

Volume

1

ICARDA IN COLLABORATION WITH OREGON STATE UNIVERSITY

Veg Measure User Manual Series



Field Manual

VEG MEASURE USER MANUAL SERIES

Field Manual version 1.1

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Introduction

VegMeasure is a Digital Vegetation Charting Technique (DVCT) that measures vegetation on the ground in a non-destructive manner. Just like quadrat sampling, it looks at how much cover the vegetation has and the types of plants can be identified to determine the ecological status. However using DVCT is much quicker, more objective, and can derive further metrics than traditional quadrat sampling. The colors from the digital camera can be interpreted by a VegMeasure computer software to create meaningful classes, for example: dark brown-soil, whitish color-litter, green-leaves. The software enables: hue extraction, calibrating a threshold, K-means classification, brightness algorithms, and green leaf algorithms. Large scale maps can be created with greater ease with this digital method. With repeat monitoring changes in vegetation can be evaluated. This method can be more accurate amongst various field collectors since it does not rely on perceptions and creates a permanent digital record that can be revisited.

To use this method certain field collection procedures have to be followed and an understanding of the software is needed. This manual series has been created to facilitate this process. Volume 1 is for field data collection and Volume 2 teaches how to process the images in the VegMeasure computer software. Volume 1 can be taken to the field to help with the camera set up and field data collection and Volume 2 can be left back in the office where the images are being processed.

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Camera Setup

Having a standard camera setup that accurately tracks the date, time, and the location in the same image resolution is essential for data comparison. This can save on pesky data corrections later on.

To save time in the future, print a copy of this document and bring it to the field. Assuring that the time, date, time zone, image resolution, and GPS data recording are set is important so that images can be compared accurately. Taking a few minutes to do this before getting started will save time later on and assure data accuracy and quality. The settings should be checked frequently as settings can often be changed accidentally between multiple users or battery removal and replacement.

Step 1: Time and Date Setup

Time Zone is important as well as setting the time so that time changes are reflected properly.



Turn the camera on

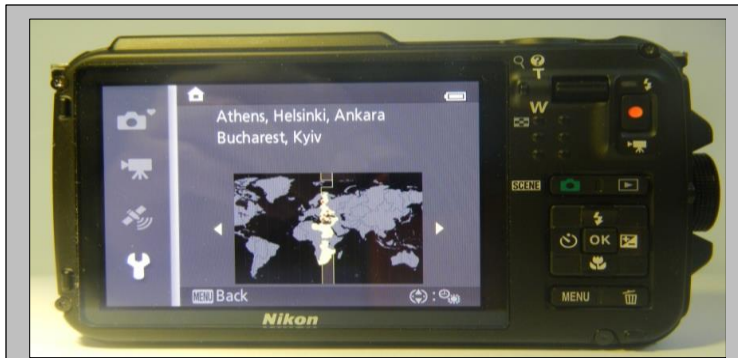
*Press **Menu***



*Then Select **Setup***



Select **Time zone and date**

Press 



Use  or  To select your **Home time zone**


Then **OK**





Date format. Press( or ) to choose the date format

Set the **Date and time**



Press  To move from one item to another (D (day) → M(month) → Y(year) → hour → minute)

Use  or  to set the contents of each item

Then press **OK**.

Step 2: Image Resolution

High Resolution is important to detect the greatest amount of change. Make sure you set your camera to the highest resolution possible and the lowest compression (Starred).



