Faustine Bernadac
Field Operations Assistant Manager D18.19

3352 College Road
Fairbanks, AK 99709
fbernadac@BattelleEcology.org

NEON Operations 2017/2018: Toolik Field Station

National Ecological Observatory Network

A project sponsored by the National Science Foundation and operated under cooperative agreement by Battelle.

Outline

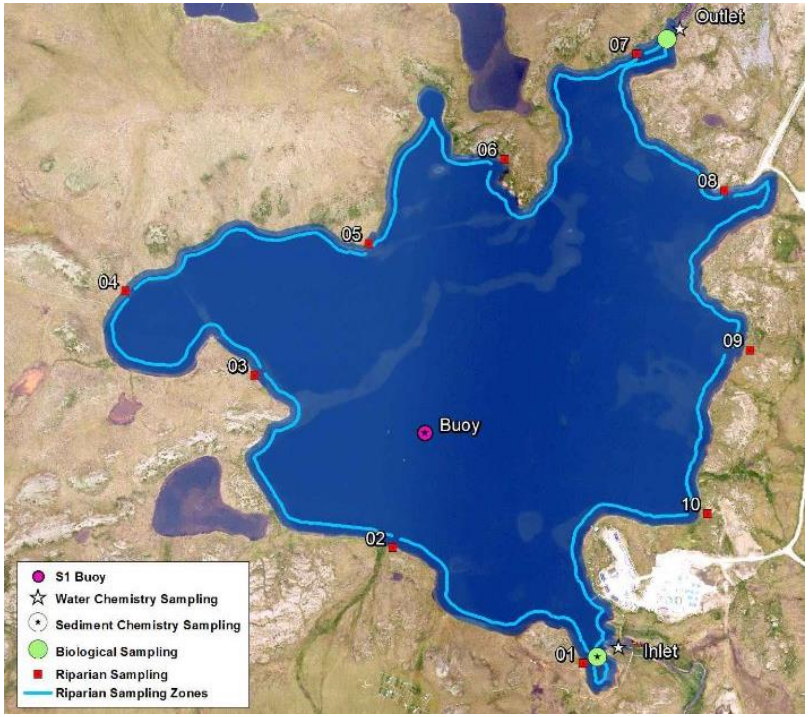
- 2017 overview:
  - Construction activities
  - Sampling activities
- 2018 plans
- Questions/suggestions/feedback

