GREEN SEAL'S Choose a GREEN REPORT

JANUARY – FEBRUARY 2000

COPY PAPER

- Laid end to end, the sheets of paper used in personal computers each year would circle the Earth over 800 times
- Worldwide copy paper production is estimated to grow to 396 million tons by 2010, an average annual consumption rate of 128 pounds per person (US consumption of 738 pounds per person in 1997 was the highest for any country)
- According to one estimate, only about 9 percent of the copy paper on the US market is made with recycled fibers

Paper is essential for communication in that it provides a universally accessible medium by which to educate, inform and even entertain. Accessibility to virtually unlimited information and ease of reproduction, made possible by recent technological advancements, has contributed to continuous increases in paper use. Yet from raw material acquisition and processing, through utilization of duplication equipment and eventual handling of used paper, copy paper can have serious and long-lasting impacts upon the environment. Fortunately, opportunities exist to lessen the ecological footprint of copy paper by carefully selecting the product, reducing the number of sheets used, and reusing or recycling the used copy paper.

As we've discussed in previous Choose Green Reports concerning paper products, the environmental impacts from pulp and paper production are numerous and cover the spectrum of resource consumption, pollution generation and consequent ecosystem damage. Our latest issue on printing and writing papers

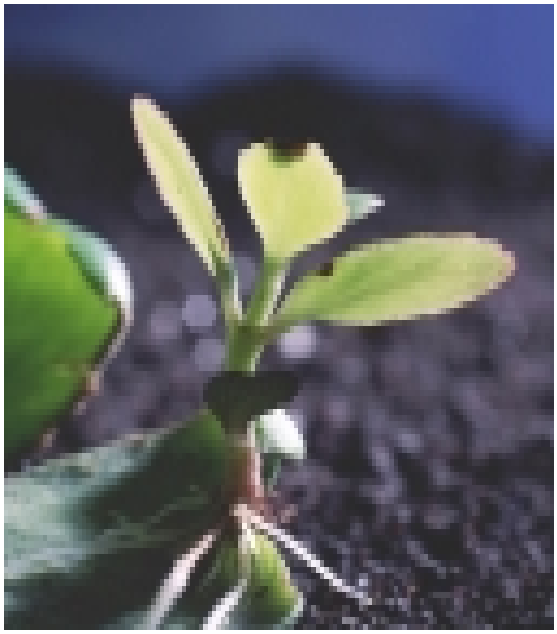
(November 1999) focused on issues related to fiber selection and pulp processing, while this issue will explore specific pollution sources. In addition, we will present opportunities for lessening the environmental footprint of copy paper — that which is used in photocopiers, printers and fax machines — as well as the steps that consumers can take to reduce the impacts of pulp and paper production and use.

Sky, Sea and Land

Air emissions from pulp processing, chemical recovery systems and creating energy for production may contain particulate matter, carbon monoxide, volatile organic compounds. nitrous oxides and sulfur oxides. Burning fossil fuels to make one ton of paper requires over 680 gallons of oil and 10,601 kilowatt hours of electricity, which taps a finite resource and also contributes greenhouse gases and other hazardous pollutants to the air. Using process waste and wastewater sludge to generate energy in mills may reduce waste to landfills and capture the energy value from the materials, but can also release hazardous substances in the air. Operating the office equipment that paper is used in demands additional energy and can result in further impacts related to fuel utilization.

For example, sulfur dioxide (SO_2) and nitrous oxides which can be emitted to the air from pulp manufacturing as well as energy production, can combine with moisture in the upper atmosphere and return to the earth's surface via precipitation — rain, sleet, snow and even fog — resulting in what is commonly referred to as acid rain. SO_2 can cause harm even as a dry deposit which reacts with moisture upon contact. Natural systems have the capacity to neutralize acidity in small doses, but greater amounts may damage terrestrial and aquatic ecosystems and hinder agricultural productivity. For instance, acid rain can cause the release of nutrients in soil that trees are not accustomed to, which can then clog the vascular systems of these plants, preventing them from taking up water and nutrients that they do need. Acid rain can damage symbiotic relationships necessary for survival of the forest ecosystem. For example, high acidity can destroy organisms such as beneficial fungi living at the root systems of trees which assist in nutrient collection as well as other organisms that break down leaves and organic matter.

Acid rain can cause the release of nutrients in soil that trees are not accustomed to... preventing them from taking up water and nutrients that they do need.



Water use in pulp and paper processing is significant, considering that the pulp and paper industry is the largest user of industrial process water in the US. Chemical pulping — the method used for about 80 percent of pulping — may lead to water pollution from the toxins in wastewater effluent. The use of elemental chlorine (chlorine gas) for removing lignin and brightening the pulp used in making paper poses potential hazards from the manufacture and handling of chemicals, the emissions during production and the effluent afterwards. If released to the environment, chlorinated organic compounds such as dioxin and furans formed during the pulping process can hinder proper hormonal functioning of the exposed organisms as well as their predators. Subsequently, the accumulation of these compounds up the food chain may eventually affect humans.

