Alaska Division of Geological & Geophysical Surveys

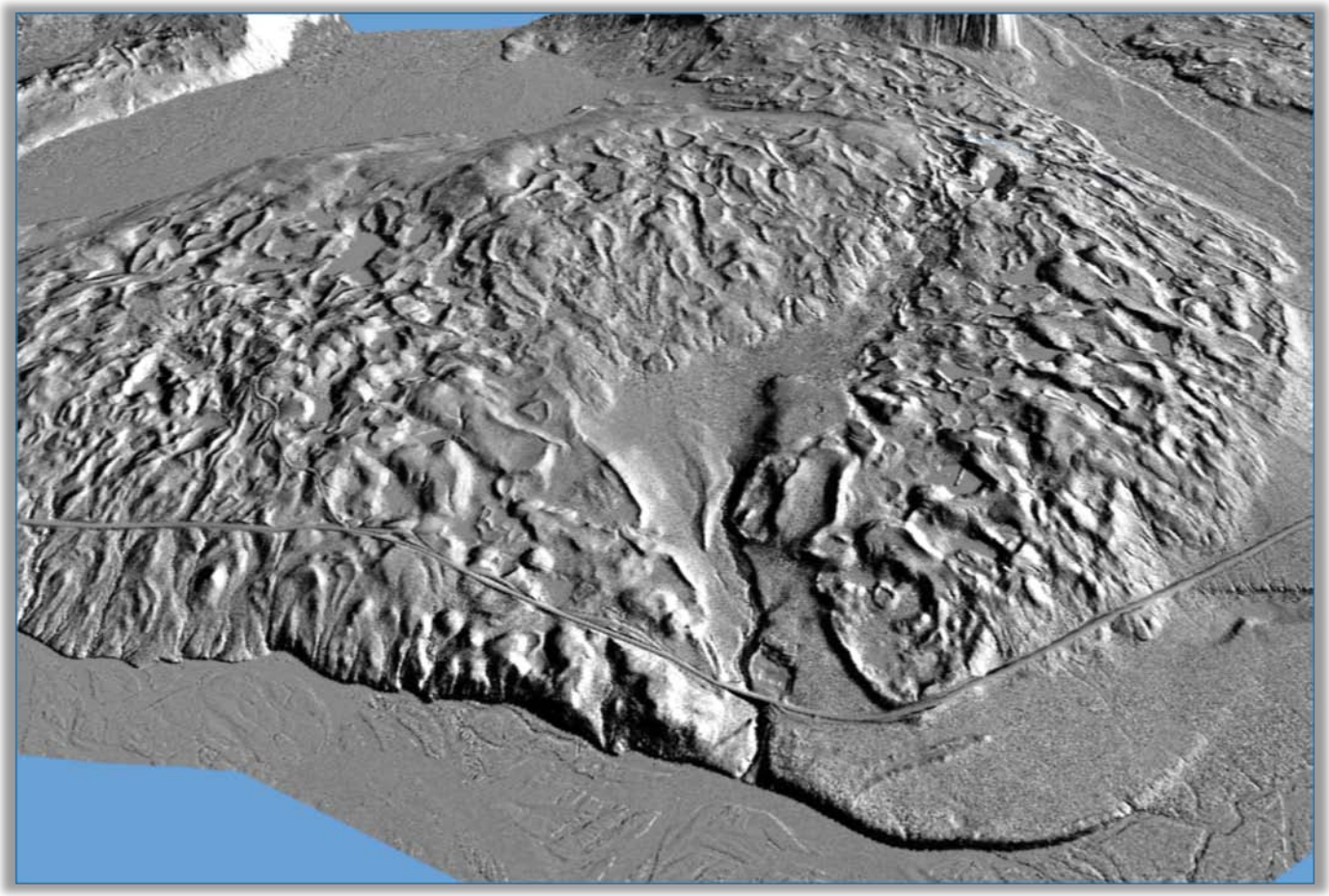
RAW-DATA FILE 2011-3

Overview Report

HIGH-RESOLUTION LIDAR DATA FOR ALASKA INFRASTRUCTURE CORRIDORS

by T.D. Hubbard, R.D. Koehler, and R.A. Combellick

May 15, 2012
Deliveries 1–11



Oblique view to the southwest of a lidar hillshade image showing a Donnelly-age esker–kame complex between Johnson River and Little Gerstle River, Mt. Hayes Quadrangle. The Alaska Highway is in the foreground.

