Glacial Influences on Water Resources of the Eklutna Basin

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Alaska Pacific University

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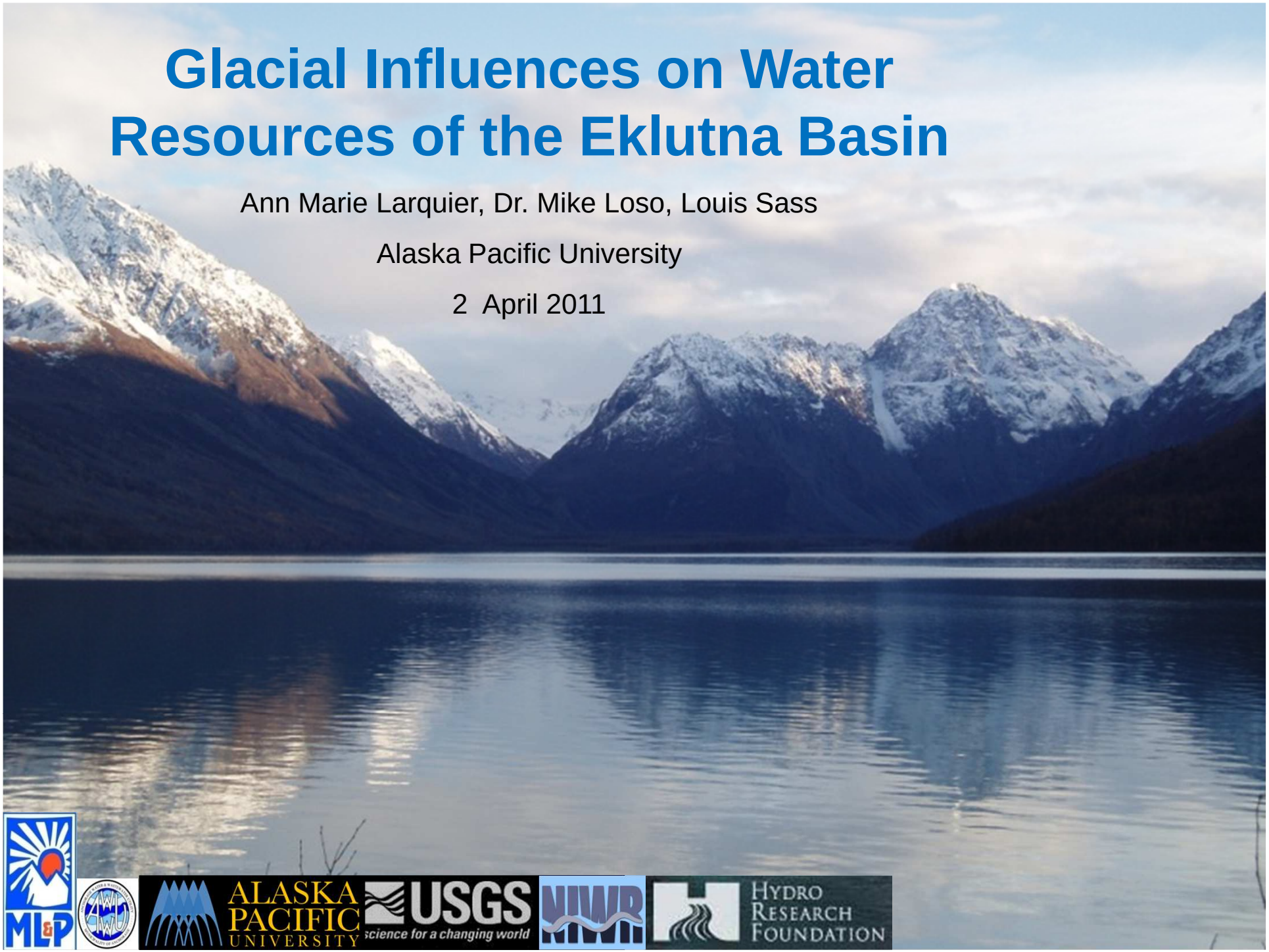
