

SEDC REPORT

OCT 1, 2020 - SEPT 30, 2021 REPORT

2020 SPATIAL AND ENVIRONMENTAL DATA CENTER REPORT



AMANDA B. YOUNG

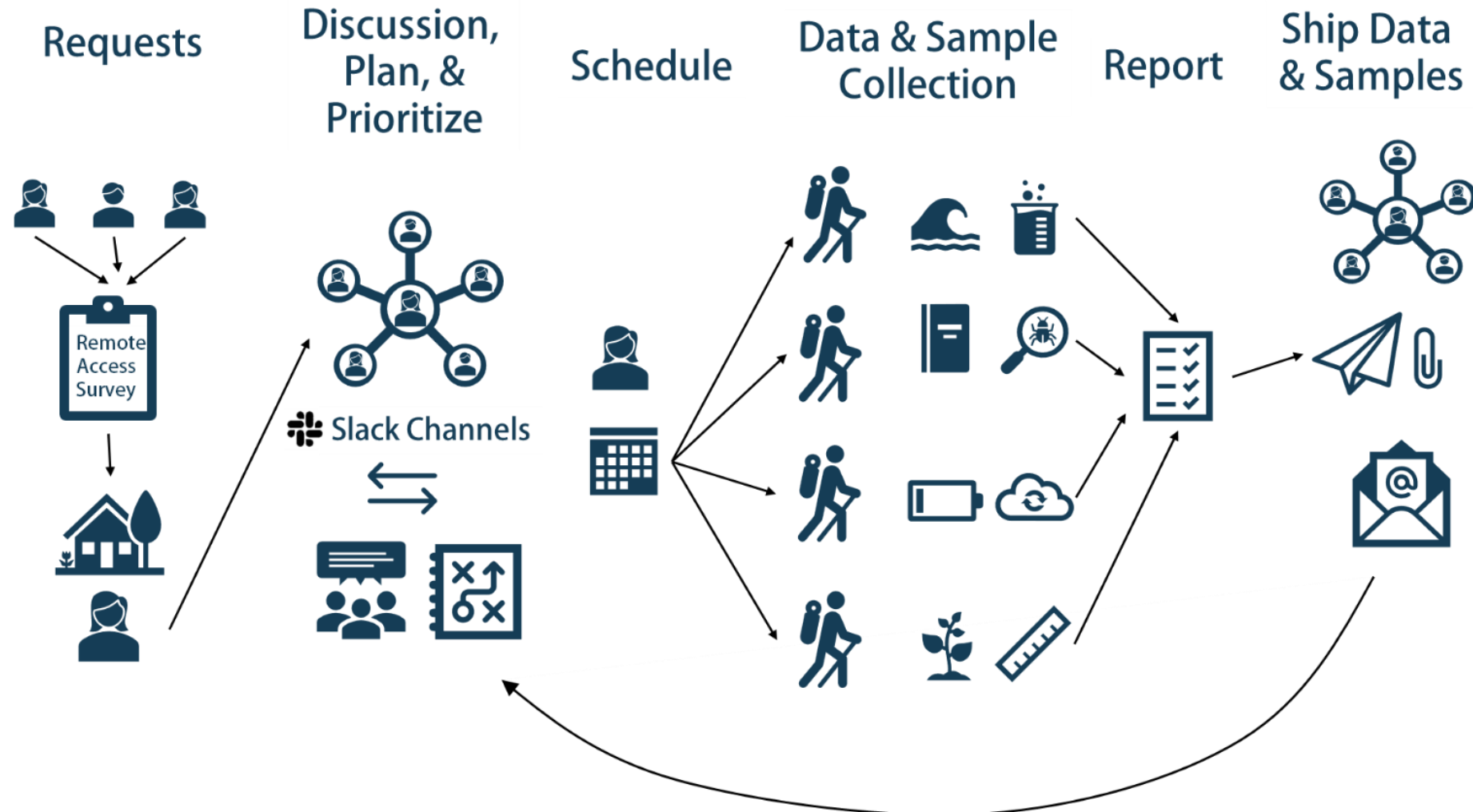


EDC MISSION STATEMENT



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

REMOTE ACCESS - STRUCTURE

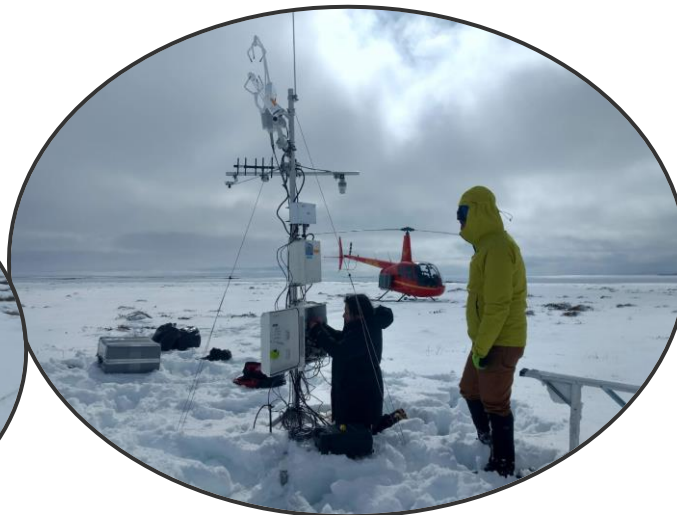
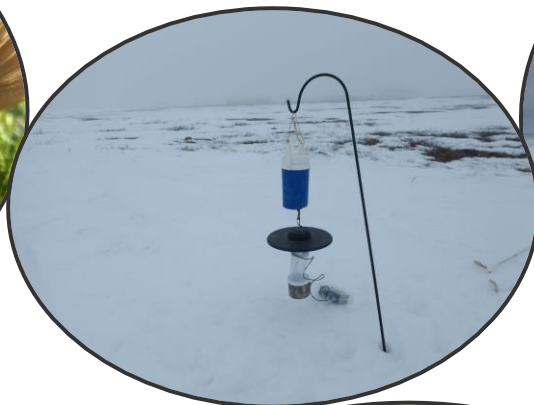


REMOTE ACCESS- SUCCESSES



- Successfully supporting 41 projects.
 - Projects supported were large collaborative NSF projects, INTERACT RA projects, and fieldwork for a graduate thesis.
- Two temporary staff members kept on through the winter to provide remote access year-round.
- Continued to work on improving communication between staff and research projects.
- Request system for support now built into myToolik
 - Slowly adding more functions, including, up-to-date reports on hours of remote access completed per project

REMOTE ACCESS EXAMPLES



REMOTE ACCESS HOURS



- 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**

- Examples of Assistance (Not exhaustive):

