead by example; and by contributing to the demand for viable environmental alternatives, Lantern increases the options available to the industry so that “publishers know what to ask for and how to ask for it.”

## Raising the Bar for FSC Paper Procurement

### SCHOLASTIC INC.

In January 2008, Scholastic further strengthened its paper-procurement practices by announcing a new policy that sets challenging goals for recycled and Forest Stewardship Council (FSC)-certified paper. Key features of the procurement policy include 2012 targets of 30% FSC-certified paper use in publications and 25% recycled fiber use, 75% of which will be post-consumer, for the company’s publications paper. By the end of 2008, Scholastic also expects all paper manufactured for its use “to be free of unacceptable sources of fiber as described by the Forest Stewardship Council (FSC) controlled wood standard.” Scholastic will also report annually on the progress it has made in meeting its stated goals.

Richard Robinson, Scholastic CEO with the first two girls in line for the launch of Harry Potter and the Deathly Hallows, 2007



Consultation played a central role in the success of the policy development, and as a result, it took about one year of discussions with stakeholders to develop the policy. Scholastic felt it was important that its supply chain had the opportunity to give feedback, as Scholastic was sensitive to the fact that the policy would impact its suppliers. Over the course of the year, the company addressed concerns raised with its stakeholders, answering questions on what they could and couldn’t do and explaining

### Scholastic Overview

#### Harry Potter

1998 Harry Potter and the Sorcerers Stone.

Print q: 50,000

Text: No pcw content;

No FSC content

Jacket: 20% pcw; non FSC

2007 Harry Potter and the Deathly Hallows

Print q: 12,000,000

Text: minimum 30% pcw;

65% paper for run FSC-certified

Jacket: 30% pcw; FSC-certified

Current Market split: 100% children

Number of Children’s titles in 2007: approx. 600

why some of the suggested goals would be a stretch too far. However, the company consciously set out to come up with policy targets that were not comfortable and easy to reach, but rather would be a challenge and force Scholastic to raise the bar across its supply chain to meet its targets. Scholastic has been using paper with recycled fiber content since the early 1980s but believed that now was the time to formalize and increase its commitments and publicly report on its performance, demonstrating how serious the company is about operating in an environmentally sustainable manner.

One area that has been particularly challenging has been the area of light weighting of the paper without compromising the quality of the books. As children's books tend to be high-end color picture books and thin-bind books, reducing the basis weights proved much harder to achieve than reducing the basis weights in standard adult trade books. Through a process of trial and error, and perseverance from key members of staff, Scholastic now saves over 3,000,000 lbs. annually due to minimization of basis weights.

Part of the process of the policy in the company's making the environmental commitment to push itself further was accepting that this will entail a financial cost. Scholastic has built this cost into its profit-and-loss plans for the next five years, with the expectation that post-consumer recycled and FSC-certified fiber will cost more than virgin fiber. Beyond paper procurement, the Scholastic policy also formalizes how seriously the company takes its role of helping educate future generations about protecting the environment. Scholastic actively creates and publishes books, magazines, and an interactive Act Green Web site to "help educate children about the importance of responsible environmental practices and the role they can play in helping preserve the environment." This includes tools for parents and teachers as well.

## Increasing Recycled Fiber Use Eightfold in Four Years, at No Cost to Publishers

### THOMSON SHORE

#### Thomson Shore

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Average PCW content in 2003:	6%
Average PCW content in 2007:	38%
Most popular house sheet:	Glatfelter Natures Book SA 50% PCW
Market share by sales in 2007:	0.4%
Market split:	Hard back: 34%
	Trade: 66%

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Thomson Shore helped develop and was the first printer to sign the *Book Industry Treatise on Responsible Paper Use* in 2006. Prior to that, it had already established company goals for increasing its use of post-consumer recycled fiber fivefold.

One of the original targets Thomson Shore set itself in 2003 was to move from a 5% PCW recycled-fiber average to a 25% PCW recycled-fiber average for all its paper use. In 2007, the company had exceeded that goal—achieving a 38% PCW recycled-fiber average for its paper use—equivalent to nearly 100 semiloads of new recycled-fiber use.

Impressively, these targets have been achieved without passing on the cost to customers. The company focused on improving its efficiency and took the step of initially subsidizing the use of recycled sheets. The realization that it could achieve productivity gains if it were able to get the recycled sheet to run as effectively as any other sheet led Thomson Shore to plow back profits into experimenting with different recycled contents; and then, when the company got it right, subsidizing the cost of the recycled paper for its customers. This did not hurt Thomson Shore at all financially, and its lead-



Myron Marsh, President of Thomson Shore



ership and commitment in this area have brought in new customers. It is able to offer a 50% PCW house sheet at price parity to a virgin sheet, a position that is now possible due to the size of the orders and through negotiation with the mills.

