

South Florida/Caribbean Network

National Park Service
Inventory and Monitoring Division



Standard Operating Procedure FVM04

Plot Photo Points—Version 1.0

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Summary

This standard operating procedure (SOP) provides instruction for photographing plots. Digital photographs will be archived and used as visual reference for change in vegetation appearance of plots over time. Photographs are taken immediately following plot setup to minimize the visual effect of field crew impact.

The datasheets used for this SOP include *SFCN Veg Form 1—Vegetation Plot Establishment* and *Veg Form 3—Plot Photo Points and Canopy Closure Measures*. Samples of these forms are included in Appendix A of this SOP.

Revision Log

Revision Date	Author	Changes Made	Reason for Change	New Version #

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SOP Source and How It Was Modified

This SOP is an adaptation of SOP 4 *Plot Photo Points—Version 1.3* of the *Cumberland Piedmont Network Vegetation Monitoring Protocol* (White et al. 2011). For a general explanation of how the South Florida/Caribbean Network modified the Cumberland Piedmont Network (CUPN) protocol and its SOPs, see *South Florida/Caribbean Network Forest Vegetation Monitoring: Protocol Implementation Plan* (Whelan et al. 2020). Additionally, this SOP used the *SOP 1.1.05 Plot Photo Points—Version 2* of the *Terrestrial Vegetation Monitoring in Southeast Coast Network Parks* (Boyle et al. 2019) as a guide. The South Florida/Caribbean Network made one specific modification to the CUPN SOP by adding a third photo point location in the plot center.

Data Collection Procedures

1. Set the point and shoot camera's resolution to the highest possible resolution, ensuring that it is at least $2,000 \times 3,000$ pixels. Do not set the camera function to digitally imprint the date and time onto the photo; however, make sure the date and time settings are accurate so they are stored as digital image file properties. Images are saved in the Joint Photographic Experts Group (JPEG) file format.
2. On the datasheet (*SFCN Veg Form 3—Plot Photo Points and Canopy Closure Measures*), record the Plot ID, Start Date, Photographer initials, and names of the camera being used (make and model).
3. Take a photograph of the datasheet with the point and shoot camera.
4. Standing at the center western edge of the plot, take a photo using the point and shoot camera pointing due east (i.e., looking back into the plot; Figure 1). Make sure the camera is set to 'landscape mode' (or the equivalent) to obtain maximum coverage of all vegetation layers. **Do not zoom in on the scene.** The photo is taken from this point facing toward plot center and the photo is shot as if one were aiming to center the photo on the head of an average-sized person 20 meters (65.6 feet [ft]) away (i.e., photo will follow the slope in which it is pointed at eye level). When remeasuring a plot, the photograph is taken from the same location used when setting up the plot.
5. After a picture is taken, review the quality of the images on the camera's screen. Take an additional photograph(s) if the quality is questionable. Make sure the date/time stamp function is reporting accurately. If the view is blocked by a large tree or other obstruction, move one pace to the right (south) of where you are standing to photograph the plot.
6. Record the photograph location on the plot diagram located in *SFCN Veg Form 1—Vegetation Plot Establishment* (Page 2 of veg form 1); and other photograph information on *SFCN Veg Form 3—Plot Photo Points and Canopy Closure Measures*.
7. Repeat Steps 3–6 at the center eastern edge of the plot, taking a photo pointing due west (Figure 1). In the event of an obstruction, move one pace to the right (north).

8. If a photo cannot be taken from the middle of the plot edge or from one pace away, move the photo location to one corner of the plot on the same end and point the camera toward plot center to take the photo. Note the alternate location of the photo on the data sheet. If necessary (in very thick vegetation), the plot photos can also be taken from plot center facing outward in the direction of the centerline. In this case, clearly explain on the data sheet where the photo was taken and which direction the camera was facing.
9. Stand at plot center and take a panoramic photo (360°) at 1.37 meters [4.5 ft] from the ground. If there is an obstruction at plot center, move either one pace to the east or west. Set the initial view due north, and record the scene. Use the Nikon CoolPix AW120 camera in panorama setting (use 360° setting) to take photo. Make sure to keep the camera on a level angle in a 360° circle.

