



# **NEON Foliar Sampling Technical Working Group**

## ***2020 Annual Report***



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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 Foliar Sampling TWG during the 2020 funding year (November 2019-October 2020).

The Foliar Sampling Technical Working Group provides expert input and advice related to sampling sunlit plant foliage, with a key goal of linking field measurements to remotely sensed observations of vegetation chemical and physical properties.

## Q1 – November 2019-January 2020

### Summary of Activities

Held the award year (AY) 2020 kick-off meeting in December. Gave brief overview of relevant sampling and data products for new members. Updated everyone on new protocol innovations - sampling with an unmanned aerial vehicle (UAV) and creation of crown polygon shapefiles. Asked for technical input on possible chemical contaminants - do we want to clean the leaves prior to analysis given high metal concentrations in some foliar samples, suggesting dirt/dust inputs.

### TWG Recommendations

Yes, group thought we should be cleaning the leaves. Exactly how to do it was discussed in depth over email. The chair sent a reference and proposed a method, then others weighed in. Ultimately, the group agreed on a path forward for how to modify our sample collection to include cleaning of the foliar tissue.

### NEON Response

The new leaf cleaning protocol was implemented starting with the 2020 sampling season.

## Q2 – February 2020-April 2020

### Summary of Activities

Over email, the TWG was asked to give feedback on a revised version of the Plant Foliar Traits data product user guide. There were several recent protocol updates and the guide was out of date. The TWG lead wanted to ensure that the user guide was clearly written and contained sufficient detail so that end users would know how to interpret the data product.

### TWG Recommendations

In general, group feedback suggested the document was written with sufficient detail and explanations, but several ideas were proposed to improve it further.

### NEON Response

TWG lead will incorporate these changes into the user guide, then post a revised version to the NEON data portal in the near future.

## Q3 – May 2020-July 2020

### Summary of Activities

The TWG did not meet this quarter, nor did we correspond over email.

### TWG Recommendations

N/A

### NEON Response

N/A

## Q4 – August 2020-October 2020

### Summary of Activities

The TWG was asked for input regarding poor execution of a foliar sampling bout at YELL – specifically, high-quality samples were not collected to coincide with AOP flights, ‘make-up’ samples were eventually collected much later in the season.

## TWG Recommendations

TWG notes that data collected outside of protocol specifications (late in the season, not aligned with AOP) must be clearly flagged. Additionally, the site should be resampled as soon as possible (not wait 5 years as is normally planned). As well, the actual AOP flights for given sampling plots where foliar data are collected should be recorded in the data.

## NEON Response

TWG lead took these recommendations to NEON internal leadership. They were supportive of re-sampling YELL as soon as AOP can return to the site, but the next scheduled bout is actually 2023 (not 2025). Decision was that if NEON can resample in 2021, we will, otherwise we will likely wait until 2023 and then continue with the every-five-years schedule from then on. TWG lead is working with data products and the AOP team to add remote sensing collection date to the foliar data as well as a new flag for 'samples not collected following protocol coordination guidance.'

## Additional Notes

An in-depth root cause analysis was conducted with the D12 manager and staff to understand why this poor protocol execution happened. As a result, plans have been made to try to limit reoccurrence, including protocol and training updates (broader Observatory concern) as well as revised strategies for communication between D12 managers and different levels of staff (regional specific concern).