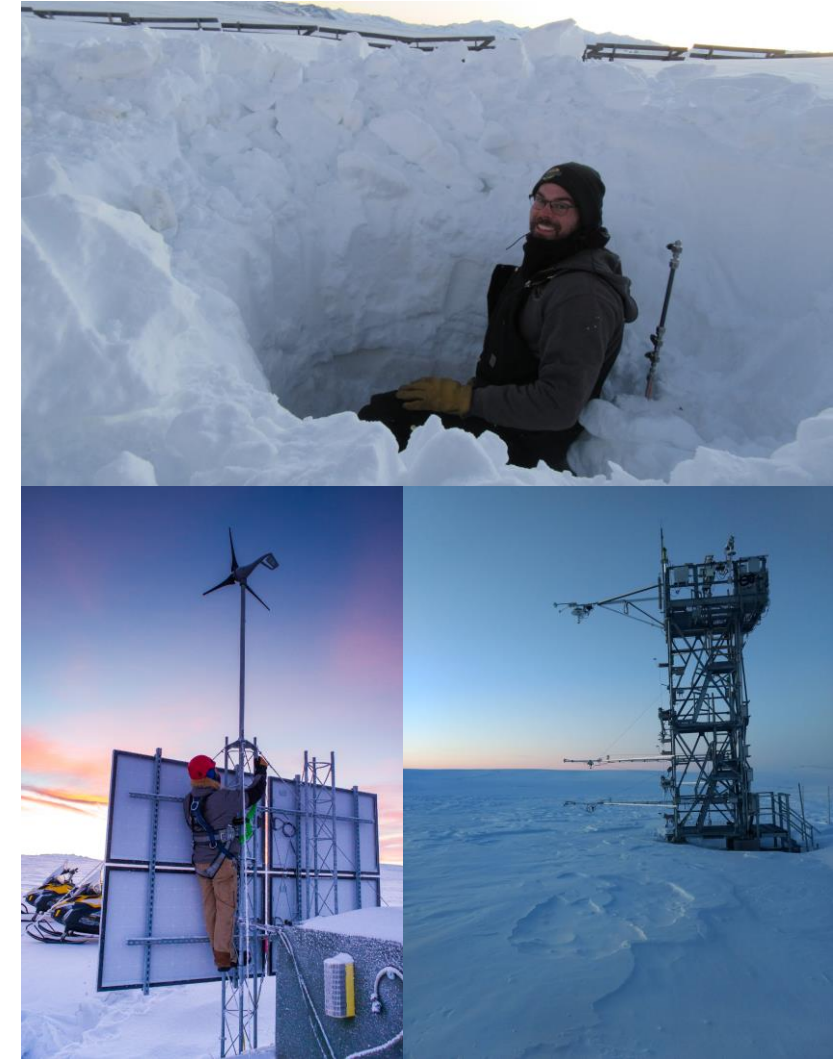
- Met Station setup, downloads, and troubleshooting
- Phenology and NDVI measurements
- River Discharge
- Soil sampling
- Tussock tiller measurements



