

Green-in-Print™

A guide to
environmentally
friendly
choices in
photographic
paper

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in collaboration with
The Nature Conservancy

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This review was compiled in collaboration with the Forest Trade team at The Nature Conservancy.

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Executive Summary

For Photographers and Exhibitors

- Photographers, exhibitors and other organizations have an opportunity to make a direct contribution to the environment by choosing the more environmentally friendly among currently available photo papers.
- On the basis of information currently available, photographers, exhibitors and other organizations wishing to minimize their environmental impact should use 100% cotton papers.
- Fiber-based papers* can only be recommended if manufacturers require their base papers to be from Forest Stewardship Council (FSC) certified sources.
- As with fiber-based papers, papers based on bamboo fibers or fibers from other sources can only be considered environmentally and socially friendly if they are properly certified. No paper based on bamboo or other source fiber is currently certified.
- Resin-coated (RC) or other papers with special coatings (metallic coating, etc) probably account for the majority of papers currently in use. Coatings used for these papers tend to be plastics of petrochemical origin and therefore have a greater environmental impact. The mix of paper base and plastic coatings also render these papers difficult or impossible to recycle.
- C-Prints, Duratrans and other plastic materials represent the least environmentally friendly choice. These 'papers' are made of plastics of petrochemical origin and the printing process generates environmentally damaging chemical waste.
- Photographers should contact manufacturers and suppliers of their favorite papers and request appropriate, environmentally-relevant information as outlined in this review about the papers they use.

*Throughout this review, the term 'fiber-based papers' is used to refer to papers using pulp made out of traditional wood fiber. Papers made out of fibers originating from other materials such as cotton, bamboo, etc are referred to specifically by their material of origin – cotton paper, bamboo paper, etc.

For Manufacturers


- Manufacturers have a significant opportunity to generate competitive advantage by improving the environmental friendliness of photographic papers and providing clear and specific information for each paper type.
- There is opportunity for short term improvement in fiber based papers by requiring proper FSC certification of all pulp sourcing.
- Manufacturers should ensure that all entities in the manufacturing and supply chain use 'clean production' techniques as evidenced by ISO 14001 (or equivalent) certification and use Processed Chlorine Free or Totally Chlorine Free production processes.
- Future research and development should be directed at maintaining or improving paper performance and cost while introducing some recycled content and replacing all coatings and bases of petrochemical origin.
- Manufacturers should move beyond making general statements about their environmental policy and provide accurate and comprehensive environmentally-relevant information for each type of paper marketed.
- The table on the next page provides a rating system for photo papers (from 0 to 5 trees). We would encourage manufacturers to use this "Green-in-Print™" system to rate the eco-friendliness of their individual papers enabling them to use the rating logo shown below.*



*Manufacturers wishing to use this grading system should contact Ms Siobhan Dolan at sdolan@zlmatheson.com

Green-in-Print™

Eco-Friendly Rating For Photographic Papers

RATING	PAPER TYPE
	<p>100% cotton rag paper</p> <p>Fiber (wood pulp) based paper sourced from FSC certified sustainable sources, with significant (30%+) post-consumer recycled content and with no resin component</p>
	<p>Fiber (wood pulp) based paper sourced from FSC certified sustainable sources without significant post-consumer recycled content and with no resin component</p> <p>Bamboo or other non-tree fiber paper with no resin component sourced from FSC certified sources</p>
	<p>Fiber (wood pulp) based paper sourced from sustainable sources certified by credible entities other than the FSC and with no resin component</p>
	<p>Fiber based paper without fully documented provenance or using pulp certified by organizations that do not meet generally recognized, acceptable certification standards</p> <p>Bamboo (or other) fiber paper sourced from uncertified sources</p> <p>Papers that have a resin component (resin base or resin coating) but using wood pulp sourced from FSC certified sources</p>
	<p>Papers that have a resin component (resin base or resin coating) and without FSC wood pulp certification</p>
	<p>Polyester or other plastics based papers using chemical processing (eg. C-Prints, Duratrans, vinyl or other plastic base)</p> <p>Any product from a manufacturing company that does not meet basic standards of environmental business practice as certified by appropriate standards (ISO 14001 or equivalent) or that sources from suppliers that do not meet these standards</p> <p>Any product that is not produced using Chlorine Free Processes</p>

Outline

Are Your Practices Environmentally Friendly?

