



DAMALANCHE: AVALANCHE DAMMED RIVER

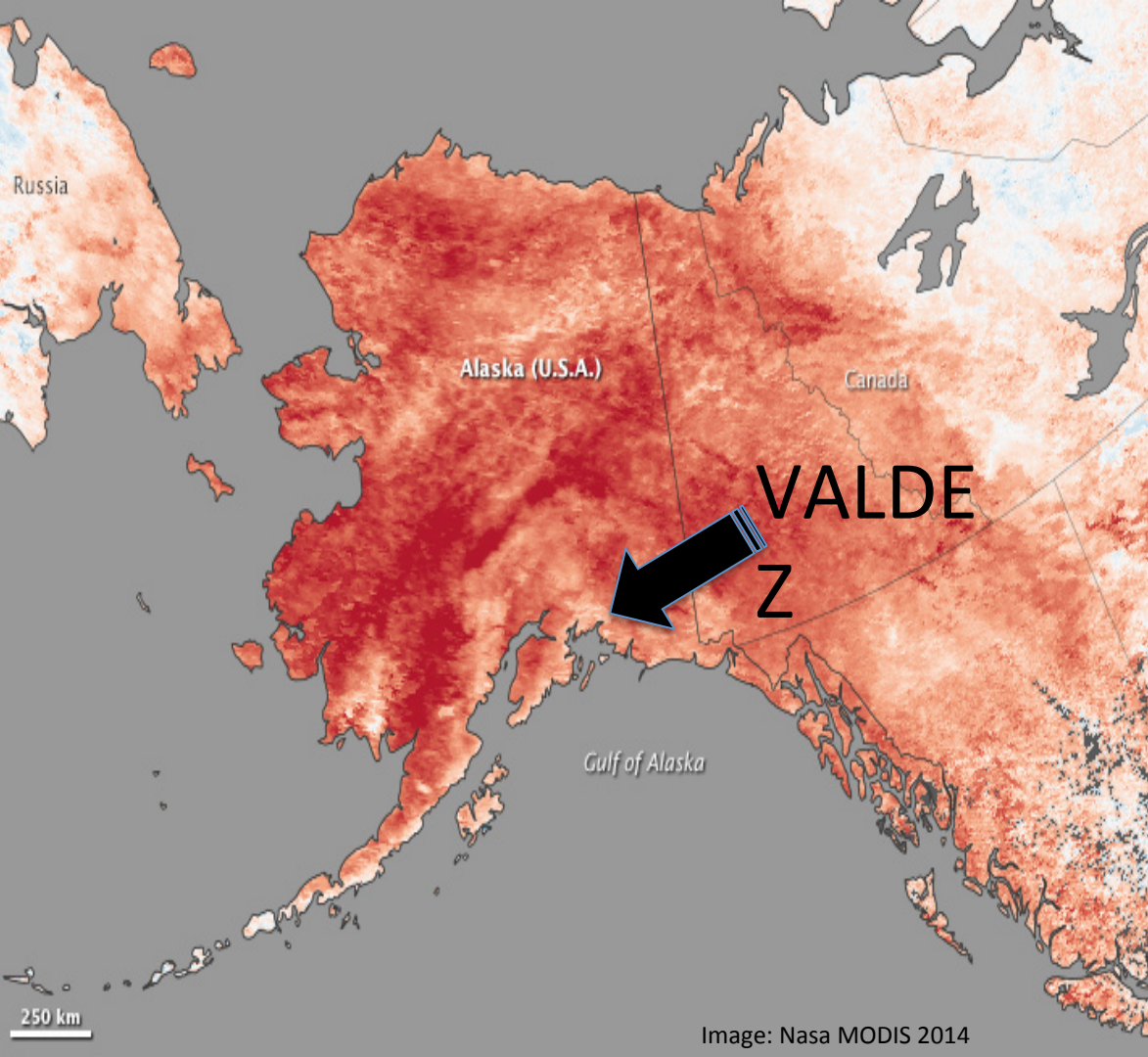
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Alaska

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Transportation,
Thompson Pass, Alaska

01/31/2014 16:00

AKDOT photo



January 2014

- 'stuck' jet stream fed significant moisture north from the tropics
- warmest January on record in Alaska

What is an avalanche dam?

