

NEON Technical Working Groups

2021 Fourth Quarter 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.

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The National Ecological Observatory Network (NEON) is a major facility fully funded by the National Science Foundation and 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 24 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 each TWG during the fourth quarter of the 2021 funding year (August 2021-November 2021).

Airborne Remote Sensing Data Quality TWG

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.

Summary of Activities

2021 flight campaign update & 2022 campaign preview.

New QA stats for spectrometer and lidar data.

NEON canopy foliage sampling with associated ASD measurements.

Discussion on transitioning from HDF5 to Cloud-optimized Geotiffs.

Reviewers for AOP publications.

Demonstration of shiny app for assessing phenology and cloud cover during AOP surveys.

TWG Recommendations

1) Would be useful to see how AOP plans to adapt to wildfire smoke in future years given this is an increasing problem (e.g., longer deployments, altered schedules, possible data processing tweaks).

2) TWG members would be willing to share their experiences with NAV hardware/software that could assist with implementation of variable altitude flights.

3) Would like to see a publication come out of the data interoperability analysis AOP conducted between NIS and other sensors since this has a lot of utility to the science community.

4) Regarding ASD foliar sampling reflectance data that are made public, a subset of these data are useful for basic science and as inputs into radiative transfer model (RTM) inversions. Most useful is "Spectral transmittance - front of sample: top of foliage (sunward) on black reference", followed by "Spectral reflectance - black reference". However, not as useful are "Spectral reflectance of the front of sample: top of foliage (sunward) on white reference" and "Spectral reflectance back of sample: bottom of foliage (downward) on white reference"; these might be removed from data repository.

5) Tree crown delineation discussion: TWG members would like access to individual plant crown delineation data acquired from iPads in field.

6) Cloud-optimized Geotiff (COG) discussion: working with raster COGS may exact a performance hit when compared with HDF5 files; recommend providing users access to both COG and HDF5 formats, the former through Google Earth Engine, the latter through the standard APIs. And to widen user base, may want to create a QGIS plug-in.

7) Phenology/cloud cover R Shiny app demonstration and discussion: clean interface, would be nice to have available; a useful addition would be to include flight line KML boundaries that display the name of the flight line (and possibly file names associated with it).

NEON Response

1) AOP will update members on wildfire smoke adaptation measures developed during the AY22 flight season in subsequent TWG meeting

2) AOP will contact interested TWG members during AY 22 flight season preparations to explore NAV software useful for variable altitude flights

3) AOP will share draft data interoperability manuscript with TWG members before this is submitted for publication

4) AOP will review ASD CFC spectral reflectance data package and modify as appropriate

5) AOP will contact interested TWG members to facilitate their access to tree-crown delineation data

6) AOP is currently benchmark testing the performance of COGS accessed from within the Google Cloud Platform from Earth Engine and other software applications to better understand performance bottlenecks, optimal configurations, etc.; will report on these tests in future TWG meeting

7) R Shiny app development is nearly complete; anticipated launch is AY22 Q2; AOP will investigate feasibility of adding additional data layer requested by TWG

Algal Taxonomy TWG

Taxonomic identification of algae is difficult. Organisms are typically microscopic, and nomenclature has been changing in recent years. Taxonomic consistency between individual taxonomists, as well as taxonomy labs, is crucial to data quality over the time span of the NEON program. The Algal Taxonomy Technical Working Group seeks to assemble a group of algal taxonomists with broad spatial representation both for soft algae and diatoms.

The Group will be called upon to plan the best way to 1) develop a method for consistent taxonomic identification for NEON contractors, across labs and over time, 2) develop taxonomic comparison or harmonization across NEON Domains, and 3) facilitate and support data quality. The Group may also be called upon to evaluate how best to allocate limited resources while maintaining the best possible science and data product delivery.

Summary of Activities

Notified group via email that this TWG is not continuing into 2022, option to move to Aquatic Biology TWG. Also updated group on progress of pilot study at CU to assess different analysis methods and efficiencies.