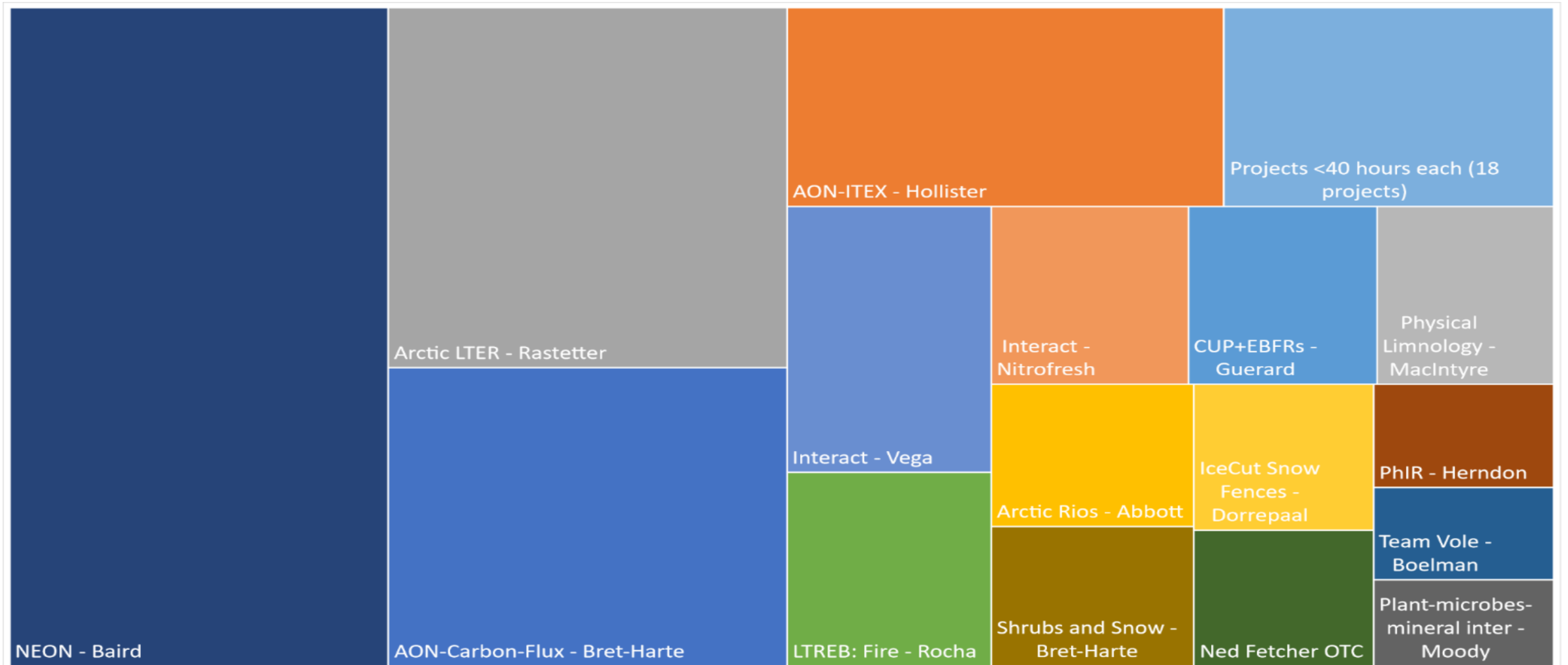
WINTER REMOTE ACCESS



- 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



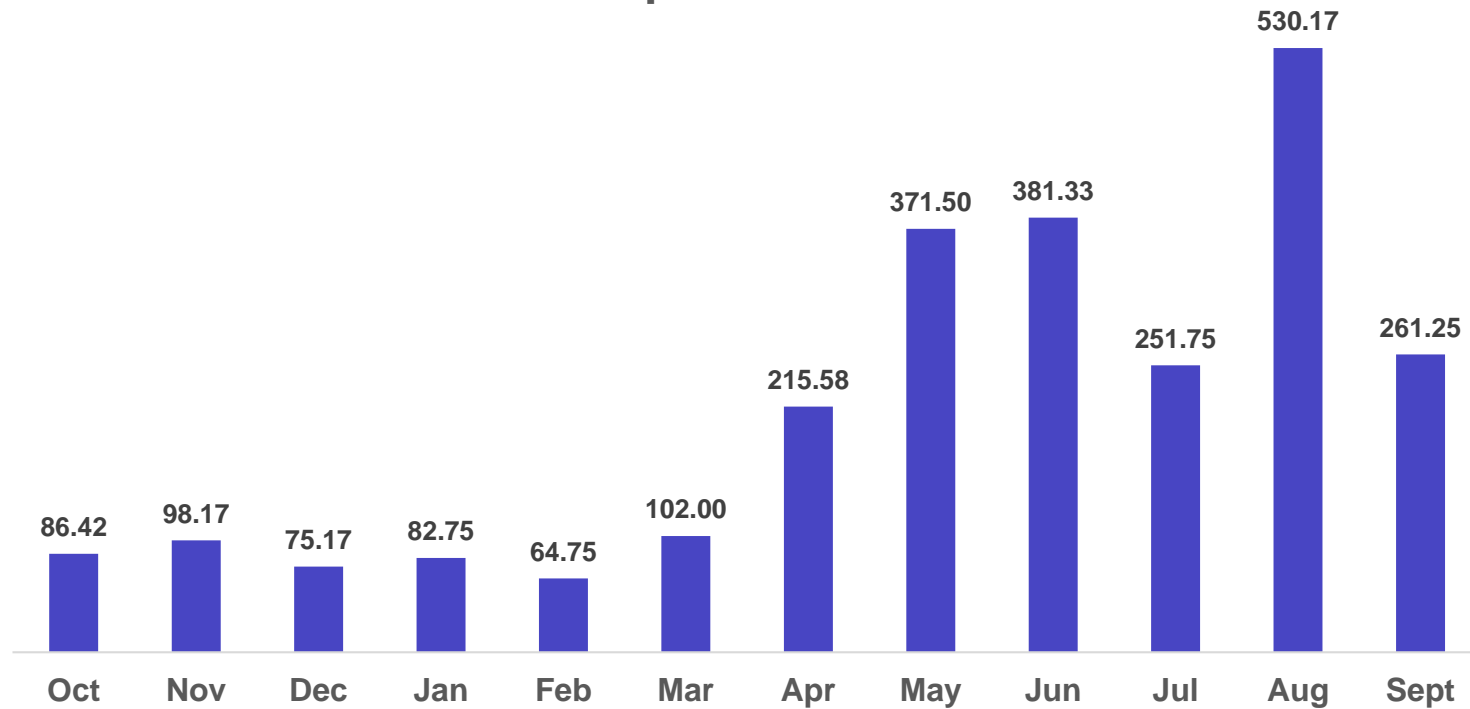
REMOTE ACCESS - PROPORTIONALLY



REMOTE ACCESS THROUGH SEPT 2020



Remote Access hours per month 2020-2021

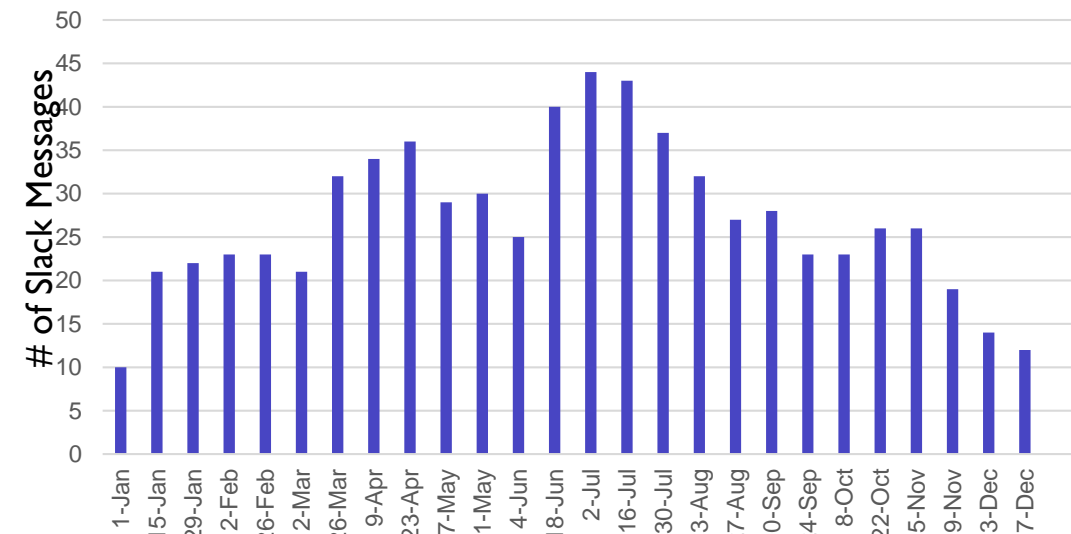


COMMUNICATION - SLACK



- Channels for each project kept correspondence organized and not lost in an inbox.
 - Currently 38 channels for research projects with numerous facets have more than one channel.
- 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
 - Moving to the Pro version - more functions and storage