- usually wet snow avalanche debris
- flooding
- erosion
- catastrophic failure could cause serious damage and/or loss of life

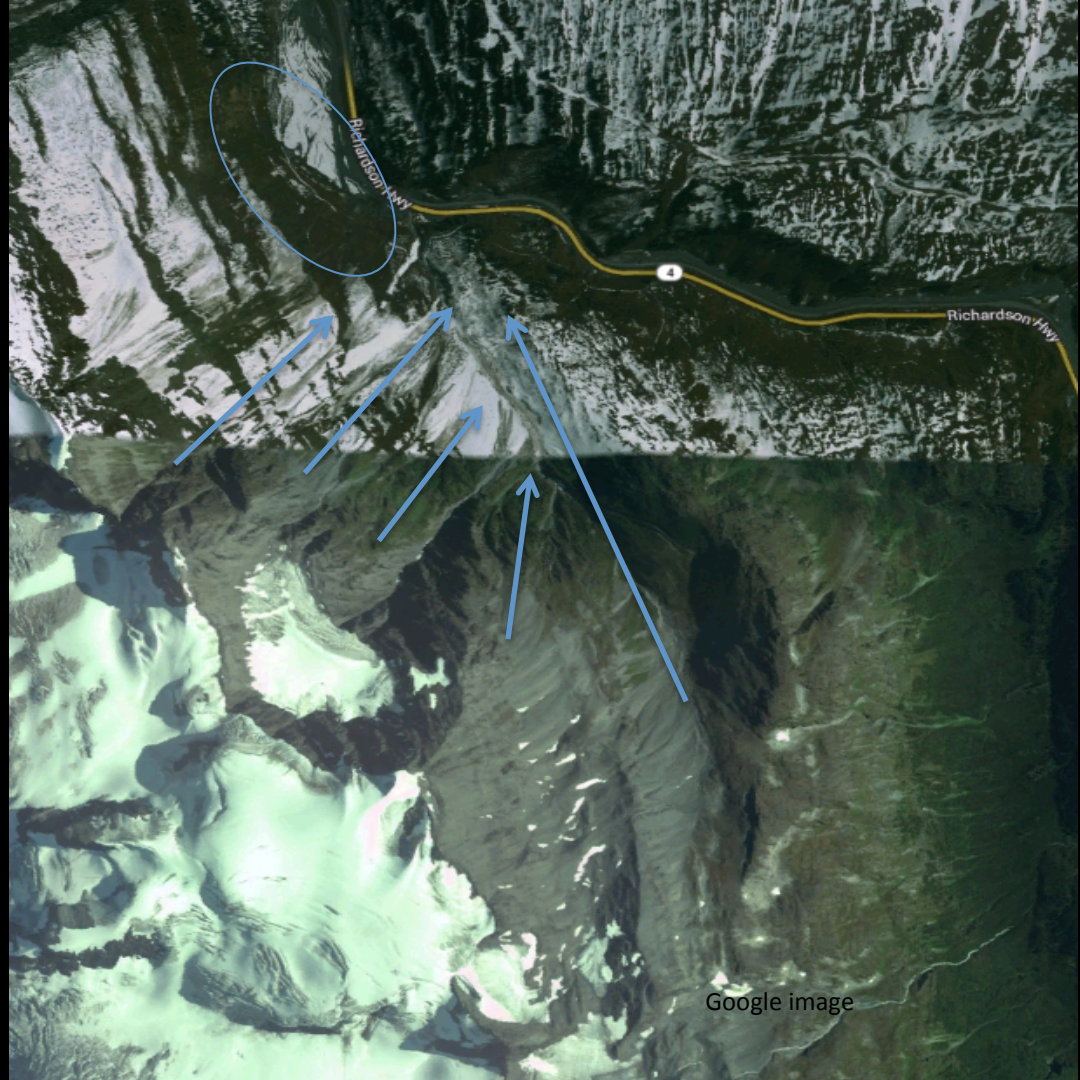


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AKDOT photo

Snowslide Gulch

- 61° north latitude
sub-arctic maritime
- Five start zones
- >5000' (1500m)
vertical drop
- tracks 30-45 degrees
- river and highway in
run-out zone
- site of two fatalities
1914