TWG Recommendations

Group agreed on path forward to:

- 1) perform pilot study.
- 2) do final assessment on field sampling design to meet budget (dependent on pilot study results).
- 3) plan which samples will be analyzed for 2021 to stay within budget using pilot study results; and

4) and write new statement of work in AY22. Final plans will be discussed in the new Aquatic Biology TWG in AY22.

NEON Response

Pilot study initiated in December 2021, waiting on results.

Aquatic TWG

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.

Summary of Activities

Did not meet in Q4 and did not have any questions to the TWG to ask via e-mail.

TWG Recommendations

N/A

NEON Response

Atmospheric Stable Isotope TWG

This group provides guidance regarding sensor designs and assemblies, data products, and field and lab procedures and protocols to measure atmospheric stable isotopes of ¹³C in CO² and ¹⁸O and 2H in water vapor and precipitation water.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Biorepository TWG

The Biorepository Technical Working Group is comprised of curation, archival and museum collections experts as well as ecologists and others who would make use of the NEON Biorepository. The group advises NEON on curation best practices, and discoverability of and ready access to biological samples and specimens for future scientific research. A particular focus is to broaden the availability and use of museum assets for regional to continental-scale ecological research.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Breeding Landbird TWG

The Breeding Landbird Technical Working Group provides expert input and advice regarding the science design and protocols related to NEON breeding landbirds sampling.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Community Engagement TWG

The Community Engagement Technical Working Group (TWG) provides guidance on the ways in which NEON engages with its existing and potential user community. This includes scientists, educators, and students as well as organizations, agencies, institutions, and companies whose activities align with the mission and goals of the NEON program. Members serve as liaisons to the NEON user community while providing input on the program's strategic engagement plan and the activities and outcomes identified in that plan.

Summary of Activities

Met in December, gave an overview of engagement at NEON and welcomed new members.

TWG Recommendations

N/A

NEON Response

Data Standards TWG

The Data Standards Technical Working Group is tasked with making recommendations about effective ways to provide NEON's data products to the broader scientific, educational, and policy communities. Topics may include 1) principles, standards, and policies for open data and software, 2) data discovery, exploration, and delivery mechanisms, 3) improvement of data products to increase utility, and 4) monitoring impact of NEON data use on research.

Summary of Activities

Met on 10/25 (technically Q3 but beyond Q3's reporting time and the final meeting of the AY where we discussed final recommendations for the year).

1) TWG asked about vaccination and work from home/office status.

2) Talked about possible future cloud storage of data - what would be used? Standard, nearline, cold line, archive, etc? Could data be made available for cloud compute? This will be discussed in next meeting.

3) Reviewed past recommendations and progress toward completion.

TWG Recommendations

The group recommends:

1) Update to Recommendation AY18-20 To better understand user needs, track flow of users through the portals. Investigate Drupal 9 analytics modules that would make tracking user flow a simpler process. Capture basic data for later analytics as needed; do not build complex dashboards before a need arises. Track which data products are getting the most use, and whether this use appears to be correlated with events, e.g., workshops or natural disasters.

2) Recommendation AY21-01 Documentation for Release-2022. Clarify between release year and dates in the release, e.g., a table with release years and data years. Provide guidance for novice users - how should people use releases, and what is the expectation for checking for updates before publishing final analyses? Provide an explicit list of changes between Release-2021 and Release-2022 as well as everything that is new in Release-2022.

3) Recommendation AY21-02 Develop and provide widget to preview release manifests. Provide a widget in the data product webpage to view the manifest prior to download. Also allow direct download as plain text. This will help users understand data availability of released and provisional data before downloading data packages.

4) Recommendation AY21-03 Provide information to users about how NEON will leverage Google Cloud Platform for data storage. Develop basic documentation for users to understand how data will be available in GCP. External communities or other TWGs may choose to develop and contribute learning materials for how to leverage use of GCP. 5) Continue looking for ways to help users properly cite data products.

NEON Response

1) AY18-20. We will look for Drupal analytics modules as recommended to capture basic data for later analytics.