Slack communication through the year

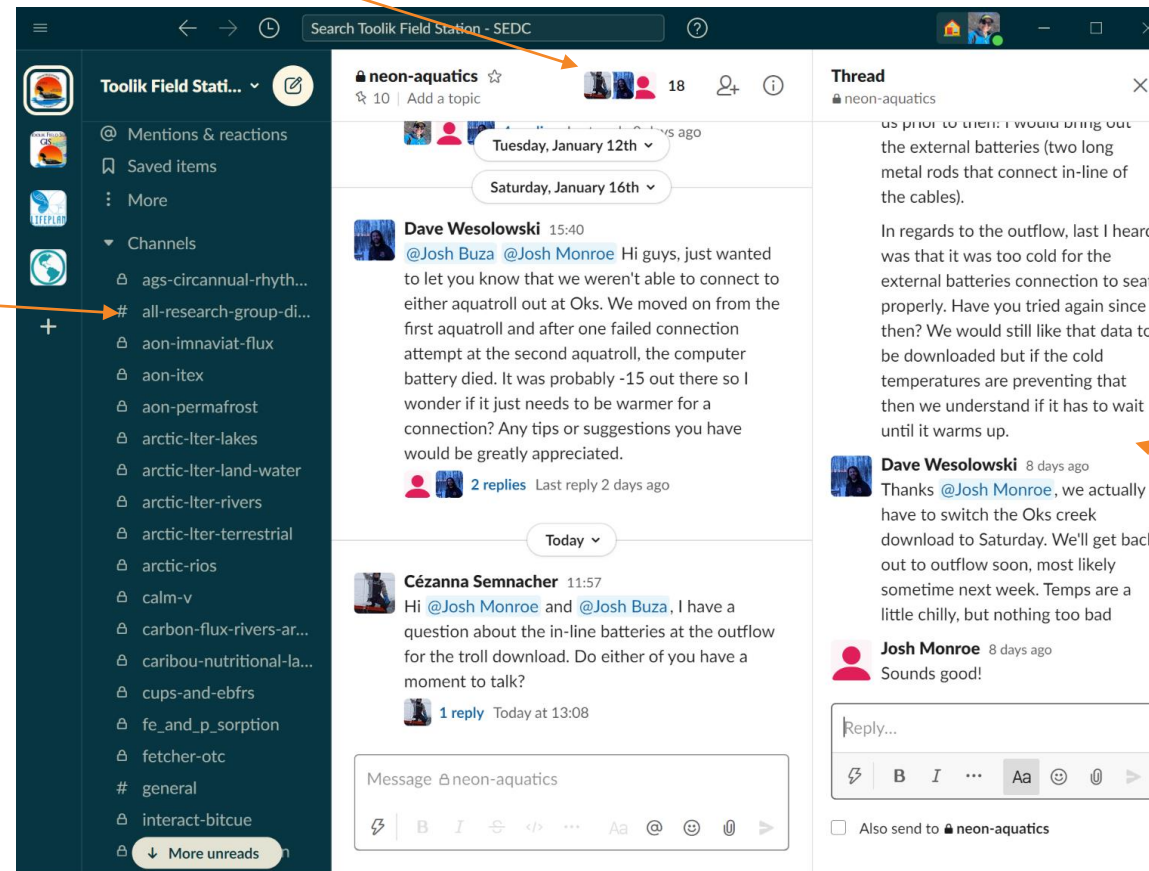


COMMUNICATION - SLACK



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 LESSONS

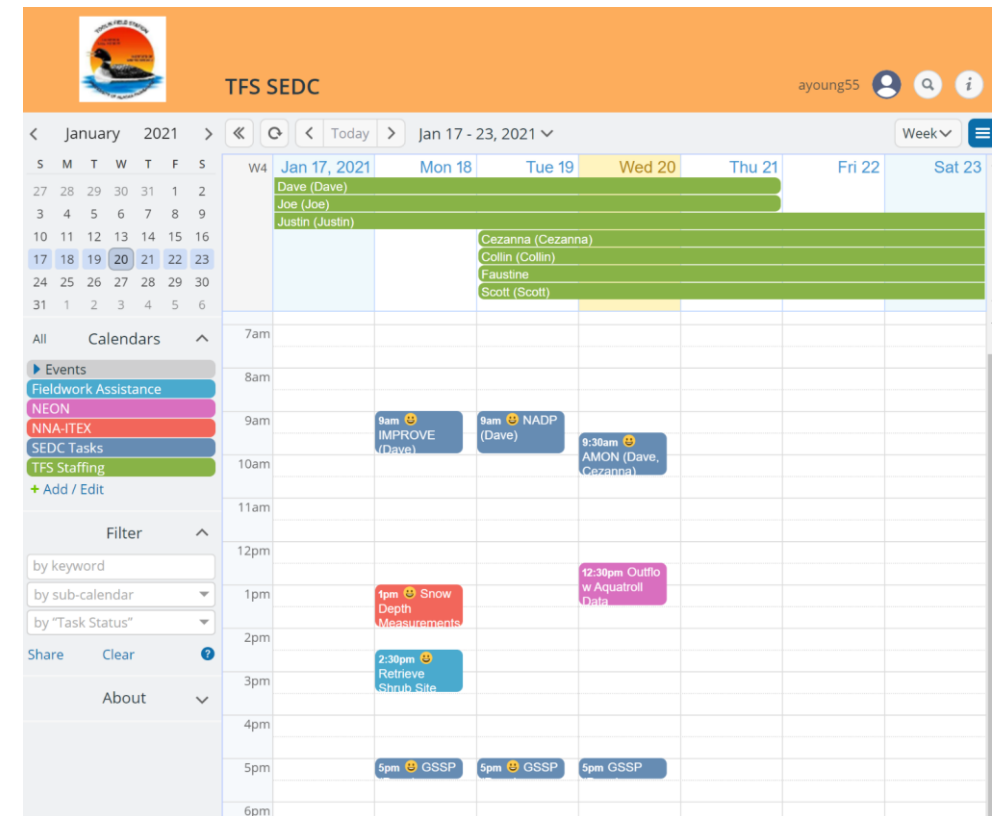


- Timing of staffing for unforeseen remote access requests
 - Example: May spring melt occurred later than researchers expected and were not in camp for the event, asking TFS staff to conduct daily measurements.
- Additional field gear needed to support specific projects
 - Waders were needed for a number of projects.
- Need to work on saying no we cannot do some things

REMOTE ACCESS GOING FORWARD












- Continue to provide year-round Remote Access
 - users who cannot make it to Toolik
 - Extend season of sampling for researchers
 - Year-round support
- Provide additional field support to researchers at Toolik
- Continue to improve communication between the SEDC and researchers
 - Slack
 - Open to other suggestions as well.
- Calendar of staffing, remote access, and field assistance for researchers to see when their sampling is scheduled.



DATA USAGE



EDC Webpage and Direct Requests













- Met station data requests 231  by 74  1194 
- Phenology data requests 10  by 8 
- Bird Point count requests  by 1 
- NDVI requests  2  by 2



NSF
**Arctic
Data
Center**

-  File
-  Downloads
-  People
-  Views

Arctic Data Center (data has DOI)

- | | | | | | |
|-------------------|--|--|------------------------------|--|--|
| Phenology |  |  17 | Naturalist Journal – Birds |  | 18  |
| Bird Point Counts |  48 |  46 | 59 |  |  |
| Met Station data |  |  2 | Naturalist Journal – Mammals | 55  | 37  |
| | | | Naturalist Journal – Insects | 0 | 272 |

ARCTIC DATA CENTER PORTAL


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



Increase of 59 datasets in 2021

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

About the Toolik Field Station




Overview
Funding
Connect

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

Overview

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About People Publications Data Metrics

Search

Search these datasets

DATASETS 1 TO 25 OF 448

Sort by Most recent

1 2 3 ... 18 Next

Adrian Rocha. 2021. [Eriophorum vaginatum rhizome nitrogen content from the 2007 Anaktuvuk River fire sca measured in 2019](#). Arctic Data Center.
<https://pasta.lternet.edu/package/metadata/eml/knb-lter-arc/20141/1>.

Adrian Rocha. 2021. [Comparison of vole-grazed and ungrazed Eriophorum vaginatum tussock biomass at](#)

Hide Map »

DATAONE TOOLIK PORTAL

<https://search.dataone.org/portals/toolik/>



- 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 427 datasets in the ADC portal to 2,804 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 its logo and a description: '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.'

Below the header is a navigation bar with tabs: 'About', 'People', 'Publications', 'Data' (highlighted), and 'Metrics'. Under the 'Data' tab, there's a search bar with 'CURRENT SEARCH' and 'CLEAR ALL' buttons. A button 'Limit search to the map area' is also visible.

The main content area shows 'Datasets 451 to 475 of 2,804'. It includes a pagination bar with 'Prev', '1', '...', '17', '18', '19' (selected), '20', '21', '...', '113', and 'Next'. Below this, there are three dataset entries, each with a thumbnail, title, author, year, and URL. The first entry is 'Relative percent cover of plant species for 2014 in LTER moist acidic tundra experimental plots established in 1981, Arctic LTER Toolik Field Station, Alaska' by Laura Gough, 2019. The second is 'Chemistry from thermokarst impacted soils, lakes, and streams near Toolik Lake Alaska, 2008-2011' by George Kling, 2012. The third is 'Eddy Flux Measurements, Tussock Station, Imnavait Creek, Alaska - 2018 - Provisional' by M. Sydonia Bret-Harte, Eugenie Euskirchen, Kevin Griffin, and Gaius Shaver, 2019.

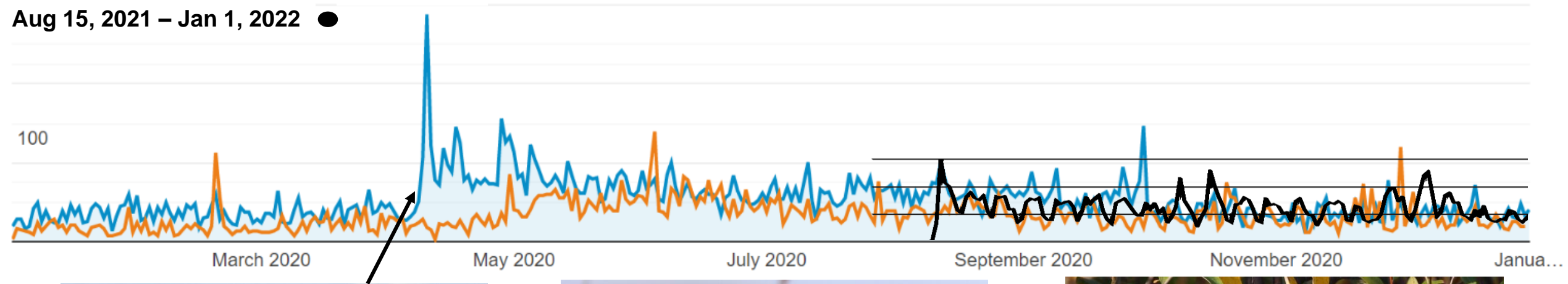
On the right side of the dataset list is a map of Alaska with a grid overlay. The grid cells contain numbers: 3, 2804, 1, 14, 1, 1. A 'Hide Map' button is at the top of the map area.

NATURALIST JOURNAL - VIEWERSHIP



Jan 1, 2020 - Jan 1, 2021: ●
Jan 1, 2019 - Jan 1, 2020: ●
Aug 15, 2021 – Jan 1, 2022: ●

