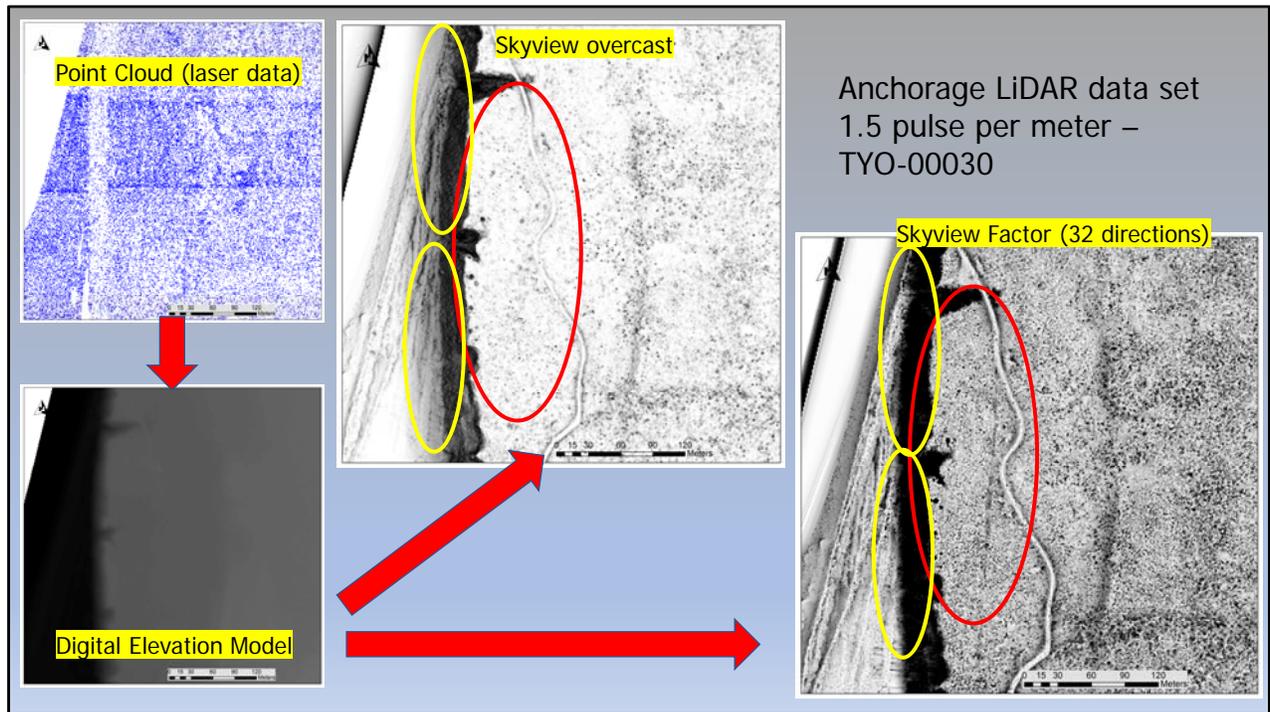


Good morning. LiDAR is fast becoming an important tool in the Cultural Resource manager's toolbox. Today I will examine some of the LiDAR datasets available in the public domain. These include MSB, Kenai, Anchorage, and Katmai NP.

Validity of Using GIS/Remote Sensing For Phase 1 Surveys (How do we know what we Know?)

- **Landscape Archaeology Theories**
- **Literature Review**
- **Cultural Site Models**
- **Ethnogeographic Data**
- **GIS analysis**

Archaeologists use a wide variety of tools in archaeological prospecting, including landscape archaeological theory, literature review, cultural site models, ethnographic data and GIS analysis as part of the planning and execution of Phase I archeological surveys.



Anchorage LiDAR data from 2012. Here is TYO-00030, a late-prehistoric/historic Dena'ina village site located about one mile south of Pt Woronzof. It is composed of at least two components, the village site (red), a cemetery (not shown but north of larger gully), and a historic fish camp on the beach which for some reason was never given a separate AHRS number (yellow).

Matanuska Susitna Borough LiDAR/Imagery Project

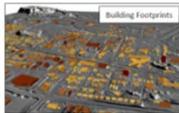
Project Summary

The project objectives included the acquisition of high resolution Light Detection and Ranging (LiDAR) and aerial photography data for 3680 sq/mi of the Matanuska-Susitna Borough, as well as the development of a digital elevation model, contours, ortho-rectified imagery, and additional products. See Attachment 4 for the project map.

