

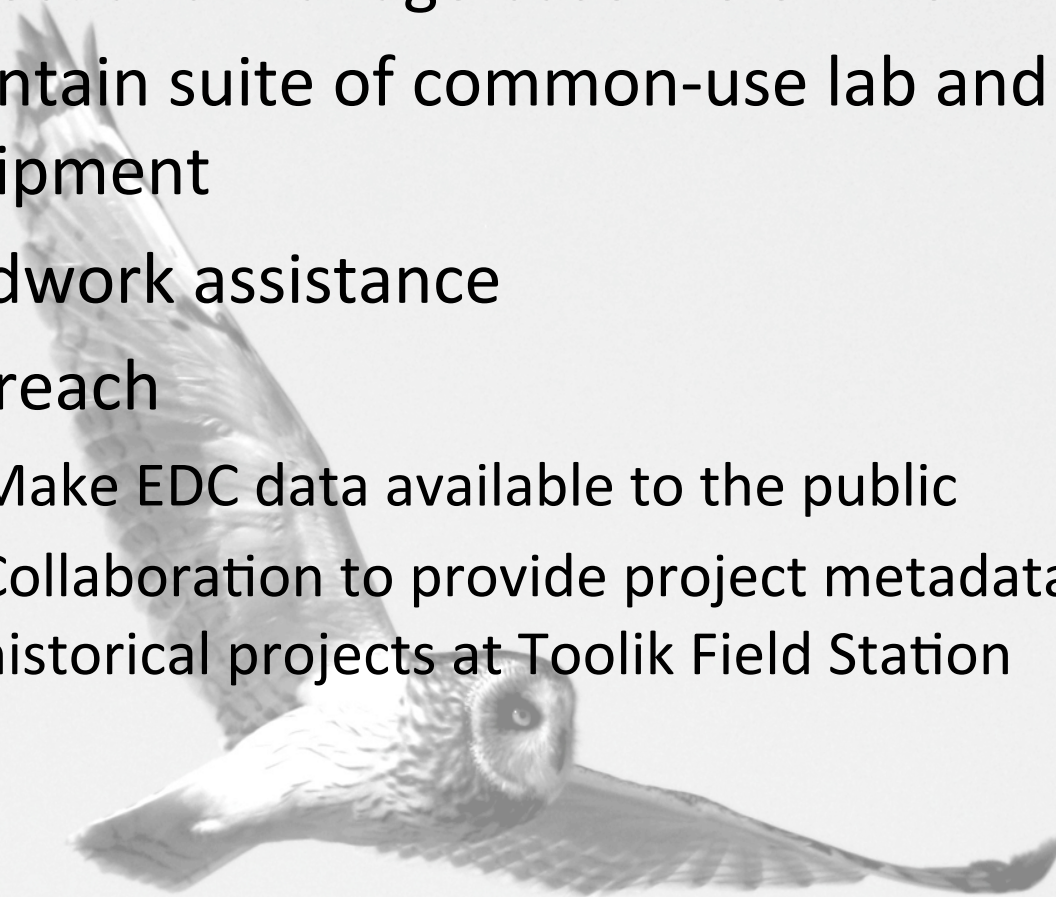
Environmental Data Center

Brie Van Dam
Toolik Field Station
Steering Committee Meeting
1 February 2018



EDC Mission Statement

- I. Collect and manage baseline environmental data
- II. Maintain suite of common-use lab and field equipment
- III. Fieldwork assistance
- IV. Outreach
 - a. Make EDC data available to the public
 - b. Collaboration to provide project metadata for current and historical projects at Toolik Field Station



