

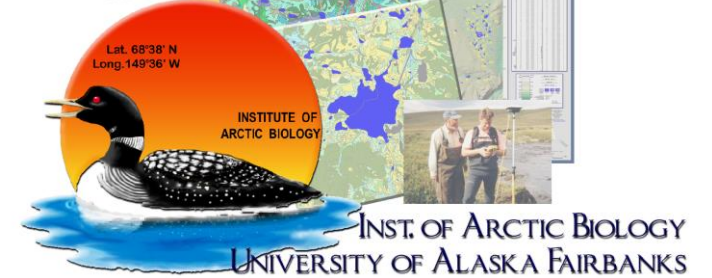
TOOLIK GIS REPORT

OCT 1, 2020 - SEPT 30, 2021

RANDY FULWEBER

TOOLIK FIELD STATION

GIS



OVERVIEW



- Staffing
- Requests Fulfilled
- Website Usage & Metrics
- Project Support Highlights
- Future Drone?

STAFFING

- We are in the process of hiring a GIS Analyst/ Field Technician.
 - During the summer, the Analyst will serve as the GIS field office coordinator.
 - The Analyst will be responsible for coordinating and completing field data collection requests.
 - During the winter, the Analyst will work out of the Fairbanks GIS office.
- Randy Fulweber will move into the GIS & RS Manager position.
 - Randy will supervise the Analyst and any GIS summer technicians/interns.
 - Randy will provide peak-season support to GIS field team
 - Randy will continue to report to Amanda Young.
- We hope/expect Jorge Noguera can return as our main summer technician (his 14th summer!).

REQUESTS FULFILLED



- 2017: 224 Requests from 34 Projects
- 2018: 207 Requests from 33 Projects
- 2019: 197 Requests from 32 Projects
- 2020: 115 Requests from 23 Projects
- 2021: 88 Requests from 50 Projects

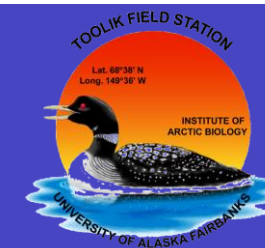
WEBSITE USAGE – METRICS*



Rank	Webpage	Views	Users
1	GIS Data Download	127	93
2	TFS GIS & Remote Sensing Homepage	105	69
3	GIS Equipment	91	80
4	Satellite Imagery	41	29
5	TFS Maps	41	29
6	(unlisted)	32	24
7	GIS Mission Statement	22	20
8	Interactive mapping	21	20
9	Maps: General	17	15
10	GIS Services	15	9

* Google Analytics reestablished on the new GIS website on 17 August 2021. Metrics shown here are from 17 August 2021 – 30 Sept. 2021.

PROJECT SUPPORT SNAPSHOT



■ Provided support to 50 research groups, PIs, students

- Site Selection support for 18 projects
- UAS flights and processing for 17 projects
- GPS surveys for 11 projects
- Publication support for 1 project

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Review article 14 Jan 2022

Multi-year, spatially extensive, watershed-scale synoptic stream chemistry and water quality conditions for six permafrost-underlain Arctic watersheds



Arial J. Shogren^{1,a}, Jay P. Zarnetske¹, Benjamin W. Abbott², Samuel Bratsman², Brian Brown², Michael P. Carey³, Randy Fulweber⁴, Heather E. Greaves⁴, Emma Haines¹, Frances Iannucci^{4,5}, Joshua C. Koch³, Alexander Medvedeff⁵, Jonathan A. O'Donnell⁶, Leika Patch², Brett A. Poulin^{7,8}, Tanner J. Williamson¹, and William B. Bowden⁵

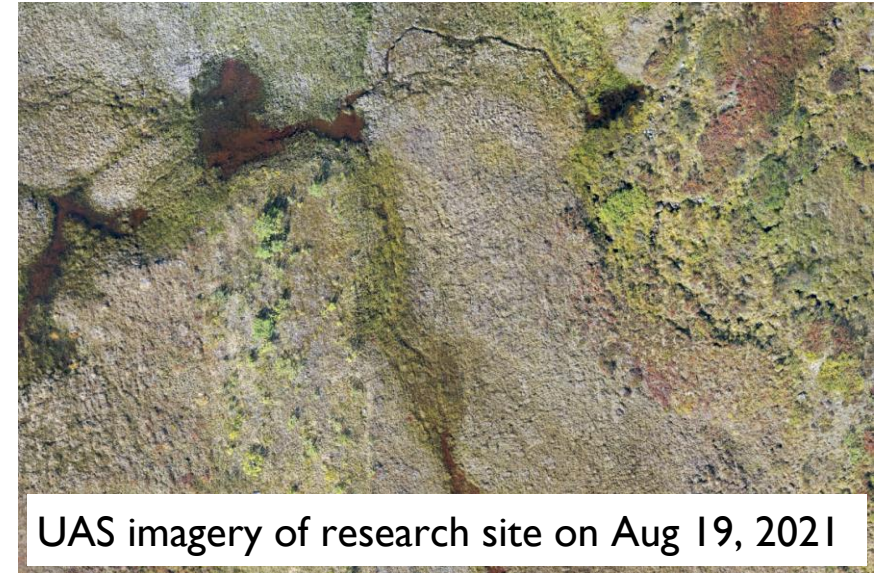
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PROJECT SUPPORT: RUSTY WATERS

- 16 UAS flights during the summer
- 3 GNSS high accuracy field surveys
- 2^o research goal: Autodetect the presence of iron (red) in UAS imagery and differentiate it from other red colored features in the imagery.
- Co-authorship for Rowan McPherson, GIS Technician, for her UAS and GNSS survey data collection and processing contributions.