Once all photos have been taken and reviewed, the reviewer puts their initials on the datasheet.

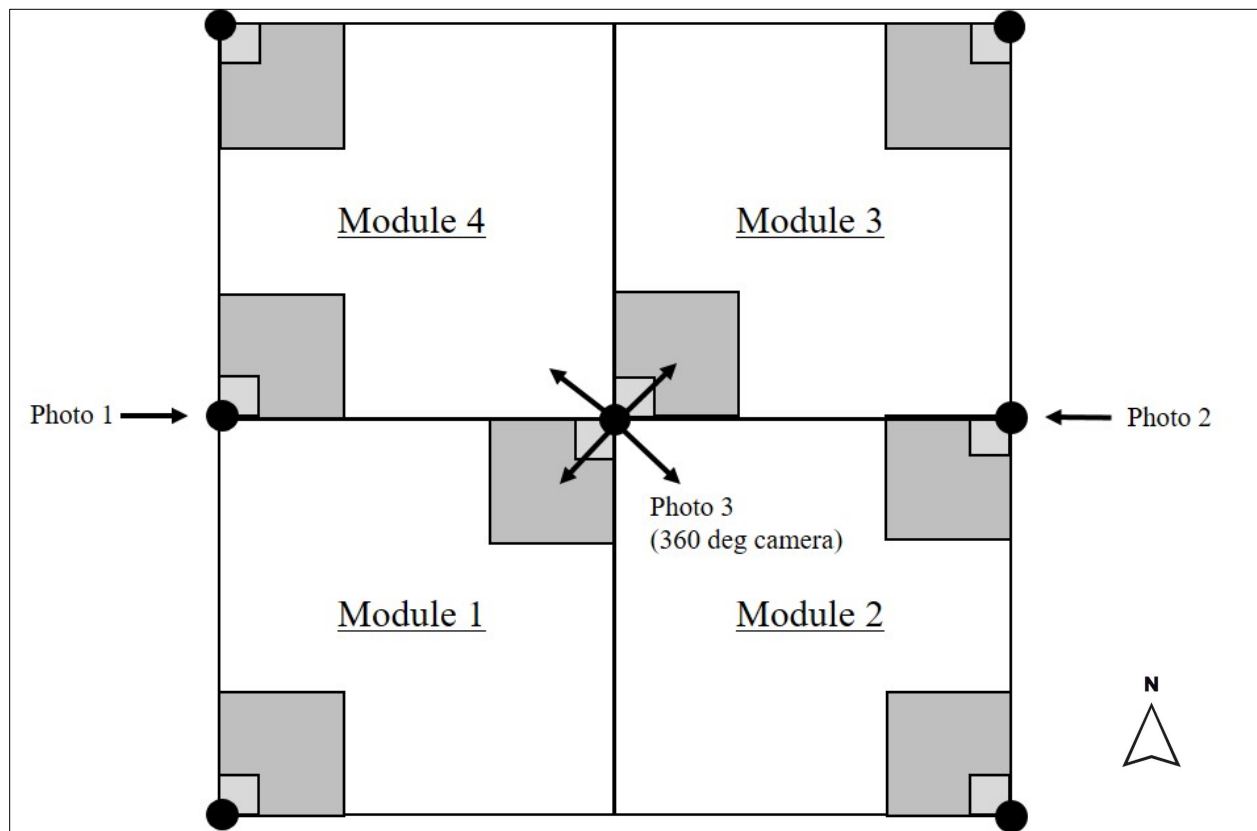


Figure 1. An example of a plot diagram (*South Florida/Caribbean Network Veg Form 1: Vegetation Plot Establishment*) illustrating plot photo point location information. The solid circles represent the location the photographer was standing and arrows represent the direction the photograph was taken.