Several paper manufacturers have used Thomson Shore as a test site to see how well their paper will run, and the company has proactively been testing different material to improve standards within the industry.

Care has also been taken with the disposal of postproduction materials, with virtually 100% of this waste being recycled. Employees of Thomson Shore worked with a local company to reconfigure its old pallets into new ones, creating employment locally for groups of employees who traditionally would find it hard to get work. All solvents are recycled and all inks are soy based, except for the ink used on the company's web press, which needs to be heat-set ink. The switch to energy-saving bulbs had already paid for itself within one year. To make further improvements in terms of energy efficiency, the entire plant's air-conditioning system is being upgraded at a rate of two units per year, so that eventually there will be one system integrating temperature and humidity throughout each sector of the operation.

Thomson Shore believes that one of the main factors that has contributed to its success is the fact that it is employee owned and managed by principles and values. This creates a high level of employee participation and a sense of pride in the company's achievements as an organization.

The end of 2007 saw Thomson Shore reach another one of its goals, FSC chain-of-custody certification. The next challenge is increasing the recycled content in other materials, such as jackets and cover material.

## A Recycling Success

### MALLOY INCORPORATED

#### Malloy Overview

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Most popular house sheets:

Glatfelter Thor (15% PCW, SFI cert.)

Glatfelter Natures (50% PCW, SFI cert.)

Market share by sales in 2007: 0.6%

Market split:	Hard back:	10%
	Trade:	90%

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Malloy is in the process of turning its Environmental Statement into a true environmental policy. As part of the policy, its Environmental Steering Committee will be following a process of continual improvement and taking action on specific annual objectives to improve Malloy's environmental footprint. Malloy has always had a commitment to preserve natural resources and protect air, water, and land. Its actions to date have focused on recycling, reduction of solid waste production, and elimination of toxic and hazardous materials from its operations where possible. The company is currently in the process of obtaining joint chain-of-

custody certification from both FSC and SFI, and hopes to receive its certification in the first quarter of 2008.

Malloy's efforts in the area of recycling date back to the early 1990s, when a planning group was put together and tasked with measuring what comes in and goes out the door. This led to recycling receiving a high priority within the company, and the result of its effort has been that more than 98% of all waste is recycled. Physically, this means that of the 10.5 million pounds of waste generated each year, less than 150,000 pounds enters a landfill.

Part of Malloy's waste reduction and recycling efforts involved improvements in the prepress area. In 1994 the company started a "computer to plate" (CTP) workflow, and now 100% of its work is done CTP. All the redundant film is being recycled along the way. Not only has this practically eliminated the use of film and its associated hazardous chemicals, but the biggest saving the company has noticed has been the reduction in water consumption. Malloy worked with its equipment suppliers, Burgess Industries and Screen, to create a custom-made system for automatically bending and handling plates made on its CTP systems. Not only has this system improved efficiency, but it has also dramatically reduced the incidence of defective plates. In 2007, the total number of plates made at Malloy was 62% higher than it was 5 years previously, but over that time the number of defective plates actually dropped by 27%. All plates are made of aluminum and are recycled after use.

In the press room, Malloy has achieved impressive waste reduction and recycling figures. Much of the improvement in recycling has come about through creating clearly marked staging areas and developing clear processes for separating material to be recycled by type and grade. One hundred percent of paper, wood, aluminium, and wood pallets

### Malloy's automated plate cart system



are recycled. The efforts to recycle these materials extend beyond Malloy's production departments and include its office and warehouse areas as well. Waste ink is collected and sold to an electric utility company, which burns it for fuel. Of the ink Malloy buys, 78% is either soy or vegetable based. The company is cautious about increasing the use of UV-based inks, because a byproduct of the UV curing process is ozone.

A further waste-reduction strategy that Malloy initiated with its suppliers involved all inks, solvent, and glues being supplied in reusable bulk containers or "totes" made of steel or plastic, which, when empty, are returned to suppliers for refill. The company credits this initiative with diverting a substantial amount of waste from landfill. In terms of emissions, Malloy's success is notable; its VOC emissions are 2.47 tons per month, on average, and the Michigan Department of Environmental Quality's set allowance for the company is 90 tons per year. Malloy also continues to investigate and test inks with lower levels of VOC contents. Like all aspects of the company's operations, it is an area that is continually reviewed with the attitude that there is always room for improvement.

## Improving Energy Efficiency and Achieving Certification

### MCNAUGHTON & GUNN INC.

#### McNaughton & Gunn Overview

Average PCW content in 2003:	30%
Average PCW content in 2007:	30%
Most popular house sheet:	
FSC-Certified Domtar 50#	
Windsor White Offset	
No of titles printed in 2006:	6000 +
Market share by sales in 2007:	0.5%
Market split:	Trade: 80%
	Other: 20%

McNaughton & Gunn's environmental policy was created in 1988 and included a target to reduce the number of dumpsters used. The company's environmental commitment now ranges from prioritizing the use of technologies and methods that use nonhazardous materials, to reducing and eliminating waste generation and emissions. It has even restored the land next to the site back to a native prairie.