2) AY21-01. When we publish RELEASE-2022, we will attempt to clarify in the release documentation the difference between the data years and the release years, as well as how people should check for and use releases in their analyses. We will provide a list of changes between the new releases as well as new items in RELEASE-2022.

3) AY21-02. We will develop a widget to preview the release manifests as described, but due to resource limitations this may occur several months after the publication of RELEASE-2022.

4) AY21-03. We appreciate the clarity and simplicity of this advice and will pass it along to our education team.

5) Citation help: This is not explicitly called out as a new recommendation, but we will continue to look for ways to help users properly cite NEON's data, particularly when they are downloading the data via neonUtilities and the API.

Ecological Forecasting TWG

The Ecological Forecasting TWG provides recommendations to NEON on how to best support ecological forecasting. This may include facilitating community discussions around forecasting needs, providing guidance for data product development, and identifying opportunities for NEON to engage with the forecasting community though workshops, educational materials, and code/data product development.

Summary of Activities

Drafted recommendations document. Recommendations and responses are here: https://docs.google.com/document/d/1IVPNu8sBh5Vq1L7QT0Q1gL3YOn6ZtlLtKssTAiNQxkQ/edit

Also elected new Chair (Cayelan Carey is stepping down and Tim Morin taking over).

TWG Recommendations

1) Continue to support the activities of the NEON Forecasting Challenge: specifically, accessing more data products more rapidly than monthly. To add to the current list, we specifically recommend expedited access to the following aquatic sensor datasets:

DP1.20264.001: Temperature at specific depth in surface water

DP1.20288.001: Water quality

DP1.20053.001: Temperature (PRT) in surface water

Moreover, we request precipitation be added to the flux 5-day latency data product (currently, the SAE HDF5 meteorological data only include air temperature, barometric pressure, wind speed, and radiation).

We see reduced latency as a win-win for both the ecological community and NEON. For example, a success story is the new 5-day latency for the tower flux data led by Dave Durden (see: https://data.neonscience.org/data-products/DP4.00200.001). The reduced latency improves forecasts as well as enables the detection of data issues sooner, resulting in improvements to the data stream independent of forecasting applications.

2) Support continued updates to the EFI-RCN NEON website (https://www.neonscience.org/efi-rcnneon-ecological-forecasting-challenge) throughout the Challenge. Soliciting feedback on website content from Challenge participants as well as monitoring website hits would be helpful for updating the site during this upcoming year.

3) Develop additional gap-filled meteorological data products that are necessary for modeling and forecasting applications. There has been great progress on the flux tower sites (under the NCAR-

NEON project, led by Dave Durden), motivating our request for NEON to: 1) provide gap-filled meteorology data projects for the aquatic sites (in addition to the flux tower terrestrial sites), and 2) develop a plan for ensuring the continuation of the gap-filling once the NCAR-NEON project ends. Specifically, it would be helpful for identifying mechanisms and a plan to ensure that gap-filling of meteorological data continues: for example, what funding might be available to support this effort? Who would the point person be (Dave Durden)? Where should the result files be stored? Etc.

4) Continue to make NEON staff available as point people for each Challenge theme to answer questions. Having these points of contact has been critical for helping new NEON data users navigate the data products specific to each Challenge theme and understand how best to include NEON data in their modeling and forecasting pipelines. Current Challenge point of contacts are:

Aquatic Ecosystems – Bobby Hensley

Terrestrial Carbon and Water Fluxes – Dave Durden

Tick Populations – Sara Paull

Phenology – Katie Jones

Beetle Communities – Eric Sokol

5) Develop a workflow for sharing, archiving, and citing Challenge-related NEON data not available in the NEON Portal. For example, every month, Bobby Hensley emails the forecasting team at Virginia Tech YSI sensor depth profiles from the lake sites, which are used to complement the stationary sensors deployed in the lakes. This ancillary data is critical for lake forecasting and hydrodynamic modeling but is not available via the NEON Data Portal (and thus there is also no current mechanism for citing this dataset in manuscripts).

