

Standard Operating Procedure (SOP) #14

Managing Photographic Images

Version 1.02 (February 26, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.01	11/24/2009	Kelly Kozar	Updated workspace setup for images and YSI files linked to database.	To reflect updates for files linked to database.	1.0
1.02	2/26/2021	Kelly Kozar	Updated workspace setup for images linked to database. Updated name of software for processing images.	To reflect updates for image files linked to database, and current software used.	1.01
		Kim Weisenborn	Updated file structure setup, downloading images from camera, processing and renaming images sections; updated to NRR formatting; renumbered SOP from #16 to #14; updated SOP references throughout this SOP.	Some content was outdated; formatting needed to be applied; some SOPs were removed or renumbered within the protocol.	

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

Purpose

This SOP describes how to download and process photographic images collected by project staff or volunteers during the course of conducting Water Quality Monitoring. Images that are acquired by other means—e.g., downloaded from a website or those taken by a cooperating researcher—are not project records and should be handled separately.

The standards described herein pertain specifically to all digital photographs related to water quality monitoring. In this SOP, digital photograph refers to any photo in electronic format regardless of acquisition by scanner or digital camera. Most photos acquired and used by I&M personnel should fit into one of the general categories.

1. *Library Photos*: These photos are final products that have been edited, documented, reviewed, and added to the photo archive in the PACN Digital Library. Metadata for these photos is created and stored using ThumbsPlus® software. The standard operating procedure for using ThumbsPlus® gives detailed instructions on how to use the metadata database (PACN 2008). These photos are representative, unique, and instructive and can be used for multiple purposes by a variety of staff.
2. *Data Photos*: Data photos are photos collected as data. Care should be taken to distinguish data photos from incidental or opportunistic photos taken by project staff. Data photos are those taken for at least one of the following reasons, to:
 - Document a particular feature or perspective for the purpose of site relocation
 - Capture site habitat characteristics and possibly to indicate gross structural changes over time
 - Document a species detection that is also recorded in the dataData photos may be linked to specific records within the database and are stored in a manner that permits the preservation of those database links. Other photos – e.g., of field crew members at work, or photos showing the morphology or behavior of certain species – may also be retained but are not necessarily linked with database records.
3. *Misc Photos*: Miscellaneous photos are photos taken during monitoring but that do not record data. Such photos, such as crew members at work or unknown species photos are miscellaneous photos.

Image Management Workflow

Effectively managing hundreds of photographic images requires a consistent method for downloading, naming, editing, and documenting. The general process for managing photos proceeds as follows:

1. File structure setup
2. Image acquisition
3. Download files
4. Process camera image files using GeoJot+ Core® software
5. Rename the image files according to convention
6. Review and edit or delete the photos
7. Move into appropriate folders for storage
8. Establish database links
9. Document the photos
10. Final storage

File Structure Setup

Prior to data collection for any given year, data management staff will set up new folders under the Images folder in the water quality monitoring project workspace. Folder structures will be set up as follows (see Figure SOP 14.1):

Images	I:\vital_signs\13_water_quality\Images
[Year]	The appropriate year (e.g., 2020, 2021, etc.)
_Ricoh_memos	Memos to be loaded onto the Ricoh GPS camera
[PARK]	Arrange files by 4-letter park code (e.g., HAVO, KAHO, etc.)
Data	Data images arranged by date
Misc	Non-data images taken by project staff and arranged by date
Originals	Data images that are downloaded from a Ricoh or non-Ricoh field camera and arranged by the date.

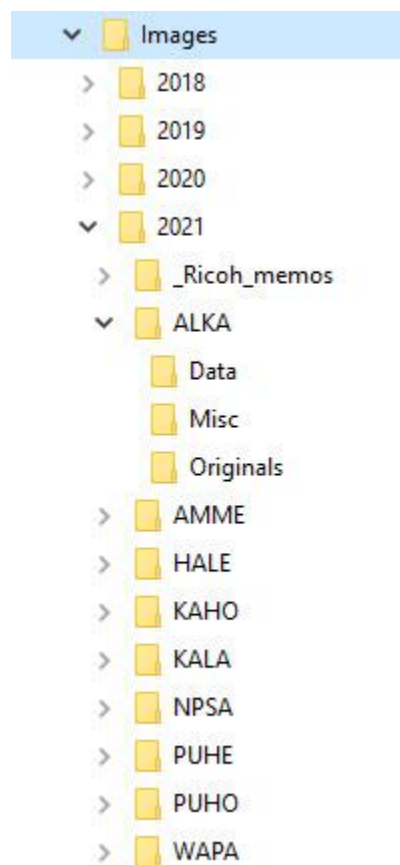


Figure SOP 14.1. Example of “Images” folder structure.