Similar viewership to the prior two seasons



EDC Baseline Datasets



■ Biotic Datasets

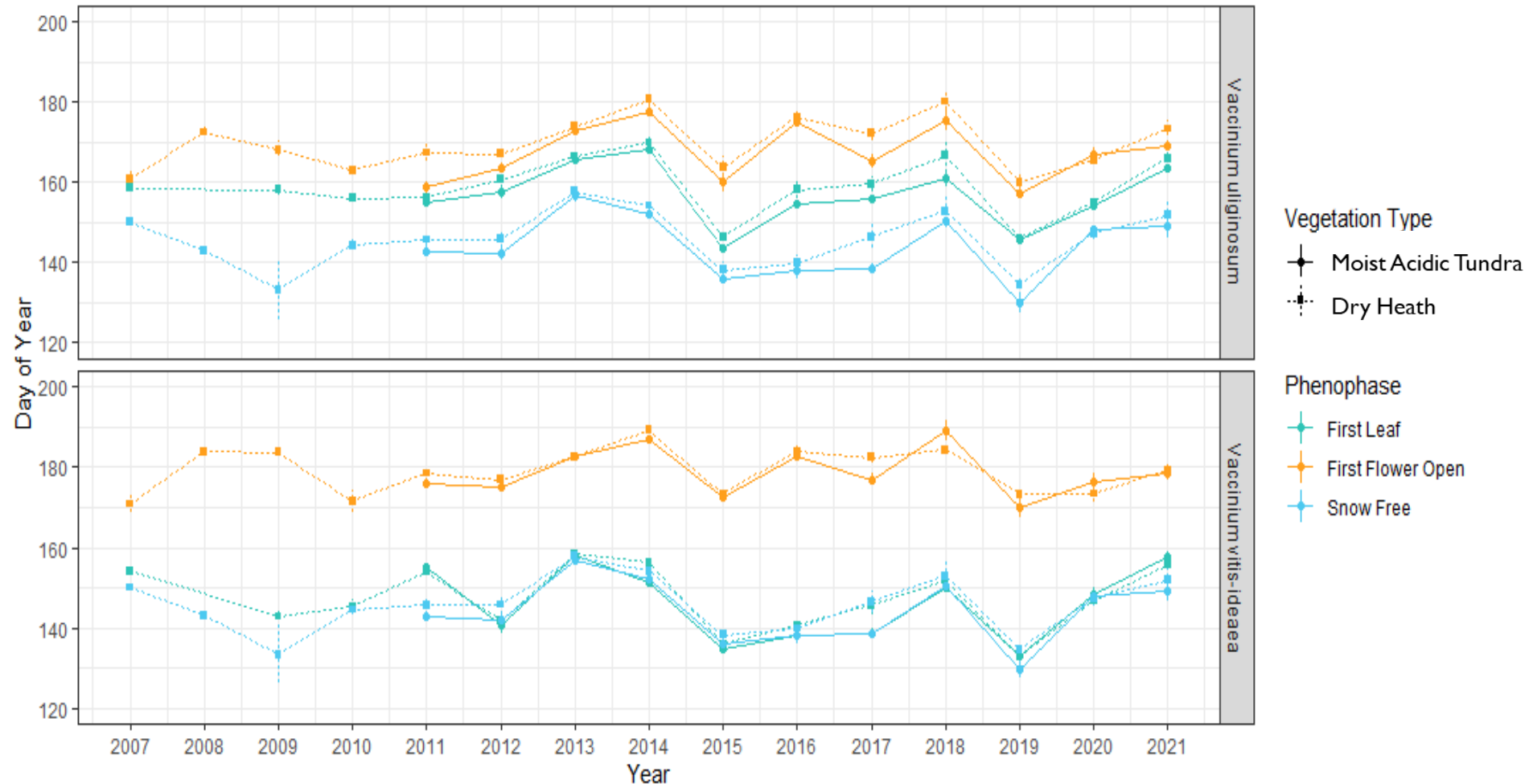
- Avian point counts
- Avian Acoustics
- Plant Phenology
- NDVI
- Naturalist Journal Observations
 - Birds
 - Mammals
 - Insects

■ Abiotic Datasets

- Snow Depth
- Ice thickness
- Time Lapse Camera Imagery
- Met station data
 - air temp, soil temp, precip, solar radiation, evaporation, etc.
- Atmospheric Monitoring
 - P2.5, ozone, mercury, etc.

BASELINE MONITORING

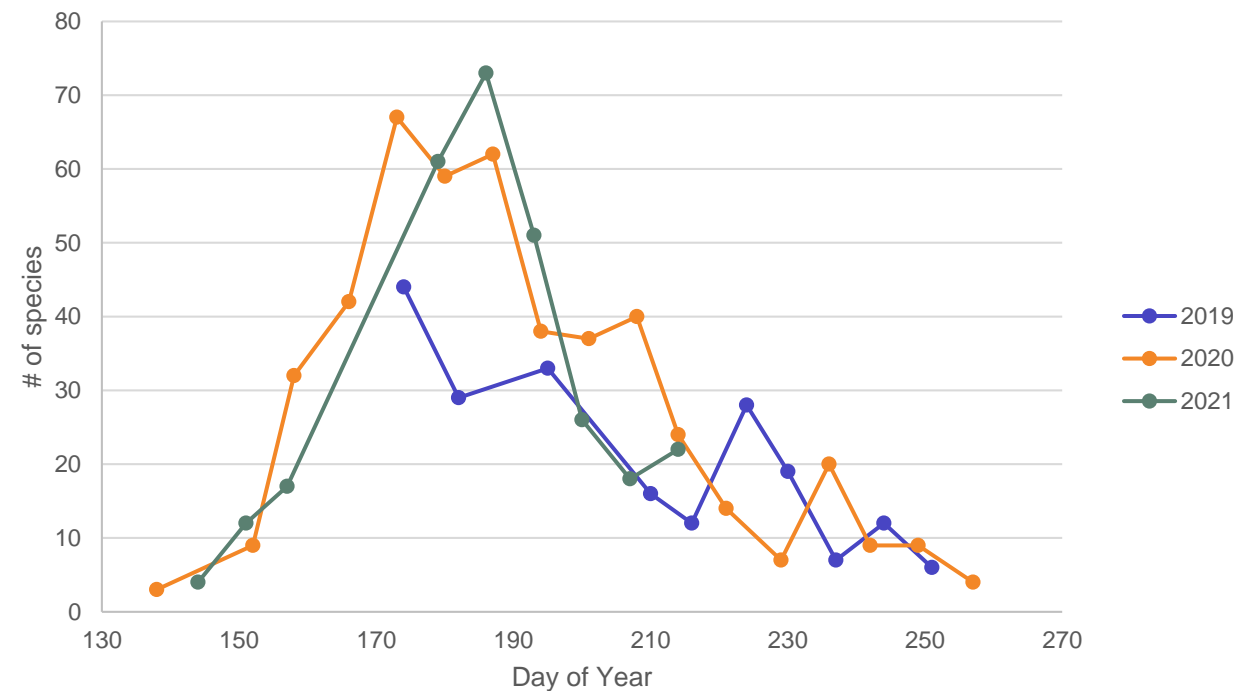
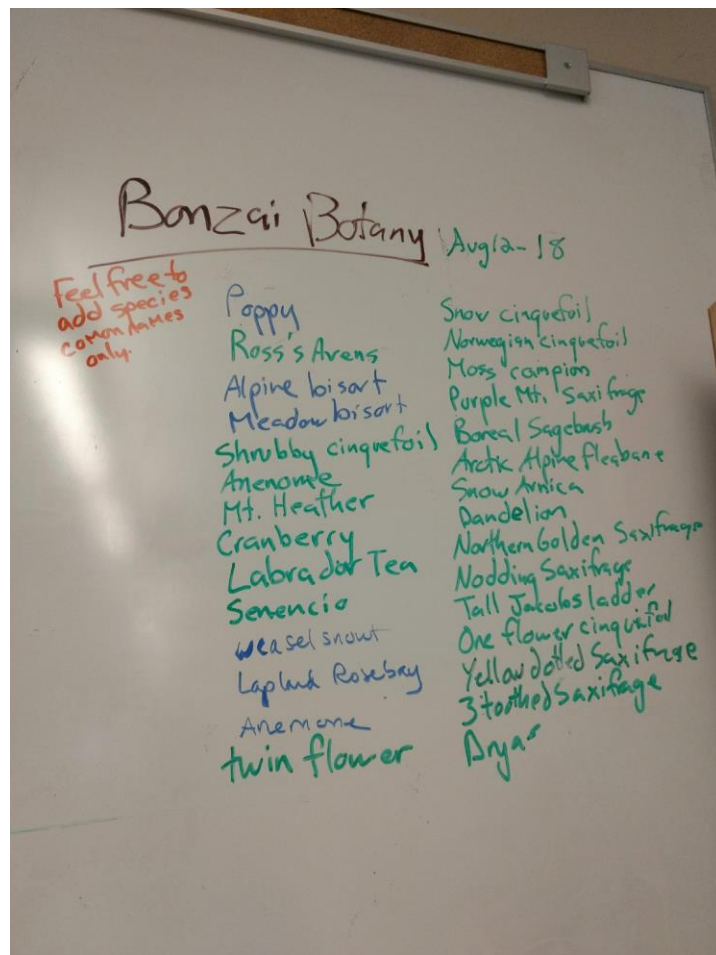
BIOLOGICAL MONITORING – PHENOLOGY