Recommendations received from an energy audit conducted 15 years ago were slowly implemented, which has led to considerable cost saving. For example, in the manufacturing area, the company has moved away from fluorescent lamps to low-band metal halide lamps, as these provide a more natural light at a lower base over a longer lifespan. Despite being more expensive to replace, in the long term they pay for themselves over the lifetime of the bulb.

A notable saving is achieved in winter by cooling the water for the coolant rolls in the web presses outside the building rather than mechanically inside. With the weather in Michigan, this works for about eight to nine months of the year.

#### Outside cooling units



The same logic has been applied in terms of ventilation and heating, as the company utilizes floor space to a maximum with a clever layout of the machines. The heat generated from the printing presses and other machinery is captured and used as heating in winter or vented out of the buildings in summer. High-speed rollup doors have been installed throughout the plant in strategic locations, particularly at the hottest and coldest times of the year. This has the added benefit of reducing the movement of dirt and dust around the plant.

McNaughton & Gunn's most recent environmental success has been obtaining FSC chain-of-custody certification, which was carried out in partnership with Domtar. The process has taken the company less than a year. To gain a better understanding of chain-of-custody certification, the decision was made to undertake the process through a partnership. This not only eased the whole process but also strengthened the company's working relationship with Domtar. McNaughton & Gunn now offer a large selection of certified house sheets and has recently switched to FSC-certified house cover stock.

McNaughton & Gunn is equally proud of the recycling initiatives it has put in place throughout the company. However, the company found it eas-



Jeff Briegel, Diane Waterhouse and Alan Stoner, Members of the Environmental Committee



ier to address recycling on the industrial paper use and manufacturing side of the operation in comparison to office operations and smaller items. “Reduce, reuse, and recycle” is one of the principles on which the company operates. For example, nearly all manufacturing waste is recycled, and nearly all jobs are on 33-inch runs to save on trimmings.

Ultimately, McNaughton & Gunn attributes much of its success to widespread employee participation in initiatives and support from its environmental team leaders. In recognition of this support, programs are in place to reward staff, including the distribution among staff of any landfill tipping fee that is avoided due to a new recycling initiative.

## Recycled Paper Leader Uses Landfill Biogas to Meet 80% of Thermal Power Needs

### CASCADES

Cascades produces a wide range of high-recycled-content book papers. In 1964, when Cascades decided to recover and recycle old paper and

### Cascades Fine Papers Overview

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100% PCW recycled papers sold in 2004: 2.1%

100% PCW recycled papers sold in 2007: 21.7%

Most popular recycled sheet:

Rolland Enviro100

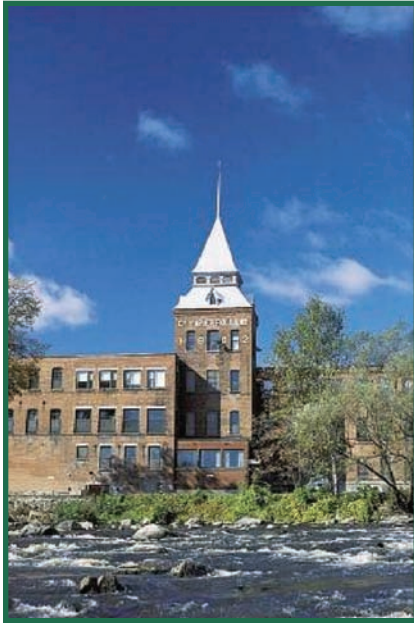
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cardboard, it was because of necessity and not environmental concerns. However, the company quickly understood the economic and environmental benefits to be gained. The desire to go beyond basic environmental compliance has led to the creation of an Environmental Mission, which includes reducing water consumption and effluent discharge from its mills, decreasing the amount of waste going into landfill sites and reducing greenhouse gas emissions.

One of the company’s most environmentally radical steps was taken in December 2004 with the project to use biogas energy generated from the decomposition of waste at a municipal landfill site eight miles from Cascades’ mill in Saint-Jérôme, Quebec. As far as the company is aware, it was the first paper mill to source biogas from a local municipal landfill. The biogas is burned to generate steam for three mechanical paper dryers. Until Cascades approached the landfill operator, the gas produced from the landfill was just burned off into the atmosphere. The project involved the landfill operator, the state gas distributor, Cascades, and a considerable investment of both time and money. Cascades estimates that this investment has reduced its electricity and energy bill by 30%.

