

**STEAC MEETING REPORT**  
**(05/20/2022)**

The STEAC met on May 20, 2022, with a quorum of 11 members attending (Emily Bernhardt, Sarah Bevins, Michael Dietze, Anne Giblin, Peter Groffman, Sparkle Malone, Jackie Matthes, Kim Novick, Steven Petruzza, and Shawn Serbin). Seven NEON-Battelle staff attended (Zoe Gentes, Darcy Gora, Claire Lunch, Paula Mabee, Chris McKay, Bonnie Meinke, and Kate Thibault) in addition to the Domain Managers.

The meeting was virtual, and the following topics were discussed: I. New STEAC member selection, II. Data product communications, issues, III. NEON Connect and the Ambassador Program, IV. Meeting with Domain Managers, V. Meeting with the NSF NEON Program Officer, and VI. Assignable Assets Update & Business Model.

**I. New STEAC Member Discussion**

The STEAC reviewed 15 applications to the STEAC. Overall, the applicant pool was perceived to be strong with sufficient representation of the areas of expertise that were prioritized in the call for nominations: Human Dimensions, Policy, Organismal Biology, Collections, Cyberinfrastructure, Performance Metrics Network Science, and Diversity Equity & Inclusion. The STEAC limited discussion to scientists who were well beyond the date they earned their Ph.D. (i.e. > 5 years). On the basis of an anonymous vote, the STEAC recommended six applicants for invitations to the STEAC. The STEAC is excited to work with these scientists and believes they will provide important and fresh perspectives. The STEAC is mindful that the majority of the more “senior” scientists on the committee are rotating off soon and a balanced career stage will be a priority for future calls for nominations.

**II. Data Product Communications, Issues**

A fundamental responsibility of NEON is providing data that researchers trust. Issues that arise with data products can have a substantial impact on downstream analyses and scientific workflows, and so NEON continues to work through how best to communicate data product issues with end-users. When an issue is identified that affects multiple data products or multiple NEON sites, data quality notifications are posted on the NEON website and individual data product landing pages. However, the STEAC pointed out that this information may still not be obvious or easy to find for end-users who have already downloaded data, particularly if they are using several different data products and need to track issues across products.

In order to make data notifications more discoverable, NEON is enhancing the data portal accounts for registered end users to allow users to indicate which data products they use and opt-in for automatic notifications on issues that arise with those data products. The STEAC notes that communicating data issues has always been a challenge and commends NEON for developing tools to improve user awareness of NEON products. While the STEAC recognizes the friction between account creation and a mandate for open data, they also note the importance of being able to communicate with data users when data quality issues arise. However, the issue of requiring a login to access some NEON tools was not fully resolved, as some members of the STEAC were concerned about adding new hurdles that could impact wider adoption of NEON data, and should be a topic for continued discussion at future meetings. The STEAC recommends the development of a single landing page that has the most up-to-date issues for all NEON data products, like a status dashboard, that allows users to quickly review the status of data products and any major outstanding issues. The quick start

guides NEON is putting together for data products will also enhance data use and will help streamline communication with data users.

As part of this discussion, the STEAC pointed out that, within some communities, data users prefer to use NEON data from data aggregators (e.g., Ameriflux for NEON eddy covariance data) instead of direct NEON downloads. This may indicate a preference for different data quality flags and formatting. The STEAC is interested in meeting with technical working groups (TWG) in the future to discuss data collection/processing and the current QA/QC flag process in order to better understand the timeline for data issues being discovered and flagged. The STEAC is also interested in hearing from TWG representatives on data challenges in order to identify and prioritize potential solutions.

### **III. NEON Connect and the Ambassador Program**

NEON Connect is a new community platform in development by NEON to manage customer relations, allowing users to communicate with NEON and the greater NEON community. Through the platform, registered users will be able to access the data portal, receive notifications, make assignable assets requests and sign up for workshops. The platform will require a single sign on that requires user registration. This platform is essential for NEON to be able to follow users and measure the true impact of the observatory on the research community.

