SEDC REPORT

OCT 1, 2020 - SEPT 30, 2021 REPORT
2020 SPATIAL AND ENVIRONMENTAL DATA CENTER REPORT

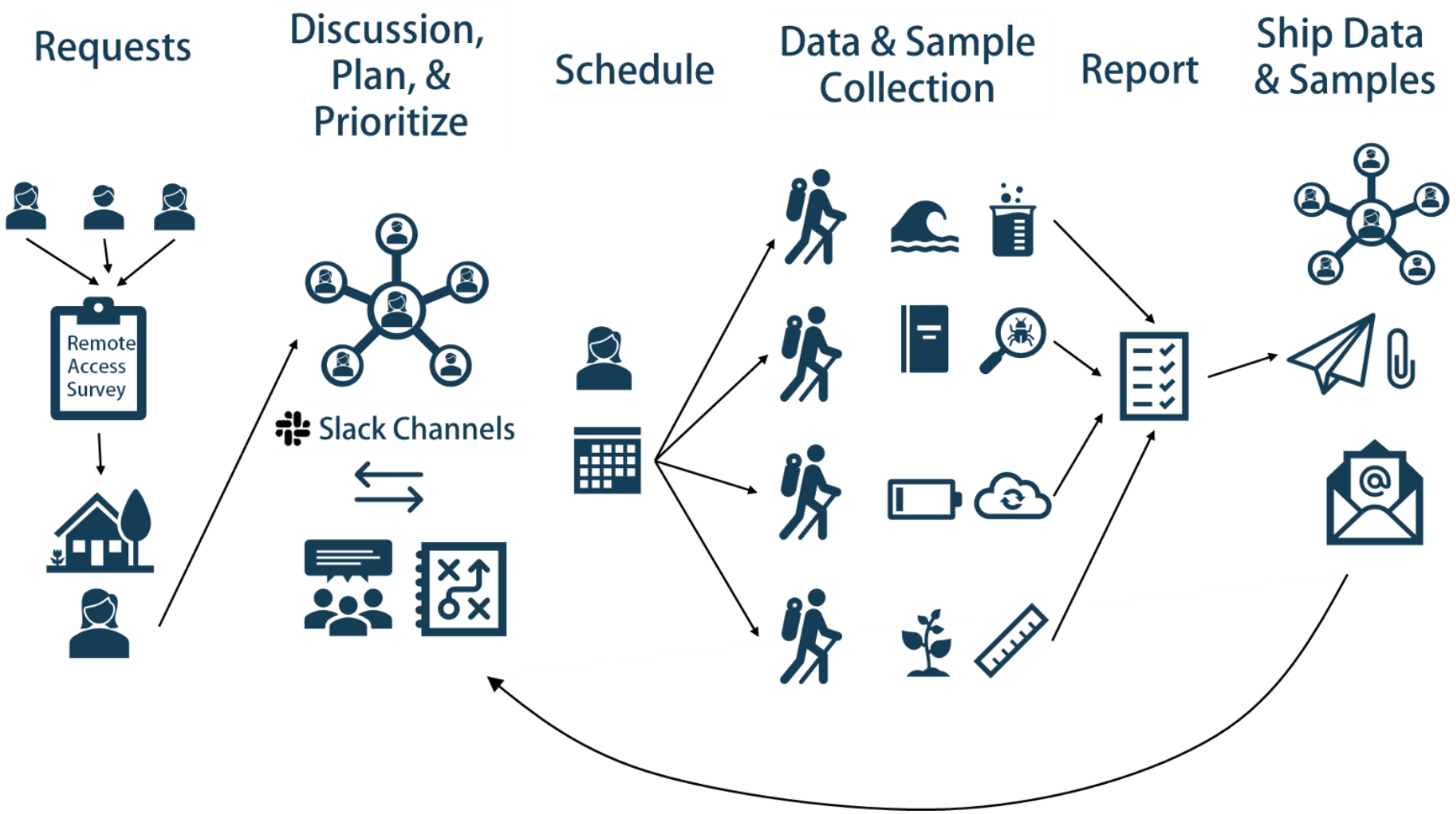
AMANDA B. YOUNG

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

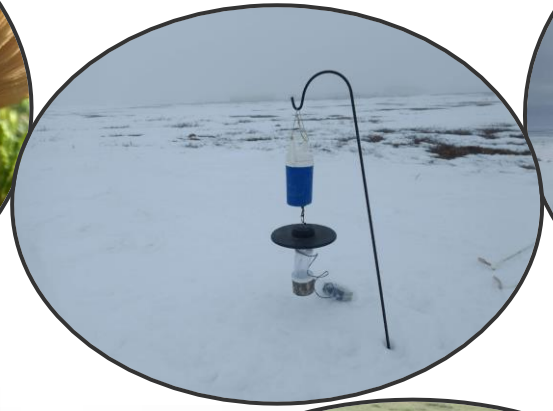
REMOTE ACCESS - STRUCTURE

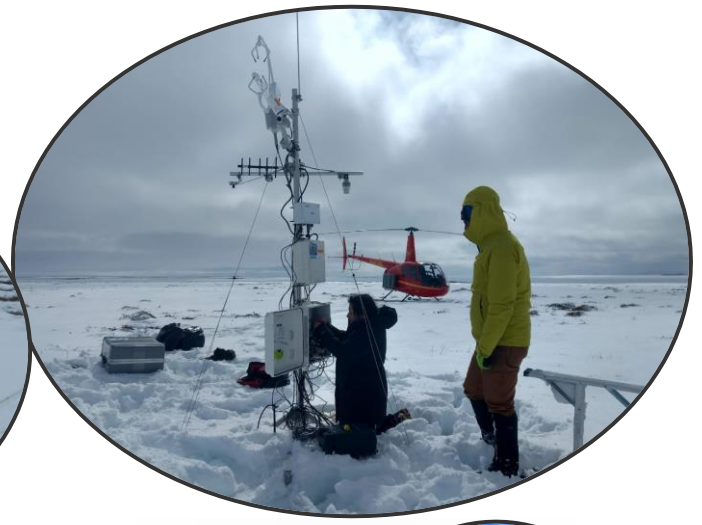


REMOTE ACCESS - SUCCESSES

- 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





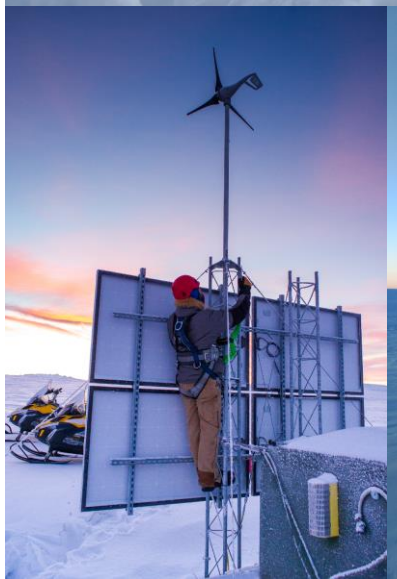
REMOTE ACCESS HOURS

- 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**

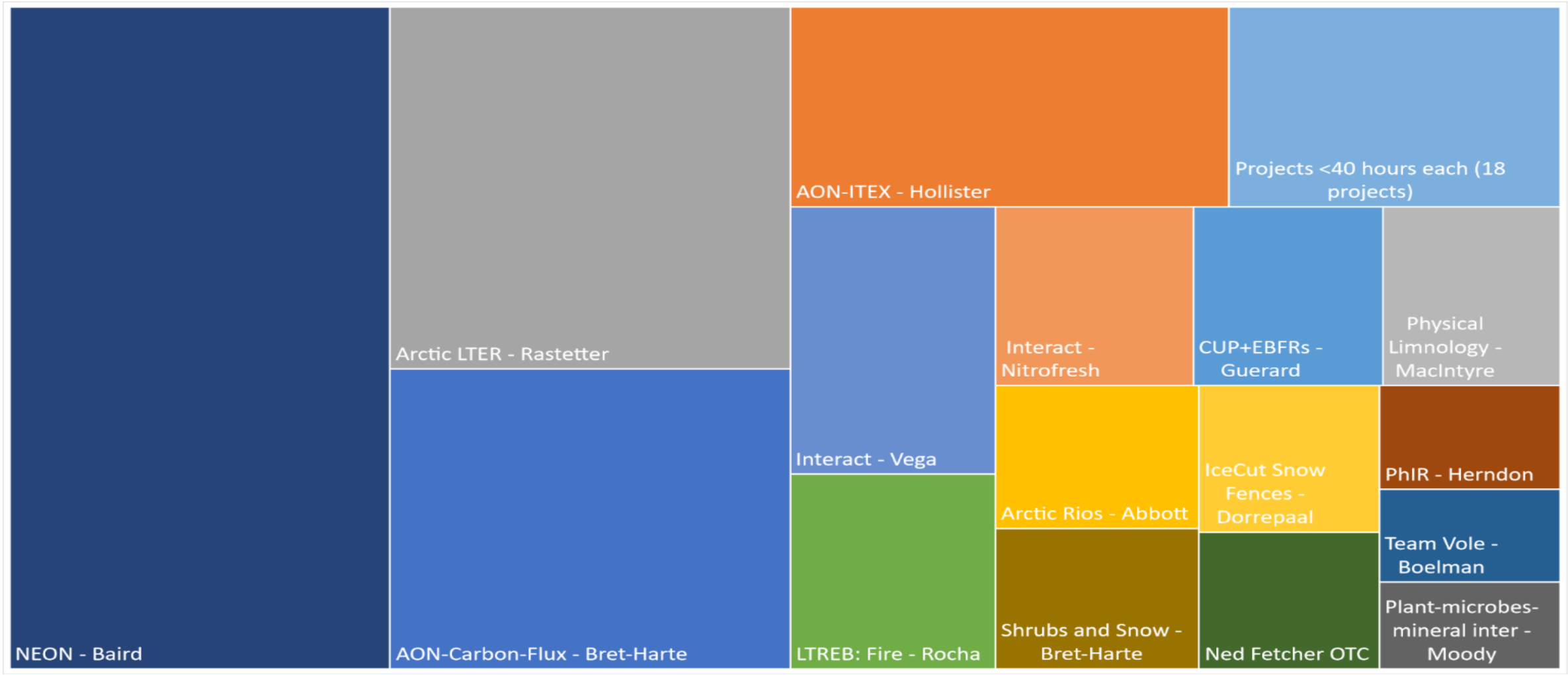
- Examples of Assistance (Not exhaustive):
