

SEDC REPORT

OCT 1, 2021 - SEPT 30, 2022 REPORT

2021 SPATIAL AND ENVIRONMENTAL DATA CENTER REPORT

AMANDA B. YOUNG

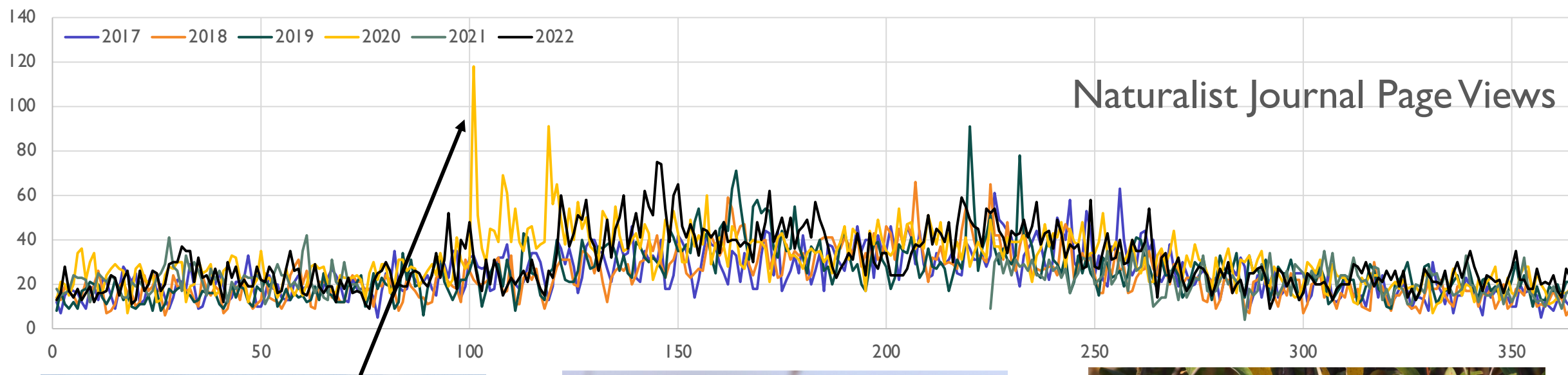


EDC MISSION STATEMENT



- Collect and manage baseline environmental data
- Maintain suite of common-use lab and field equipment
- Fieldwork assistance & Remote Access
- Outreach
 - Make EDC data available to the public
 - Create guides to help in identification

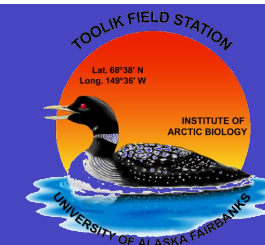
NATURALIST JOURNAL - VIEWERSHIP



Seth returns to Toolik and sees a wolf on his first day in 2020!



DATA USAGE



■ EDC Webpage and Direct Requests

- Met station data requests 232  by 74  921 
- Phenology data requests 10  by 8 
- Bird Point count requests 1  by 1 
- NDVI requests 2  by 2 



NSF
**Arctic
Data
Center**



■ Arctic Data Center (data has DOI)

- | | | | | | | | | | |
|---------------------|-----|---|----|---|--------------------------------|----|---|----|---|
| ■ Phenology | 37 |  | 70 |  | ■ Naturalist Journal – Birds | 14 |  | 19 |  |
| ■ Bird Point Counts | 115 |  | 35 |  | ■ Naturalist Journal – Mammals | 28 |  | 27 |  |
| ■ Met Station data | 36 |  | 80 |  | ■ Naturalist Journal – Insects | 17 |  | 24 |  |

ARCTIC DATA CENTER PORTAL

<https://arcticdata.io/catalog/portals/toolik>



Increase of 7 datasets in 2022

Hosted by the Arctic Data Center

Sign in with ORCID



Toolik Field Station

The Toolik Field Station (TFS) has been a major site for research in the North American Arctic since 1975. Much of what is known about structure and function of arctic terrestrial and aquatic ecosystems, effects of climate change, and feedbacks to global climate has emerged from long term, process-based ecological research at TFS. This portal provides access to datasets collected as part of the Toolik Field Station program.

[About](#)[People](#)[Publications](#)[Data](#)[Metrics](#)



Overview

Funding

Connect

For more information about Toolik Field Station, please see our main [website](#).

Overview

The Toolik Field Station (TFS) has been a major site for research in the North American Arctic since 1975. Much of what is known about structure and function of arctic terrestrial and aquatic ecosystems, effects of climate change, and feedbacks to global climate has emerged from long term, process-based ecological research at TFS. TFS-based work has resulted in significant discoveries on adaptations of organisms to the Arctic and population-level changes in animal and plant distributions and phenologies. Because climate is changing rapidly in the Arctic, continuing research into mechanisms of ecosystem response and feedbacks is a high priority. This need and ongoing interest by scientists from many disciplines in use of TFS promise a steady demand for TFS science support in the future. TFS supports the [Arctic Long-Term Ecological Research program \(LTER\)](#), projects in the [Arctic Observatory Network program \(AON\)](#), [NASA's Arctic Boreal Vulnerability Experiment \(ABOVE\)](#), the [Earthscope Transportable Array](#), and is a core site for the [National Ecological Observatory Network program \(NEON\)](#). TFS is a founding partner in the EU-sponsored [International Network for Terrestrial Research and Monitoring in the Arctic \(INTERACT\)](#), which links field stations around the circumpolar Arctic, and a member of the [Organization of Biological Field Stations \(OBFS\)](#). At least 993 peer-reviewed journal articles, 161 books or book chapters and 144 dissertations and theses have been published on research based at TFS.



Toolik Field Station

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[About](#)[People](#)[Publications](#)[Data](#)[Metrics](#)

Search

Search these datasets

DATASETS 1 TO 25 OF 455

123...19Next

Sort byMost recent

Brian Buma. 2001. [Disturbance ecology and the problem of n=1: A proposed framework for unifying disturbance ecology studies to address theory across multiple ecological systems, 2001](#). Arctic Data Center. doi:10.18739/A2GH9BB2P.

Anne Giblin and George Kling. 2022. [Water chemistry data for various lakes near Toolik Research Station, Arctic LTER. Summer 2010 to 2021](#). Arctic Data Center. <https://pasta.lternet.edu/package/metadata/eml/knb-lter-arc/1062/9>.

1343

DATAONE TOOLIK PORTAL

<https://search.dataone.org/poi>

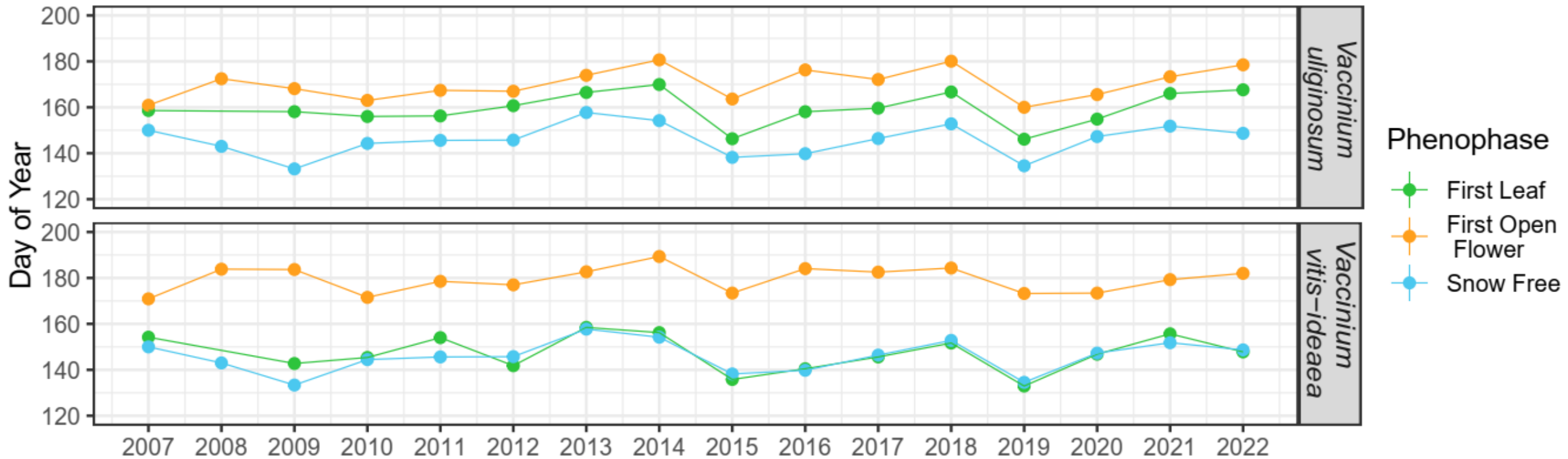


- Working with DataONE programmers we duplicated the Arctic Data Center (ADC) portal to encompass all of DataONE repositories
 - ADC, EDI, NEON, USGS, LTER, etc.
 - Datasets in the portal grew from 455 datasets in the ADC portal to 2,652 datasets!
- Working with the ADC and DataONE programmers to add filters to the datasets based on location and study system.
- If these portals are used and appreciated by the community we will keep them up.