Staffing update

EDC Manager: Brie Van Dam

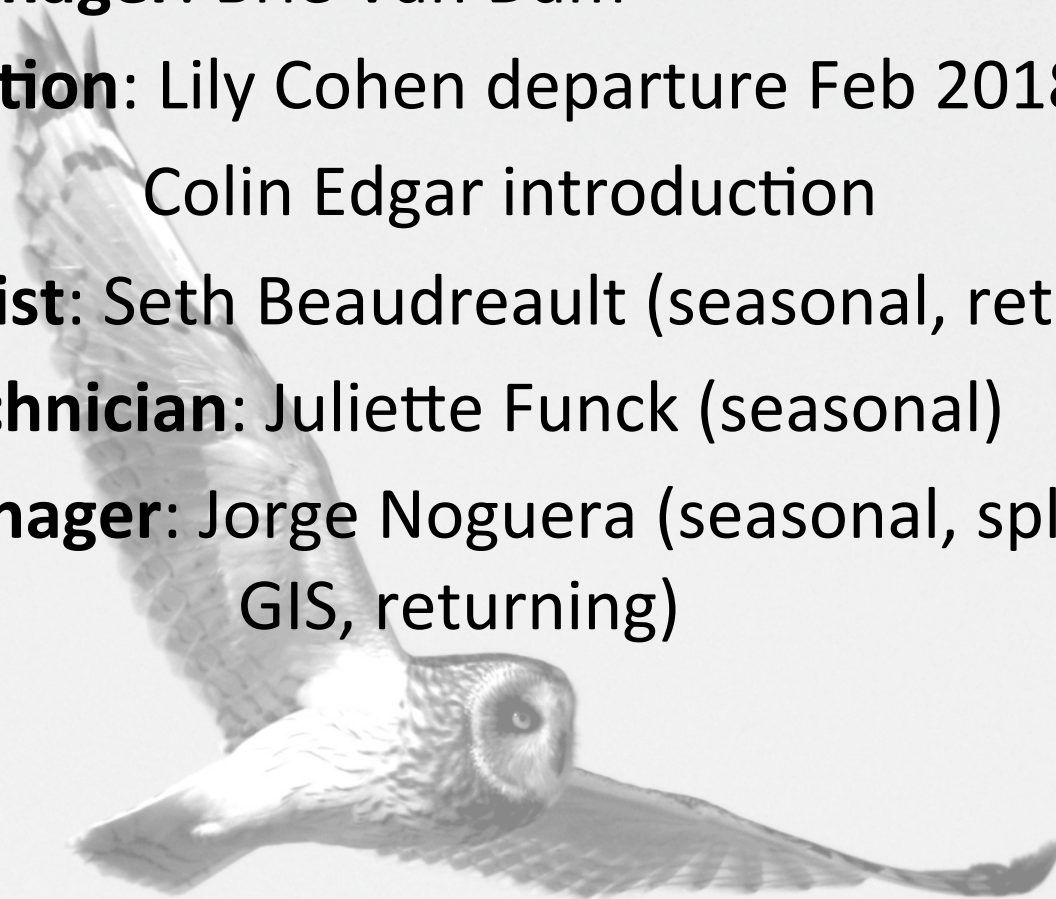
Met station: Lily Cohen departure Feb 2018

Colin Edgar introduction

Naturalist: Seth Beaudreault (seasonal, returning)

EDC Technician: Juliette Funck (seasonal)

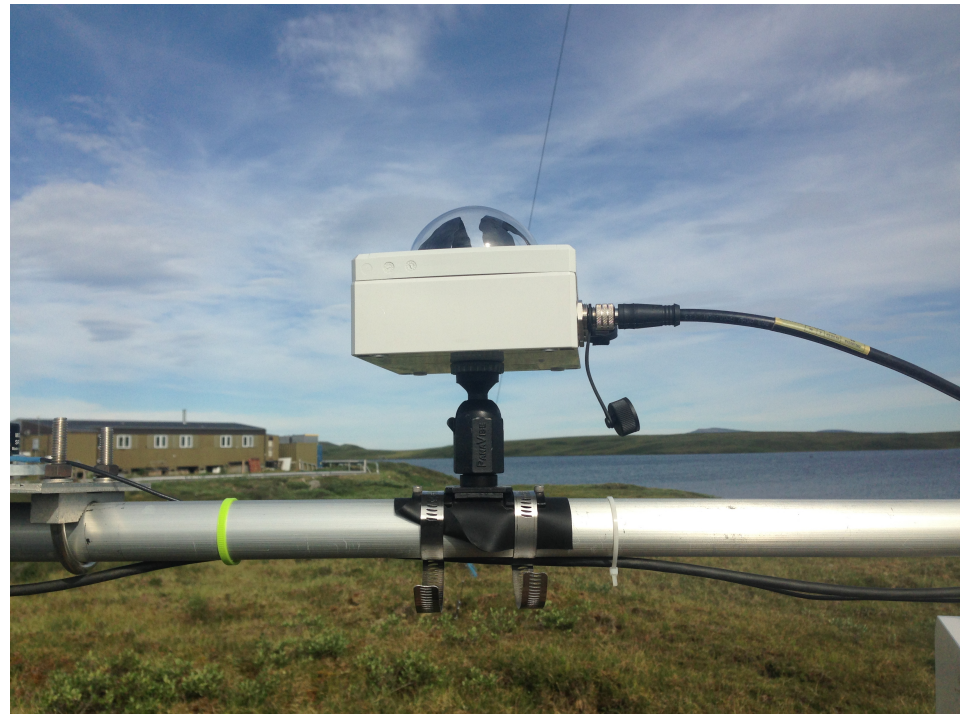
Lab Manager: Jorge Noguera (seasonal, split-time with
GIS, returning)



