

# Image Editing

## A Photoshop Tutorial for Natural Resource Managers

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# **Chapter 1**

## **Introduction**

## Introduction

Land managers are increasingly turning to a new tool for visually depicting, analyzing, and communicating the technical aspects of forestry, specifically in the area of timber harvest and unit design. This tool is computer-based image editing software. In the 1980's, it was referred to as image capture technology, or ICT. In the 1990's, it is called digital photography, or video imaging. Regardless of which terminology is used, it all refers to editing images to display some particular effect. In this paper, I will use the term image editing.

The objective of this paper is to aid the natural resource manager in learning and applying image editing techniques to display the visual effects of timber harvesting. There are many articles that address the use of edited images, but few that actually provide step-by-step instruction on how the images were created. This paper is a basic introduction in how to use image editing technology. It is understood that software product upgrades will make this paper obsolete in just a short time, but the basic concepts will remain the same.

Chapter 2 provides some discussion of the software and hardware required to begin editing images. If you are knowledgeable about computer hardware, you may just want to read the section on input and output devices. There are many such devices available at a wide range of prices. The discussion is limited to the "affordable" choices. These are deemed "affordable" because it is assumed that the computer will be used in an office environment where the computer will not be used solely for image editing. Funds will probably be limited to those devices and applications that have use under a multi-tasked computer system.

Chapter 3 contains the step-by-step processes for editing an existing forest landscape. This chapter includes exercises on how to edit an image (regardless of the source of the image) using the tools available in Adobe Photoshop version 2.5

software program. The instructions include examples of overlaying one image onto another, editing an image to show timber harvest units on a landscape, and portraying changes in the harvest units over time due to timber growth.

Chapter 4 discusses the need for an image library. A small library is included in this section as an example. You will need to create your own image library depending on the type of terrain that you intend to simulate. The Appendix includes a glossary of terms that are commonly used in image editing.

This tutorial was tested by a group of natural resource managers. Their comments and suggestions have been incorporated in this document.

## **Uses of Photo Image Editing Software**

According to Jim Folts, OSU (Oregon State University) associate professor of art, virtually all images in journals, newspapers, and other media have been edited (Folts, 1994). Basic photo film developing can make some minor adjustments, but computer-based imaging software offers many more editing tools. Edits can be made that would not have been possible in the traditional dark room setting.

## **Uses in Natural Resource Management**

Images can be rough drafted fairly quickly (5 to 10 minutes) to aid a forest manager in deciding upon harvest unit alternatives. These edits could be pictures of a foreground (viewed from up to 1/4 to 1/2 mile away) depicting various unit shapes in the same location. It is also possible to display a variety of unit combinations on a middleground (as seen from 1/4 to 1/2 mile up to 3 to 5 miles away) or background (as seen from over 3 to 5 miles away) picture.



A recent newspaper article (Seattle Post-Intelligencer, 1994) documented the use of image editing by timber firms. Weyerhaeuser is using image editing to design timber harvests in visually sensitive areas. The article mentions that an unnamed private landscape architecture firm in Seattle is using image editing software to teach land managers how to design visually pleasing harvest units.

Nassauer (1990) describes four ways in which land managers could use image editing: (1) before and after simulations, (2) historic portrayals, (3) simulation of alternative policies and plans, and (4) simulation of incremental change. She cites a US Fish and Wildlife Service project where simulations of a plan to restore a prairie wetland complex were used to provide information to residents and decision makers regarding a management plan in Minnesota. Image editing was used for a historic portrayal to help residents visualize the appearance of restored whitewater after removing a non-functioning hydroelectric dam in Minnesota.

Nassauer's last two ways to use image editing are especially applicable to timber management. These are the (1) simulation of alternative policies and plans and (2) simulations of incremental change.

For forest managers, these simulations can be accomplished by the use of computer-based image editing. For example, image editing could be useful for a long-term planning effort. If an area of concern has been identified from a particular viewpoint, photos can be taken of the area as it is now. These photos can be edited to show how current openings are expected to look in 10, 20, even 50 years after harvest. The edited images can aid in determining if the proposed activity meets the original objective of the land management plan. This tutorial will present step-by-step techniques used to create these simulations.

## **Acceptance by the Public/Viewers**

Perkins (1992) states that image content influences perceived quality. For example, a study at Oregon State University (Johnson, 1994), found that people are willing to accept visual impacts in a non-specific, or general, forest scene that they would not accept (or accept to a lesser degree) in a specific, valued place. It follows that the use of image editing software to simulate proposed timber harvest activity in a specific location should be more helpful in the decision making process than images depicting the same activity in a generic locale.

The acceptance of an edited image is dependent upon the perceived realism and image quality (Perkins, 1992). In the OSU study referenced above, it took 30 to 45 minutes to edit each image because the final use of these images demanded close attention to details. Some time management must be observed when editing images. The image must contain enough detail to create a realistic picture, but not so much that the time spent in perfecting the image is excessive. For example, if an image is to be used in a final product as a 3-inch by 5.5-inch photograph, minute details such as branches on the top of a tree located in the background of the picture need not be perfect. They won't be visible on a small photograph. But, if the images are to be used in a poster, or a detail-oriented slide show, 30 to 45 minutes of editing time may be required. Similarly, images used in preliminary planning do not require the same attention to details as perhaps images that would be used to communicate the final management decision to others.

## **Chapter 2**

### **Selecting a System**

## Selecting a System

This chapter provides some information regarding image editing software programs. The hardware requirements for Photoshop version 2.5 are also listed. Keep in mind that the newer versions of this program will have different hardware requirements. Some additional details are included for input and output devices since some of these devices may not be found in a typical office environment.

A 486 processor configured with DOS 6.0 and Microsoft Windows™ (version 3.1) was used to edit the images in this tutorial. This computer had 16 MB of RAM, a 15-inch monitor, and a video card that would only support 256 colors at the resolution used. Photoshop will retain all of the color information of an image, regardless of how many colors you can see on your monitor. When an image is printed, all of the colors in the file will be output.

## Software Packages

There are many software packages available that can be used to perform image editing. One of the today's leading packages is Adobe Photoshop. It was used to create all of the edited photographic images in this paper. Photoshop was originally written for the Macintosh™ platform, but is now available for Windows™. This paper refers to the commands and function keys for the Windows™ version of Photoshop, but the commands and function keys used in the Macintosh™ version are very similar. Although this paper was written specifically for Photoshop version 2.5 for Windows™, the techniques could be used with any other software package with similar editing tools.

Photoshop was selected for this paper because of price (under \$900 US) and customer support. Other popular image editing packages were considered prior to purchasing Photoshop. The friendliness and experience of the technical support for

Photoshop was the final decision factor in the purchase decision. Photoshop is continually being updated for both the Macintosh™ and the PC platforms.

Photoshop is supported by professors in the Oregon State University (OSU) Art Department and by the Institute for a Sustainable Environment at the University of Oregon. At OSU, the program is used in classes such as color photography, graphic design, and digital photography. Professors, such as Jim Folts at OSU, chose Photoshop for use in classroom instruction because it is the industry standard.

There are more sophisticated image editing packages available, such as LUMENA™, but these packages can cost double or triple the cost of Photoshop. These expensive packages typically contain additional tools, such as animation, that are not needed for image editing. Perkins (1992) cautions against the temptation to continually acquire more powerful, faster, and more expensive technology, that may or may not create more realistic edited images.

Some image editing programs come packaged with drawing programs. These typically contain some of the editing tools, but lack other important tools. A useful image editing software package should have the capability to apply sharpening filters and other effects to correct a poorly scanned image. It should also contain tools to perform color corrections over the full spectrum shown in the image. Many lesser-priced programs and those that come bundled with other software often do not have these color correction features. Adobe Photoshop has these features plus the added benefit of the user-friendly Windows™ environment.

### **Image Editing Programs Vs. Draw Programs**

There are many differences between drawing programs and image editing programs. Photoshop produces a pixellated, bitmapped image, while most of the popular drawing programs are object-oriented. A bitmapped image is similar to a grid. Each

square in the grid is a pixel and assigned one color value. This color can change, but only one color can be assigned to a pixel at one time. An object-oriented image is created using a series of mathematical formulas to define a shape. Each object on an image has a separate mathematical expression.

When something is overlapped on a bitmapped image, the underlying pixels are replaced by the new pixel colors. Because a pixel can only have one color assigned to it at a time, when the overlying image is moved or deleted, the underlying pixels are replaced by some default color. On an object-oriented program, when an overlying image is moved or deleted, the previous underlying image remains.

Another basic difference between the two is how a scanned image is treated. When an image is scanned or imported into a drawing program, the program may regard the image (or picture) as one object, so that it cannot be edited. Text and other information may be added to the picture, but the base picture cannot be edited. Because image editing programs use bitmapped images, each pixel, or groups of pixels, can be edited.

## **Photoshop Requirements**

Software packages typically list their minimum hardware and software requirements in their documentation. This section includes this list and suggests some areas that may need to be expanded beyond the manufacturer's listed minimum requirements. This section also describes some of the hardware that can be used for image input and output.

**Minimum Requirements for Adobe Photoshop**

Intel® i386™, i486™, or Pentium™ processor

(i486™ or Pentium™ are recommended)

DOS 5.0 (or better)

Microsoft Windows 3.1

Minimum 4MB RAM

(8MB or more is recommended)

Color VGA display adapter and compatible color monitor

(24-bit color display adapter (2 MB VRAM) is recommended)

Mouse or other pointing device

**RAM (Random Access Memory)**

Photographic images can be quite large. While most software programs can operate using a minimum of 4MB of RAM, 16MB or 32MB is preferred. Image editing software makes image changes by using numerous calculations. The speed of these calculations is dependent upon the amount of RAM available. With RAM limited, certain functions could take anywhere from 15 seconds to one minute to process and redraw the image on your monitor. Newer versions of Photoshop will require larger amounts of RAM.

**Input and Output Devices**

The quality of an edited image is dependent upon the input and output devices. What you see on the computer's monitor is not necessarily what you get on another output device. Image quality is affected by the resolution of the input and output devices. The selection of these devices should be based upon the final use of the edited image. For example, if the image is to be used as a small picture in a black and white document, a printer capable of 600 dpi (dots per inch) may be adequate. If the image is to be used in a full-color poster, a higher resolution will be needed.

### Scanners

Common input devices are flatbed scanners and slide scanners. Although images can be cropped and color corrected from within Photoshop, it is sometimes useful to use the cropping tools provided with most scanners to help reduce file size.

Because the slide is a common media for natural resource managers, the slide scanner is preferred. Images scanned from a slide or color print negative typically generate more color differentiations (thus, a higher quality scan) than images scanned from a flatbed scanner. The flatbed scanner is useful for more media types, including photographs and books, and, in an office setting, may be more useful if the device is to be used with other software programs.

### Digital Cameras

The digital camera is another method used to capture images for input. The cameras use regular camera lenses and filters. Currently, the lower priced cameras (\$650) do not allow for focusing or aperture settings. The resolution obtained from a scanner is much higher than these low-end cameras.

Digital cameras can be carried into the field like a camera. Images can be stored in the digital camera and downloaded into a PC later. The number of images the camera can store is based on the storage capacity of the camera and the resolution used. At a lower resolution, the camera may be able to store 32 images. At a higher resolution, only eight images may be stored. Most cameras allow for a combination of resolutions to be stored at one time.



A digital camera can also be used as a means to input slide media. When mounted over a light table, it can be an effective method of inputting image data from a slide or other media. Overhead lighting, fluorescent lighting, and glare can affect the input from this device when used in this way.

