

# Put It On Paper Part 1

January 14, 2021

Dennis Fritsche and Frank Richards

“The negative is the score, and  
the print the performance.”

- *Ansel Adams*

# Topics – Part 1

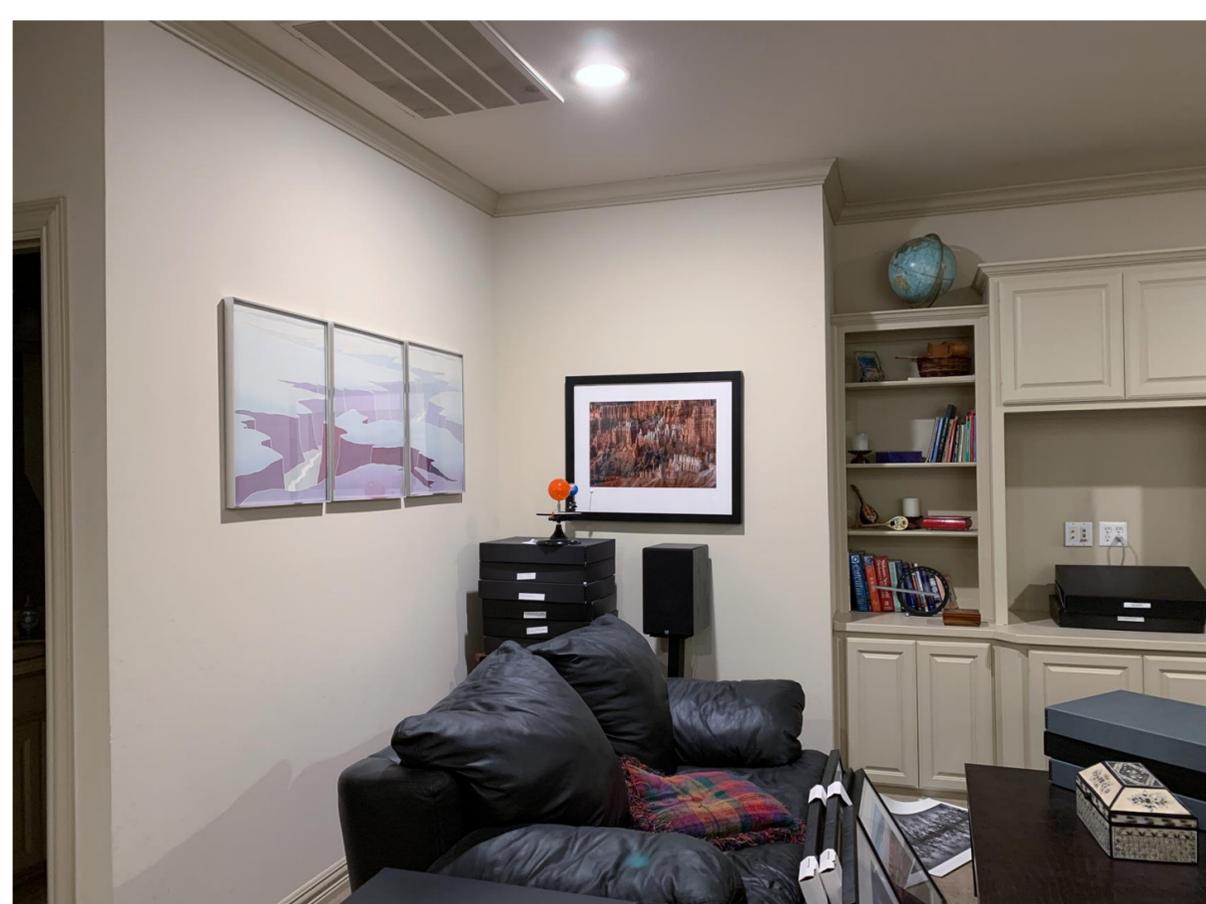
- Why Print Photographs?
- Color Management and the Display and Work Environment
- Options for Printing Your Photograph
- Paper choices
- Soft Proofing and Hard Proofing

# Why Print Photographs?

- A print is the ultimate manifestation of the photographer's art.
- The tactile feeling of holding a print on fine paper is gratifying.
- When a photograph is hung on the wall, it is enjoyed each time someone passes.
- You will learn to be a better photographer.
- A photograph can last 100's of years but your digital files will be forgotten tomorrow.