Not only does the use of biogas reduce the company’s energy costs, but this also meets another of its environmental mission goals by reducing its carbon footprint. According to Cascades, the capture and combustion of the biogas avoids landfill emission of 470,000 metric tons of CO<sub>2</sub> equivalent annually, and the use of biogas at the

Saint-Jérôme Paper Mill,  
Quebec



Cascades mill results in a reduction of 70,000 tons of CO<sub>2</sub> annually, equivalent to removing approximately 17,300 cars from the road each year. As biogas is made up of mainly carbon dioxide and methane, this contributes positively to the avoided-emissions figure. When methane burns to produce steam, it becomes CO<sub>2</sub>, which is 21 times less harmful to the atmosphere than methane. Cascades is proud of the fact that this project allows the company to actively reduce its carbon footprint rather than offsetting through the purchase of credits.

Cascades has tried to ensure that it addresses every aspect of the paper-production process that adversely affects the environment. This has included gaining certification from the Chlorine Free Product Association, CFPA, for all the company's recycled fine paper products, reaching the highest standard of processed chlorine free. Cascades is the only mill in Canada to have this certification. The use of hydrogen peroxide to de-ink the paper means that there is no water pollution. Cascades also uses around 80% less water than a standard

de-inking facility. This saving is mainly due to the reuse of the water in the de-inking process, which has the added benefit of requiring less energy. The cost saving from lower energy and water consumption means that even if the company has to pay slightly more for the chemicals, the cost is easily absorbed back into the production process.

Cascades is continuously working to increase its customers' understanding of the environmental implications associated with different paper choices. This has stimulated a new way of thinking among its clients and has led to the realization of the marketing and sales potential of papers with a full range of environmental attributes.

## A U.S. Leader Continuing Its Innovation

### GLATFELTER

Glatfelter's environmental policy arose as part of the ISO 14001 process in 1997. At this time, the company had the first mill in the United States to be certified under this standard and is now aiming for all its mills to reach ISO 14001 standards. One aspect of this policy is to encourage the landowners the company works with to manage their land in a sustainable way. A holistic approach to management ensures that environmental, economic, and social sustainability underlies operations.

The approach to land management taken by these landowners has grown in significance over the years as, like most U.S. mills, Glatfelter has sold off land it had purchased decades ago to release capital back into the company. A large proportion of the land that was sold was SFI certified, which led to a reduction in the amount of certified timber entering the company's mills. As Glatfelter has a strong environmental record, the company realized that this was a gap that needed addressing. This situation was reinforced after nu-

merous customers asked when the company planned on becoming certified. In mid-January 2008, Glatfelter achieved triple certification in SFI, PEFC, and FSC.

For Glatfelter, achieving triple certification is a way of ensuring a broad certification base across all facilities and mills in the United States. It also means that the company can now give its customers a choice and know that as a company it is meeting the highest environmental certification standards. This broadens the scope of products on offer and, significantly for Glatfelter, it enables the company's customers to meet their own environmental goals.

Glatfelter is conscious that it is an industry leader in providing a large range of products containing PCW recycled fiber for the book-publishing sector. One of the biggest environmental challenges the company faced was in 2006, when, due to economic considerations, it shut down its recycled fiber mill, which had provided PCW pulp since 1979. This meant the company faced the conundrum of how to reintroduce purchased recycled fiber into the virgin fiber mill-processing system, which is a closed-loop system. As all of Glatfelter's mills were fully integrated, introducing fiber from outside the system created

challenges: how much fiber could be taken in and delivered to machines that were not designed to deal with introduced recycled fiber? The company overcame these problems within a year by re-designing the fiber-handling equipment, testing to see how much material could be fed into the paper machines, and evaluating the impact of outside fiber on the quality of the product.

In response to continued customer interest in environmentally preferable papers, Glatfelter extended its leadership by achieving chain-of-custody forestry certification to Forest Stewardship (FSC), Sustainable Forestry Initiative (SFI), and Programme for the Endorsement of Forest Certification (PEFC) programs. The first chain-of-custody certified product, available beginning in February 2008, will be Natures Book. The new feature of Natures Book is that, in addition to being FSC-certified, it will also include 30% post-consumer waste (PCW) fiber. Natures Book will be the first uncoated, archival, FSC-certified book paper that also includes 30% PCW content. Glatfelter maintains that listening to market demand, leveraging mill capabilities, and helping customers meet their environmental goals is what keeps Glatfelter in the forefront of environmental book-publishing papers.

#### Glatfelter recovered fiber statistics—book papers

	2003	2007
Percentage of book paper volume containing post-consumer recycled fiber	0.80%	24%
Estimated post-consumer recycled fiber volume shipped into market <sup>^</sup>	700 tons	10,000 tons
Percentage of book paper volume containing pre-consumer waste fiber*	63%	15%
Estimated pre-consumer waste volume shipped into market	58,600 tons	32,000 tons

\* Does not include saw mill wood waste

<sup>^</sup> Calculated by converting PCW content in paper to 100% PCW fiber.