  - Met Station setup, downloads, and troubleshooting
  - Phenology and NDVI measurements
  - River Discharge
  - Soil sampling
  - Tussock tiller measurements

WINTER REMOTE ACCESS

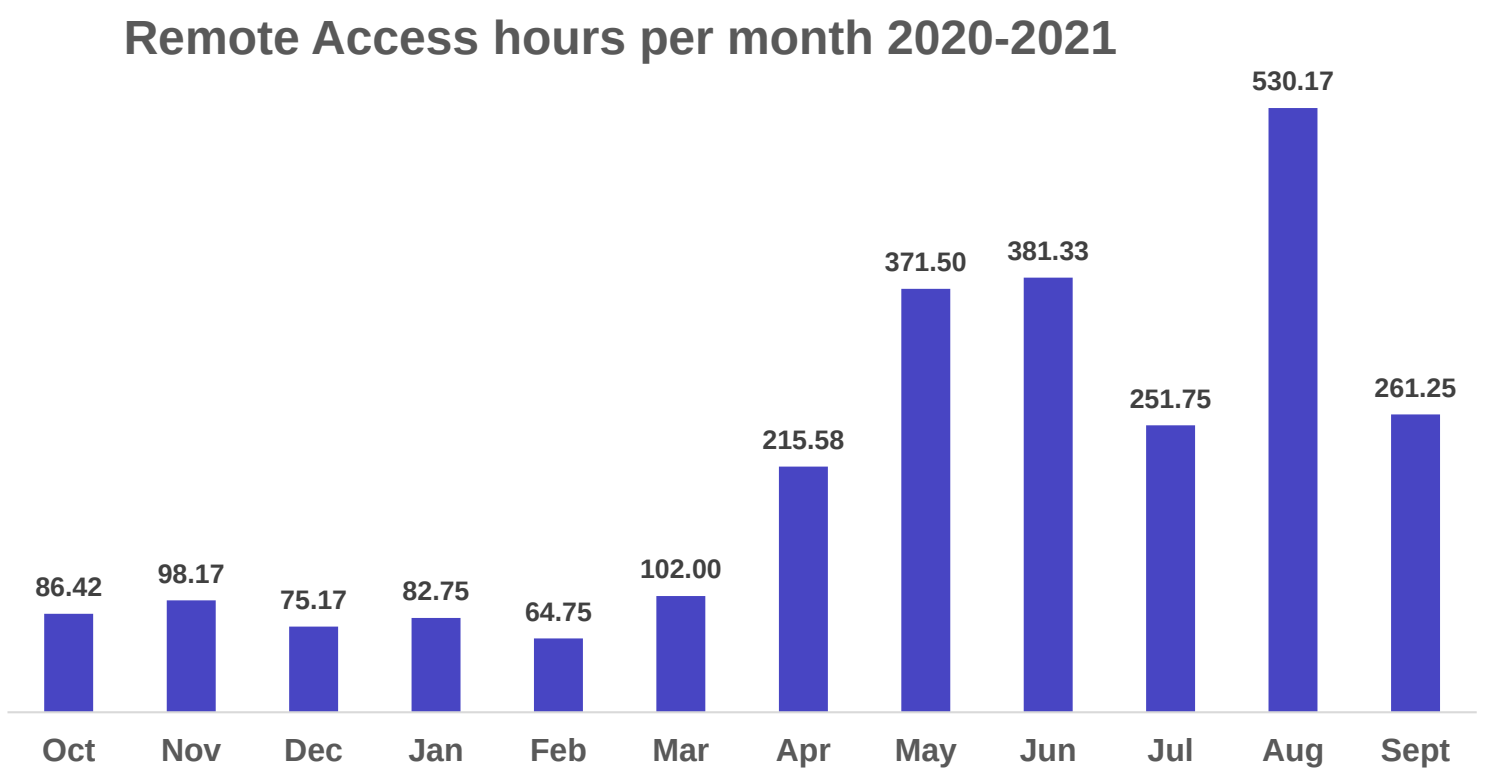
- 20-40 hours of remote access per week.
- EDC staff at Toolik year-round working with Maintenance staff
- Activities:
  - Autonomous Equipment
    - preventative maintenance checks
    - data download
    - Power system charging and repairs
    - Sensor swap
  - Snow depth measurements
  - Lake Ice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