2017 overview

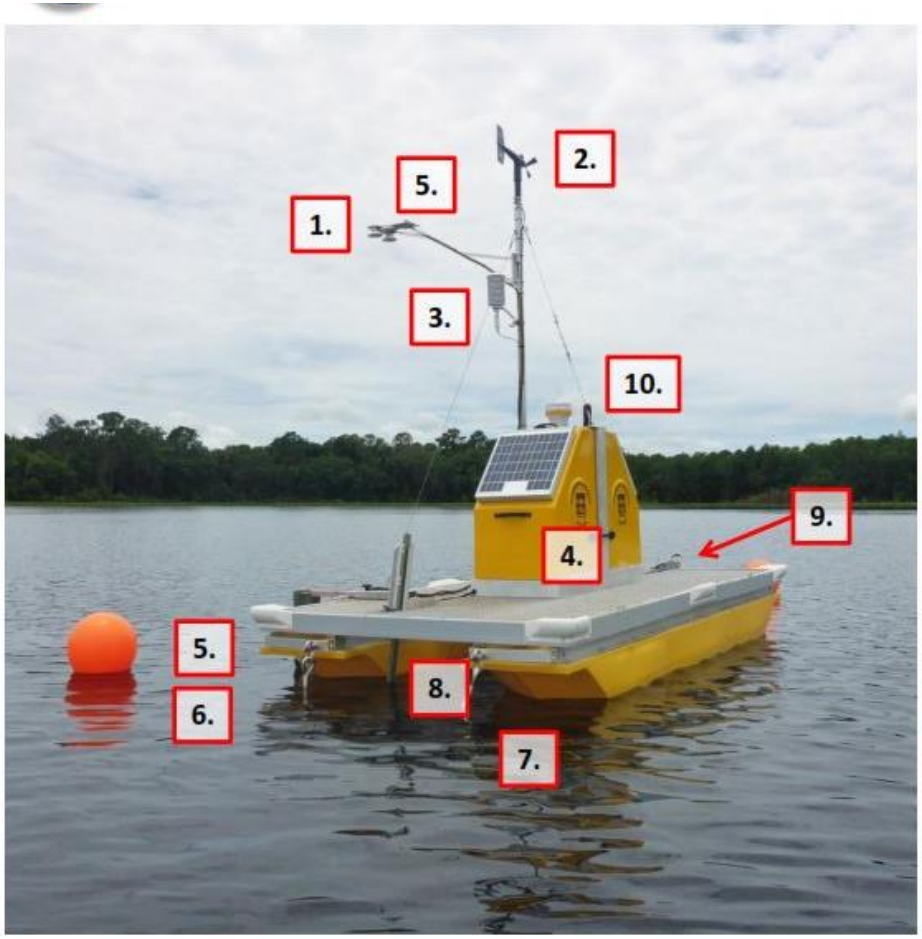
Construction phase complete

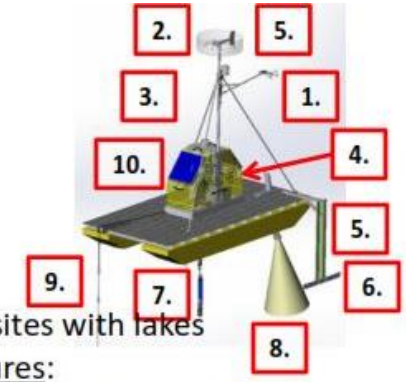
- All sites transitioned to operations!
- Aquatic Instrumentation System (AIS):
  - 3 sensor sets at Toolik Lake: Buoy and inlet/outlet sensors deployed late June, removed late September
  - 2 sensor sets at Oks Creek with power hut, also removed for winter
  - Toolik Lake met station running and maintained bi-weekly by TIS technicians
  - GWW drilled and installed at Toolik Lake and Oks Creek
- Terrestrial Instrumentation System (TIS):
  - Tower instrumented and running since 2016
  - Adjustments made to boardwalk
  - Generator Module operational – frequent maintenance, additional spill prevention measures, no major issues
- Boardwalk installed at all targeted plots, except GWW
- Terrestrial plots finalized and established

AIS – Toolik Lake



AIS – Toolik Lake





AIS Buoy:

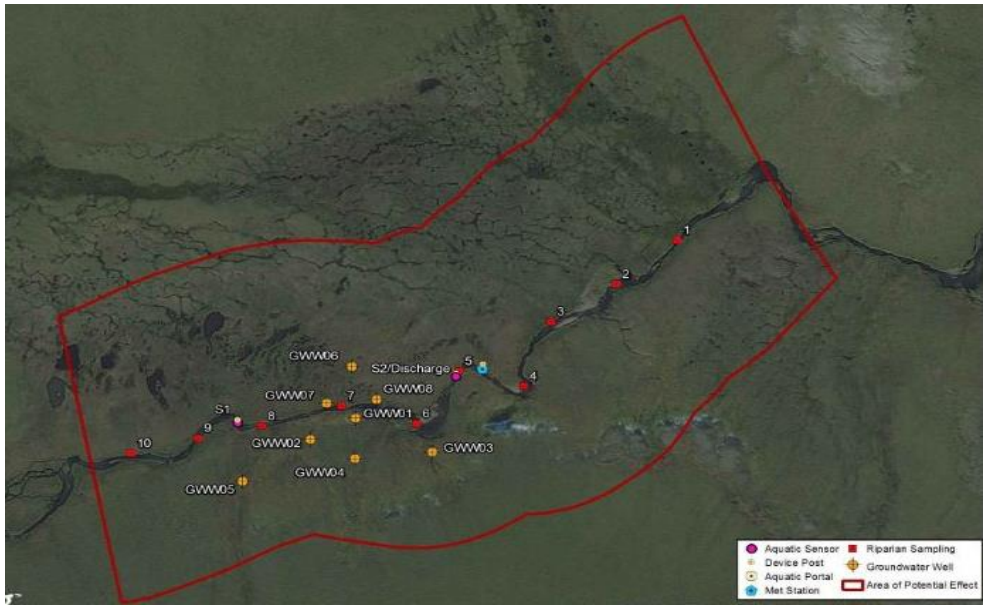
Location:

- Select AIS sites with lakes

What it Measures:

1. Net Radiation (NR01) and Photosynthetically Active Radiation (PAR)
2. Wind Speed and Direction (R.M. Young Wind Monitor)
3. Temperature and RH (HMP-155)
4. Barometric Pressure
5. Upwelling and Downwelling Underwater PAR
6. Ultraviolet Nitrate Analyzer (Suna V2)
7. Exo 2 Sonde
8. Depth Sounder
9. Temperature Profile (T-Chain)
10. *HMR3300 Digital Compass and a Garmin 16-HVS GPS Receiver*

AIS – Oks Creek



AIS – Oks Creek

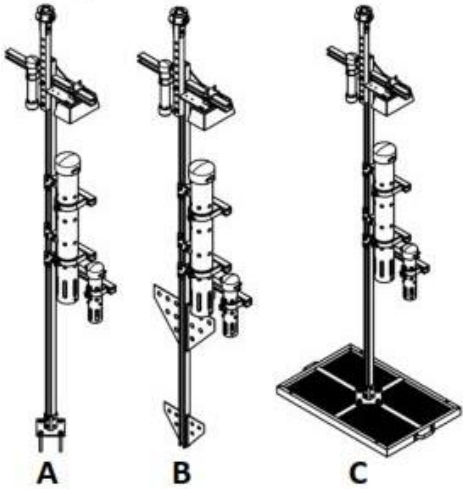
In Stream Sensors

Include:

- Level-Troll 500 Sensor
- Exo 2 Sonde
- SUNA
- Kipp and Zonen PQS 1 PAR Sensor
- PRT

Infrastructure:

- Sensors are mounted to Unistrut frame
- The frame can be installed with several foundations for different ground conditions, such as:
  - Bedrock (**A**)
  - Sand (**B**)
  - Cobbles (**C**)

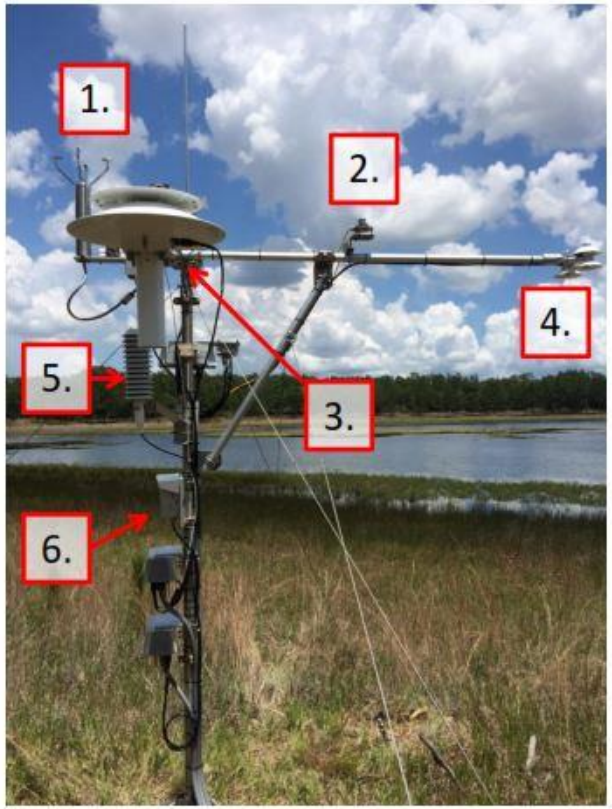


AIS – All sites

AIS Met Station

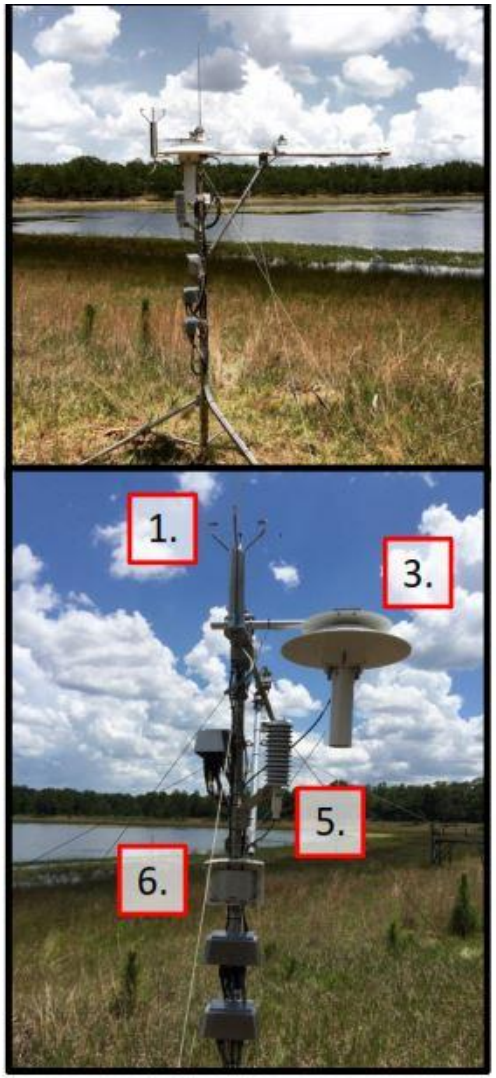
Infrastructure:

- Campbell Scientific CM110 stainless steel tripod
- Designed to be installed over rough/uneven terrain
- Stabilized using multiple guy wires



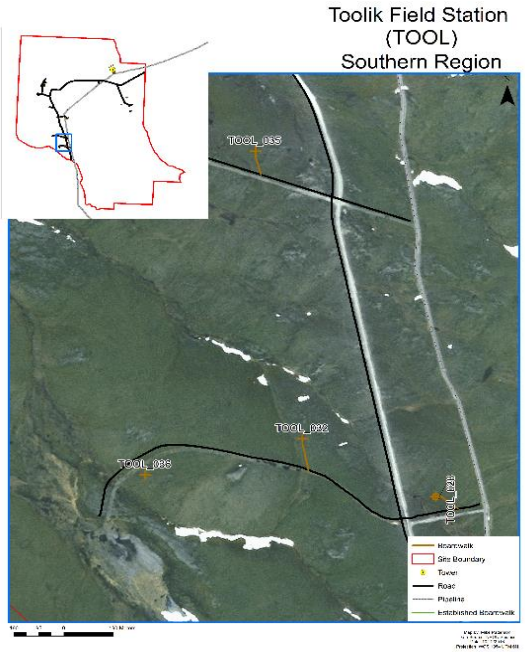
Sensors:

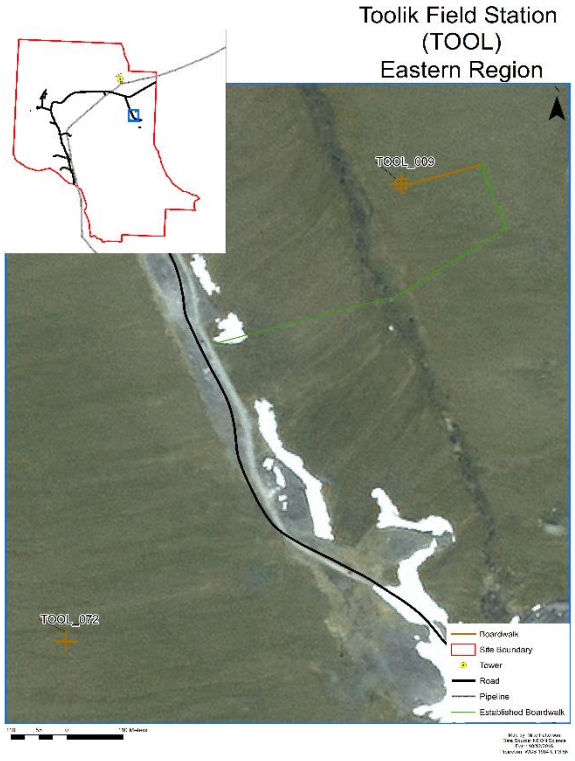
1. 2-D Wind Speed and Direction
2. Photosynthetically Active Radiation
3. Aspirated Air Temperature
4. Net LW and SW Radiation
5. Relative Humidity (RH)
6. Barometric Pressure

