

SEDC REPORT

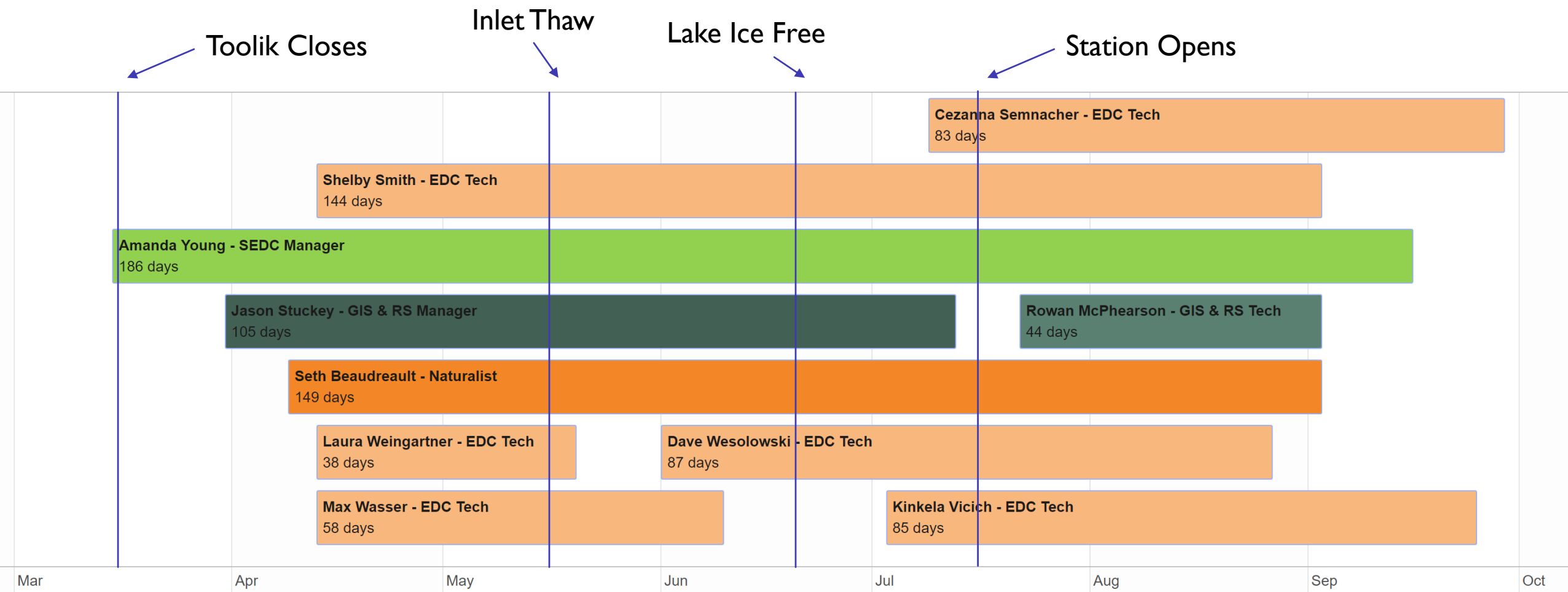
OCT 1, 2019 - SEPT 30, 2020 REPORT

2020 SPATIAL AND ENVIRONMENTAL DATA CENTER REPORT

AMANDA B. YOUNG



2020 STAFFING AT TOOLIK



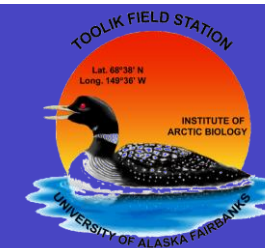
EDC MISSION STATEMENT



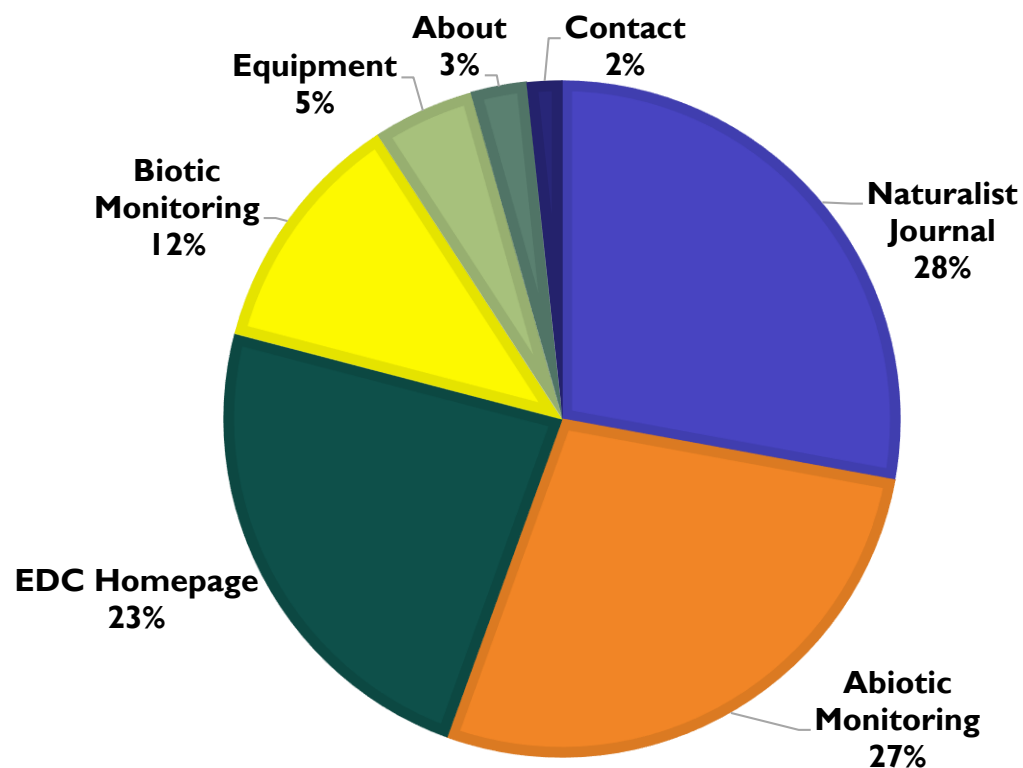
- Collect and manage baseline environmental data
- Maintain suite of common-use lab and field equipment
- Fieldwork assistance & Remote Access

- Outreach
 - Make EDC data available to the public
 - Create guides to help in identification

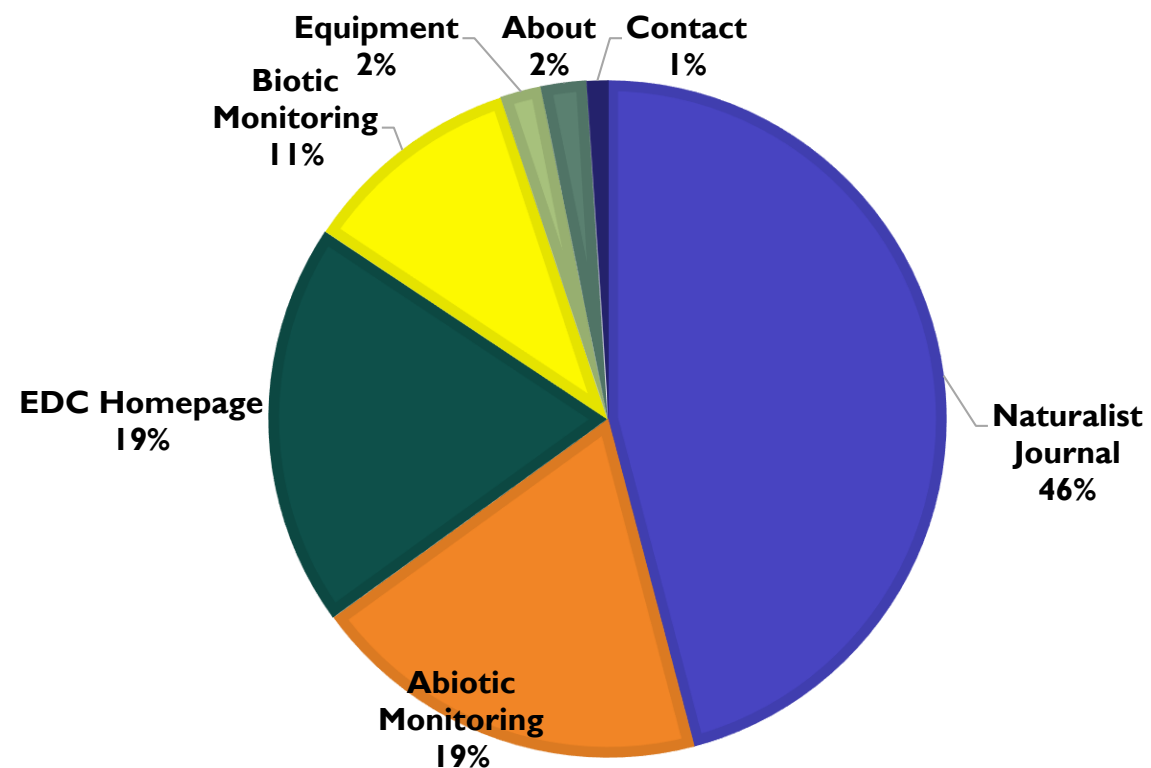
PAGEVIEWS (OCT 1-SEPT 30)