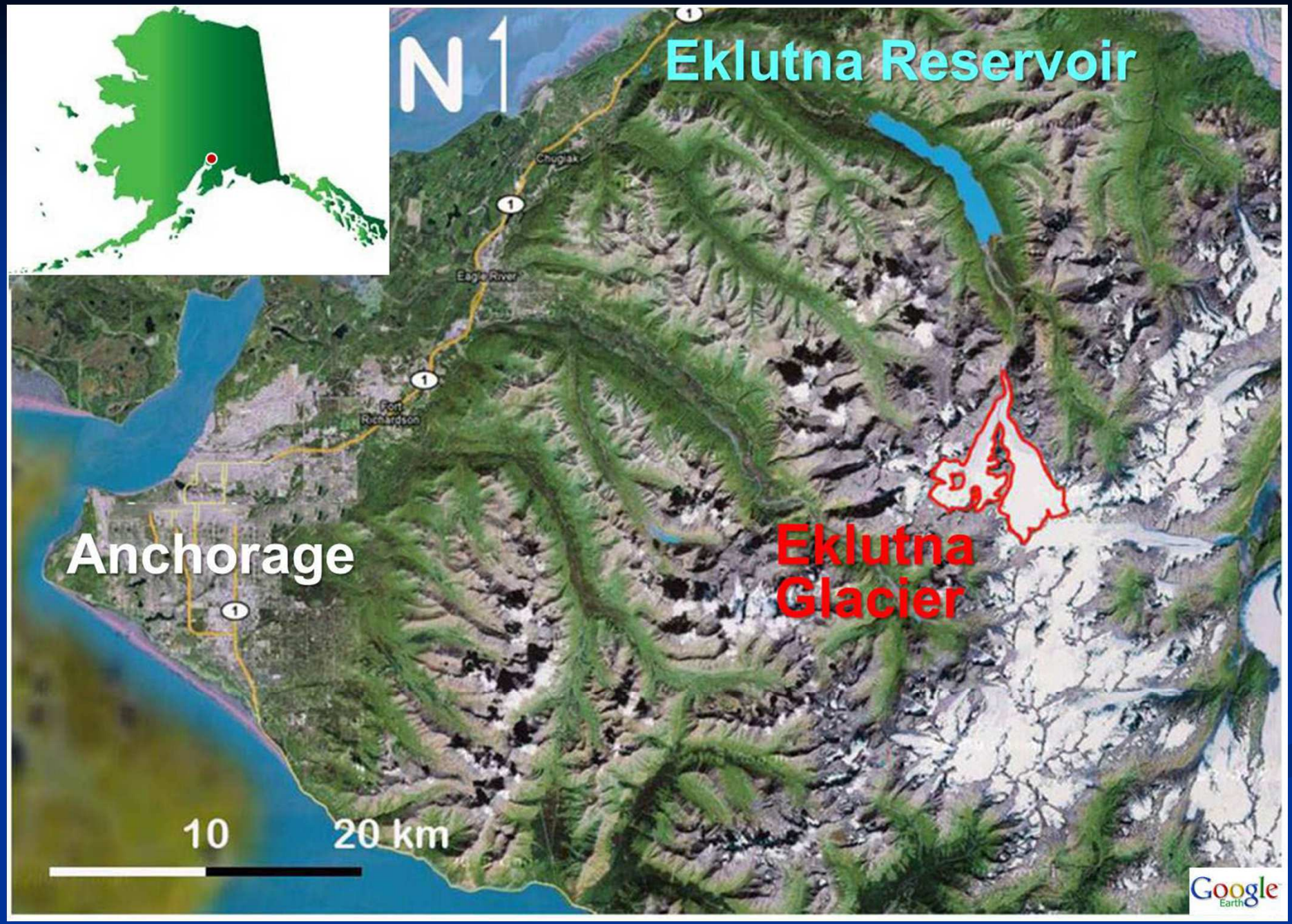
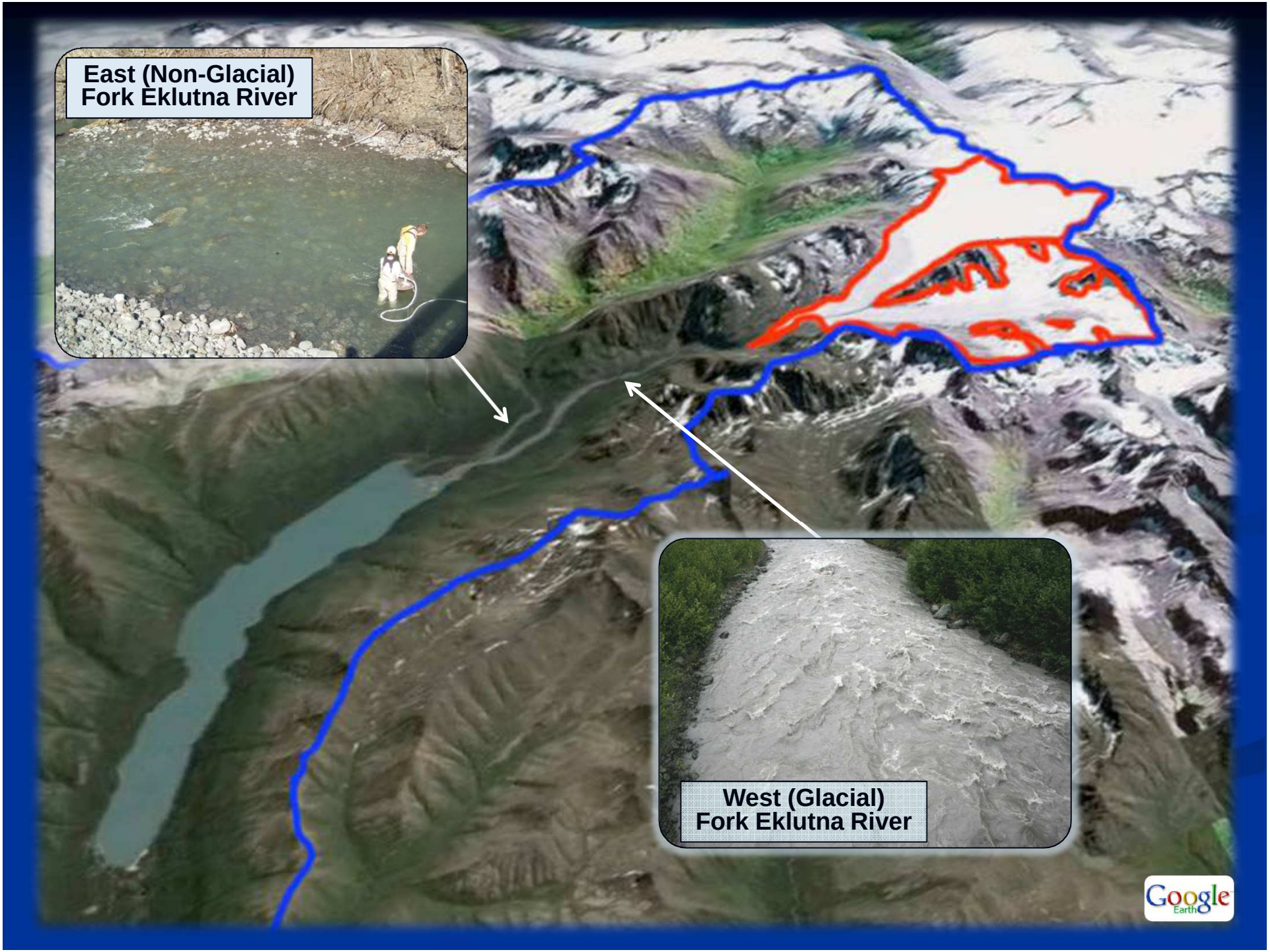
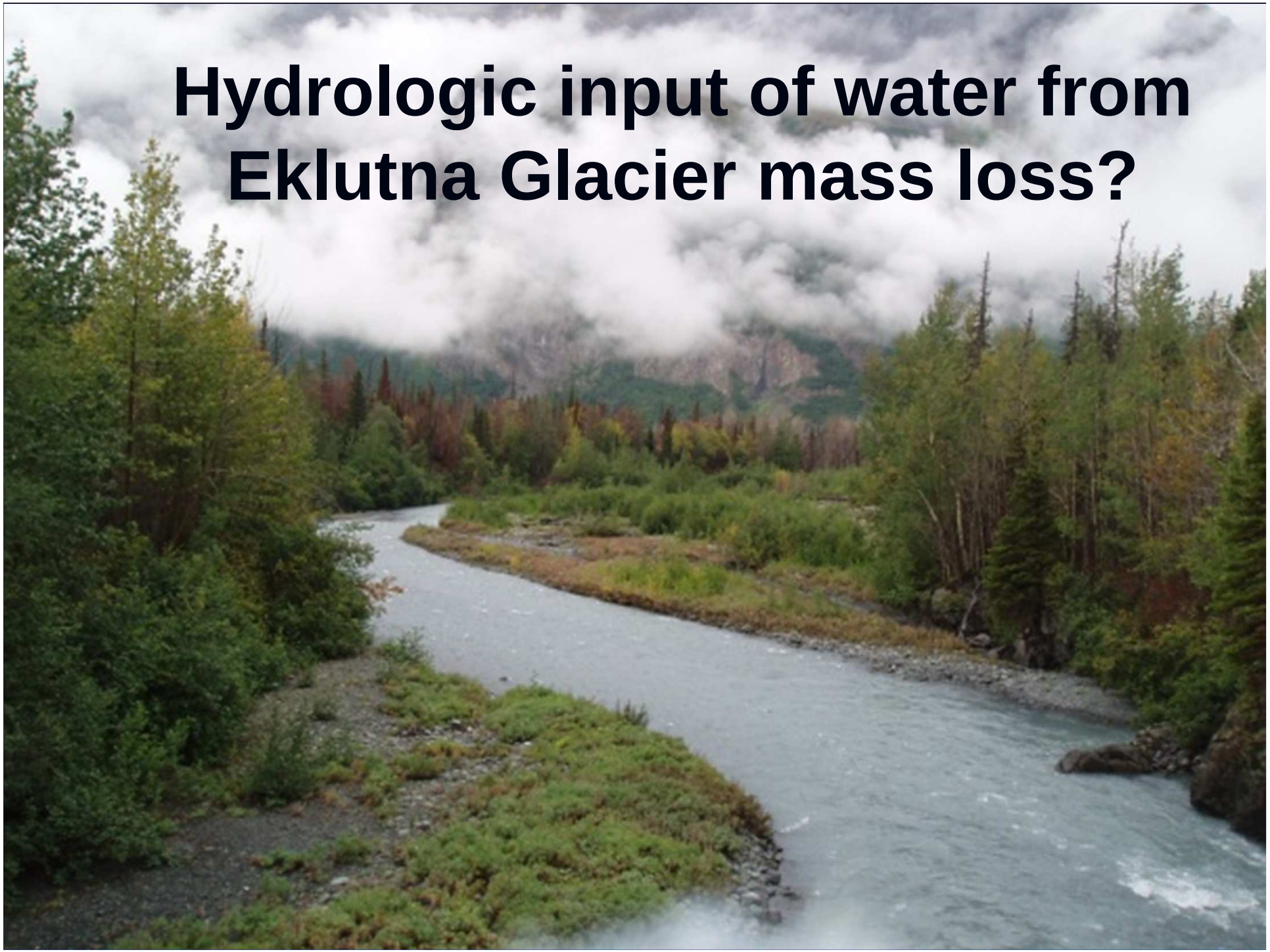