BONZAI BOTANY



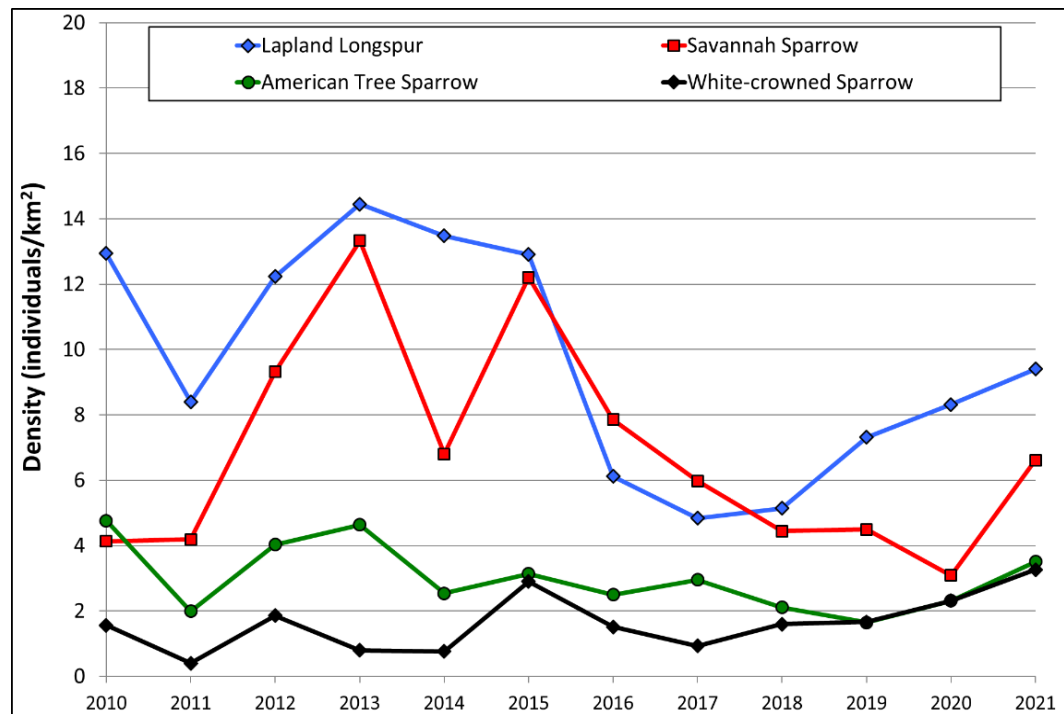
- Plants in flower during a given week are recorded
- Common names only so all can participate



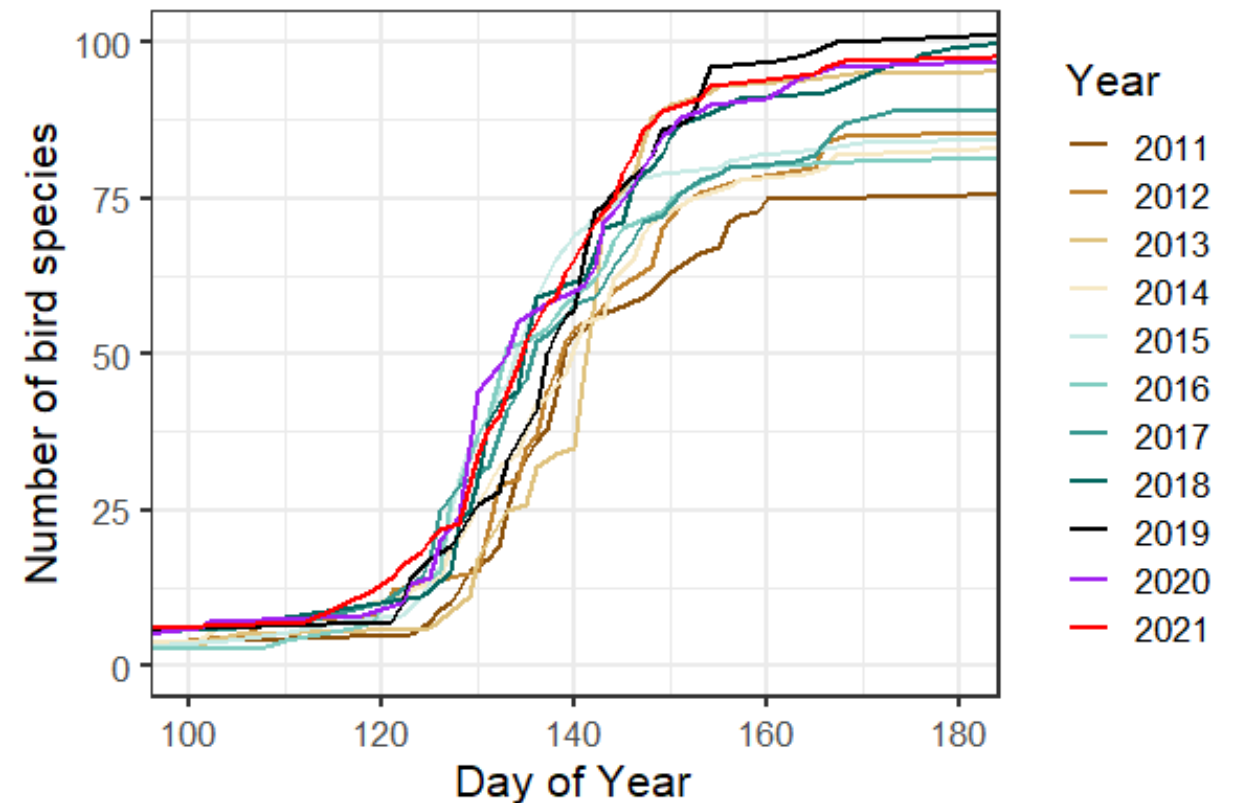
BASELINE MONITORING BIOLOGICAL MONITORING - AVIAN



Avian point counts



Date of Arrival of bird species from the naturalist journal



BASELINE MONITORING BIOLOGICAL MONITORING – AUDIO RECORDINGS OF BIRDS



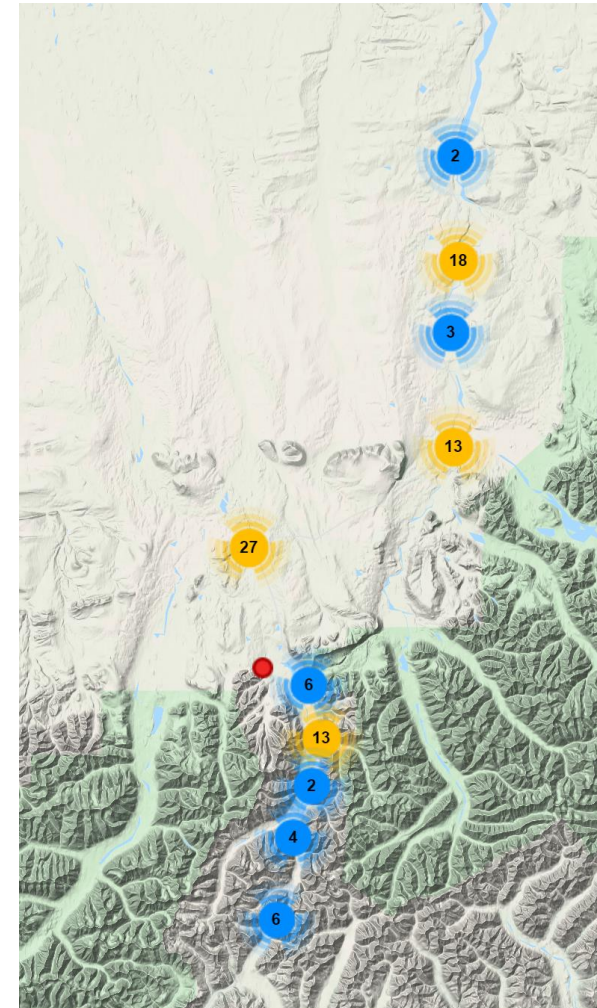
- Audio recording of bird species continues now with 95 recordings from the Toolik area.
- Calls are being added to the Bird Guide