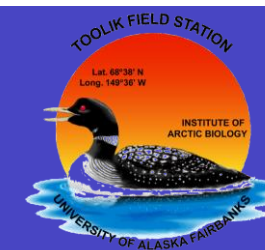
2019 – 26,817 pageviews



2020 – 28,668 pageviews



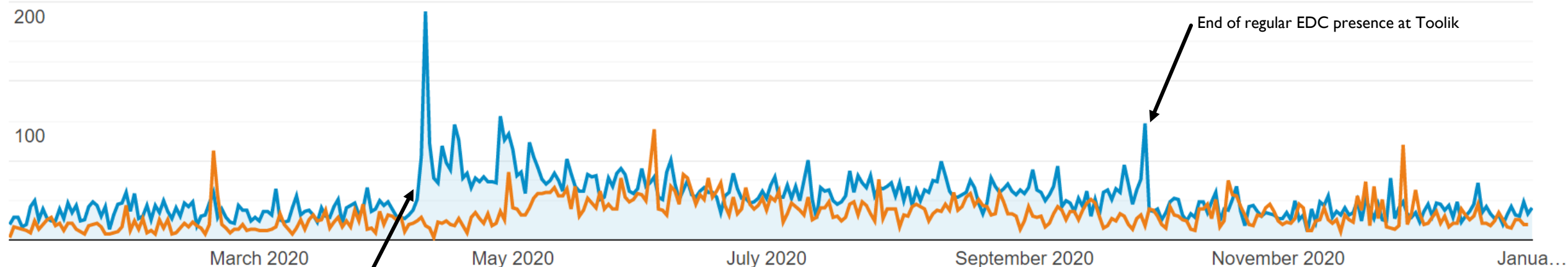
NATURALIST JOURNAL - VIEWERSHIP



Jan 1, 2020 - Jan 1, 2021: ● Pageviews

Jan 1, 2019 - Jan 1, 2020: ● Pageviews

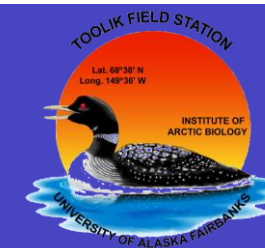
Increase of viewership of the Naturalist Journal throughout the field season.











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



DATA USAGE









EDC Webpage

- Met station data requests 290  by 72 
- Phenology data requests 14  by 8 
- Bird Point count requests 2  by 2 
- NDVI requests 8  by 6 

Direct Request

- Met station data 3  by 3 



Arctic Data Center (data has DOI)

- Phenology 79  118 
- Bird Point Counts 268  116 
- Met Station data 104  237 



NSF
**Arctic
Data
Center**

 Downloads
 People
 Views

- Naturalist Journal – Birds 215  62 
- Naturalist Journal – Mammals 332  53 
- Naturalist Journal – Insects 261  62 

ARCTIC DATA CENTER PORTAL

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

Hosted by the Arctic Data Center



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

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.

Hosted by the Arctic Data Center



Toolik Field Station

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About

People

Publications

Data

Metrics

Search

CURRENT SEARCH × CLEAR ALL

🔍 📍 Limit search to the map area ×

DATASETS 1 TO 25 OF 427

1 2 3 ... 18 Next

Sort by Most recent ▾

Jason Stuckey, Jorge Noguera, Reyce Bogardus, and Rowan McPherson. 2019. [Bathymetric data from Alaskan Lakes, Toolik Field Station, Alaska \(2006-2015\)](#). Arctic Data Center. doi:10.18739/A2MK65900. 📄 3.7K 👁 3.3K

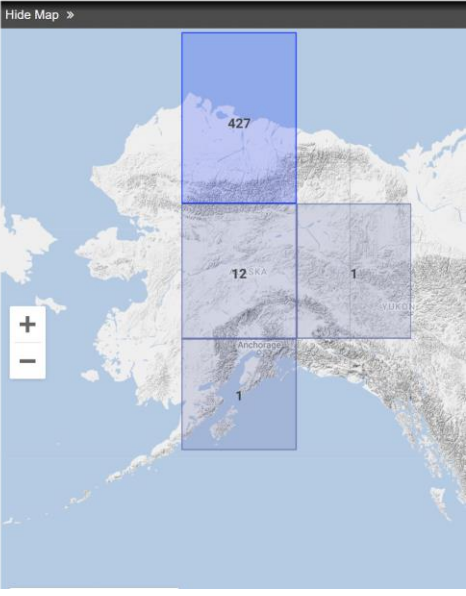
Jason Stuckey, Jorge Noguera, and Rowan McPherson. 2020. [Bathymetric data from S4 Lake, Toolik Field Station, Alaska \(2019\)](#). Arctic Data Center. doi:10.18739/A2W08WH55. 📄 27 👁 25

Jason Stuckey, Jorge Noguera, and Rowan McPherson. 2020. [Bathymetric data from NE9B Lake, Toolik Field Station, Alaska \(2019\)](#). Arctic Data Center. doi:10.18739/A2OR9M50V. 📄 16 👁 12

Jason Stuckey, Jorge Noguera, and Rowan McPherson. 2020. [Bathymetric data from GTH83 Lake, Toolik Field Station, Alaska \(2020\)](#). Arctic Data Center. doi:10.18739/A24J09Z44. 📄 11 👁 5

Jason Stuckey, Jorge Noguera, and Rowan McPherson. 2020. [Bathymetric data from NE8 Lake, Toolik Field Station, Alaska \(2019\)](#). Arctic Data Center. doi:10.18739/A28911R9R. 📄 10 👁 5

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.

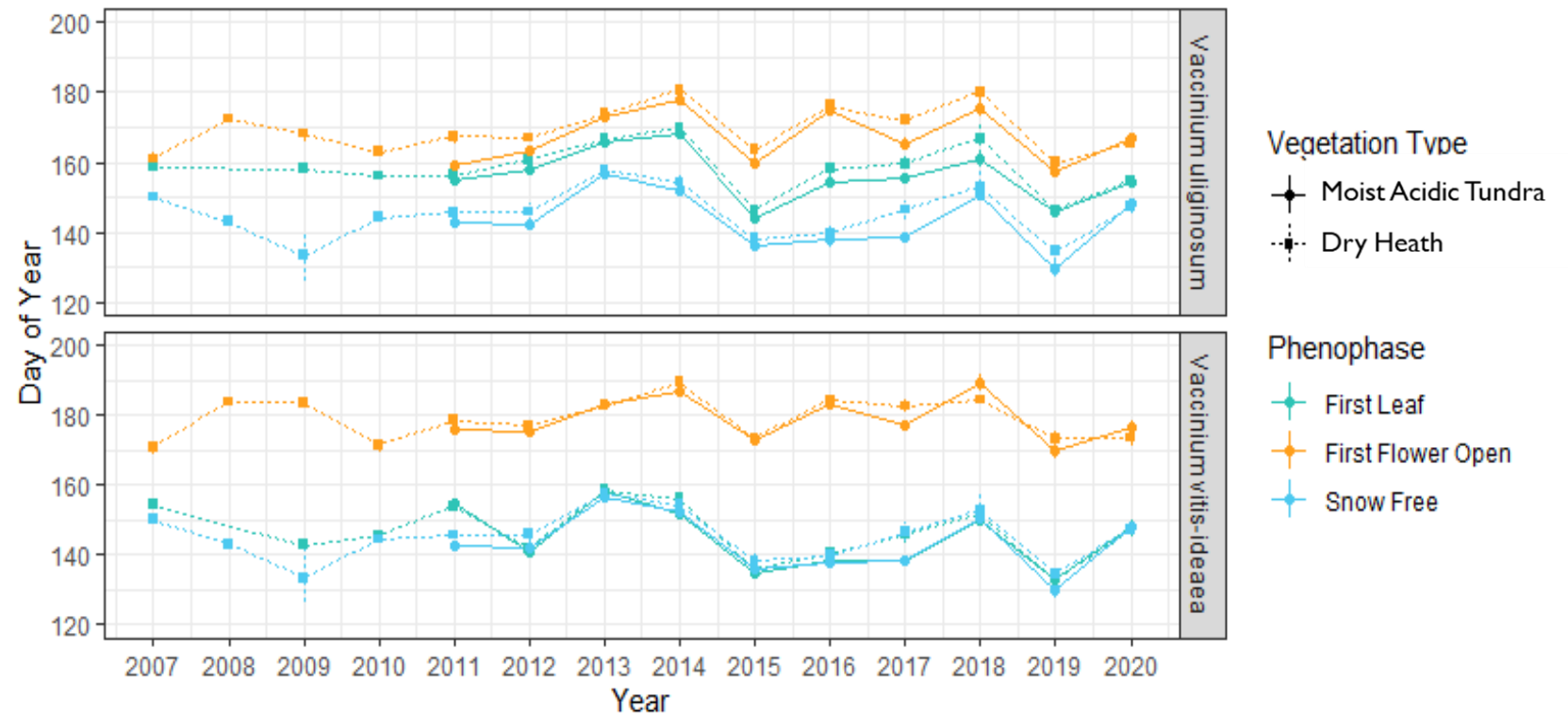
The screenshot shows the DataONE Toolik Field Station portal. At the top, the DataONE logo is on the left, and navigation links for 'Get DataONE Plus', 'NEW', 'Donate', and 'Sign-in' are on the right. Below the header, the 'Toolik Field Station' logo and title are displayed, followed by a descriptive paragraph about the station's research history. A navigation bar with tabs for 'About', 'People', 'Publications', 'Data' (highlighted), and 'Metrics' is present. A search bar is located below the tabs, with a 'Limit search to the map area' button. The main content area shows a list of datasets, with the first two visible: 'Relative percent cover of plant species for 2014 in LTER moist acidic tundra experimental plots established in 1981, Arctic LTER Toolik Field Station, Alaska' and 'Chemistry from thermokarst impacted soils, lakes, and streams near Toolik Lake Alaska, 2008-2011'. A map of Alaska is shown on the right, with a grid overlay indicating the location of the Toolik Field Station (grid cell 2804).