This folder structure permits data images to be stored and managed separately from miscellaneous images collected during the course of the project. It also provides separate space for storage of originals. For additional information about the project workspace, refer to SOP #12 Workspace Setup and Project Records Management.

Folder Naming Standards

In all cases, folder names should follow these guidelines:

- No spaces or special characters in the folder name
- Use the underscore (“_”) character to separate words in folder names
- Try to limit folder names to 20 characters or fewer
- Dates within folder names should be formatted as YYYYMMDD for better sorting

Within the “Data” and “Originals” folders, additional folders should be created for each sampling event in the format YYYYMMDD. **When a sampling event is multiple days long, use the first date of the sampling event for folder name.** All data images for a sampling event should go in the appropriate sampling event folder.

Image Acquisition

Digital photographs should be captured at a resolution and quality setting appropriate for the highest detail intended use. As a general rule, images destined for printing or publication should be of a higher quality and resolution than images that will be used for email or internet use. If the camera will allow, the resolution should be set at 1760 x 1168 or higher. The quality should be set for “super fine” or “high”. Uncompressed TIFF files retain the greatest amount of image information, but the trade-off for the highest image quality is that these image files are large, and fewer images can be saved to any single memory card.

Publication quality photos should be taken at a minimum of 5 megapixels. Because the destination of a photo is unknown at the time it is taken, all photos should be taken with this resolution, or for lower resolution cameras, the highest resolution possible. Any resizing or file compression should be done during post processing using image editing software.

Though most digital cameras can digitally imprint the date and time directly onto the photo image, this feature usually should not be used. Date and time data are automatically recorded in the EXIF metadata by most digital cameras. If the image is being cataloged and documented, it has value – imprinting the image reduces the image quality and hence the image value.

Different brands of digital cameras name photos differently. Some cameras will have several file naming options that may include:

- Sequential numbering which resets each time a memory card is formatted, or a new card is put in.
- Sequential numbering which loops from 0001 to 9999.
- Numbering based on date-photo sequence.

As a general rule, the most useful setting is a date-photo sequence, then the 0001-9999 loop and the least useful is the card-based sequence. Projects must carefully review the naming options of the project cameras for the most useful convention. Projects must also ensure the same convention is used by all cameras collecting data photos. Photos will be renamed later following the naming

conventions described below.

Download Images from the Camera

When returning from the field, images must be downloaded from the camera and placed in the appropriate folder as soon as possible. If this is the first-time processing images, create a folder called “GeoJot_Original_Images” in your local working C:\ drive:

1. Connect the camera to the computer with the appropriate import cable or use a card reader to download the images.
2. Download photos from the camera and copy them to:
 - a. A sampling event folder (YYYYMMDD) within the “GeoJot_Original_Images” folder, *C:\Users\[UserName]\Documents\GeoJot+ Core\GeoJot_Original_Images\[YYYYMMDD]* (see Figure SOP 14.2).

