

TECHNICAL NOTE

USDA NATURAL RESOURCES CONSERVATION SERVICE PACIFIC ISLANDS AREA

Conservation Planning Technical Note - No. 5

Guidance on Establishing Photo Points and Plots for Monitoring

WHY USE PHOTOGRAPHS?

Photo monitoring is a valuable qualitative tool for documenting the current management of a farm or ranch, as well as, conditions or events that may assist in its management. Photo points are easily established. There may already be old family pictures available illustrating how the property, a stream, or facilities looked in the past. New photographs of the scenes in these old photos provide one good way to get started with a photo monitoring program. If no old photos exist, now is a good time to start developing a photographic record for the benefit of current and future farm or ranch managers or owners.

While photographs cannot tell the entire story about a situation, project, or practice, much information can be gathered by comparing photographs taken of the same scene over a number of years. When a photographic collection is established to monitor landscape conditions, it does not generate the large amounts of data often associated with quantitative monitoring methods or projects.

WHY MONITOR?

Before you begin a photo monitoring program, you should consider why you are monitoring. Here are some common purposes:

- to describe or document current (normal) conditions (*baseline monitoring*)
- to describe or document abnormal or catastrophic events
- to detect and document change (*trend monitoring*)
- to confirm agency assessments
- to investigate perceived problems
- to document the application or implementation of management practices
- to document the effectiveness of management practices

MEASURABLE OBJECTIVES

In many cases, your reasons for monitoring can be translated into measurable management objectives. Your statement of measurable objectives should tell you what to monitor and where to monitor. For example, suppose your management objective is to increase stream bank shrub cover by reducing livestock grazing along stream channels. You can document the measurable objective of increasing shrub cover with a series of photographs of the stream bank taken over time. Another measurable objective is to maintain adequate stubble height on your rangeland to provide nesting cover for birds. While you cannot take photographs of everything, the installation of photo points at several locations can help you document your objectives from year to year. Non-specific management objectives such as enhancing riparian habitat are more difficult to monitor: they lack a clear statement of which habitat characteristics the manager is

trying to change. A statement of measurable objectives is crucial to good monitoring. You should establish clear objectives for the ranch as a whole. In addition, for each photo location, you should write down the objectives specific to that location.

WHAT TO MONITOR

There are several kinds of photographs that you can take to document conditions in a watershed or on a farm or ranch, including:

- landscape photos
- plot or close-up photos
- photos of riparian, stream, wetland, or other special habitats
- event photos
- practice photos

Landscape photos should give a representative view of the area and feature a distinctive landmark in the background (e.g., a peak, rock outcrop, or ridgeline) to aid in taking follow-up photos in the future (Figure 1). Be sure to include enough horizon in the picture to allow a future photographer to find the same photo point again. You can record large areas of bare soil, erosion, weed and shrub invasions, and burns using landscape photos.

Plot or close-up photos can be used to document ground cover, residual dry matter, erosion, endangered species, and weeds (Figure 2).

Riparian, gulch, stream, or wetland photos provide a representative view of the stream channel, bank stability, ground cover, and overstory vegetation (Figure 3).

Event photos can be used to document unplanned or unusual events such as fires, floods, erosion, herbicide effects, wildlife damage, and vandalism (Figure 4).

Practice photos can be used to document management practices. You can use “before and after” photos to document the implementation and effectiveness of practices, the effects of fire and post-fire recovery, the invasion and control of weeds and shrubs, and other long-term changes.

SUPPLIES AND EQUIPMENT

A good quality, pocket-sized, single-lens 35 mm camera is adequate for photo monitoring. To maintain consistency in the photos over time, you should use only one lens of a fixed focal length. A multi-lens camera is not necessary. We generally recommend the use of color slide film because its dyes are more stable so the photos retain true colors longer. You can make quality prints from slides. Prints are useful because you can use them in later photo monitoring sessions to ensure that repeat photos depict the same scene, especially if different people do the photo monitoring. Any camera with appropriate film, used carefully, will produce useful photos. Digital cameras provide the opportunity to maintain photo records on a personal computer and to delete photographs in the field until just the right scene is captured.

Other supply and equipment needs include note cards or a notebook, a steel post (5.5 to 6-feet in length), a compass, one 4.8 feet-squared plot frame (can be circular with approximately 29.6 inch diameter or 93.1 inch circumference; or square with approximately 26.3 inches per side), and a marker board (minimum 8.5 x 11 inches). In the notebook you will describe each photo point. Good records that describe the location, time of year, time of day, management activities, and comments on vegetation and other conditions make it easier to re-photograph photo points and to evaluate change. A map showing photo point locations should be included with the

notes. You can also use a global positioning system (GPS) receiver to document the photo point location. Good record keeping is crucial to successful photo monitoring. [Figure 5](#) is a sample form that you can copy onto 3 x 5 cards and use to document each photo point.