Released by:

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Note: *This report, including all digital lidar data, explanations, and tables, is available in digital format from the DGGS website (www.dggs.alaska.gov) for free download.*

HIGH-RESOLUTION LIDAR DATA FOR ALASKA INFRASTRUCTURE CORRIDORS

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Introduction

In advance of design, permitting, and construction of potential natural gas pipelines to deliver North Slope natural gas to out-of-state and Alaska customers, the Division of Geological & Geophysical Surveys (DGGS) acquired, and is making publicly available, lidar (light detection and ranging) data for an area of ~3,000 square miles along the proposed pipeline routes. This data acquisition was supported by the Alaska Gas Pipeline Project Office, the Office of the Federal Coordinator, and the Alaska Gasline Development Corporation. These data serve multiple purposes, but were primarily collected to (1) evaluate active faulting, slope instability, thaw settlement, erosion, and other engineering constraints along the proposed pipeline routes, and (2) provide a base layer for the state–federal GIS database that will be used to evaluate permit applications and construction plans. Lidar has proven to be one of the most useful forms of remotely sensed data for identification and characterization of potentially active faults and many other surficial-geologic landforms and hazards, especially in areas of heavy vegetation where access may be difficult and other forms of remotely sensed data are ineffective.

Data Location and Organization

Lidar data, acquired and processed by Watershed Sciences, Inc. (WSI) consists of: (1) continuous 1-mile-width coverage over existing infrastructure along the entire length of the proposed natural gas pipeline corridors from Prudhoe Bay to the Canada border along the Trans-Alaska Pipeline System (TAPS) and Alaska Highway, from Delta Junction to Valdez along the TAPS, and Livengood to the Anchorage area along the George Parks Highway; (2) approximately 1-mile-wide corridors over routes the State believes gas pipeline applicants are considering, where departing from existing infrastructure; (3) half-mile-wide coverage of existing primary pipeline-support roads where outside the main corridor; and (4) expanded areas of coverage along these corridors where data are needed for evaluation of active faults, slope instability, and other hazards. Figure 1 (following page) shows the areas where lidar data were collected.

To facilitate processing and product delivery, WSI grouped the data into delivery areas (subsets of the entire data collection region) in the order in which they were processed, with files for each delivery area organized by 1:63,360-scale quadrangle(s). Following lidar data collection and processing by WSI and their survey subcontractor, McClintock Land Associates, WSI sent the data for each delivery area to the State of Oregon Department of Geology and Mineral Industries (DOGAMI) for independent quality control analysis. After addressing any concerns from DOGAMI, WSI sent the revised data set to DGGS along with a delivery report describing details about lidar acquisition, accuracy, and quality for the delivery area. DOGAMI also provided a separate report for each delivery area summarizing their methodologies and results of quality control checks.

Via its website at http://www.dggs.alaska.gov/pubs/id/22722, DGGS is making lidar data available to the public by USGS quadrangle in the order that delivery areas are received from WSI. A single data delivery