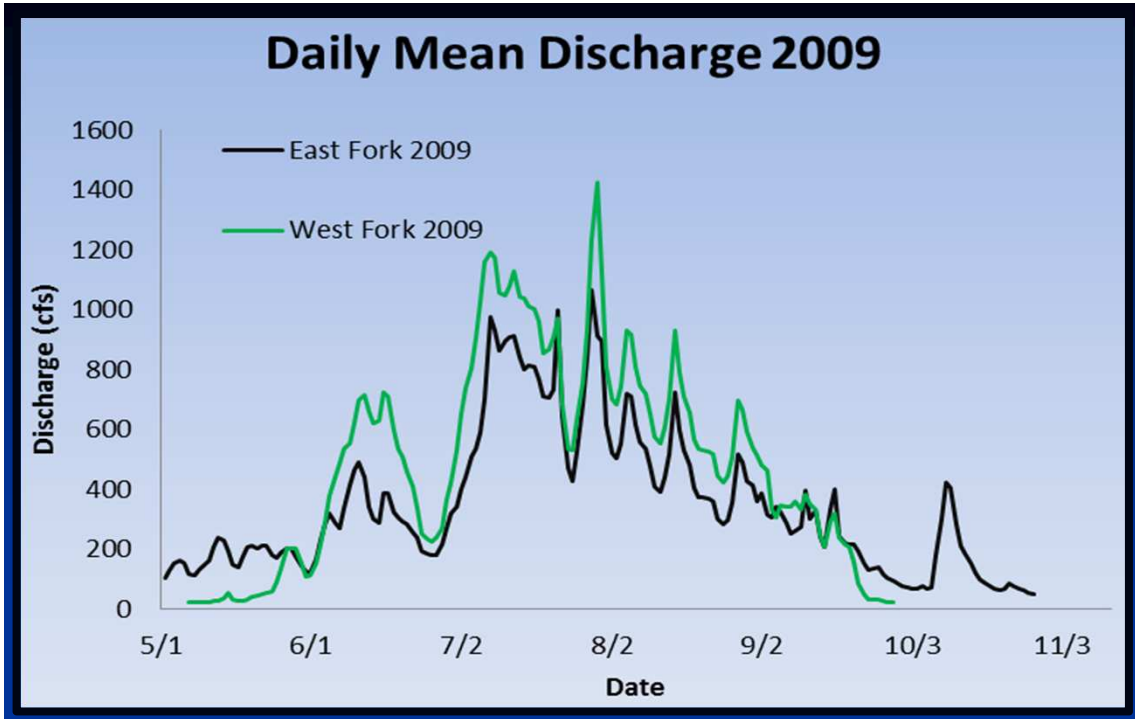

Eklutna Reservoir
Anchorage
Eklutna
Glacier
10
20 km
Google
Earth

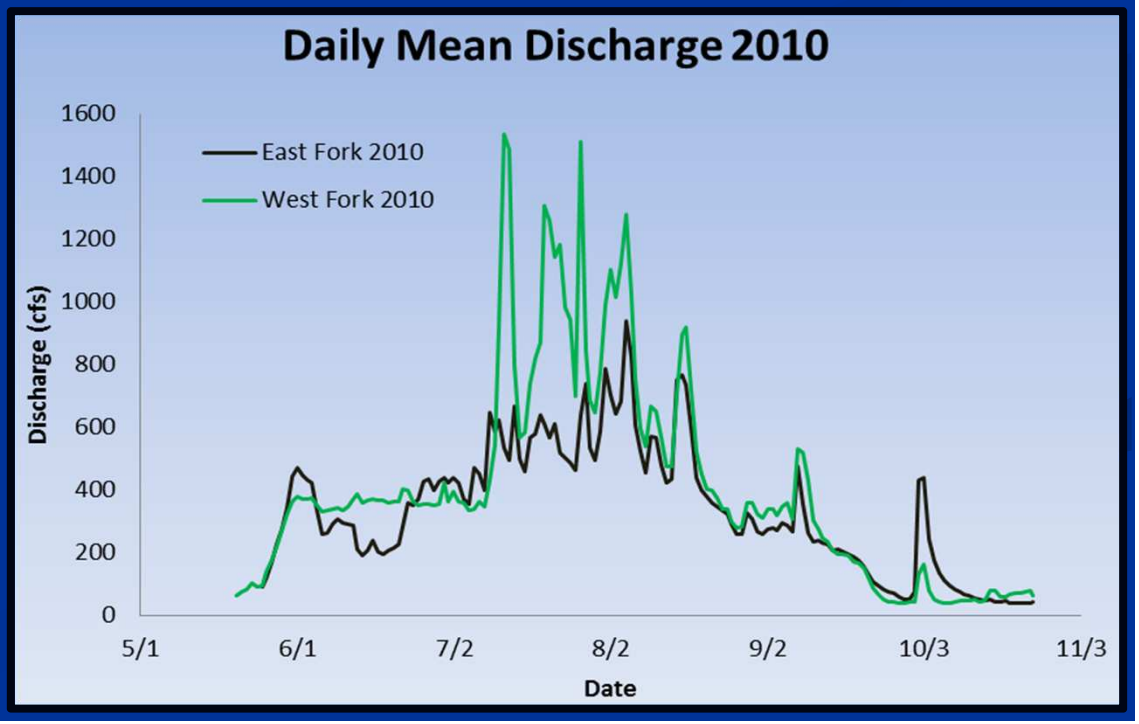

East (Non-Glacial)
Fork Eklutna River
West (Glacial)
Fork Eklutna River
Google Earth

Hydrologic input of water from Eklutna Glacier mass loss?