It is crucial that you mark the photo points well so that you will be able to locate them for future photographs. You can use a steel post to mark each photo point, but any other permanent feature, such as a large pile of rocks, will do just as well, provided they will remain in place over time. Trees may not make good photo point markers because they grow and change their shape over time.

Use the compass to take a bearing from the steel post to the center of focus for all photos. By establishing permanent photo points with compass bearings, you ensure that monitoring photos will be taken consistently from the same point and in the same direction over time. Time-of-day and time-of-year of photo monitoring should also be consistent over time. If you are monitoring vegetation it is important that you are consistent in the stage of plant growth or maturity that you photograph. Plot photos or close-ups should be taken some distance from permanent marking posts, since the posts may attract livestock who's feeding and traffic will be uncharacteristically heavy in those areas.

Take as many photos as necessary to adequately document landscape conditions. For example, you may need to take upstream, downstream, and across-stream photos in order to thoroughly document riparian conditions along a stretch of a stream. Within each picture, include a marker board to record the date, compass direction, field/pasture name, and photo point number. Be sure the writing is large and legible. An 8.5 x11 inch sheet of paper with large, thick writing from a felt-tip pen should be adequate. Some cameras are equipped with a date stamp, which simplifies record keeping. To provide scale in photographs, especially close-ups, you may want to include an object of a known size in the picture. Any object with delineated measurements that will be visible in a photograph is adequate.

HOW TO TAKE THE PHOTOGRAPHS

There are many ways to design photograph methods that will illustrate resource conditions and document the success of management changes. The following are some detailed design ideas, but you can change them to suit your individual situation.

Landscape Photos for Upland Sites

At each monitoring location, drive the steel post into the ground, leaving 4-feet of post aboveground. Use your compass to find magnetic north (0°). All compass bearings for each photograph should be based on magnetic north, not true north because the magnetic declination may not be known so you won't be able to adjust the compass for true north. Complete the information on the marker board ([Figure 6](#)), and place the board so that it appears in one of the lower corners of the photo when you take the picture. Make sure the handwriting on the marker board is large enough that it can be read off the photograph. Try to avoid any shadows or sun glare on the marker board, thus making the board unreadable. Hold the camera on the top of the steel post, and take a landscape photo at 0° (making sure you can read the marker board, and that you get a little bit of horizon in the picture). Now take a compass bearing to 90° , move the marker board into this view, hold the camera on the top of the post, and take the landscape photo. Repeat this procedure for 180° and 270° . When you are finished, you'll have a total of four landscape photos in the primary compass directions of magnetic north, east, south and west. Repeat this procedure annually at approximately the same day and time each year.

Plot Photos for all sites

At each monitoring location, measure a distance of 100-feet away from the permanent steel post, in the direction of magnetic north (0°). Lay the 4.8 feet-squared plot frame on the ground, 100-feet magNorth from the steel post. If there are shrubs or tall grasses, carefully pull those through the plot frame so they are left standing in their natural position for the photograph. Position yourself on the north side of the plot frame so that your shadow will not be cast into plot as you take the picture. Complete the information on the marker board and place it outside of the plot frame in one of the corners of the photograph. Standing above the plot frame, look through the camera viewfinder, making sure the entire frame and marker board are visible. Take the picture. Repeat this procedure annually at approximately the same day and time each year.

Riparian, Gulch or Stream Photos

If the monitoring location is a riparian, gulch or stream area, follow this procedure. Locate one permanent in-stream (or in-channel) location to take two photos: one looking upstream and one looking downstream. If water depth is too high or conditions are unsafe, locate the permanent photo site on one side of the streambank, and take the upstream and downstream photos from there. Also take a cross-stream photo from your permanent bank location to the opposite bank looking perpendicular across the stream channel. Before you take the photos, complete the marker board and place it close enough to you that it can be read once the photograph is taken. You may need to hang it from a portable post, or have someone hold the marker board in the photo for you. Repeat this procedure annually at approximately the same day and time each year.