231

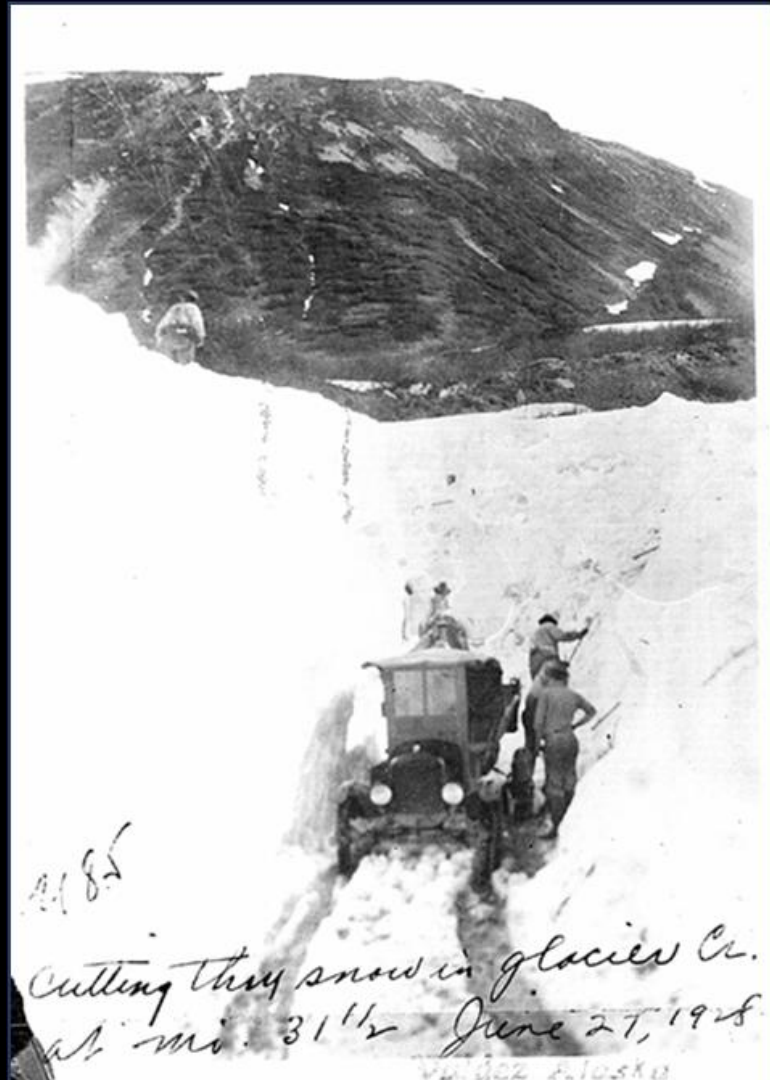
RICHARDSON HIGHWAY, VALDEZ DISTRICT

Slide at Mile 16 $\frac{1}{2}$. Snowslide Gulch in left background.
6/16/29