REMOTE ACCESS - PROPORTIONALLY

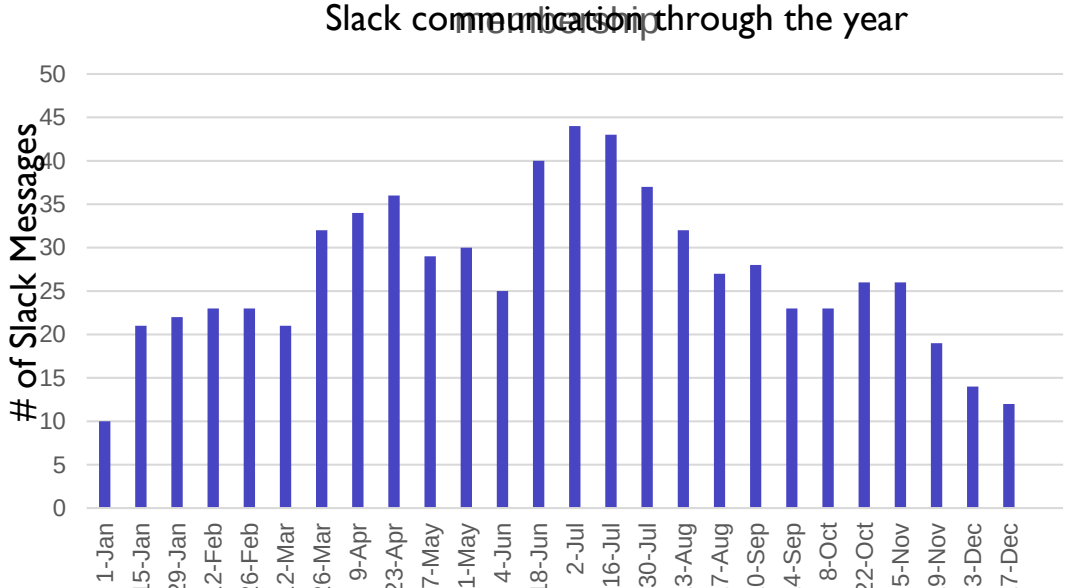


REMOTE ACCESS THROUGH SEPT 2020



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

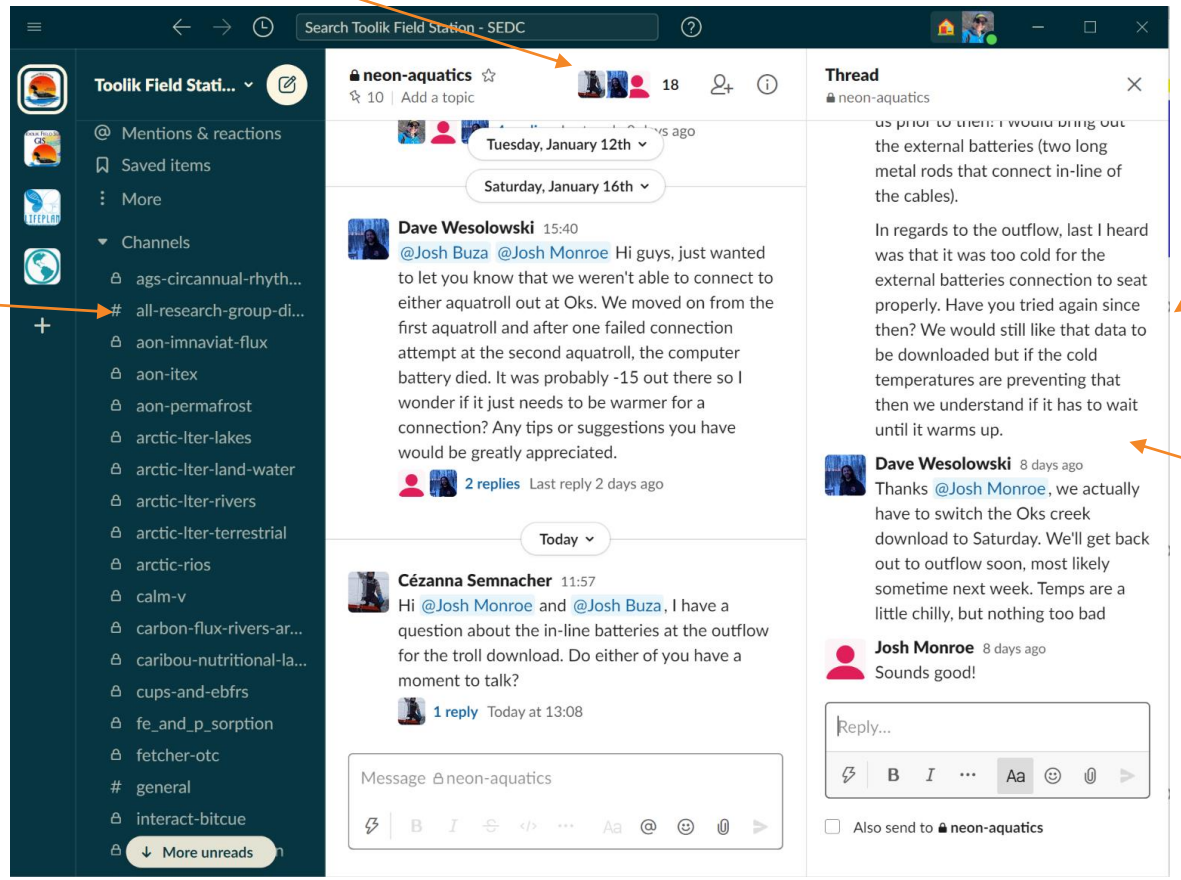


COMMUNICATION - SLACK

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

= open channel for all to discuss

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



Threads are used to respond to specific questions or topics

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

REMOTE ACCESS LESSONS

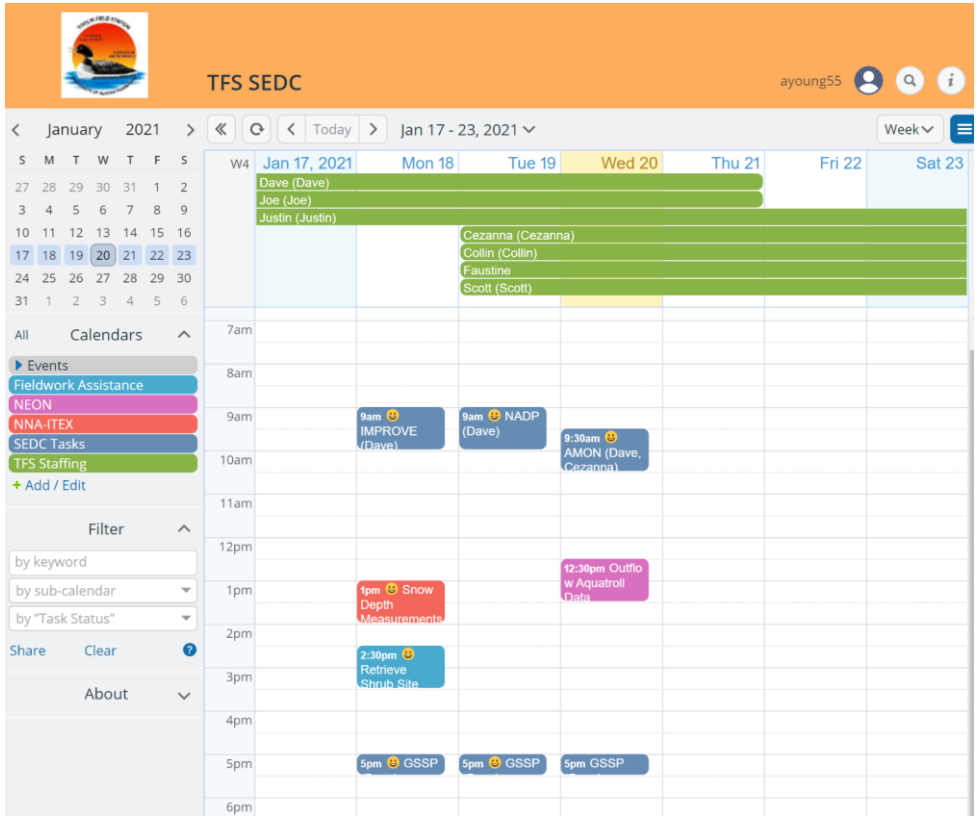
- Timing of staffing for unforeseen remote access requests
  - Example: May spring melt occurred latter than researchers expected and were not in camp for the event, asking TFS staff to conduct daily measurements.