### Monitor

A monitor is considered an output device. Although Photoshop allows for “zooming in”, or magnifying, sections of photos, a large monitor screen is more “user friendly”. A 17-inch monitor or larger is a comfortable size for this type of work. At a given resolution, the larger monitor displays a larger pixel size than the smaller monitor. Due to the detailed nature of editing forested landscapes, a larger monitor is recommended.

### Printers and Film Recorders

The two most common output devices are film recorders and printers. If an image is to be placed in a word processing document, the file can be imported into the document. For this use, a printer is an adequate output device. As mentioned above, the resolution of the printer can affect the quality of your image. The printer should be matched with the needed quality of the image.

A film recorder is a device used to output your image files to slide or print film. If the document is to be printed by a commercial vendor, slide film works well. There are service bureaus available that can output your file to a high-quality device if you don't have one. Another option is to use a common 35mm camera to photograph images directly from your screen.

All of the photographic images in Chapter 3 are digital images. They were output from the computer onto 35mm print film using a film recorder. The images in Chapter 4 were created using traditional photography. They are traditional prints from slides, not digital images.

Printing a Photoshop file to a printer is not as simple as printing in a typical Windows<sup>TM</sup> application. There are instructions at the end of Chapter 3 that describe how to prepare your image for output to a printer or to 35mm film using a film recorder.

### **Digitizing Board and Stylus**

For many of the software packages in the market now, a mouse is adequate for editing photo images. A digitizing board and pen stylus may offer better control than a mouse, depending on the software chosen and the preference of the software user. A mouse was used for all of the edited images in this paper.

### **Managing File Sizes**

The size of image files are related to the method of input. The resolution and image size specified in the input device directly affects the file size. The Photoshop User Guide (Adobe, 1993) provides guidelines for determining the scanned resolution. File size can also be changed from within Photoshop by adjusting the resolution or the image size. Increasing either of these can increase the file size. A file size of 1MB is typical, while a 20MB file size is not unusual.

Most scanning software allows for the selection of image size as well as resolution. When resolution is increased, the file size increases. For example, if an image is scanned in at 300 ppi (pixels per inch), with an image size of 3 inches by 5 inches, the file size would be 3.86MB. If the resolution were increased to 500 ppi, the file size would be 10.7MB. If the same 550 ppi image was increased to 4 inches by 6 inches, the file size increases to 17.2MB.

Basically, the Photoshop User Guide (Adobe, 1993) provides formulas that use the image size combined with the resolution of the output device to determine how much image data is needed. Then, in turn, a calculation is needed to determine how much data will be created by the scan based on the resolution scanned, image size, and a scale factor. The objective here is to conserve hard disk memory while capturing enough data to make a realistic image representation.

If too much data is scanned, the Photoshop processing time will be slowed considerably. For example, it typically takes only 10 seconds to open or save a 1 to 2MB file, but it takes up to two minutes for a 20MB file. Some of the more involved applications, such as applying filters to large files, can take much longer than two minutes.

For most forest managers, editing will be routinely performed on similar images. Once a resolution and image size is found to work well, it can be used repetitively. The same holds true for filters and color corrections. If the original slides or photographs are routinely taken under the same conditions, applications of certain filters and color corrections may become a fairly automatic process. The correction processes are described throughout the exercises in Chapter 3.

The scanner used for this project was connected to a Macintosh™ computer. Since files were transferred to a PC via a 3.5-inch floppy, all images were scanned at a file size of 1.4MB or less. The images were scanned from slides at their original size (something less than 2-inches by 1-inch) and resolution was increased until the maximum file size (1.4MB) was reached.

One important point to remember is that when you increase the resolution (called resampling) of a scanned image from within Photoshop, the program has to make some assumptions about what color to put into the newly created pixels. These added pixels have colors that the program interpolated from the surrounding pixels. The result may be a blurry image. When an image is resampled down (resolution is decreased), some pixels will be lost, but no assumptions are made within the program. This pixel loss may not be too important, depending upon your final output size.

## **File Formats/Compression**

Because file sizes can be quite large, a short discussion of the available file formats is needed. Some file formats contain a compression scheme. These may be lossless or lossy compression schemes. A lossless compression does not lose data when an image is saved. A lossy compression will lose data upon saving.

### **Tagged Information File Format (TIFF)**

This file format was designed by Aldus® and Microsoft® as a flexible image format. It supports both the Macintosh™ and PC computer platforms. Although this file format is referred to as TIFF, the file extension .tif is used due to the three letter file extension required by MS-DOS (Microsoft® Disk Operating System). This is considered the most universal file format and was used for all of the images scanned

for this document. Within Photoshop, there is also the capability to compress TIFF files using a file compression scheme (LZW) which does not lose data upon compression and decompression.

### **Photoshop 2.5 File Format**

This format is a simple, uncompressed file format. It is not as universal as a TIFF file. The file extension for a Photoshop file is .psd. If you are planning to use the edited images in a program that does not support the Photoshop file format, you will need to consider some of the other options described here.

### **Bitmap File Format (.bmp)**

This is the standard Windows™ format for bitmapped images. An interesting note here is that this is the file format used in Windows™ for the wallpaper. Images created in Photoshop can be used as wallpaper on your desktop if you file them on your hard drive. The wallpaper files are typically found under: c:\windows\system.

### **CompuServe Graphic Interface Format (GIF)**

This format was designed by CompuServe for efficient image file transmission. It only supports limited modes, meaning only a restricted number of colors will be represented in an image. GIF offers lossless compression and uses the file extension of .gif.

## **Chapter 3**

### **Techniques Used in Editing Forested Landscapes**

## **Techniques Used in Editing Forested Landscapes**

Digital photography basically allows an existing landscape or base image to be changed by the addition of features from other landscapes ("borrow images") or by the multiplication of features within the base image (for example, a single tree may be duplicated (cloned) to represent a tree plantation). Landscape features photographed or recorded in some way, are digitally collaged onto a base landscape image (Nassauer, 1990).

### **Preparation**

Photoshop uses many features common to Windows<sup>™</sup> programs. To complete the exercises in this chapter, you should be familiar with the following Windows<sup>™</sup> skills and features:

- using a mouse,
- making menu selections using drop-down menus,
- opening and closing files, and
- using the minimize and maximize buttons when viewing files.

Many items are needed in preparation of image editing. The obvious items needed are slides, photographs, or some sort of picture to be edited. These images should depict what silvicultural treatment you want to display (including the age of the timber stand after treatment) and where you want to display it. The images need to be scanned into the computer or they can be downloaded from some other source. For this paper, all images were scanned from slides and output onto standard 35mm film using a film recorder.

### **A Brief Introduction to Photoshop**

This section is provided to help familiarize the reader with screen that is seen when Photoshop is opened. The toolbox tools are also listed and briefly defined in this

section. Double-click on the Photoshop icon to open the program and get acquainted with the screen.

### The Photoshop Screen

Photoshop can be customized to display any combination of palettes upon startup. The toolbox is always displayed, but can be moved by clicking and dragging the blue bar at the top of the toolbox. Any of the palettes can be moved by clicking and dragging the title bar of the palette. When a file is opened, the window for that image can be resized using the typical Windows™ method of clicking and dragging a corner of the window. A palette can be “rolled up” on the screen by clicking in the top right corner of the palette. The palette title bar remains on display, but the rest of the palette is not seen. Click on that same right corner again to view the entire palette. Palettes can be shown or hidden using the drop-down menu under Window on the Menu Bar.

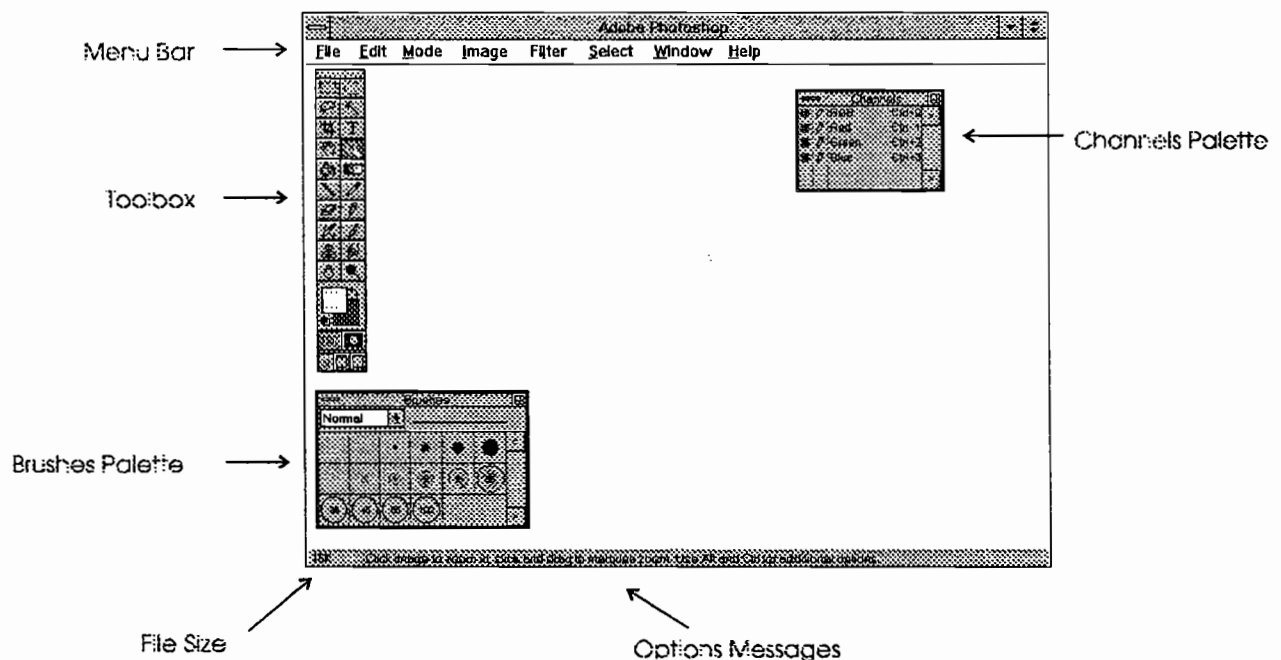
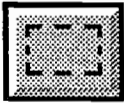
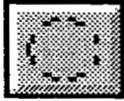
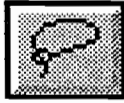
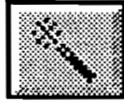
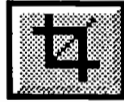
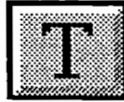
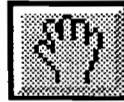




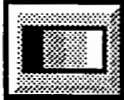


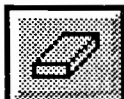



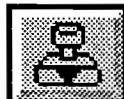



Figure 1. The Photoshop screen display



**Definition of Photoshop Tools**

This listing of tools can be used as a quick reference when editing images in this chapter. Some of the tools listed below are not used in this tutorial. In addition, use of the function keys, such as the ALT, SHIFT or CTRL keys in conjunction with many of these tools will provide additional options. Some of these additional tool options are introduced in this tutorial. When a file is open and a tool is selected, the options are listed at the bottom of the Photoshop screen.