# Obsession or Addiction?





# Color Management and the Display and Work Environment

# My Print is Too Dark and Does Not Match the Monitor

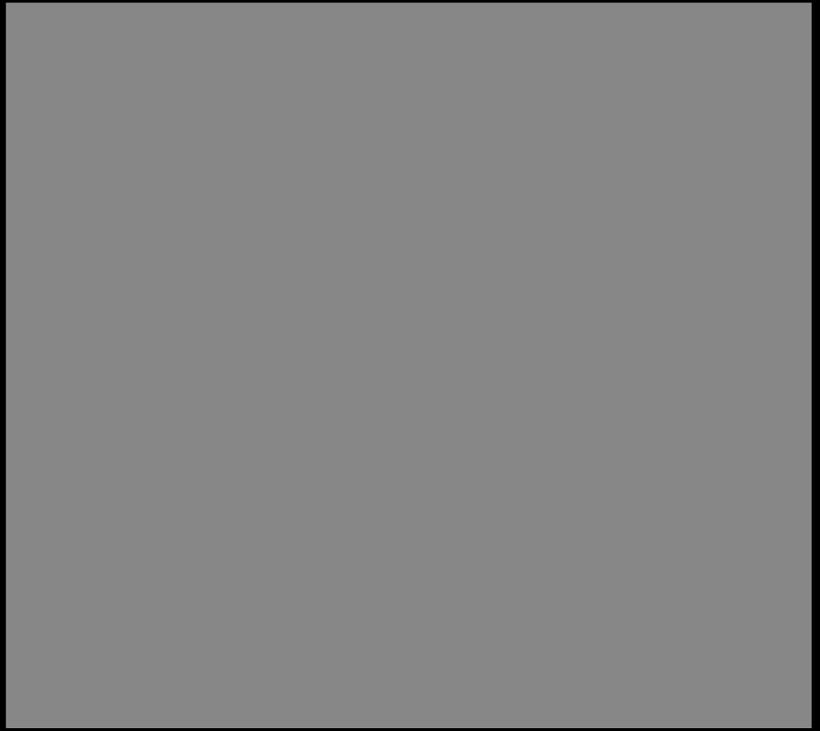
- They will never be exactly the same
  - Monitor emits light and a print reflects light
  - The monitor can show more colors than the printer
  - Different printers and papers show colors differently
- Put you can get close
  - Monitor calibration
  - Work and Viewing Environments

# Color Management and Viewing Environment

- You must have good color management habits to achieve repeatable results
  - Calibrate your monitor!
  - Set the brightness to 120 cd/m<sup>2</sup> for a relatively bright room. I use 75 cd/m<sup>2</sup> for a fairly dark room.
  - Use a white surround when editing.
- Let Lightroom or Photoshop control the color
  - Download the correct paper/printer profile from the paper manufacturer.
  - Follow the instructions in setting the paper type!
- A Note on Colorimeters
  - If you have an older instrument, read this <https://photographylife.com/the-basics-of-monitor-calibration#colorimeters>