BASELINE MONITORING

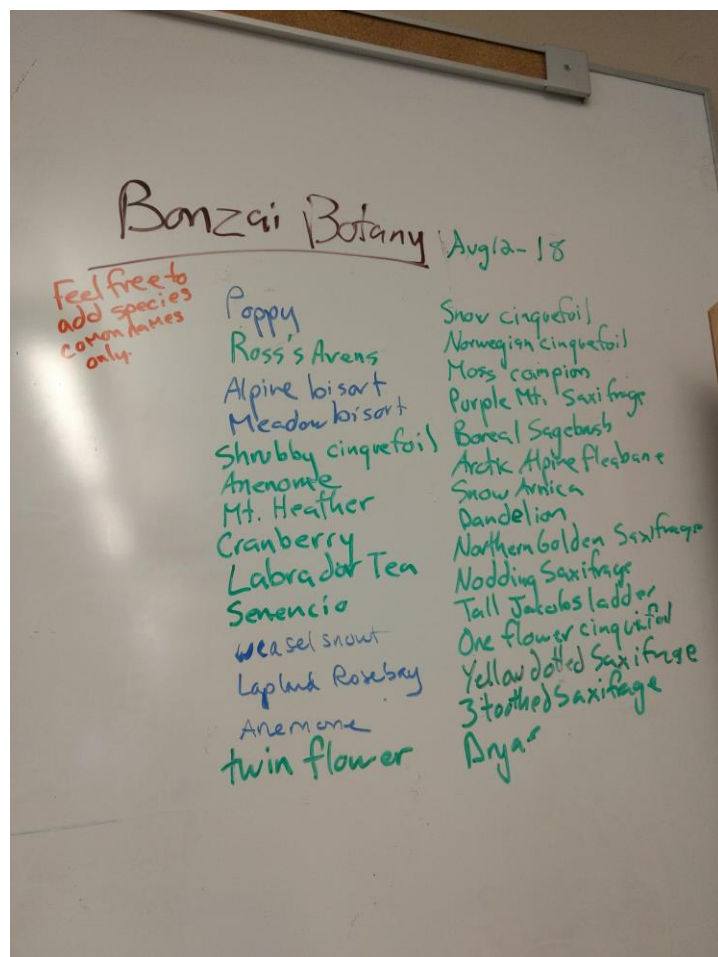
BIOLOGICAL MONITORING – PHENOLOGY



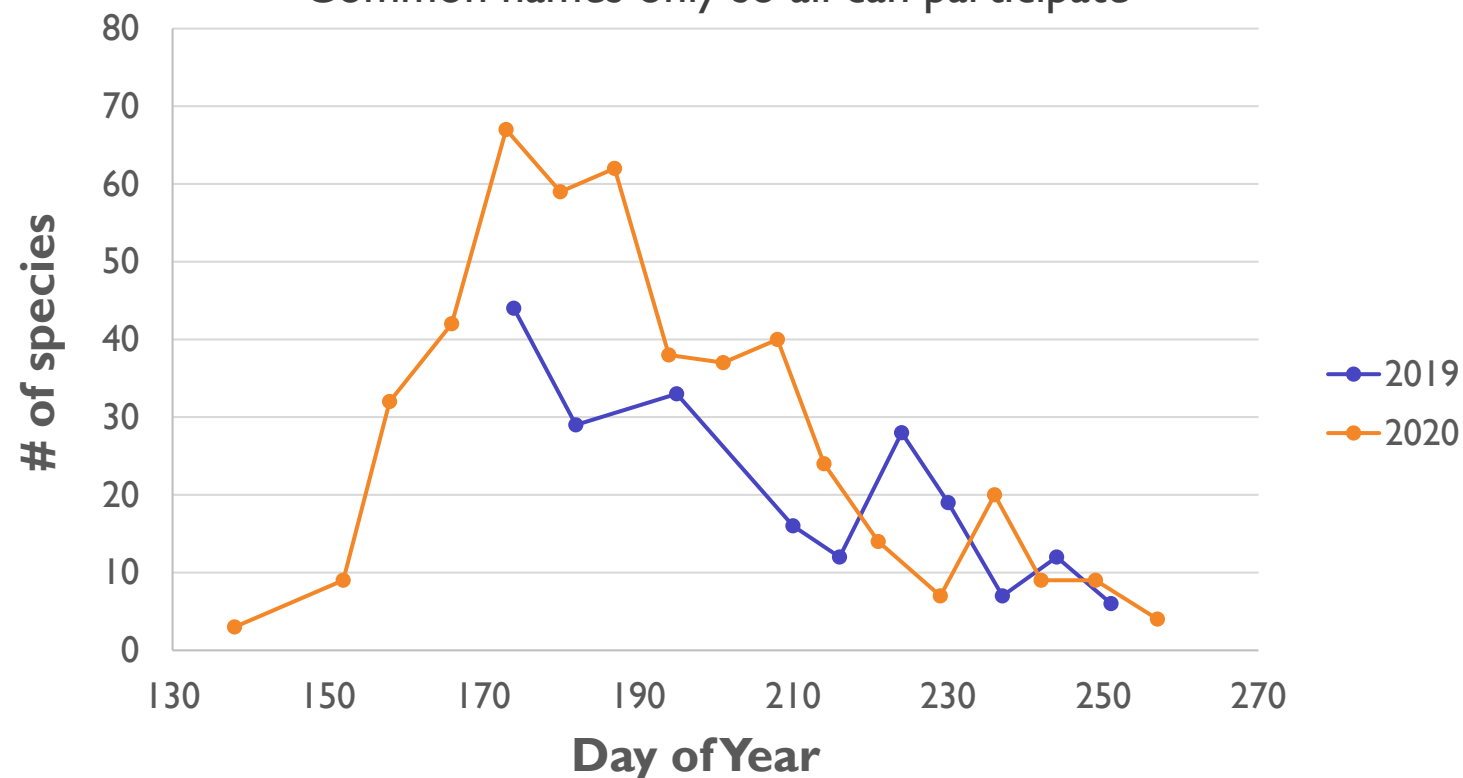
- Vegetation Phenology
- NDVI



BONZAI BOTANY



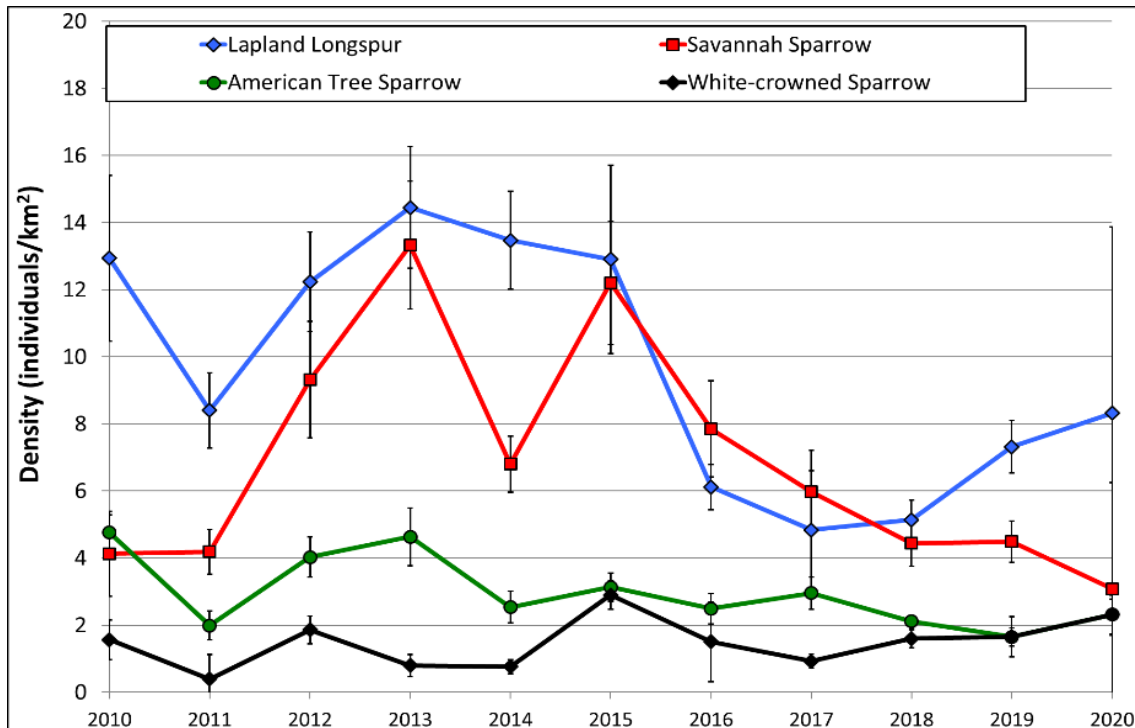
- Plants in flower during a given week are recorded
- Common names only so all can participate



