

South Florida/Caribbean Network

National Park Service
Inventory and Monitoring Division



Standard Operating Procedure CR22

File Storage and Archiving—Version 2.1

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Summary

Describes where the physical items as well as digital files produced from implementing this protocol are stored, and how they are archived.

Revision Log

Revision Date	Author	Changes Made	Reason for Change	New Version #
2015	Andrea Atkinson	Procedures documented in a written SOP.	Steps were performed previously but not written as an SOP. Tied to I&M 2.0 version of protocol.	2.0
2020	Judd Patterson	Refreshed to cover current physical and digital artifacts, and the use of Data Store for more products.	Some items like tapes are no longer used, but SD cards have been added. The database is now hosted in an NPS Data Center. Overall the archiving strives to decrease the number of duplicate file copies kept on the SFCN Server and instead increase the usage of NPS Data Store.	2.1
2023	Mike Feeley	Updated archival external hard drive address.	Address changed.	2.1
2025	Lee Richter	Updated server information to Azure locations	Shift from physical FL & VI servers to Azure server	2.1

Overview

Each year many physical and digital artifacts are produced for this protocol that must be properly stored and archived (Table 1) to ensure their long-term availability. These include:

- Physical artifacts
 - Datasheets, tapes, and Secure Digital (SD) cards
- Digital artifacts
 - Video files and video frame image files with dotting
 - Disease photos
 - Scanned datasheets
 - Field database (i.e. FileMaker Pro *.fmp12)
 - Long-term SQL database
 - Exported flat files
 - Protocol and SOPs
 - Analysis scripts and data dashboards
 - Resource briefs, data summary reports, trip reports, and trend reports

Table 1. Digital file types and storage locations.

File Type	SD Memory Card ^A	NPS Data Center	Server ^A	Network Attached Storage (NAS) ^A	IRMA Data Store	Git Repository
Video files	X	–	X (current year)	X	–	–
Video frame images w/ dotting	–	–	X	–	–	–
Disease photos	–	–	X	–	X	–
Scanned Datasheets	–	–	X	–	X	–
Field Database (FileMaker Go)	–	–	X	–	–	–
SQL Database	–	X	–	–	–	–
SQL Database Exports (as flat files)	–	–	X	–	X	–
Protocol & SOP documents	–	–	X	–	X	–
Analysis scripts and data dashboards	–	–	X	–	–	X
Resource briefs	–	–	X	–	X	–
Reports	–	–	X	–	X	–

^A SFCN will continue to update long-term storage with the best available, affordable technology.

This is a very active protocol, and in 2019 alone there were approximately 17,500 digital files with a total storage size of over 500GB. There are several strategies employed, depending upon the data type, to ensure that all digital data are stored redundantly to prevent loss. Annual archiving typically occurs in December/January of each calendar year, although some of the steps may occur after each site visit.

The South Florida/Caribbean Network (SFCN) historically maintained two separate servers, one physically located at the SFCN office in Palmetto Bay, Florida and the second one at Virgin Islands National Park on St. John, U.S. Virgin Islands. In 2023, a shift occurred to a cloud-based Azure server. This Azure server is currently the primary storage for all SFCN digital files.

Video Files

Video collection for this protocol began with MiniDV tapes in 1999, then moved to HDV tapes in 2008, and most recently changed to SD memory cards in 2016 (Table 2). All the original recording media are retained and stored in either the SFCN Palmetto Bay conference room or the VIIS Visitor Center on St. John. For a time, video files from the HDV tapes were also backed up to BluRay disc and stored in the SFCN Palmetto Bay conference room.

Table 2. Video formats used over time and storage locations.

Video Camera	Recording Media	Video Resolution (pixels)	Years of Usage at SFCN	Recording Media Storage Location(s)
Sony DCR-VX1000	MiniDV tape	640x480	1999-2008	SFCN Palmetto Bay Conference Room
Sony HDR-FX1	HDV tape	1920x1080	2008-2016	SFCN Palmetto Bay Conference Room
Panasonic Lumix GH4	SD memory card	1920x1080	2016-present	SFCN Palmetto Bay Conference Room and VIIS Visitor Center

Given the large file sizes created from hours of HD video recorded each year, the server is not ideal for long-term storage. To save space only the last year or two of video is stored on the server. Periodically the remainder is transferred to longer-term storage on the INPSFCN18800NAS networked attached storage device. This hard drive array is in the SFCN Palmetto Bay conference room.