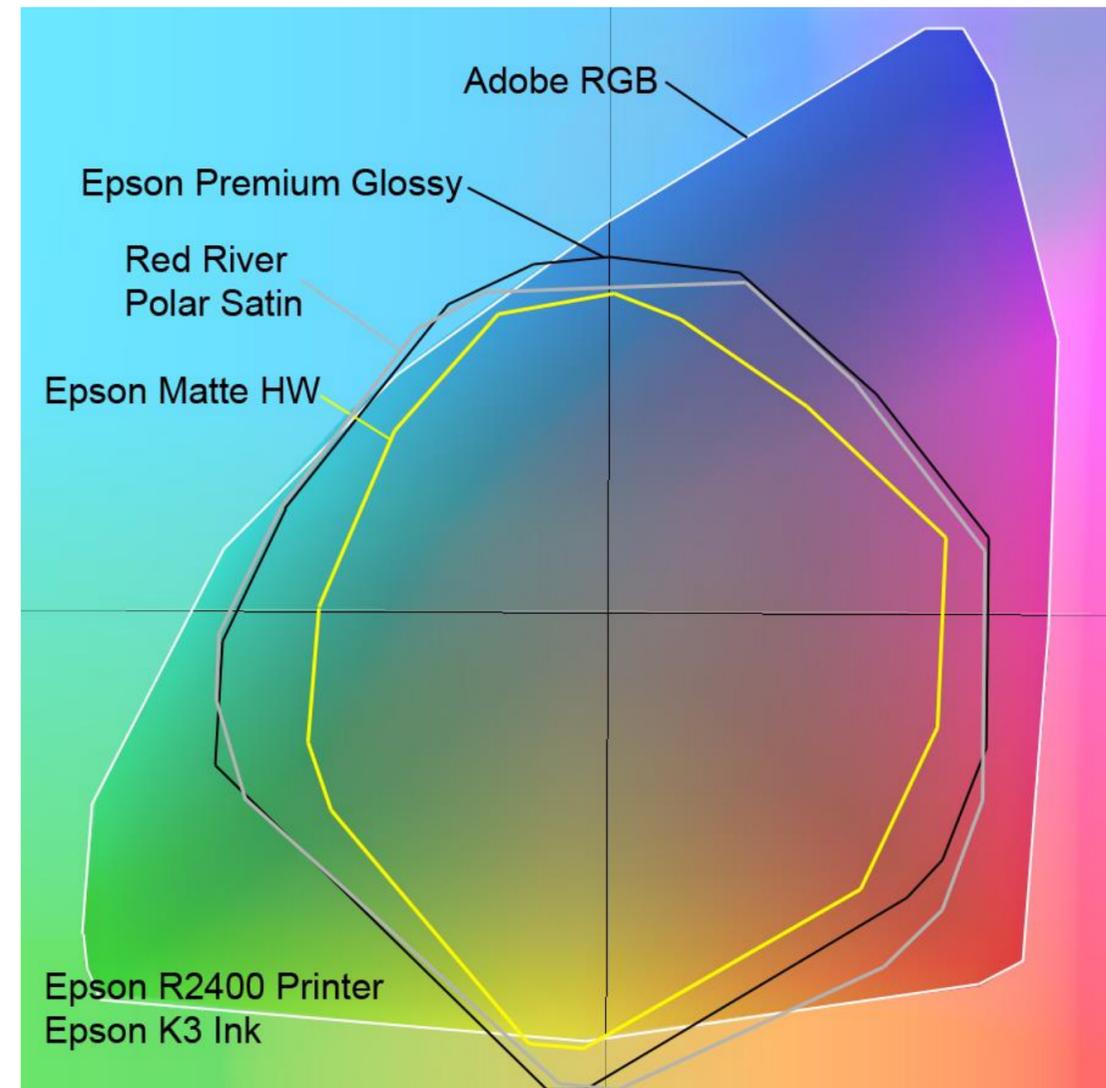
# Color Spaces

- Color spaces (also referred to color profiles or gamut) can be either:
  - Device-independent (e.g. Adobe RGB)
  - Device-dependent (e.g. Epson P900, UltraChrome HD PRO10 ink on RR UltraPro Satin paper)
- Some common device-independent RGB color spaces are:
  - sRGB IEC61966-2.1 - created by HP and Microsoft for images to be displayed on “typical” monitor. Smallest gamut. Only supports 8 bits.
  - Adobe RGB 1998 - developed by Adobe as an alternative to sRGB to provide a better gamut match for printers. Is a good general-use color space for images that can be output on a variety of devices. It encompasses roughly 50% of the visible colors of light.
  - ProPhoto RGB is a popular wide-gamut color space that includes much larger gamut than today’s printers allowing for growth. Default for Lightroom.
- Device-dependent color spaces describe specific device behavior. They include color spaces for cameras, scanners, monitors, printers/papers...

# Device-dependent Color Spaces

## Printer

- Adobe RGB covers most photo inkjet printer's full gamut. sRGB not so good. ProPhoto can provide for future growth, but must use 16 bit.
- Inkjet printer input is RGB and it is translated to CMYK inks in printer.
- Printer settings control the amount of ink dispensed, drop size, gamma and color adjustments.
- A printer's color space depends on the type of printer and its settings, ink and paper. Each different combination has a unique profile.



# Printer Color

For printing, the colors in your image have to be converted to account for the printer, settings, ink and paper. This can be done a couple of ways:



Have your software (e.g. Lightroom, Photoshop) manage the color conversion using paper profile.

Have your print driver perform the color conversion using a printer embedded profile.

Be sure that both the printer and processing software are not both trying to manage the color.



# Color Profiles

- Color profiles are the heart of color management
  - Color spaces are defined by ICC Color Profiles which are used to translate color values into specific colors.
  - ICC profiles can describe either device-independent color spaces or a specific device-dependent color space.
  - Device-dependent profiles are used to describe the color behavior of monitors, printers, etc. Profiles may be:
    - Canned – come with (in) the device and may be hidden
    - Generic – tailored to specific models, papers, etc. but not unique to an individual device