Tool Name	Tool Symbol	Tool Definition
Marquee		Makes rectangular-shaped selections
Elliptical Marquee		Makes elliptical-shaped selections
Lasso		Makes selection of any shape
Magic Wand		Select areas of similar color
Crop		Crops an image
Type		Applies text to the image
Hand		Moves the image within the window
Zoom or Magnifying Glass		Magnifies an image

Paint Bucket		Fills a selection with the foreground color
Gradient		Creates a gradient fill - color fades or changes tint from one point to another
Line		Draws straight and 45-degree lines.
Eyedropper		Selects colors from the image
Eraser		Erases image to background color
Pencil		Draws freehand or straight lines
Airbrush		Airbrushes an image
Paintbrush		Paints an image
Rubber Stamp		Duplicates an area
Smudge		Blends color from one point to another
Blur/Sharpen		Blurs or sharpens an area
Dodge/Burn		Lightens or darkens an area

*Figure 2. Definitions of Photoshop Tools*

## Exercise Overview

The exercises in this chapter will describe how to edit an image by providing step-by-step instruction. Instructions are given for five editing exercises: (1) creating a landscape mosaic from two separate images; (2) locating a unit on an image using a grid, (3) depicting a timber harvest unit in a forested area using the Rubber Stamp technique, (4) depicting a timber harvest unit in a forested area using the Cut and Paste Into technique; and (5) creating an image to visually show changes in the harvest unit over time--the Pattern technique.

These exercises should be performed in the order presented in this tutorial. New tools are defined the first time they are used in this tutorial. Consecutive exercises will present new tools or show new techniques for using the tools introduced earlier. Because it will take some time to complete all of the exercises in this tutorial, it is suggested that you complete only one or two exercises at a time. Exercises 1 and 2 (creating a landscape mosaic and the grid exercises) are somewhat lengthy. It is suggested that these exercises be completed in two separate training sessions. Exercises 3, 4, and 5 (creating units on a landscape using three different techniques) are fairly similar and could be completed in one or two sessions. The main difference between these last three exercises is how the harvest unit characteristic is placed onto the landscape.

It is estimated that it will take a person who is comfortable with Windows™ approximately 3 to 4 hours to complete this tutorial. For someone with less experience in working in the Windows™ environment, it could take 8 or more hours to complete these exercises. This tutorial would be more beneficial to the new Windows™ user if they had assistance from someone who knows how to use Photoshop or who is familiar with similar image editing tools.

This tutorial was written to be used not only as an instructional manual for learning image editing, but also as reference material that the reader will continue to use after

completion of the tutorial. Photoshop is such a complex program, readers should not expect to master image editing after completing these few exercises. It may be beneficial to the reader to follow the steps outlined in this tutorial when editing images for their own projects.

The exercise images are included on floppy disks with this tutorial. Take the time now to copy these files to a working directory on your hard drive. (If Photoshop is open, minimize or close it so you can access your file manager.) When you are finished, the following files should be on your hard drive:

REID2.TIF,  
REID3.TIF,  
REID4.TIF,  
GRID.TIF,  
SAGINAW.TIF, and  
CCGREEN.TIF

### **Location of Exercise Images**

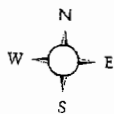
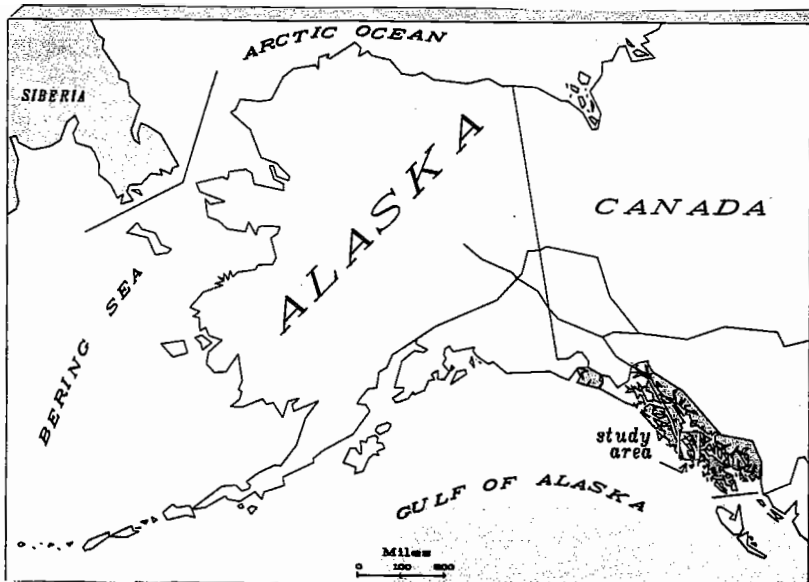
Once the images are available, decisions are needed to determine harvest setting combinations for units, and where on the landscape image the harvest unit should be placed. The harvest setting combinations may be limited by the size of opening that may be allowed. Likewise, the arrangement, location, and design of setting boundaries may be driven by economics, aesthetics, or some other factor.

Placement of the unit should be as precise as you'll need for the finished image. If it is to be used in preliminary planning the exact unit placement may not be too critical.

The images in this tutorial were prepared for this preliminary level of planning.

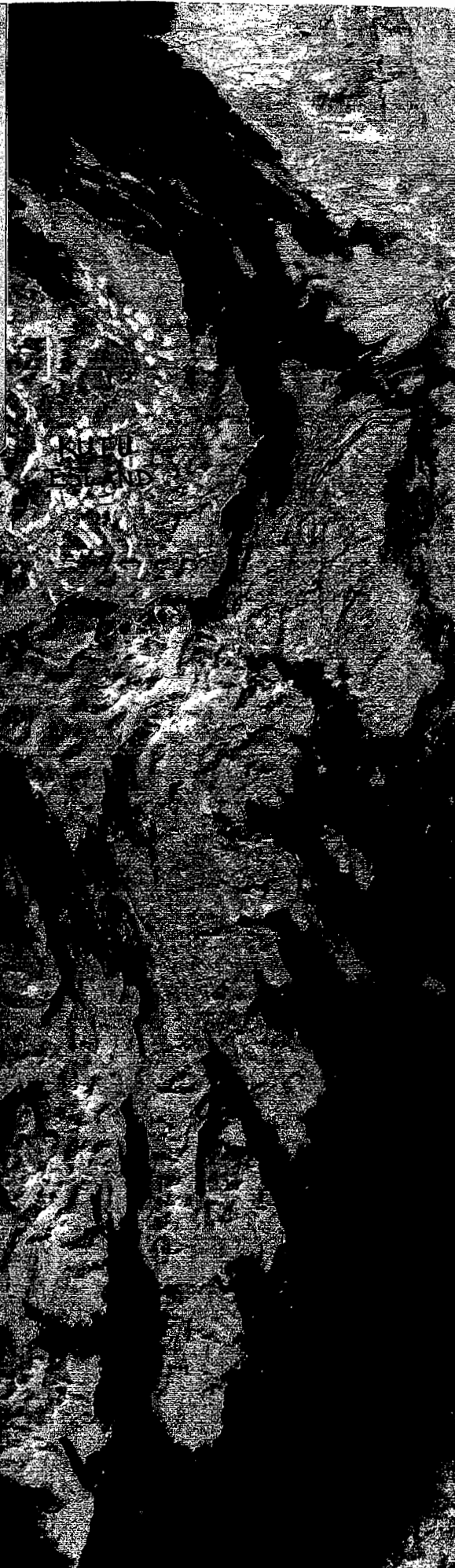
Orthophotos and a harvest/transportation plan on a topographic map were used to determine unit placement. One exercise, the grid overlay exercise, uses output from another software program to more accurately locate a unit location.

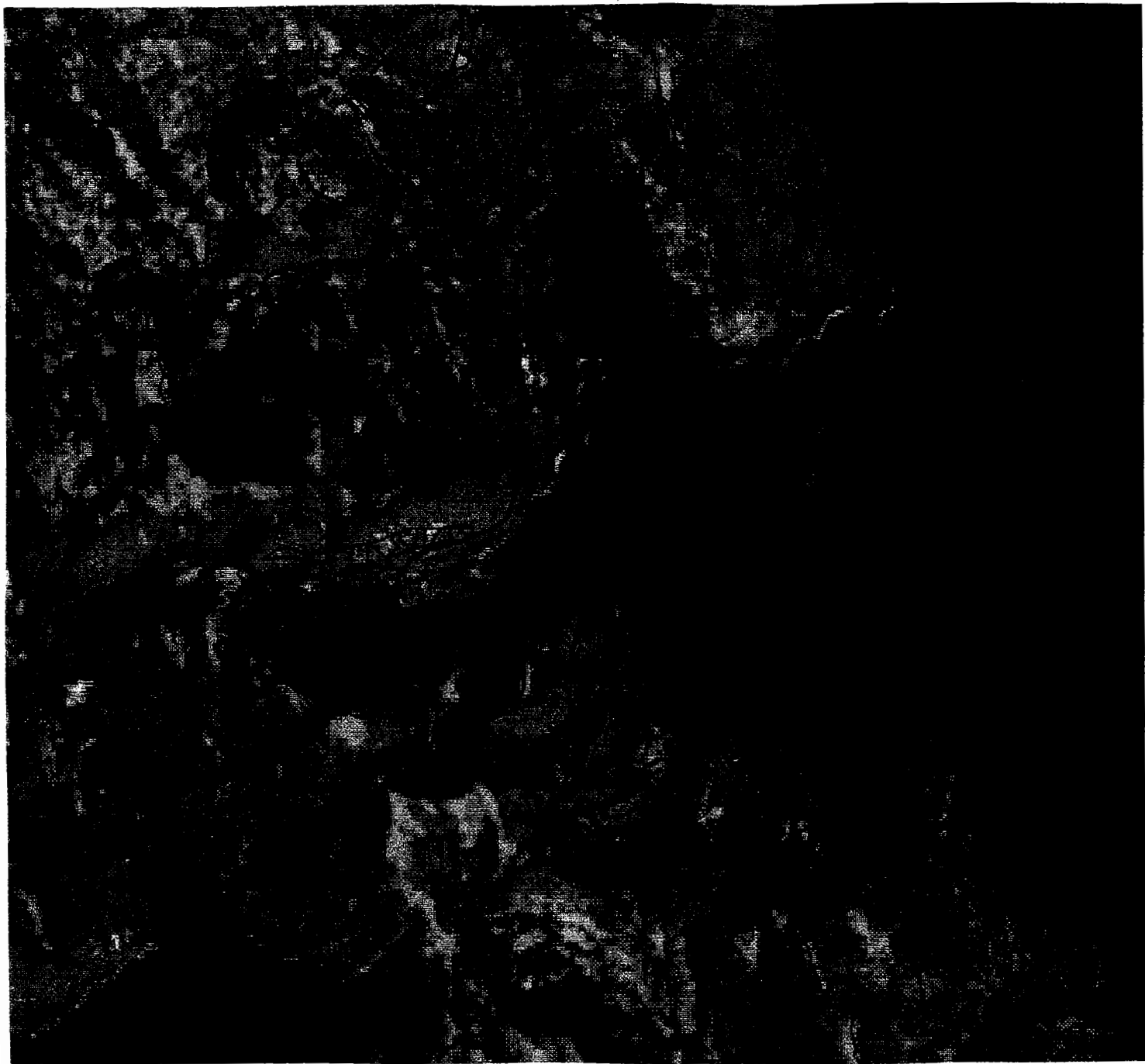
Most of the images used in this chapter are of Reid Bay. This bay is located in southeast Alaska on Kuiu Island. The following pages display the location map for Reid Bay, a harvest and transportation plan map, digital pictures of the images used in the exercises, and descriptions of these images.