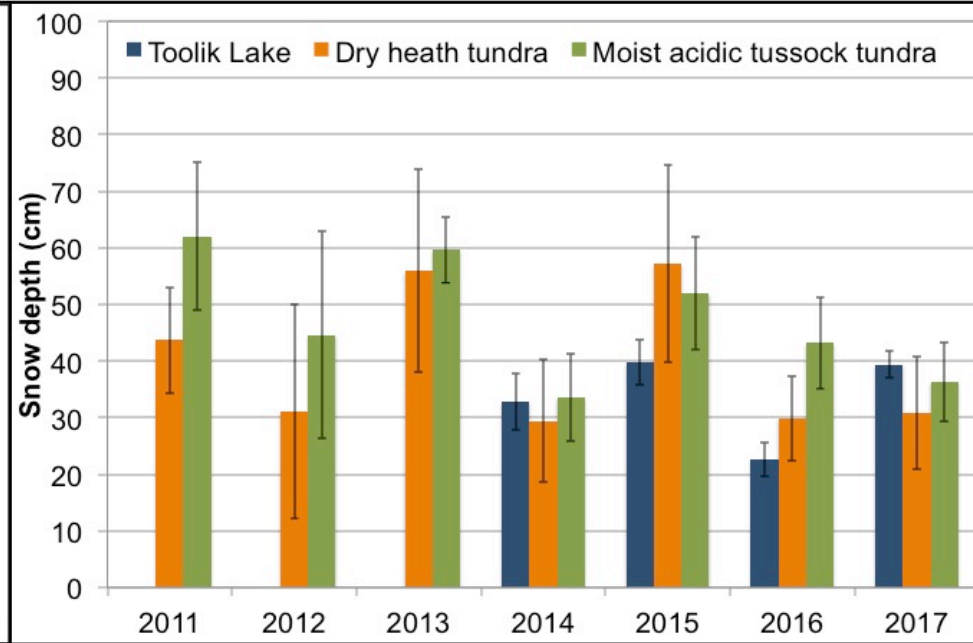
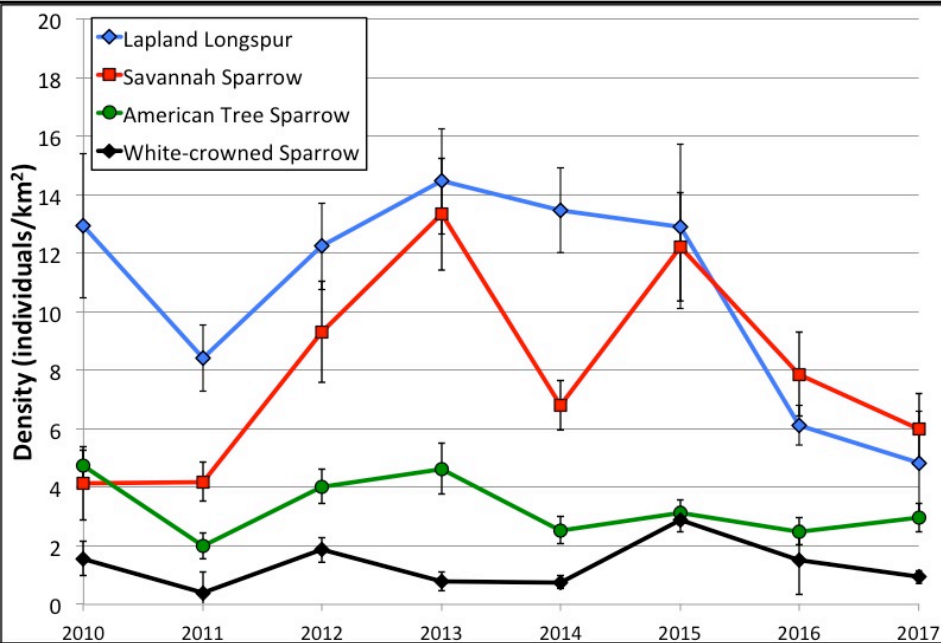
I. Baseline Environmental Monitoring Program