    - Custom – unique to individual device developed by user or service, e.g. monitor profile
  - Device-dependent profiles may be provided by manufacturer, profiling services, or developed by the user, e.g.
    - Monitors – factory-calibrated or profiled with third-party software and colorimeter.
    - Printer – supplied with printer, paper manufacturers, purchased custom profiles, or third-party profiling software and spectrometer.
- International Color Consortium (ICC) was founded by Adobe, Agfa, Apple, Kodak and Sun to create standards for color management. ICC profiles are the standard across most devices and platforms today.

# Device Dependent Manufacturer Supplied Paper Profiles

● **RED RIVER PAPER** Since 1997  
Inkjet Paper by Inkjet Experts

Google Custom Search

Snapshot Sale  
4x6 5x7 Up to 40% Off

Shop for Papers | Top Selling Papers | Inkjet Greeting Cards | Sample Kits | Ink Cartridges | Accessories | Support

You are here: [InfoCenter](#) » **Inkjet Printer Color Profiles**

Welcome to Red River Paper's inkjet printer profile library - the largest private collection of ICC color printer profiles on the web. Here you will find printer profiles for your printer and many different Red River papers as well as help understanding how to install and use printer profiles.

**Rapid Profile Locator**

Choose your printer make then model to quickly find the right profiles.

● Canon | PRO Models | PRO-100 | Find Your Profile | Reset

● **Profile Support Center**

While using printer profiles is not at all complicated, you will need to follow a specific set of instructions to get properly color managed prints.

[How to Install Profiles](#) | [Color Profile FAQ](#)  
[How to Use Profiles](#) | [Seven Tips for Using Printer Color Profiles](#)

**Canon Profiles**

Download printer specific paper profiles from the paper manufactures website

● **Canon Pro Printers**

- PRO-1000
- PRO-10
- PRO-1
- PRO-100

rr-ups4-can-pro-100

rr-ups4-can-pro-100

Organize Extract all files

Name	Type	Compressed size	Password p...	Size
profile-instructions-all-canon-pro-100	Adobe Acrobat Document	59 KB	No	
RR UPSatin 4.0 CanPro-100	ICC Profile	801 KB	No	

# Device Dependent Manufacturer Supplied Paper Profiles



Color profiles are data files that contain a description of how a particular paper, ink, and printer create all colors, shades, and densities. Using a profile will result in more accurate and consistent output.