Photographers, exhibitors and other organizations interested in environmental and conservation issues should make sure that their own photographic practices have the least possible adverse impact on the environment. One area where significant improvement remains possible is in the use of photographic paper. This report provides photographers with guidance on how to choose papers with less environmental impact in their production.


What Manufacturers Say

Responding to photographers' interest in environmentally friendly papers, some manufacturers have started developing photo papers with 'eco-friendliness' as an important criterion. Others have started providing background information about what parameters photographers should use to evaluate how environmentally friendly are the different papers. Some of this information is accurate, some less so.

About This Review

This review is intended to provide unbiased advice to help photographers evaluate different papers should they wish to take environmental impact into account when choosing their papers.

This review is focused on papers used for inkjet printing, C-Prints and other exhibition or display printing that is in widespread use (eg backlit Duratrans prints, outdoor displays, etc). Other processes like silver halide printing or platinum palladium printing are now marginal activities only accounting for a small proportion of photo paper use. They have not been evaluated in this report.



This review has been sent out to major paper manufacturers for consultation. Useful responses and suggestions from those manufacturers who responded have been incorporated into the final version.

We hope to publish further editions of this report incorporating greater manufacturer input and eventually including ratings for specific papers from different manufacturers. We are dependent on manufacturer collaboration to make that happen.

This review has not received any sponsorship or financial assistance from any manufacturer.

The Papers

This main section of the review explains the different type of photo papers available and what makes these papers environmentally friendly – or not.

Cotton Rag Papers

Cotton is grown primarily for the textile industry. For the production of textiles, the first step is a ginning process which removes seeds from the cotton plants. These seeds, a by-product of the textile producing process, are the source of the cotton linters that go to make cotton paper.

Being sourced from a recycled by-product of the textile making process, cotton paper can therefore be considered of very low environmental impact as no cotton is grown specifically to make paper. If cotton paper were not made, the linters would be a wasted by-product.

Further, the environmental impact of turning cotton linters into paper is no greater than turning wood pulp into paper.

Could it be improved?

In spite of contrary claims by the cotton industry, growing cotton uses large amounts of pesticides and is damaging to the environment. This impact can be mitigated in two ways:

- Use of organic cotton
- Use of genetically modified cotton that requires less pesticide

We do not intend to get into the genetically modified debate here. However, it is now generally accepted that organically grown cotton is desirable and should be encouraged. Production of organically grown cotton is, however, very limited and would not produce enough linter by-product for paper production. Organic cotton photo paper is, therefore, not yet a viable product and has not been included in the grading system.

A further issue to be considered is the use of 'fair trade' certified cotton. The Fair Trade movement promotes the payment of a fair price as well as social and environmental standards related to the production of a wide variety of goods. As with organic cotton, the production of fair trade cotton is currently too low to make it a viable source of paper production.

Conclusion

Papers made of 100% cotton must today be considered the most environmentally friendly of photo papers. This is not an endorsement of cotton production as an environmentally friendly activity. Rather it is based on the fact that cotton linters are a by-product of the textile production process. The production of cotton paper is therefore environmentally friendly because it produces no additional environmental impact.

Over time, it is hoped that organic and fair trade cotton production will supplant traditional cotton production. As consumers, we can only encourage that shift by buying textiles sourced from certified organic and/or fair-trade cotton.

Fiber Based Papers

Fiber based papers have recently been introduced in the ink-jet market in an attempt to reproduce more closely the look and feel of traditional photo papers as used, for example, in silver halide printing. These papers use traditional wood pulp fibers sourced from trees – ie traditional paper sources.

The degree of environmental-friendliness of fiber-based papers is driven by three factors:

1. Recycled Content
2. Provenance of the wood pulp
3. Any resin component

Recycled Content

Use of a high proportion of recycled content would clearly contribute to the eco-friendliness of any paper. Recycled content is usually reported as two different numbers: Total Recycled Content and Post-Consumer Content . Of the two, post-consumer content is the more important and a 30% post-consumer content is the minimum one should consider significant when assessing the environmental friendliness of specific papers.