Meteorological Station updates: 2017

- Installed Delta-T Devices BF5 Sunshine Sensor
 - Measures diffuse and global radiation, summer-only
- Final QA/QC data for 2018 available on website
- Air temperature and relative humidity sensors calibrated
- Created metadata database, provided with data query
- Rewired datalogger
- Annual data report available on the website
- Various other sensor maintenance and upkeep



I. Baseline Environmental Monitoring Program



Biological Monitoring Program

- Vegetation phenology
- NDVI
- Avian point counts
- Bird arrivals/departures
- Naturalist journal

Snow monitoring

- Time lapse imagery
- Manual surveys of depth and density (SWE)
- Sonic ranger snow depth at met station
- Radiation (albedo) at met station
- 2 year-round precip gauges (Pluvio and ETI NOAA IV)

I. Baseline Environmental Monitoring Program

Herbarium

- Live plant photos on virtual herbarium
- iDigBio spring short course on Strategic Planning for Herbaria
- TFS vascular plant guide
 - ~130 species



Color Guide: White



Cassiope tetragona



Rhododendrontomentosum



Vaccinium vitis-idaea



Anticlea elegans



Tofieldia pusilla



Epilobium palustre



Castilleja caudata



Castilleja hyperborea



Pedicularis capitata



Anthoxanthum monticola



Bistorta vivipara



Montia bostockii

I. Baseline Environmental Monitoring Program

National Atmospheric Deposition Network: Oct 2017

- National Trends Network (precip chemistry)
- Mercury Deposition Network (total Hg)
- Collaboration in the works with BLM to add two new networks: IMPROVE, AMoN
- Relying on Science Support Services for winter sample collection



I. EDC Website

Website updates

- New bird and mammal guides on the web
- Updated annual summaries
- Updated data downloads
- Online Herbarium updates

Waterfowl

American Wigeon
Brant
Bufflehead
Cackling (Canada) Goose
Canvasback
Greater Scaup
Greater White-fronted Goose
Green-winged Teal
Harlequin Duck
King Eider
Lesser Scaup
Long-tailed Duck
Mallard
Northern Pintail
Northern Shoveler
Red-breasted Merganser
Redhead
Ring-necked Duck
Snow Goose
Spectacled Eider
Surf Scoter
Tundra Swan
White-winged Scoter

Ptarmigan

Rock Ptarmigan
Willow Ptarmigan

Loons and Grebes

Common Loon
Horned Grebe
Pacific Loon
Red-necked Grebe
Red-throated Loon
Yellow-billed Loon

Hawks and Eagles

Bald Eagle
Golden Eagle
Northern Harrier
Osprey
Red-tailed Hawk
Rough-legged Hawk

Cranes

Sandhill Crane

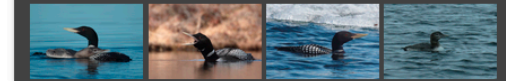
Shorebirds

American Golden Plover
Baird's Sandpiper
Black-bellied Plover
Buff-breasted Sandpiper
Hudsonian Godwit
Killdeer

Yellow-billed Loon (*Gavia adamsii*)



Adult with chick, early September. Photo credit: ©2015 Seth Beaudreault



The Yellow-billed Loon is an arctic tundra lake specialist and Toolik Lake is its prime habitat. A pair has raised one or two chicks a year here for many years.