Measuring Streamflow


Daily Mean Discharge 2009
East Fork 2009
West Fork 2009
Discharge (cfs)
1600
1400
1200
1000
800
600
400
200
0
5/1
6/1
7/2
8/2
9/2
10/3
11/3
Date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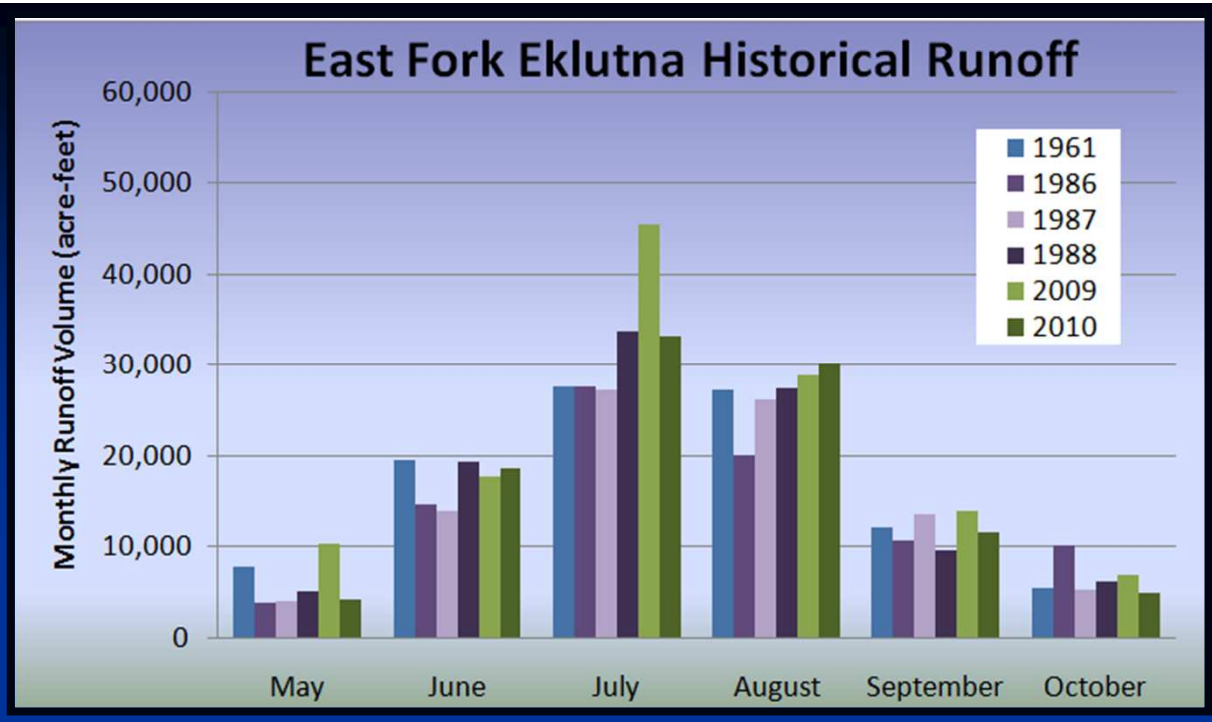
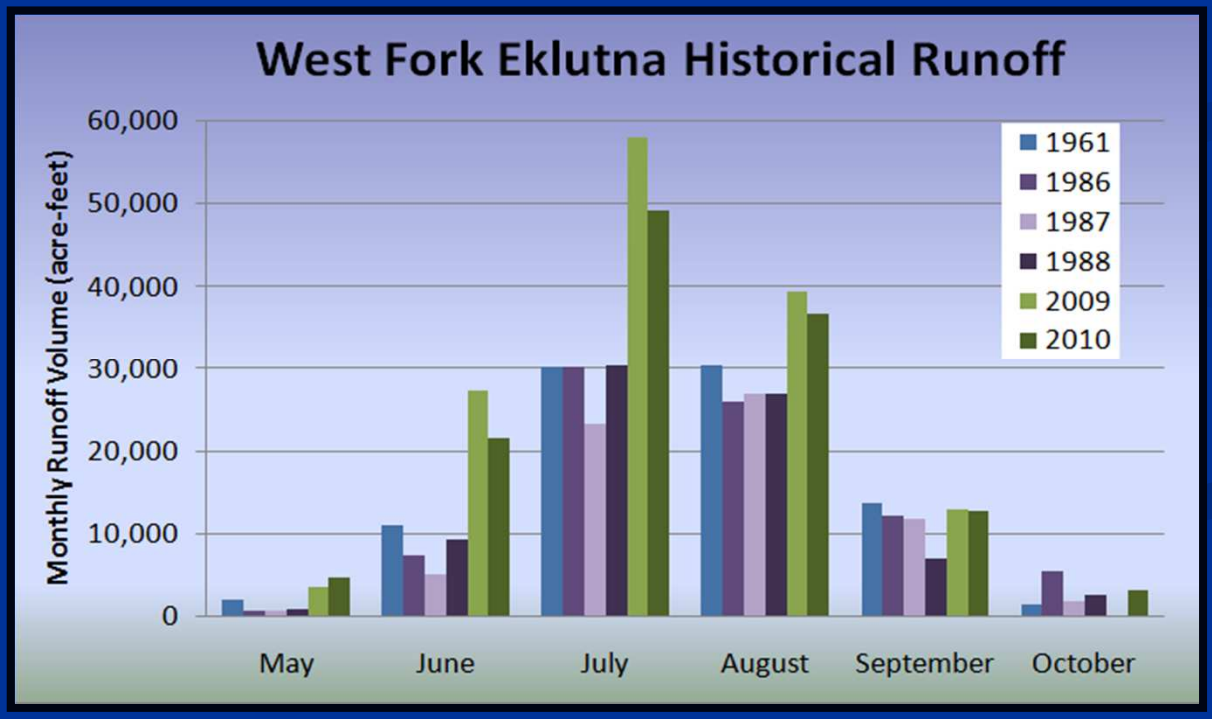
10/3
11/3
Date