Photo papers do not currently contain recycled content. This is a result of the difficulty in achieving the cleanliness, color consistency and surface and formation control necessary when using recycled pulp that typically comes from many different sources. Attempts to increase the re-cycled content of photo papers are clearly to be encouraged. It remains to be seen whether this will prove to be technically achievable.

Provenance of Wood Pulp

In order to minimize the environmental impact, wood pulp for fiber based papers should be sourced from trees coming from forests that are certified as sustainable and having good forest management practices. Two issues arise when assessing compliance of photo papers using this standard:

1. Manufacturers have no requirements

Most manufacturers we have spoken to do not have a firm requirement that their suppliers only provide them with paper made from pulp originating from certified sources. While many manufacturers believe that their suppliers do use certified sources, most have not yet made it a formal requirement of their suppliers and have no systems and processes to monitor compliance. Some manufacturers (eg Innova) have started to move in this direction.

2. Most certification standards are inadequate

The market demand for wood products sourced from certified sources has led to a proliferation of certification standards. It has been well reported that "the majority of existing certification schemes certify the

current status quo of forest management, which, in most cases does not earn the label 'from well managed forests!' (Ref: Footprints in the Forest. FERN, February 2004. www.fern.org)

Further, many certification schemes are closely linked to the forestry industry limiting their credibility.

To our knowledge, all evaluations carried out in the last few years continue to confirm that FSC certification is the only certification system with sufficient credibility and independence and which meets the standards set by the World Bank and WWF. "The only certification scheme currently recognized as credible by industry, NGOs and indigenous people's groups alike is the scheme operated by the Forest Stewardship Council." (Ref: WWF Press Release. 2006)

We therefore suggest that only wood products certified by the Forest Stewardship Council (FSC) can today be considered as being credibly certified.

Having said that, some form of certification is probably better than no certification at all. Some certification schemes, although falling well short of FSC standards, at least guarantee that wood is not sourced from illegal logging and that certain basic standards are met. We therefore suggest that certain defined certification schemes (eg. schemes affiliated to the PEFC [Programme for the Endorsement of Forest Certification schemes]) provide a minimum level of certification that should be considered better than no certification at all.

That said, the FSC scheme remains the only scheme that is truly independent and fully credible.

Resin Component

Some fiber-based papers are laid on a resin base. In terms of environmental impact, these papers should be considered equivalent to Resin Coated (RC) papers. These papers are the subject of a section later in this report.

Bamboo and Other Fibers

Some manufacturers promote paper sourced from alternative fibers as being particularly eco-friendly because they are 'tree free'. Such papers include bamboo papers and other niche papers such as Japanese rice papers that are traditionally made from mulberry and hemp fibers.

The moniker 'tree-free' rests on the fact that, botanically, these plants are grasses or bushes rather than trees. However, it says nothing about the eco-friendliness of the growing or harvesting methods used or the social conditions of the workers involved.

Because of their rapid growth and the ability to harvest the same plant repeatedly, some of these plants do offer the potential to create pulp that is eco-friendly. However, without some form of verification and certification, the consumer cannot know whether these papers are, in fact, based on wood pulp sourced from eco-friendly sources.

History has shown that assurances from growers and manufacturers do not provide sufficient safeguards. For instance, in the early and mid 1990s, bamboo paper was presented as an environmentally preferable alternative to tree pulp paper. However, further investigation at that time showed that the production of this pulp was associated with massive clearance of established bamboo habitats with significant environmental damage. In addition, social conditions at bamboo pulp mills were found to be well below acceptable standards. In the wake of this outcry, US paper manufacturers stopped importing bamboo-sourced pulp and this has not resumed.

We therefore suggest that photographers should be suspicious of paper labeled as eco-friendly simply because it is 'tree-free' or based on some different type of fiber. As with all other paper, these papers can only be considered acceptable if certified by a credible, independent third party certification scheme.