To connect to Coral Video Archive, use the following mapping while connected to VPN or behind the firewall:

file:///10.250.230.209/SFCN_Archive/

Open a File Explorer tab and cut and paste the link above or press control and click on the link. This will open the directory in a windows explorer window. To permanently map to the Coral Video Archive you'll need to Map the Network Drive (Figure 1).

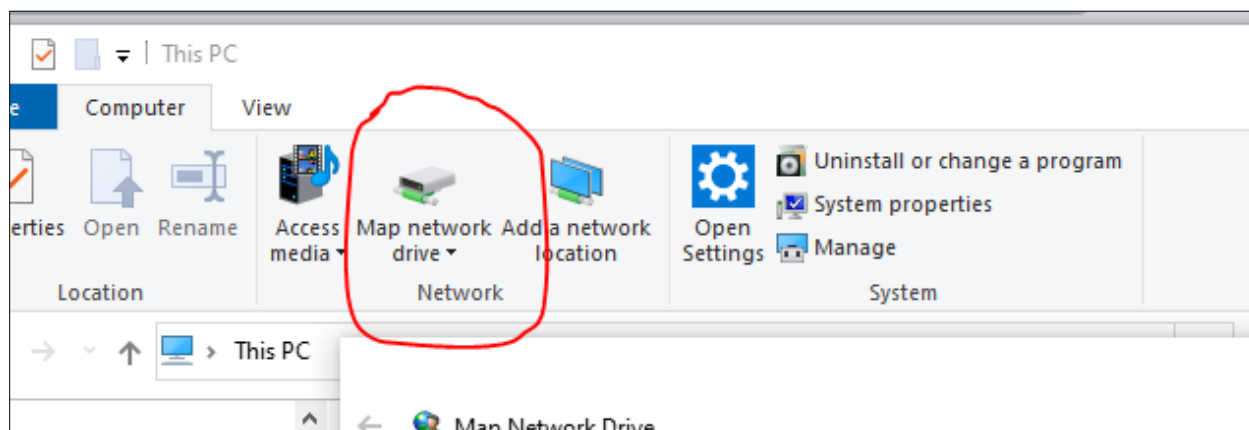


Figure 1. In Windows Explorer, select Map Network Drive (circled in red) to connect to the Coral Video Archive.

Enter the following location into the “Folder” field (Figure 2):

[\\10.230.230.209\SFCN_Archive](\\10.230.230.209\SFCN_Archive)

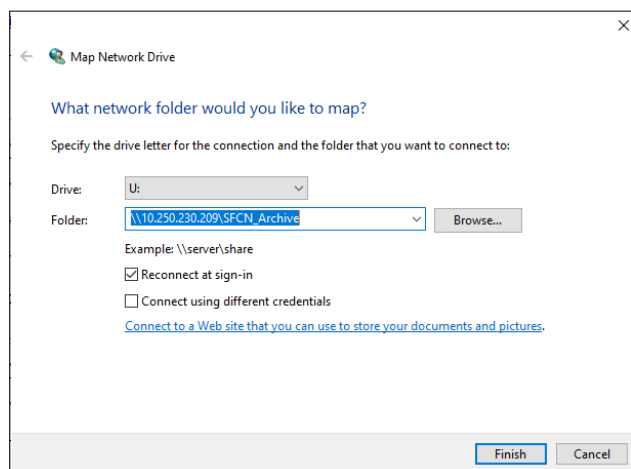


Figure 2. Enter the location of the Coral Video Archive into the Folder field.

Dotted Video Images

These images are stored on the server in an organized folder structure. The root folder is located here:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\images\coral_video

There are additional subfolders by PARK and SITE, and a final folder by YYYYMM_TripType_VideoType (e.g., 201909_annual_HDGH4).

Disease Photos

These photos are stored on the server in an organized folder structure. The root folder is located here:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\images

There are additional subfolders by PARK and SITE, and a final folder by YYYYMM (e.g., 201909).

After the coral disease data have been checked and the data processing level has been changed to ‘Accepted’ or ‘Certified,’ the disease photos for that year are combined into a zip file and uploaded to IRMA Data Store by Data Management.