## New Leaf Paper— Environmental Leadership

### New Leaf Paper—Environmental Statistics

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Average recycled content of uncoated book papers:	100%
Average post-consumer content of uncoated book papers:	88%
Average recycled content of coated book papers:	76%
Average post-consumer content of coated book papers:	58%
Number of FSC-Certified papers for book publishing:	7

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New Leaf Paper was founded with the mission of leading a shift toward sustainability in the paper industry. The company developed a unique approach to business, embedding its social and environmental values into every product line and every business relationship. Since the company was founded in 1998, it has an unparalleled track record of product innovation introducing leading environmentally responsible papers to market.

New Leaf Paper plays a leading role in the greening of the book publishing industry. The company participated in the drafting of the *Book Industry Treatise on Responsible Paper*, and is the only merchant signatory at the time of this writing. Perhaps the greatest example of New Leaf Paper's leadership was the launch of New Leaf EcoBook 100 in the year 2001, the first trade book paper made with 100% post-consumer recycled content, processed chlorine free. Two years later in 2003, the Canadian Harry Potter books were printed on EcoBook 100, which catalyzed a major shift in the marketplace. Book printers and publishers could for the first time confidently specify Ancient Forest Friendly papers.

New Leaf Paper has developed a wide range of product lines for book publishing, and every one of them has leading environmental specifications. Uncoated paper choices include groundwood offset, trade book, offset, and opaque. Coated papers include the only 100% recycled matte and silk coated papers, and the highest post-consumer waste coated papers in matte, silk, or gloss finishes. Currently, seven of the company's ten publishing product lines are FSC-certified, including the first FSC-certified matte coated paper in North America.



# Appendix:

## The Science of Climate Change

The average global temperature is determined by three measurable factors:

1. solar radiation
2. albedo
3. concentration of greenhouse gases in the atmosphere

Solar radiation is simply the amount of sunlight (warmth) reaching the earth. Albedo is the reflectivity of the earth, which ranges from highly reflective elements (white clouds, polar ice caps) to less reflective elements (dark areas such as asphalt or darker ecosystems). Greenhouse gases capture the heat from solar radiation and re-reflect that heat to the atmosphere. We can see the effect of greenhouse gases dramatically played out in the difference of temperature between the sun's innermost planets. Mercury (a cold planet with few or no greenhouse gases in its very thin atmosphere), the planet closest to the sun, has an average temperature of 66.85 degrees Celsius on the side facing the sun and *negative* 73.15 degrees Celsius on the side facing away from the sun. Venus, the second planet from the sun, which has a very heavy atmosphere with high concentrations of greenhouse gases, has an average temperature of 461.85 degrees Celsius. Earth's average global temperature is 14 degrees Celsius.

When any one of the three factors listed above increases or decreases, the average global temperature is affected accordingly. Humans have no control over solar radiation and only limited or indirect con-

trol over planetary albedo (for example, our activities might change the type and amounts of clouds and their ability to reflect heat out of the atmosphere). When humans increase the concentration of greenhouse gases in the atmosphere, temperature increases. Climate change is due primarily to society's release of carbon from fossil fuels and forests into the atmosphere. Two other greenhouse gases relevant to the book industry are methane and nitrous oxide.

The Intergovernmental Panel on Climate Change (IPCC) is the world's preeminent scientific body that collects and analyzes information on climate change. It was the IPCC that shared in the 2007 Nobel Prize for Peace for its work on climate change. The following quotations are excerpted from the IPCC's *2007 Summary for Policy-Makers*, which is intended to help nonscientist decision makers and policy makers understand the underlying science, policy needs, and potential effects of human-induced global climate change.

Regarding changes in greenhouse gases:

- The global atmospheric concentration of carbon dioxide has increased from a preindustrial value of about 280 ppm to 379 ppm<sup>3</sup> in 2005. The atmospheric concentration of carbon dioxide in 2005 exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice cores.
- The primary source of the increased atmospheric concentration of carbon dioxide since the preindustrial period results from fossil