Go to **Setup** Menu → **Image mode**

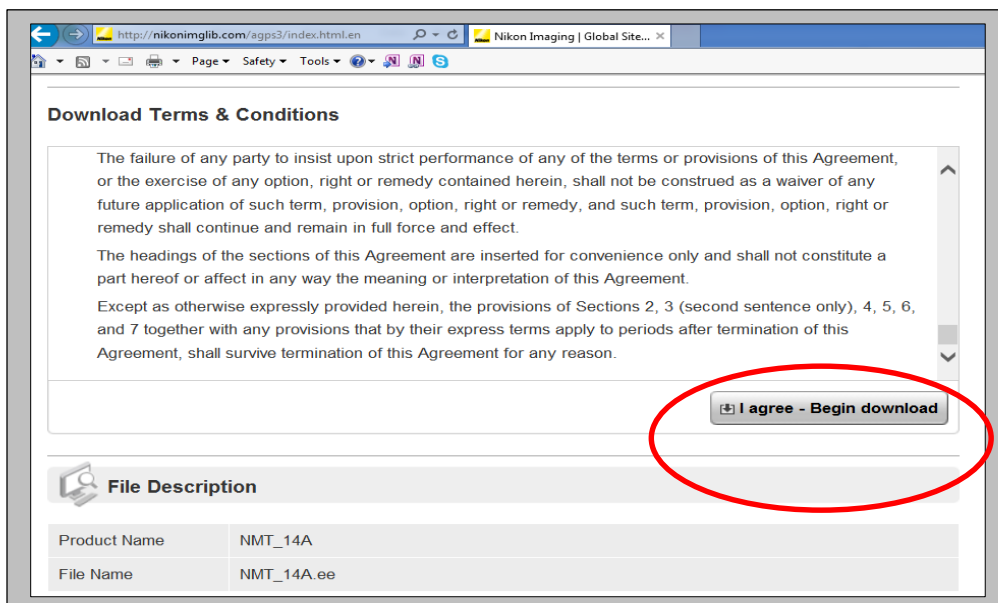
Choose the highest resolution of 16 Mb (4608 x 3456★). This will enhance the quality of the image output (processed image) and give more accurate results.

Press **OK**

Step 3: Nikon Camera GPS File Download

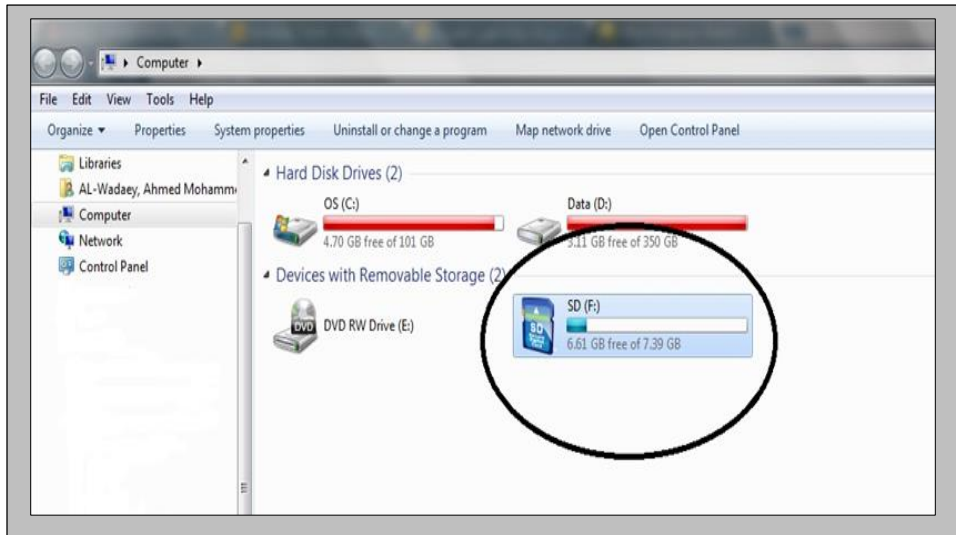
Determining GPS positions faster in the field is important to assure quicker field collection between pictures. Accuracy is very important as pictures are often taken in close proximity and can overlap due to point acquisition accuracy. A file is provided here that will be downloaded on your camera SD card to improve the speed and accuracy in which points are acquired.

Visit the website <http://nikonimglib.com/agps3/index.html.en>



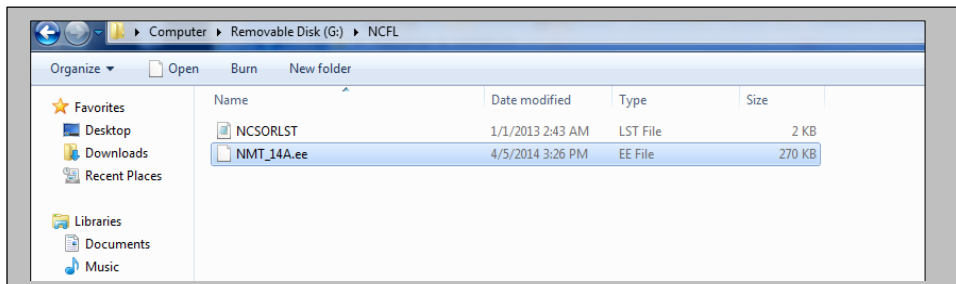
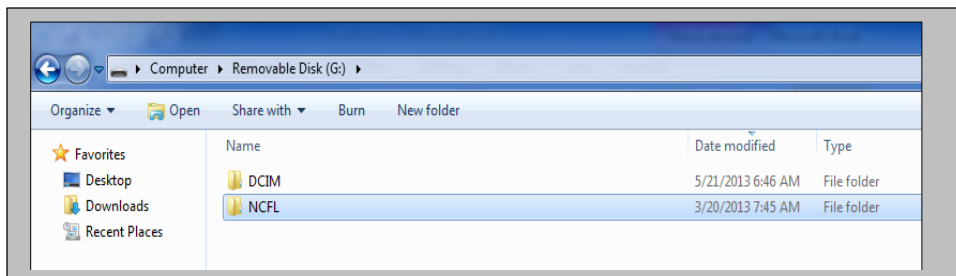
*Download the file
"NMT_14A.ee"*