Juvenile Northern Shrike, Sept 2021
<https://www.xeno-canto.org/680332>



Yellow-Billed Loon Duet, July 2021
<https://www.xeno-canto.org/680308>

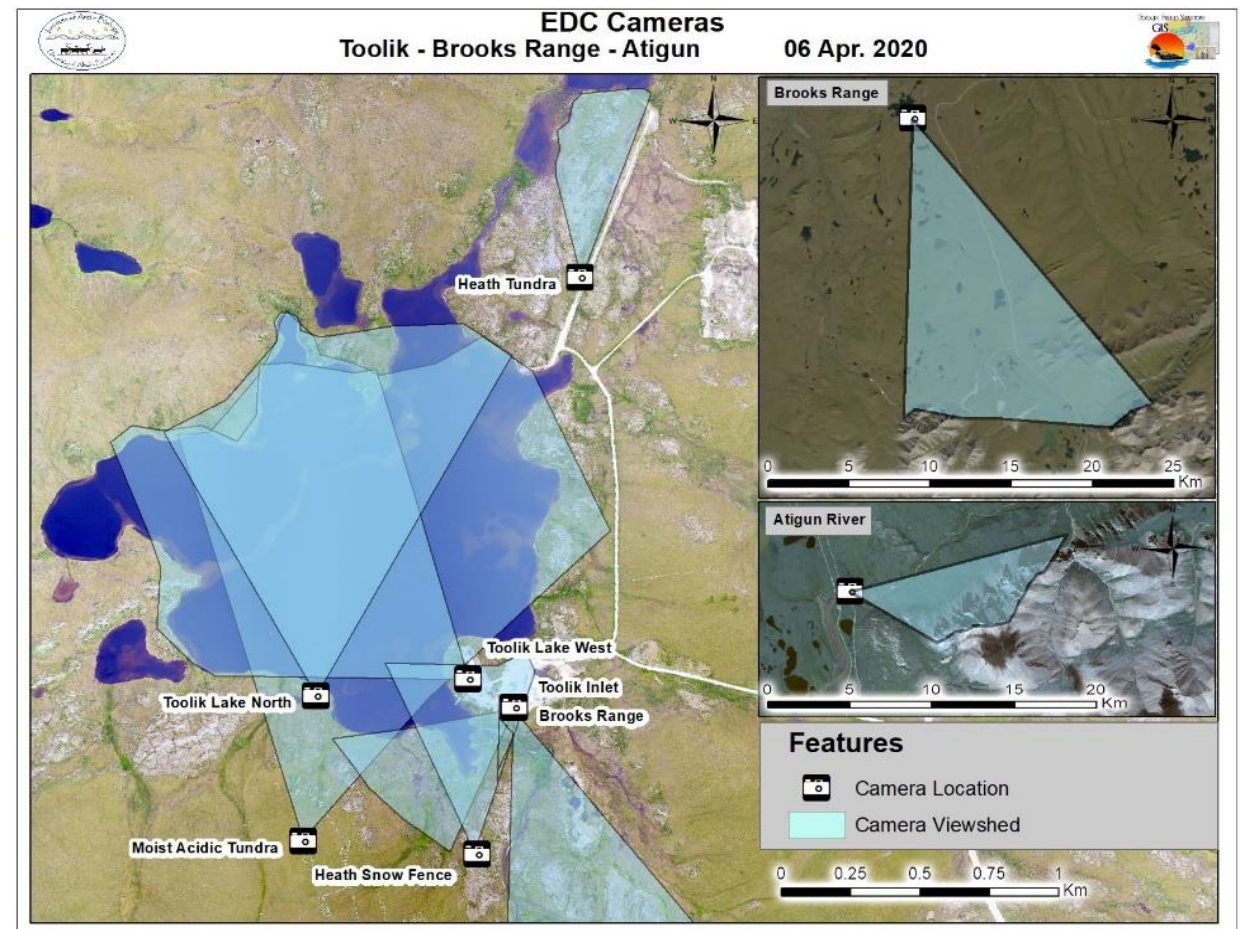


BASELINE MONITORING

ABIOTIC MONITORING - TIME LAPSE IMAGERY



- Cameras up-to-date online
- Two webcams
 - Daily update to website
- Five Buckeye cams
- Future replacement of the Atigun Gorge camera



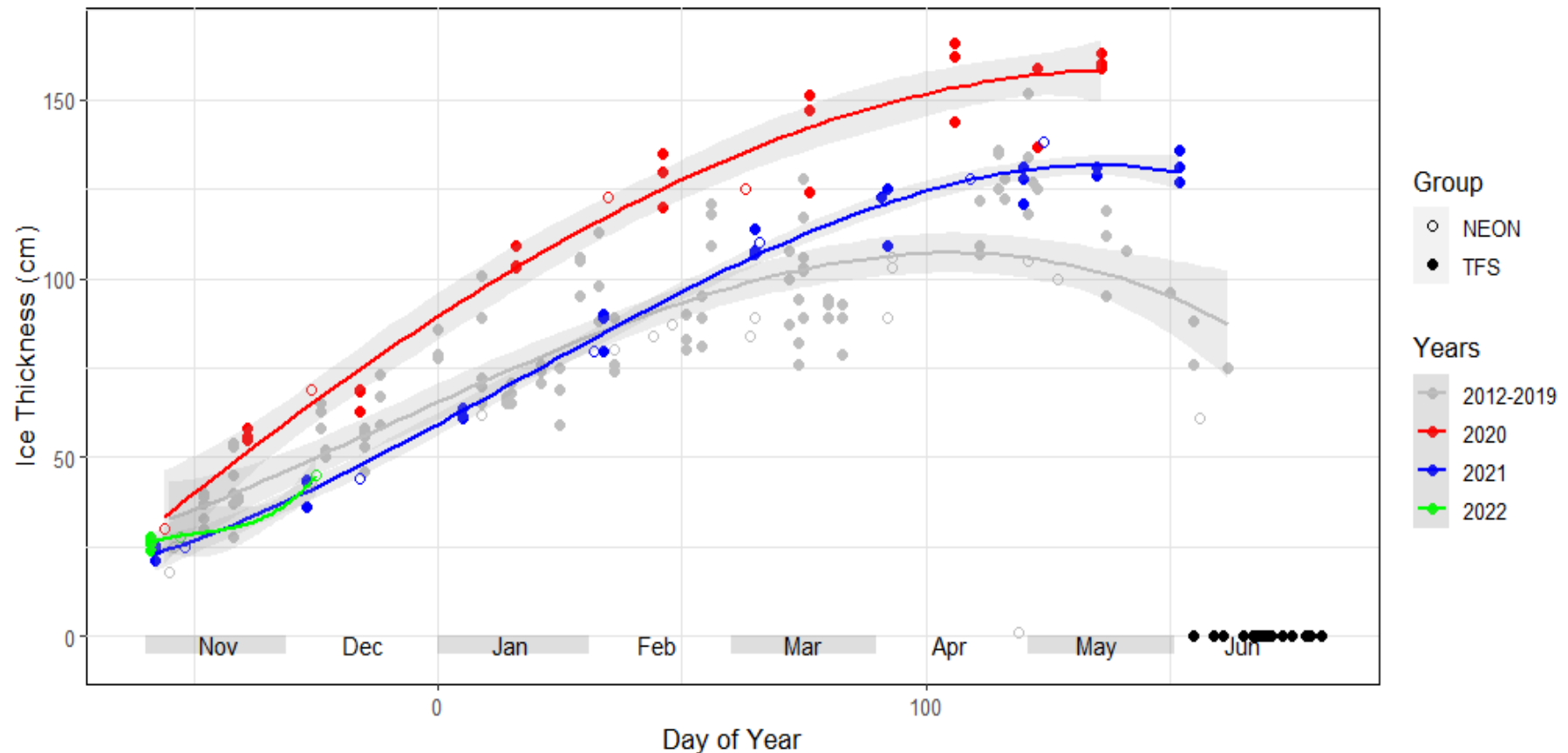
BASELINE MONITORING

ABIOTIC MONITORING – SNOW AND ICE



Toolik Lake Ice Thickness 2012-2022

Ice Off dates (2000-2021)