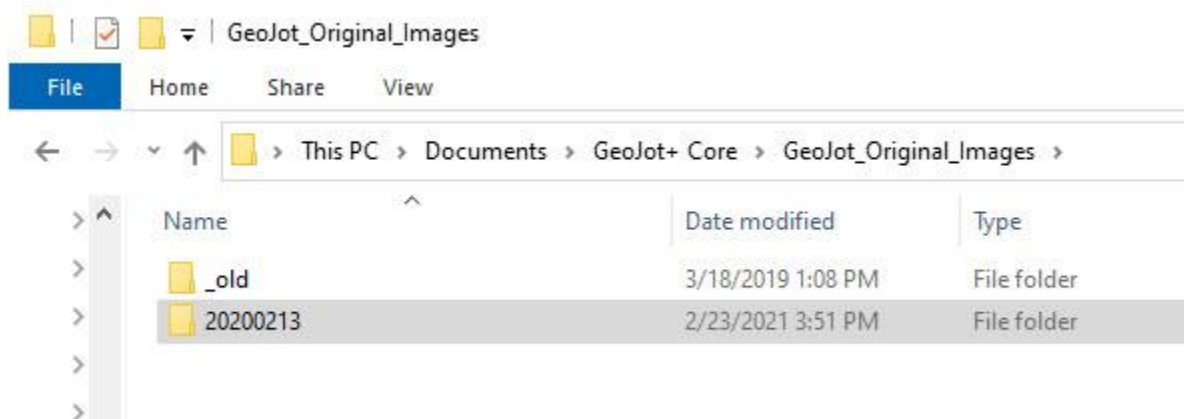


Figure SOP 14.2. Example of “GeoJot_Original_Images” folder structure.

-and-

- b. A sampling event folder within the “Originals” folder on the I:\ drive, *I:\vital_signs\13_water_quality\Images\[Year]\[Park]\Originals\[YYYYMMDD]* (see Figure SOP 14.3).

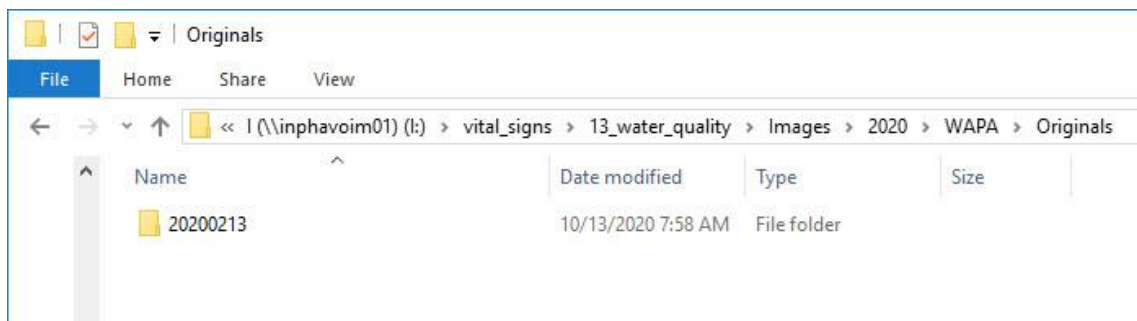


Figure SOP 14.3. Example of “Originals” folder structure.

3. Once images have been successfully downloaded, delete them from the camera.

Process Images

All data photos should be processed using the GeoJot+ Core® software following the instructions in the latest version of the *SOP Processing Images with GeoJot+ Core® Software*, located at [I:\\vital_signs\\13_water_quality\\Data\\Database\\Database_documentation,SOP_Processing_photos_GeoJot_Core.docx](I:\\vital_signs\\13_water_quality\\Data\\Database\\Database_documentation,SOP_Processing_photos_GeoJot_Core.docx).

The SOP contains information on how to add the watermarks to the images, rename images, and where the processed image files should go.

Rename Images

All data photos will be renamed during image processing with GeoJot+ Core® software and should be named in the following format (see Figure SOP 14.4):

[YYYYMMDD]_[Station_ID]_[type]_WQ_[TYPE]_[Direction]¹.jpg.

The software will automatically update the file names during processing based on the applied memos. If the watermarks are incorrect, they can be updated during processing. For renaming image filenames correctly, refer to the “Rename Photos” section in the SOP [Processing Images with GeoJot+ Core® Software](Processing_Images_with_GeoJot+_Core®_Software).

¹ Refer to “Appendix B: Abbreviation Key for File Naming Conventions” in the most recent version of the *SOP Processing Water Quality Sampling Event Files* located at [I:\\vital_signs\\13_water_quality\\Data\\Database\\Database_documentation,SOP_WQ_data_processing_steps.docx](I:\\vital_signs\\13_water_quality\\Data\\Database\\Database_documentation,SOP_WQ_data_processing_steps.docx).