Project Deliverables

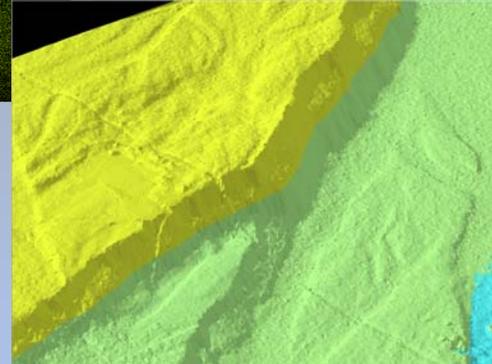
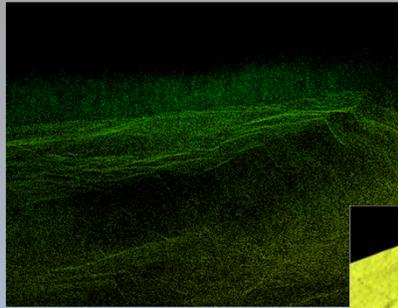
All the deliverables are public domain.

- 1/4 R Orthorectified, 4-band imagery for a 270 sq/mi urbanized area
- 1 R Orthorectified, 4-band imagery for the entire 3680 sq/mi area
- Point Cloud Data w/ 1m true nominal pulse spacing (npis) and 0.6m rps through overlapping flights
- Automated "Vegetation" Classification, low (1-6ft), medium (6-15ft) and high (>15ft)
- 1 m First Return Digital Surface Model (DSM) (aka top of canopy)
- 1 m Bare Earth Digital Elevation Model (DEM) w/ hydro-flattening
- 1 m First Return Hillshade
- 1m Bare Earth Hillshade
- 1m Intensity Images
- 2 ft Contours
- Building Footprints @ 97% accuracy
- Hydro Breaklines