6) Consider "awards" or recognition for the EFI-RCN NEON Challenge participants - in its first year, recognition has been mainly focused on the Challenge participants leading the important and significant work needed to get the Challenge up and running for multiple themes. In its second year and beyond, recognition could include the best forecast(s) for each theme with some special recognition from NEON at the annual ESA meeting or other event. The focus would be to increase the recognition of both the forecasting teams and the NEON Challenge itself, as well as celebrate the integration of NEON data into analyses led by many different research teams.

NEON Response

1) Eric and Dave will continue to communicate these priorities for lower latency to the appropriate teams at NEON and provide updates on progress to the EF TWG in AY2022. This will be an iterative process, but the EF TWG will provide an avenue of two-way communication between the user community and the scientists and developers at NEON.

2) Eric and Christine will provide a point of contact for the EF TWG and others involved with the EFI RCN forecasting challenge to make updates to the NEON EcoForecasting web page.

3) We thank the EF TWG for identifying this effort as a priority moving forward. We will prioritize gapfilling as a topic for discussion for the EF TWG during AY2022 and work with NEON Science Leadership to determine if this effort is within scope or if the EF TWG should identify other options to pursue to continue this effort over the long-term.

4) The NEON staff POCs for each topic have been updated in the list above.

5) We will prioritize this topic for the EF TWG in AY2022 and work with NEON staff to (1) identify such data sets that may not be available and (2) develop a plan to prioritize and make such data sets available, possibly through the NEON prototype data portal (https://data.neonscience.org/prototype-datasets).

6) This is a great idea and might help increase participation in the EFI-RCN NEON Challenge. The EF TWG can coordinate this effort between NEON and the EFI RCN during AY2022 if the TWG decides this is a priority.

Fish TWG

The Fish Technical Working Group provides expert knowledge and support for the development of field-based protocols and strategies for standardization of sampling across NEON aquatic sites.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Foliar Sampling TWG

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.

Summary of Activities

Samantha Weintraub-Leff spoke with specific members of the TWG with experience mapping crown polygons in the field about software and technical workflows. NEON uses ESRI software, which has advantages but also some limitations, and Samantha Weintraub-Leff wanted to learn more about alternate approaches.

TWG Recommendations

TWG members explained their different proprietary and open-source software approaches, but none are perfect, and each has tradeoffs and limitations. As such, a specific software solution was not recommended by anyone for NEON-wide adoption.

NEON Response

Samantha Weintraub-Leff continues to work with the AOP team to optimize the process for creating raster layers to use for field crown polygon delineation. With continued experimentation, she is optimistic that the ESRI/ArcGIS approach can serve the needs of the foliar sampling data product.

Ground Beetle TWG

NEON collects ground beetle observations and archival samples at all terrestrial field sites to capture how ground beetles (*Carabidae*) communities change in different habitats and ecosystems over time. This TWG determines targets for sampling that generate data that can reveal significant changes in beetle abundance, diversity, and community composition.

Summary of Activities

No meeting held.

TWG Recommendations

N/A

NEON Response

LiDAR TWG

The LiDAR Technical Working Group assesses and recommends strategies for developing and implementing techniques for instrument calibration and data validation, operational instrument testing, and product data formatting for vegetation remote sensing.

Summary of Activities

Provided overview of 2021 flight season including challenges associated with the new lidar sensor, and preview to 2022 season. Demonstrated enhanced capabilities provided by the new lidar sensor, particulart in terms of high point densities. Gave overview of new lidar QA metrics we have adopted. Solicited input on different workflows for alignment of lidar strips.

TWG Recommendations

TWG though our handling of the lidar sensor issues was good, were excited with the data produced by the new lidar sensor, no recommendations concerning the new lidar sensor.

Discussion on the strip alignment processes demonstrated these different techniques can have an effect on the data at the 5 cm - 10 cm level. TWG members were not concerned about this level of accuracy and recommended to choose the most efficient method for data processing.

NEON Response

In response to comment on the strip alignment methodology, AOP will continue in its current workflow for correcting relative strip to strip adjustments.

