

# ***Annual Toolik GIS Report***



# Overview

- **Highlights From 2017**
- **Website Usage & Metrics**
- **Update on Summer Internship Position**
- **Update on Unmanned Aerial System (UAS) Services**



# Requests Completed

2013: 215 Requests from 28 Institutions

2014: 253 Requests from 33 Institutions

2015: 213 Requests from 36 Institutions

2016: 203 Requests from 39 Institutions

2017: 224 Requests from 34 Institutions



# Website Usage - Metrics

## 10 Most Popular Pages

- |                   |                               |
|-------------------|-------------------------------|
| 1. Homepage       | 6. GPS Equipment Reservations |
| 2. General Maps   | 7. Maps Homepage              |
| 3. Data Download  | 8. Plots/Permits              |
| 4. Photos/Imagery | 9. GPS Base Station Data      |
| 5. Thematic Maps  | 10. Online Mapping            |

## Downloads - Oct. 1, 2016 to Sep. 30 2017

Maps – 539 Unique Users, 186 Maps, 4161 Downloads

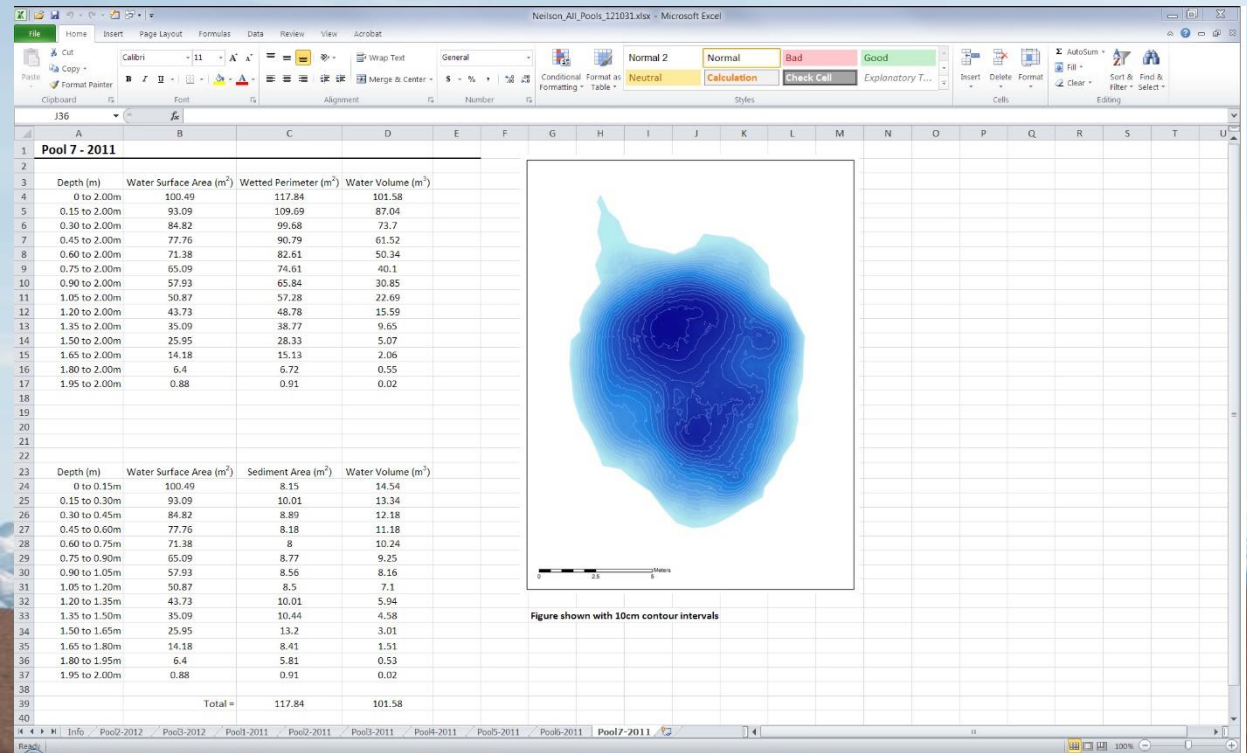
GIS Data – 322 Unique Users, 50 Files, 4370 Downloads