To address these air and water pollution concerns, the US Environmental Protection Agency issued a joint "cluster rule" for the pulp and paper industry under the authority of both the Clean Air Act and the Clean Water Act. By limiting emission of sulfur, volatile organic compounds and particulates and discouraging the use of elemental chlorine, among other requirements, the rule could lower toxic air pollutants by almost 60 percent and significantly reduce dioxin discharge.

Land impacts can come from obtaining the raw materials to make pulp. If virgin fibers are used, trees are generally the fiber of

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choice at this time. Using virgin wood may require building roads to harvest trees in addition their actual removal, which can destroy habitat and reduce the ability of both plants and animals living within these forests to exist in healthy populations. Removing trees can reduce soil health and lead to erosion of topsoil. If the land is near to water bodies, the erosion can destroy aquatic habitats as well. Other services that forests provide, such as recreational opportunities and carbon sequestration, will be limited with the harvesting of trees.

In addition to the potential impacts at the beginning of the copy paper life cycle, there are land issues related to post-consumer paper as well. In particular, the amount of paper and paper products in landfills is a well-known topic related to paper use. Although the number of landfills has decreased, there is not necessarily a dearth of landfill space in many areas of the country because either the land is still plentiful or the disposal sites have an exponentially larger amount of capacity than some older sites.

However, if value can still be derived from a particular material, such as paper, it is preferable to maximize the value by recycling it if possible. Doing so allows for better utilization of the "extra" landfill space.

Curbing Impacts of Copy Paper

Some of these impacts can be mitigated by pulp and paper producers to a certain extent with proper forest management practices, chemical substitution to eliminate the use of chlorine and closed loop processing to minimize emissions and effluents. However, because ensuring that forests are managed sustainably is often a complex and costly process, and because some technological

PAPER USE POINTERS

"CHOOSE GREEN" COPY PAPER

- keep market for recycled fibers strong and show manufacturers, suppliers and retailers that environmentally preferable products are in demand, by buying paper with high recycled content
- choose paper with the lowest basis weight to minimize the amount of fiber needed per sheet
- choose chlorine-free papers to reduce the release of dangerous substances such as chlorinated organic compounds
- you can recycle all you want, but if you're not buying recycled you're only doing half the job

REDUCE TOTAL USE OF PAPER

Writing

- review and edit drafts on screen
- use word processing programs that have editing functions for displaying edits on screen

Printing

- make double-sided copies – set the default on your copier to duplex mode to ensure that it is the first option
- make as many corrections as possible to the document on screen before printing final version
- minimize the number of copies made – copy only what is needed in the near-term

DISTRIBUTION

- share electronic versions of documents whenever possible (electronic mail or fax through computer, make available on-line)
- when printed versions are needed, reproduce only the quantity needed and make sure they are double-sided copies

REUSE USED PAPER

Collect copy paper that has only been printed on one side and use the blank side for use in

- printer or fax machine
- scrap paper for drafts
- shred paper to use for packing material, animal bedding and crafts, which can be used by you or neighboring businesses

RECYCLE PAPER

Set up a recycling program where you work, and

- make sure there is infrastructure to do so (separate bins for different recyclables and trash; municipal collection or buyer for used paper)
- educate co-workers as to what is required of them (cleaning staff knows to keep separate; waste haulers also keep recycled separate, etc.)

BLEACHING DEFINITIONS

Descriptions of paper products often include identification of the bleaching method used for processing the pulp. Papers made from fibers processed with a derivative of chlorine, such as chlorine dioxide, are called *elemental chlorine free* (ECF). Papers bleached with no chlorine or chlorine derivatives are sometimes referred to as *totally chlorine free* (TCF). Recently, a new term - *process chlorine free* - has been introduced in attempt to further refine the term TCF. PCF and TCF are both intended to identify papers that do not include fibers processed with chlorine or its derivatives in the current production cycle. However, use of PCF is intended for paper that contains fibers from recovered paper whose fibers may have been bleached with chlorine for its original use. TCF would then be reserved for describing paper that contains only fibers that have never been chlorine bleached. In other words, PCF paper would contain recycled fibers while TCF paper could only contain virgin fibers. Because there is no consensus on their use of these terms, Green Seal identifies papers in the recommended product table by using generic, descriptive terms rather than these acronyms.

changes would require substantial capital investments, there are other, more immediate steps that can be taken by the consumers to reduce environmental impact.