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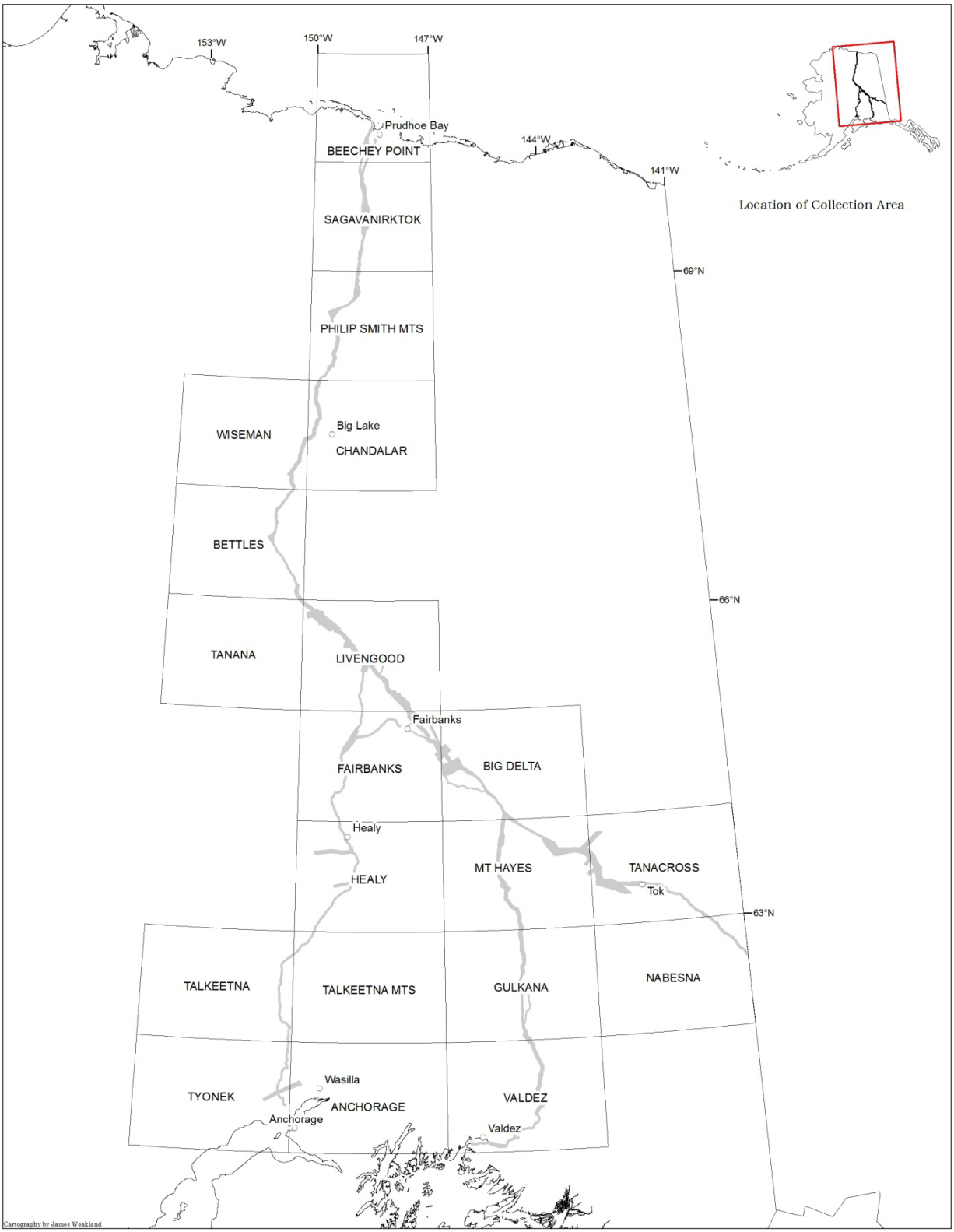

Figure 1. Location of lidar data collection areas, shown by gray shading. More information and a map showing lidar delivery areas to date are available on the DGGS website (http://www.dggs.alaska.gov/pubs/id/22722).

from WSI typically covers portions of several 1:250,000-scale quadrangles. Individual delivery reports from WSI are combined into a comprehensive report organized by delivery area. Section 1 of this delivery report contains information about the first delivery received by DGGS; Section 2 contains information about the second delivery received, and so on. A similarly organized quality control report contains information provided by DOGAMI. Both reports are available via the DGGS website and will be updated as additional data delivery areas are released. Table 1 lists the USGS 1:63,360-scale quadrangle areas associated with each section of the current comprehensive reports.

If you would like to be notified automatically when the data are updated or when new data are added to this project, please sign up for the DGGS news feed (available via email, RSS, Twitter, or Facebook) on the DGGS home page at http://www.dggs.alaska.gov/.

DELIVERY 1

Tanacross	Mt. Hayes
tnxb6a	xmhb1
tnxc6a	xmhc1a
tnxc6b	xmhc1b
tnxc6c	xmhd1
tnxd6	

DELIVERY 2

Mt. Hayes
xmhb4
xmhc2
xmhd2
xmhd3a
xmhd3b
xmhd4b

DELIVERY 3

Nabesna	Tanacross
nabd1	tnxa2
nabd2	tnxa3
	tnxb3

DELIVERY 4

Fairbanks	Big Delta	Big Delta
faic1a	xbda4a	xbdb6b
faic1b	xbda5	xbdb6c
	xbdb5a	xbdc6a
	xbdb5b	xbdc6b
	xbdb6a	xbdc6c