The screenshot shows the DataONE Toolik Field Station portal. At the top, there's a navigation bar with 'DataONE' logo, 'Get DataONE Plus' (NEW), 'Donate', and 'Sign-in'. Below this is the 'Toolik Field Station' header with a loon logo and a descriptive paragraph. A navigation menu includes 'About', 'People', 'Publications', 'Data' (highlighted), and 'Metrics'. A search bar is present with the text 'Search these datasets'. Below the search bar, it says 'Datasets 1 to 25 of 2,652'. A list of datasets is shown, including one by Brian Buma (2001) and another by Anne Giblin and George Kling (2022). On the right, there's a map of Alaska with a grid overlay showing dataset counts in different regions: 3, 2645, 1, 17, 1, and 1. The map is titled 'Hide Map'.

BASELINE MONITORING

BIOLOGICAL MONITORING – PHENOLOGY

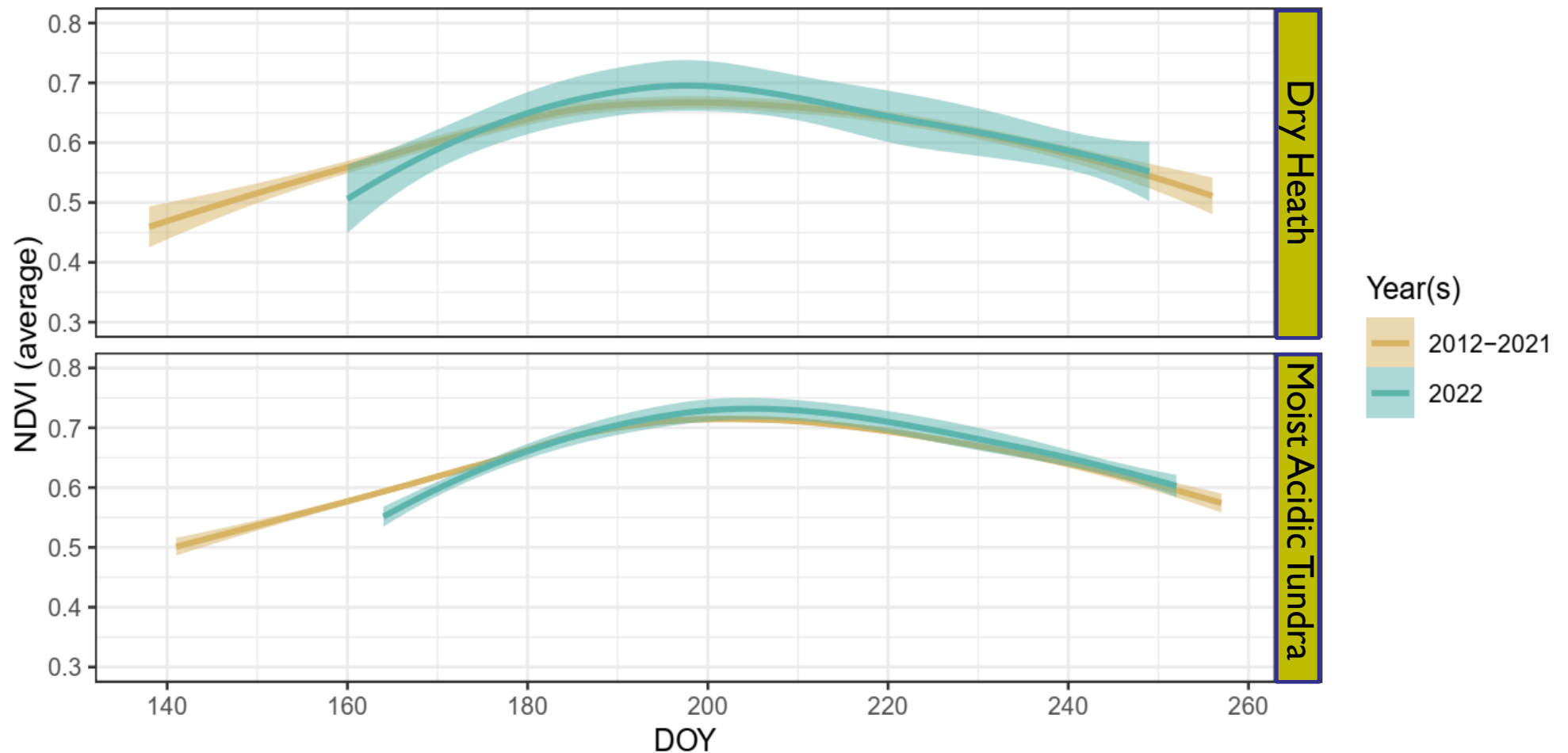


BASELINE MONITORING

BIOLOGICAL MONITORING – NDVI



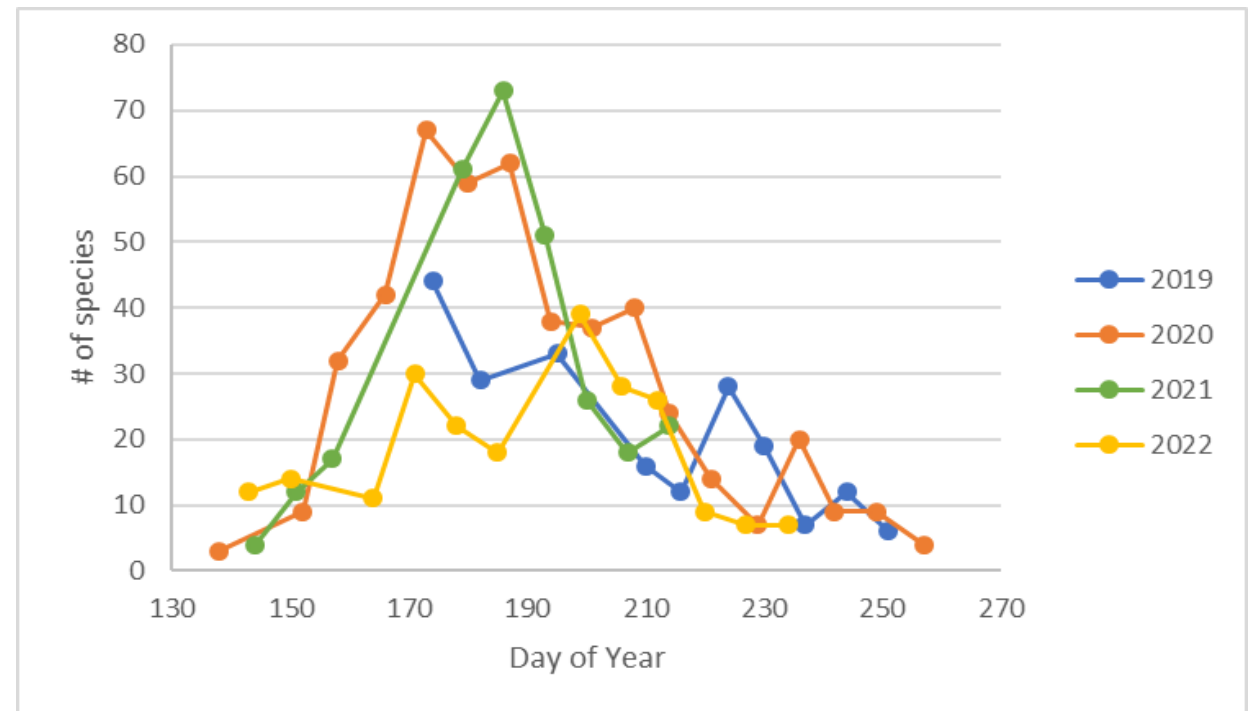
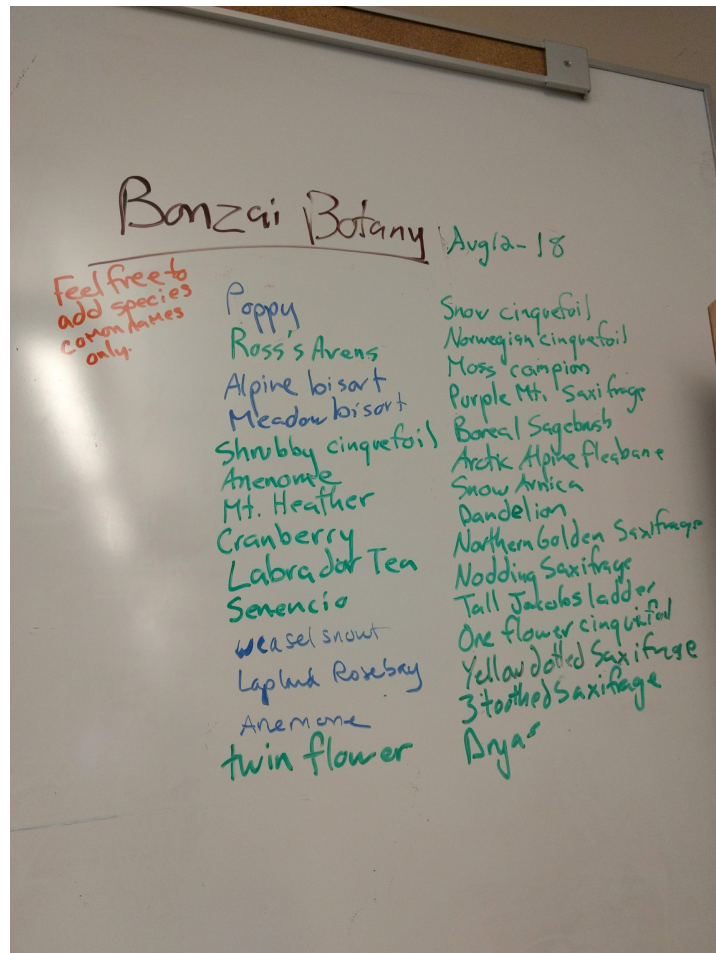
Toolik EDC plot NDVI (2012–2022)