Datasheets

Florida physical datasheets are stored in the SFCN Palmetto Bay conference room in a three-ring binder on the Marine Benthic Communities shelf. Virgin Islands physical data sheets are stored in the file cabinet drawer labeled “Data,” organized by year. All datasheets must also be scanned into PDF format and stored on the server. Care is taken that the scanned datasheets are both legible (e.g., any pencil markings have high enough contrast in the scan) and include any important markings along the page margins. The scanned datasheets are found at:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\data\scanned_datasheets\PARK

After the coral data have been checked and the data processing level has been changed to ‘Accepted’ or ‘Certified,’ the scanned datasheets for that year are combined into a zip file and uploaded to IRMA Data Store by Data Management.

Databases

There are two primary databases used for this protocol. The first is the field database that is used on our iPads for the underwater collection of disease lesions, species lists, colony counts, *Diadema* counts, and rugosity measurements. These files are stored on the server in the following location, with subfolders for year and park:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\data\iPad\YYYY\YYYYMM_PARK

The second database is a SQL Server 2014 instance (database name: SFCN_Coral) running on an NPS Data Center server (INP2300VIRMASQL) within the National Information Services Center (NISC). At NISC the SQL database has full, nightly backups that are stored on physical disks for 90 days, and then on tape for three years (Patterson et al. 2017).

Exported Flat Files

Annual archiving for these files starts once the Marine Ecologist or designated project lead and Data Manager has affirmed that the appropriate QA/QC procedures for a calendar year's data are complete and determined that the data are ready for sharing.

Within the IRMA Coral Reef Monitoring application reports for coral video, coral disease, species lists, *Diadema* counts, and rugosity are each run and exported to a CSV flat file. These files are stored on the server in the following location:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\data\AIR\YYYY

These files are then uploaded to IRMA Data Store and set to be viewable by the public.

This is a format that can easily be sent in response to data requests.

Protocol

The latest versions of the protocol and SOPs are on the server in the following folder:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\documents\protocol

There are additional subfolders to hold versioned documents, as well as an 'updates' folder where changes are staged before they are published. Each published version is also uploaded to IRMA Data Store, set to be visible to public, and linked via the [SFCN website](#). The Data Store references take advantage of the versioning system to ensure line of sight through previous protocol/SOP versions.

Associated Analysis Scripts and Data Dashboards

Any analysis scripts that are used such as an R script or dashboard Rmd are saved in the following folder:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\analysis\R

To ensure clear code management, ideally these scripts will be stored on an approved Git repository. The latest version of the Coral dashboard can be found here:

<https://github.com/nationalparkservice/SER-SFCN-CoralDash>

Resource Briefs and Reports

Any resource briefs and reports produced are stored on the server in the following folder:

X:\SFCN\Vital_Signs\Marine_benthic_communities\CoralMonitoring\documents\summaries
_&_reports

There are additional subfolders for each report type. These folders are used to store both the final Word document version and the 508-compliant PDF. The PDF is also uploaded on to IRMA Data Store and shared with the public.

The [SFCN website](https://irma.nps.gov/im/sfcn/reports-publications.htm) is a particularly good resource for finding protocol-specific documents. In particular, the ‘Reports and Publications’ page summarizes published reports across all protocols:

<https://irma.nps.gov/im/sfcn/reports-publications.htm>

Server Archive

The entire contents of the SFCN server are backed up nightly, and encrypted backups are also periodically transferred to the I&M Central Office in Fort Collins, Colorado.

Protected Information

The protection of sensitive resources is covered in detail in the latest, signed Protected Data Memo for each of the parks where we work. Typically, the only sensitive information that requires special attention is the presence of black coral (*Antipatharia*) and submerged cultural resources. In the unlikely event that black coral appears on an SFCN transect, data sets made available to the public will have black corals replaced with the taxon code for CORALU (unknown coral). If submerged cultural resources are observed or captured on video, this will be brought to the attention of the relevant park management.

Literature Cited

Patterson, J., S. Moll, and W. Sontag. 2017. NPS Inventory and Monitoring Technical Documentation: South Florida Caribbean Network (SFCN) Coral Monitoring. Inventory and Monitoring Division. Natural Resource Stewardship and Science. Fort Collins, Colorado. NPS/NRSS. <https://irma.nps.gov/DataStore/Reference/Profile/2276828> (last accessed April 2025).