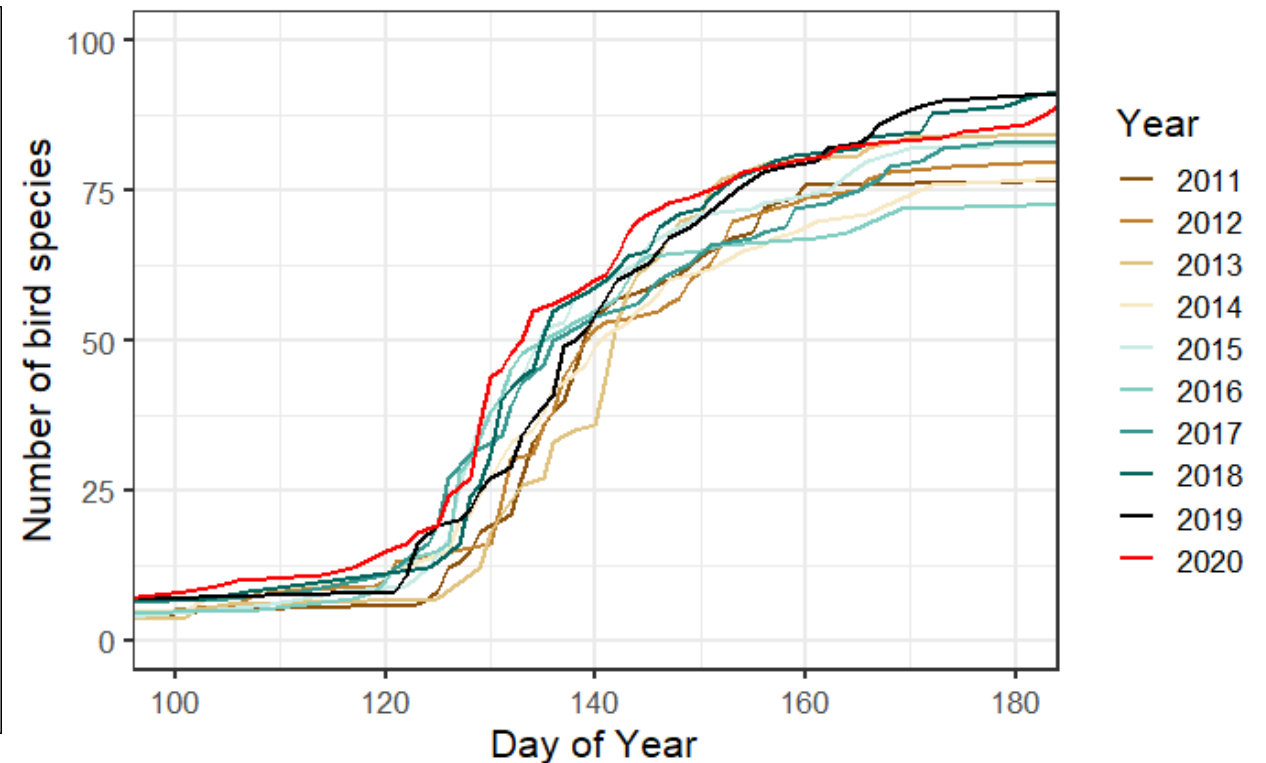
BASELINE MONITORING BIOLOGICAL MONITORING - AVIAN



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 from the Toolik area.
 - Calls are being added to the Bird Guide



Male Lapland Longspur Call in May 2020
<https://www.xeno-canto.org/589929>



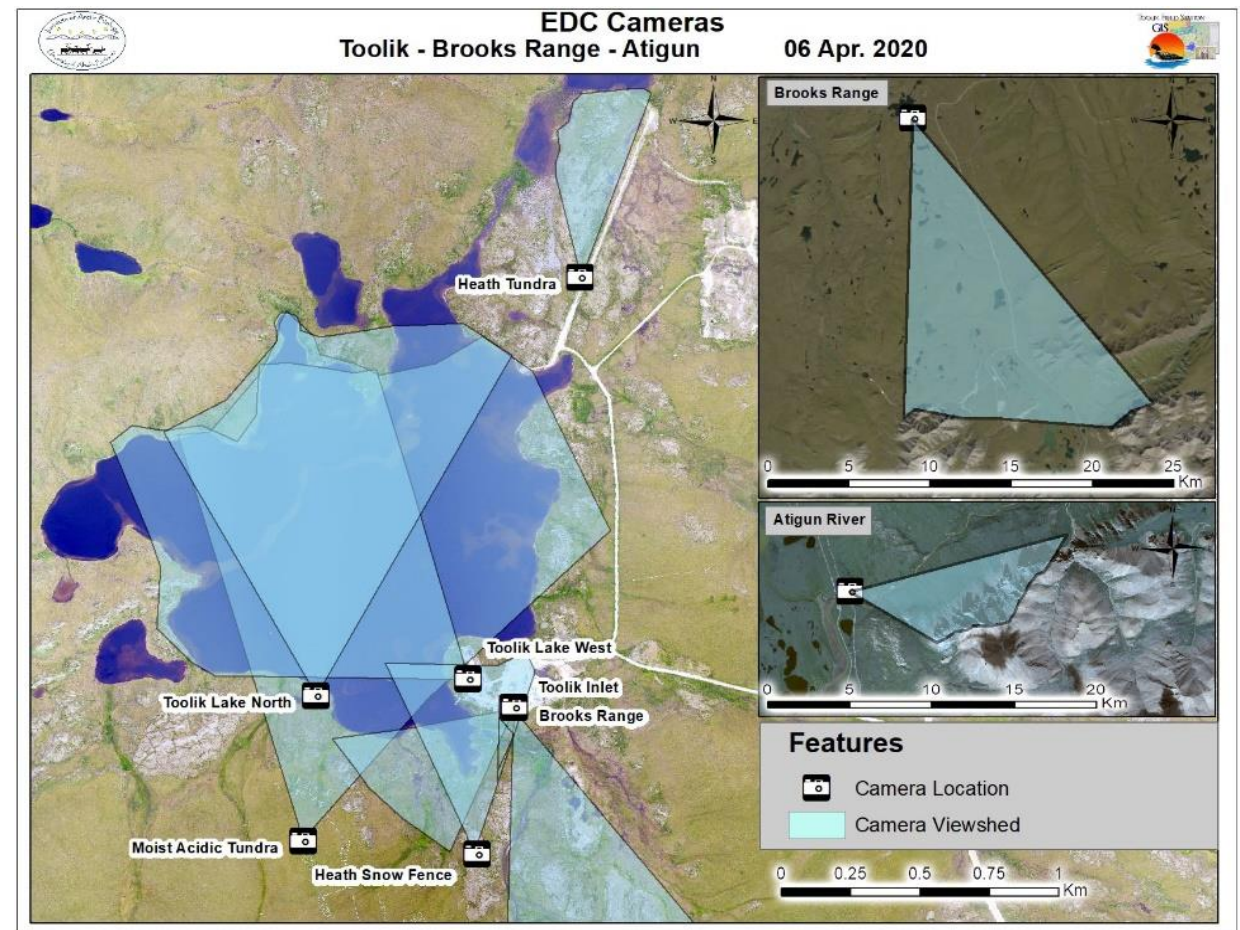
Bluethroat Call in May 2020
<https://www.xeno-canto.org/590296>

BASELINE MONITORING

ABIOTIC MONITORING - TIME LAPSE IMAGERY



- Cameras up-to-date online
- Two webcams
 - Daily update to website
- Five Buckeye cams
 - Upgrading cameras
 - Redeploy week of Jan 14th
 - Daily update to website
- Future cameras?