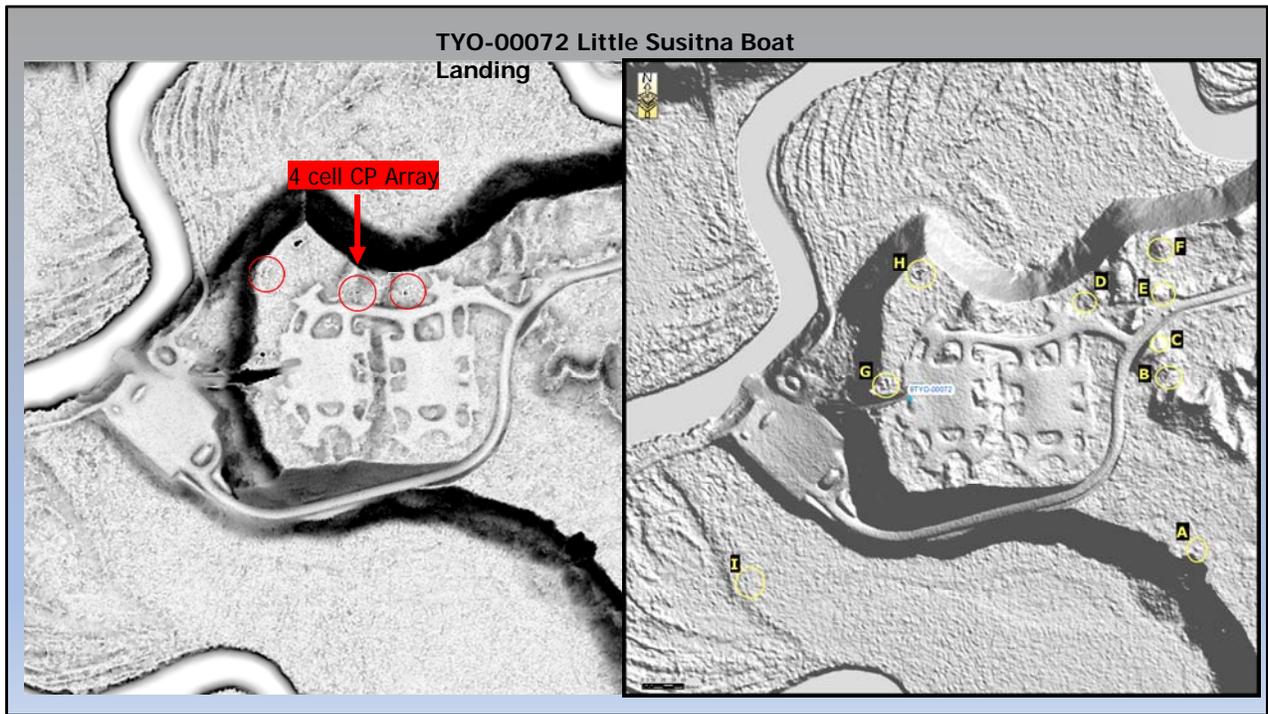
October 2015

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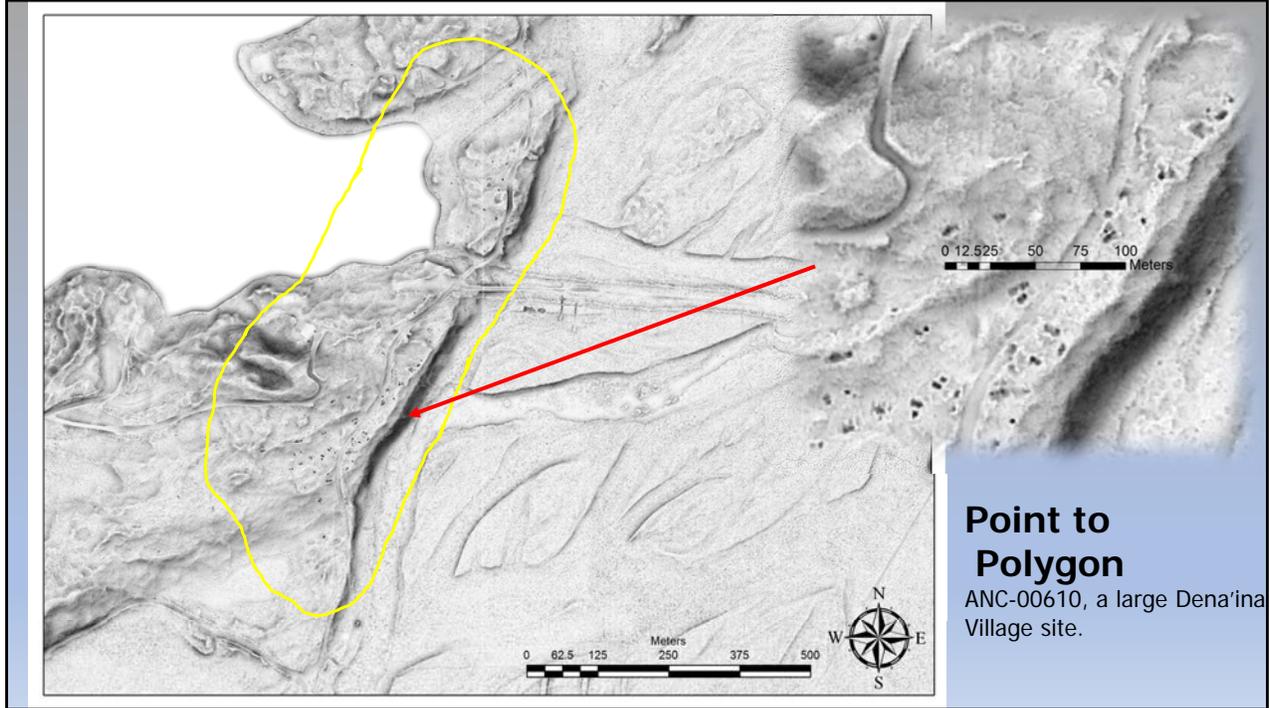


Matanuska-Susitna Borough 2011 LiDAR data is 1 pulse per meter, with 1 pulse .6 meter in overlap.

Second dataset is the MatSu Borough LiDAR project from 2010 and is used with the following two slides.