- 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 1 by 1
  - NDVI requests 2 by 2

NSF Arctic Data Center

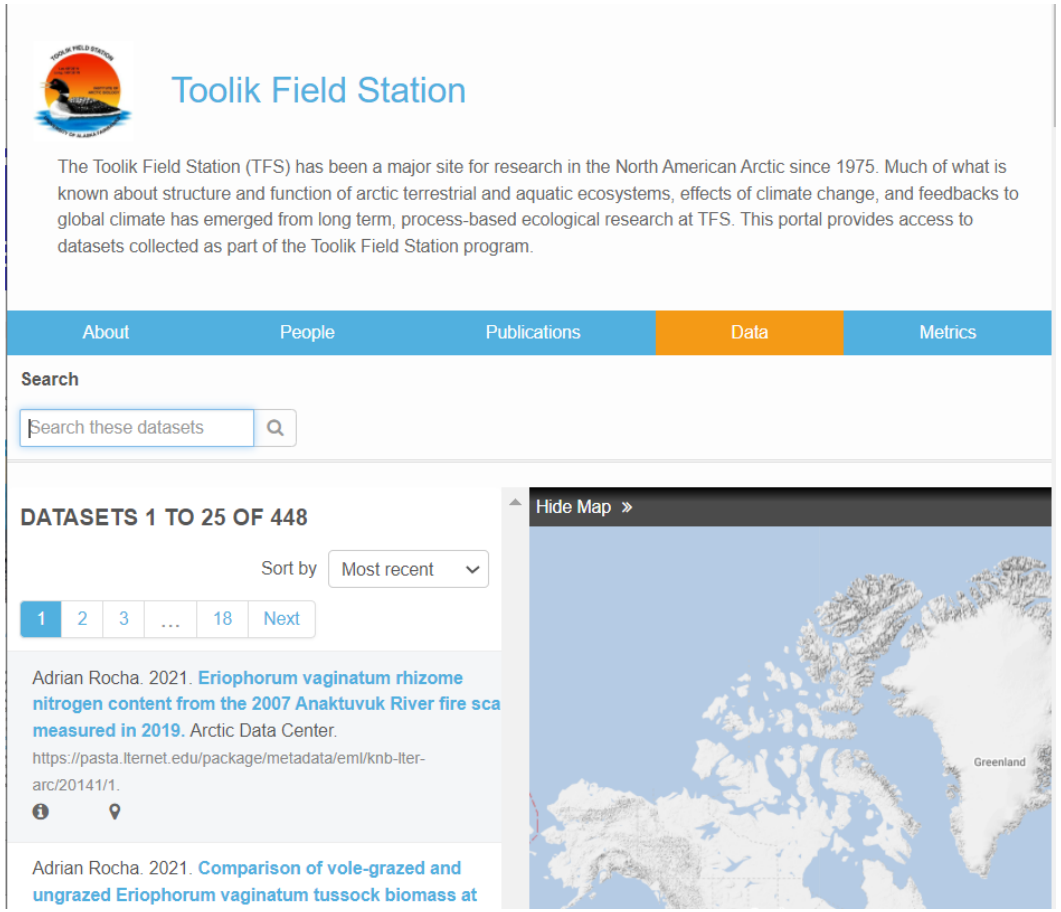
File
Downloads
People
Views

- Arctic Data Center (data has DOI)
  - Phenology 107
  - Bird Point Counts 48 46
  - Met Station data 88
  - Naturalist Journal – Birds 18
  - 59
  - Naturalist Journal – Mammals 55 37
  - 85
  - Naturalist Journal – Insects 0 272

ARCTIC DATA CENTER PORTAL

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

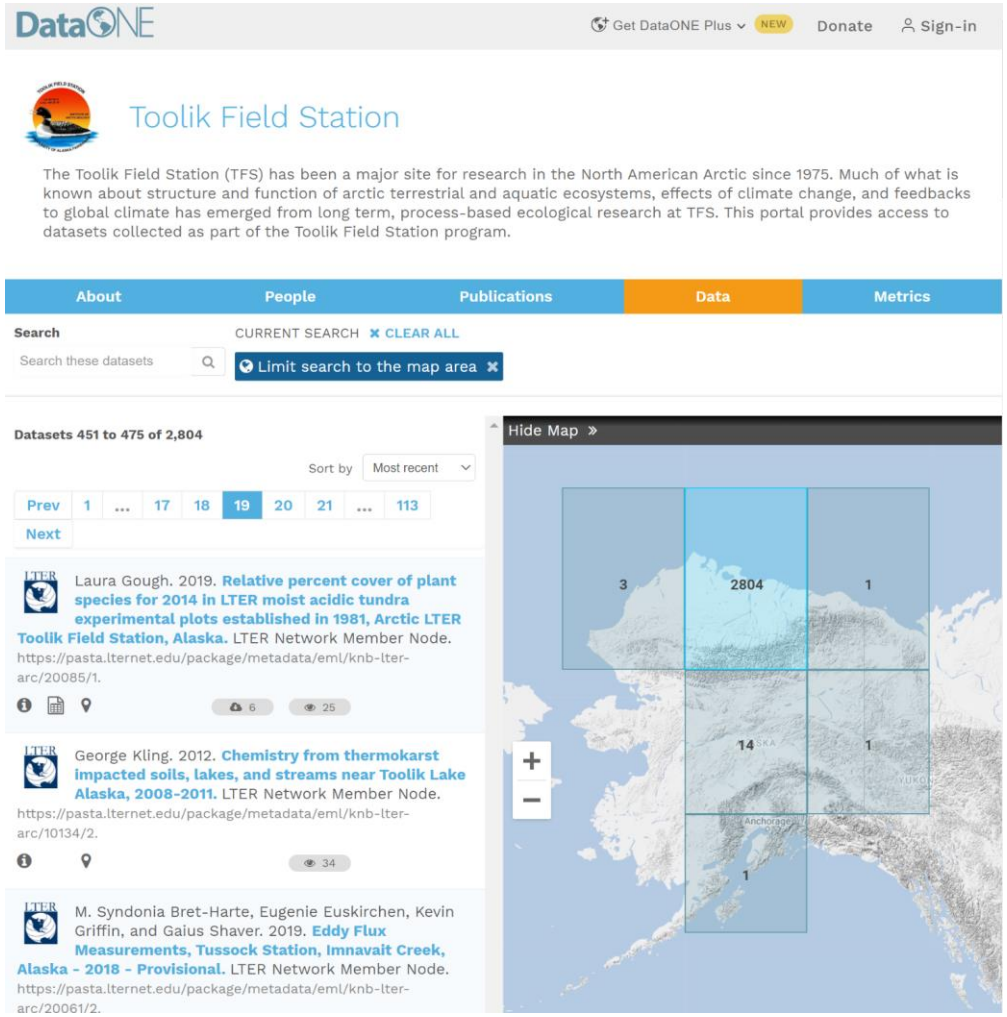
Increase of 59 datasets in 2021



DATAONE TOOLIK PORTAL

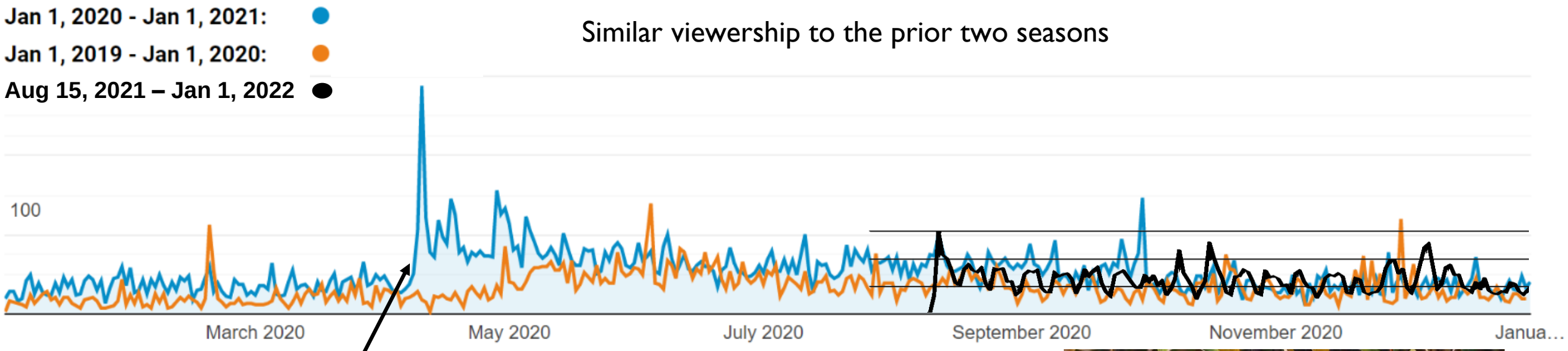
https://search.dataone.org/portals/toolik/

- 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.