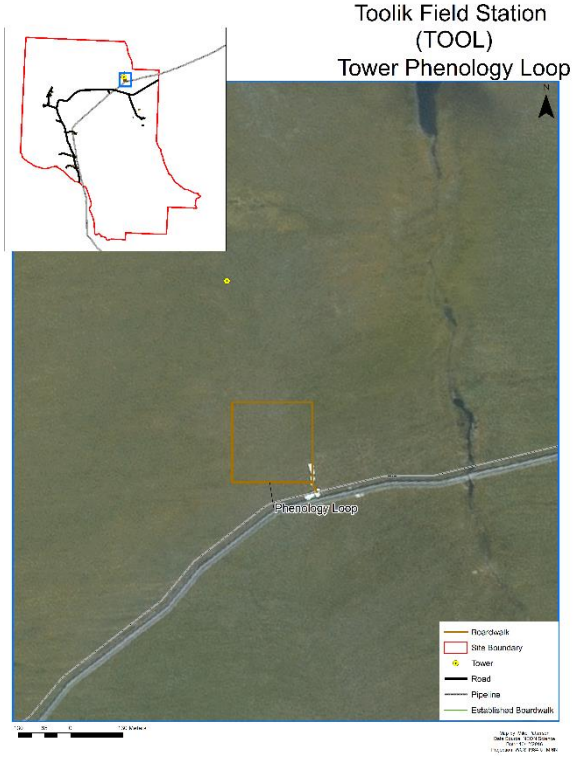


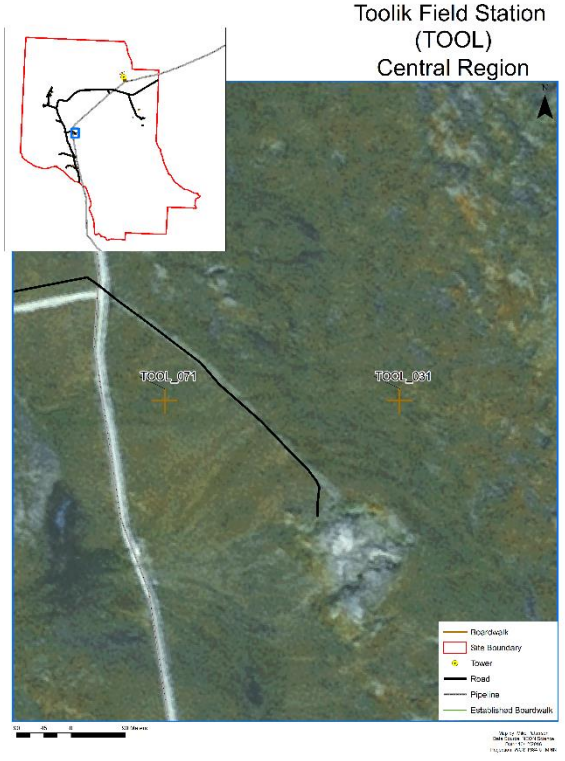
Boardwalk installation

- 3 tower plots & phenology loop
- 10 distributed plots; 5 w/access boardwalk





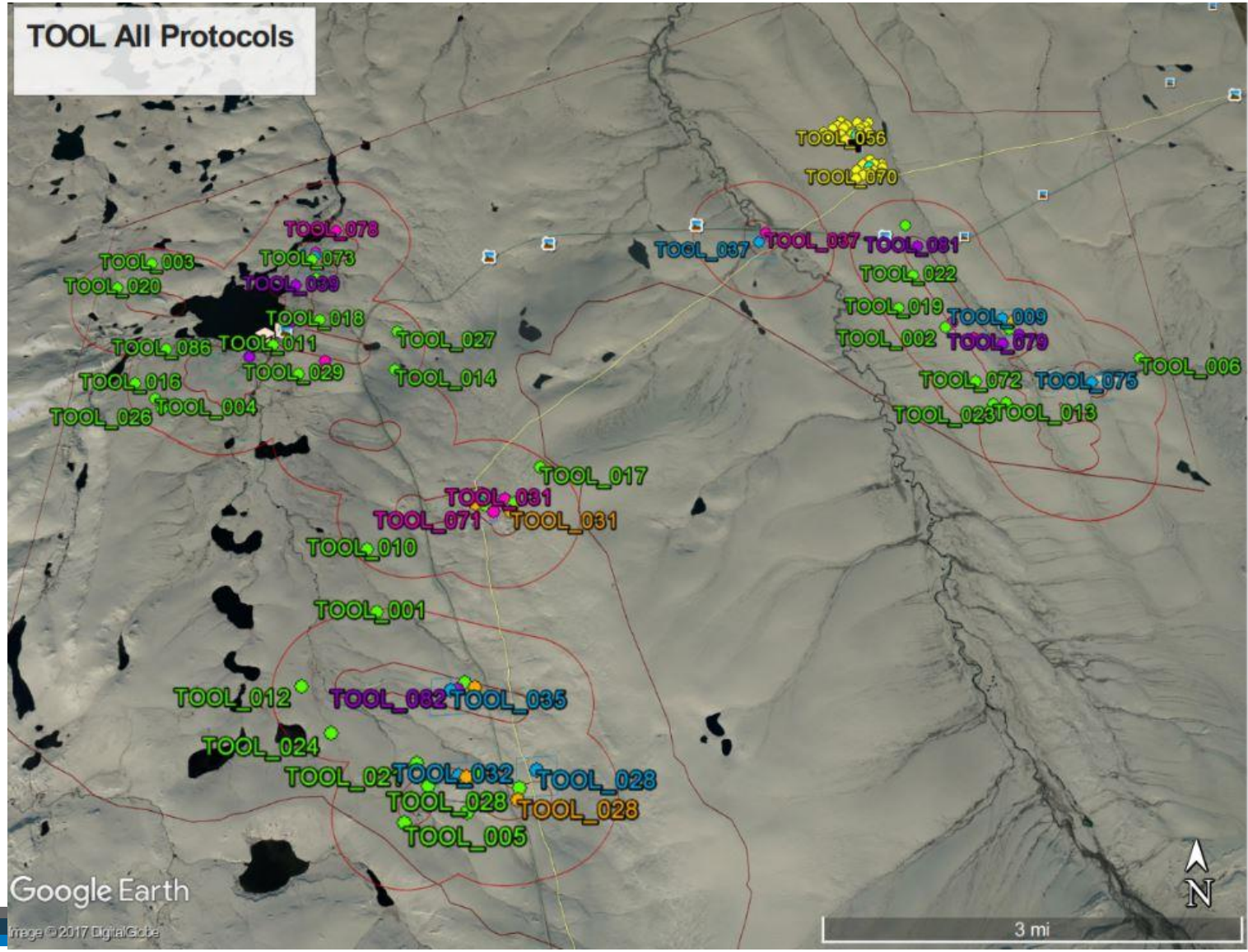




NEON Terrestrial Plots (TOS)

- 30 Distributed
- 30 Tower
- 10 Beetle
- 10 Mosquito
- 8 mammals
- 6 Tick
- 2 Phenology

- Establishment was completed



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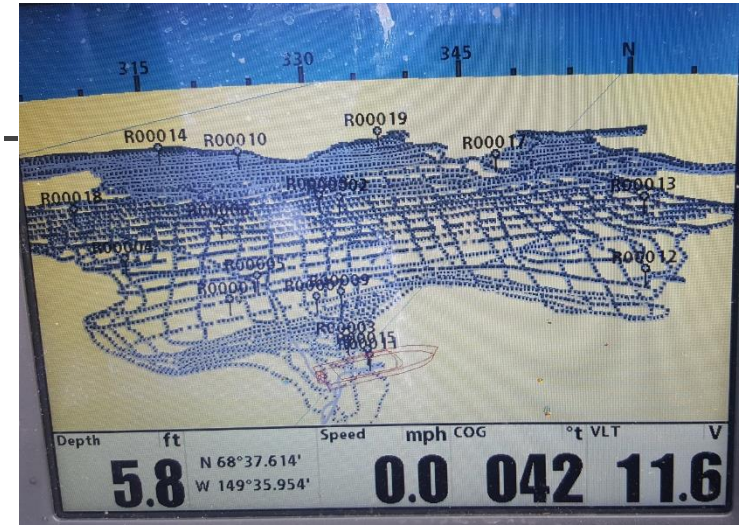
The Business of Innovation

Sampling activities

- Terrestrial sampling:
  - 1st terrestrial sampling season July 10 – Oct 17
  - Couple highlights:
    - Very low mammal captures: 3 voles, 2 shrews
    - Last mosquito caught in early October

- Aquatic sampling:
  - 2nd season
  - Core team sampling from early-June to mid-September
  - 1st time fishing at Toolik Lake. No fishing at Oks Creek
  - Bathymetry completed at Toolik Lake



2018 plans

2018 projected schedule

Terrestrial (TOS/TIS)

- Earlier start than 2017 – core crew in Toolik ~May 29th
- Pre/post season mosquito observations. Help from EDC?
- 3 mammal trapping efforts: June, July, August
- Peak season: early July to early August - Diversity, herbaceous clip, bryophyte, soil
- Bi-weekly year-round schedule for TIS

Contracted TOS work - TBD

- Not captured in our schedule
- Bird work contract pending – effort to take place after mid-June
- Soil sampling by NRCS: tentatively planned for mid to late August for max thaw depth
  - 1mx1mx1m holes at 19 plots
  - Collection of 700-1000g of soil from each horizon
  - ~6 people, 1 week

Aquatics (AOS)