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) – 2011 to Present
 - Funded by the BLM
 - Purple Air – June 2019 to Present
 - Particulate matter sampling
 - Mercury Passive Air Sampler – January 2020 to Present
 - Changed quarterly

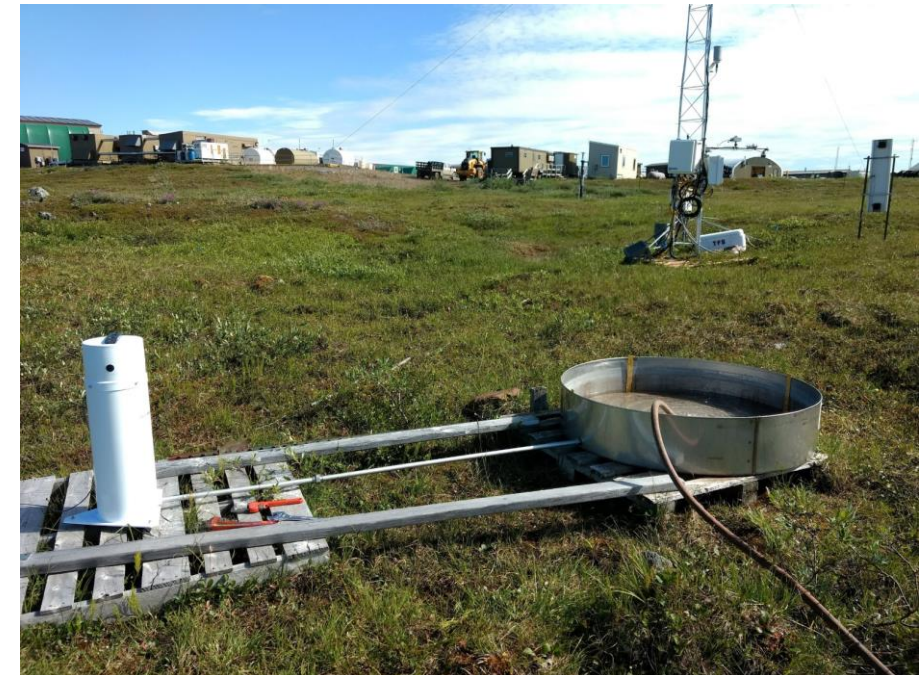


Photo by Sarah King

MET STATION REPORT



- TFS Meteorological Data updates
 - 2021 final error checked data is now available.
 - Data now posted on the TFS website under the Meteorological Data Query
- No Sensor Upgrades in 2021
 - Deployed and maintained current sensors.
 - Establish protocols for remote repair of equipment.
- Frequent Communication between Colin Edgar and the EDC staff to troubleshoot issues.
- Everything still works!



EXAMPLES OF DATA AND EQUIPMENT USAGE IN PUBLICATIONS



esa

ECOSPHERE

Received: 22 March 2021 | Revised: 17 June 2021 | Accepted: 1 July 2021
DOI: 10.1002/ece3.7977

Ecology and Evolution WILEY

ORIGINAL RESEARCH

Snowier winters extend autumn availability of high-quality forage for caribou in Arctic Alaska

J. C. RICHERT^{1,5} , A. J. LEFFLER^{1,†} , D. E. SPALINGER^{2,3} AND J. M. WELKER^{2,4}

World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:15, No:4, 2021

Early Melt Season Variability of Fast Ice Degradation Due to Small Arctic Riverine Heat Fluxes

Grace E. Santella, Shawn G. Gallaher, Joseph P. Smith

ORIGINAL RESEARCH article

Front. Earth Sci., 31 May 2021 | <https://doi.org/10.3389/feart.2021.651731>



Hydroclimatic Controls on the Isotopic ($\delta^{18}\text{O}$, $\delta^2\text{H}$, d -excess) Traits of Pan-Arctic Summer Rainfall Events

Moein Mellat^{1,2†}, Hannah Bailey¹, Kaisa-Riikka Mustonen¹, Hannu Marttila²

Large and small herbivores have strong effects on tundra vegetation in Scandinavia and Alaska

Elin Lindén¹ | Laura Gough² | Johan Olofsson¹

Research Article

Intercomparison of Thermal Regime Algorithms in 1-D Lake Models

Mingyang Guo, Qianlai Zhuang , Huaxia Yao, Malgorzata Golub, L. Ruby Leung, Zeli Tan

First published: 08 June 2021 | <https://doi.org/10.1029/2020WR028776>

TIME-INTEGRATED COLLECTION OF CO₂ FOR ¹⁴C ANALYSIS FROM SOILS

Shawn Pedron^{1*} • X Xu¹ • J C Walker² • J C Ferguson³ • R G Jespersen⁴ • J M Welker^{4,6,7} • E S Klein⁵ • C I Czimczik^{1*}

Meteorological

Fieldwork

COMMON USE EQUIPMENT



■ New Equipment

- Hatch Pocket Pro+ (field pH meter) (user suggested)
- Avalanche Probe
- Fridge/Freezer digital Thermometer (user suggested)
- Ultra Low Freezer Verification Thermometer (user suggested)

■ Suggested new equipment during 2021

- Sledge microtome
- Metal Detector
- Cyclone Twister Mill
- New Freeze Dryer

Hatch Pocket Pro +



Flat Freeze Dryer



Cyclone Twister Mill

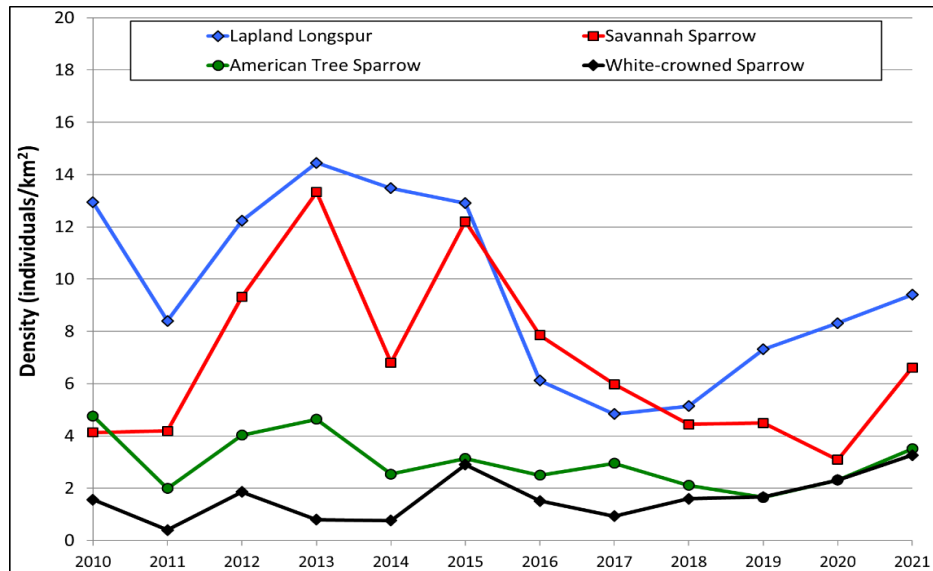


Sledge Microtome

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



Baseline Datasets



Remote Access