NATURALIST JOURNAL - VIEWERSHIP

Similar viewership to the prior two seasons

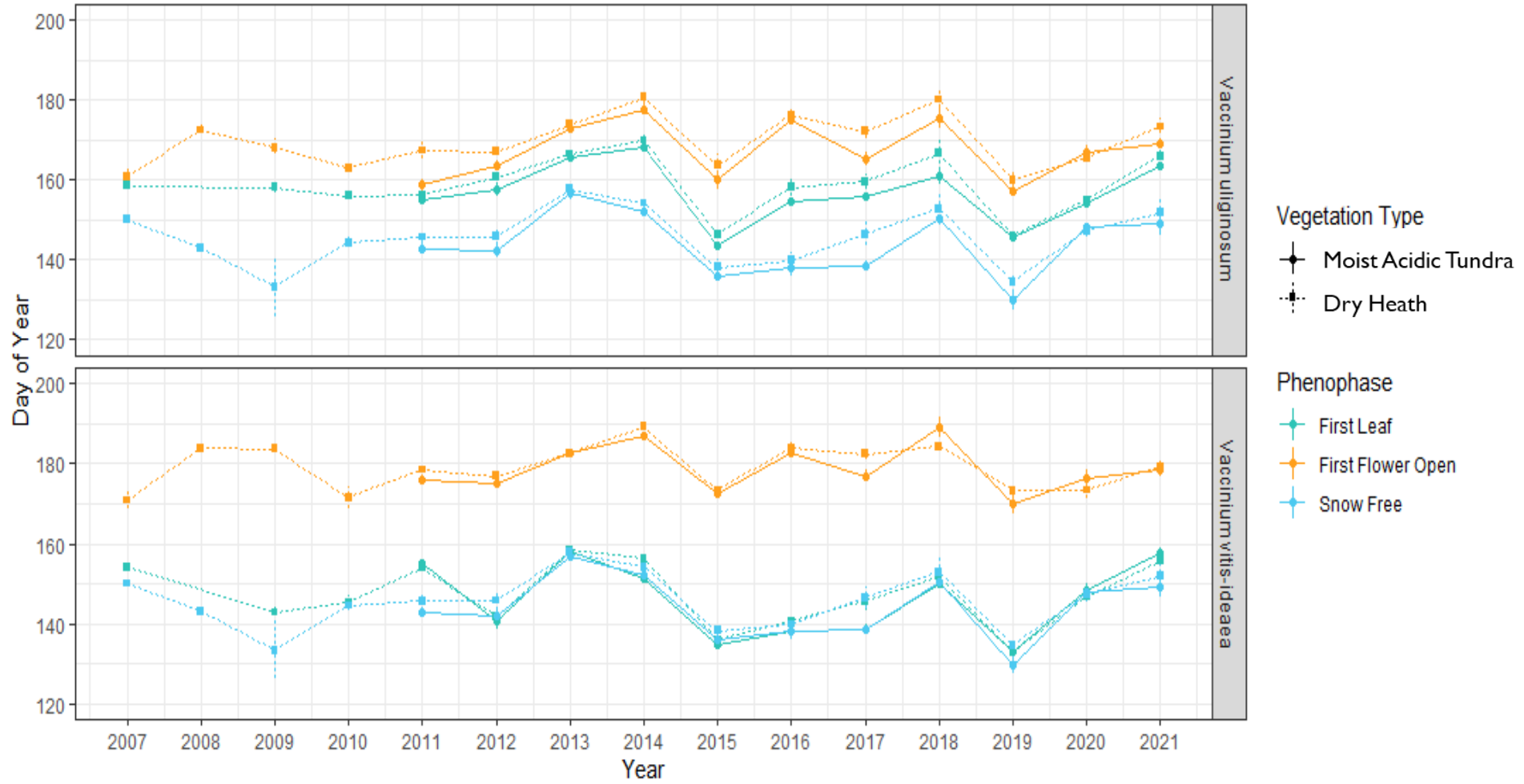


EDC Baseline Datasets

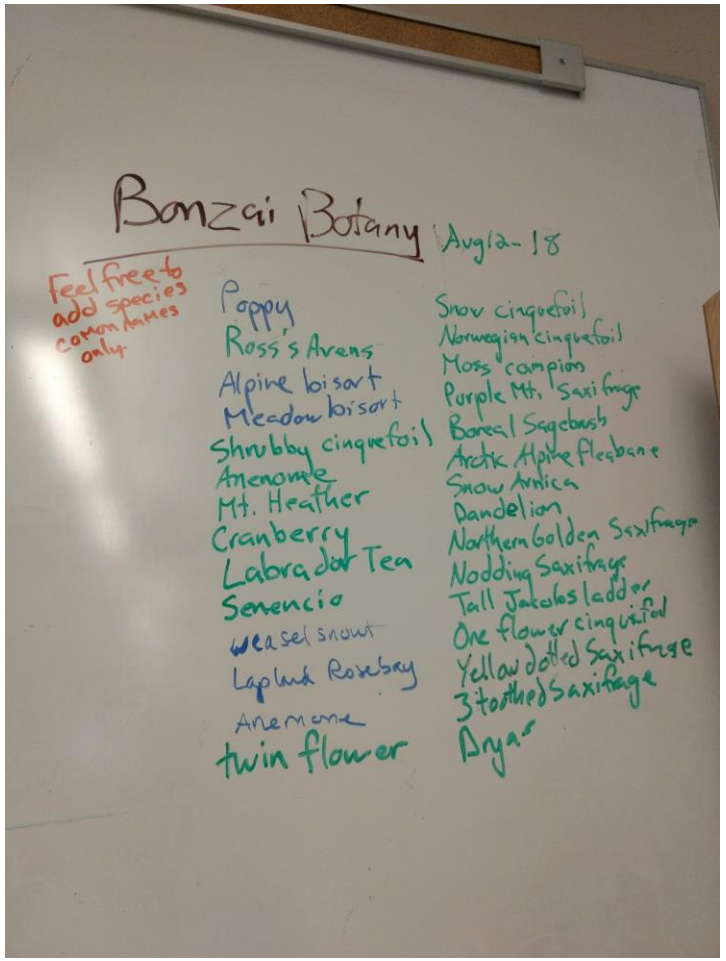
- Biotic Datasets
  - Avian point counts
  - Avian Acoustics
  - Plant Phenology
  - NDVI
  - Naturalist Journal Observations
    - Birds
    - Mammals
    - Insects

- 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.