BONZAI BOTANY



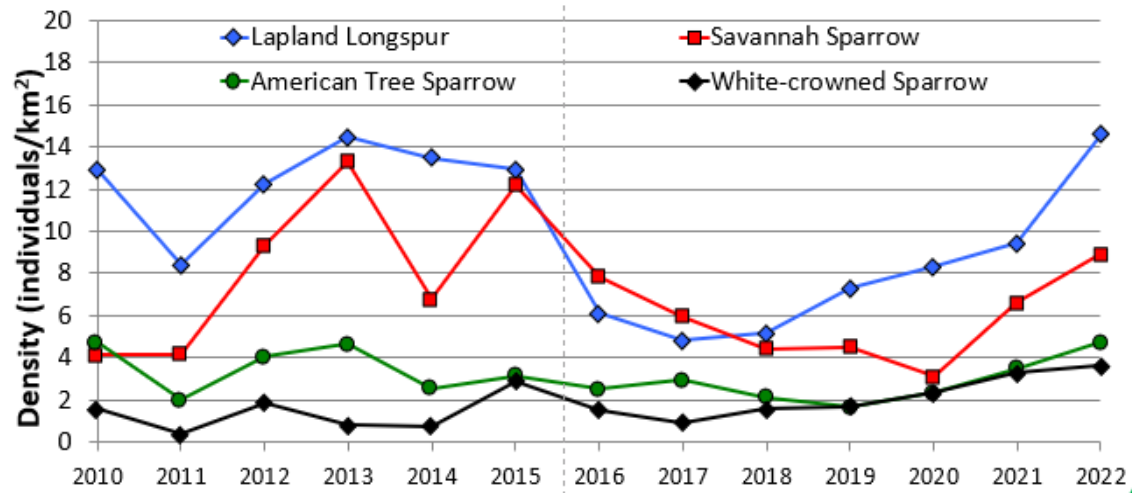
- Plants in flower during a given week are recorded
- Common names only so all can participate
- Lower participation in 2022, while some staff on breaks



BASELINE MONITORING BIOLOGICAL MONITORING - AVIAN

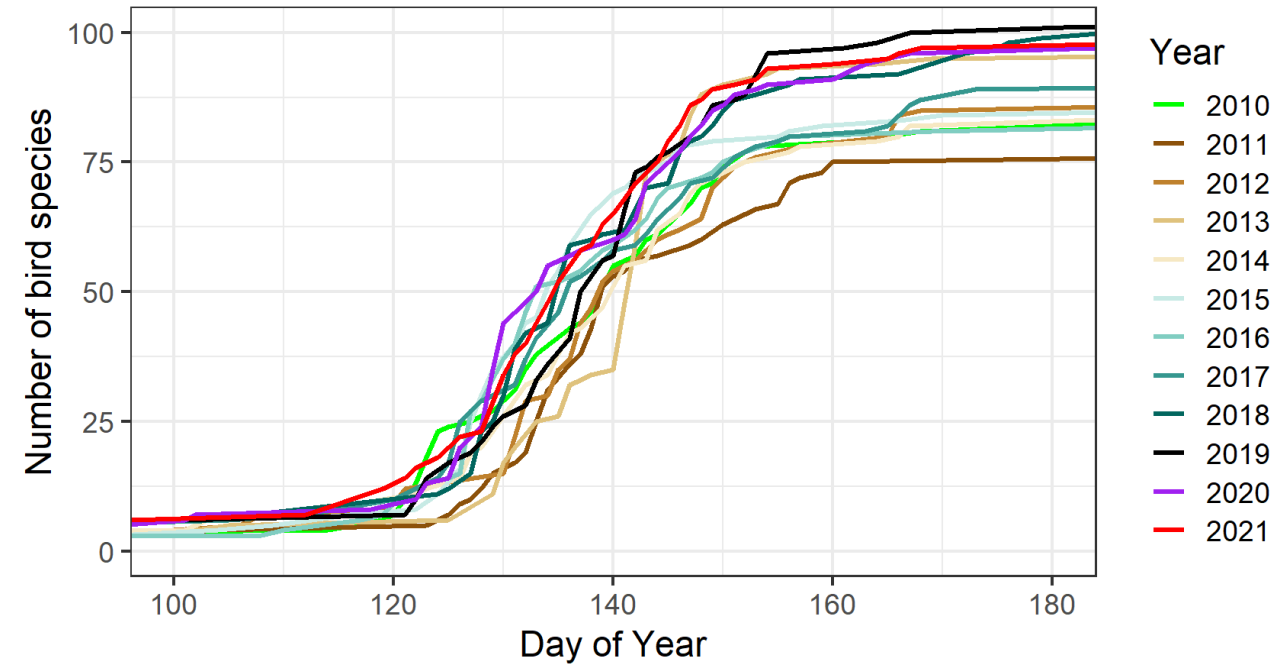


Avian point counts

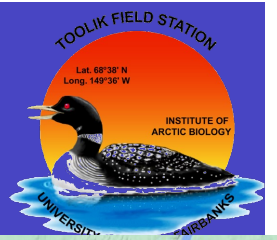


Recovery of the Lapland Longspur and Savannah Sparrow populations occurring

Date of Arrival of bird species from the naturalist journal



BASELINE MONITORING BIOLOGICAL MONITORING – AUDIO RECORDINGS OF BIRDS



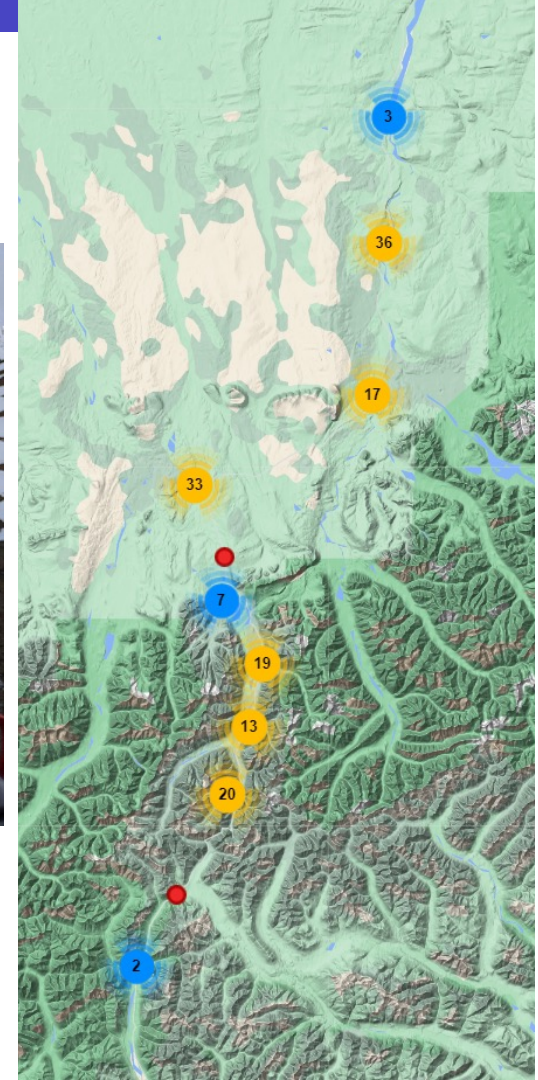
- Audio recording of bird species continues now with 152 recordings from the Toolik area.
- Calls are being added to the Bird Guide