**Printer:** Canon Pro-100

## Setting Recommendations

Manual Color Adjustment Matching: None

Print Quality: Custom / Set Level 2

## Support

How to install profiles

[www.redriverpaper.com/installprofiles](http://www.redriverpaper.com/installprofiles)

How to use profiles

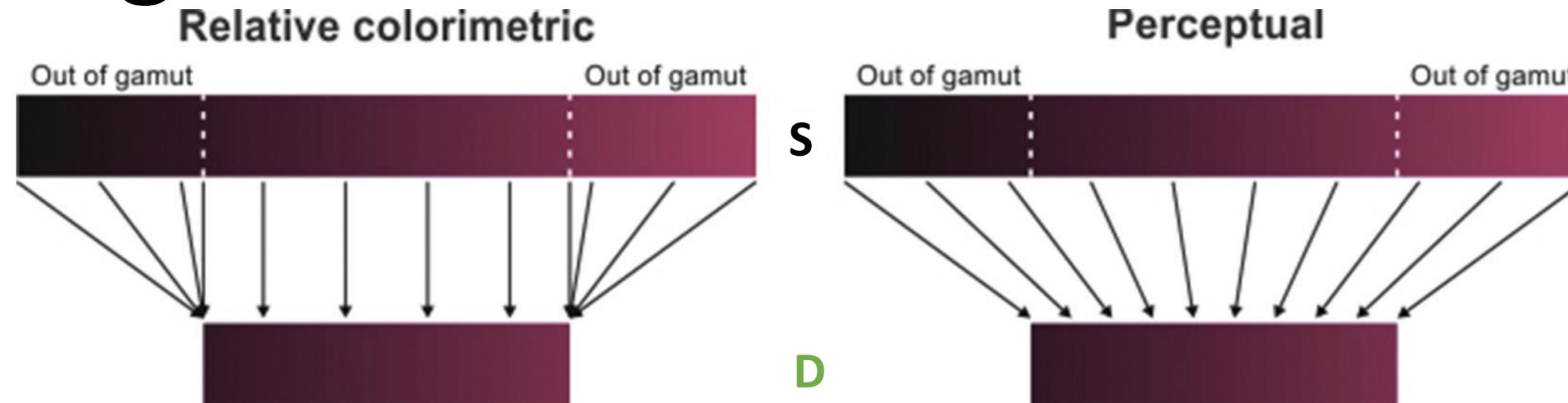
[www.redriverpaper.com/useprofiles](http://www.redriverpaper.com/useprofiles)

Instructions providing printer settings are usually packaged with the paper and provided with profile. Also available online.

## MEDIA SETTING RECOMMENDATIONS

Paper	Media Setting	Special
68lb. UltraPro Gloss 2.0	Photo Paper Plus Glossy II	
66lb. Arctic Polar Gloss	Photo Paper Plus Glossy II	
60lb. & 42lb. Pecos River Gloss	Photo Paper Plus Glossy II	
96lb. Pecos River Gloss Magna	Photo Paper Plus Glossy II	<a href="#">Prevent Paper Abrasion</a> Use single sheet feed
86lb. Pecos River Gloss Duo	Photo Paper Plus Glossy II	<a href="#">Prevent Paper Abrasion</a> Use single sheet feed
45lb. Zeppelin SemiGloss	Matte Photo Paper	
68lb. UltraPro Satin 4.0	Photo Paper Plus Semi-Gloss	