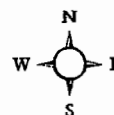
## Vicinity Map

Scale 1 inch = 2238 feet





## Reid Bay



## Harvest/Transportation Plan Map

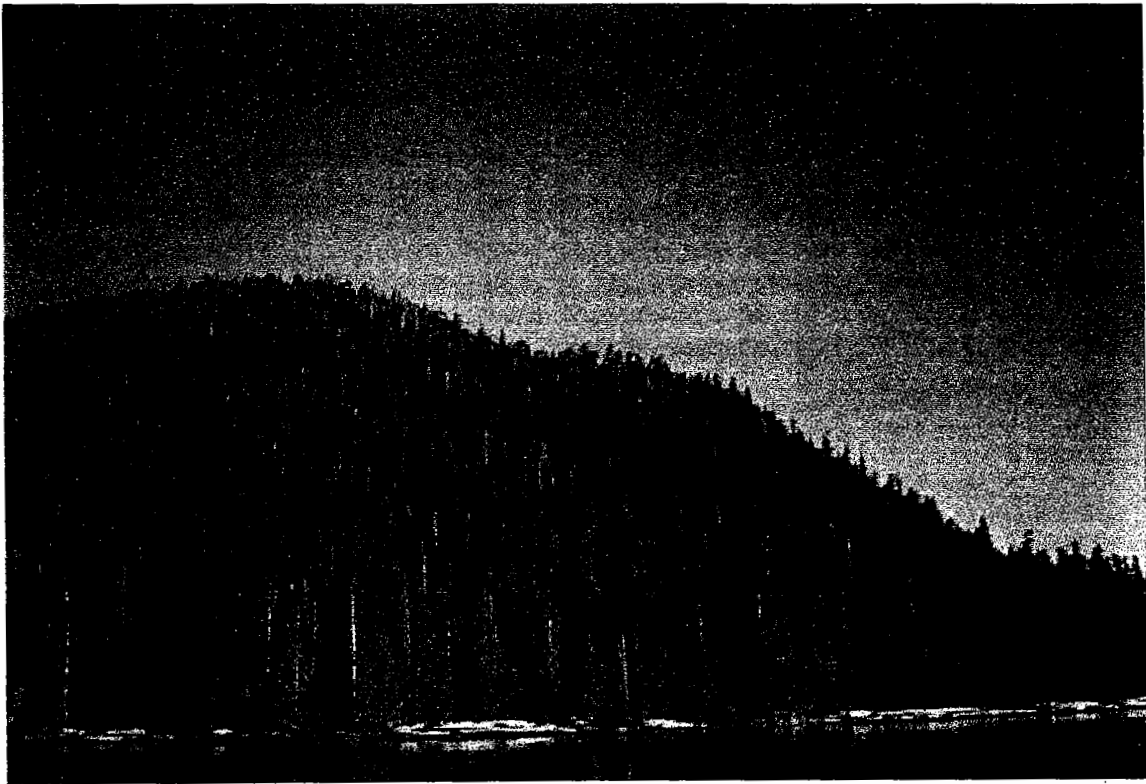
scale 1.3" = 1 mile



Proposed Roads



Proposed Harvest Settings



*Figure 5*

**Image Name or Number:** REID2.TIF

Location

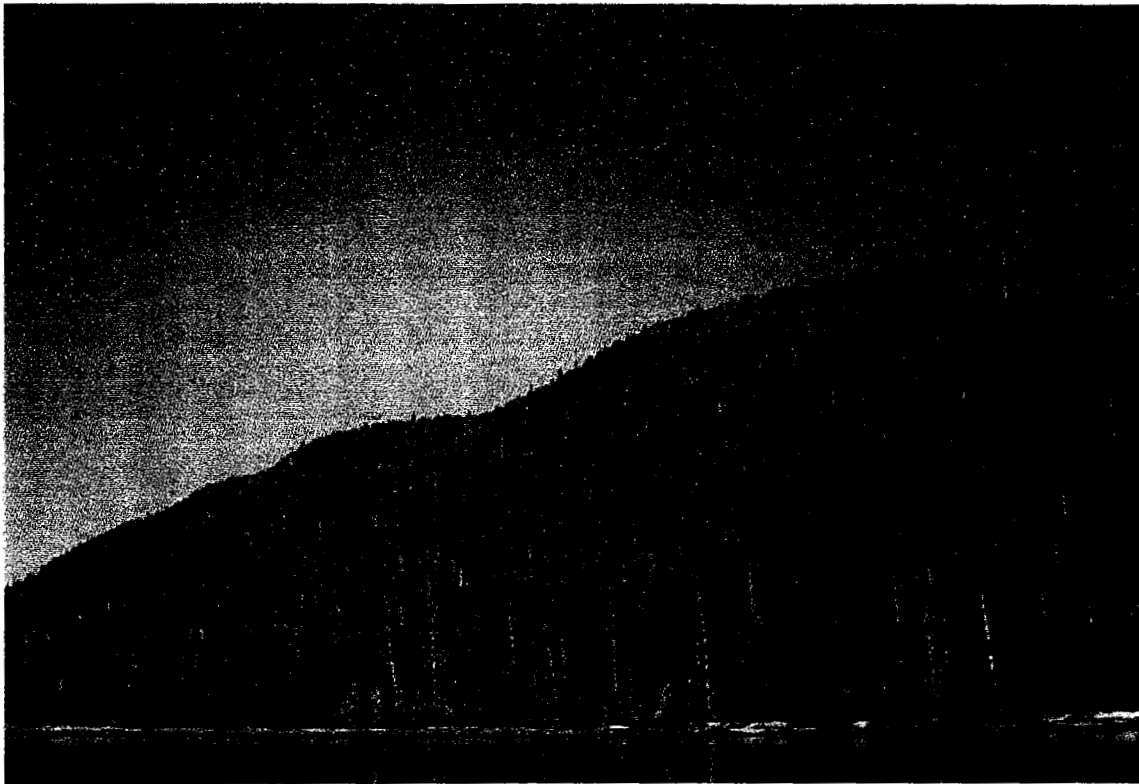
Alaska, Tongass National Forest - Stikine Area, Petersburg District, Kuiu Island, west arm of Reid Bay.

Other

Photographed from a boat within the west arm of Reid Bay approximately 800 feet from shore.

Filmed in July, 1994.





*Figure 6*

**Image Name or Number:** REID3.TIF

Location

Alaska, Tongass National Forest - Stikine Area, Petersburg District, Kuiu Island, West Arm of Reid Bay.

Other

Photographed from a boat within the west arm of Reid Bay approximately 800 feet from shore.

Filmed in July, 1994.

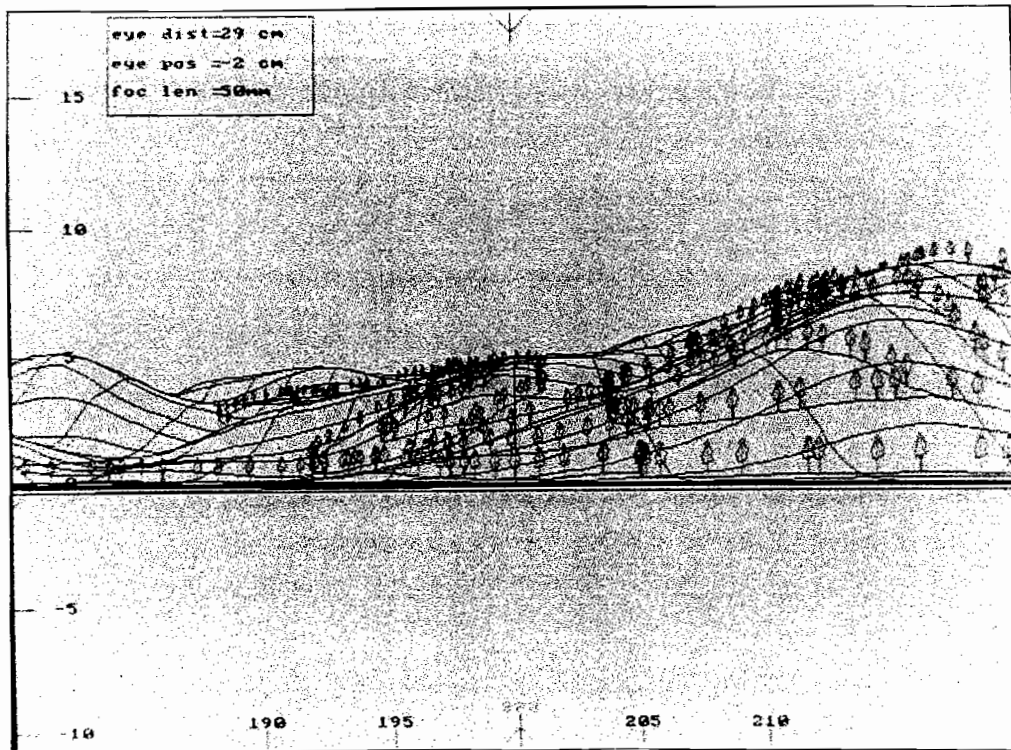


Figure 7

**Image Name or Number:** GRID.TIF

Location

Alaska, Tongass National Forest - Stikine Area, Petersburg District, Kuiu Island, West Arm of Reid Bay.

Other

GRID.TIF was created by Deirdre Buschmann (Landscape Architect) in a software program that uses a digital elevation model. In this image, the graphical trees depict the boundaries of a designed harvest unit. These trees depict scaled tree heights, so that the tree tops that extend into a red polygon area actually depict that area of the unit that would be blocked from view. The area of the red polygon not covered by tree tops is the area of the unit that would be seen. GRID.TIF is based on the same location, distance, and eye level as REID4.TIF.



*Figure 8*

**Image Name or Number:** REID4.TIF

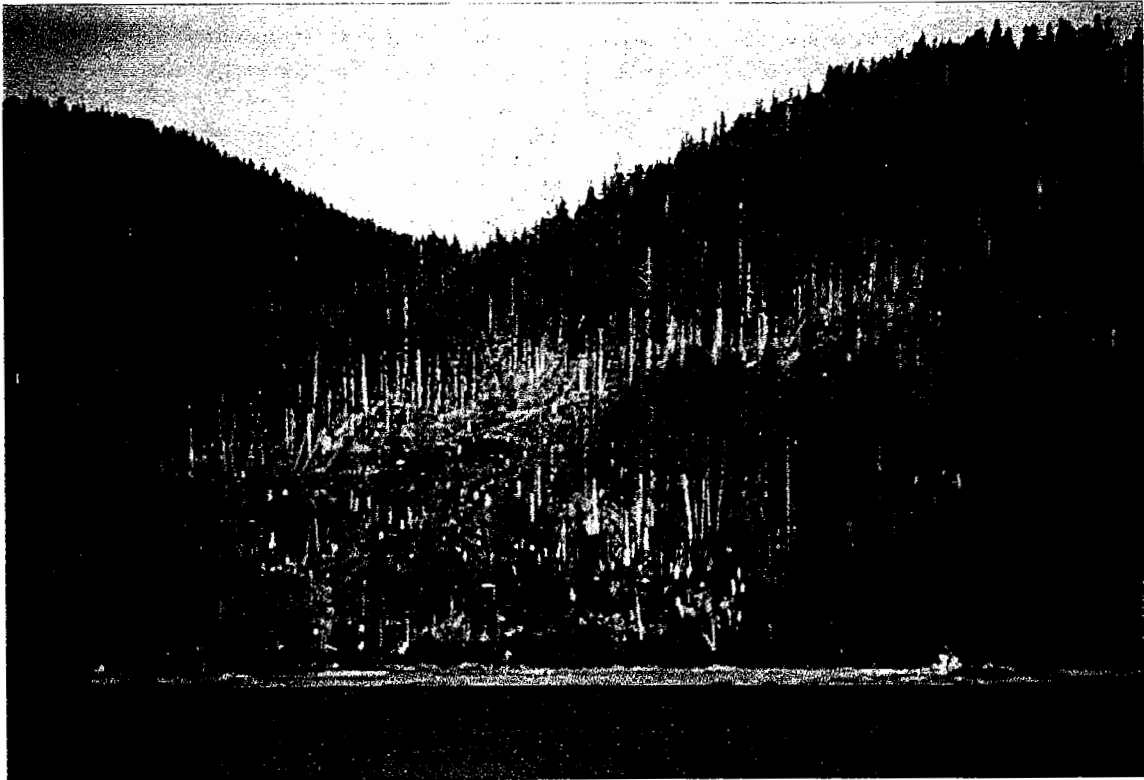
Location

Alaska, Tongass National Forest - Stikine Area, Petersburg District, Kuiu Island, west arm of Reid Bay.