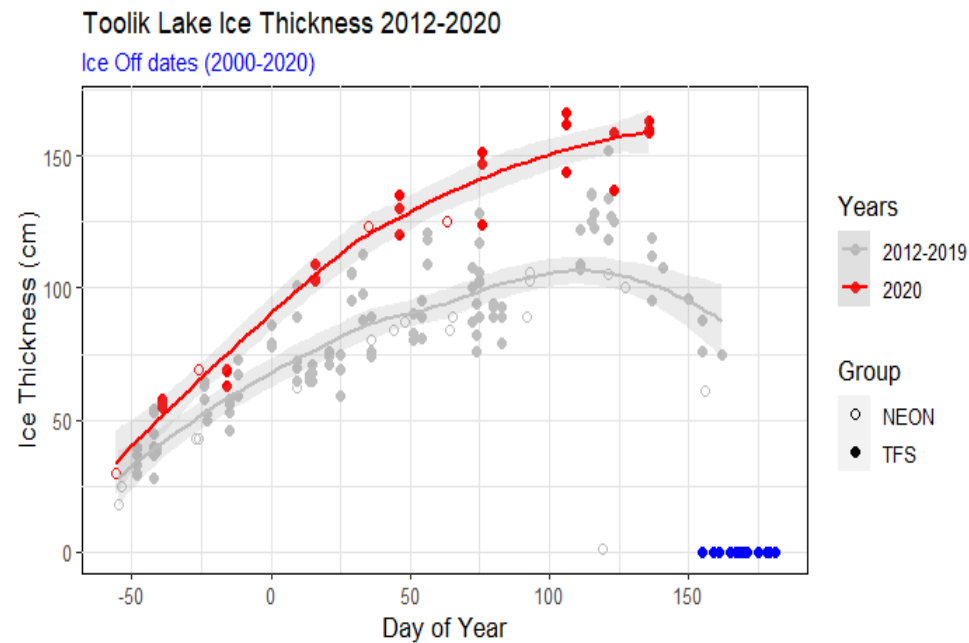


BASELINE MONITORING

ABIOTIC MONITORING – SNOW AND ICE

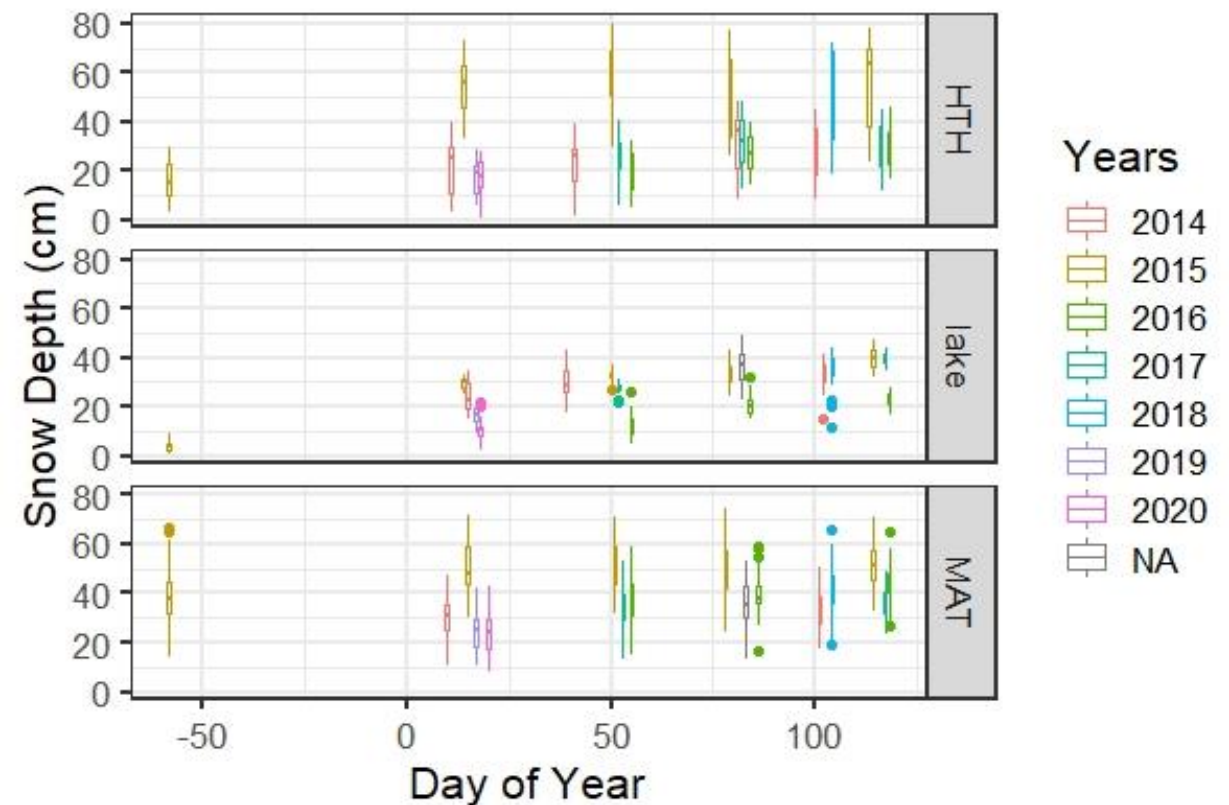


- Ice Thickness Measurements



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
 - Mercury Passive Air Sampler – January 2020



Photo by Sarah King

EXAMPLES OF DATA AND EQUIPMENT USAGE IN PUBLICATIONS



Meteorological

ARCTIC, ANTARCTIC, AND ALPINE RESEARCH
2020, VOL. 52, NO. 1, 109–119
<https://doi.org/10.1080/15230430.2020.1733891>



OPEN ACCESS [Check for updates](#)



Above- and belowground responses to long-term herbivore exclusion

Austin Roy ^a, Matthew Suchocki ^b, Laura Gough ^b, and Jennie R. McLaren ^a



Contents lists available at ScienceDirect

Quaternary Science Reviews

journal homepage: www.elsevier.com/locate/quascirev




Insolation and greenhouse gases drove Holocene winter and spring warming in Arctic Alaska

William M. Longo ^{a, b, *, 1}, Yongsong Huang ^{a, b}, James M. Russell ^{a, b}, Carrie Morrill ^{c, d}, William C. Daniels ^{a, b}, Anne E. Giblin ^e, Josue Crowther ^a



Autumn migratory departure is influenced by reproductive timing and weather in an Arctic passerine

[Helen E. Chmura](#) , [Jesse S. Krause](#), [Jonathan H. Pérez](#), [Marilyn Ramenofsky](#) & [John C. Wingfield](#)

Journal of Ornithology **161**, 779–791(2020) | [Cite this article](#)

Fieldwork

Biogeosciences, 17, 4025–4042, 2020
<https://doi.org/10.5194/bg-17-4025-2020>

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Environmental controls on ecosystem-scale cold-season methane and carbon dioxide fluxes in an Arctic tundra ecosystem

Dean Howard^{1,2}, Yannick Agnan³, Detlev Helmig¹, Yu Yang⁴, and Daniel Obrist²

LIMNOLOGY AND OCEANOGRAPHY



Article | [Open Access](#) |    

Mixing processes in small arctic lakes during spring

Alicia Cortés , Sally MacIntyre

<https://doi.org/10.5194/bg-2020-235>
Preprint. Discussion started: 17 July 2020
© Author(s) 2020. CC BY 4.0 License.



- 1 Biogenic volatile organic compound ambient mixing ratios and emission rates
- 2 in the Alaskan Arctic tundra
- 3 Hélène Angot¹, Katelyn McErlean¹, Lu Hu², Dylan B. Millet³, Jacques Hueber¹, Kaixin Cui¹, Jacob Moss¹,
- 4 Catherine Wielgasz², Tyler Milligan¹, Damien Ketcherside², Marion Sydonia Bret-Harte⁴, Detlev Helmig¹