Microbial TWG

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.

Summary of Activities

TWG met to discuss strategies for recruiting a new microbial bioinformatician for the NEON program.

TWG Recommendations

TWG recommended modifications to draft language to better emphasize the opportunities for the candidate to maintain a scientific research program.

NEON Response

NEON modified the job description according to TWG recommendations, providing the revised version to the group. Once the job was posted, the link and announcement was shared with the TWG to assist with recruiting.

Mosquito TWG

The Mosquito Technical Working Group is comprised of researchers focused on topics including mosquito surveillance, public health, disease ecology, and phenology. The group advises NEON on sampling approaches that will generate data that reveal significant changes in mosquito abundance, diversity and community composition. A focus of this group is to ensure compatibility of the mosquito dataset with other surveillance infrastructure used to monitor arboviruses in mosquito populations.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Re-aeration TWG

The Re-aeration Technical Working Group provides feedback on NEON re-aeration sampling protocols. The TWG is helping to evaluate previously collected data and develop plans to reduce the frequency of re-aeration experiments by strategically targeting certain discharge ranges to complete k-Q rating curves which can be used by data users to estimate re-aeration. The ultimate goal is to phase out the use of sulfur-hexafluoride as tracer gas.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Small Mammals TWG

The Small Mammal Technical Working Group provides expert input and advice regarding the science design and protocols related to NEON small mammal abundance, diversity, and pathogen sampling.

Summary of Activities

We discussed prioritization of ear samples across 3 competing uses (barcoding, archive and pathogen testing). We also discussed the use of N95s for sampling in D17 as well as app enhancements to provide enhanced warning if a taxonID or sex would be changing on entry of recapture data.

TWG Recommendations

Archival uses of ear tissue can be low priority because whole voucher specimens can be used to supplement ear tissue use. Rare individuals should be prioritized for barcoding uses.

NEON Response

Sara's code for sample selection for different uses incorporated all these suggestions.

Soil Sensor TWG

The Soil Sensor Technical Working Group (TWG), provides feedback on all aspects of sensor measurements made in the TIS soil plots, including soil temperature, soil moisture and salinity, soil CO₂ concentration, soil heat flux, throughfall, soil surface photosynthetically active radiation (PAR), net longwave radiation, and soil surface/litter/vegetation infrared temperature measurements. In addition, the Soil Sensor TWG provides recommendations on approving or disapproving requests for large amounts of soil from the NEON Megapit Soil Archive.

Summary of Activities

Discussed optimal response to treefalls that partially obscure a ground-level quantum line PAR sensor. Requested feedback for TWG survey.

TWG Recommendations

TWG recommended to remove the smallest amount of fallen tree feasible that results in all debris (tree trunk, branches, etc.) removed from a zone extending 60 degrees from vertical above the quantum line PAR sensor in all directions. 60 degrees is the angle of incidence where the sensitivity of the sensor starts decreasing more rapidly.

NEON Response

Recommendation is being implemented.

Surface Atmosphere Exchange TWG

NEON measures the surface-atmosphere exchange of momentum, heat, and several climate-relevant trace gases. This Technical Working Group advises on the operation of NEON's surface-atmosphere exchange assets, development of novel, scale-aware data products, adaptive algorithms, and usability tools, and active contribution to network science. The Technical Working Group accomplishes these tasks by working closely with NEON's Surface-Atmosphere Exchange Group. This includes prioritizing quarterly developments, pre-reviewing new resources, and bringing forward community input.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Terrestrial Biogeochemistry TWG

The Terrestrial Biogeochemistry Technical Working Group provides expert input and advice regarding the science design and protocols related to measurements of plant and soil biogeochemistry within the NEON Observational System (e.g., not sensors).

Summary of Activities

Samantha worked with one of the TWG members, Mathew Craig, to analyze litter biogeochemistry data from a prototype study that the TWG helped formulate in 2020. The goal was to create an improved approach for litter biogeochemistry measures going forward. The prototype analyses and ultimate recommendations were shared with the rest of the TWG.