Other

Photographed from a boat within the west arm of Reid Bay approximately 1200 feet from shore.

Filmed in July, 1994.



*Figure 9*

**Image Name or Number:** SAGINAW.TIF

Location

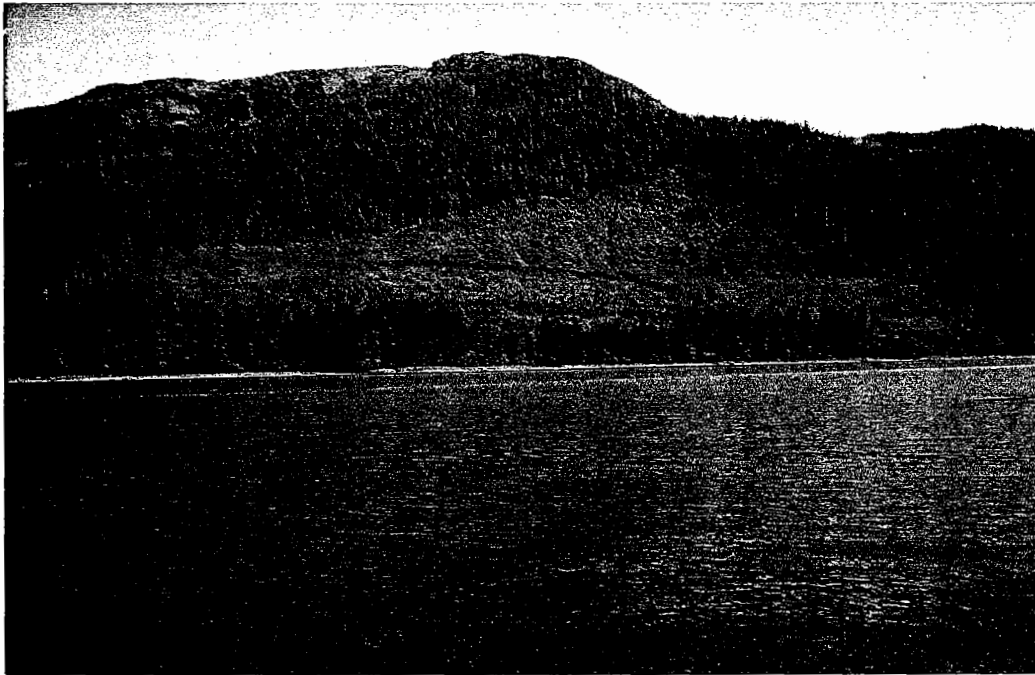
Alaska, Tongass National Forest - Stikine Area, Petersburg District, Kuiu Island, Saginaw Bay.

US Forest Service GIS stand/polygon # 399000003.

Other

Photographed from a boat within the bay approximately 800 feet from shore. 279-acre unit harvested in 1963, filmed in 1974. Approximately 35 acres of the unit are visible in this photograph.

11-year-old stand in picture was naturally regenerated.



*Figure 10*

**Image Name or Number:** CCGREEN.TIF

Location

South end of Mitkof Island, southeast Alaska.  
Private land - Mason Creek Mining Claim.

Other

Photographed from within the Wrangell Narrows approximately 2,200 feet from shore.

95 acre unit harvested in 1983, filmed in July, 1994.

Stand in picture is 11-years-old.

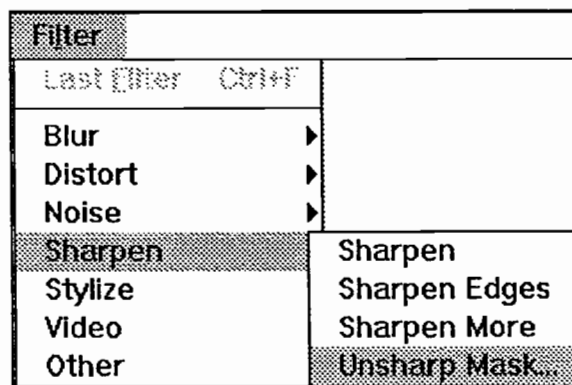
## Refocus the Exercise Images

The first step in getting started with the actual editing of an image is to prepare the images. The files that you have copied to your hard drive should be made a little clearer before starting the exercises. In this section, the images will be sharpened, or refocused, using the UNSHARP MASK filter. This filter adjusts the contrast of edge detail (such as tree branches), creating the illusion of more image sharpness. This step of sharpening an image should become an automatic process when preparing editing scanned images.

- OPEN Photoshop if it isn't already opened.
- Choose OPEN from the FILE drop-down menu.
- Select one of the files that you copied to your hard drive.

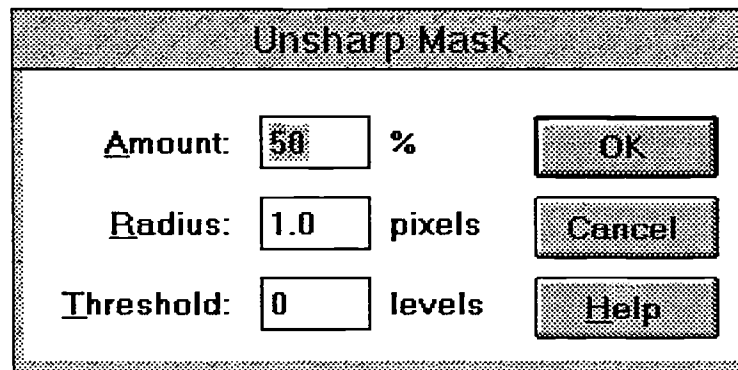
The image opens in an active window on the screen.

- Choose SHARPEN under the FILTER drop-down menu.



- Choose UNSHARP MASK.

A dialog box opens.



*The unsharp mask dialog box*

- CLICK OK to accept the default values.

The cursor turns into an hour glass while the filter is being applied. You will notice that the branches appear more focused.

- Apply the UNSHARP MASK filter again using the same defaults.

Follow the same above steps. After this second application of the filter, you may notice that the image begins to appear somewhat abstract and “blocky”.

- Choose UNDO from the EDIT drop-down menu.

The last application of the Unsharp Mask is removed.

#### **Photoshop Tip: UNDO**

Unlike some Windows™ programs, Photoshop allows just one level of UNDO. There is no way to backup more than one step. The best solution around this problem is to save your image as you make your edits. Under the FILE drop-down menu, Photoshop has a REVERT option. When selected, this reverts the image to the last saved version. (It is the same as closing a file without saving it, then opening the file again, but with fewer key strokes.)

- Choose SAVE under the FILE drop-down menu to save the focused image.
- CLOSE the file once it is focused.

- Repeat these steps for each of the images included with this tutorial except the GRID.TIF image.

The GRID.TIF image was not scanned, so it will not benefit from the application of the Unsharp Mask filter.

**Photoshop Tip: Keeping Multiple Images Open**

If you have more than one or two images open at one time, you may notice that the colors of the images turn to abstract neon colors when not in an active window. The files haven't been damaged. This display is caused by the amount of video RAM available on your machine. Your computer may not be able to support quality viewing of multiple images. This is not a serious limitation and will not affect the completion of any of the exercises in this tutorial.



## Creating a Landscape Mosaic

Sometimes you may need to create a landscape image from two or more images. There could be several reasons for doing this. Perhaps your image library doesn't include the area of interest on one image, or maybe your camera lens doesn't have a wide enough angle to cover the area needed. Whatever the reason, this section will take you through the steps required to create a new landscape mosaic.

The two images used in this section are REID3.TIF and REID2.TIF. These images and their descriptions are located near the beginning of this chapter. The REID3.TIF image will be the target, or base image. This is the image that will be the foundation for the creation of the combined images. The REID2.TIF image will be the source selection. This image will be copied and placed on the REID3.TIF image. The original slides of these files were taken from the same viewpoint, on the same day, at the same time so the lighting, direction of shadows, and tree colors are fairly similar.

### Open the two images (or files) that you want to mosaic

- Choose OPEN from the FILE menu.
- From the proper directory, select the FILENAME for each of the images listed below and click OK.

REID2.TIF    This image will be the source image.

REID3.TIF    This image will be the target, or base image.

#### **Photoshop Tip: File Type Not Recognized**

You may need to use Open As under the File menu if Photoshop doesn't recognize your file format. If a file does not have a file extension, you need to use the Open As command to open the file in Photoshop.

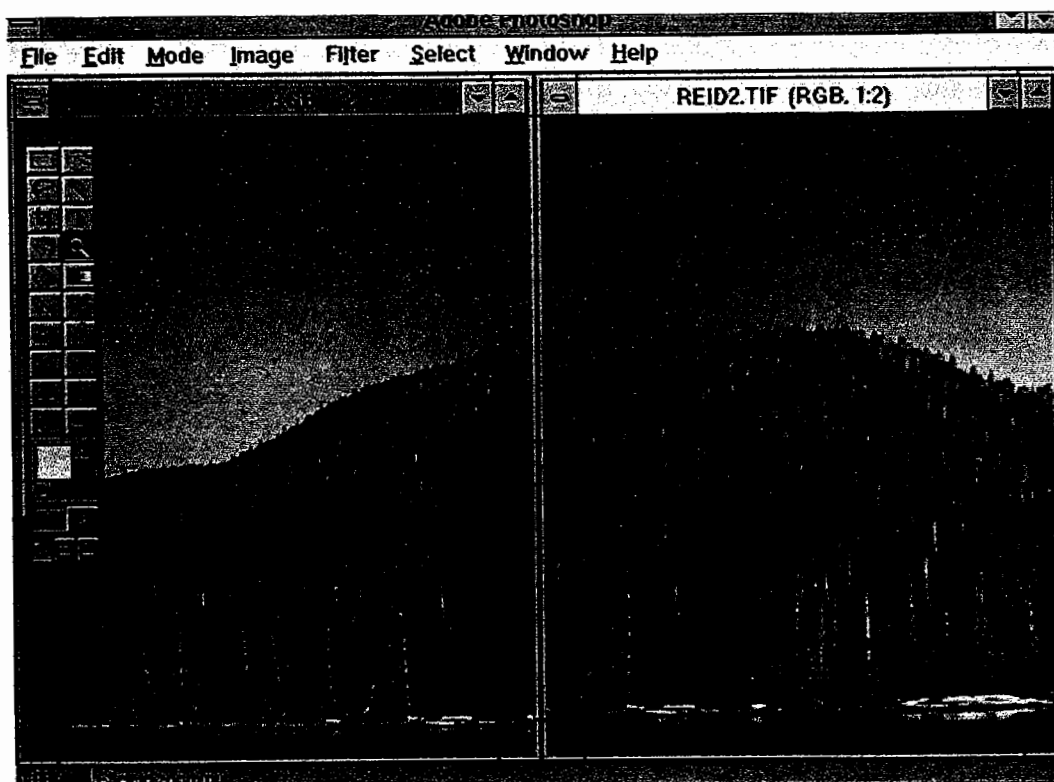


Figure 11. Tiled Windows

*REID3.TIF and REID 2.TIF are both opened within Photoshop. In this image, REID3.TIF is in the active window. (See the Windows™ Tip below.)*

**Photoshop Tip: Tile Images**

To see images side-by-side rather than on top of each other, choose TILE under the WINDOWS drop-down menu.