Yellow-billed Loon distribution in North America

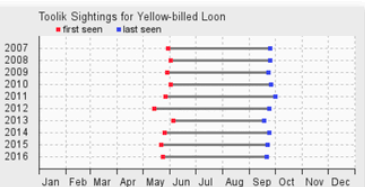
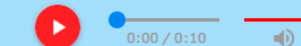
(Click map to enlarge)



Map provided by:
Birds of North America Online

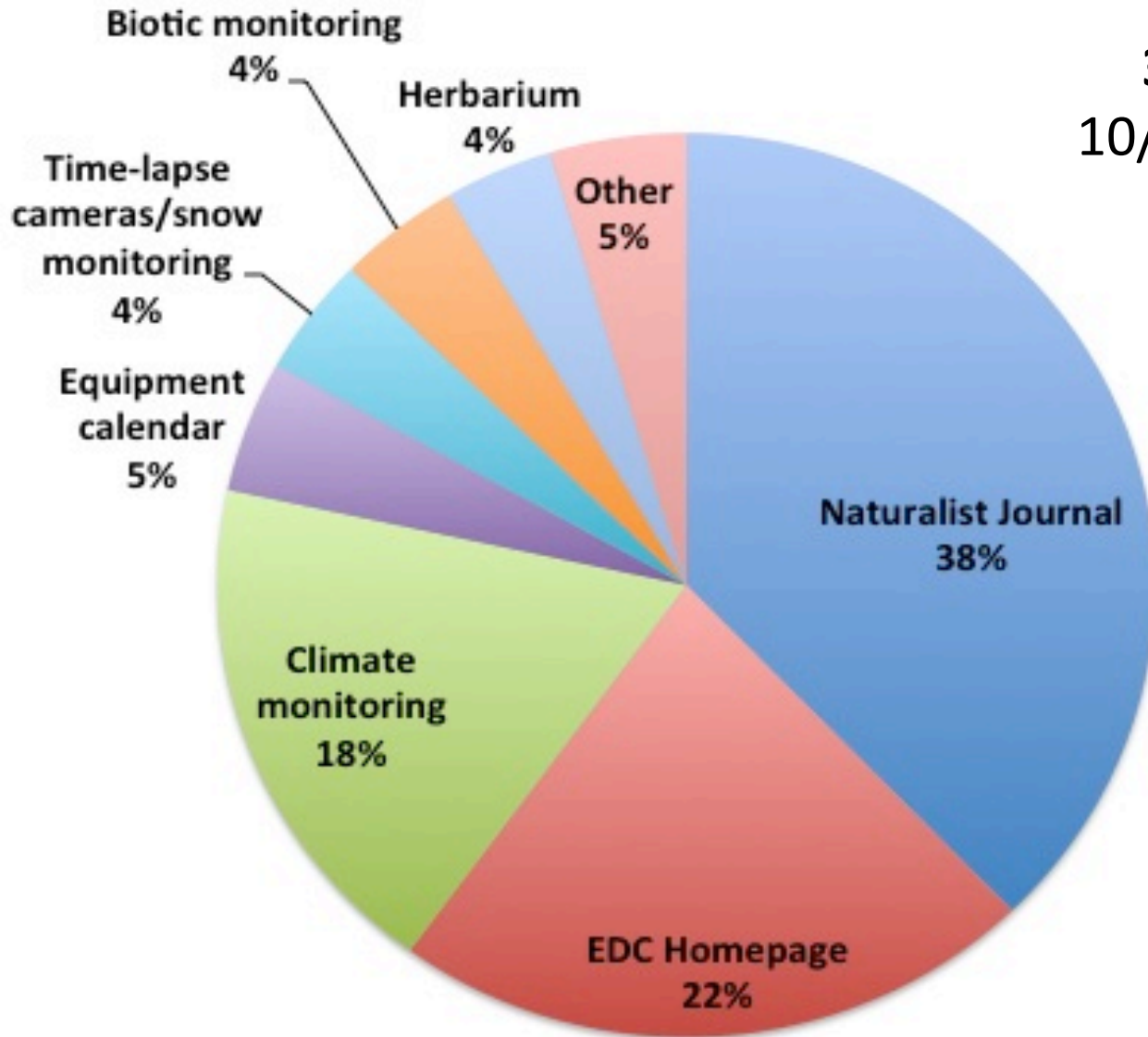
Sounds of the Yellow-billed Loon

Song
Andrew Spencer
<http://www.xeno-canto.org/185362>



I. EDC Website

EDC Website Use 2017



35,111 pageviews
10/1/2016 – 9/30/2017

Meteorological data

- **188 requests** from **68 different users** were made for meteorological parameters