Northern waterthrush, June 2022
<https://xeno-canto.org/738716>



Surfbird (Mt Dalton), June 2022
<https://xeno-canto.org/739011>



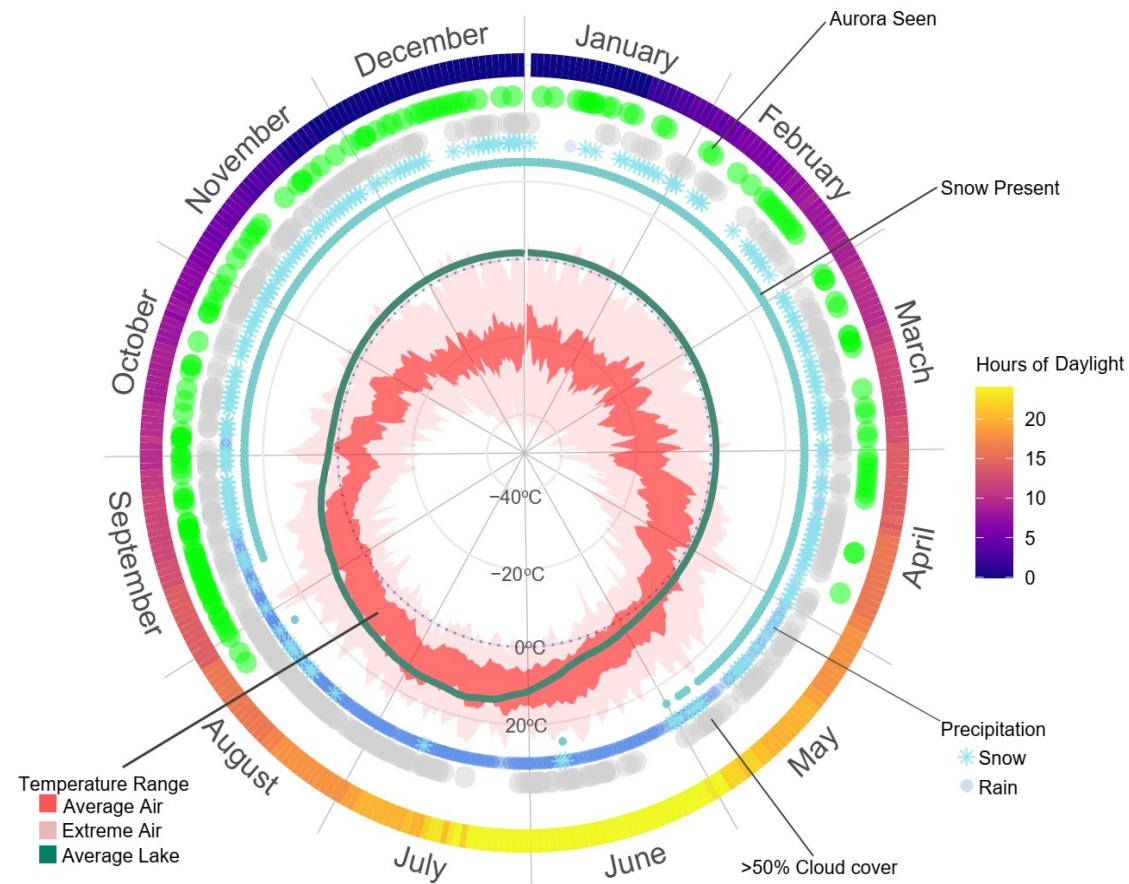
BASELINE MONITORING

ABIOTIC MONITORING



Through the year at Toolik

Data from the TFS Met Station and Naturalist Journal (2007-2021)

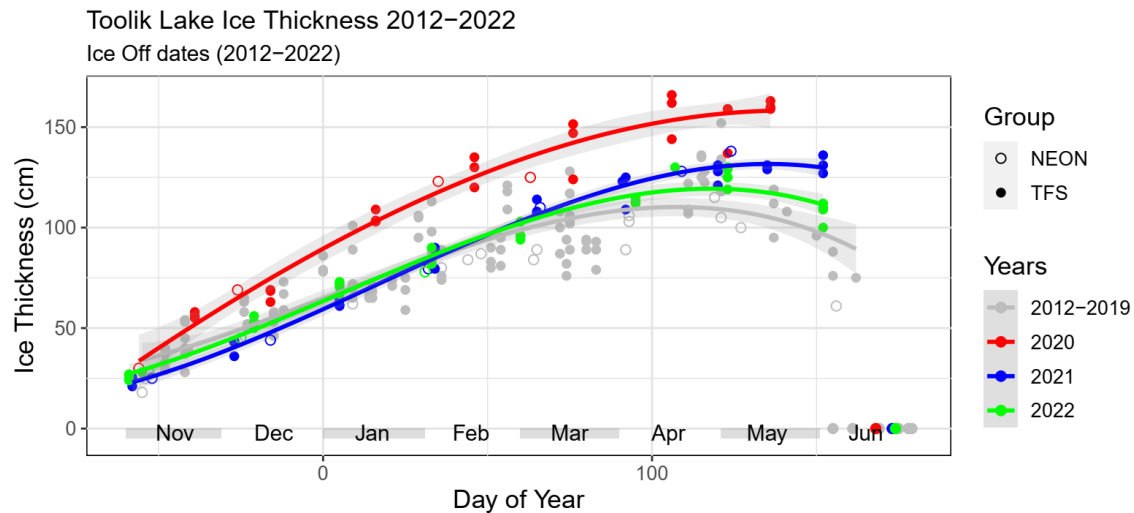


BASELINE MONITORING

ABIOTIC MONITORING – SNOW AND ICE

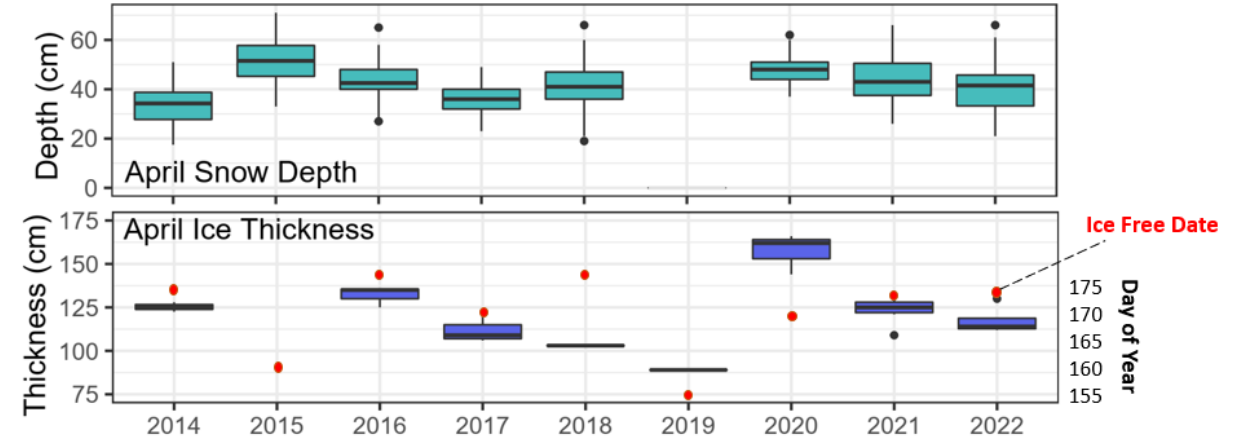


- Ice Thickness Measurements



TFS = Toolik Field Station, SEDC data
NEON = National Ecological Observatory Network. 2020. Data Product DP1.20254.001, Depth profile at specific depths.
Provisional data downloaded from <http://data.neonscience.org> on May 1, 2020. Battelle, Boulder, CO, USA NEON. 2020.

- Snow Depth Measurements



BASELINE MONITORING ATMOSPHERIC MONITORING



- Monitoring
 - Ozone Monitoring – 2009 to Present
 - National Atmospheric Deposition program (NADP) – 2017 to Present
 - National Trends Network
 - Mercury Deposition Network
 - Ammonia Monitoring Network
 - Inter-agency Monitoring of Protected Visual Environments (IMPROVE) – 2018 to Present
 - Funded by the BLM
 - Purple Air – June 2019 to Present
 - Particulate matter sampling
 - 2 additional sensors added in 2022
 - Mercury Passive Air Sampler – January 2020
 - Changed quarterly
 - Lower than average Mercury for the Arctic

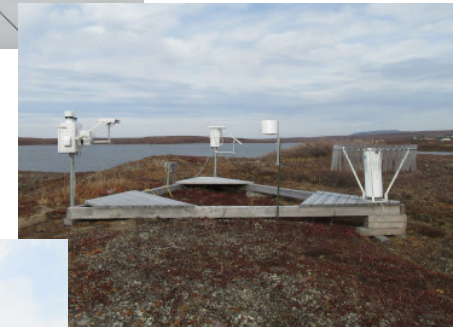


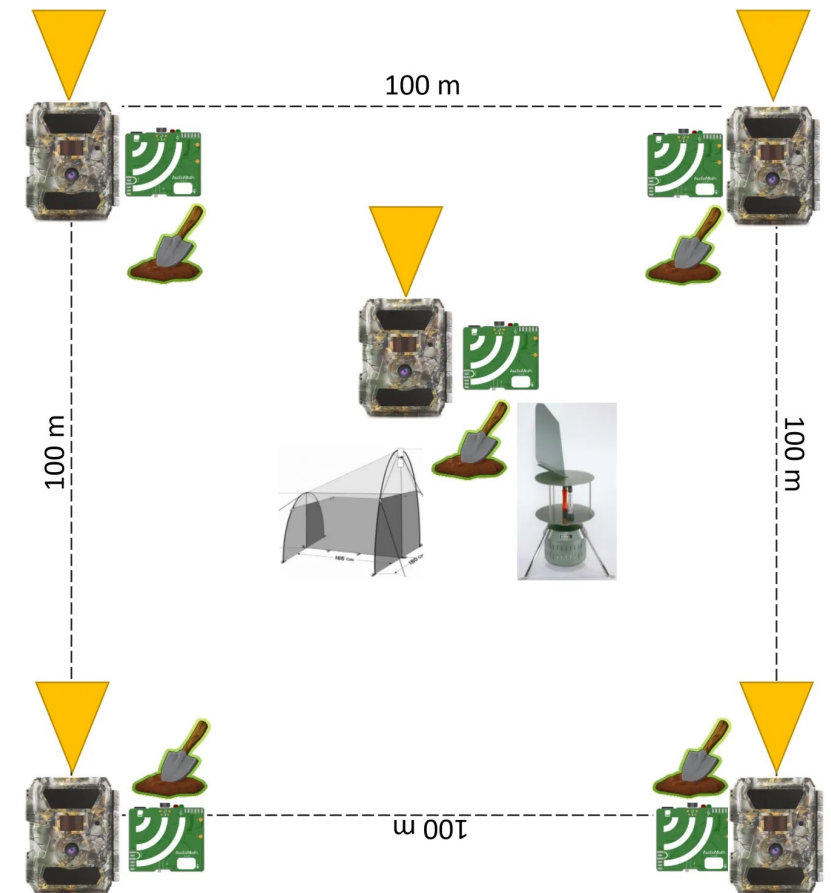
Photo by Sarah King

NEW MONITORING



- In 2021 and 2022 Toolik began participating in two global initiatives:

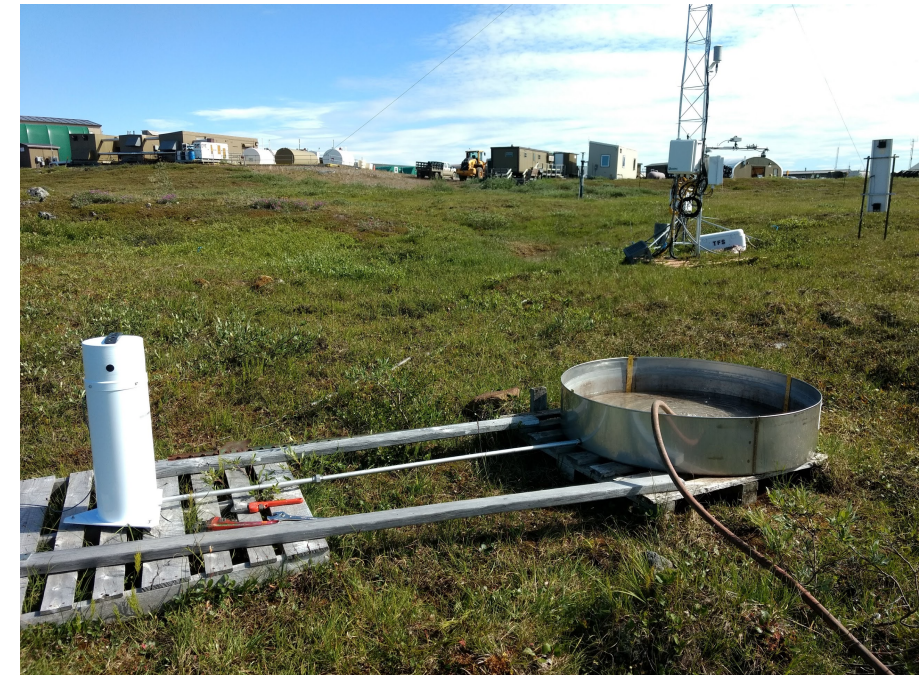
- LIFEPLAN – A Planetary Inventory of Life
 - Weekly Spore Sampling
 - Camera and audio traps
 - Community training of AI to process data
 - Audio Traps - <https://bsg.laji.fi/identification/recordings>
 - Malaise trap
- myThaw
 - EDC NDVI/ snow survey transect
 - Thaw depth, veg height, snow depth
 - Data collected is online at <https://permafrostthaw.org/>



MET STATION REPORT

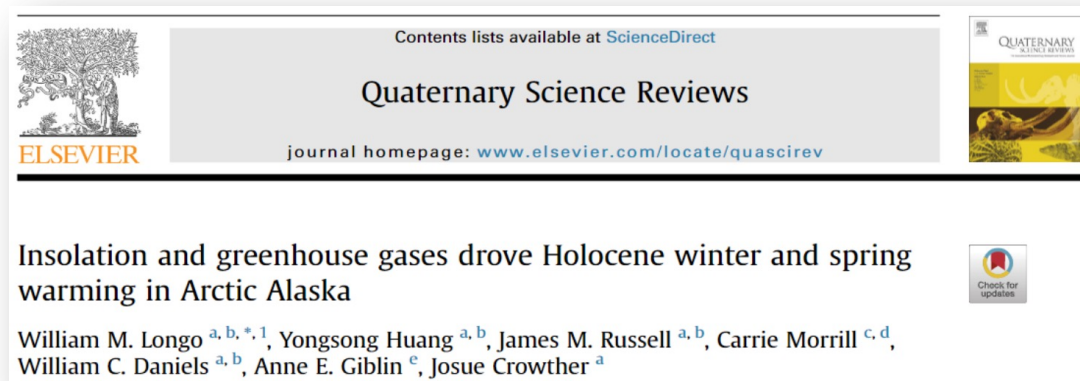


- TFS Meteorological Data updates
 - 2022 final error checked data is in progress and will be posted on the TFS website under the Meteorological Data Query once ready.
- No Sensor Upgrades in 2022
 - Deployed and maintained current sensors.
 - Establish protocols for remote repair of equipment.
- Fixed the fabric on the Wyoming Gauge and calibrated the tipping bucket and OTT sensors
- Frequent Communication between Colin Edgar and the EDC staff to troubleshoot issues.
- Everything still works!



EXAMPLES OF DATA AND EQUIPMENT USAGE IN PUBLICATIONS

88 publications in 2021
84 publications in 2022



Received: 30 November 2021 | Accepted: 6 April 2022
DOI: 10.1111/2041-210X.13944

REVIEW

Methods in Ecology and Evolution

Temporal design for aquatic organismal sampling across the
National Ecological Observatory Network

Stephanie M. Parker¹ | Ryan M. Utz^{1,2}

COMMON USE EQUIPMENT



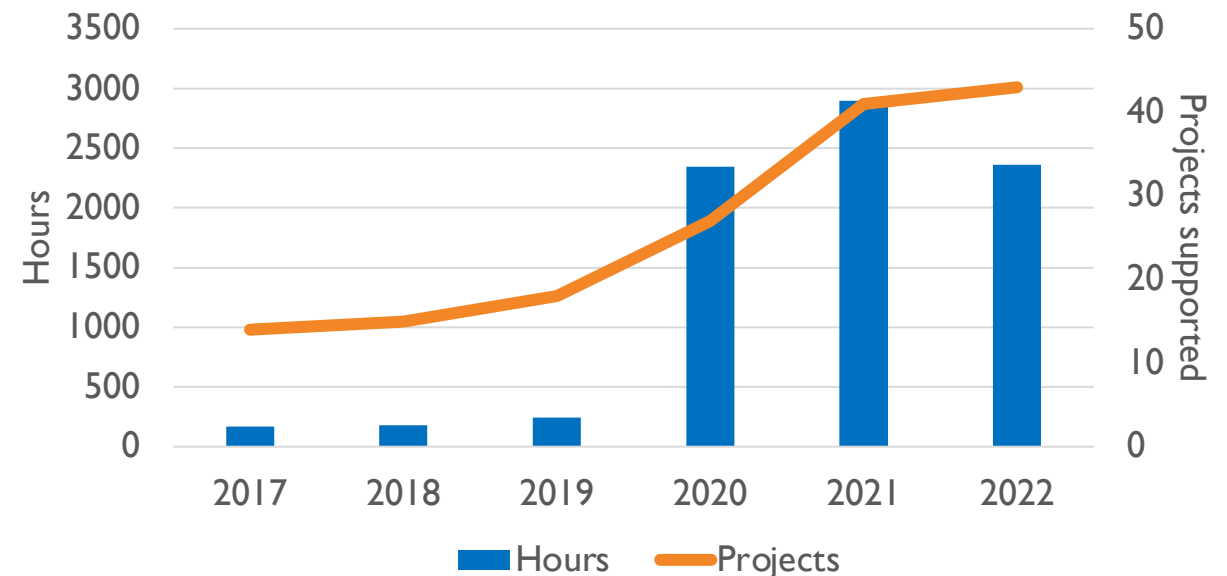
- New Equipment
 - New YSI probe
 - Rechargeable double AA batteries
 - Microscope phone adaptor
 - SIPRE Auger
 - Donated by Laurel Lynch and Josh Schimel to TFS
 - 2023 – adding 2 extensions
 - Biotek Plate Reader
 - Donated by Donie Bret-Harte and Michelle Mack
- Suggested new equipment during 2022 (Check user forum notes)
 - Dolly's and carts
 - Batteries for Science workshop power tools
- Equipment in for repairs
 - Soil moisture probes
 - Kestrel – cannot repair, new one to replace the old

FIELD WORK ASSISTANCE



- 2017: 170 hours of assistance to 14 projects for 14 different researchers.
- 2018: 179 hours of assistance to 15 projects for 14 different researchers.
- 2019: 242 hours of assistance to 18 projects for 29 different researchers.
- 2020: 2344 hours of assistance to 27 projects
- 2021: 2899 hours of assistance to 41 projects
- **2022: 2361 hours of assistance to 43 projects**