Remove the SD memory card from the camera and insert it in the computer. Then open the SD memory card folder.

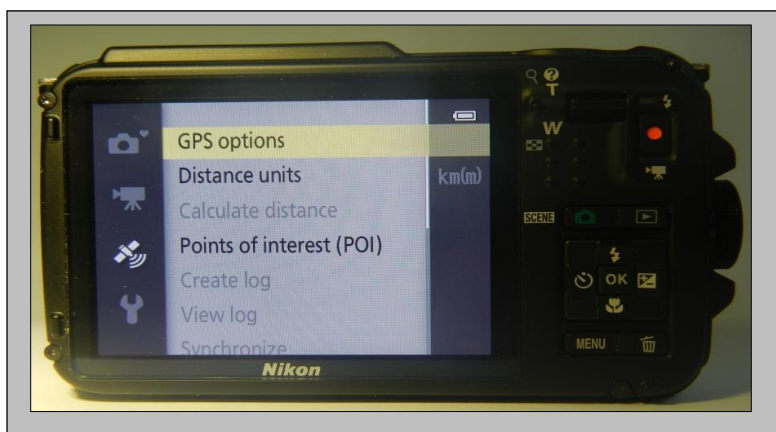


Copy the file downloaded prior to the "NCFL" folder in the camera SD memory card.

See the next steps below.



When complete, remove the SD memory card from the computer and insert it in the camera



*Press the **MENU** button, use the multi selector to select "GPS options".*

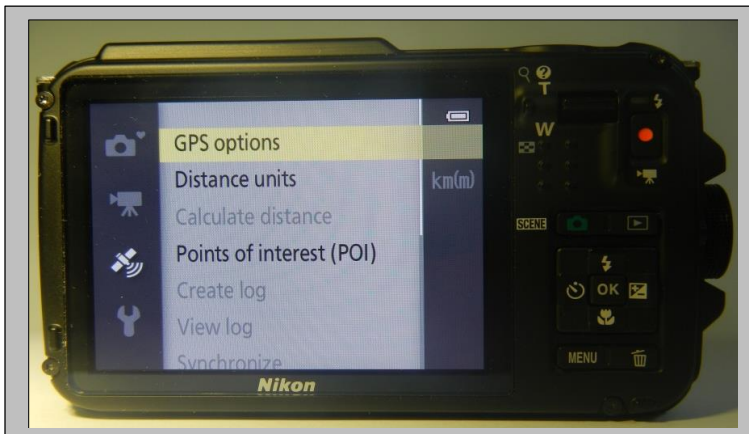


Select "Update A-GPS file" to update the file.

Press **OK**

Step 4: GPS Data Recording

Enabling GPS recording on the Nikon is important so that the camera can received signals from the GSP satellites. Without this step the camera cannot receive data and synchronize the signals from the GPS satellites along with the data and the time of the camera's internal clock.



Press the **MENU** button, use the multi selector to select "GPS options".

Press ►



The default of **Record GPS data** setting is **Off**, to change it press ►



*Select **On**, Press **OK**, Press the action button.*

Note: To allow the camera to get a GPS Fix, turn on the camera and **Record GPS data** for at least 15 minutes before taking Photos.

Data Collection



Having a standard field collection that accurately measure the plants is important so that the data is comparable. Standard steps and recommendations are important to reduce and mitigate collection error.

To save time in the future, print a copy of this document and bring it to the field. Assuring that the field measurements are taken in a standard manner assures that results are comparable. Following standard documentation procedures also helps mitigate possible collection errors later on.

