Preparing Figures for Publication in the *Forest Products Journal*

In recent years, the *FPJ* editorial staff has encountered numerous problems with electronic files submitted for publication, and an inordinate amount of time has been spent attempting to convert files into a usable format. Due to the high cost of the electronic-to-print process, it has become necessary for us to require authors to submit manuscripts and figure files in a closely defined format.

The following instructions for preparing figures to be printed in the *FPJ* must be followed carefully. Failure to do so may result in return of the manuscript or in additional charges beyond the standard *FPJ*page charges. Before reading these instructions, it would be a good idea for you to read the definitions in glossary below. Terms included in the glossary are highlighted in **bold** type.

The *FPJ* is primarily printed in black and white and the page charge rate is calculated on the basis of black and white printing. Unless there is a very compelling reason to request color printing of certain figures, and you are willing to pay the extra charge for color printing, all figures should be prepared in black and white format only.

Figure Composition

- Figures in the *FPJ* will be typeset in one of three sizes: 1 column (20.3 picas; approx. 3.5 in.); 1-1/2 columns (29 picas; 4.5 in.); or 2 columns (42 picas; 7 in.).

- Use Arial or Helvetica fonts (**standard fonts**) for labeling of axes, etc. Be sure that the font size will be no less than 8 point when the figure is reduced to its final size.

- Titles or labels not absolutely necessary for understanding the figure should be removed and explained in the caption. Do not include page numbers, figure numbers, or figure captions within the boundaries of a figure.

- Scales or axes should not extend beyond the bounds of the plotted data.

- Be sure that all lines in a figure are heavy enough to withstand substantial reduction; choose rule weights that are 0.5 point or more at a size of 4 by 4 inches. If lines are less than 0.5-point-thick, they may “drop out” after reduction. **Hairline rules** should not be used; choose bold lines (do not choose the thinnest line available in whatever program you are using).

- The style in figures should be consistent with the text, including capitalization and SI usage. Place units of measure for axis labels in parentheses after the label (e.g., Growth (%) not Percent growth).

- Keys to symbols, if needed, should be kept as simple as possible and be positioned so they do not needlessly enlarge the figure (i.e., placed inside the figure in an open area if possible).

- Use solid symbols for plotting data if possible. Size symbols so that they will be distinguishable when the figure is reduced.

- If your figures were originally prepared in color, with different colors representing different values, the likelihood is great that when the files are printed in black and white, the contrast necessary to differentiate the data will be lost. Whenever possible, use different patterns of hatching instead of gray levels to differentiate between values in a figure. If that is not possible, be sure to use gray levels between 20 and 80 percent with at least a 20 percent difference between the levels of gray.

File Formats

Photographs (Continuous Tone Figures)

- **Continuous tone** figures (e.g., photographs) should be submitted as **TIFF** files at a minimum resolution of 300 dpi for an original figure size of not less than approximately 4 by 4 inches. If the images were taken with a digital camera, save or export the images to a 300 dpi TIFF file. If your only option is to save the image as a **JPEG** file, be sure to save it with the least amount of compression (highest quality) setting. Submit separate TIFF files; do not place image files in a Word document. Include a lightly labeled printout of the image for comparison purposes. If it is not possible to submit an electronic file, you must provide high-quality prints, made from original negatives, and printed on a matte coated stock, for scanning. You will have to pay an extra charge if we must scan prints.

Line Art (Vector Graphics)

- If you *created* your **line art** (**vector graphics**, such as drawings, graphs, charts) in a drawing program (e.g., Illustrator, CorelDraw, FreeHand, etc.), you will likely be able to save them as **EPS** files. But if you are unable to save/export the line art as EPS files, then save the files as high-resolution TIFF files (900 to 1200 dpi). Submit separate EPS or TIFF files; do not place files in a Word document. Include a lightly labeled printout of the artwork for comparison purposes.

- If you *created* the line art in Word, Excel, or Powerpoint, you can produce **PDF** files using Adobe Acorbat or other pdf maker software. If those instructions are followed carefully, the figures should be acceptable for printing. Include a lightly labeled printout of the artwork for comparison purposes.

- If it is not possible to submit acceptable electronic files of your figures, you must provide laser-printed originals of the drawings that are clean enough for scanning. Artwork should have clear numbers and letters and sharp black lines. Thin lines, particularly in figures requiring considerable reduction, must be avoided. You will have to pay an extra charge if we must scan artwork.

Combination Figures

- When artwork contains both text and continuous tone elements (**combination figure**), it should be submitted as a TIFF file (resolution of 500 to 900 dpi).

Color Figures

We must charge an additional amount if authors feel that their figures must be printed in color to be useful. The cost is $1,050 for 4-color photos, micrographs, etc. The cost is the same if you have one page of color figures or several pages of color figures. If it is only necessary to include one extra color, besides black, the cost would be $550. Color photographs should be submitted as TIFF files in**CMYK** color mode (not **RGB**) at a minimum resolution of 300 dpi for an original figure size of not less than approximately 4 by 4 inches. If the images were taken with a digital camera, save or export the images to a 300 dpi TIFF file. If your only option is to save the image as a JPEG file, be sure to save it with the least amount of compression (highest quality) setting. Submit separate TIFF files; do not place image files in a Word document. Include a labeled printout of the image for comparison purposes. Prices are subject to change without notice. Please contact the FPS office to verify latest prices at 608.231.1361 ext. 202.

