



NEON Aquatic 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 Aquatic Technical Working Group TWG during the 2020 funding year (November 2019-October 2020).

The Aquatic Technical Working Group provides expert knowledge across the fields of Aquatic Ecology, Biogeochemistry, and Ecohydrology. This group is broadly geared toward aquatic observational sampling and instrumentation along with associated data products, design and maintenance documents, protocols, and algorithms.

Q1 – November 2019-January 2020

Summary of Activities

Kickoff meeting was held on 12/20/19. Introduced group and NEON points of contact, updated group on AOS and AIS status and challenges for 2020. Mentioned achievements and partnership with GLEON (Global Lake Ecological Observatory Network).

TWG Recommendations

TWG group members recommended that NEON correct SUNA (nitrate sensor) data from DOC (dissolved organic carbon) interference. DOC also absorbs UV (ultraviolet) light, which the SUNA uses to measure nitrate. The TWG also recommended that NEON apply a temperature correct chlorophyll-a data. Temperature affects fluorescence, a process known as quenching. A similar temperature correction is already applied to NEON fDOM (fluorescent dissolved organic matter) data. This kicked off an ongoing discussion about SUNA nitrate data quality via comparison with analytical lab samples.

NEON Response

The SUNA internal algorithm already attempts to compensate for DOC interference. We decided further SUNA-DOC corrections are site/situation dependent (variable in both space and time based on the aromaticity of DOC) and not easily without a large amount of additional information. Moreover, based

on existing literature, nearly all NEON sites have DOC concentrations below the level where the effect is likely to be outside currently published uncertainties in nitrate measurements. Chlorophyll-a temperature corrections are applicable to all sites and may be added in the future. SUNA-grab sample analysis was performed during commissioning, but NEON Aquatic Science should develop a workflow for regular data review (bi-annual).

Q2 – February 2020-April 2020

Summary of Activities

The Aquatic TWG did not meet during Q2 but is scheduling an update meeting to occur in mid-May. All communication during this quarter was via email. The TWG was asked to review draft examples of the newly designed data product quick start guides. There was also communication from AIS regarding a SUNA correction algorithm in response to recommendations made in Q1.

TWG Recommendations

Updated Data Products Quick Start guide templates-based feedback.

NEON Response

Updated QS guide templates. AIS also responded to SUNA correction discussion from Q1. Scheduling TWG meeting for May 18.

Q3 – May 2020-July 2020

Summary of Activities

Meeting held 5/18/20 with 7 external members present, 2 FSCI, and 2 AOS/AIS science. Discussed and assigned AOS protocol reviews, algal taxonomy QAQC issues, presented sensor data comparisons, and under-ice temp chains.

TWG Recommendations

Some recommendations on what groups to target for algal taxonomy QC survey. Continue looking at sensor/lab data comparisons, especially with pH, make sure labs are using appropriate standards. Under ice temperature is important and glad to see we are doing this.

NEON Response

Starting a separate Algal Taxonomy TWG to address those issues. Need to continue to monitor sensor and external lab data quality. AIS to continue with installing under-ice temperature chains in lakes.

Additional Notes:

Moving forward with reconfiguring multisondes to report chlorophyll in RFU, which was previous recommendation of the TWG.

Q4 – August 2020-October 2020

Summary of Activities

TWG has advised on the following topics:

- Chla sensors in small streams
- Shallow lakes sonde profiling
- Changes to NEON data product names

Next TWG meeting scheduled for Dec 15.

Adding four new members, plus NEON's visiting scientist Jeff Wesner.

TWG Recommendations

- Remove chla sensors from water quality multisondes at all small stream sites where chla is effectively non-detectable
- Allow water quality multisondes to not profile at shallow lake sites where prolonged stratification does not occur (D03, D09)
- Agree to changing discharge data product names

NEON Response

Aquatics is planning to move forward with recommendations.