



# **NEON Technical Working Groups**

## ***2020 Annual Report***

### ***Airborne Remote Sensing Data Quality TWG***



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National Ecological Observatory Network (NEON) is a project sponsored by the National Science Foundation and proudly operated by Battelle.

# Introduction

Since its inception, NEON has relied on expertise within the science, education, and engineering communities to advise on key areas impacting the design, construction, and maintenance of the observatory with the goal to optimize its operation. Currently, two types of external advisory bodies support staff and leadership in making key decisions that guide all of NEON's activities: the Science, Technology & Education Advisory Committee (STEAC) and Technical Working Groups (TWGs). Both bodies are comprised of experts nominated to serve in these roles who are selected by NEON staff following a rigorous selection process.

NEON currently relies upon input from 22 TWGs. These groups play an important role by providing input to NEON's data collection and processing methods and ensuring that NEON infrastructure, data, and programs are a valuable community resource. Working groups are participatory and advisory; they are often tasked with providing input on issues that have scientific, educational, engineering, or operational implications.

This document includes a summary of activities, recommendations, and NEON's response to those recommendations for the Airborne Remote Sensing Data Quality TWG during the 2020 funding year (November 2019-October 2020).

The Airborne Remote Sensing Data Quality Technical Working Group provides expert input and advice regarding NEON's airborne sampling design, data collection requirements and constraints, campaign scheduling, data products and algorithms, and reported quality metrics.

## Q1 – November 2019-January 2020

### Summary of Activities

Note: Contacted TWG co-leads in December 2019 about holding meeting in January or February, but no response received. FY2020 meeting now tentatively scheduled/proposed for March. Preparing revised charter to expand remit of TWG to cover AOP data products and data quality, as well as presentations focusing on revised flight campaign schedules for 2020-21.

### TWG Recommendations

N/A

### NEON Response

N/A

## Q2 – February 2020-April 2020

### Summary of Activities

Meeting held on 3/29/20 to introduce new members, review revised TWG name and charter, provide status update on Airborne Observation Platform (AOP) flight season, review letter to NSF on AOP data products, and to discuss and solicit feedback from TWG on sampling and data product optimizations.

### TWG Recommendations

The Airborne Remote Sensing Data Quality TWG agreed with new TWG name and charter, focusing on AOP data quality issues more broadly in addition to flight sampling design. The TWG recommended that NEON announce as soon as possible if collections are halted for the remainder of the year due to COVID-19 to reduce uncertainty to external science community. Regarding new data products, recommended potential adoption of the Committee on Earth Observation Satellites (CEOS) standards and evaluation processes (i.e., products might be published while in provisional stages so that they can be tested and improved by community). In response to proposal on scaling of NEON Imaging Spectrometer H5 radiances, the TWG agreed that this should be implemented to save storage space and cost. Due to time constraints, the TWG did not achieve consensus on proposal to relax solar angles, or whether recent flight schedule optimizations should be adopted on an annual basis, so group will further discuss these optimizations and their implications in the next meeting.

### NEON Response

Will present recommendations on external communications and CEOS standards to NEON's Science Working Group. Scaling of H5 radiances will proceed as part of production data processing. The next TWG meeting will be scheduled within two months to address optimization questions.

## Q3 – May 2020-July 2020

### Summary of Activities

Meeting held on 6/29/20 with 16 TWG members present. Provided updates on the AOP flight season, finalized the NSF letter on AOP data products, discussed potential AOP test flights to be held during 2020 down-time due to COVID-19, provided a brief update on plans to host AOP data in Google Earth Engine, presented on and further discussed the possibility of adopting CEOS standards for stages of data production, and continued the previous meeting's discussion on relaxing acceptable solar elevations for AOP collections.

### TWG Recommendations

The TWG recommended that AOP make it a priority to adopt a BRDF-correction algorithm in generation of surface reflectance products, and in the meantime ensure that the NEON website be very

clear on how to use non-BRDF corrected data properly. TWG suggested that if test flights were conducted, NEON should reach out to external researchers who could benefit from the data. TWG members were excited by the prospect of having access to AOP data in Google Earth Engine, and consensus was that both orthorectified flight line radiances and reflectances, as well as site mosaics be included, at least until BRDF corrected data were available. The TWG agreed that NEON should evaluate the CEOS standard to see if they are appropriate. Finally, the group recommended that 35-degree solar angles be considered for sites where topography was not too extreme.

## NEON Response

AOP will follow up with NSF regarding BRDF correction, and work with TWG members to adopt and implement the appropriate algorithm once inclusion of BRDF-corrected products is approved. AOP will also make NSF aware of TWG recommendations to add data to Google Earth Engine, and will approach the Science WG to evaluate the appropriateness of CEOS standards in rating data product maturity. AOP will also develop a list of sites where relaxed solar angles are appropriate for the 2021 flight campaign.

## Q4 – August 2020-October 2020

### Summary of Activities

No meeting was held during Q4. The next TWG meeting is scheduled for early December (Doodle poll sent out, awaiting responses). Three new members have been recruited, replacing two long-time members who have decided to withdraw for 2021. Meeting agenda includes the following items:

- New TWG member introductions
- 2021 flight campaign update
- 2020 test flights review
- Update on AOP data in Google Earth Engine
- Maintaining legacy data products
- Utility of tower cam metadata to external users
- Point density versus complete waveforms

### TWG Recommendations

N/A

### NEON Response

N/A