Glossary

Bitmap – A method for representing graphical images in which the image is composed of rows and columns (a grid) of dots (pixels).

Bitmap image – An image stored in a pixel-by-pixel format. To display a bit-mapped image on a monitor or print it on a printer, the computer translates the bitmap into pixels (for display screen) or ink dots (for printers). Bitmap images are often referred to as raster graphics.

BMP (*.bmp) – Windows bitmap is the native format for Microsoft Paint. It is not well supported by other operating systems and should not be used.

CMYK – Cyan, magenta, yellow, and black. A model used to represent color in print, known as a subtractive color model. Color is reproduced by the reflection of light off of ink pigments. Although the full color spectrum can be represented just with CMY, true black cannot be produced in the printing process due to impurities in the CMY inks, so black (K) is added.

Combination figure – Artwork that contains both text and continuous tone elements (e.g., an annotated photograph).

Continuous tone – An image composed of a range of color or shades of gray (e.g., a photograph). These types of images cannot be described mathematically and instead are described pixel-by-pixel in a bitmap.

Encapsulated PostScript [EPS] (*.eps) – Graphics file format used to transfer PostScript image information from one program to another. It encodes vector artwork as a series of mathematical expressions, allowing vector artwork to be stored and re-sized without affecting resolution.

GIF (*.gif) – Graphics interchange format. A file format for displaying images on the web. GIF includes data compression but is limited to 256 colors. It should not be used for images that will be printed.

Grayscale – An image composed of black, white, and intermediate shades of gray. There are 256 shades of gray in a grayscale image.

Hairline rule – A specified rule that will reproduce at the finest resolution of the output device. Hairline rules should not be used for printing.

Halftone – A continuous tone image, such as a photograph, that has been converted into a black and white image. Halftones are created through a process called dithering, in which the density and pattern of black and white dots are varied to simulate different shades of gray. In conventional printing, halftones are created by photographing an image through a screen. Halftones are used since the printing process cannot print the fine gradations of ink required for continuous tone.

JPEG (*.jpg/*.jpe/*.jpeg) – Joint Photographic Experts Group. A type of compressed file particularly suited for storing continuous tone bitmap data such as photographs on the web. JPEG is a lossy compression technique that is designed to compress color and grayscale continuous tone images. The user typically has to compromise on either the quality of the image or the size of the file. JPEG does not work well on line drawings, lettering, or simple graphics because there is not a lot of the image that can be thrown out in the lossy process, so the image loses clarity and sharpness.

Line art – Any image composed of lines and text, such as graphs, charts, and illustrations. Best saved in a vector format (such as EPS).

LZW – Short for Lempel-Zif-Welch, LZW is a lossless compression algorithm for data compression that conserves disk space without sacrificing any data in the image.

PDF (*.pdf) – Portable document format. A file format for representing the visual aspects of pages, and for certain other information about those pages, independent of the software, hardware, and operating system used to create them and independent of the output device on which they're to be displayed or printed. Created and maintained by Adobe Systems.

Pixel – Short for picture element, a pixel is a single point in a graphic image.

Postscript – Instead of using pixels (as in bitmaps) or mathematical expression (as in vector graphics), Postscript is a programming language that describes the shapes, lines, spaces, positions, fonts, colors, and other features of a page.

RGB – Red, green, blue. A color model used to represent color on computer screens. Known as an additive color model, the colors on screen are produced by additive amounts of light passing through a range of pigments.

Standard fonts – Common fonts that can be found on all computer systems. For maximum clarity it is recommended that Arial or Helvetica (sans-serif fonts) be used for labeling figures, and Symbol be used for Greek, Latin, and other characters. Uncommon fonts may not be supported on all computer systems and may cause problems in the printing process.

TIFF (*.tif) – Tagged image file format. A widely supported format for saving bitmap images. It can store images in color (CMYK and RGB) and grayscale, and supports LZW compression. This is the recommended format for storing continuous tone images (i.e., photographs). If it is used to store line art, the images must be saved at 900 dpi or higher resolution.

Vector graphics – An image that is composed of mathematically defined geometric shapes - lines, objects, and fills. Vector graphics may include text, graphs, or illustrations. Vector graphics are more flexible than bitmap images because they can be scaled; they are resolution independent. Vector graphics are typically saved in EPS format.

WMF (*.wmf) – Windows metafile format. A Microsoft Windows format usually used for interchange of image data between various Windows software programs and rarely used as a final format.

ZIP (*.zip) – A derivative of LZW, Zip is a popular data compression format commonly used for compressing and archiving files in Microsoft Windows environments.