To our knowledge, there is currently no independent, third party certification system that can trace and verify sourcing for such pulp. The FSC does have a bamboo certification scheme. As far as we are aware, this has been applied to bamboo products such as furniture and flooring but not yet to bamboo paper.

Resin Coated Papers

Resin coated papers account for the bulk of photo papers in use today. These papers contain a resin (plastic) coating which provides a relatively low cost route to the smooth finish and sheen required of a photo paper. Most lower cost and bulk photo papers are RC papers.

Some high-end photo papers also use coatings to provide a special effect. Examples would include metallic coated papers.

The resin used in coated papers has a number of negative environmental impacts. First of all, these resins are all chemicals of petrochemical origin. Their use therefore encourages the use of petroleum products. Secondly, because of the intimate mix of plastic and paper in these products, they usually cannot be recycled adding further waste to the system.

Overall, RC papers have higher environmental impact than non-resin alternatives.

C-Prints and Other Plastics

The final category of 'paper' we will address is that which contains the various brands used to make C-Prints. We put 'paper' in quotes because these are not papers in any traditional sense. Most brands consist of a polyester base coated with light-reacting chemicals. In other words these papers are plastics of petrochemical origin.

In addition, C-Prints require chemical processing. Modern processing machines have shown significant improvement in the amount of chemical used and significant reductions in the amount of chemical waste generated. However, this is still a chemical process that generates chemical waste and is therefore less environmentally friendly than alternatives.

Overall, C-Prints can therefore be considered the least environmentally friendly of printing methods.

The comments made about C-Prints also largely apply to other plastic materials such as Duratrans and others that are used in various circumstances such as backlit displays. As with C-Prints, these materials represent the least environmentally-friendly choices for photographic printing.

Other Considerations

Modern Materials

Modern technology allows photographs to be printed on an almost endless number of different materials from translucent plastics that allow backlighting to canvas materials to aluminum sheets that can be put through inkjet printers. As these tend to be specialty applications, we have not addressed every conceivable printing material. We would, however, welcome the opportunity to work with manufacturers and marketers of any of these materials to define the environmental impact of the materials and explore ways in which it can be improved. For instance, some manufacturers such as Intelicoat provide information for how their plastic materials can be re-cycled thereby improving some of the environmental impact.

However, as general guidance, it is probably fair to say that printing on any plastic or other product of petrochemical origin should be considered less environmentally friendly than alternatives. Sometimes the use of these materials is unavoidable – for instance when printing on weatherproof materials for outdoor use. However, in many cases, and especially for general use and for indoor exhibition, more environmentally-friendly options are a viable alternative and should be considered by any environmentally-conscious photographer.

ISO Certification

When asked about the environmental friendliness of their papers, some manufacturers respond by stating that their suppliers are certified to ISO standards such as ISO 14001, ISO 9001:2000, etc. What does this mean?

None of these standards refer to the source of the cotton or wood pulp or the recycled content of the paper. Rather they refer to internal quality standards and, in the case of ISO 14001, to proper environmental practices in the production processes and how the businesses are managed.

It is important that manufacturers and their suppliers manage their businesses to high quality standards and meet proper environmental practice.

We would suggest that all paper manufacturers should meet these standards of quality in their business practices as a basic requirement and should require that all suppliers in the chain of production also meet these modern standards. Manufacturers should also make customers aware that these standards are met.

Photographers interested in minimizing their environmental impact should only use papers manufactured by ISO 14001 (or equivalent) certified manufacturers throughout the whole chain of production. However it should be remembered that these standards, while essential, have no bearing on how environment-friendly are the materials used in manufacturing the individual paper types.

Production Process

One other process to be considered is the wood pulp bleaching process. In the past, chlorine was widely used for the bleaching or delignification process. This released environmentally damaging organochlorine and human carcinogens such as dioxin into the environment.

Production processing is now being converted to Elemental Chlorine Free (ECF), Totally Chlorine Free (TCF) or Process Chlorine Free (PCF) bleaching processes. Most ECF processes still release dangerous chemicals into the environment and TCF (for virgin pulp) or PCF (for recycled pulp) are the cleanest production processes.