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



REMOTE ACCESS

Remote Access to 27 projects

Remote Access helped support
Student and post-doctoral research

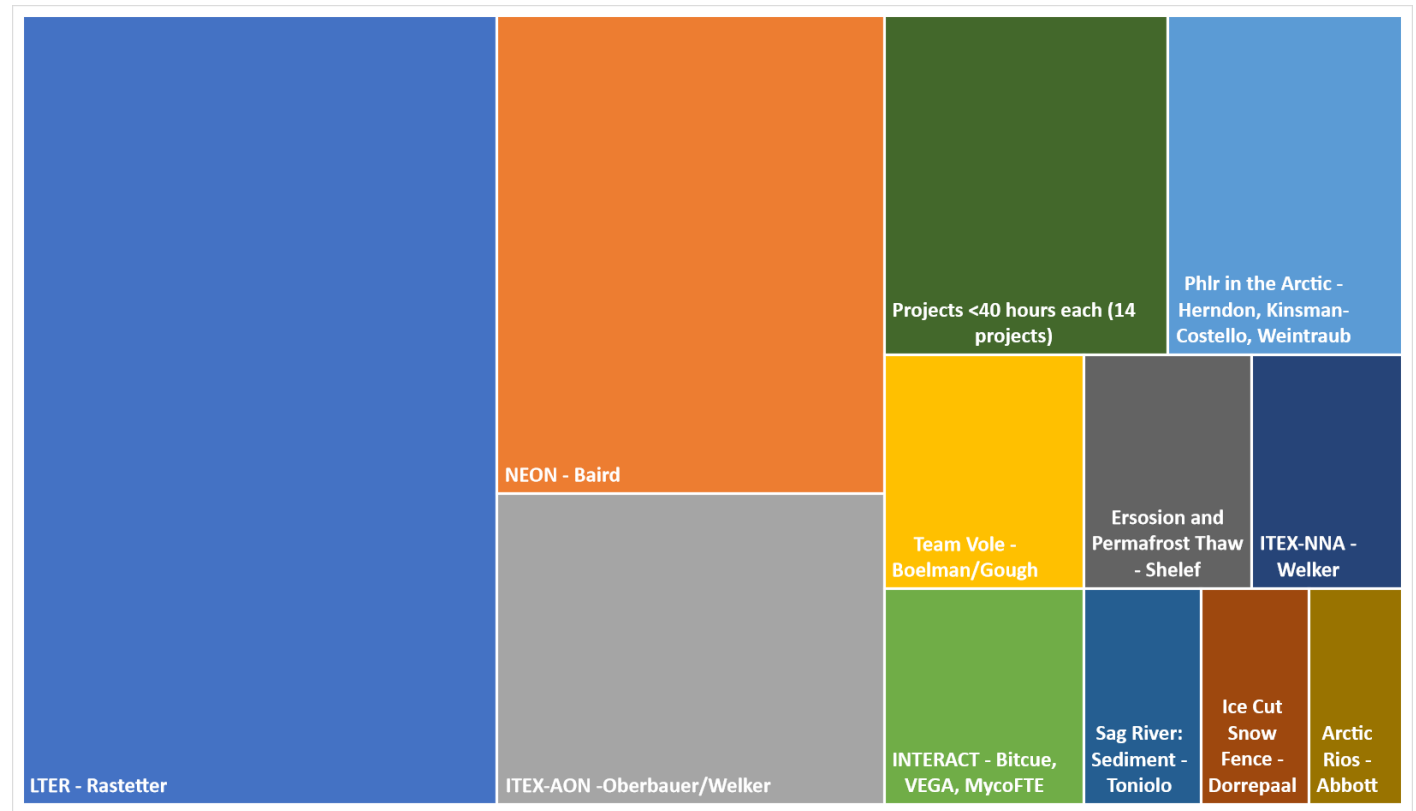
4 Post-docs ~ 110 hours

12 PhD students ~ 320 hours

4 MS Students ~ 90 hours

>6 Undergraduate Students ~200
hours

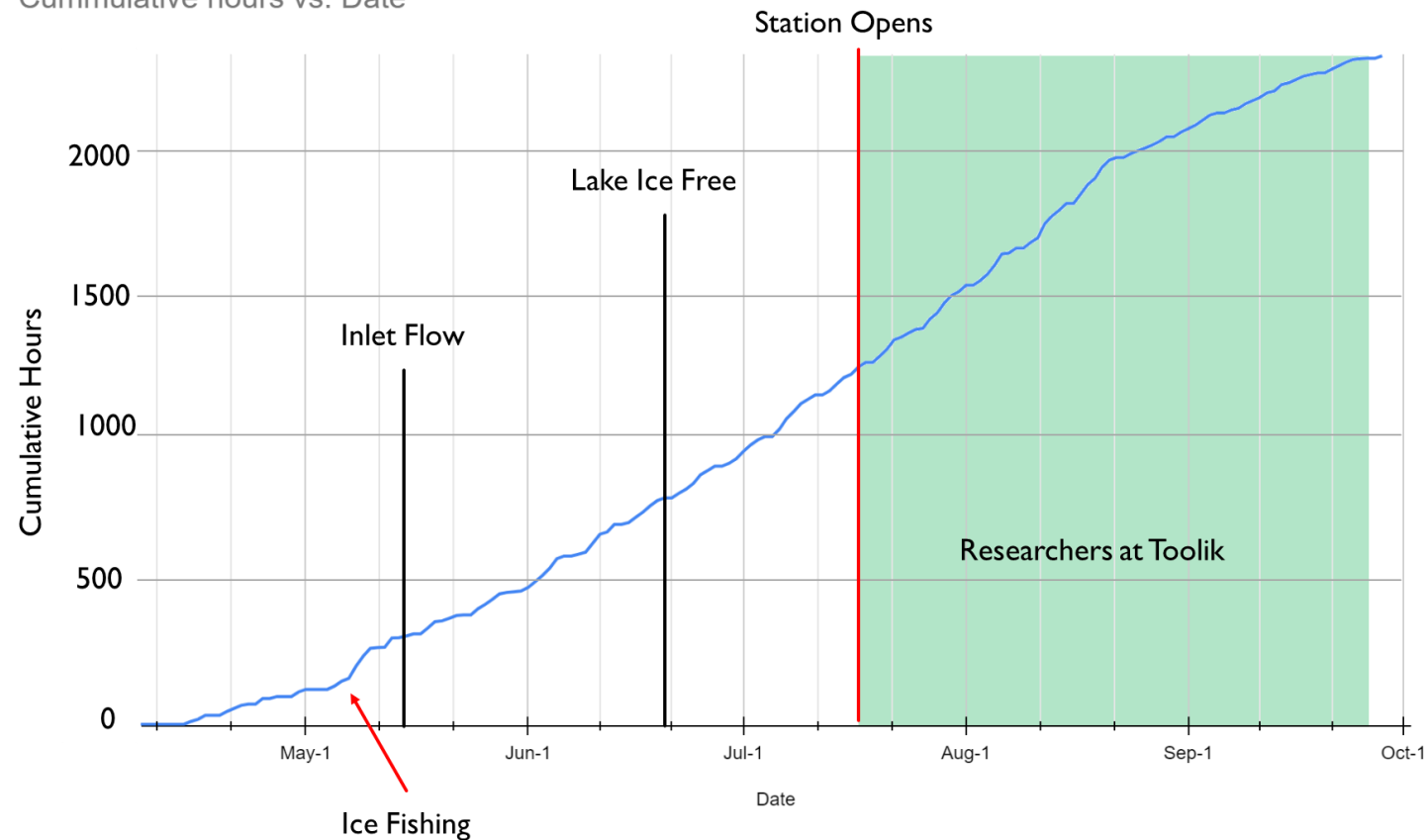
Hard to calculate for some of these
exactly how many hours are for
students and post-docs due to their
projects being part of a large program.



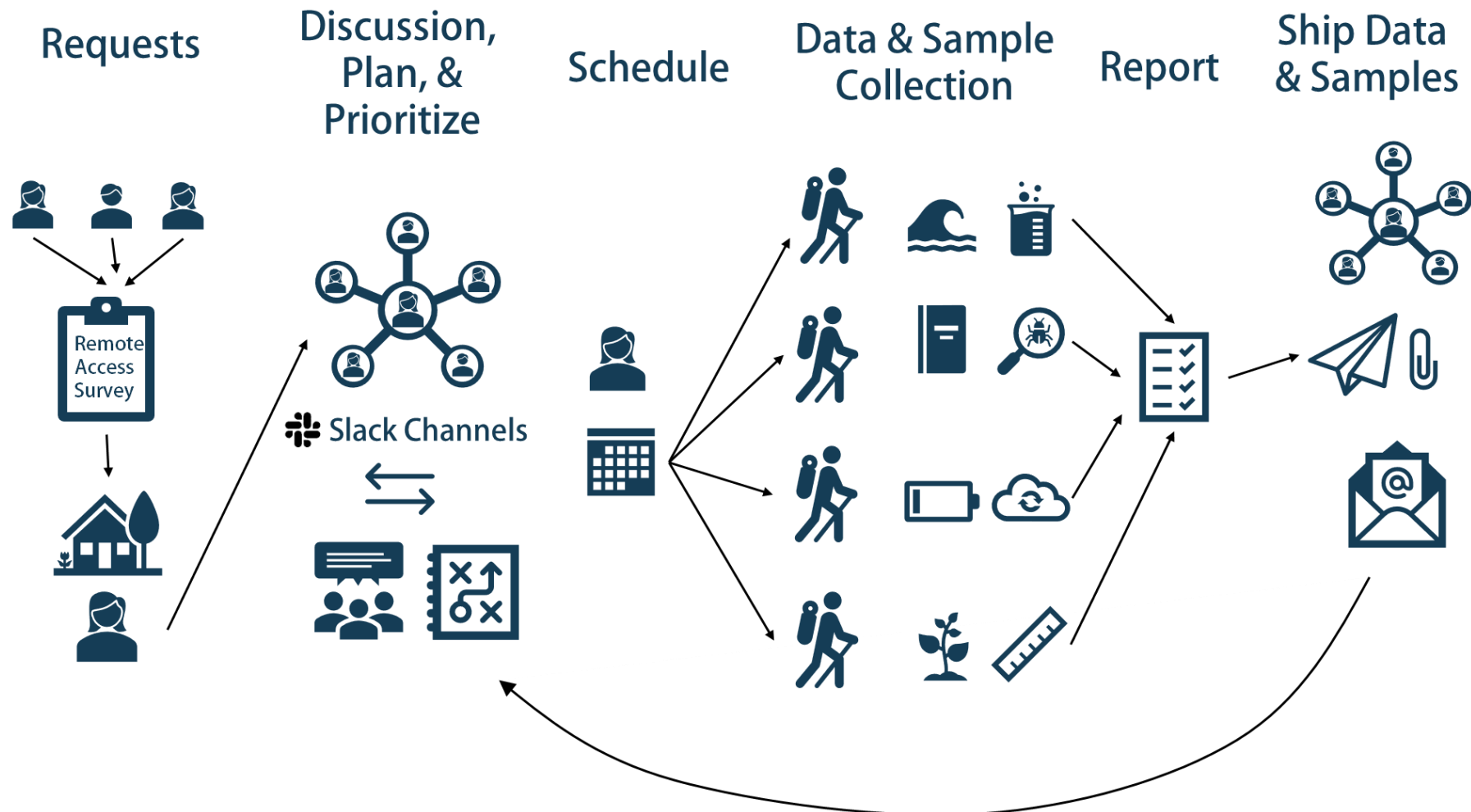
REMOTE ACCESS THROUGH SEPT 2020



Cummulative hours vs. Date



REMOTE ACCESS - STRUCTURE



REMOTE ACCESS - SUCCESSES



- Hired all staff from within Alaska to reduce the risk of COVID.
- Lessons were learned in what the level of detail were needed to functionally communicate.
 - Details in the protocols from researchers.
 - Details in the questions to clarify from the TFS staff.
- Established a mechanism to help support more projects at Toolik throughout the year.
- Successfully supporting 27 projects.
 - Projects supported were large collaborative NSF projects down to fieldwork for a graduate thesis.