Data Management

After fieldwork is complete for the day, download the photos to a field laptop and a backup location (e.g. a flash drive or external hard drive). When the field crew has access to the internet, transfer digital records to the 'Z:\SFCN\Vital_Signs\Forest_Vegetation\images\PARK\Year\Raw' folder on the network share. These are the digital images in an unaltered form. Make sure this directory is set to "read-only" permissions to prevent inadvertent edits to the original files.

Images need to be processed before they are ready to be stored long-term or used. Field crews will have maintained a record of all photos taken at a plot on the plot data sheets including the image numbers (from the camera), whether a picture with plot identification information was taken prior to initiation of each photo point, how many photos were taken at the plot, etc. Therefore, ***do not continue with processing of photos, beyond copying them to the network server as outlined above, unless you have the field datasheets in hand.***

When ready to proceed, raw images are copied and pasted into a plot photos folder at: 'Z:\SFCN\Vital_Signs\Forest_Vegetation\images\PARK\Year\PlotName' on the network share. Some of these images will not be useful due to improper exposure, or alternatively, they may be bad versions of better images taken to document the same data need. Any bad image is deleted. All other images are renamed in their original form. The images within the PlotName folder are renamed to include these four, mandatory elements, each separated by an underscore:

- PlotID—The unique name for the plot that was photographed.
- YYYYMMDD—Four-digit year, two-digit month, and two-digit day representing the date the photograph was captured.
- Protocol—The 'ForestMonitoring' tag to identify the protocol.
- PhotoDirection—The direction that the photograph was taken in the plot. For the three data photos at each plot these will be: E (picture taken facing east), W (picture taken facing west), or C (panoramic photo taken at the plot center). For any non-data images, a brief title can be added to indicate the subject (e.g. HurricaneDamage or MangroveRoots).

There is also one optional element that is added if it is applicable to the photograph:

- Sensitivity (optional)—If the photograph shows sensitive resources and must not be shared, add the word SENSITIVE in all caps to the end of the filename.

The renamed images will look similar to: DRTOMF1_20190801_ForestMonitoring_E.jpg (or DRTOMF1_20190801_ForestMonitoring_E_SENSITIVE.jpg in the case of a sensitive image). Once all working images have been fully processed, including file renaming and a check by the community ecologist, the raw files may be deleted. Final, non-sensitive images are packaged and stored in the NPS Integrated Resource Management Applications (IRMA) Data Store as part of the SFCN forest vegetation monitoring annual reporting requirements.

Equipment List

- Relatively high-quality camera with installed SD card, with panorama capabilities. Currently using Nikon COOLPIX AW120.
- Pencil
- Field datasheets (SFCN *Veg Form 1—Vegetation Plot Establishment* and *Veg Form 3—Plot Photo Points and Canopy Closure Measures*). Datasheet field descriptions for Form 3 are detailed in Table 1.

Table 1. Datasheet field descriptions for *Veg Form 3—Plot Photo Points and Canopy Closure Measures*.

Field Name	Field Description
Photographer ID	Record initials of photographer.
Reviewed by	Initials of individual who reviewed completed data sheet for SOP 3 elements. Ideally, this should be someone other than individual who completed this portion of datasheet.
Cameras	Text name of camera and/or make/model of camera used (e.g., Nikon Coolpix AW120).
Mark Photopoint	Is the photo point location, number and direction clearly marked on plot diagram (Veg Form 1): Yes or No.
Datasheet Photo	Was a photo of the datasheet (designating photographer, date, plot id, photo point number and direction) taken with camera before taking plot photo?
Photo Notes	Include photo name (file name) from camera. Will likely be a generic number such as Cam001, etc. Also, include other notes about photo point such as whether moved from standard position, etc.
Other Photo Notes	To be used if other photos documenting something related to plot were taken. This may include additional reference photos to aid future teams in realigning plot or photos of potential forest pest evidence.