# Requests

## Summer Field Support

- Collaborative Research: Quantification of Dominant Heat Fluxes in Streams and Rivers in Arctic Alaska
- Collected High-Accuracy Elevation Measurements
- Sonar Mapping of Research Pools



# Requests

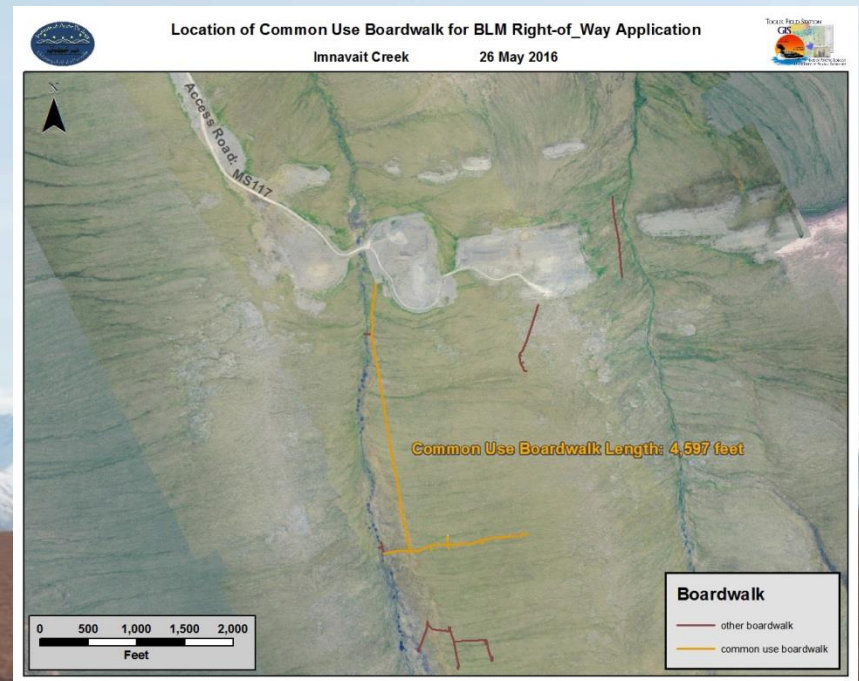
## Site Selection

- **Provided Assistance to 15 Research Groups**

- Arctic LTER
- Donie Bret-Harte
- Claudia Czimczik
- Ned Fetcher
- Laura Gough
- Go Iwahana
- Michelle Mack
- Cam MacKenzie
- NEON, Inc.
- Jon Nichols
- Ted Raab
- Rebecca Rowe
- Otakar Strunecky
- Alireza Tabatabaeenejad
- Ken Tape

# Upgrades to Common Use Boardwalk

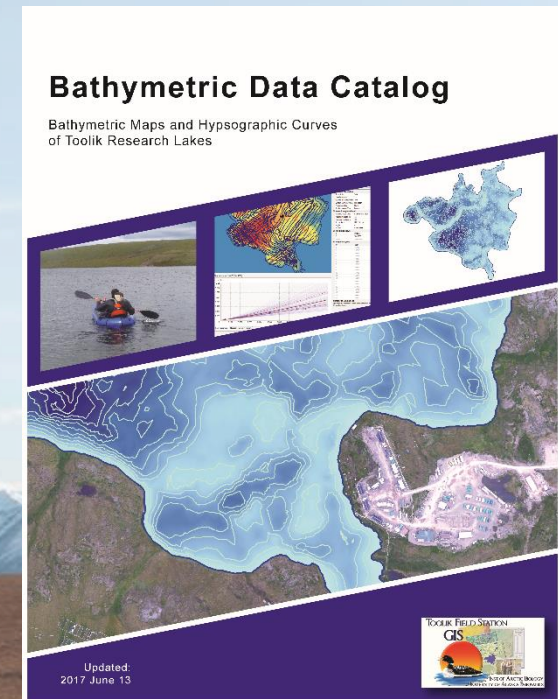
- Continued Collaboration With CPS Staff and Toolik Researchers
- South of Toolik in Good Condition
- Shifted Focus to Imnavait