Biological data

- Biological data, including plant phenology and avian point counts and NDVI, were downloaded **44 times** from the website this year

Updates

- DOI assignments and data submission to NSF Arctic Data Center



I. Data Usage

Examples of data use (not full list)

- Real-time **met data** to drive experimental decisions
- **Naturalist Journal annual summaries, snow cover data, time-lapse images** used by Jack Reakoff of Wiseman to work with State of Alaska Department of Fish and Game to determine the impact of late spring storms and snow melt timing on sheep and caribou populations
- **Avian point counts** incorporated in the Alaska Landbird Monitoring Survey database and used for statewide analysis.

Publications

- At least 16 manuscripts published in 2017 using EDC data, including:

Ackerman, D., Griffin, D., Hobbie, S., Finlay, J. 2017. Arctic shrub growth trajectories differ across soil moisture levels. *Global Change Biology*, 23:4294-4302.

Cortes, A., MacIntyre, S., Sadro, S. 2017. Flowpath and retention of snowmelt in an ice-covered arctic lake. *Limnology and Oceanography*, 62:2023-2044. Doi:10.1002/lno.10549.

Daniels, W.C., Russell, J.M., Giblin, A.E., Welker, J.M., Klein, E.S., Huang, Y. 2017. Hydrogen isotope fractionation in leaf waxes in the Alaskan Arctic tundra. *Geochimica et Cosmochimica Acta*. 213: 216-236.

Galka, M., Swindles, G., Szal, M., Fulweber, R., Feurdean, A, Response of plant communities to climate change and fire over the late Holocene: palaeoecological insights from arctic peatlands in Alaska. In preparation for *Journal of Vegetation Science*.

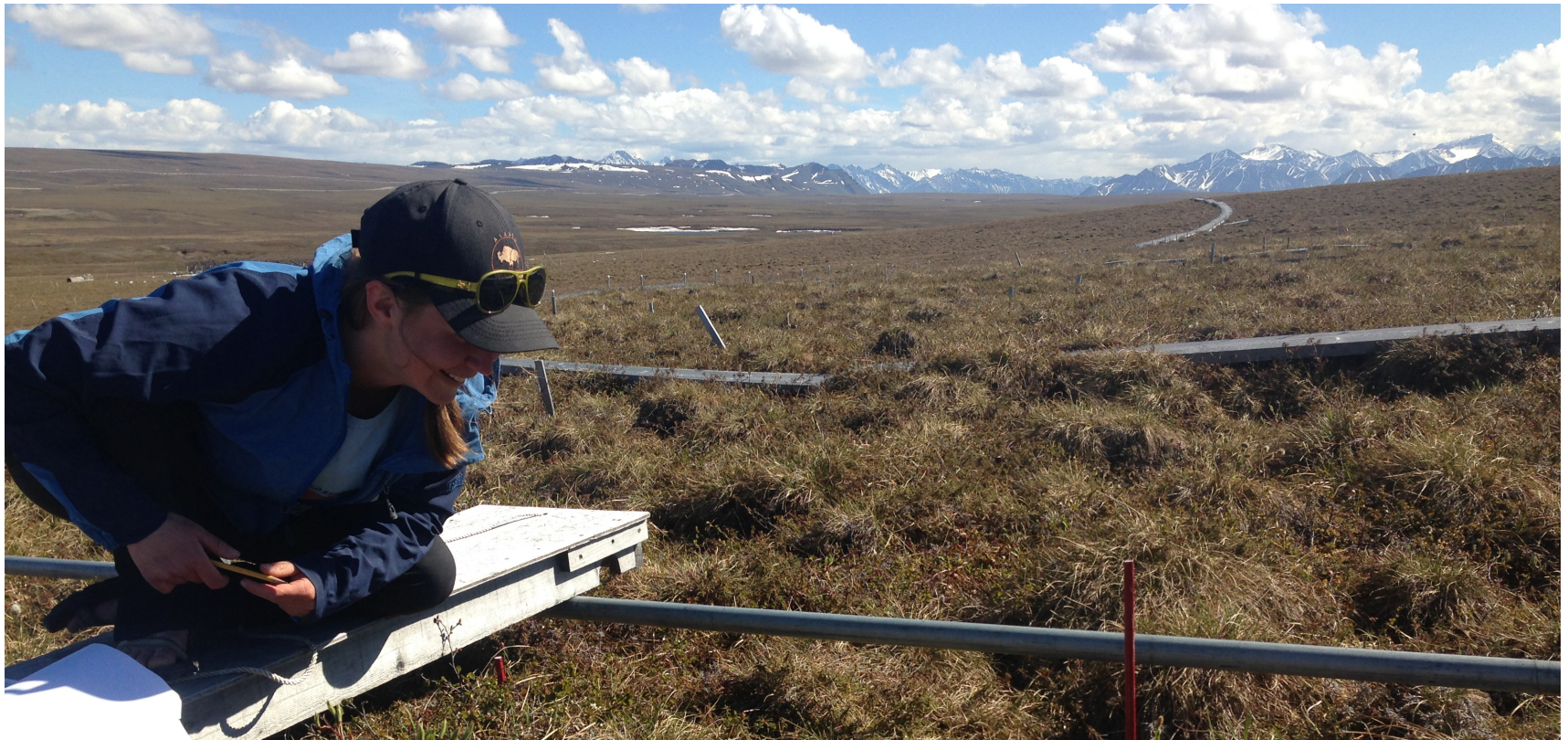
Kosh, M.S., McClelland, J.W., Jacobson, A.D., Dougas, T.A., Barker, A.J., Lehn, G.O. 2017. Seasonality of dissolved nitrogen from spring melt to fall freezeup in Alaskan Arctic tundra and mountain streams. *Journal of Geophysical Research Biogeosciences*.