**Windows Tip**

Each file (or image) is in a window on the computer monitor. When a window is "active", the title bar for that window is highlighted. The title bar is the colored strip at the top of each window that contains the filename. The colors for the background and the text in the title bar are selected under Microsoft® Windows™.

### Enlarge Canvas Size

You can consider the canvas as the page. Currently, the page is the same size as the REID3.TIF image. In this step, the CANVAS SIZE will be widened to make room for the placement of the adjacent REID2.TIF image.

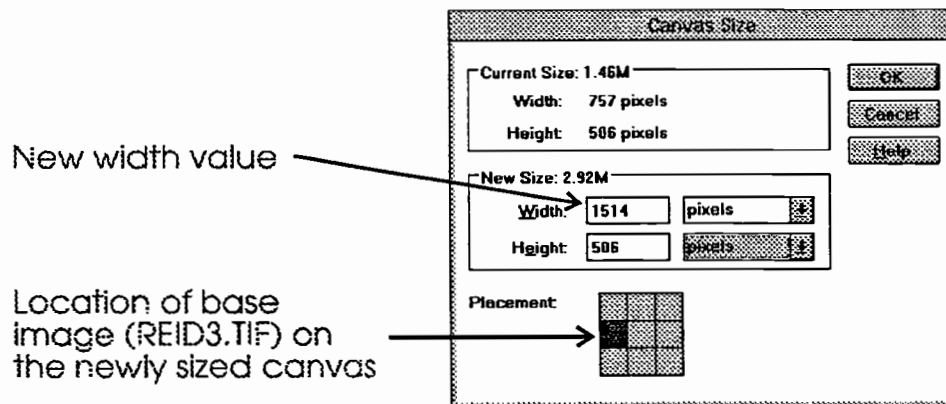
For this step, the REID3.TIF file should be in the active window. If it is not currently active, click in the window containing the REID3.TIF image to make it active.

- Choose CANVAS SIZE from the IMAGE menu.

A dialog box opens.

- Select a new width and placement for the new canvas.

This new size will affect only the canvas, it does not affect the size or resolution of the currently active image. (File size will be increased.) To make room for the REID2.TIF image, double the value shown in the width box. (The unit of measure is not important--just double the value that appears in the width box.) These images are the same width, so double the width shown in the box. The source image is to be placed to the right of the target (REID3.TIF) image, so click the Left, Center box for placement of the target image in the active window.



*Canvas size dialog box with new width value and placement selected*

**Photoshop Tip: Keyboard Shortcut**

You can see the size of the canvas by holding down the ALT key and clicking in the bottom left corner of the active image window where the file size is displayed. The file dimensions and resolution show on the screen as long as you hold down the ALT key.

- Click OK.

Your image will show in the active window on the left and there will be a blank space to the right.

*The blank space will be filled with the default background color. The color is not important for this exercise because it will be replaced by the source image in the following steps.*

**Copy the Source Image**

- Click in the window of the source image (REID2.TIF) to make it active
- Choose ALL from the SELECT menu.

This selects the entire image.

Select	
All	Ctrl+A
None	Ctrl+D
Inverse	
Defloat	Ctrl+J
Grow	Ctrl+G
Similar	
Border...	
Feather...	
Defringe...	
Show Edges	Ctrl+H
Load Selection	
Save Selection	

Edit	
Undo Marquee	Ctrl+Z
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Paste Into	
Paste Behind	
Clear	
Fill...	
Stroke...	
Crop	
Define Pattern	
Take Snapshot	
Composite Controls	

- Choose COPY from the EDIT menu.

This copies the selection to the Windows™ clipboard.

- Close the source image (REID2.TIF) file.

**Photoshop Tip: Out of Memory?**

If you get an out of memory message, close the source image after copying it to the clipboard. This will make more memory available. If the edits seem to be taking a long time, you may also want to clear the clipboard of any large images. Anything on the clipboard will decrease the available memory. To clear the clipboard, marquee select a small area of the image and copy it to the clipboard. -using the MARQUEE tool as a selection tool is introduced on page \*\*\* \_\_\_\_.

**Paste the source image on the target image**

- Click in the window of the target image (REID3.TIF) to make it active.
- Select PASTE from the EDIT drop-down menu.

The source image (REID2.TIF) is pasted into the center of the base image (REID3.TIF). Crawling lines will surround the source image.

Do not click elsewhere in the image just yet. Clicking outside of the selection area pastes the source image in place and it cannot be moved without disrupting the base image. Crawling lines will surround the source image until it is moved, scaled, and color corrected in the following steps.

**Photoshop Tip: Error Recovery**

If the source image is accidentally pasted onto the base image before it is moved, scaled and color corrected, the original REID3.TIF image can still be recovered. To revert to the last saved version of a file, choose REVERT under the FILE main menu. Select YES to invoke the revert command.

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**Photoshop Tip: Using the Magnifying Glass**

The MAGNIFYING GLASS can be used to “zoom in” and “zoom out” on portions of an active image. Accessing this tool will not affect the operation of any other tools. Specifically, when a selection is surrounded by crawling lines, the MAGNIFYING GLASS tool can be used without changing the status (crawling lines do not disappear) of a selection.



To “zoom in” on an area of an image, click on the MAGNIFYING GLASS in the toolbox. The cursor changes to a magnifying glass with a “plus sign” in the center of the glass. This signifies that when the mouse is clicked, the area under the mouse will be enlarged.



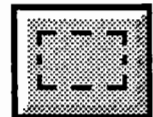
Conversely, to “zoom out” from an area of an image, hold down the ALT key. The “plus sign” in the glass turns into a “minus sign”. When the mouse is clicked, the area under the mouse will encompass more of your image.

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**Move the source image to the blank portion of the canvas**

- Click on the MARQUEE tool in the toolbox.

Because there is a selection already made, the cursor will appear as an arrow when moved to any area within the selection.



- Move the source image (REID2.TIF) into the blank space to the right of the target image (REID3.TIF).

With the arrow-shaped cursor within the selection area, click and drag the selection to the right of the base image.

**Adjust the location of the source image**

- Choose COMPOSITE CONTROLS from the EDIT menu.

The composite controls command is only visible when a selection is made.

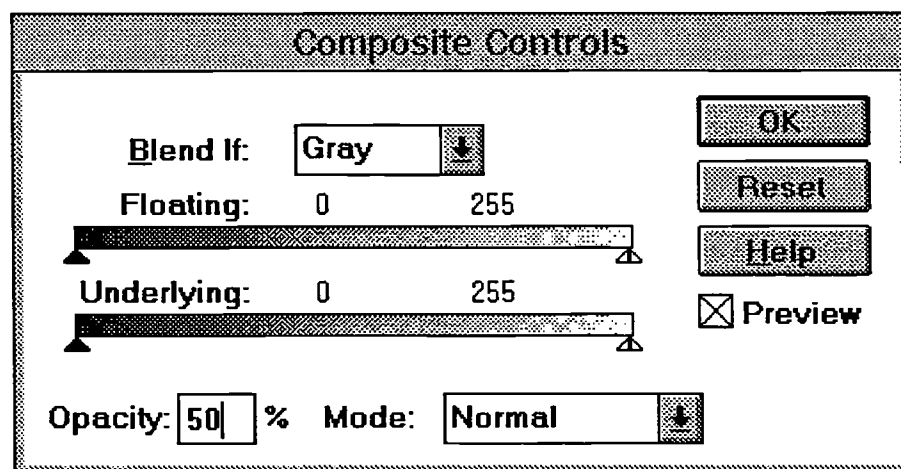
*Remember, crawling lines indicate the selection outline.*

- Enter an Opacity value of 50% on the COMPOSITE CONTROLS dialog box.

Since the two images are difficult to distinguish on the screen, use the composite controls to make the source image opaque. This makes a distinguishable difference between the images and makes alignment easier.

**Photoshop Tip: Opacity Shortcut**

The brushes palette can be used to set the opacity value. Display the brushes palette by clicking Show Brushes under the Window drop down menu. The top right corner of the palette has an opacity slider. With a selection made, click on the triangle and move, or slide, the triangle left until the 50% value is displayed.



*The composite controls dialog box*

- Click OK to close the COMPOSITE CONTROLS dialog box.

**Move the source image to align distinguishing characteristics of the two images.**

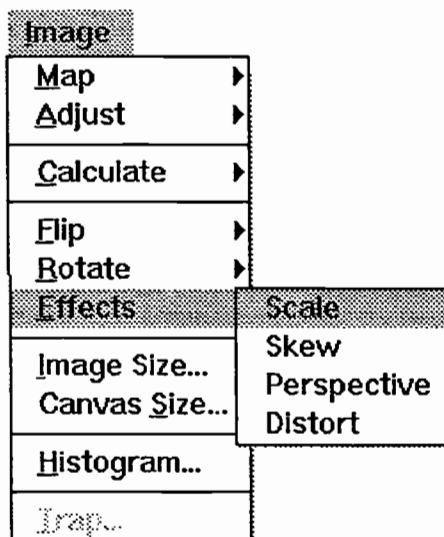
- Using the arrow keys on the keyboard, make incremental adjustments to align the images.

For this image, a distinguishable shadow in the center of the hill and a small, leaning tree at the shoreline can be used for alignment. As these adjustments are made, you will notice that the REID2.TIF hillside is a little larger than the REID3.TIF hillside. The next step will correct this using the scale command.

**Scale the source image.**

*Even when pictures are taken from the same place, a different angle, or a step away, will change the scale of the pictures. The images may have been scanned to different sizes. To correct for this, you need to scale one of the images.*

- Choose SCALE under the IMAGE menu, EFFECTS sub-menu.



Handles (gray squares) now appear on the border of the selection.

- Drag a handle to alter the selection.



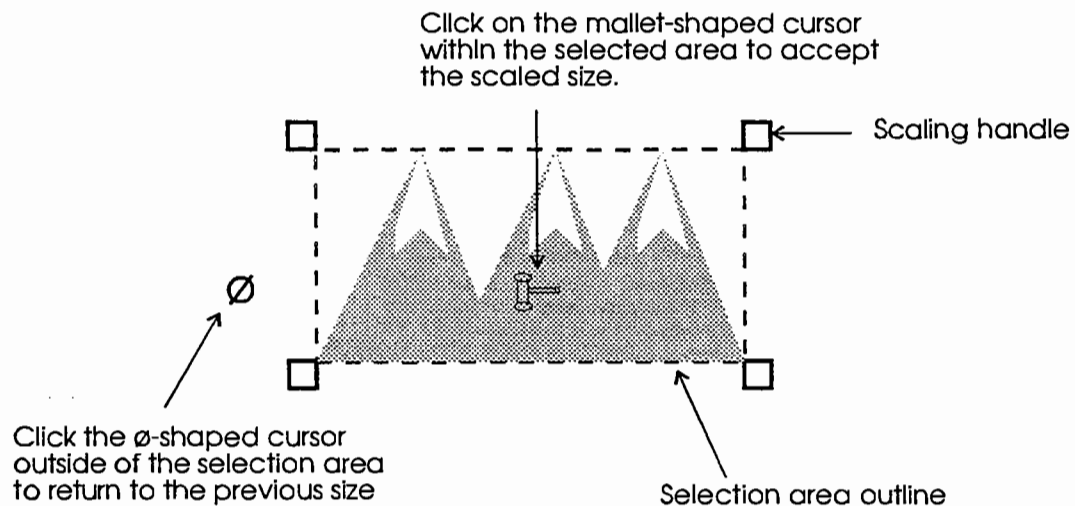
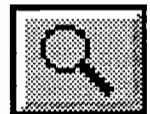


Figure 12. Using Scale under the Image/Effects Menu

**Photoshop Tip: Maintain Proportions When Scaling**

Hold down the SHIFT key when dragging a scaling handle to maintain the selection's proportions and prevent distortion.