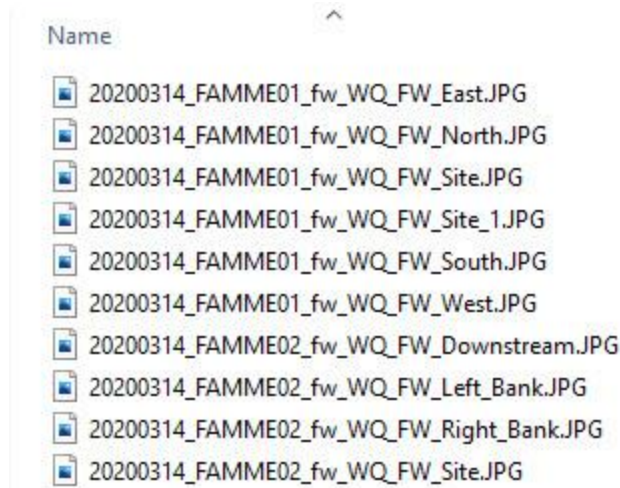


Figure SOP 14.4. Example of image file naming standards for water quality monitoring.

If data photos were taken with a non-Ricoh camera, it is likely that you will need to add memos to the photos during processing. There are several resources that can be used in order to determine the correct memos for a photo:

- Scanned or hard-copy datasheets –
 - Photo information may be noted in the Digital Photograph Information section of the water quality datasheet for a station.
 - Compare data/time information on the datasheet to the data/time information associated with the image files.
- Rite in the rain logbook

Refer to the “Data Editor” section in the SOP [Processing Images with GeoJot+ Core® Software](#), which will go over the method used to add missing memos during processing.

Review and Edit Images

Delete any poor quality photos, repeats, blurred or otherwise unnecessary photos. Low quality photos might be retained if the subject is highly unique, or the photo is an irreplaceable data photo. Edit the photos by doing any of the following if needed:

- Rotate the image to make the horizon level.
- Photos of people should have ‘red eye’ glare removed.
- Photos should be cropped to remove edge areas that grossly distract from the subject.

Photos can be edited using any approved software – e.g., Photos®, Paint®, SnagIt®, and GeoJot+ Core® (refer to the “Photo Editor” section in the SOP [Processing Images with GeoJot+ Core® Software](#) for more information).

Organize Images

Specific procedures for organizing images can be found in the “Copying Processed Image Files to the I:\ Drive” section in the SOP [Processing Images with GeoJot+ Core® Software](#).

Once data images have been renamed and reviewed/edited, the data images can be copied to the “Data” folder for the correct year and park. Any other miscellaneous images should be moved to the “Misc” folder for the correct year and park. Images that are to be linked to the database will need to go into the “Database_images” folder. See Figure SOP 14.5. See “Copying to “Data” Folder” section in the SOP [Processing Images with GeoJot+ Core® Software](#).