Choosing Copy Paper

The first step people can take toward a more sustainable paper cycle is selecting paper with high post-consumer recycled fiber content. These are fibers that have been recovered from paper products already "consumed" by an end user, as opposed to mill scraps and other such "waste" that are routinely added to the pulp mixture. Specifying paper with post-consumer recycled fibers which augment or replace virgin fibers directly reduces the stresses on forest resources and destruction of habitat, loss of topsoil and other silvicultural harm.

Many other impacts are reduced when products are made with post-consumer recycled fibers, which, when looking at the entire life cycle, use fewer resources per ton of paper produced than virgin fibers. Use of post-consumer fibers eases the burden on landfills, which are currently composed of almost 40 percent paper products, by saving 3 cubic yards of space for every ton of paper diverted. If incineration is the disposal method in use, recycling prevents the emissions from burning chemicals which, particularly where chlorine is involved, can emit hazardous pollutants into the air. Not only that, but incorporating recycled fibers into new paper production makes use of a viable resource instead of burying or burning it.

> *Use of post-consumer fibers eases the burden on landfills, which are currently composed of almost 40 percent paper products.*

Fiber recycling and reuse is now well-developed and no longer carries a stigma of inadequate brightness or poor quality. Technologies have improved since post-consumer recycled fibers were first used in paper products. Now there are a variety of high quality office papers available, which work well in all types of office equipment and are virtually indistinguishable from their virgin content relatives. According to our survey of manufacturers in this report, prices of many of the recycled-content copy papers are comparable to virgin fiber papers.

In addition to choosing paper with post-consumer recycled fiber, using the lowest basis weight of

paper will also help to alleviate demand on fiber supply. As discussed in the November 1999 *Choose Green Report,* different paper grades (bond, text, cover, etc.) are produced in specific sizes and basic weights. The cut paper is identified by a basis weight in pounds based upon the standard size and weight with the most prevalent basis weights for copy paper being 20 or 24. Common sense indicates that the lower the basis weight within a specific paper grade will require fewer fibers per sheet.

An energy study showed that the use of copy paper can cost a company ten times more per person than the cost of the paper itself.

Choosing papers that do not contain fibers bleached with chlorine is another easy step consumers can take to reduce the environmental impacts of paper purchasing. The brightness of paper is a function of the chemicals used on the pulp and/or the amount of recycled fibers used in the paper. While recycled-content papers can range from grayish tones to bright white, as well as colored, chlorine free technology can achieve brightness levels for paper with recycled fiber content equivalent to those made from 100 percent virgin pulp.

Selecting which paper is appropriate for a given situation depends on who will use the final document. Copy paper is not generally used for publicity materials or documents that will be seen by clients, customers and other stakeholders. Thus, it is the content, rather than the appearance, of the paper that matters and as long at the text is legible, the whiteness of the paper it is printed upon is irrelevant. Even so, as mills convert from pulp processing methods that use elemental chlorine to those that use chlorine dioxide or complete alternatives such as hydrogen peroxide or ozone, the selection of more benign bright papers increases.

Using Copy Paper

Finally, reducing the total amount of copy paper used will simultaneously mitigate related impacts. (See box on page 3.) According to a recent Worldwatch Institute study, approximately 230,000 reams of paper are used in personal computers alone. Several sources observe that at least some paper use is unnecessary and that in many cases possibly a 20 percent reduction of in paper use is feasible. Consuming less paper would not only prevent the damage caused by paper production, but also the environmental impacts associated with energy use from operating printers and copiers. An energy study conducted by Bruce Nordham of Lawrence Berkeley Laboratory showed that the use of copy paper can cost a company ten times more per person than the cost of the paper itself. Nordham estimates that if copy paper use in the US were reduced by 10 percent, it could save 500,000 tons of paper and about 1.6 terawatt hours (TWh) of energy. That is enough to supply electricity to all the homes in the state of California for almost twelve years.

However, even if paper use declines in countries where feasible, developing countries will increase their consumption as they gain greater access to information and technology. Some countries use such a paltry amount of paper, it is considered to be insufficient to fulfill basic education needs. Therefore, because the amount of paper consumed is increasing every year, all impacts - from production, use and disposal of copy paper - need to be addressed.

Recommended Copy Papers

Green Seal recommends that when purchasing paper, choose products that are made with at least 30 percent post-consumer recycled fiber content, with preference given to the highest post-consumer content percent possible. Also, use papers made from pulp that has not been processed with elemental chlorine and, where possible, without chlorine derivatives either. The following copy papers meet the Green Seal paper criteria and contain at least 30 post- consumer recovered fiber and are produced without elemental chlorine, or they contain virgin fibers but use no chlorine or its derivatives.

