

Cumberland Piedmont Network

National Park Service
Inventory and Monitoring Division



Standard Operating Procedure 8

Revising the Protocol and Documentation of Deviations and Major Changes—Version 2.0

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Summary

This standard operating procedure (SOP) explains how to make changes to the ozone and foliar injury monitoring protocol narrative for the Cumberland Piedmont Network (CUPN) and accompanying SOPs, and how to track these changes. Any changes in the ozone and foliar injury monitoring protocol will adhere to the guidelines contained in this SOP. Observers asked to edit the protocol narrative or any of the SOPs need to follow this outlined procedure to eliminate confusion in how data are collected and analyzed. This SOP also documents any known deviations from the narrative and SOPs, as well as formalized changes to the protocol narrative and SOPs that have been made over time.

Revision Log

Revision Date	Author	Changes Made	Reason for Change	New Version #
July 1, 2020	Johnathan Jernigan	Text in the protocol revision section was replaced with updated text from another network's protocol and then edited as necessary to fit this protocol. Also, a section was added that discusses major changes and deviations to the protocol.	The protocol revision section was updated because version 1.0 text was outdated and very generic. Version 1.0 did not include a section wherein changes and deviations to the protocol could be documented. So, that was added here to be more in line with what other networks are doing.	2.0

Revising the Protocol

SOP Source and How It Was Modified

The protocol revision section of this SOP is an adaptation of SOP VEG11 *Protocol and Database Revision—Version 1.0* (Carlson and Segura 2018) of the Monitoring Terrestrial Vegetation in Gulf Coast Network Parks Protocol Implementation Plan (Carlson et al. 2018). The Cumberland Piedmont Network has modified the Gulf Coast Network SOP where necessary to fit its ozone and foliar injury monitoring activities. Much of the text within this document is completely unchanged from that found in the Gulf Coast Network SOP.

Scope and Applicability

All changes to the CUPN ozone and foliar injury protocol require careful documentation and record keeping. This is completed in two ways: (1) summarizing and recording revisions at the start of each document in a Revision Log and conglomerated in a single location, at the end of this SOP, and (2) retaining a library of previous versions. Completing these steps enables the network to maintain consistency in the collection, summary, analysis, and reporting of data.

Instructions for the Revision Process

General Statement

The Cumberland Piedmont Network follows the most recent Inventory and Monitoring Division (IMD) protocol review guidance and procedures (Mitchell et al. 2018) in reviewing and revising protocol materials.

Review Panel

The recommended approach to revising the ozone and foliar injury monitoring SOPs, protocol narrative and database is to first discuss changes at an annual protocol operational review. A review panel consisting of CUPN staff and cooperators meets within a few months following the completion of the field season. Several weeks prior to the review panel, the CUPN protocol lead distributes a draft outline of discussion topics to each panel member. Panel members provide feedback on the outline to the protocol lead before the meeting. The protocol lead incorporates the panel members' comments and distributes a final version of the outline no later than the day before the review. This outline serves as the framework for the discussion during the meeting. Discussion topics cover, for example, protocol deviations, equipment changes, methods or safety improvements, lessons learned during the field season, field crew feedback, and potential SOP and database changes that came up during the field season or at other times.

After the review, the protocol lead makes revisions based on the review discussions. In instances where the database may be affected, the network data manager's input is solicited as well, to ensure they can make necessary modifications to the database.

After all document revisions are made, the protocol lead changes the date and version number on the title page of the master document (and elsewhere in other documents, as needed) and updates the revision log. The draft revised document is then sent to panel members and the Network Program Manager for review. Finally, the revised document is sent to the Regional Inventory and Monitoring

(I&M) Division Chief for final approval. Generally, the protocol lead revises the document in a “tracked changes” format, checks for internal review, and then sends all documents (including response to reviewers, if they were obtained) to the regional chief for final review and approval. The data manager revises the database, which is also sent to panel members for review.

After regional chief approval is obtained, revised protocol narratives and protocol SOPs are assigned a new report number by the National I&M Program Publication Manager. The new version of the document is then posted to the National Park Service’s Integrated Resource Management Applications (IRMA) Data Store, as well as archived in the appropriate CUPN vital signs protocol folder on the CUPN network drive.

Revision Timeframe

Most revisions are made once per year, following the annual Operational review procedure explained above. As minor changes are noted throughout the year, each user is expected to maintain a list for the annual review, or they can send potential changes as they arise to the protocol lead, who organizes and compiles them once a year for that meeting.