- Broadly divided into biology and chemistry
  - 3 biology bouts at each site
  - 2 fish bouts at each site
- 2 seasonal core techs + FTT support from Fairbanks

Aquatics (AIS)

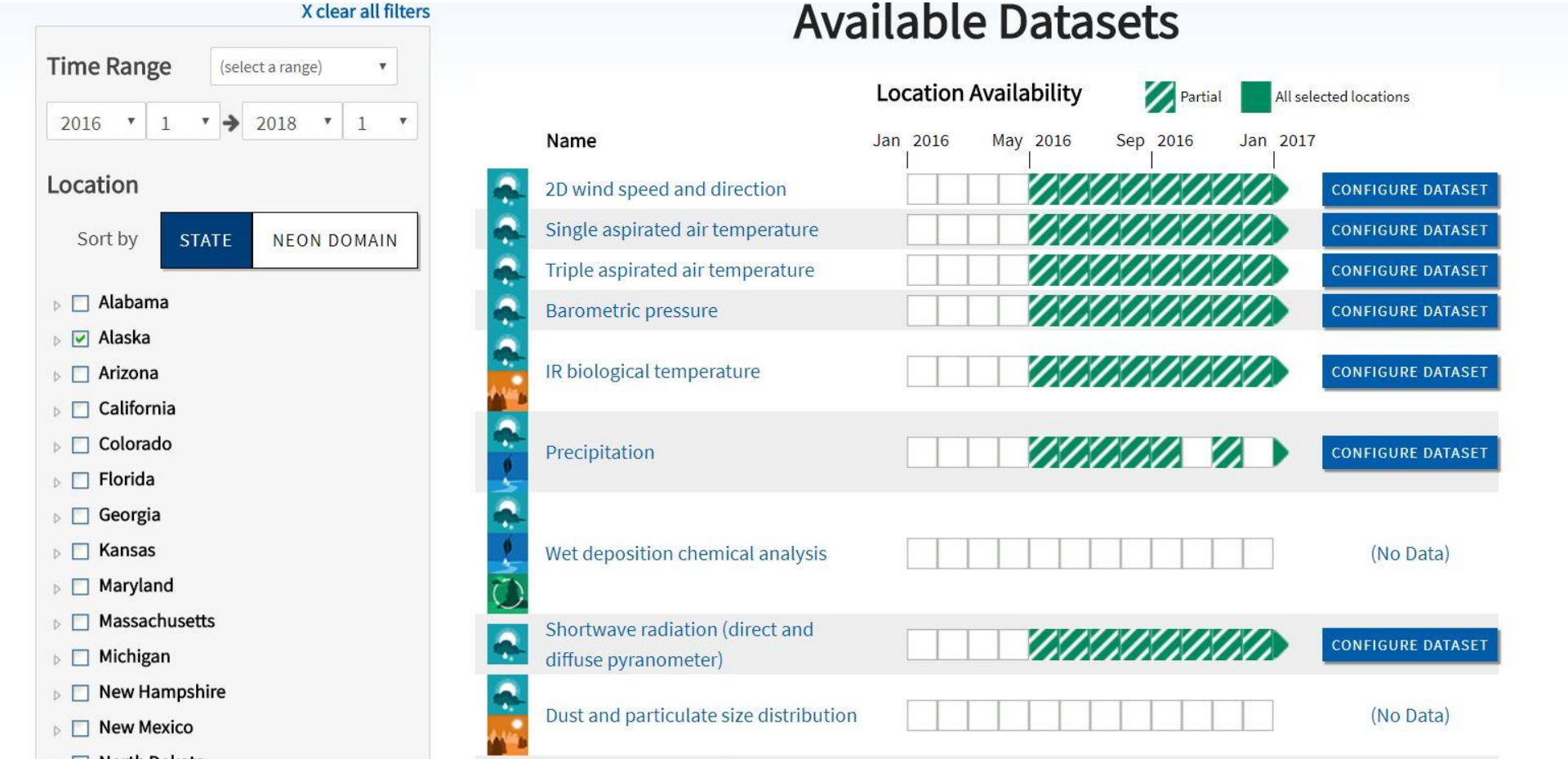
- Oks Creek:
  - Stream sensors and met station installation as soon as creek is thawed ~mid to late May.
  - Removal by mid-September.
- Toolik Lake:
  - Inlet and outlet sensors and buoy at Toolik Lake installation late June.
  - Removal by mid-September.
  - Sensor refresh on Toolik met station planned in spring.
- All instrumented sites will be maintained on a bi-weekly basis.
- GWW: trolls to be installed after thaw

Airborne Observations Platform (AOP)

- DHC-6 Twin Otter flight scheduled between July 6-July 28
- Remote sensing instruments:
  - imaging spectrometer
  - waveform light detection and ranging instrument (LIDAR)
  - instrument and a high-resolution digital camera
- ~380km2 will be surveyed over tower airshed and distributed plots, representative vegetation types, and watershed boundaries for both the terrestrial and aquatics sites.