# Rendering Intent



- Relative Colorimetric and Perceptual are the two rendering intents used for photography. They define how to map out-of-gamut colors from one color space to another.
- Relative colorimetric – Colors outside the destination gamut are mapped to the nearest reproducible color. Colors within the destination gamut are not altered. Photoshop defaults to relative colorimetric.
- Perceptual – full source space is compressed to fit into the destination space while maintaining the relationship between colors. Lightroom defaults to perceptual.
- Most of the time it does not matter. Relative colorimetric works well when most of source gamut is covered by destination gamut. If your image has a lot of very saturated colors, perceptual may be a better choice. If in doubt, try them both and choose one that looks best. Can get an idea using soft proofing.

# Options for Printing Your Photograph

# Options for Printing Your Photograph

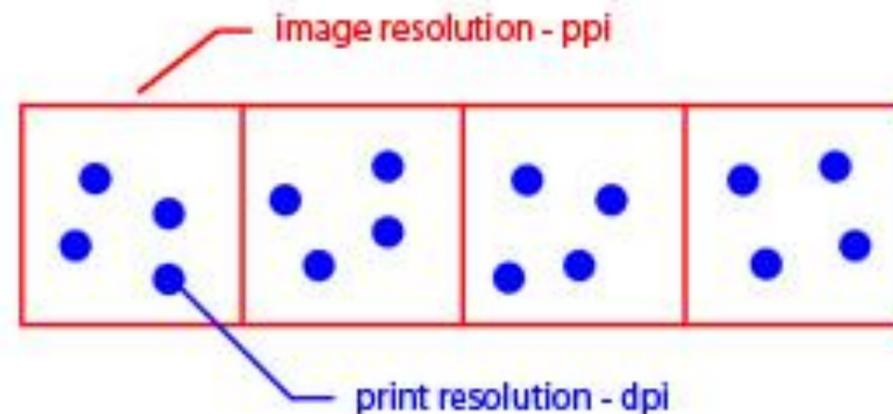
- Ink Jet Printer
  - **Epson**, Canon, HP
  - 13 inch, 17 inch, 24 inch, 44 inch
  - 8 to 12 inks
  - I use the 17 inch Epson P900
- Printing Service
  - You sign-up for the service, send files to them, and pick-up your print
  - Other services often available such as mounting, books, etc
  - Please note the following for PPC Contests *“While images may be printed by the entrant or a photo lab/print service, the latter should not be allowed to alter the image itself (e.g., through color correction, white balance, or cropping).”*

# Inkjet Inks

- Inks have major impact on
  - Color gamut and B&W quality
  - Print life and stability
- Basic ink types
  - Dye
    - Vivid color
    - Shorter life, but have gotten much better
  - Pigment
    - Deeper blacks
    - Longer life - archival
- All prosumer inkjet printers use RGB inputs and convert in printer to CMYK inks
- Color gamut depends on ink, profile and paper
  - CMY are basic ink colors used in all printing
  - K added for crisp, neutral blacks
  - LC and LM often added to provide better shading
  - Other colors may also be added to extend gamut – red, orange, blue, green
- Better black and white – smooth tonal gradients and deep blacks
  - Shades of gray added to get smooth tonal gradients – often K plus 2 grays
  - Use photo and matte black ink for deeper blacks on different papers

# Inkjet Printing Resolution

- Inkjet printer input is image pixels and the printer algorithms translate these pixels into droplets of ink.
- Resolution is important when printing an image. Actually, two resolutions.
  - Image resolution - the number of pixels that you want to print per inch (ppi).
  - Printer resolution or quality setting - the number of droplets (dots) of ink that are used to represent each pixel expressed in dots per inch (dpi).



- When printing an image,
  - Image processing software sends pixels to the printer.
  - Printer takes care of putting ink down on paper.
  - Think in terms of image resolution (ppi) when sizing image.
  - Printer setup quality choice determines the printer resolution (dpi).