II. Common-use equipment

Equipment	2017	2016	2015	2014	2013	2012	2011	2010	2009
Muffle furnace	53	21	16	33	43	34	31	25	11
Shaker table	42	12	0	58	10	27	0	3	16
Centrifuge	0	0	0	0	0	0	6	11	0
Autoclave	23	19	15	15	15	15	11	23	13
Freeze drier	4	2	4	0	30	66	76	81	106
Leaf area meter (Licor)	0	9	1	0	7	0	18	0	51
Leaf area meter (WinFolia)	6	55	29	12	58	37	5	0	0
Balances	130	72	84	129	36	83	63	60	46
Hot stir plates	33	3	42	16	0	0	0	0	0
Compound microscope	6	35	6	0	9	75	0	0	0
Unitron Stereoscope	19	35	15	27	61	51	94	14	79
Heerburgg Stereoscope	9	11	0	11	16	106	51	3	79
Leica LED Stereoscope	36	54	30	0	0	0	0	0	0
Zeiss Primostar microscope	5	15	5	0	0	0	0	0	0
Hydrolab water profiler	33	46	52	88	70	70	76	77	26
Unispec spectral analyzer	35	35	23	18	13	37	76	0	0
Flow Tracker	1	13	46	26	10	10	0	0	0
Soil moisture probes	24	28	67	6	0	0	0	0	0
Soil temperature probes	31	35	11	0	0	0	0	0	0
Handheld weather meter	3	2	7	7	0	0	0	0	0
Dry Incubator	0	20	0	0	38	12	71	48	15
Incubation baths (6 total)	424	309	572	551	363	523	406	238	270
Total	917	831	1025	997	864	1146	984	583	712