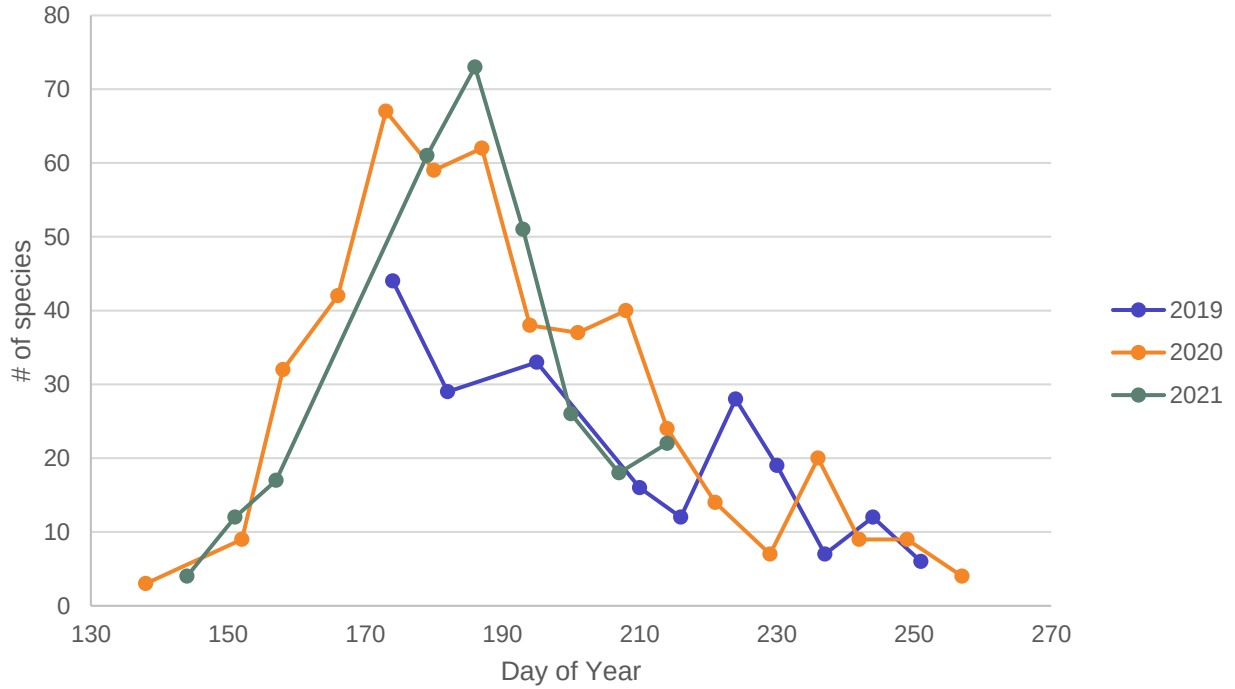
BASELINE MONITORING
BIOLOGICAL MONITORING – PHENOLOGY



BONZAI BOTANY

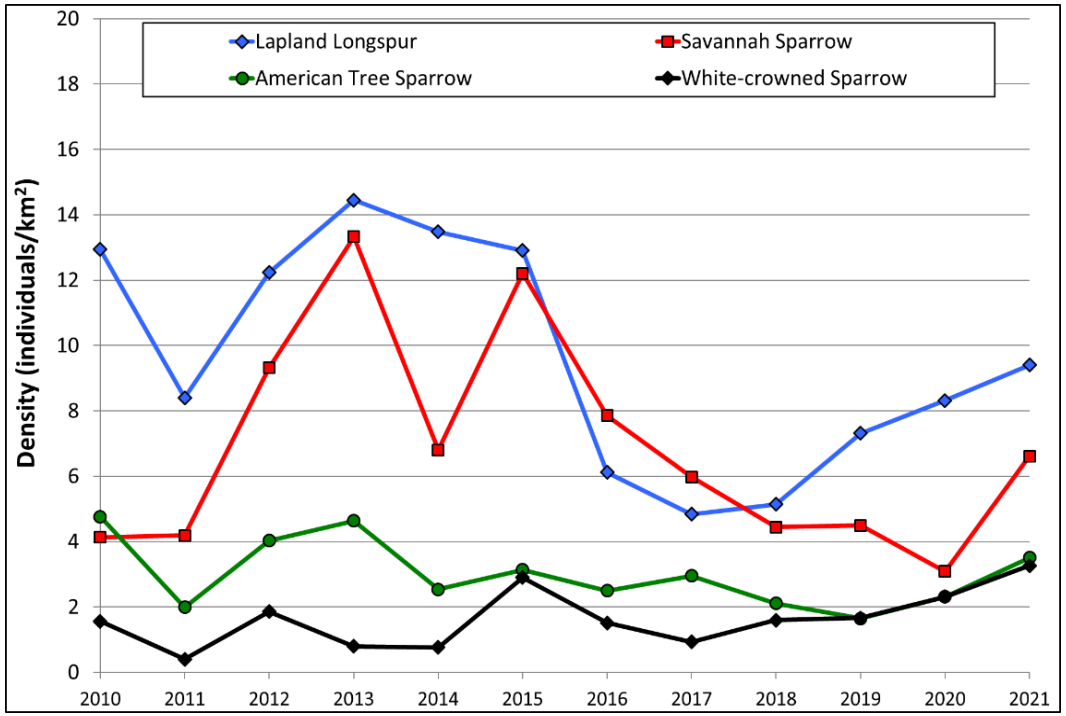


- Plants in flower during a given week are recorded
- Common names only so all can participate