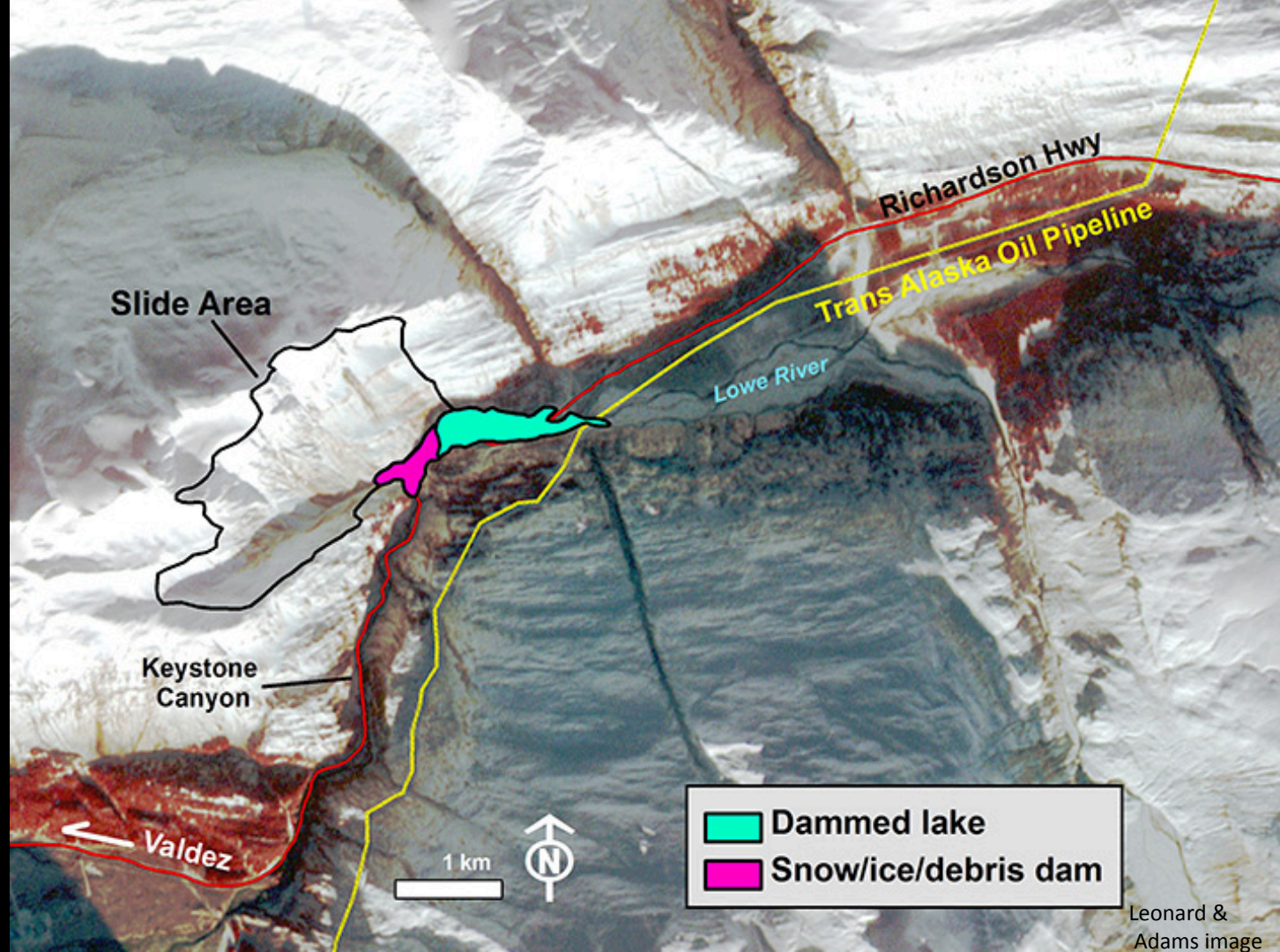
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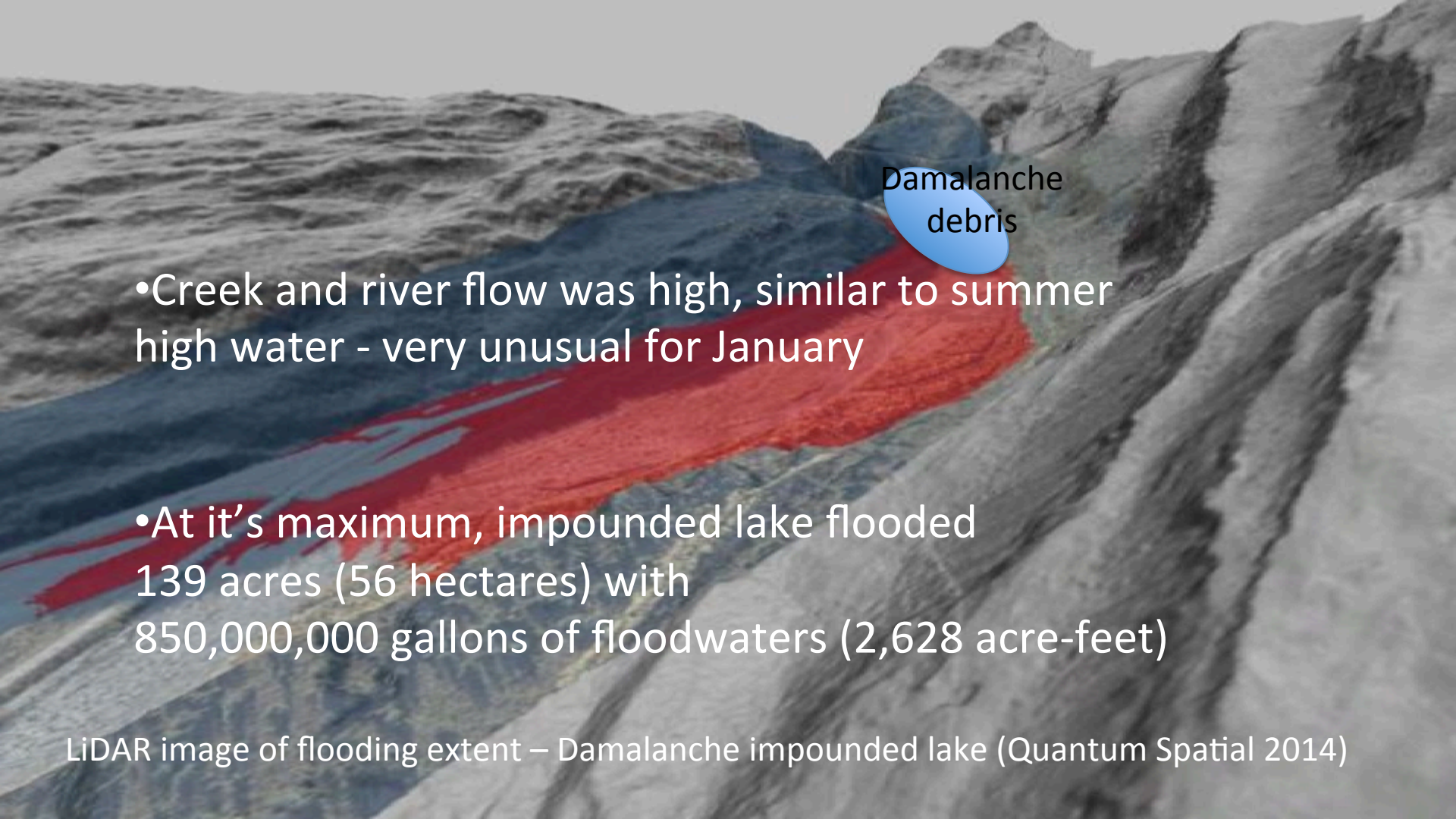
Old photos of Snowslide Gulch
area avalanches