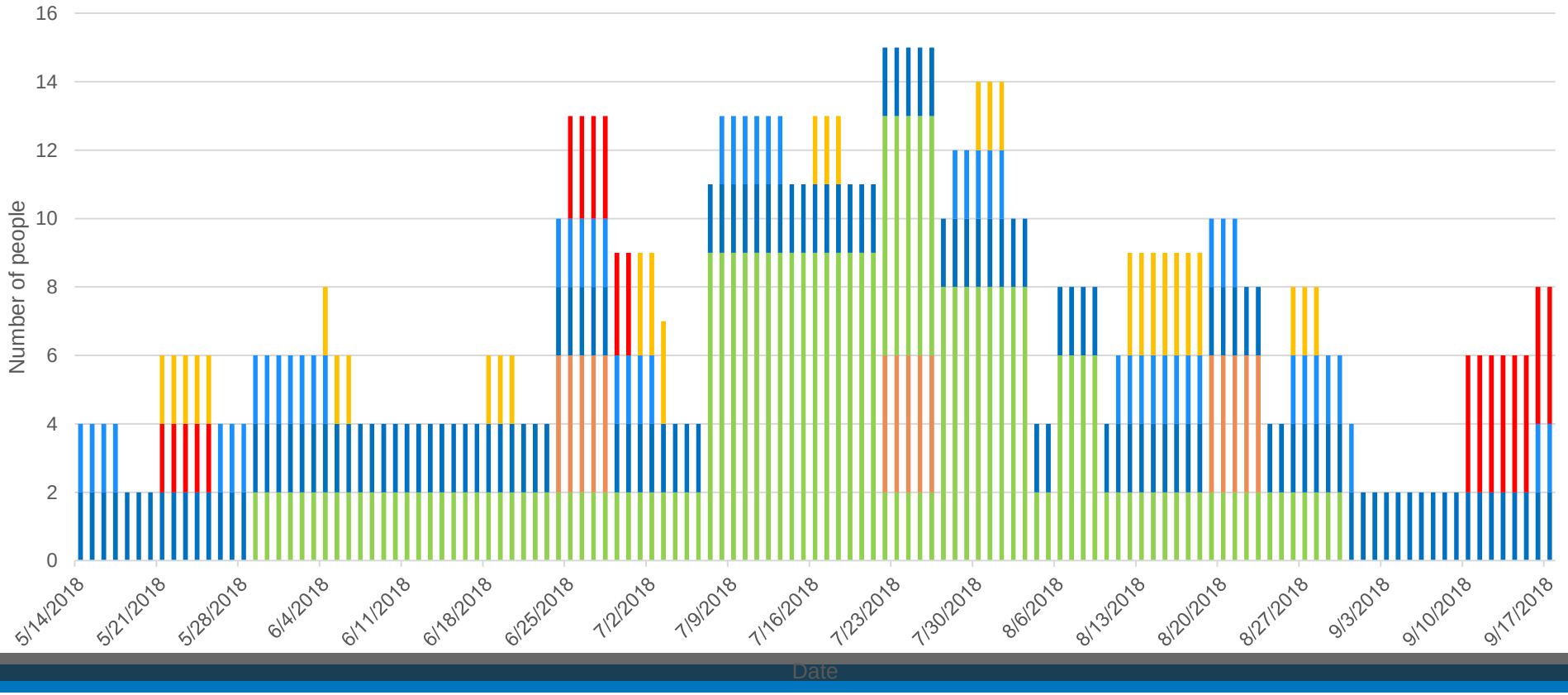
Data portal

- Free and open-access automated instrument, observational and remote sensing data.
- Collects specimens and samples that complement automated measurements and observations on the ground.



2018 projected housing needs

- **AOS/TOS/TIS/AIS: ~940 user days mid-May to mid-September**
- **Earlier TOS start in 2018**
- **Similar AOS activities**



Questions?
Suggestions?
Feedback?

Thank you