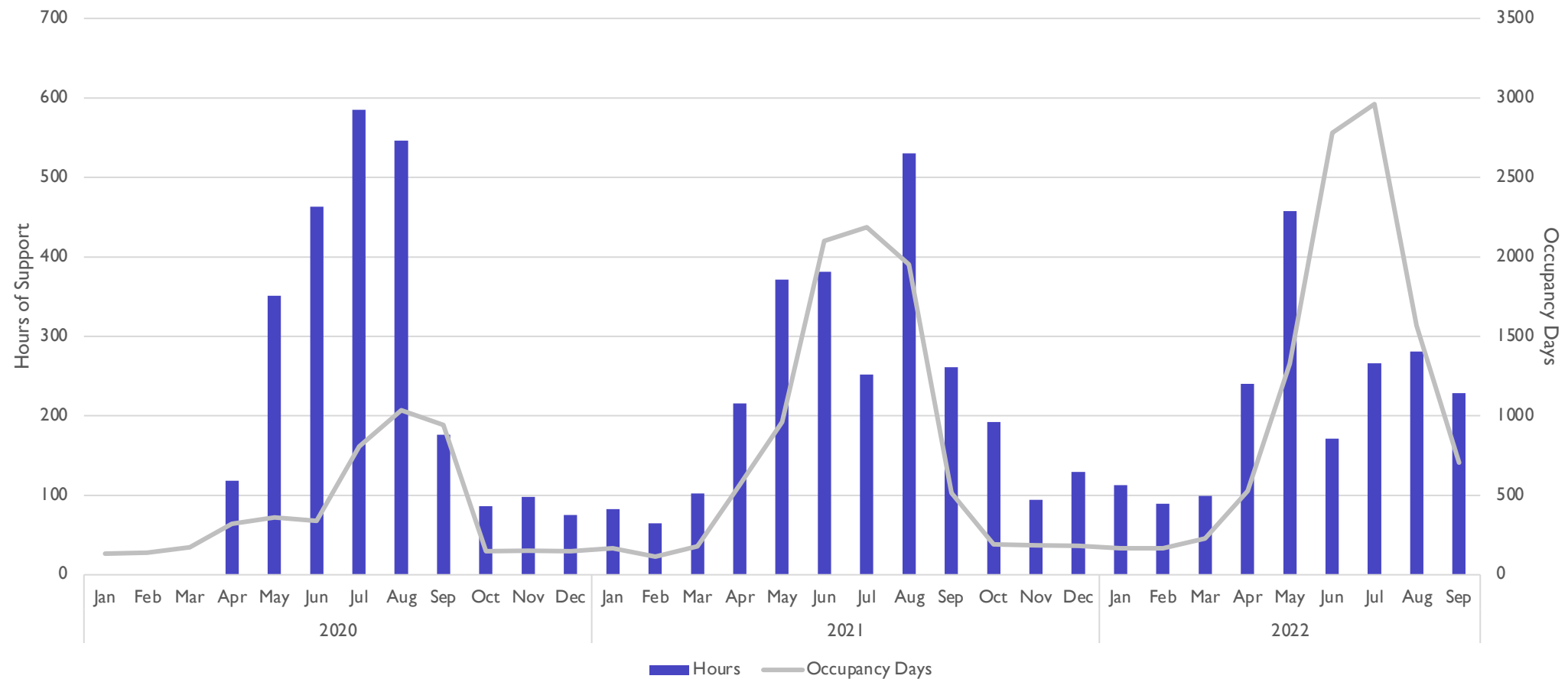
- Examples of Assistance (Not exhaustive):
 - Met Station setup, downloads, and troubleshooting
 - Phenology and NDVI measurements
 - River Discharge
 - Soil sampling
 - Tussock tiller measurements