# Definitions

(Often used interchangeably)

- **Pixel (picture element)** – smallest element on sensor or screen that can be assigned a color (1, 3 or 4 colors depending on the color space)
- **Dot** – Drops of ink used to represent a specific color in a printed image.
  - Came from offset printing which uses colored dots of varying sizes to represent one or several pixels.
  - Inkjet printer puts down multiple droplets of colored ink for each pixel.
- **Size** – Overall dimensions of the sensor, monitor or print expressed in pixels or inches
- **Resolution** – The density, or fineness, of information content expressed in pixels or dots per inch
  - **ppi (pixels per inch)** – Resolution of displayed or printed image expressed as the number of image pixels utilized per inch
  - **dpi (dots per inch)** – Resolution of a printed image expressed as the number of dots (drops of ink) printed per inch.

# Image to Printer Resolution

## (Inkjet Printing)

- *Image resolution* of the printed image will determine how much detail will be rendered.
  - The image resolution is set by viewing distance.
  - When viewing an image up-close, an image resolution of 200 to 300 ppi provides good results.
- *Printer resolution* determines how much ink is laid down.  
The higher the printer resolution
  - The more droplets per pixel.
  - The more ink used.
  - The slower the printer.
  - The better the print looks.

# Printer Resolution

## (Inkjet Printing)

- *Printer resolution or quality setting* defines the number of droplets of ink that the printer lays down, ie dots per inch (dpi).
  - Epson native resolution is 720 ppi. Typical printer resolutions are 720, 1440, 2880, 5760 dpi... (Draft, Photo, Best Photo... )
  - Canon native resolution is 600 ppi. Typical printer resolutions are 600, 1200, 2400, 4800 dpi... (Fast, Standard, High...)
- Regardless of the image resolution (ppi) sent to the printer, the printer will render the image at a multiple of it's native resolution.
- Printer algorithms determine how printer translates image resolution (ppi) into the pattern of ink droplets based on printer resolution (dpi)
- So, where to set the final image resolution for printing.
  - Printer driver's interpolation algorithms are getting much better
  - But, image processing software is probably better
  - Consider sending image to printer at multiple of its native resolution
  - Recommended image resolution - 300 ppi for Canon and 360 ppi for Epson

# Photo Labs

- Be sure your image is prepared to match lab process – file type, color profile, resolution and aspect ratio.
- Most consumer labs expect jpeg files with embedded sRGB color profile.
- Limit lab adjustments for predictable results.
- 200-300 dpi input resolution preferred. Appears most labs will accept very low res files.
- Many labs will crop (blowup) image to fill standard formats.
- Will probably want to do test series to dial in image.
- Club members are using Costco, Bay Photo, BWC, Shutterfly and Full Color.

# Paper Choices

# Paper Choices

- The choice of papers has a big impact on the quality of the image and how the viewer reacts.
- I like paper almost as much as I like lenses. And they both matter when trying to get the last bit of nuance in your photograph.
- Rag or Fiber Matte has the best overall combination of feel, texture, detail, color space, and pop for me at the moment.
- A high-quality gloss or luster will give somewhat deeper blacks and more saturated colors but can have reflection and surface texture characteristics that can distract a bit (but not usually an issue when framed).
- Optical Brighteners (OAB's) can give paper a pop but can be an issue over the very long run. Not a real problem for us mortals.