DELIVERY 5

Bettles	Tyonek	Talkeetna
beta1	tyob1a	tala1
betb1	tyob1b	talb1
betb2	tyob2	talc1
betc2	tyoc1a	tald1
betd1	tyoc1b	
betd2	tyoc2	
	tyod1	

Tanana	Wiseman	Anchorage
tand1	wisa1	ancc8
	wisb1	

DELIVERY 6

Fairbanks	Livengood	Livengood
faid1a	liva2	livc4b
faid1b	liva3	livc5
faid1c	livb3	livd5
faid1d	livb4a	livd6a
faid2a	livc4a	livd6b

DELIVERY 7

Fairbanks	Healy
faia5	heaa5
faib4	heaa6
faib5	heab4
faic4	heab5a
faic5	heab5b
faid2b	heac4
faid3a	heac5
faid3b	heac6
faid4a	head4
faid4b	head5

Livengood	Talkeetna Mts.
liva4	tlmd6
livb4b	

DELIVERY 8

Nabesna	Tanacross
nabc1	tnxb4
nabd1	tnxb5a
	tnxb5b
	tnxb6a
	tnxb6b

DELIVERY 9

Gulkana	Mt. Hayes	Big Delta
gulc3a	xmha3	xbda4b
gulc4a	xmha4	
gulc4b	xmhb4	
guld3	xmhc4	
guld4a	xmhd4a	
guld4b		

Table 1. USGS quadrangles associated with each lidar data delivery.

DELIVERY 10

Gulkana	Valdez
gula3	vala4
gula4a	vala5
gula4b	vala6
gulb3a	vala7
gulb3b	valb3
gulb4	valb4
gulc3b	valc4
gulc4c	vald4

DELIVERY 11

Chandalar	Philip Smith Mts.	Sagavanirktok	Wiseman	Beechey Point
chnb6	psma4	saga3a	wisb1	xbpa3
chnc6	psma5	saga3b		xbpa4
chnd6	psmb4	saga3c		xbpb3
	psmb5a	saga4		
	psmb5b	sagb3		
	psmc4	sagc3		
	psmc5	sagd3a		
	psmd3a	sagd3b		
	psmd3b	sagd4		
	psmd4			

Table 1. USGS quadrangles associated with each lidar data delivery.

The DGGS data release includes bare-earth digital elevation models (DEMs), lidar intensity images, bare-earth DEM hillshade images, water body polygons, canopy cover digital surface models (DSMs), normalized DSMs, vegetation DSMs, highest-hit DSMs, and Coefficient Variation DSMs. Other lidar data, including point cloud data, will be made available at a later time.

File Naming Convention

Download packages are organized by U.S. Geological Survey (USGS) 1:250,000-scale quadrangle. Each 1:250,000-scale quadrangle download package will have data for one or more of the associated 1:63,360-scale quadrangles. The names of geospatial data files (tiles) in each download package identify both the lidar data type and 1:63,360-scale quadrangle location of the data. The first five characters of each file name correspond to the abbreviated quadrangle name associated with the USGS 1:63,360-scale quadrangle map. If quadrangles contain two or more tiles, they were split into two portions in order to

create a more manageable file size, and an “a”, “b”, “c”, or “d” was added to the end of the name. Table 2 lists the abbreviations used for each available data type. Quadrangle abbreviations follow USGS standards (see Table 1 for examples).

Data type	Data type abbreviation (x)
Bare-earth digital DEM	be
Bare-earth DEM hillshade image	hs
Lidar intensity image	in
Hydro-flattened water bodies	lakes
Canopy cover DSM	cc
Normalized DSM	nDSM
Vegetation DSM	veg
Highest-Hit DSM	hh
Coefficient Variation DSM	cv

Table 2. Abbreviations used in file names to designate different data types. This table will be updated as additional products become available.

File naming examples:

1. A file with the name “be_xmhb4” is a bare-earth DEM for the Mount Hayes B-4 Quadrangle.
2. A file with the name “be_tnxb6a” is one of several tiles of bare-earth DEM data for the Tanacross B-6 Quadrangle.

Acknowledgments

The authors are thankful for support from several staff members of the Division of Geological & Geophysical Surveys. Jim Weakland helped process and interpret the data; Susan Seitz created the programming by which the data is offered online; Simone Montayne assisted with metadata creation and helped streamline the process for its update; and Ken Woods managed data on the server, and ensured there was plenty of room for the huge amount of data.