Literature Cited

- Boyle, M. F. 2019. 1.1.05 Plot Photo Points—Version 2.0. Standard Operating Procedure NPS/SECN/SOP—1.4.07. Southeast Coast Network, Athens, Georgia. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2260348> (last accessed December 2019).
- Whelan, K. R. T., R. B. Shamblin, M. Prats, J. M. Patterson, M. Londoño, and R. Muxo 2020. South Florida/Caribbean Network forest vegetation monitoring: Protocol implementation plan. Natural Resource Report NPS/SFCN/NRR—2020/2064. National Park Service, Fort Collins, Colorado. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2271719> (last accessed February 2020).
- White, R., C. Nordman, L. Smart, T. Leibfreid, B. Moore, R. Smyth, and T. Govus. 2011. Vegetation monitoring protocol for the Cumberland Piedmont Network, Version 1. Natural Resource Report NPS/CUPN/NRR—2011/XXX. National Park Service. Fort Collins, Colorado. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2192468> (last accessed July 2019).

Appendix A: Field Data Forms

SFCN Forest Vegetation Monitoring Veg Form 1: Vegetation Plot Establishment Form <i>Refer to SOP VEG03 – Site Selection, Plot Establishment, and Return Visits for details on using this form.</i>	Plot ID _____ (park code + community code + plot #)	Visit Date _____ (mm/dd/yyyy)
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Plot Layout Notes (notable plot features or irregularities) _____

SFCN_Form_1_PlotEstablishment_Datasheet_Page_2.docx
12/12/2019

Figure A-1. Sample Veg Form 1 Forest Vegetation Plot Establishment form. This is page 2; page 1 can be found in SOP 3 *Plot Evaluation, Plot Establishment and Return Visits*.

SFCN Forest Vegetation Monitoring Protocol
Veg Form 3– Plot Photo Points and Canopy
Closure Measures

Plot ID _____
 (park code + community code + plot #)

Visit Date _____
 (mm/dd/yyyy)

SOP 04 – Plot Photo Points	Photographer initials _____	Reviewed by: _____
Camera: text name of camera or make/model of camera _____		
Photopoint 1 - Mark photopoint location and direction on plot diagram (pg 2) Yes or No		
Photo of datasheet taken before taking plot photo (with Plot ID, Date, Photo Pt #, and Direction?) Yes or No		
Photo notes (record photo file name from camera): _____		
Photopoint 2 - Mark photopoint location and direction on plot diagram (pg 2) Yes or No		
Photo of sign taken before taking plot photo (with Plot ID, Date, Photo Pt #, and Direction?) Photo notes Yes or No		
(record photo file name from camera): text _____		
Add other photo notes in case there are other photos taken in plot: _____		
Photopoint 3 (360°) - Mark photopoint location and direction on plot diagram (pg 2) Yes or No		
Photo of sign taken before taking plot photo (with Plot ID, Date, Photo Pt #, and Direction?) Yes or No		
Photo notes (record photo file name from camera): text _____		
Add other photo notes in case there are other photos taken in plot: _____		

SOP 05 – Canopy Closure and Stand Height	Data taker initials _____	Reviewed by: _____
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#1 Stem ID ____ Height (m) ____ #2 Stem ID ____ Height (m) ____ #3 Stem ID ____ Height (m) ____

Module	Direction	Spherical Densiometer tally of shaded dots (0-96)
1	N	
1	E	
1	S	
1	W	
2	N	
2	E	
2	S	
2	W	
3	N	
3	E	
3	S	
3	W	
4	N	
4	E	
4	S	
4	W	

Module	Alternative Quick Estimate of % Canopy Cover*
1	
2	
3	
4	

Average % Canopy Cover: _____

* "Quick method should only be used in rare circumstances with explanation noted below

Cover Notes (if any): _____

Note: It is only necessary in the field to collect the tally of "shaded" dots in canopy; the remaining calculations can be done at the time of data entry (the table is provided for convenience). For forests, it is easiest to count the number of dots that are not shaded (sky is showing through canopy opening) and then subtract that number from 96 to obtain the number of "shaded" dots.

Figure A-2. Sample Veg Form 3, Plot Photo Points and Canopy Closure form. See SOP 5 *Canopy Closure and Stand Height Measurements-Version 1.0* for instruction on how to record canopy closure.