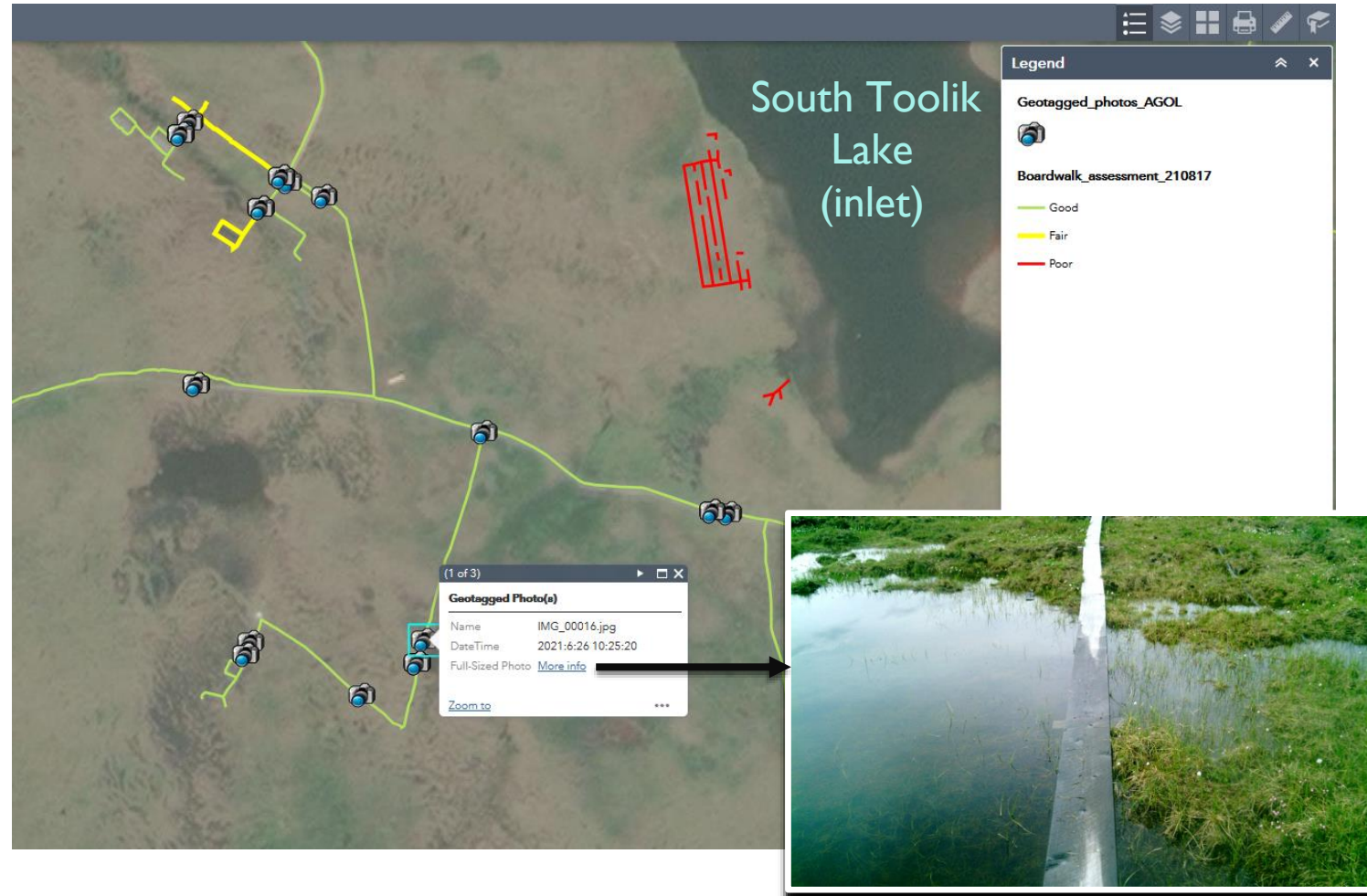
UAS imagery of research site on Jun 22, 2021



UAS imagery of research site on Aug 19, 2021

BOARDWALK CONDITION ASSESSMENT

- Completed a condition assessment of high-traffic boardwalk sections at Toolik and Imnavait.
- Sections of boardwalk were labeled as Good, Fair, Poor.
- Collected georeferenced photos of boardwalk sections in need of attention.
- Online map of boardwalk condition now available.
- Online map can be used for boardwalk adjustment, repair, or replacement planning.
 - Digitally measure boardwalk section lengths
 - Display GPS coordinates



FUTURE DRONE PLATFORM?



- A few drone requests the past couple of years have asked for high detail imagery over large areas (≥ 50 ha).
- Our current fleet of propeller-driven drones are good for small plot areas, like the LTER plots (0.15ha), but our fleet can not safely and efficiently complete large area requests.
- VTOL (Vertical Take Off and Landing) fixed-wing drones are particularly suitable for large area requests around Toolik.
 - Leading candidate: WingtraOne:
 - <https://wingtra.com/mapping-drone-wingtraone/>
 - Can accommodate Micasense multispectral camera
 - Est. cost: \$27,000.