Revision Log Table

The revision log found at the beginning of each protocol document lists a summary of all edits to each version of that document since the original publication date. Information entered in these logs should be complete and concise. The logs track the following information: (1) the date of revision, (2) author(s) of revision, (3) description of change, including why it was made; and (4) the new version number. Author information will consist of full name.

Minor Revisions

Minor revisions are those that do not represent a change in the underlying methods or procedures used to generate data values for the protocol’s existing data set. Minor revisions include small changes in, or clarification of, procedures. Version numbers for minor revisions increase incrementally by tenths (1.1, 1.2, 1.3...).

Major Revisions

Major revisions are designated with the next whole number in the sequence (2.0, 3.0, 4.0...). A revision is considered “major” if there were changes in methodology that could influence the resulting data values and thereby limit the ability to compare newly-collected data with data collected using a previous version. Examples of this type of revision include:

- addition of monitoring objectives
- changes to the sampling design
- changes to reporting requirements
- addition of new variables
- deletion of variables

Communicating Changes to Investigators and Users

Once changes have been made, the updated document is posted on the IRMA portal under the “A protocol for monitoring ozone and foliar injury throughout the Cumberland Piedmont Network” project. The narrative and SOPs are each contained in their own digital file. Each time an SOP is revised, the protocol lead ensures that all known users obtain a current copy of the SOP and receive the necessary briefing material or training to understand and incorporate the change(s). Anyone completing tasks under this protocol is encouraged to contact the protocol lead beforehand to check for updates to the protocol or associated SOPs.

Archive of Previous Versions

All published versions of the ozone and foliar injury protocol are made available under the “A protocol for monitoring ozone and foliar injury throughout the Cumberland Piedmont Network” project on IRMA. This online record begins with version “1.0.” All current and previous versions of the protocol are maintained on the CUPN server, in the following location: \\INPMACAFS\CUPN-MACA IM Projects\Vital_Signs\Vital_Signs_Prj\Ozone\Docs\Protocols.

Summary of Deviations from and Changes to the Protocol

Acknowledgements

This section of the SOP borrows heavily from Tierney et al. (2018).

Section Overview

This section documents:

- Known deviations from established methods. Deviations are situations where data were collected in a manner that is substantially different from the methods documented in the SOPs used during a particular field season.
- Major changes in the protocol. Major changes are fundamental shifts in the way data are collected that cannot easily be rectified with earlier data. Major changes are not deviations, provided that the changes are documented in the SOPs. Ideally, any time there is a major change in methods the networks will use both methods long enough to determine whether the results from the different methods are sufficiently correlated to allow old data to be corrected. In some cases, the small amount of data lost by the protocol change may not be worth the cost of overlapping methods.

The changes listed in this section use the park acronyms listed in Table 1.

Table 1. List of CUPN parks and their abbreviations.

Park Name	Abbreviation
Abraham Lincoln Birthplace National Historical Park	ABLI
Carl Sandburg Home National Historic Park	CARL
Chickamauga & Chattanooga National Military Park	CHCH
Cowpens National Battlefield	COWP
Cumberland Gap National Historical Park	CUGA
Fort Donelson National Battlefield	FODO
Guilford Courthouse National Military Park	GUCO
King's Mountain National Military Park	KIMO
Little River Canyon National Preserve	LIRI
Mammoth Cave National Park	MACA
Ninety-Six National Historic Site	NISI
Russell Cave National Monument	RUCA
Shiloh National Military Park	SHIL
Stones River National Battlefield	STRI

Known Deviations and Major Changes

This section of the SOP is intended to capture major changes in data collection over time, so changes that impact data analyses are summarized in one place. This section is also captures those situations where procedures were not followed as specified in the SOPs current at the time of data collection. Individual biosite deviations, such as datasheets missing data, are generally not recorded within this section of the SOP. These and similar individual biosite deviations are noted in the database, but not in this section of the SOP. Data users should consult the protocol database for anomalies in the dataset in addition to reviewing this SOP.

Overall Protocol Changes and Deviations

Narrative

1. 2023. Deviation: ceased sampling using a POMS (portable ozone monitoring station) and used QA/QC (quality assurance/quality control) procedures at MACA.
2. 2022. Deviation: ceased sampling using a POMS and used QA/QC procedures at MACA.
3. 2021. Deviation. Sampled CUGA at two sites since sampling could not be completed in 2020 due to COVID-19 travel restrictions.

Deviation: ceased sampling using a POMS and used QA/QC procedures at MACA.

