

The NEON Program: Engineering Resiliency for Climate Change

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Background/Objectives. This poster aims to raise awareness of newly implemented designs that address impacts to NEON program operations from climate-related extreme events and highlights some of the considerations being made in reducing self-generated impacts when collecting sensitive climate change measurements. In optimizing the NEON program's sensitivity to observe these changes, the selection of site locations and measurement infrastructure and technologies are carefully considered. In doing so, measurement locations are often situated in highly vulnerable ecological zones that can be easily disturbed by the measurement activity itself. The balance between operational resilience and measurement effectiveness is continually evaluated; while data availability and validity are key NEON program deliverables, the need to ensure meaningful data is paramount.

Approach/Activities. Updated examples of field infrastructure designs and installation/maintenance approaches will be provided to exemplify engineering resiliency in the NEON Program. This includes, but is not limited to: overhead and single station design for sensors at stream sites to survive and collect data on high water events or enable designs to sustain the volatility of the hydrologic and geomorphologic conditions of streams, rivers, and lakes; alternate power designs to address infrastructure vulnerabilities in remote, austere environments, and at sites that encounter extreme seasonal and weather events (desert/tundra/archipelago islands); designs made to evolve with changing or evolving canopies, flora and fauna; design considerations to include materials to reduce our influence on measurement collection and prevent native biodiversity loss across our sites; new designs to incorporate new data collection methods, such as Atmospheric Methane Concentrations (Data product "L1 Methane Concentration") and sites located in agricultural areas; and lastly, tower site locations in remote areas to capture carbon measurements where there were none before, such as national parks.

Results/Lessons Learned. These design considerations have not only increased NEON data availability and validity but have also enhanced our operational preparedness for a changing climate.