PRODUCT MANUFACTURER	BASIS WEIGHT	BRIGHTNESS	% P-C RECYCLED	%TRC	ACID FREE	OFFICE EQUIP.
Minimum 30% post-consumer recycled content and no elemental chlorine or chlorine derivatives						
Envirographic 100 Badger Paper Mills	20	85	100	100	yes	E
Sandpiper Domtar Papers	24	86	100	100	yes	E
Eureka! 100 Fort James	20	84	100	100	yes	E
Encore 100 New Leaf Paper	20	85	100	100	yes	A, B, C
New Life DP 100 Rolland	20, 24	88	60	80	yes	E
Downtown #3 Arbokem	20	82	50	50	yes	E
Environment Neenah Paper	24	90, 94	30	100	yes	E
Minimum 30% post-consumer recycled content and no elemental chlorine						
Mohawk Satin Mohawk Paper	24	90 - Cool White	30	30	yes	E
Mohawk Superfine White Recycled Mohawk Paper		24 Recycled White	89 -	30	30	yes E
Worx Multipurpose Fraser Papers	20	88 - White	30	30	yes	E
GeoCycle Georgia-Pacific	20	84	30	30	yes	E
Valorem Multi System Georgia-Pacific	20	colors	30	30	yes	E
Neutech 25 % Cotton Recycled Gilbert Paper	20, 24	93	30	100	yes	E
Classic Crest Recycled Neenah Paper	20, 24	91	30	60	yes	E
Neenah Laser Recycled Neenah Paper	20, 24	91	30	60	yes	E
Classic Laid Recycled Neenah Paper	20, 24	91	30	60	yes	E
Encore 30 New Leaf Paper	20	85	30	50	yes	A, B, C
Windsor Copy Recycled Domtar Papers	20, 24	84	30	30	yes	E

NOTES

EQUIPMENT
A - PHOTOCOPIERS
B - PLAIN PAPER FAXES
C - LASER PRINTERS
D - INKJET PRINTERS
E - ALL

% P-C RECYCLED = Percent Post-Consumer Recycled Content
% TRC = Percent Total Recycled Content

Recommended Copy Papers (cont.)

PRODUCT MANUFACTURER	BASIS WEIGHT	BRIGHTNESS	% P-C RECYCLED	%TRC	ACID FREE	OFFICE EQUIP.
Minimum 30% post-consumer recycled content and no elemental chlorine (cont.)						
Recycled Relay DP International Paper	20	84	30	30	yes	E
Hammermill Savings DP International Paper	20	84	30	30	yes	E
Hammermill Fore DP International Paper	20, 24	colors	30	30	yes	E
Great White Xerographic International Paper	20	84	30	30	yes	E
Royal Bond Wausau Papers	20, 24	92	30	30	yes	E
Exact Multipurpose Wausau Papers	20	colors	30	30	no	E
Royal Laid Wausau Papers	20	92, colors	30	30	no	E
Royal Linen Wausau Papers	24	92, colors	30	30	no	E
Recycled Husky Lasercopy Weyerhaeuser	20	88	30	30	yes	E
Recycled Husky Xerocopy Weyerhaeuser	20	84	30	30	yes	E
Recycled Lynx Laser Weyerhaeuser	20	92	30	30	yes	E
Willcopy Willamette	20	84	30	30	no	E
No elemental chlorine or chlorine derivatives						
Mohawk Options TCF Mohawk Paper	24	n/a	0	0	yes	A, B, C
Environment (Cream) Neenah Paper	24	Cream only	0	0	yes	E
Multicopy StoraEnso	20	99	0	0	yes	E

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D - INKJET PRINTERS
E - ALL

% P-C RECYCLED = Percent Post-Consumer Recycled Content
% TRC = Percent Total Recycled Content

MANUFACTURER CONTACT INFORMATION

Arbokem 604.322.1317
Badger Paper Mills 800.826.0494
Domtar Papers 800.6DOMTAR
Fort James 800.854.5345
Fraser Papers 937.859.5101
Georgia-Pacific 715.887.5100
Gilbert Paper 800.445.4465
International Paper 800.242.2148
Mohawk Paper 800.THEMILL
Neenah Paper 800.558.5061
New Leaf Paper 888.989.5323
Rolland Paper 800.388.0882
StoraEnso 888.407.8672
Wausau Papers 800.950.9762
Weyerhaeuser 800.523.5590
Willamette 800.220.8062

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WHO IS GREEN SEAL?

Green Seal's mission is to achieve significant environmental benefits by encouraging organizations and individuals to choose environmentally responsible products and services. We accomplish this goal in two key ways.

First, we set rigorous environmental standards for products and services and award a seal of approval to those meeting the standards. When consumers select products bearing the Green Seal, they know they are buying products that have a lessened impact on the environment, without sacrificing performance.

Second, through our Green Seal Environmental Partners Program and the Choose Green Reports, we help large and small institutions become environmentally sensitive shoppers. We provide detailed guidance — such as this report — on how organizations can protect the environment while saving money. Please contact us to find out how you can become a partner and receive our monthly newsletters.