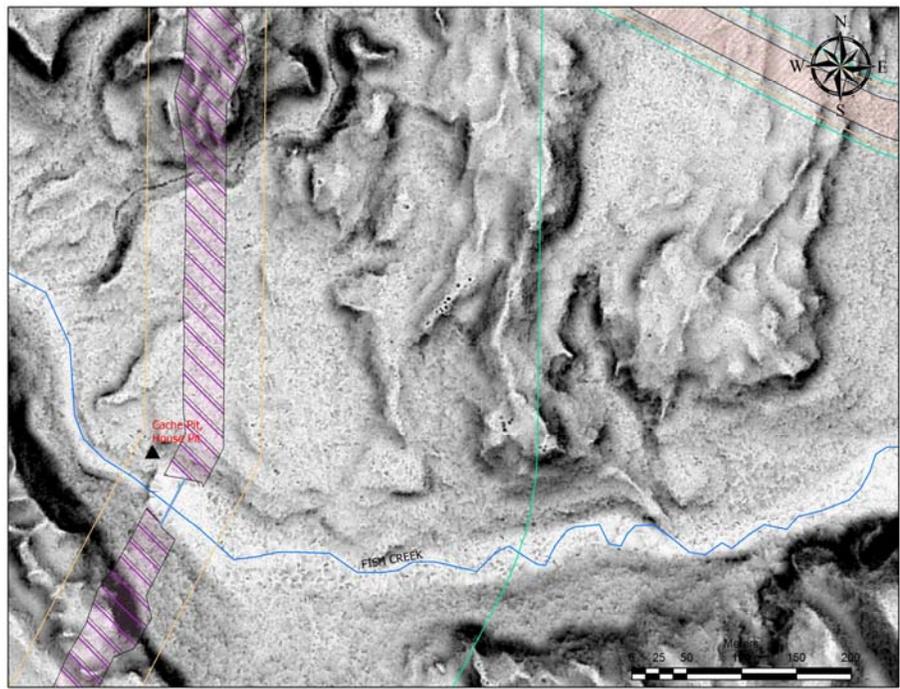


In comparison with Skyview factor and greyscale hill shade using MSB LiDAR data.

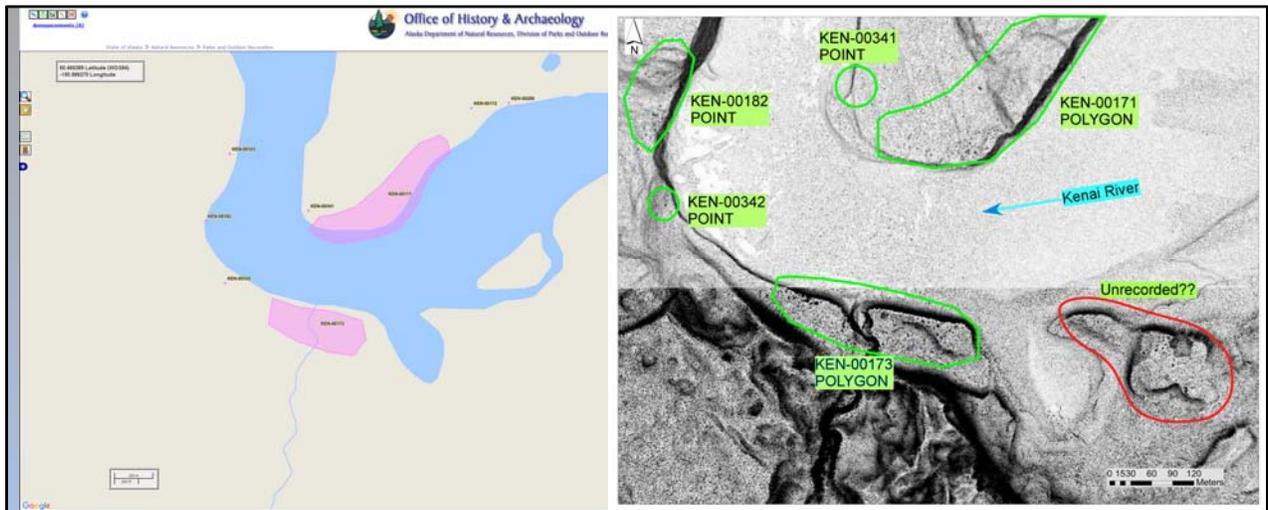


ANC-00610, located adjacent to the outlet of Echo Lake, is a large Dena'ina village site recorded by Dan Stone in 1998. Echo Lake's outlet stream is a tributary to Fish Creek. Stone noted that over 70 house features located on both sides of the road strung out along the bluff (within the yellow polygon). Inset is a zoomed in 1:1000 view of a small section. This entire site is represented by a single point in the AHRS and illustrates using LiDAR data in creating site polygons in the AHRS.