It may be beneficial to use the magnifying glass in the toolbox to “zoom in” on particular areas for alignment. For this example, magnifying glass tool can be used to “zoom in” on the skyline trees to determine when the proper scale is reached. The waterline and the leaning tree near the waterline can be used to aid alignment at the bottom of the image.



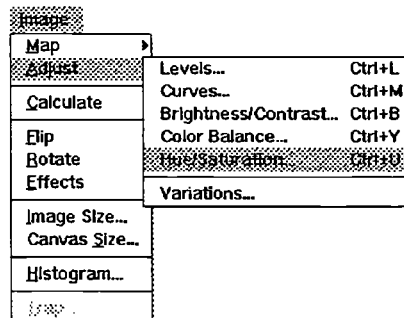
Repeat the Align and Scale steps until you get a satisfactory result.

**Return the REID2.TIF portion of the image to full color**

- Choose COMPOSITE CONTROLS from the EDIT menu.
- Enter an OPACITY VALUE of 100%.
- Click OK to close the COMPOSITE CONTROLS dialog box.

**Use Hue and Saturation to adjust the coloration of the source selection**

The newly placed REID2.TIF (source) image should still be selected.



- Under the IMAGE menu, select ADJUST.

- Select HUE/SATURATION.

A dialog box appears. Hue affects the color, while saturation adjusts the amount of color. The lightness affects how light or dark the colors appear.

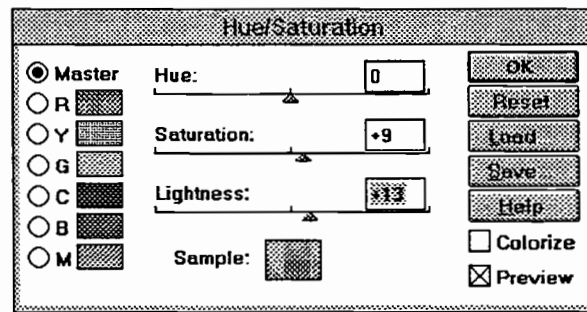
- Click the PREVIEW box.

A mark is displayed in the preview box to indicate the preview mode is active. As each adjustment is made, the changes can be seen on the image before actually changing the image.

- Move the sliders until the color differences between the trees of the two images disappear.

For this example, the Saturation slider was moved to +9, and the Lightness slider was moved to +13.

Because the original images were photographed at different angles from the sun, the tree colors in the two images are different. The hue and saturation dialog box was used here to correct the tree colors. The "seam" in the sky area will still be noticeable after the tree color is corrected. The sky color will be corrected later using the rubber stamp tool.



- Click OK.

**Deselect the source selection to incorporate it into the target selection.**

- Choose NONE under the SELECT menu, or hold down the CTRL key and type the letter D (CTRL + d).

The source image is now a part of the target image.

**Select the entire sky**

The source (REID2.TIF) image has been pasted and scaled. Color correction was applied to correct the color of the forested hillside. Unfortunately, the sky portions of the two images are still visibly different. The sky area will be selected using the MAGIC WAND, MASK mode, and CHANNELS so that the hillside portion of the image will be protected from edits.

- Select the MAGIC WAND tool from the toolbar.

The cursor turns into a wand.



- Click the wand-shaped cursor in the sky.

Some areas of the sky will be selected with crawling lines, but many areas will still be unselected. Holding down the SHIFT key and clicking the wand cursor in the image will add additional portions of the sky to your selection. The main objective in this step is to select the areas of the sky adjacent to the hillside.

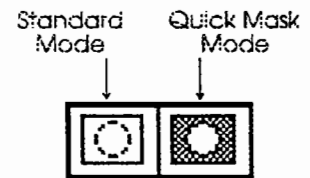
There will still be some stray areas of the sky not selected. These can be easily fixed in the next step with the Quick Mask tool.

**Photoshop Tool Note**

The MAGIC WAND tool selects portions of the image based on the color similarities of adjacent pixels. Although the color range, or tolerance, of the selection can be set within photoshop, the default value will be used for this tutorial.

- Click on the QUICK MASK mode in the toolbox.

The areas not within the selection are now red opaque. (This is the default Photoshop mask color.) If any red color is displayed in the sky area of the image, those areas are not within the current selection. Only those colors from the original image are within the selection. The red sky areas will be added to the sky selection in the next step by using the ERASER tool.



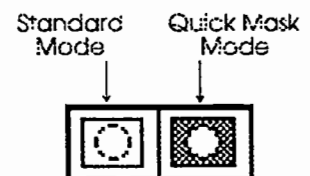
- Click on the ERASER tool in the toolbox.

Depressing the left button of the mouse, move the mouse over red areas of the sky that you want added to the selection. Dragging across the red areas changes the red to the sky color underneath, thus adding that portion of the image to the selection. The Eraser is a fairly large tool in terms of pixel size, so use it to select areas away from the detail of the trees. You can magnify areas with the magnifying glass while making the mask.



- Click on the STANDARD MODE in the toolbox to quit the QUICK MASK mode.

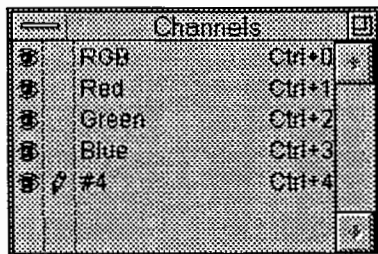
The sky selection will be surrounded by crawling lines and all image colors return.

**Save the selection (or mask) as a new Channel.**

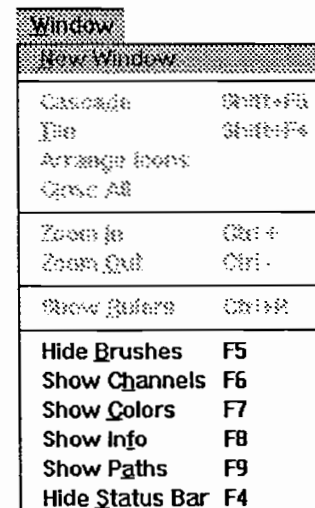
- Choose SAVE SELECTION under the SELECT menu.

If the Channel Dialog box is not visible on your screen, select Show Channels under the Window sub-menu. You will see that a new channel, #4, has been created in the dialog box. This is the mask created for the sky selection.

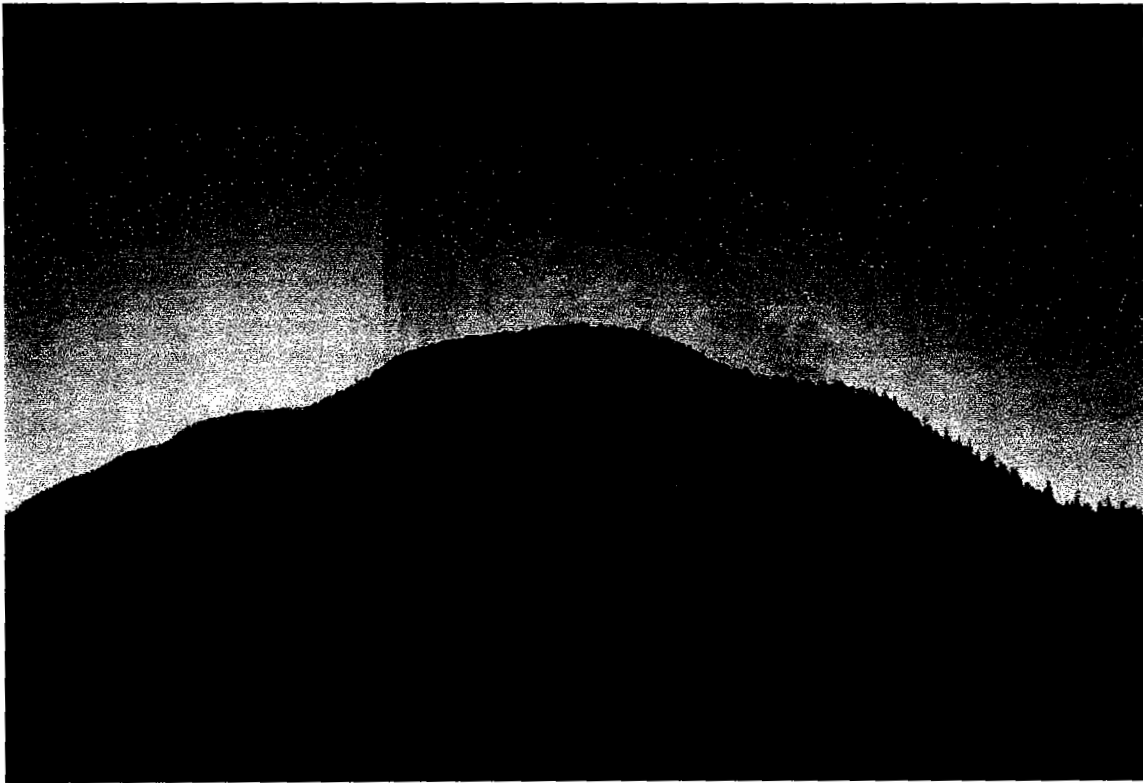
Masks saved as channels can be viewed and edited later. The channels dialog box lists all current channels in the image. There are two columns next to the channel names. The left column is used to make a channel visible on the image. When you click in this column next to channel #4, an eye will appear in the column and your mask will appear. To edit the mask, click in the other column and a pen will appear next to the channel name. You are now in the edit mode and can use the editing tools in the toolbox to make any changes.



*Channels Dialog Box*



*Window Menu Drop-down*



*Figure 13. Red Mask Created for the Sky Selection*

### **Paint the sky with the Rubber Stamp tool**

In this section, the sky colors above the target image will be copied (or cloned) to the sky area above the source portion of the image using the RUBBER STAMP tool.

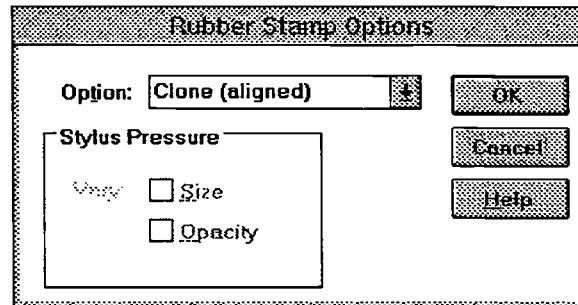
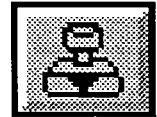
- Select the sky portion of the image.

If it is not selected, use the saved mask channel to reselect it.

- Select Show Channels under the Window drop-down menu.
- Select only the mask channel (#4) to be viewed by clicking in the far left column next to the channel name. An eye will appear in that column. Select the other channels so that the eyes next to the other channel names disappear.
- Click the Wand tool in the white (sky) area.

- In the Channel Palette box, click in the far left column next to the RGB channel and the mask channel (#4) to return the colors to the image.
- The sky area is now selected and surrounded by the crawling lines.
- Double-Click on the RUBBER STAMP tool in the toolbox.

Double-clicking on the tool reveals a dialog box.



- Select CLONE ALIGNED
- Click OK
- Sample an area of sky to be cloned

Move the rubber stamp-shaped cursor to an area of the sky above the target image. Hold down the ALT key and click the left mouse button to sample (or select) an area where cloning is to begin. To begin, select an area well away from the "seam" in the sky and well above the forested hillside. Release the mouse button.

When the ALT key is depressed, the triangle in the rubber stamp-shaped cursor turns white to indicate sampling. Release the ALT key and the triangle in the cursor returns to black.



The white triangle indicates sampling  
(selection of the point where cloning will begin)

- Clone the sky.

In this example, you'll notice that the sky is lighter near the hillside and darkens toward the top of the image. Cloning should try to repeat this gradation of the sky.