# Some Paper Descriptions

- Canson Infinity Plantine Fibre Rag –low-gloss lightly-textured satin, cotton rag, near white, acid free, no OBAs, 310 gsm, 15.6 mils, discontinued Epson Legacy Plantine is similar
- Harman Matte Cotton Smooth –smooth matte finish, cotton rag, acid free, 300 gsm, 22 mils, discontinued
- Hahnemuhle Harman Gloss Baryta – near smooth glossy, near white, alpha cellulose, acid free, 320 gsm, 12.5 mils, discontinued Hahnemuhle Photo Gloss Baryta is similar
- Hahnemuhle Harman Gloss Baryta Warmtone – same as above with warm color
- Epson Legacy Fibre – smooth matte fine art, cotton fiber, near white, no OBAs, 310 gsm, 19 mils
- Epson Cold Press Bright – textured cold press fine art, near white, acid free, cotton base, no OBAs, 340 gsm, 21 mils
- Red River UltraPro Satin – medium depth satin, bright white, acid free base with slightly acid coating, 270gsm, 10.4 mils
- Red River Palo Duro SoftGloss Rag – slightly-shiny lightly-textured satin, near white, cotton rag, acid free, no OBAs, 310 gsm, 16.5 mils
- Red River Palo Duro Etching – cold press fine art, deep texture, warm white, cotton rag, acid free, no OBAs, 315 gsm, 21 mils
- Red River Aurora Art White – hot press semi-smooth fine art, white, cotton rag, acid free, minimal OBAs, 250 gsm, 13.5 mils, double sided

# What do some of these code words mean?

- Baryta - A baryta paper has barium sulfate coatings which provides a white, smooth satin finish.
- Cold Press – goes back to handmade paper, where wet pulp was spread over screen or fabric to dry which produced at textured surface.
- Hot Press – similar to cold press except pulp is placed between smooth (heated) plates or rollers to dry resulting in a smooth surface
- Fibre – paper substrate may use cotton fiber or alpha cellulose fibers
- Rag – subset of fibre with paper substrate using cotton fiber
- Resin-coated (RC) – plastic substrate or fiber base substrate impregnated or sealed with plastic
- Bright or White – cool toned to neutral white paper color
- Warmtone – warm creamy or yellowish paper color
- E-surface – darkroom designation for luster paper
- F-surface – darkroom designation for glossy paper

# My Current Favorites

- Matte
  - **Epson Legacy Fibre Rag**
  - Epson Hot Press Bright
  - Canson Infinity Fine Art Rag Photographique
- Gloss
  - **Canson Infinity Fine Art Baryta Photographique II**
  - Canson Infinity Fine Baryta Prestige
  - Hahnemuhle Photo Gloss Baryta (has some curl)
  - Hahnemuhle Baryta FB

# High Quality Paper at Lower Cost

- Red River is a Dallas based supplier of high quality paper at a low cost
- <https://www.redrivercatalog.com/>
- Generally not sold through retailers. Available locally at
  - Red River CORporate Office
    - Will mail
    - Pickup - (SW quadrant of Stemmons and Mockingbird) 8330 Directors Row. Dallas Texas, 75247
  - Competitive Camera - 2025 Irving Blvd Suite 107, Dallas, TX 75207
- Some Red River papers used by club photographers
  - Red River UltraPro Satin PK
  - Red River Palo Duro SoftGloss Rag PK
  - Red River Aurora Art White (Hot Press) MK
  - Red River Palo Duro Etching MK
  - Red River Polar Matte MK

# Soft vs Hard Proofing

# Soft Proofing and Hard Proofing

- Soft proofing is done in LR or PS and shows you what your print is likely to look like.
- Hard proofing is printing the photograph and seeing what it actually looks like.
  - Print early and print often.
  - Create a consistent viewing environment.
  - Spend some time with the first prints to get to know them.
  - Having more than one print out can help identify tint problems.

# Recommended Sources

- Paper, Ink, and Printers
  - **B&H Photo/Video/Audio** <https://www.bhphotovideo.com/>
  - **ITSupplies** <https://www.itsupplies.com/>
  - Competitive Camera
  - Amazon, Adarama, etc
- Mounting and Framing Supplies
  - **Frame Destination** <https://www.framedestination.com/>
  - Michael's etc.
- Printing Services
  - ~~Costco~~, Full Color, BWC Printmakers
  - Online Mpix
- Reference and Instruction
  - The www
  - Red River and Frame Destination have excellent instructions.