# Bathymetric Catalog

- Various Requests for Bathymetric Maps
- Re-Analyzed Using a Standardized Analytical Methodology
- New Maps and Hypsographic Curves Created





# Summer Internship Program

- Hands On Training and Experience
- Spatial Surveying Tools, Techniques, and Processing
- Contributed to GIS Program



# UAS Services

- Drone technology has advanced and equipment prices have significantly decreased
- UA entered into agreement with Amazon Web Services which created an opportunity for test processing
- FAA updated licensing requirements allowing Toolik GIS to obtain UAS pilot licenses

# Field Season 2017

- Purchased UAS, cameras, and support equipment
- Collaborated with UA OIT for free test processing on Amazon Cloud
- Two demonstration projects were flown as test cases summer 2017





# Drone Equipment

- 3DR Solo Drone [\$1000]
  - 3DR Solo Payload = 1lb
- GoPro Camera [\$325]
- Mapir NDVI Camera [\$600 w/calibration target]



# Drone Equipment

- Time estimate for mission planning and flights
  - 2-4hrs in the field



# Current Processing Options

- **Current laptop (free)**
- **Amazon Cloud (\$20-\$2000)**
  - **Cost depends on number of photos, which is dependent upon size of research area and photo resolution**
  - **Toolik GIS would process imagery on cloud and invoice researcher for cost (discounted)**
- **Researchers process imagery themselves**





# Demonstration Projects

- Dorrepaal and Toolik River Thermokarst





# User Survey

- People are interested in using this service
  - NDVI flights
  - High-resolution digital elevation models
  - Thermal mapping
  - Stream perimeter delineation



# Moving Forward

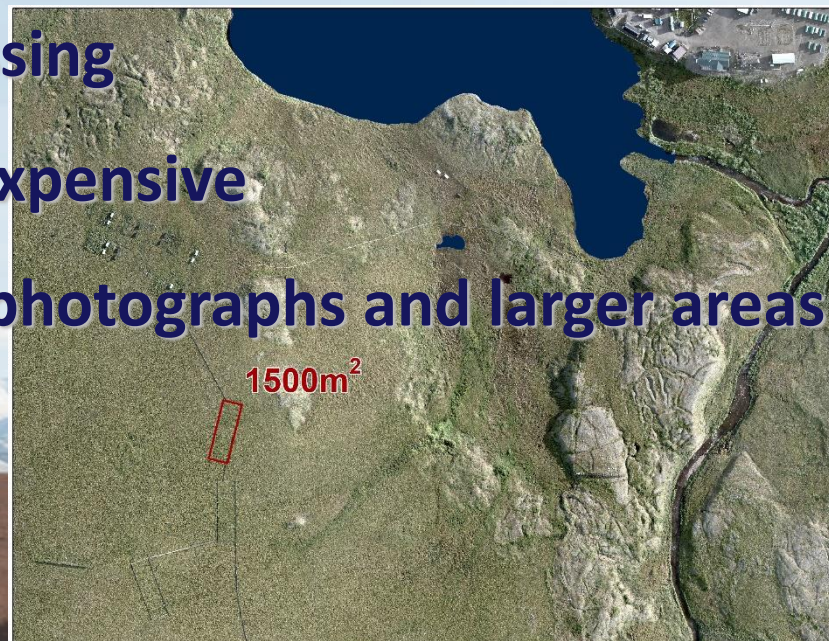
Options are:

1. Process on GIS laptop at no cost to researcher

- Maximum plot size of  $1000\text{m}^2$
- May take up to 1 year to deliver product

2. Amazon Cloud Processing

- Faster, but more expensive
- Can handle more photographs and larger areas





# Moving Forward

- GIS will process on Amazon Cloud, but processing costs must be paid for by researcher
- Or user processes data themselves
- New UAS Service Request Calendar on website (April 2018)



# ***Toolik GIS***