4. 2020. Document Revision: added discussion of how we ceased sampling using POMS, removed references to POMS ozone monitoring, and added field QA/QC procedures. Revised protocol objectives to eliminate direct ozone monitoring and to no longer include detecting trends. Updated budgets and task lists. Updated database discussion. There were also numerous, small changes to processes that have been learned in the process of executing the protocol for 12 years.

Deviation: did not sample using a POMS and used QA/QC procedures. Also, did not sample CUGA, as was scheduled, due to COVID-19 travel restrictions.

5. 2019. Deviation: ceased sampling using a POMS and used QA/QC procedures at MACA. Also, sampled at COWP, which was not according to version 1.0 sampling schedule of the protocol.
6. 2018. Deviation: ceased sampling using a POMS and used QA/QC procedures at MACA.
7. 2017. Deviation: ceased sampling using a POMS and used QA/QC procedures at MACA.
8. 2015. Deviation: For logistical reasons, COWP was not sampled. It was moved to the last year of the protocol's six-year sampling rotation.

SOP#1: Training of Field Personnel

1. 2020. Document Revision: added details on the training materials available and which crew members should complete these trainings.

SOP#2: Pre-sampling

1. 2020. Document Revision: added revised training procedures, introduced possibility of episodic monitoring, and refined language from previous version.

SOP#3: Establishment and Location of Sampling Sites

1. 2020. Document Revision: added a current site list and modified some of the body text to remove references to outdated items, such as USFS (U.S. Forest Service) split plots (USFS 2008).
2. 2013. Established sites for KIMO and NISI.
3. 2012. Established sites for CARL and GUCO.
4. 2011. Established sites for LIRI and RUCA.
5. 2010. Established sites for CHCH and STRI.
6. 2009. Established sites for COWP, FODO, and SHIL.
7. 2008. Established sites for ABLI, CUGA, and MACA.

SOP#4: Sampling

1. 2023. Further edits to field forms to bring in-line with reviewer comments and comments received during operational review.
2. 2022. Further edits to field forms to bring in-line with reviewer comments and comments received during operational review.
3. 2020. Document Revision: QA/QC discussion was added and field forms were updated. There are numerous other minor edits/updates as well. Version 1.0 did not include QA/QC procedures except as described by USFS. Since the USFS ozone program is no longer active, we needed to design our own QA/QC processes. Version 1.0 also used USFS field forms. We have modified those here to better reflect how we have adopted USFS processes. Many of the fields they collected were not consistent with our needs.

SOP#5: Post-sampling

1. 2020. Document Revision: updated tasks due upon completion of field work and added voucher processing details. Tasks have been added since version 1.0. We also felt that this was the better place to discuss voucher processing.

SOP#6: Data Management

1. 2022. Database modifications: database functionality that had been lost due to malfunctioning elements was restored. Also, some modifications made to address changes made in version 2.0 of this protocol.
2. 2020. Document Revision: Added info about database development, data management overview and timeline, QA/QC procedures, and recent I&M (Inventory and Monitoring) guidance.

SOP#7: Data Analysis and Reporting

1. 2020. Document Revision: updated and included more details on what analysis and reporting consists of. This includes the addition of what we are doing for trip reports, resource briefs, and plans for synthesis reports.
2. 2019. Deviation: Used resource briefs for reporting results in place of NRR (Natural Resource Report) series reports. As of publication of version 2.0 of the protocol, reports for CY2019 fieldwork have not been completed.
3. 2018. Deviation: Used resource briefs for reporting results in place of NRR series reports.
4. 2017. Deviation: Used resource briefs for reporting results in place of NRR series reports.
5. 2016. Deviation: Used resource briefs for reporting results in place of NRR series reports.
6. 2015. Deviation: Used resource briefs for reporting results in place of NRR series reports.
7. 2014. Deviation: Used resource briefs for reporting results in place of NRR series reports.

SOP#8: Revising the Protocol and Documentation of Deviations and Major Changes

1. 2020. Document Revision: A deviations and major changes section was added to this SOP in the protocol (approach derived from Northeast Temperate Network protocol [Tierney et al. 2016]) to capture changes and deviations made over the course of protocol implementation, where changes impact analysis and interpretation of data. Much of the descriptive text for this SOP was borrowed from that previous version, as well as those edits written by the authors of CUPN's vegetation monitoring protocol (Carlson et al. 2018).

Field Forms

1. 2020, 2021, 2022, 2023. Made incremental edits to all field forms in response to suggestions during operational reviews and comments from protocol review. Edits, in total, are substantial.

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