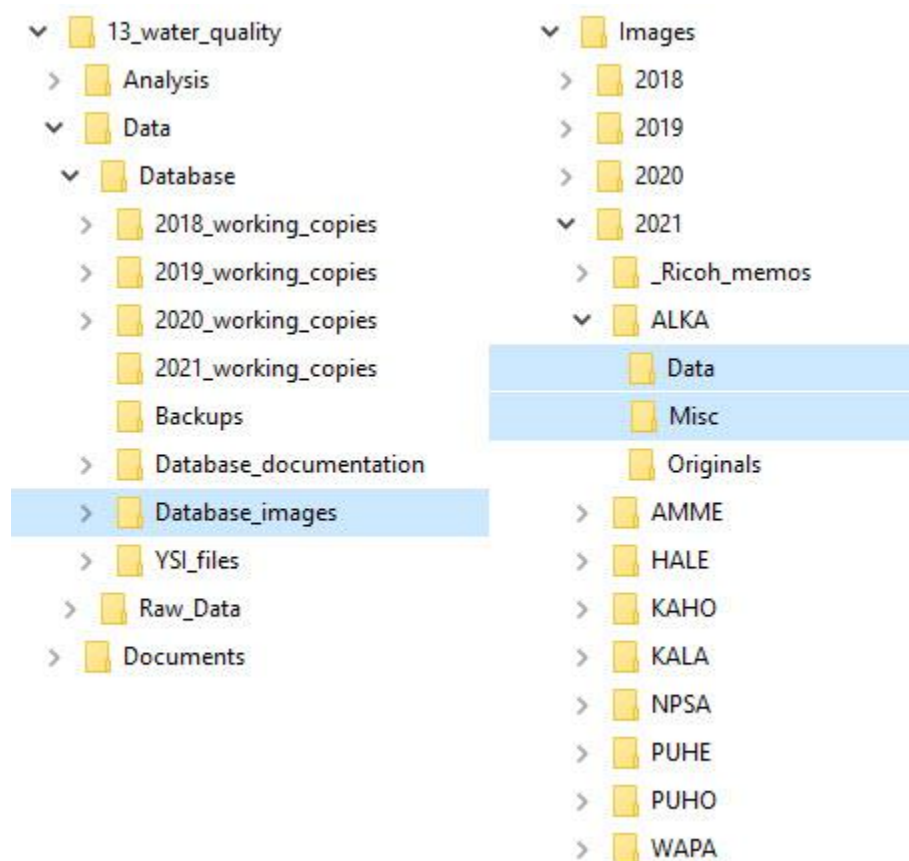


Figure SOP 14.5. Example of “Data”, “Misc”, and “Database_images” folders for image file organization.

Photos of interest to a greater audience will be copied to the PACN Digital Library\Photo Archive folder by the PACN Data Manager. Generally, these images are high quality, high resolution, but lower quality images may be included if the subject matter has broad appeal and is special, rare, or unique. Metadata associated with the image should be entered into the ThumbsPlus® application. The SOP for using ThumbsPlus® gives detailed instructions on how to use the metadata database.

Establish Database Links

Images for the water quality monitoring protocol can be directly linked to the data in the Water Quality Monitoring Database. During data entry and processing, the database application will

provide the functionality required to establish a link between each database record and the appropriate image file(s). To establish the link, the database prompts the user to indicate the root project workspace directory path, the specific image folder within the project workspace, and the specific file name. This way, the entire workspace may be later moved to a different directory (i.e., the PACN Digital Library) and the links will still be valid after changing only the root path. Refer to SOP #12 Workspace Setup and Project Records Management, and SOP #16 Data Entry and Verification for additional details on setting up the database images structure and establishing these links.

Note: It is important that the files keep the same name and location once these database links have been established. Users should not rename or reorganize the directory structure for linked image files without first consulting with the PACN Data Manager.

The procedures for linking images to the Water Quality Monitoring Database can be found in *Water Quality Monitoring Database User Guide*, located at [I:\\vital_signs\\13_water_quality\\Data\\Database\\Database_documentation](I:\\vital_signs\\13_water_quality\\Data\\Database\\Database_documentation), *PACN_water_quality_database_users_guide.doc*.

Image Documentation and Cataloging

Non-data images stored in the PACN Digital Library should be documented and cataloged. Documentation, or metadata, provides the minimum information a user will need to appropriately use the photo. Cataloging provides a collective means for searching, finding, and retrieving photos. A variety of software is available to facilitate this process; the software the PACN uses is the latest version of ThumbsPlus®. The standard operation procedure for using ThumbsPlus® gives detailed instructions on how to use the metadata database.

The NPS has published the Digital Photo Metadata Standard for all images. This standard identifies the full scope of metadata elements that a project in the NPS might use to describe, manage, and preserve digital images. The Digital Photo Metadata Standard specifies that seven metadata elements are considered mandatory. It was determined that these are the minimum number of elements required to enable an NPS project to access, interpret, and manage an image. All photos should be documented with these minimal metadata attributes:

- Date/Time
- Title
- Location
- Park Code
- Metadata/Access Control
- Constraints Information
- Contact Information

Projects should store data photo metadata attributes in the appropriate relational tables of the project database. Project databases should contain at least the minimum metadata requirements listed above.

Final Storage

At the end of the season, and once the year's data are certified, data images for the year will be moved to the PACN Digital Library for archival. Before data is certified all data images should be checked for completeness and linked to the database. Since the project images are on the network server, simply inform the PACN Data Manager that the images are ready to be archived. These files will be loaded into the water quality monitoring project section of the PACN Digital Library, and the database links to data images will be updated accordingly.

Literature Cited

National Park Service (NPS). 2006. Digital Photo Metadata Standard, Version 1.0, A Conceptual Model. U.S. Department of Interior, National Park Service. Washington, D.C.

Pacific Island Network (PACN). 2021. Processing Images with GeoJot+ Core® Software, Version 2.0. Pacific Island Network, National Park Service. Hawaii National Park, HI.

Pacific Island Network (PACN). 2021. Water Quality Database User Guide, Version 2.0. Pacific Island Network, National Park Service. Hawaii National Park, HI.

Pacific Island Network (PACN). 2008. Using ThumbsPlus® Version 7, Version 1.0. National Park Service, Pacific Island Network. Hawaii National Park, HI.