COMMUNICATION - SLACK

- Channels for each project kept correspondence organized and not lost in an inbox.
- 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

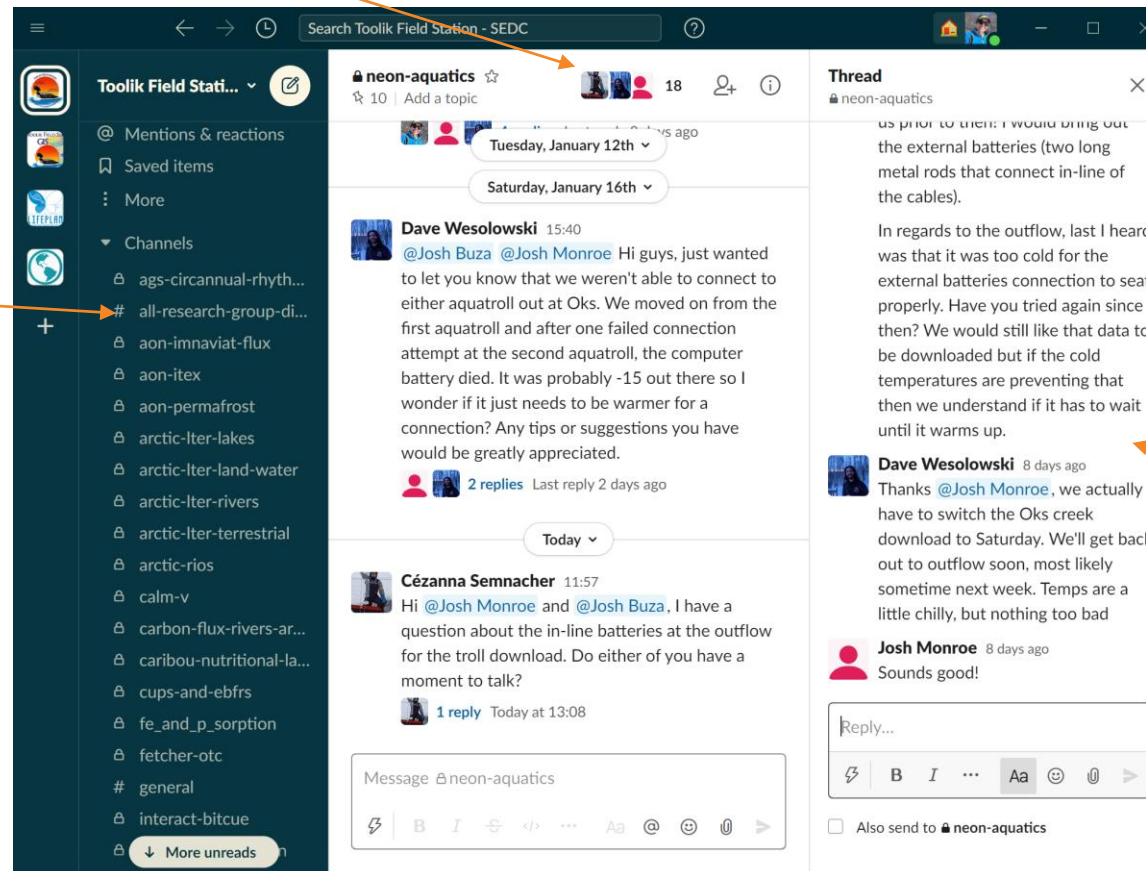
COMMUNICATION - SLACK

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

Threads are used to respond to specific questions or topics

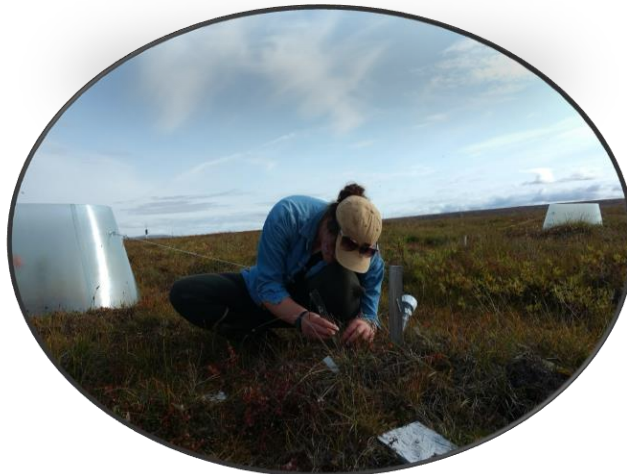
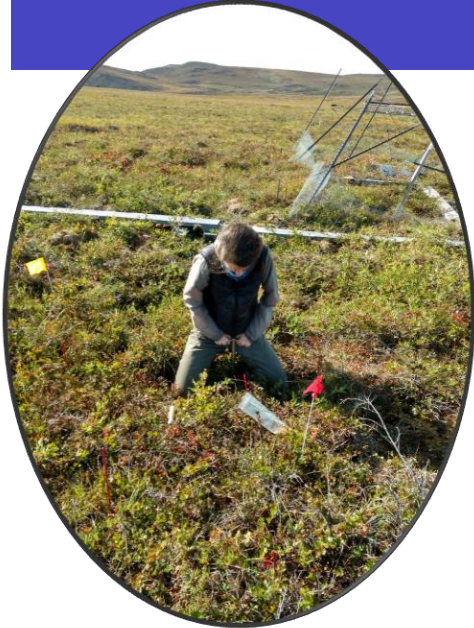
= open channel for all to discuss

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

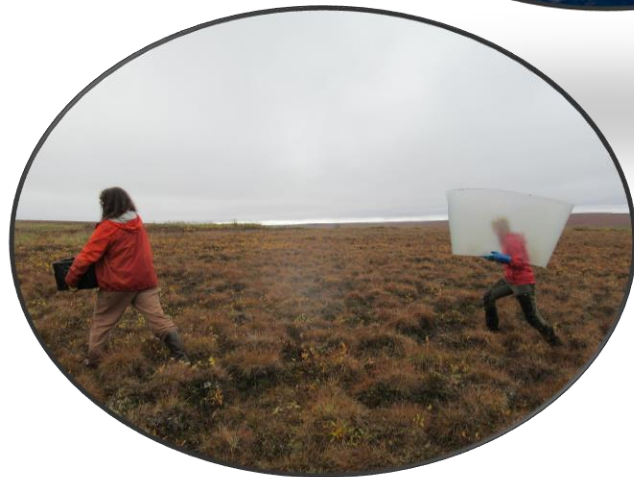
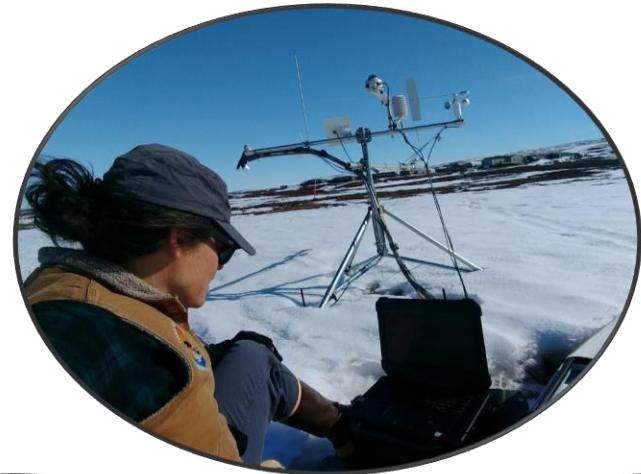
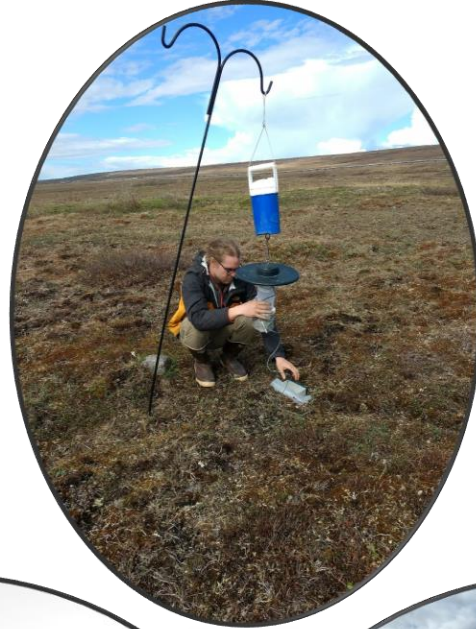