III. Field Work Assistance

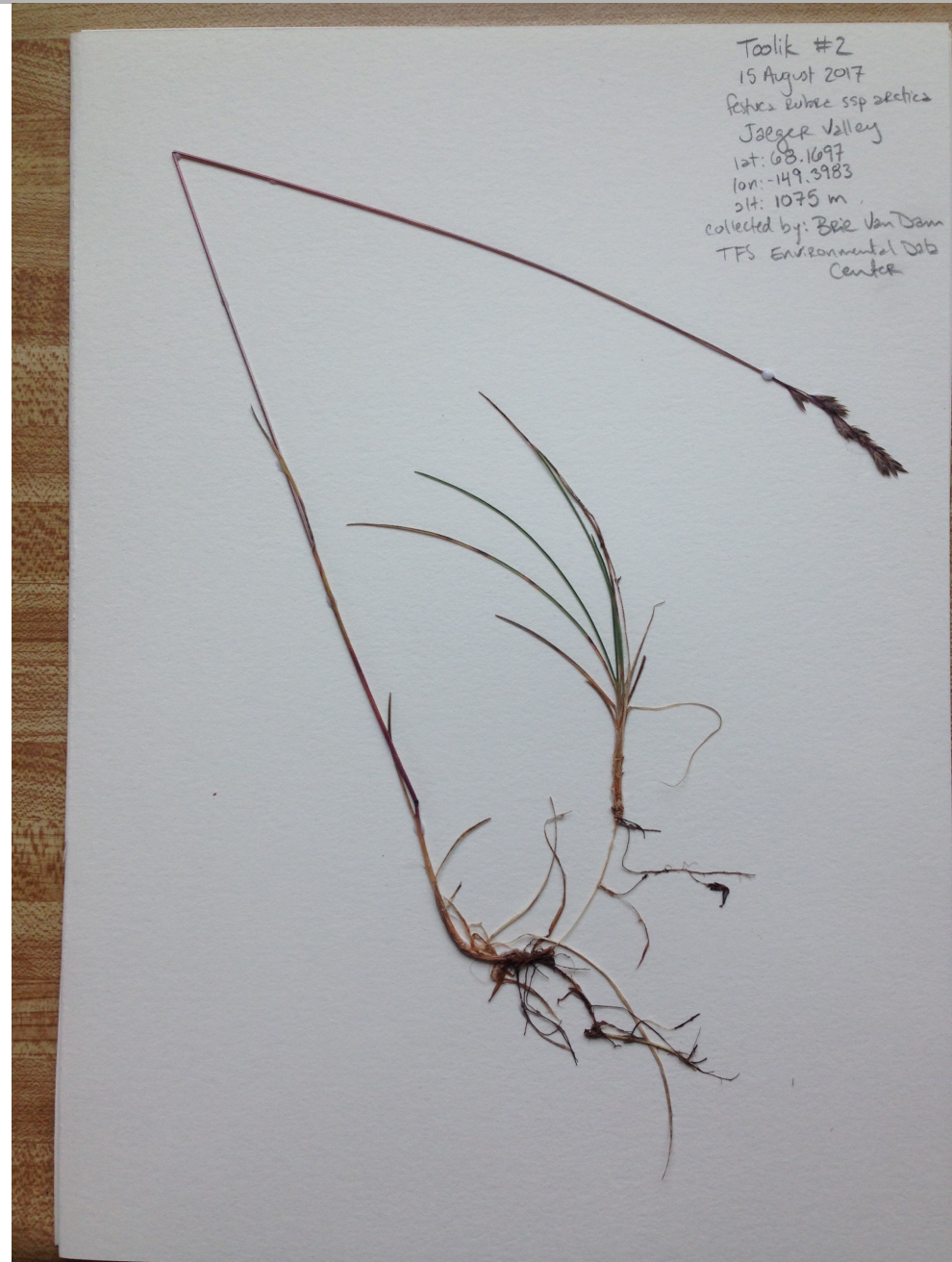
- 2017 season: **~170 hrs, 14 researchers; *Examples (not full list):***
 - Filtered samples collected from the Fog Lakes and Toolik Lake for DNA analysis for LTREB project between August and September
 - Measured thaw depth and installed snow fences at 12 control and snow fence plots at Ice Cut for Ellen Dorrepaal in August.
 - Retrieval of the Toolik Lake Met Station and winterization of the Toolik Inlet stream gauge for the LTER



III. Field Work Assistance

INTERACT Remote Access

- *Festuca rubra* collections for Dr. Marjo Helander, University of Turku - Finland during summer 2017
- Anticipate support for 3 remote access projects in summer 2018



IV. New and Continuing Projects

- Incorporate nomenclature edits in TFS vascular plant guide, publish
- Potential collaboration with BLM and NPS on IMPROVE and AMoN
- Collaboration on vegetation phenology methods comparison with ITEX Snapshot phenology protocols, EDC observations, and EcoIS/EcoIP photographic analysis
- Continue adding live plant photos to online Herbarium

Questions?