Fish Creek and
ASAP project APE

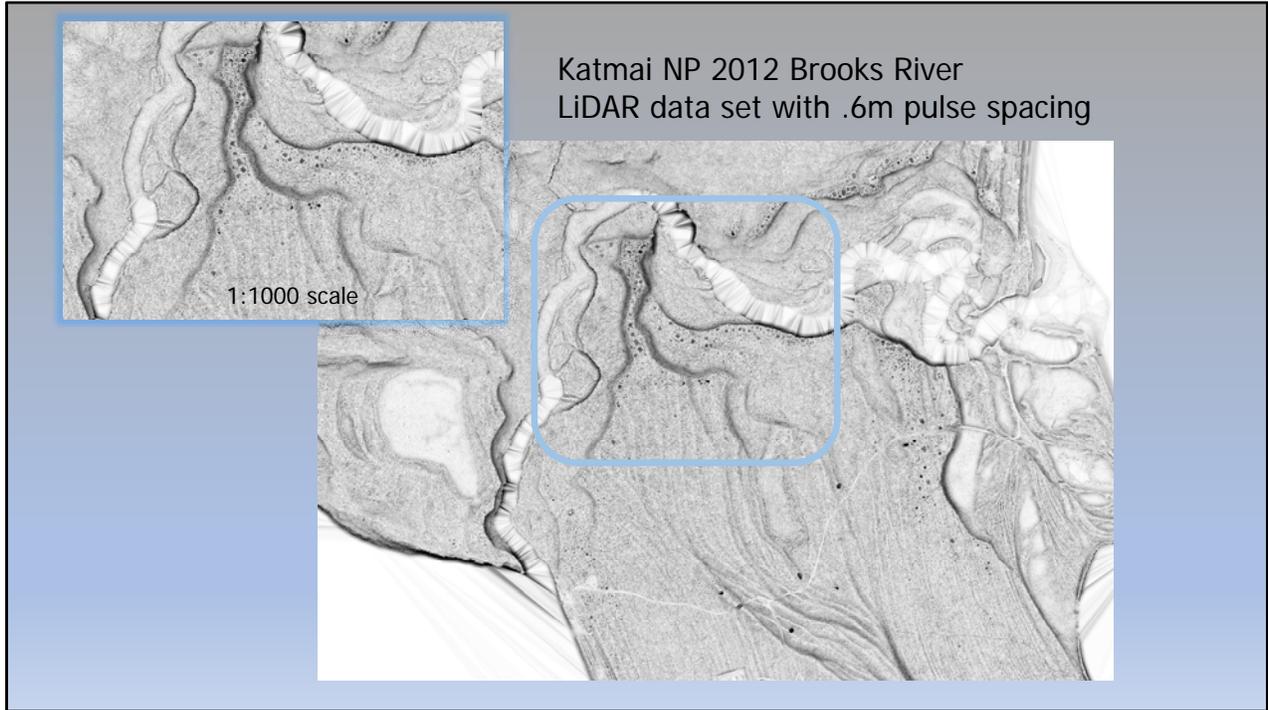


ASAP APE where it crosses Fish Creek about 2 miles downstream for outlet of Cow Lake.



Kenai River – Approx. 1 mile downstream from Skilak Lake
6 feet (~2 meter) horizontal resolution LiDAR dataset

This example is Kenai River about 1 mile downstream from Skilak Lake. Using AHRs mapping data and LiDAR data obtained from public database, I examined 5 previously recorded sites (green polygons), all of which have features that can be discerned using Sky View Factor, even considering this dataset's relatively poor density of LiDAR ground returns. Note the red polygon indicates a possible unrecorded site in lower right.



The last the 2012 Brooks River data set.

GIS/LiDAR



An Matrice 600 airframe equipped with a ScanLiDAR A-series LiDAR system

The future trends in archaeological survey will include increased used of LiDAR and Camera equipped UAS.

https://www.youtube.com/watch?v=cu7_jFiRwwA

References:

Zaksek, Klemen, Kristof Ostir and Žiga Kokalj.
2011. Sky-View Factor as a Relief Visualization Technique. *Remote Sensing* 3: 398–415.