Using the @ symbol you can direct questions to a specific person

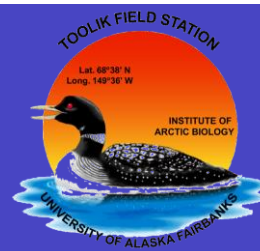
REMOTE ACCESS EXAMPLES



REMOTE ACCESS EXAMPLES CONTINUED



WINTER REMOTE ACCESS



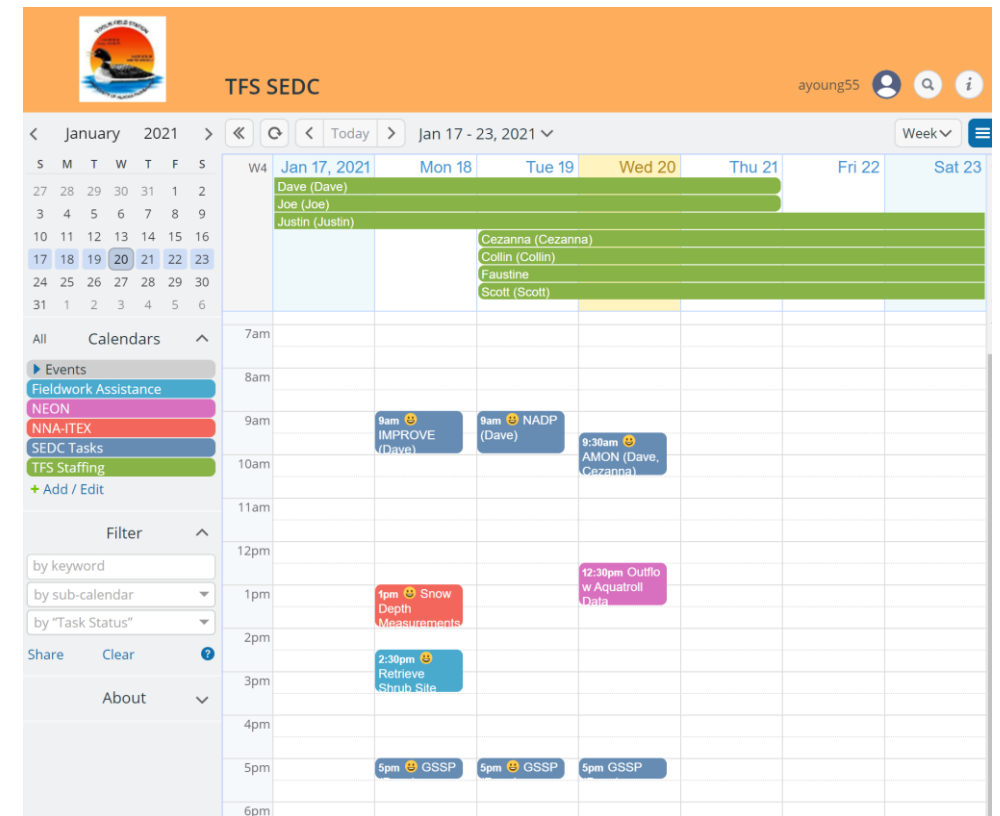
- Winter Remote Access
 - 20-40 hours of remote access per week.
 - EDC staff at Toolik year-round working with Maintenance staff
 - Activities:
 - Autonomous Equipment
 - preventative maintenance checks
 - data download
 - Power system charging and repairs
 - Sensor swap
 - Snow depth measurements
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



REMOTE ACCESS GOING FORWARD

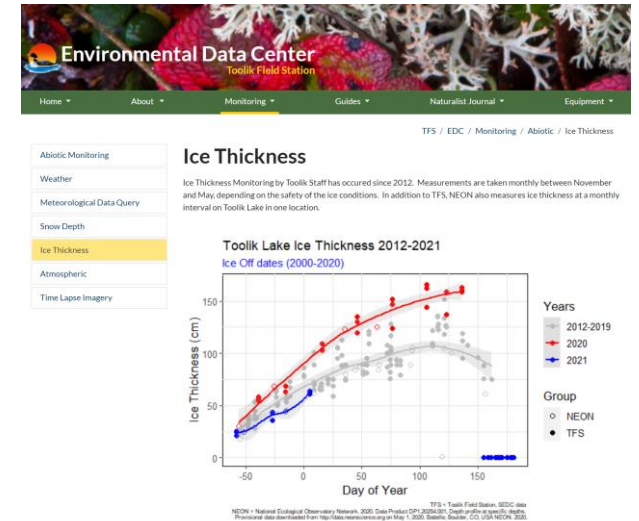
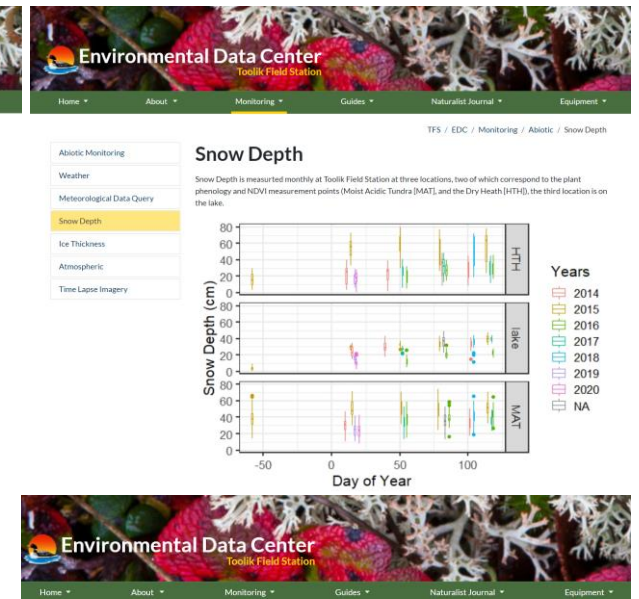
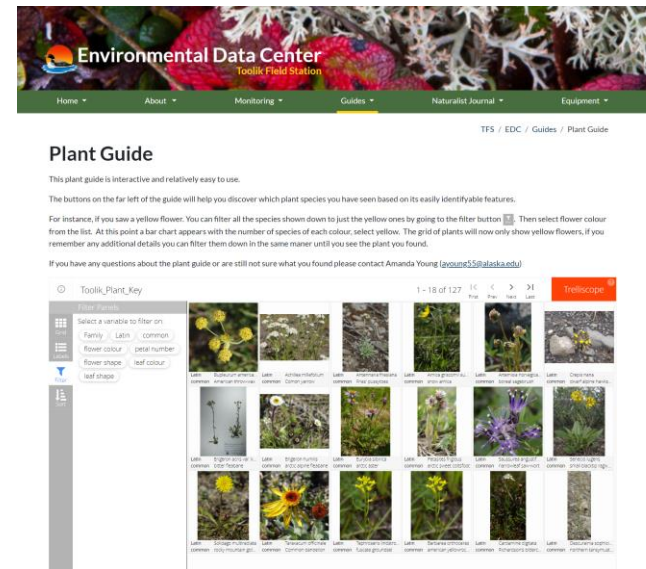


- Continue to provide Remote Access to users who cannot make it to Toolik
 - Year-round support
- Provide additional field support to researchers at Toolik
- Continue to improve communication between the SEDC and researchers
 - Slack
- Calendar of staffing, remote access, and field assistance for researchers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

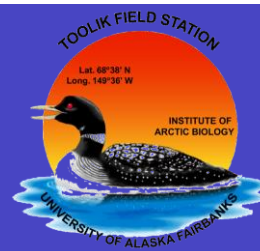


EDC WEBSITE - UPDATES

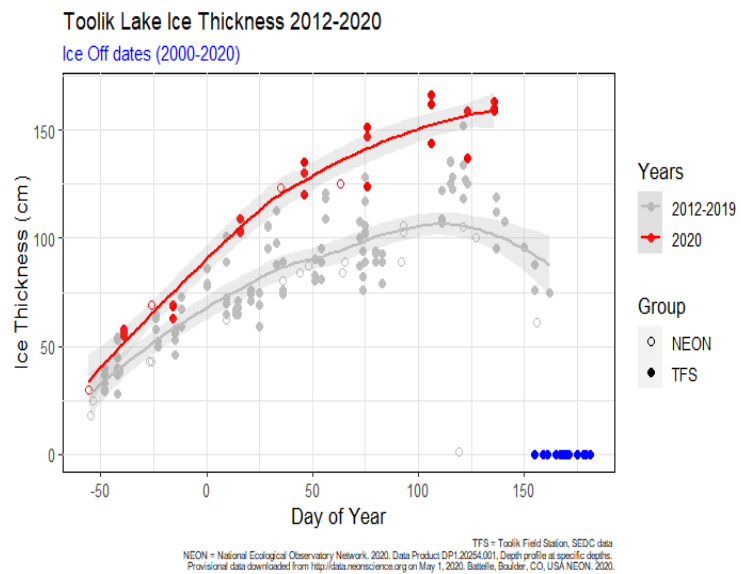
- In addition to the revamping of the whole website.
- Guides
 - Added an interactive plant guide for those that want to identify plants by flower colour, flower shape, petal number, etc.
 - Local bird calls to the bird guide
- Abiotic Monitoring
 - Snow Depth Measurements
 - Ice Thickness Measurements
 - Wind Speed and Direction chart in addition to the wind rose.



DISCUSSION / FEEDBACK



Baseline Datasets



Remote Access

