



NEON Microbial Technical Working Group

2020 Annual Report



1685 38th St., Suite 100 | Boulder, CO 80301 | 720.746.4844 | www.neonscience.org

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

The Microbial Ecology Sampling Program encompasses measurements of soil and aquatic microbial diversity, composition, and abundances that are deemed critical for understanding long-term changes in biodiversity and ecosystem function. The tools used for measuring microbial diversity in the environment develop and change rapidly. NEON relies on input and guidance from the Microbial Technical Working Group to advise on questions related to methods and analyses, as well as best practices for ensuring data quality, accessibility, and usability.

Q1 – November 2019-January 2020

Summary of Activities

Held kickoff meeting in December: new member was introduced, and Charter was reviewed; Discussed issues with sequence data quality and lack of quality flagging of sequence data; Discussed workshop proposal.

TWG Recommendations

Recommend instituting quality flagging as soon as possible, general support for draft quality flagging criteria, seeking more community input.

NEON Response

Beginning internal discussions on proposed quality flagging approach.

Q2 – February 2020-April 2020

Summary of Activities

Email correspondence only occurred during this quarter. The TWG was asked to provide input on the following items: review the analytical laboratory's calculations for microbial biomass; aligning soil microbial measurements with other organismal sampling protocols; the technical soundness of employing different data processing methods for fungal ITS sequencing data.

TWG Recommendations

The TWG concurred that co-location of soil microbial sampling with plant measurements is more important than maintaining all tower plots within the tower airshed. The TWG also wondered how many soil plots would move as a result of NLCD rectification efforts, which spurred a flurry of internal discussion with the spatial team. Finally, the TWG did not have specific expertise regarding the use of two different methods for assigning fungal taxonomy; a member of the TWG reached out to a colleague who provided helpful insight into this topic. Internal discussions are ongoing.

NEON Response

The TWG perspectives were considered as part of the final internal review to spatially re-allocate plots for the NLCD rectification effort. Moving forward, the decision was made to not attempt to 'chase' NLCD classes if and when classifications change, in order to retain the important time series. Regarding ITS fungal taxonomic methods, internal discussions continue, and no final decision has been made, since testing of the processing pipeline is still underway.

Q3 – May 2020-July 2020

Summary of Activities

Reviewed and approved a proposal to change the data processing methods for microbial community composition data products; formed a microbial biomass QC working group; discussed ideas for NEON in developing useful tutorials for NEON microbial sequencing datasets.

TWG Recommendations

N/A

NEON Response

N/A

Q4 – August 2020-October 2020

Summary of Activities

In October, emailed with the group requesting feedback about 1) whether NEON should sample immature biocrusts as part of soil microbial sampling; 2) whether NEON should document the presence of biocrusts in soil samples.

TWG Recommendations

About half of the TWG responded. From the respondents, recommendation was made to 1) exclude immature biocrusts from soil samples, as they are not part of the soil matrix, and 2) to document the presence of biocrust in soil samples.

NEON Response

This is a relatively large change to the protocol and resulting data, and also would leave a data gap for the Observatory for measuring 'vegetative' biomass in arid environments. As such, a decision hasn't been made with reference to item 1, and the TWG lead is waiting to get feedback from the Biogeochemistry TWG as to whether they concur with the microbial TWG recommendation. As for item 2, decision was made to add the ability to document the presence of biocrusts in soil samples as a field data entry value.