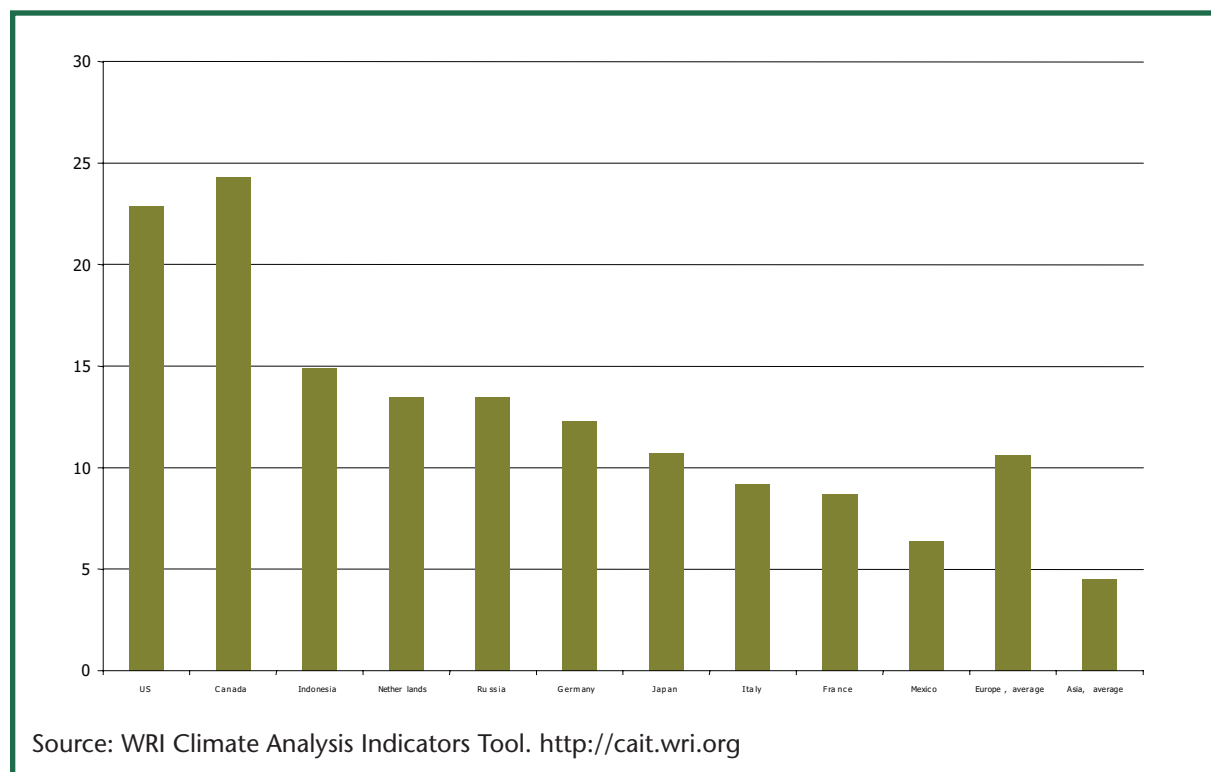
fuel use, with land-use change providing another significant but smaller contribution.

Regarding observations of changes in the climate:

- Eleven of the last twelve years (1995–2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850). . . . The linear warming trend over the last 50 years ( $0.13^{\circ}\text{C}$  [ $0.10^{\circ}\text{C}$  to  $0.16^{\circ}\text{C}$ ] per decade) is nearly twice that for the last 100 years. The total temperature increase from 1850–1899 to 2001–2005 is  $0.76^{\circ}\text{C}$  ( $0.57^{\circ}\text{C}$  to  $0.95^{\circ}\text{C}$ ).
- Mountain glaciers and snow cover have declined on average in both hemispheres. Widespread decreases in glaciers and ice caps have contributed to sea level rise.

It is important for the U.S. book industry to understand the U.S. context for the causes of climate change. Per capita emissions in the United States are the second highest in the world, after Canada. Appendix Figure 1 shows the per capita emissions in selected countries and regions. While high emissions pose a significant challenge to U.S. consumers and producers, they also mean Americans have the greatest opportunity to take leadership in fixing the problem. Americans' widespread use of products from around the world means that the reduction of the overall footprint of the products they consume can have meaningful positive impact. The high per capita emissions also indicate the strong possibility that there are large benefits to be gained in the United States, perhaps greater than in other countries, from increasing our efficiency of energy use.

**APPENDIX FIGURE 1** Per Capita GHG Emissions for Selected Countries.



## APPENDIX TABLE I High Conservation and Endangered Forest Values as Mapped by Scientists and Conservation Organizations.

The areas below are forest sources of book paper where conservation values have been identified. Most of these studies are available online from the organizations listed. The last column indicates a likely source for book paper from the region. Wood chips and pulp are sometimes shipped thousands of miles for further processing. For example, wood chips from Tasmania and Chile are shipped to Japan and other regions to be made into pulp and paper products for paper producers.