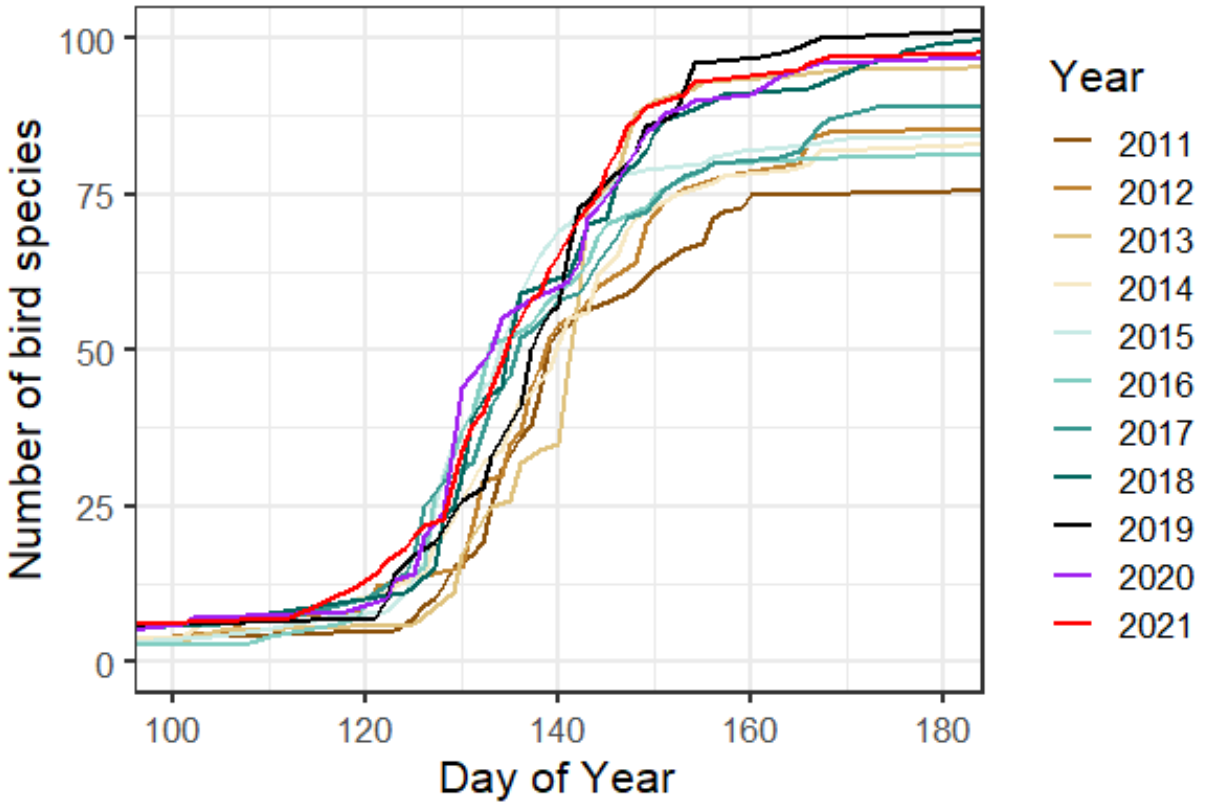


BASELINE MONITORING
BIOLOGICAL MONITORING - AVIAN

- Avian point counts



- Date of Arrival of bird species from the naturalist journal

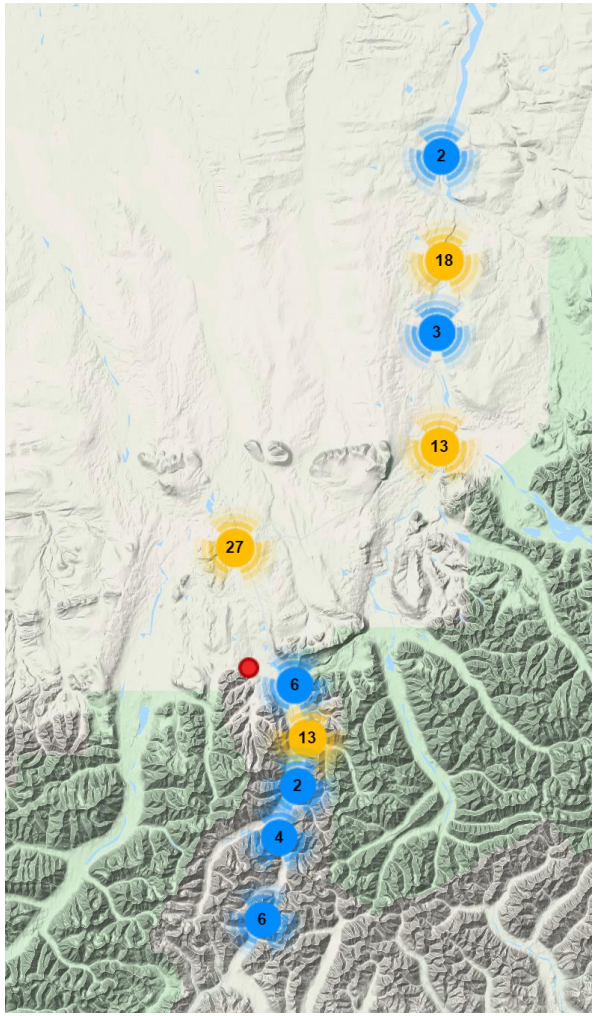


BASELINE MONITORING
BIOLOGICAL MONITORING – AUDIO RECORDINGS OF BIRDS

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

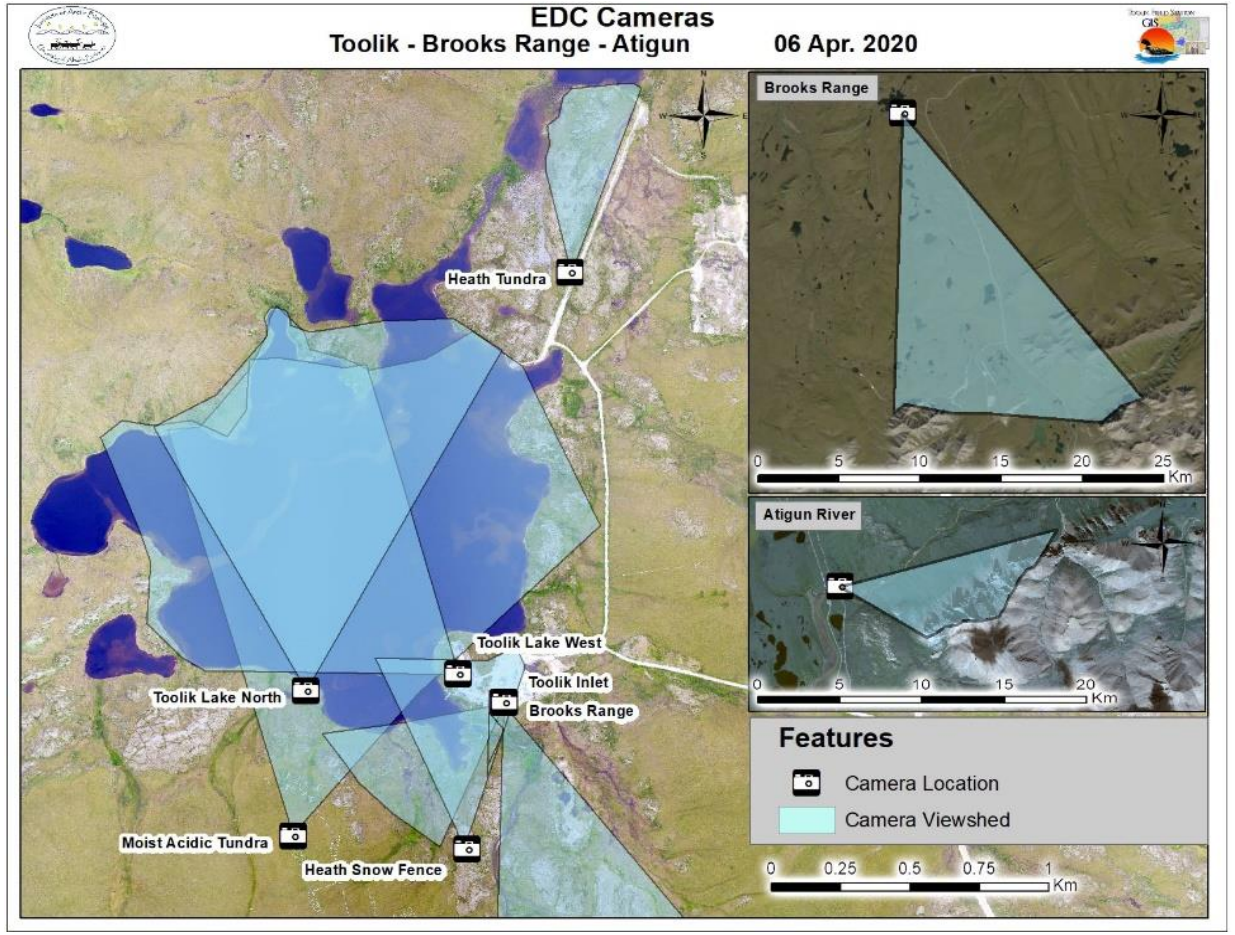
Juvenile Northern Shrike, Sept 2021
https://www.xeno-canto.org/680332