2185

Cutting thru snow in glacier Cr.
at mi. 31 $\frac{1}{2}$ June 27, 1928
W. H. H. H. H. H.





Damalanche
debris

- Creek and river flow was high, similar to summer high water - very unusual for January
- At it's maximum, impounded lake flooded 139 acres (56 hectares) with 850,000,000 gallons of floodwaters (2,628 acre-feet)

LiDAR image of flooding extent – Damalanche impounded lake (Quantum Spatial 2014)



Seven day flash-flood advisory for downstream neighborhoods.

The concern was rapid or catastrophic breach of the avalanche dam.

Water found a hydraulic pathway in the form of an old highway tunnel to drain lake.

AKDOT photo

January 2014 Damalanche Timeline

14th AKDOT control, debris across river, post control (30 minutes) Size D3 natural

16th AKDOT control, debris blocked river, Size D3 to edge of road

21st rain started, widespread activity across all three climate zones

Problem of forecasting the timing of rain on snow avalanche release

23rd Size D3 natural blocked river, flooding down highway off the debris pile

23rd freezing level rose to above 5000'

24th Size D3.5 natural completely blocked river, lake began to rise

25th AKDOT control, Size D4 started relatively dry then entrained wet snow

Challenge for forecasting:

- Timing: how much rain would the snowpack absorb before it avalanched? And again?
- Extent: how much entrainment would occur and how far would the wet snow slide?



AKDOT crew
assessing
size and extent
of Damalanche

2000' road
buried
Avg. depth 75'
Max. depth 140'

AKDOT photo



View of
Damalanche
from
Keystone Canyon

AKDOT photo



Full depth
Fracture lines
~12' (4m)
Sympathetic
avalanches
down to glacier
Ice from AKDOT
heli bombing –
January 25, 2014.

01/29/2014 10:42

AKDOT photo



Widespread Cycle
Wet avalanches
behind the town
of Valdez
January 2014



S. Carter photo



Wet avalanches
Filling up and
Blocking the
Tsaina River
January 2014



Deposit removal took 5 ½ days and nights. 100,000 tons of snow removed from highway.
The Hitachi 450 excavator dug down seven terraces each 15 to 20 feet high.
Also used was the D-8 and D-6 shown, another dozer, three loaders and three rock trucks.
Richardson Highway was closed for 12 ½ days.



- Damalanche Cycle affected stability for the remainder of the season

- Expect more warm, wet events?

We wish to thank the City of Valdez for sharing photos and reports from the Damalanche period. Many thanks to the AKDOT crews who worked hard to keep the highway open and get it reopened.