The members of the STEAC recognize the value and necessity of NEON Connect. The STEAC recommends that NEON make it clear that registration helps measure engagement over time. The members of the STEAC also appreciate that NEON

Connect is independent of the NEON data portal/API and therefore will not create a barrier to accessing NEON data for users who do not want to share information. The members of the STEAC recommend that NEON Connect highlight the benefits for registered users when this new engagement platform is launched (e.g., individualized data issue notifications, access to workshops and the assignable assets program).

The Ambassador Program is successfully building a community of helpers. Current projects include 1) NSF proposals for workshops and hackathons, 2) applications for private support to NEON research proposals, and 3) the aggregation of contributed NEON stories to popular literature and professional history anthologies. The Ambassadors have also produced new ideas for projects that include: connecting with other NEON engagement programs and showing how NEON resources can be used by hosting events at conferences and meetings.

The STEAC congratulates NEON on the development of this program which is and will continue to pay off scientifically. Although very successful, this program seems like a lot of work for activities that are not central to the mission of collecting and providing data. While the STEAC understands that the priority for the NSF is the collection of data, they are also interested in the expansion of and engagement of the communities using NEON infrastructure.

#### **IV. Meeting with NEON Domain Managers**

The members of the STEAC were impressed with the perseverance of the Domain Managers throughout the COVID-19 pandemic. With the support of scientists at NEON,

Domain Managers maintained data collection during the pandemic. The STEAC is proud of what they have accomplished during a very difficult time!

Domain Managers discussed the impact of a number of interacting socioeconomic factors (the COVID-19 pandemic, supply chain disruption, and inflation) on NEON's fixed budget. The STEAC pressed the Domain Managers on whether they think that seasonal employee salary rates, which may be low compared to entry level salaries in retail and the service industry, are making it hard to hire seasonal employees to work at the Domain sites. There was a sense that this problem was exacerbated this year due to inflation and overall low unemployment rates, and some managers mentioned that it might be impacting their capacity to hire a diverse workforce. That said, Domain Managers mentioned that the nature of the work and opportunities for career development were helping them to get good employees. The STEAC recognizes the ethical concerns of offering low pay to early career/ entry level staff is an issue in the ecological sciences in general.

Domain Managers are currently recording some information about declined job offers and the STEAC is interested in reviewing this information following the "after action" review of temporary recruiting to identify successes, challenges and proposed changes. Domain managers also identified issues with the retention of full time employees (as opposed to seasonal technicians), which seemed to be more related to general societal trends (i.e., The Great Resignation) than NEON-specific job dissatisfaction.

Domain Managers discussed challenges brought on by the economy (inflation, fuel prices) and supply chain issues on research protocols. There have been important

changes to protocols in response to budgets/logistics (personnel, supplies, etc.) rather than science. A specific example was temporarily reducing sample sizes on some protocols due to insufficient availability of sample vials. It is not currently clear how this will impact data records in the long term, but it is clearly going to lead to short-term changes in data quality and quantity. When important changes are made to protocols, the members of the STEAC are interested in discussing supply chain induced changes with the TWGs to understand the full impact of the COVID-19 pandemic on NEON data quality and quantity.

#### **V. Meeting with the NSF NEON Program Officer, Dr. Charlotte Roehm**

Dr. Charlotte Roehm is the new cognizant NSF Program Officer for the NEON Program (<https://beta.nsf.gov/funding/opportunities/national-ecological-observatory-network>).

Roehm thanked members of the STEAC for their important service and made it clear that the NSF POs appreciate the expertise and strategic advice that the STEAC has provided to the NEON project. She emphasized that NSF pays attention to our reports and Battelle's responses to our recommendations. *We discussed data use challenges and the Assignable Assets program.*

Now that NEON is transitioning out of the operations stage and into the sustaining stage, the NSF would like to see people stress testing and using NEON data. The new challenge and the exciting potential requires high data quality and usability. Dr. Roehm expressed that NSF's priority is ensuring that collection, delivery and use of NEON data is continuing and growing, and that the data products are trusted. NSF would like to see an expansion of the user community, and that we see this growth in users for all data

and collection resources as well as the assignable assets program. The community should be thinking about how to build capacity to catalyze discovery. One challenge here is that NEON can not currently track who is downloading and using data, making it hard to assess progress on this priority. The STEAC recognizes that this is the cost of not requiring users to register and that NEON Connect will help address these challenges. The members of the STEAC commend NEON for working to address user challenges while reducing barriers to engagement for data users who do not wish to share their information.