As you implement management changes, riparian and stream vegetation has the ability to respond and grow rather quickly. When this happens, you may lose your original vantage point of the stream from the permanent in-stream or on-bank photo location. Whenever possible, if the terrain allows for a permanent photo location above the stream looking down onto it, you should take upstream and downstream photos from that point also. As vegetation grows, you may need to abandon your original in-stream or on-bank photo location, and only take photos from the above-stream location. By establishing the above-stream photo series along with the in-stream or on-bank photo series, you'll have a continuous record of change in these critical but difficult-to-monitor areas.

DIGITAL ENHANCEMENT OR ALTERATION OF PHOTOS

Photo enhancement software makes it rather simple to alter digital photographs/images. Digital enhancement or alteration of photos for documentation may be interpreted as data falsification. It is important to be able to distinguish between acceptable and unacceptable alterations to digital photographs.

Acceptable alterations to a digital photograph/image:

- Cropping a large photo to focus on the area of interest.
- Lightening or darkening a photo to make it more useable.
- Enhancing the contrast in a photo taken on a cloudy day.

Unacceptable alterations to a digital photograph/image:

- Adding or subtracting items from the photograph (e.g. removing cows from a picture taken near a stream)
- Changing the relative position of items in a photograph
- Changing the date or time on the photo record (metadata).

Even if acceptable changes are made to a photograph, be sure to save the original photo and to clearly label the altered photo indicating that it has been altered as well as the alteration(s) made.

PHOTO USAGE FOR DISPLAYS OR PUBLIC INFORMATION

There may be instances where you would like to use photos taken as part of monitoring activities for purposes beyond the scope of the original Conservation Plan. These might include public presentations or simply sharing the photos with a potential cooperater interested in implementing similar practices.

In general, if the cooperater cannot be identified from the photograph, it is permissible to use the photos. Please be aware of situations where it is likely that another person could identify the location where the photograph was taken (due to a recognizable local landmark or other feature), even if you do not provide that information. If you think this could be the case, you must obtain written permission from the cooperater before you share or display the photos. Forms for this purpose are available from the State Public Affairs Officer. Signed forms will be kept in the Cooperater's Conservation Plan and Contract File.

ORGANIZING AND MAINTAINING PHOTOGRAPHS AND WRITTEN RECORDS

Once you have taken the photos and assembled a complete set of notes, you should store them in a safe, dry place. The PIA-Conservation Planning Technical Note 4 offers a place to log your digital images and notes. You can also print and store larger imagery in transparent photo sleeves. Then store them in a three-ring binder for convenience. If you don't use the PIA-Conservation Planning Tech Note 4, you'll need to identify each photo either on the back of the print or on the slide mount. You can judge the success of your storage method by observing how easily you can retrieve the records and make sense of them.

FIGURES AND EXAMPLES

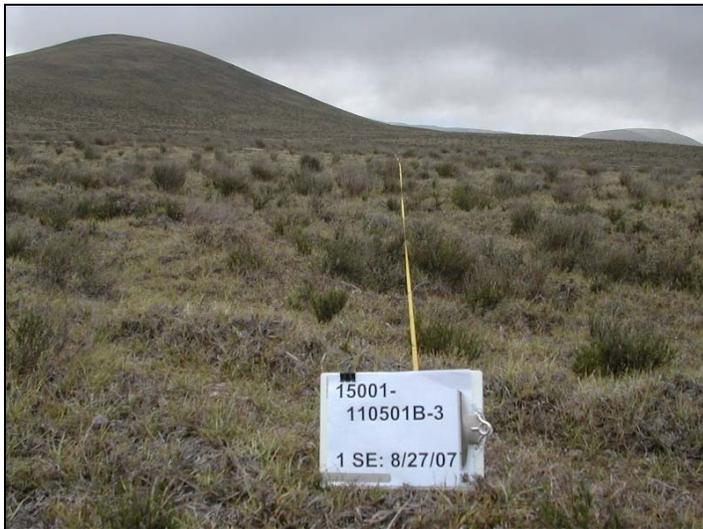


Figure 1. Example of landscape photo with prominent natural features.



Figure 2. Example of plot photo using 2.4 ft² frame.



Figure 3. Riparian photo example.



Figure 4. Event photo example of rooting and erosion.

Photo point name or number	Date photo point established
Location description	Compass bearing
Photograph date and time	Name of photographer
Notes	

Figure 5. Sample record card for photo point descriptions (copy onto 3 x 5 card).

SITE # or Name: 3

DATE: 04-20-2008

FIELD: *Mauka Tank*

magN COMPASS BEARING: 270^o

PHOTOGRAPHER: *S. Smith*

Figure 6. Marker board example form.

SITE # or Name:

DATE:

FIELD:

magN COMPASS BEARING:

PHOTOGRAPHER:

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