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

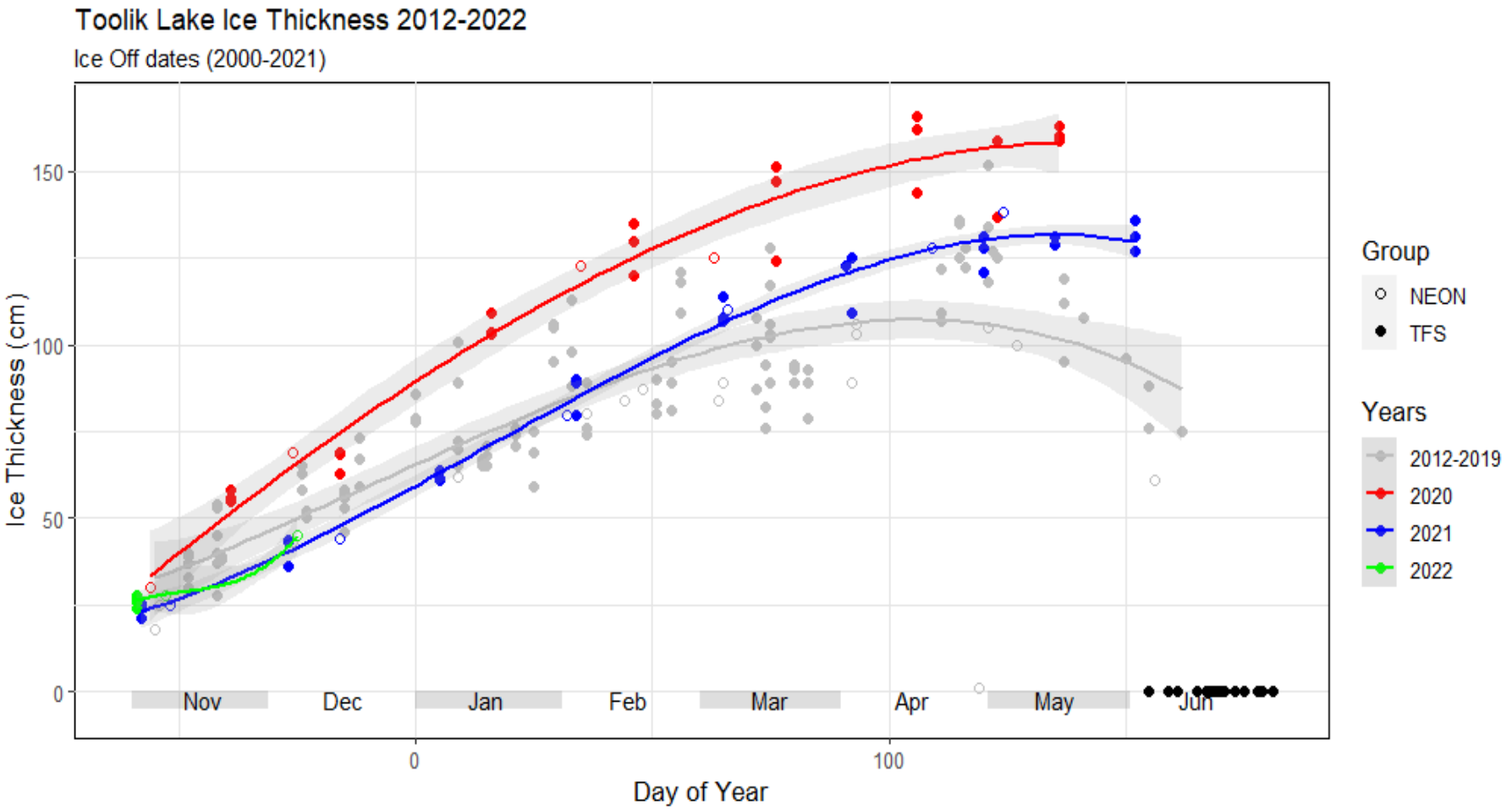


BASELINE MONITORING
ABIOTIC MONITORING - TIME LAPSE IMAGERY

- 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



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.

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) – 2
    - Funded by the BLM
  - Purple Air – June 2019 to Present
    - Particulate matter sampling
  - Mercury Passive Air Sampler – Januar
    - Changed quarterly

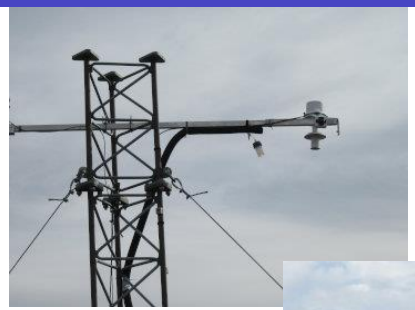
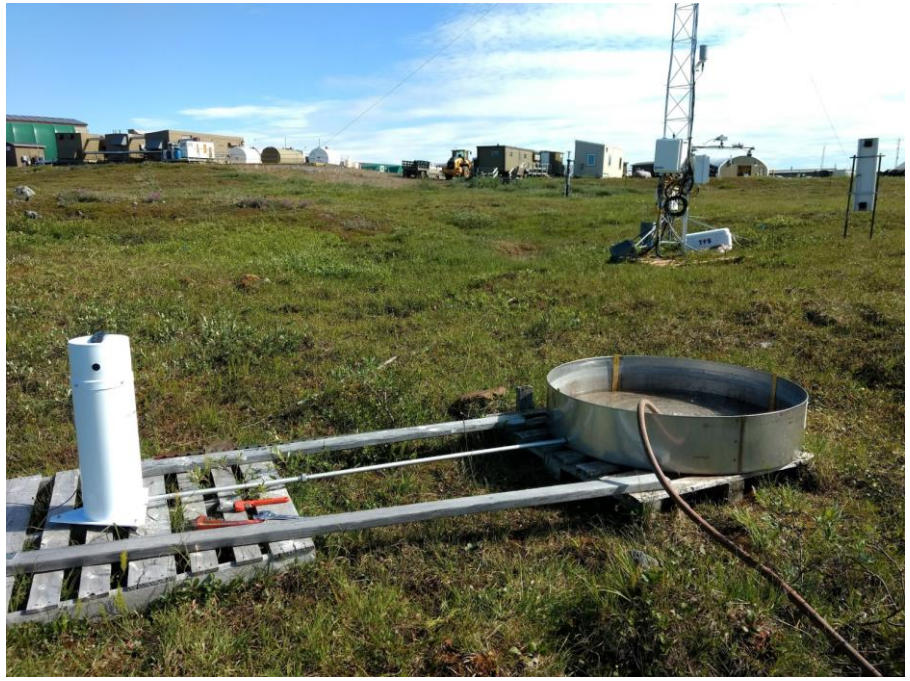


Photo by Sarah King

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

Meteorological

Fieldwork

esa

ECOSPHERE

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

Check for updates

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

Moein Mellat[1,2*†], Hannah Bailey[1], Kaisa-Riikka Mustonen[1], Hannu Marttila[2],

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

ORIGINAL RESEARCH

Ecology and Evolution Open Access WILEY

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

Elin Lindén[1] | Laura Gough[2] | Johan Olofsson[1]

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 CO_2 FOR ^{14}C ANALYSIS FROM SOILS

Shawn Pedron[1*] • X Xu[1] • J C Walker[2] • J C Ferguson[3] • R G Jespersen[4] • J M Welker[4,6,7] • E S Klein[5] • C I Czimczik[1*]

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 +

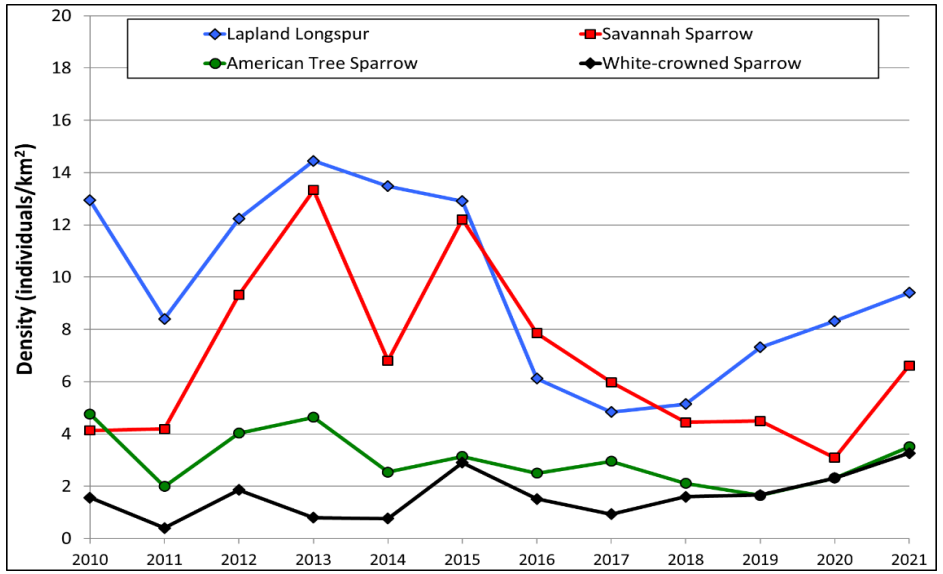
Flat Freeze Dryer

Cyclone Twister Mill

Sledge Microtome

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

Baseline Datasets



Remote Access