Region	Identified and Mapped Values	Studies, Reports	Sources	Fiber Sources
Canada	Intact forest landscapes, landscape connectivity, forests containing high concentrations of endangered species, core habitat for focal species (wolverine and caribou)	Canada's Forests at a Crossroads	Global Forest Watch Canada	Paper and pulp mills
Canada: Boreal Forests	Intact and remnant forest landscapes, focal conservation species' habitat, ecosystem services	Boreal Information Centre	Global Forest Watch Canada and Conservation Biology Institute	Paper and pulp mills
Ontario	Intact forest landscapes, landscape connectivity	Canada's Large Intact Forest Landscapes	Global Forest Watch Canada	Paper and pulp mills
Quebec	Intact forest landscapes, landscape connectivity	Canada's Large Intact Forest Landscapes	Global Forest Watch Canada	Paper and pulp mills
Alberta	Remnant forest landscapes, landscape connectivity, focal conservation species' habitat	Mapping High Conservation Value and Endangered Forests in the Alberta Foothills Using Spatially Explicit Decision Support Tools	Conservation Biology Institute	Pulp mills
Alberta	Intact forest landscapes, landscape connectivity	Canada's Large Intact Forest Landscapes	Global Forest Watch Canada	Pulp mills
Alberta: Chinchaga Wilderness	Intact forest landscapes, focal conservation species' habitat	Chinchaga Wilderness: The Last Hope for the Creation of a Large Protected Area in the Alberta Foothills	Canadian Parks and Wilderness Society, Edmonton	Pulp mills
Alberta: Rocky Mountain Foothills	Remnant forest landscapes, focal conservation species' habitat, ecosystem services	Rocky Mountain Foothills and the Little Smoky	Canadian Parks and Wilderness Society, Edmonton	Pulp mills
British Columbia	Intact forest landscapes, landscape connectivity	Canada's Large Intact Forest Landscapes	Global Forest Watch Canada	Paper and pulp mills

*Table continues on next page*

Region	Identified and Mapped Values	Studies, Reports	Sources	Fiber Sources
British Columbia: Inland Temperate Rainforest	Focal conservation species' habitat	Mountain Caribou Habitat	Conservation Northwest, ForestEthics et al.	Pulp mills
Canada and Continental U.S.	Intact forest landscapes, landscape connectivity	Low-Access Forests and Their Level of Protection in North America	Global Forest Watch, Conservation Biology Institute, US Forest Service, Nature Conservancy, World Resources Institute, Pacific Biodiversity Institute	Wood chips, pulp and paper mills
California: Klamath-Siskiyou	Intact forest landscapes, rare forest types, remnant forest landscapes, high endemism	A Science-Based Conservation Assessment for the Klamath-Siskiyou Ecoregion	Conservation Biology Institute	Wood chips
California: Southern Sierra	Focal conservation species' habitat	Science Assessment for the Sierra Checkerboard Initiative	Conservation Biology Institute	Wood chips
Oregon	Intact and remnant forest landscapes, focal conservation species' habitat, rare forest types	Oregon's Legacy Wild Forests	Conservation Biology Institute	Wood chips, paper mills
South-eastern U.S.: Cumberland Plateau (TN, AL, KY, GA)	Remnant forest landscapes, landscape connectivity, focal conservation species' habitat, rare forest types, ecological services	Endangered Forests of the Cumberland Plateau	Conservation Biology Institute	Wood chips, pulp and paper mills
South-eastern U.S.	Intact and semi-intact forest landscapes	Forest Intactness Database	Conservation Biology Institute	Wood chips, pulp and paper mills
Pacific Northwest, MT, ID	Intact forest landscapes	Wildlands of the United States	Pacific Biodiversity Institute	Wood chips, paper mills
Pacific Northwest	Intact and semi-intact forest landscapes	Forest Intactness Database	Conservation Biology Institute	Wood chips, paper mills
Chile	Intact forest landscapes, forests of high endemism, great ecological and evolutionary value, geographic isolation, high degree of threatened species	Chile's Frontier Forests: Conserving a Global Treasure	Global Forest Watch Chile	Wood chips, pulp mills
Chile	Intact forest landscapes, rare forest types, remnant forest landscapes, high endemism	Forest Conservation Priority Setting for the Lake Region of Central Chile Using a Preliminary Endangered Forests Assessment	Conservation Biology Institute	Wood chips, pulp mills

Region	Identified and Mapped Values	Studies, Reports	Sources	Fiber Sources
Tasmania, Australia	Rare forest types, focal conservation species' habitat, remnant forest landscapes	Tasmanian Temperate Rainforests: World Wildlife Fund Ecoregional Assessment	World Wildlife Fund	Wood chips
Indonesia	Intact forest landscapes, rare forest types, forests of high species richness, forests containing high concentrations of rare and endangered species, forests of high endemism	The State of the Forest: Indonesia	Global Forest Watch	Wood chips, round logs, and pulp mills
China	Rare ecosystems types, focal conservation species' habitat	World Wildlife Fund Ecoregional Assessments	World Wildlife Fund	Paper mills
Russia	Intact forest landscapes	The Last Intact Landscapes of Northern European Russia	Global Forest Watch Russia	Pulp mills
Russia	Intact forest landscapes	Atlas of Russia's Intact Forest Landscapes	Global Forest Watch Russia	Pulp mills

# Resources for Further Reading and Research

**NAVIGATING THE NUMBERS**, the World Resources Institute

[http://pdf.wri.org/navigating\\_numbers.pdf](http://pdf.wri.org/navigating_numbers.pdf)

This is a review of the numbers of climate change and the science behind them.

**STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE**, Nicholas Stern for the Treasury of the United Kingdom

[http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)

*The Stern Review* is an exhaustive study by a leading economist of the potential economic impacts of climate change and the necessary economic remedies for it.

**IPCC SUMMARY FOR POLICY-MAKERS 2007**, the Intergovernmental Panel on Climate Change

[www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf)

A summary of the scientific findings of the IPCC to date.

**COMMON VISION FOR TRANSFORMING THE PAPER INDUSTRY**, the Environmental Paper Network

[www.environmentalpapernetwork.org](http://www.environmentalpapernetwork.org)

This is the vision of a sustainable paper industry by the leading advocacy organizations working on paper issues.

**STATE OF THE PAPER INDUSTRY: MONITORING THE INDICATORS OF ENVIRONMENTAL PERFORMANCE**, the Environmental Paper Network

<http://www.environmentalpaper.org/stateofthepaperindustry/index.htm>

An overview of the key factors in environmental performance for the paper industry and how to track performance over time.

## PAPER TASK FORCE

<http://www.environmentaldefense.org/article.cfm?contentid=1689>

The Paper Task Force is one of the most extensive resources on the paper industry in the United States for purchasers.



# Glossary of Terms and Abbreviations

**BISG.** Book Industry Study Group ([www.bisg.org](http://www.bisg.org))

**Carbon footprint.** The total annual emissions of greenhouse gases of an activity, industry, person, or group as measured in carbon dioxide equivalents emissions (CO<sub>2</sub>e).

**CSA.** Canadian Standards Association ([www.csa.ca](http://www.csa.ca))

**Carbon dioxide (CO<sub>2</sub>) equivalent (CO<sub>2</sub>e).** Carbon dioxide is the most prevalent greenhouse gas produced by human activities and is used as the standard measure for the total greenhouse gas impact of emissions and removals to and from the atmosphere.

**Endangered Forests.** The most valuable forests on the globe, from which industrial resource extraction would cause irreparable harm. The definitions are published at [www.forestethics.org/article.php?id=1176](http://www.forestethics.org/article.php?id=1176).

**EPN.** Environmental Paper Network ([www.environmentalpaper.org](http://www.environmentalpaper.org))

**FSC.** Forest Stewardship Council ([www.fsc.org](http://www.fsc.org))

**GHG, greenhouse gas.** The most prominent greenhouse gases for this study are carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and methane (CH<sub>4</sub>).

**GPI.** Green Press Initiative ([www.greenpressinitiative.org](http://www.greenpressinitiative.org))

**GtC.** Gigatons of carbon, or billions of tons of carbon.

**HCVFs.** High Conservation Value Forests ([www.hcvnetwork.org](http://www.hcvnetwork.org))

**PCF.** Processed Chlorine Free. Refers to paper or pulp made without the use of chlorine or chlorine compounds.

**PEFC.** Programme for the Endorsement of Forest Certification ([www.pefc.org](http://www.pefc.org))

**SFI.** Sustainable Forestry Initiative ([www.sfiprogram.org](http://www.sfiprogram.org))

**TCF.** Totally Chlorine Free. Refers to paper or pulp from virgin fiber made without the use of chlorine or chlorine compounds.

# About the Authors and Project Partners

## Green Press Initiative

**The Green Press Initiative (GPI)** was founded in 2001, and since that time it has worked to catalyze environmental innovations in the book-publishing sector and paper industry at large. The mission of the Green Press Initiative is to work with book and newspaper industry stakeholders to conserve natural resources, preserve endangered forests, reduce greenhouse gas emissions, and minimize impacts on indigenous communities.

The work of the Green Press Initiative is made possible through the support of several foundations that are committed to advancing sustainable production and consumption and include:

Richard and Rhoda Goldman Fund  
Overbrook Foundation  
Wallace Global Fund

Merck Family Fund  
Town Creek Foundation  
Weeden Foundation

Their leadership and support is greatly appreciated.

## Book Industry Study Group, Inc.

**The Book Industry Study Group, Inc. (BISG)** is the U.S. industry's leading trade association for policy, standards, and research. Membership consists of publishers, manufacturers, suppliers, wholesalers, retailers, librarians, and others engaged in the business of print and electronic media. For over 30 years, BISG has provided a forum for all industry professionals to come together and efficiently address issues and concerns to advance the book community.

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