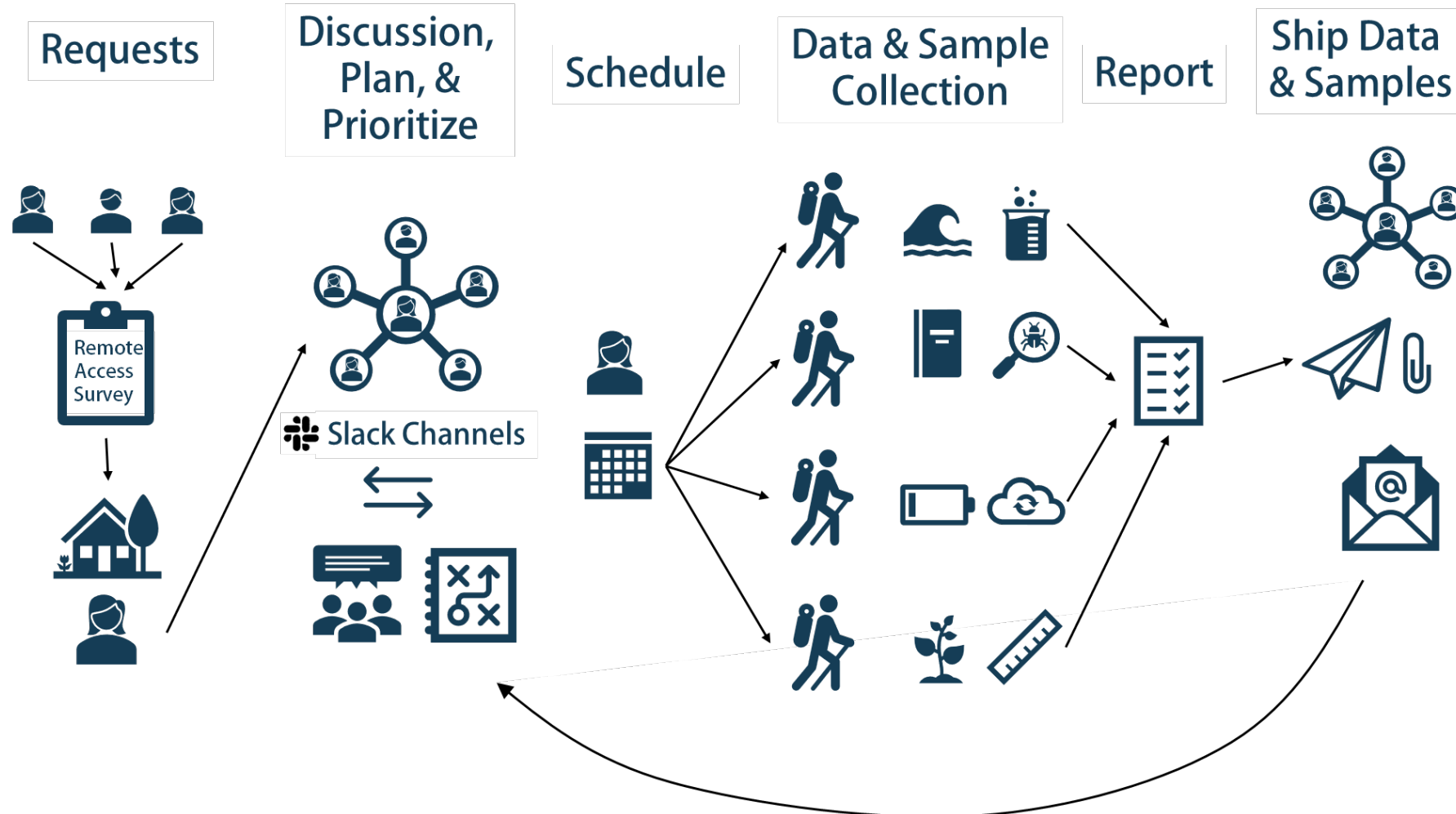
REMOTE ACCESS - PROPORTIONALLY



REMOTE ACCESS THROUGH SEPT 2022



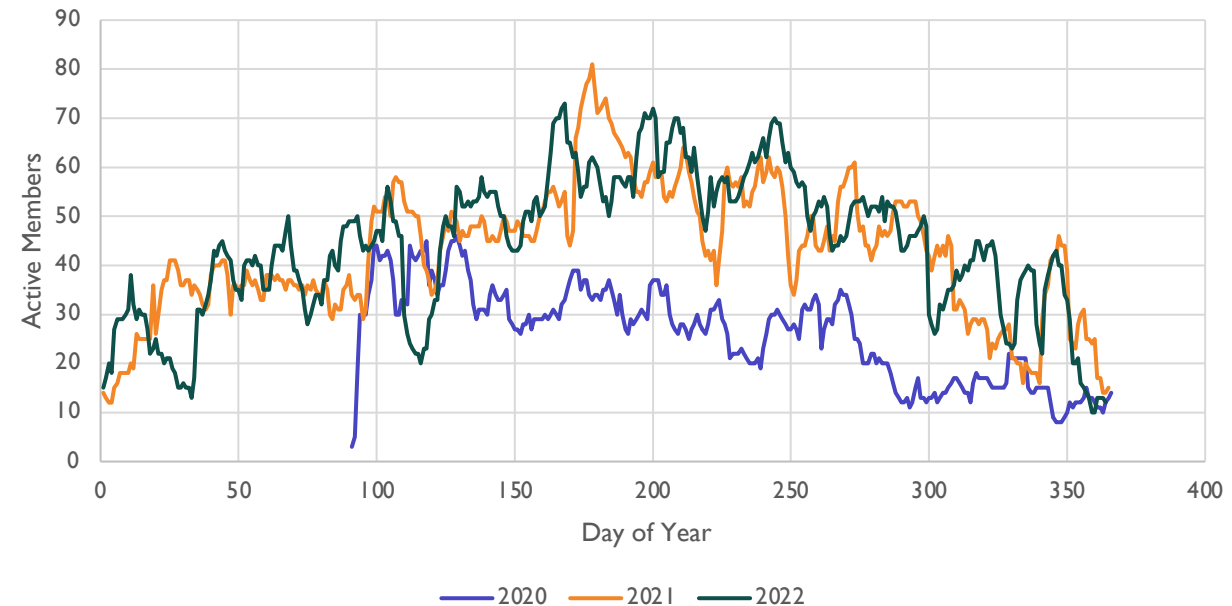
REMOTE ACCESS - STRUCTURE



COMMUNICATION - SLACK



- Channels for each project kept correspondence organized and not lost in an inbox.
 - Currently >50 channels for research projects with numerous facets have more than one channel.
 - Channels for group discussions on diversity, gear, research, and general updates
- Easy and transparent communication between TFS staff and the researchers.
 - Including everyone in the conversation rather than passing on information
 - Added ability to call or video chat with researchers
- Easy sharing of protocols and files

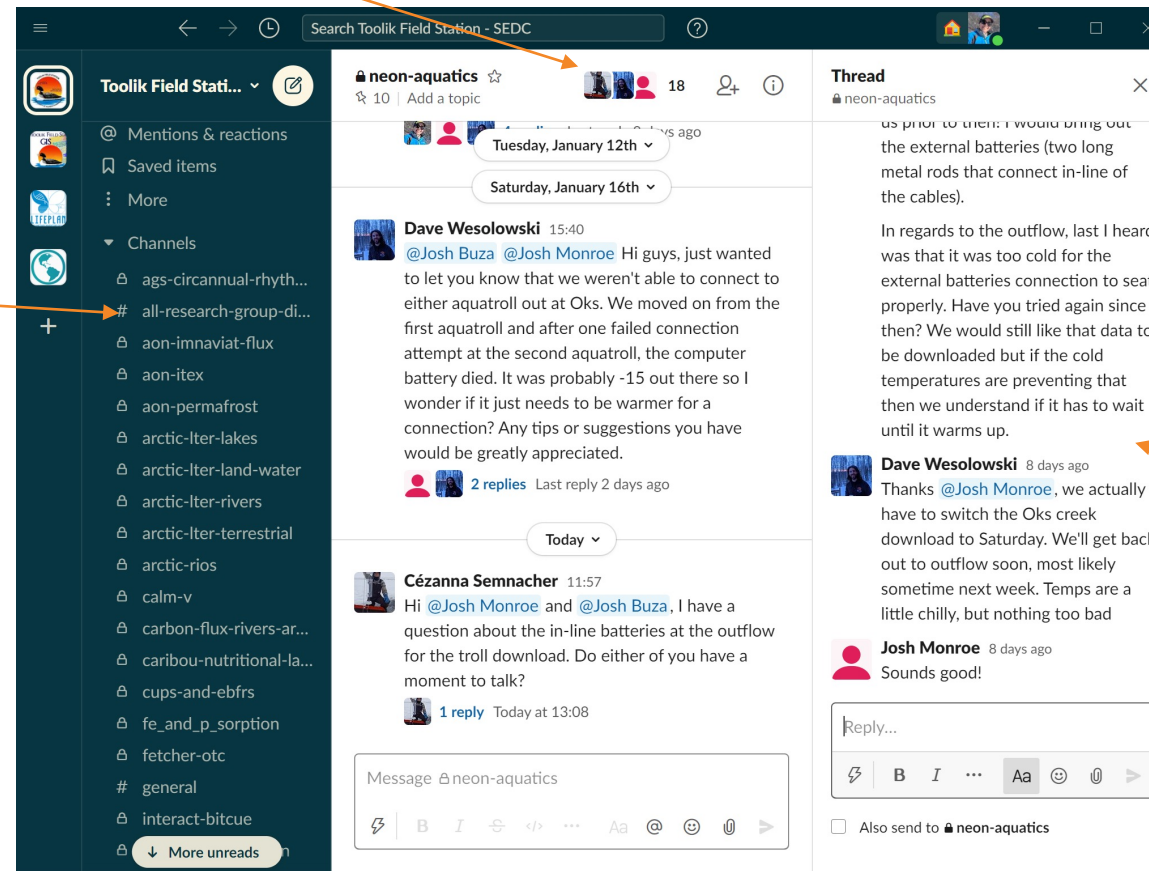


COMMUNICATION - SLACK



All researchers and TFS staff involved with a project in the same channel

Threads are used to respond to specific questions or topics



= open channel for all to discuss

🔒 = Closed channel for each project, so only assigned members can see the posts.

Using the @ symbol you can direct questions to a specific person

REMOTE ACCESS EXAMPLES



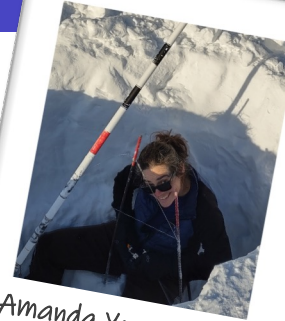
Cézanna Semnacher ice fishing, May 2022



Tenny Grischuk & Isaac Aguilar measuring vegetation height, July 2022



Duncan Cameron repairing weather station, April 2022



Amanda Young digging herself into a hole, 2022



Elizabeth Traver measuring discharge in a creek, July 2022



Mayra Melendez Gonzalez carrying the ice auger back from a day in the field, May 2022



Aurora Researcher Kylee Branning filming a rocket launch, April 2022



Winter generator charging for eddy covariance towers, January 2022



Dennis Wasserman auguring the lake, May 2022

WINTER REMOTE ACCESS



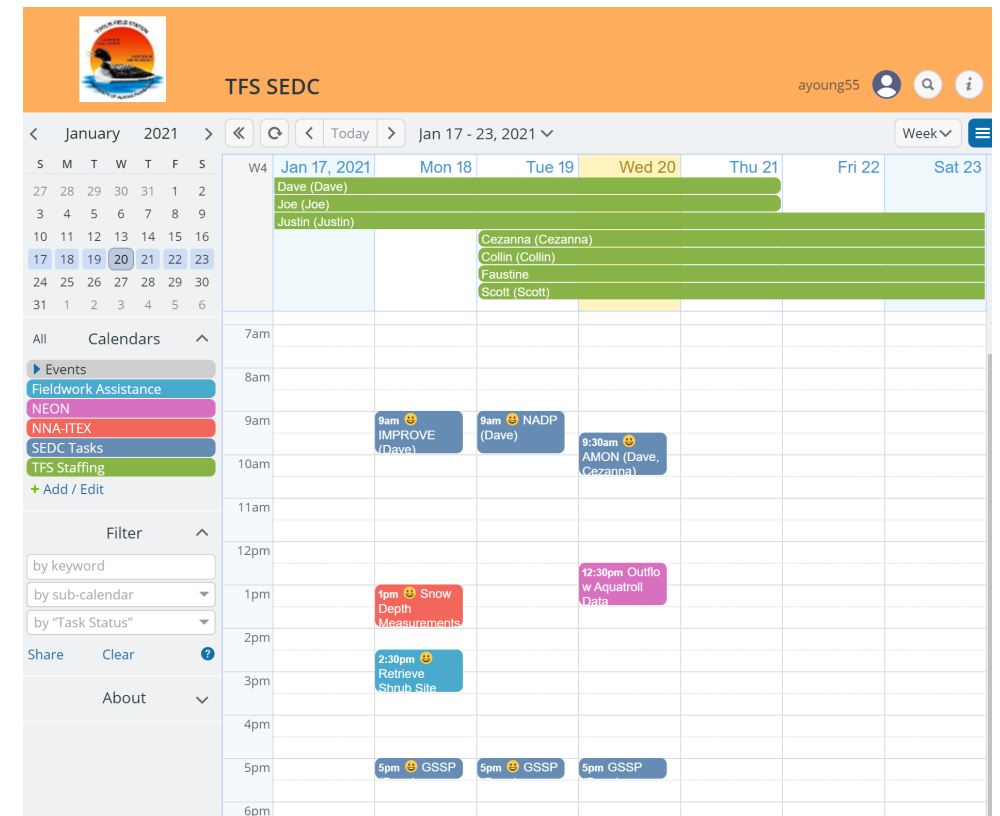
- Winter Remote Access
 - 20-40 hours of remote access per week.
 - EDC staff at Toolik year-round working with Maintenance staff
 - Activities:
 - Autonomous Equipment
 - preventative maintenance checks
 - data download
 - Power system charging and repairs
 - Sensor swap
 - Snow depth measurements
 - Lake Ice
 - Ice thickness measurements
 - Sonde casts
 - Water sampling and filtering
 - Atmospheric Measurements



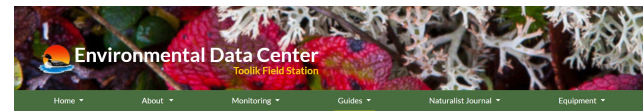
REMOTE ACCESS GOING FORWARD



- Continue to provide Remote Access to users who cannot make it to Toolik
 - Year-round support
- Provide additional field support to researchers at Toolik
- Continue to improve communication between the SEDC and research groups
- Hiring Staff with wide array of skills
 - Hiring year-round staff decrease knowledge turnover
 - Participation of staff across departments in remote access has lead towards a greater sense of community and sense of belonging.