**Photoshop Tip: Tool Size**

The size of the area cloned by the rubber stamp tool is affected by the brush size. If a small brush is selected, only a band of a few pixels will be cloned at a time. If a larger brush is used, a wider area is cloned with each passing of the cursor. Choosing a soft-edged brush creates fewer noticeable edges in the sky.

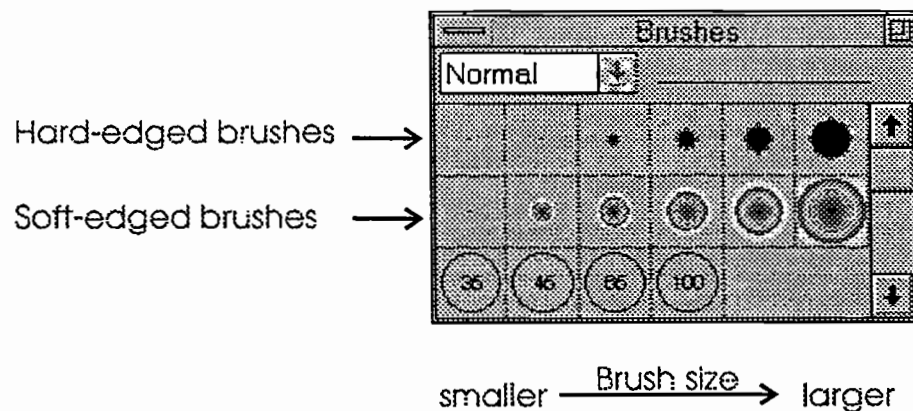
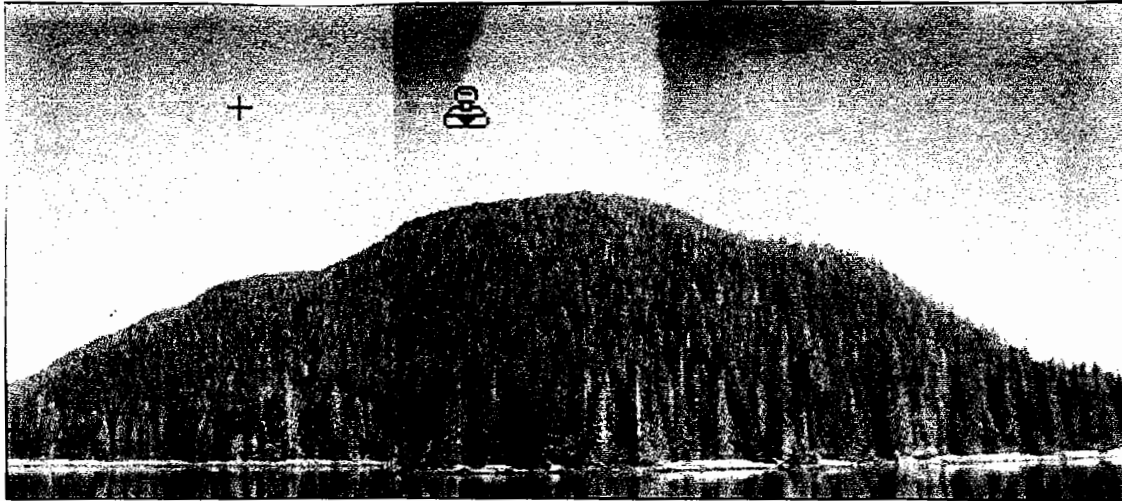


Figure 14. Selecting a brush size

Click and drag the mouse over the sky in the source area of the image. A plus sign will appear in the area chosen to sample. The pattern under the "plus sign" is duplicated to the area under the rubber-stamp shaped cursor. Resample new areas of the sky as needed. If a repeating pattern of sky becomes noticeable, resample in a new area using the ALT key and clone again.

Because the area being cloned is selected, the unselected areas of the image are protected from the editing. If the cursor is dragged outside of the selection, the unselected area is not affected. This is not true of the sampled area, though. If the plus sign travels outside of the selection area, the area underneath is sampled and cloned to the selected area. If this happens, trees will be cloned into the sky area. Resample with the ALT key and clone again.





*Figure 15. Cloning (Rubber Stamping) the Sky*

- When finished cloning, deselect the sky using CTRL+D.

The crawling lines will disappear.

### **Save your changes**

- Click SAVE AS under the FILE menu.

If Save is selected, you will overwrite your original (REID3.TIF) target file.

- Select the .TIF file format.

Use a format that is compatible with programs you intend to use for final output of your images.

*For additional information on compression and file formats, see the File Formats section in Chapter 2.*

- Type in a new filename and file extension – MOSAIC.TIF
- Click OK.

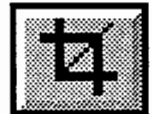
### **Reduce the Canvas Size**

Reducing the canvas size will reduce the file's size. Since some overlap occurred in a previous step, the double-width canvas is too large. Some canvas is displayed to the right of the completed mosaic image. The Cropping tool will be introduced in this section.

- Use the MAGNIFYING GLASS to “zoom out” until the entire image is visible on the monitor.

Holding down the ALT key will access the “zoom out” feature of this tool.

- Select the CROPPING tool.



The cursor changes to the shape of the cropping tool.

- Click the mouse in the upper left corner of the image and drag to the bottom right corner of the image.
- Release the mouse.

The image is outlined with a dotted line showing where the cropping will occur. If the selection is correct, move the cursor within the dotted outline. The cursor changes to scissors. Click in this area, and the image size and canvas size are both reduced.

If the area outlined is not correct, select a “handle” and move it to the desired cropping location. To start over, move the cursor outside of the dotted outline. The cursor will change to a “Ø” symbol. Click in this area, and the dotted outline will disappear. Reselect the area to be cropped.

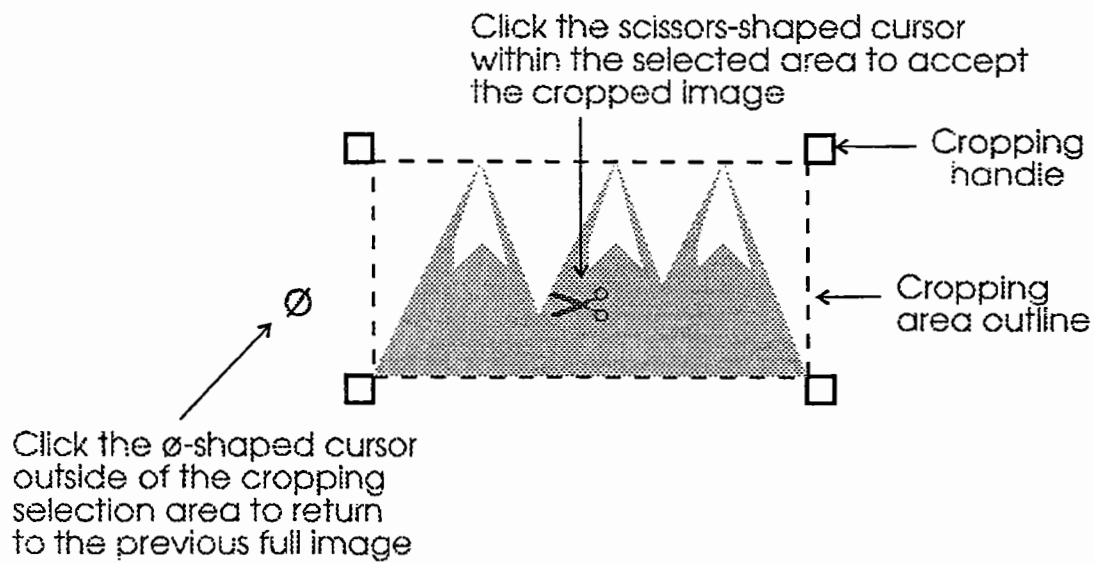


Figure 16. *Cropping an Image*

### **Finishing Touches**

If the seam between the two images is still noticeable, there are a variety of tools to mitigate this. This section discusses the use of three tools: the SMUDGE tool, the BLUR tool, and the DODGE tool. These tools are affected by the size of brush selected in the brushes palette. A smaller soft-edged brush works best with these tools when editing a landscape image.

- Magnify the "seam" area on the hillside using the MAGNIFYING GLASS.
- Click on the SMUDGE tool.

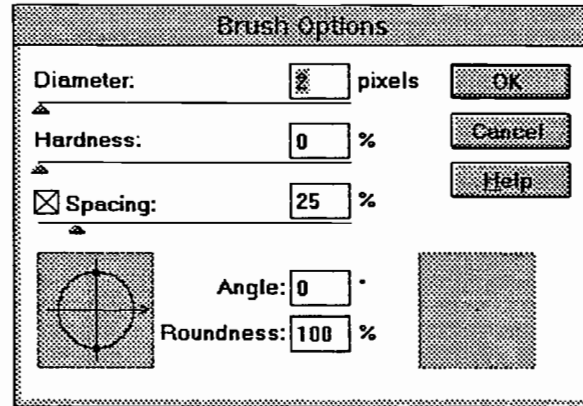
The cursor turns into a finger. The effect of this tool is similar to dragging a finger through wet paint. This tool is used by depressing the left mouse button and dragging the cursor. The color from the place of origination is dragged and smeared as the cursor is moved. The area affected by this tool is determined by the brush size - see the next step.



- Select the small soft-edged BRUSH from the BRUSHES PALETTE.

To change the brush size, select a brush from the brushes palette. The default brush size for the smallest, soft-edged brush is three pixels. For this step, three

pixels may be too large. To make this brush smaller, double-click on the brush. A dialog box opens. Change the three pixels to two pixels, and click OK to close the dialog box. The small, soft-edged brush will now cover only two pixels at a time as it is dragged over the image.



*Changing the brush size*

- Select an area of origination and smudge across the seam.

Only smudge from a few pixels on one side of the seam to within a few pixels of the other side. The purpose of this is to make the shadow areas and tree branches that have a sharp, blunt edge look more natural. The finished look should simulate tree branches or shadows crossing over the seam.

- Click on the BLUR tool in the toolbox.

The cursor turns into a droplet. The blur tool blurs hard edges, but reduces detail.



- Select a small soft-edged BRUSH from the brushes palette.

The brush size determines how big of an area is affected by the blur tool.

- Click and Drag the cursor over any obvious vertical line at the image seam.

- Click on the DODGE tool in the toolbox to lighten dark areas of the image.



- Click and Drag the cursor over areas near the seam that seem darker than the surrounding area.

## Glossary

**bitmap** An image stored as a pattern of dots.

**channels** Analogous to a plate in the printing process. Some images may have only one channel, while others can have up to 16 channels. A typical color photograph has three channels, red, blue, green. This is commonly called RGB. These colors combine to create all of the colors seen in the photograph.

**clone** To copy portions of an image into the same or another image.

**crop** To cut or trim an image.

**lossless** An image compression function where image data is not lost every time compression is performed.

**lossy** An image compression function where image data is lost every time the compression is performed.

**mask** A tool used to isolate part of an image. This tool is commonly used to create a selection and save the selection in a channel.

**pixel** The smallest graphic unit that can be displayed on a monitor. Pixels are single-colored dots. Pixels are also known as picture elements, or pels.

**RAM** Random access memory. This is the memory that Photoshop uses to perform tasks while the computer is on. It is temporary storage and the information contained in the RAM is lost when the computer is turned off.

**resolution** The number of dots or pixels that make up an images on a monitor or a printer or other output device. Resolution is commonly measured in pixels per inch (ppi) or dpi (dots per inch).

**source** The image containing some characteristic that will be copied into another (base) image.

**target** The base image serves as the background, or base, image. Other characteristics are added to this image.