Step 1: Print the Area of Interest

Print out a satellite image with and overlaid boundary of the area. This will help to orient the data collectors to the site and plan out where to sample.

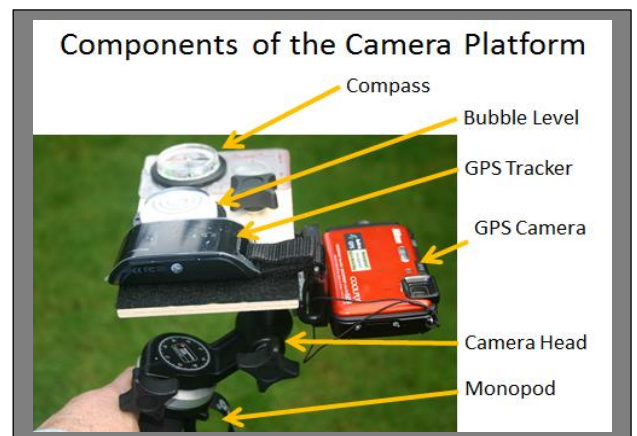
Step 2: Take Reference Photos of the Important Plant Species

Close up reference photos can help detect document dominant plant species when conducting data analysis in the field. They can also serve as a check in case any plants were identified incorrectly. As sites can change in ecological condition by the prevalence of different species and these things can change over time, this simple step can help to further understand the ecological condition of the site.



Step 3: Assemble the Camera Platform

A compass, bubble level, camera, wooden platform, and monopod are essential components for the camera platform.



A GPS tracker can be included on the platform to track where data collectors went in the field but it is not essential as the camera will take GPS points as well.



Attach Bogen-Manfrotto 3025 3D junior tripod head to the monopod



Attach the digital camera to the Bogen-Manfrotto 3025 3D junior tripod head.



Attach the digital camera to the Bogen-Manfrotto 3025 3D junior tripod head.



The camera has to be vertical, pointed towards the ground (a bubble level will indicate whether it is at the right angle or not)

Step 4: Adjust Camera Height

Find a comfortable position to hold the monopod, making sure your feet are behind the camera (so they are not in the picture) and adjust the height. If there are multiple collectors make sure it is comfortable for all as the height should not be changed during the sampling period.



Error Check

Keep the height constant throughout the sampling period.

Step 5: Measure Height

Take note of the height that pictures are taken. Any changes in height during the sampling period will introduce error.



Measure height and take note of this in field data collection forms/ notes.

Step 6: Check the Level Again . . .

The correct angle of the camera is important. After adjusting the height it is important to check the level again and adjust the bubble accordingly.

Step 7: Choose and Orientation (N or S)

Eliminating shadows is important so that images can be processed and identified correctly. Shadows introduce error as images cannot be read well. The camera needs to be oriented in the direction that will eliminate the effect of a shadow.



Read the directional orientation on the compass and write it down in your field data collection forms/ notes.

Error Check

Keep the orientation constant throughout.

Step 8: Take Landscape Photos

Site Overviews are helpful when you are back in the office to give yourself and others and overall orientation and understanding of the site and its condition.



Reposition the monopod to take landscape pictures.

Step 9: Start Taking Images

Stand in a comfortable position and take pictures of the plants following the spacing and collection methods. Keep the camera upright between pictures to maintain the satellite fix. Make sure to use the default set up of the optical zoom. Don't zoom in or out.



Error Reduction Recap:

- Don't change the height once it is set
- Don't change the orientation once it is set.
- Don't zoom in or out.
- Keep the camera upright to maintain the satellite fix.
- Keep the same camera and picture settings.

The number of images taken depends on the scale of the study on the ground. A plot that is evaluating plant response to fertilizer with subplots 10 by 30 m will have perhaps 10 sample images relatively close together. A landscape scale study examining plant cover on ecological sites in a watershed could have sample images 40 m apart and scattered across 10 km². In this case, the land would be stratified by ecological sites and sampling would be done in each site.

Step 10: Downloading Images to a Hard Drive

When you return to the office, all GPS positioned images should be transferred to a folder on the hard drive of your work machine. We like to label the folder with the project name, location and date. For example, Jordan Range Project Amman east site 14 Mar 2015. The reference plant photos and the landscape photos should be kept in a sub-folder in the same directory. Be sure to back up your files so your photographs are preserved for future analysis.