EDC WEBSITE - UPDATES



TFS / EDC / Guides / Plant Guide

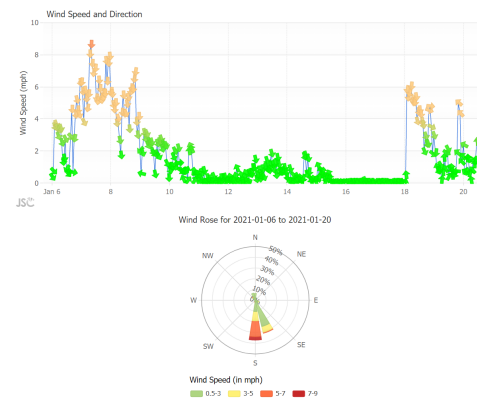
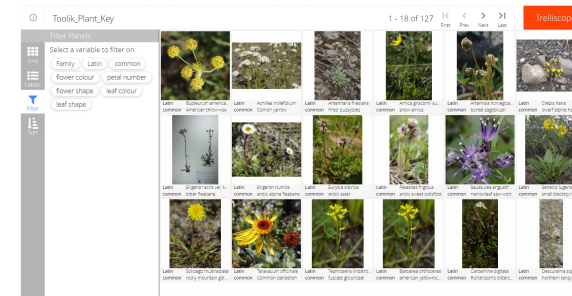
Plant Guide

This plant guide is interactive and relatively easy to use.

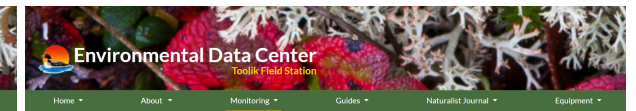
The buttons on the far left of the guide will help you discover which plant species you have seen based on its easily identifiable features.

For instance, if you saw a yellow flower, you can filter all the species shown down to just the yellow ones by going to the filter button. Then select flower colour from the list. At this point a bar chart appears with the number of species of each colour, select yellow. The grid of plants will now only show yellow flowers, if you remember any additional details you can filter them down in the same manner until you see the plant you found.

If you have any questions about the plant guide or are still not sure what you found please contact Amanda Young (ayoung55@alaska.edu)



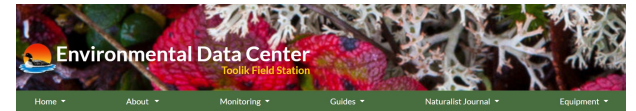
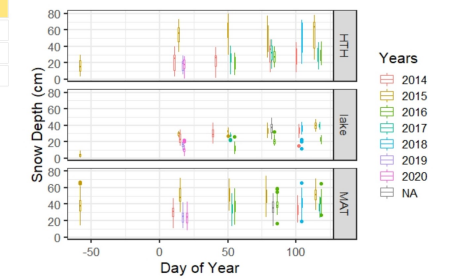
JSC



TFS / EDC / Monitoring / Abiotic / Snow Depth

Snow Depth

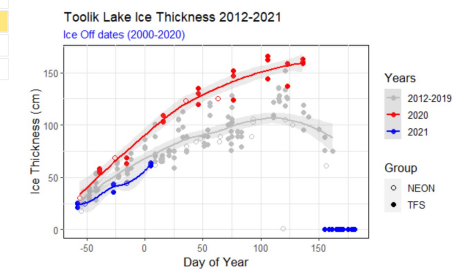
Snow Depth is measured monthly at Toolik Field Station at three locations, two of which correspond to the plant phenology and NDVI measurement points (Moist Acidic Tundra [MAT] and the Dry Heath [HTH]), the third location is on the lake.



TFS / EDC / Monitoring / Abiotic / Ice Thickness

Ice Thickness

Ice Thickness Monitoring by Toolik Staff has occurred since 2012. Measurements are taken monthly between November and May, depending on the safety of the ice conditions. In addition to TFS, NEON also measures ice thickness at a monthly interval on Toolik Lake in one location.



TFS - Toolik Field Station, SEDC data
NEON - National Ecological Observatory Network, 2020. Data Product ID: 2020-01. Depth profile of ice thickness.
Download data from <https://data.neon.org/data> for the 1. SEDC, Boulder, CO, USA NEON, 2020.

- No updates just maintaining

MEETINGS AND OUTREACH

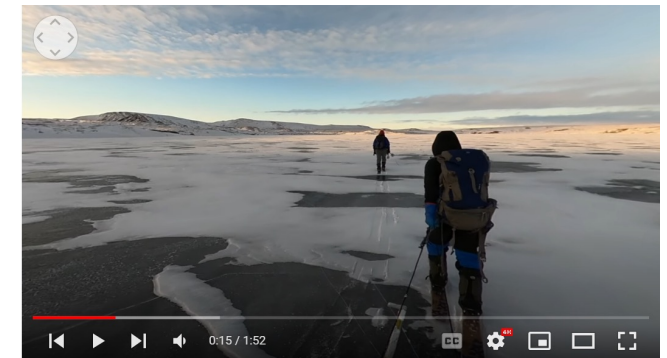
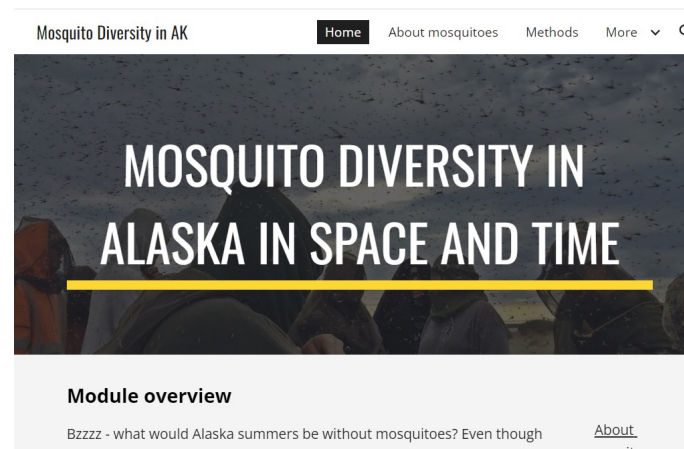


■ Meetings

- Organization of Biological Field Stations
 - Virtual Field Workshop
 - Poster on Remote Access
- American Geophysical Institute 2022
 - Booth
 - Session on Safety at Field Stations Field Camps, Research Vessels, and Marine Labs
 - Poster

■ Outreach

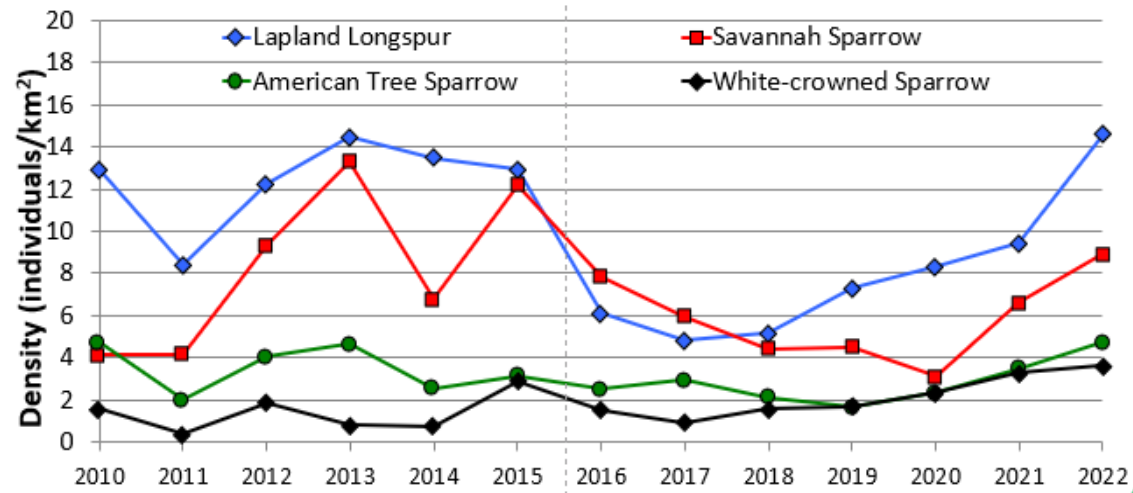
- AK Datum
 - [Mosquito Diversity in Alaska](#) Module using NEON data
- Immersive videos (360 & VR)
 - [YouTube](#) – best viewed in a VR headset or smartphone with resolution set to 4k.



LET ME KNOW IF YOU HAVE ANY FEEDBACK
AYOUNG55@ALASKA.EDU



Baseline Datasets



Remote Access