Many paper manufacturers now use these newer processes but it would be useful if photo paper suppliers would confirm the use of these processes on their individual papers and consider certification by the Chlorine Free Products Association.


What Should Photographers and Manufacturers Do?

Photographers, Exhibitors – Use Only 100% Cotton Papers

In the absence of proper product labeling as described above, environmentally conscious photographers and exhibiting and other organizations today have no option but to confine their paper use exclusively to 100% cotton rag paper.

While we all try to optimize the look and feel of our printed output, the reality is that there are a sufficiently large number of cotton rag papers available to satisfy the needs of most photographers. Exhibition prints used for display in museums, commercial galleries and other venues are commonly C-Prints or use other materials of petrochemical origin using chemical processing. This practice is driven largely by habit and by the fact that these organizations are unaware of the 'eco-score' of these technologies compared to alternatives. As there is nothing inherently superior in chemically processed prints, we have already seen a significant shift towards inkjet prints in the exhibition and fine art photography markets – a move especially driven by the archival properties of pigment prints. In these markets, a continuing shift towards cotton or fiber-based papers will further improve the environmental impact of printed display.

It is up to the individual photographer to decide whether the difference in output seen by switching to a different paper base or the lower cost associated with resin-coated paper are sufficient to accept the greater environmental impact associated with these papers. However, organizations and photographers that have made the environment their primary focus may feel that their credibility risks being undermined when they mount exhibits or market an environmental message using C-Prints, backlit Duratrans prints or any other of the less environmentally-friendly technologies in situations where greener alternatives are available.



Hopefully, competition among manufacturers is sufficient to lead some manufacturers to provide information about production standards for their cotton rag papers enabling us to switch to those brands that are produced by ISO 14001 and Chlorine Free Products Association certified papers.

But – DO NOT WAIT. Contact your preferred paper manufacturer now and ask them to provide you with information about the eco-friendliness of their papers. They have this information ready to hand and have no reason not to provide it.

Manufacturers — Please Label Your Products

Manufacturers are already responding to photographers' desire for environmentally-friendly papers by improving their practices and providing information about their sourcing and their general environmental policies. There is now an opportunity to take the next step by moving beyond broad, general statements to specific and detailed labeling of every paper type that is marketed.

What is required is relatively simple and manufacturers have easy access to all the necessary information for every paper type they market. One must therefore question the motivation for not providing such information on a paper-type by paper-type basis.

Below is a suggested list of information manufacturers could consider providing for each paper type:

1. Production standards:

- Are all manufacturers in the production chain for this paper ISO 14001 (or equivalent) certified?
- Confirm Chlorine Free production methods and which method is used (TCF, PCF, ECF).

2. Paper Base:

- What is the primary paper base (100% cotton, wood-pulp fiber, bamboo-pulp fiber, polyester or other synthetic material, etc)?
- For fiber-based papers:
 - What is the proportion of post-consumer re-cycled content?
 - Is the paper FSC certified with full chain of custody documentation?

3. Coating:

- Does the paper contain a resin base or coating?

The Future

As environmentally-conscious photographers looking to manufacturers to help us continue to improve our output, we look forward to a future of:

- properly labeled photo papers produced using clean production methods
- a selection of fiber-based papers with high recycled content and sourced from FSC certified sources
- new technologies that can reproduce the finish of resin-coated papers and C-Prints without using products of petrochemical origin.

Green-in-Print™ Rated

We would encourage manufacturers to use the Green-in-Print™ rating scheme outlined in this review. Manufacturers wishing to use this scheme should contact Ms Siobhan Dolan (sdolan@zlmatheson.com) for an information pack. Below is an example of the product labeling that will be available for manufacturers wishing to use this rating scheme.



Manufacturer Feedback

A first draft of this review was sent to the following manufacturers:

Canon, Epson, Fujifilm, Hahnemuhle, Harman, Hewlett-Packard, Ilford, Innova, Intelicoat/Museo, Kodak, Legion Paper/Moab, Pictorico.

Responses were received from Hahnemuhle, Harman and Intelicoat/Museo and their appropriate suggestions were incorporated into the review.