TWG Recommendations

The purpose of this exercise was to find a path to robust annual flux-weighted litter chemistry values without increasing costs substantially. Using the prototype data, Samantha and Mathew were able to propose a solution building off but not identical to what was done in the prototype. TWG members were supportive of the proposal as a sensible compromise solution, none were opposed.

NEON Response

Samantha took the recommendations to NEON leadership, who approved the change for implementation starting in 2022.

Terrestrial Instrument Data QA/QC TWG

The Terrestrial Instrument Data QA/QC Technical Working Group represents a diverse set of NEON data users and experts, in the relevant disciplines of biometeorology, soil science, ecology, and data science. The overarching goal of the TWG is to ensure that NEON delivers the highest quality data possible with the available resources and that quality information is adequately communicated to data users. The TWG broadly covers terrestrial instrument measurements, data processing, data monitoring, and data publication as they relate to quality.

Summary of Activities

Discussed progress and recommendations for new and old quality issues including 1) observations of spurious night-time PAR observations, 2) shading of tower-top radiation sensors, 3) unheated tipping bucket precipitation sensors, and 4) results of NEON's observatory-wide assessment of sensor drift.

TWG Recommendations

The TWG recommended to highly prioritize repositioning of radiation sensors at the tower top to avoid any shading. For precipitation records potentially impacted by lack of heating, the TWG recommended to identify a narrow range of temperature conditions which may cause precipitation data to be unreliable and to flag these records.

NEON Response

Both recommendations were accepted. A working group was formed to expeditiously address shading of radiation sensors. Precipitation records adversely impacted by lack of sensor heating were flagged.

Terrestrial Plant Diversity and Phenology TWG

Membership of the Terrestrial Plant Diversity and Phenology Technical Working Group includes researchers and practitioners from universities, federal and regional government agencies, and coordinated research networks. This group represents the community of plant diversity and phenology data users that NEON aims to serve; members provide expert input and advice regarding the science design, protocols, and data quality issues related to NEON plant diversity and phenology sampling.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response

Terrestrial Plant Productivity and Biomass TWG

The Terrestrial Plant Productivity Technical Working Group advises which methods, protocols, and equipment are employed to create robust ground-based estimates of live and dead woody biomass, woody and herbaceous productivity, coarse downed wood volume and density, fine and coarse litterfall, belowground plant biomass, and leaf area index across a suite of different vegetation types. The TWG also considers optimal spatial and temporal integration of ground-based measurements with remotesensing hyperspectral and LiDAR datasets (i.e., the NEON AOP system), and with data streams generated by the NEON Terrestrial Instrument System. Finally, the TWG is also deeply invested in determining how NEON Plant Biomass and Productivity data products can be optimized to enhance usability and value for the NEON end-user community.

Summary of Activities

Discussed TWG review of the Vegetation Structure protocol and Data Product.

TWG Recommendations

Getting comfortable with actually using the data is a heavy lift for people with no experience. In general, TWG members and their lab groups focused more on the Data Portal experience than the structure of the VST data products. Compared to the AmeriFlux website, members felt NEON Portal is not as intuitive. The focus of the review was meant to be on the structure of the products, so the fact that so much of the meeting was focused on the mechanics of interacting with and understanding the Portal was an unexpected (and not entirely positive) message in itself. Several TWG members also pointed out that the raw VST products are difficult to use, and many steps are required before a researcher is able to get to what may be of interest - e.g., biomass numbers per unit area. There is a market for derived data products when it comes to plant biomass.

NEON Response

Feedback was noted, received, and verbally communicated to Project Scientist (I believe). TWG POC (Meier) needs to prioritize continuing to work on external funding opportunity to create derived biomass data product; other priorities have prevented moving this forward.

Tick Sampling TWG

The Tick Technical Working Group provides expert input and advice regarding the science design and protocols related to NEON tick abundance, diversity, and pathogen sampling.

Summary of Activities

No meetings were held.

TWG Recommendations

N/A

NEON Response