The members of the STEAC recognize that NEON has made great strides to get the data to the scientific community. The next big challenge for NEON is addressing data quality and usability issues. The STEAC is interested in working with NEON and TWGs to develop efficient workflows that can identify and address data issues before data is provided to the public. The goal of these enhancements will be to ensure that NEON is viewed as a trusted data source by the community.

The Assignable Assets program is an opportunity for ecologists to expand the work of NEON beyond the core sites and core datasets. While such flexibility is necessary it is not clear if the NEON budget is sufficient to enable this. Can the NSF make it easier for grant writers to get funds for these tools? And, can support for these efforts expand well beyond the NSF Macrosystems program? These questions were shared between the members of the STEAC and Dr. Roehm.

The members of the STEAC emphasized the importance of investigator initiated / peer reviewed science that allows the community to think about how to use Ecology's equivalent of the 'International Space Station' of our NEON sites and datasets. We appreciate the open-ended, bottom-up generation of questions rather than top down controls.

Members of the STEAC asked Dr. Roehm about the priorities for the new NSF Directorate for Technology, Innovation and Partnerships and whether that will involve NEON. Roehm expressed that it was not yet clear what the full direction of the new directorate will be, but encouraged members of the STEAC and the ecology community to engage in conversation with NSF DEB Program Officers about our creative ideas in this space.

## **VI. Assignable Assets Update & Business Model Discussion**

Mike SanClements, Rommel Zulueta, and Sam Kremidas made a presentation to review progress on the assignable assets (AA) program, and to pose some questions to the members of the STEAC. The AA program has received 252 requests to date. Most have been associated with NSF-funded projects (143), followed by NASA projects (28). The requests have been for a mixture of field sampling and access to sensor data. The number of requests has been stable at around 55/year since 2019. It is not clear if the pandemic increased or decreased the number of requests. This year is active, with 30 requests so far. The STEAC is impressed with the level of activity and interest in the AA



program. The members of the STEAC are also impressed with the use of the mobile deployment platforms.

The STEAC recognizes that the AA program, while impressive and useful, is challenging because of the time needed to provide detailed budgets. NEON has made great improvements to the AA request process, but there are still challenges with people coming in with late and or unfeasible requests. The members of the STEAC suspect that the AA process will continue to improve as people become more familiar with the program. The STEAC recommends targeted outreach to improve AA requests; perhaps presentations focused on AA at scientific meetings, or the production of “quick start” guides. A list of “lessons learned” e.g., sensors too close to the flux tower, could be quite helpful. This outreach should highlight that AA is not a free program, with a clear explanation of terms (e.g., clarify that “cost-recoverable” means that you have to raise money to use AA) and the budget process. NEON might consider creating a short document that highlights the most common “feasibility pitfalls” (e.g., lessons learned from previous applications). NEON could request that users “click a box” attesting to the fact they reviewed this document and any other relevant documentation when submitting their requests.

The AA program staff have some other good ideas for improving the efficiency of the program. The idea of doing a very quick feasibility review and general budget for projects at the proposal stage and saving the detailed development of budgets for projects that are selected for funding could save a significant amount of time. The STEAC agrees that the idea of submitting general budgets and feasibility checks at the proposal stage is very appealing. NEON could perhaps use an approach similar to what

is done in NSF Polar Programs and at NCAR (<https://www.eol.ucar.edu/>). The STEAC is interested in discussing this further and comparing the cost of providing detailed budgets for all proposals versus general budgets and feasibility checks.