East Fork Eklutna Historical Runoff
Monthly Runoff Volume (acre-feet)
60,000
50,000
40,000
30,000
20,000
10,000
0
May
June
July
August
September
October
1961
1986
1987
1988
2009
2010


West Fork Eklutna Historical Runoff
Monthly Runoff Volume (acre-feet)
60,000
50,000
40,000
30,000
20,000
10,000
0
May
June
July
August
September
October
1961
1986
1987
1988
2009
2010

Glacier Volume Loss

LiDAR

September 2010

Surface elevation change

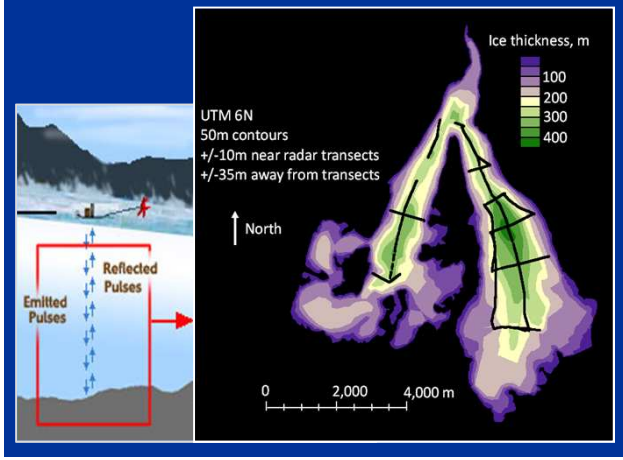
+ 20m

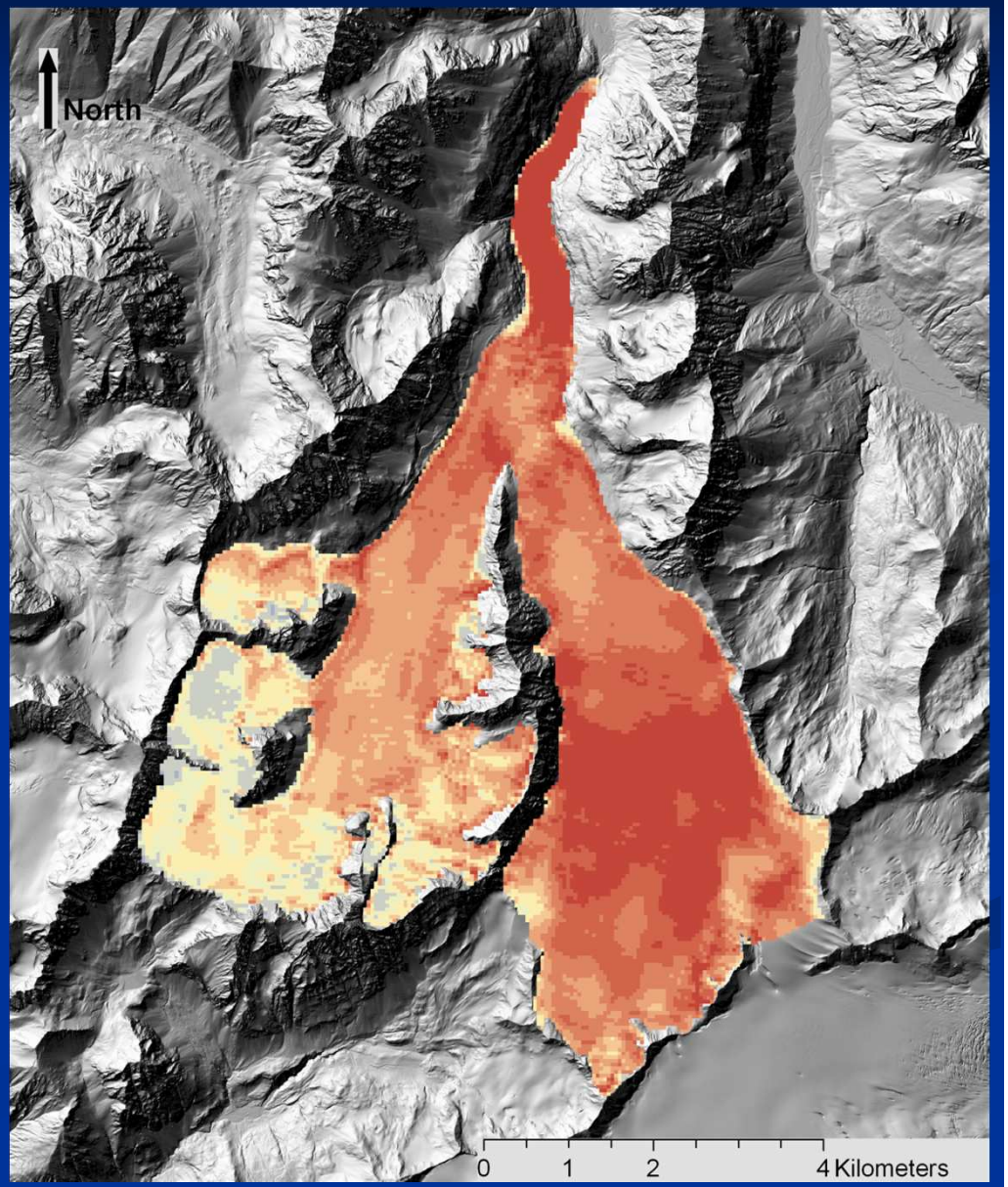
0m

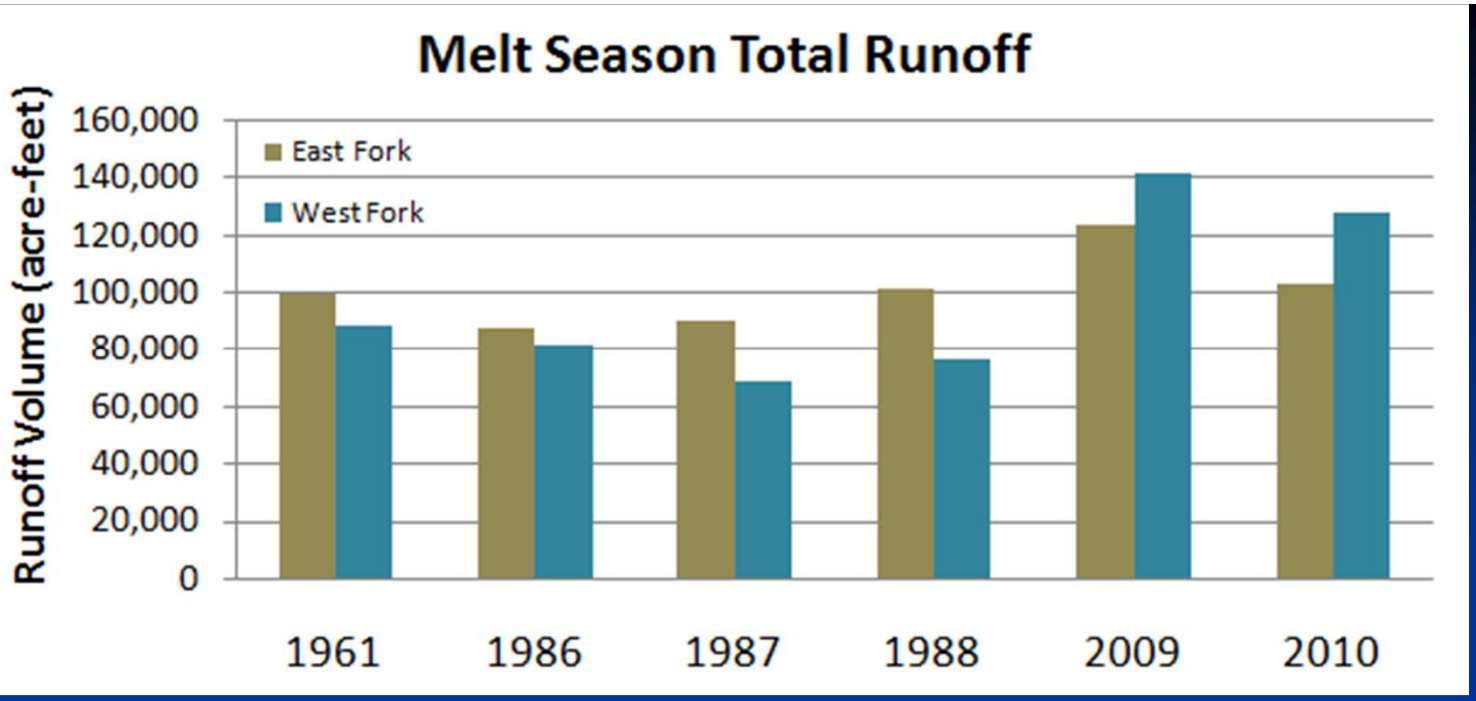
- 20m

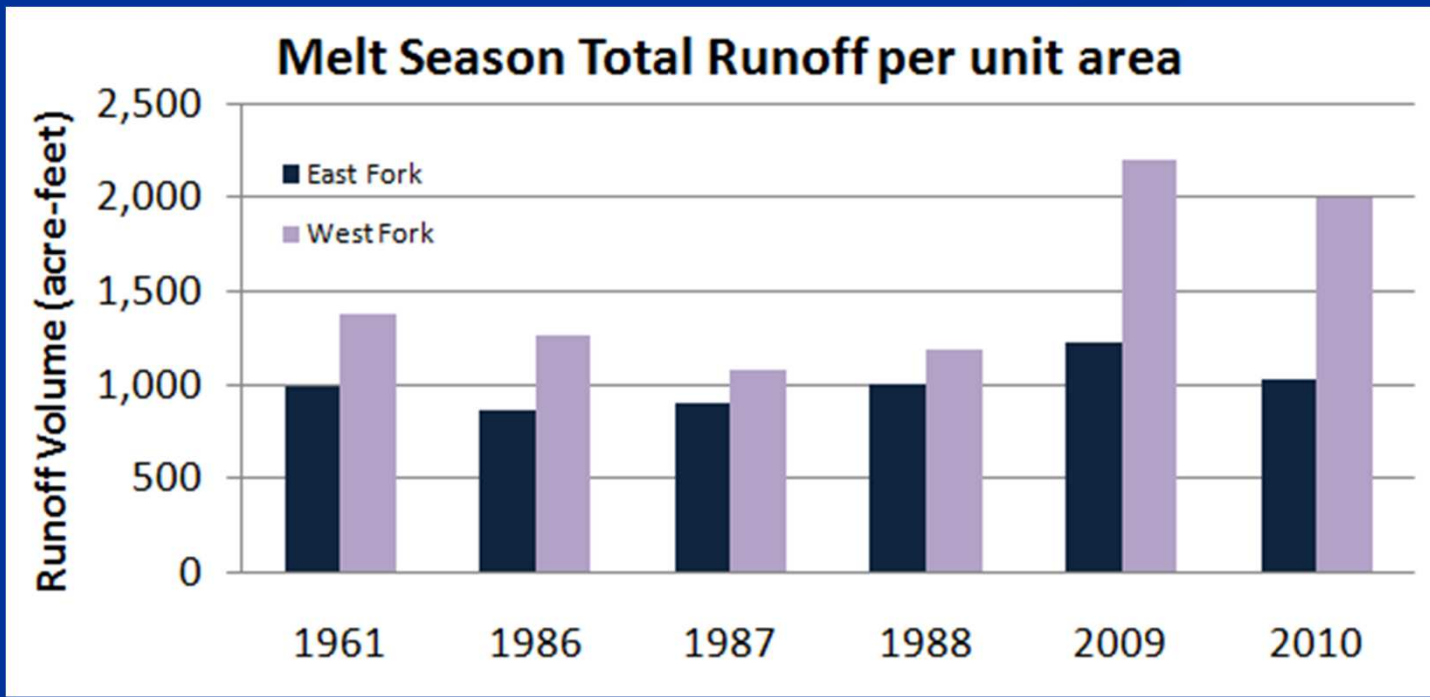
- 40m

- 60m

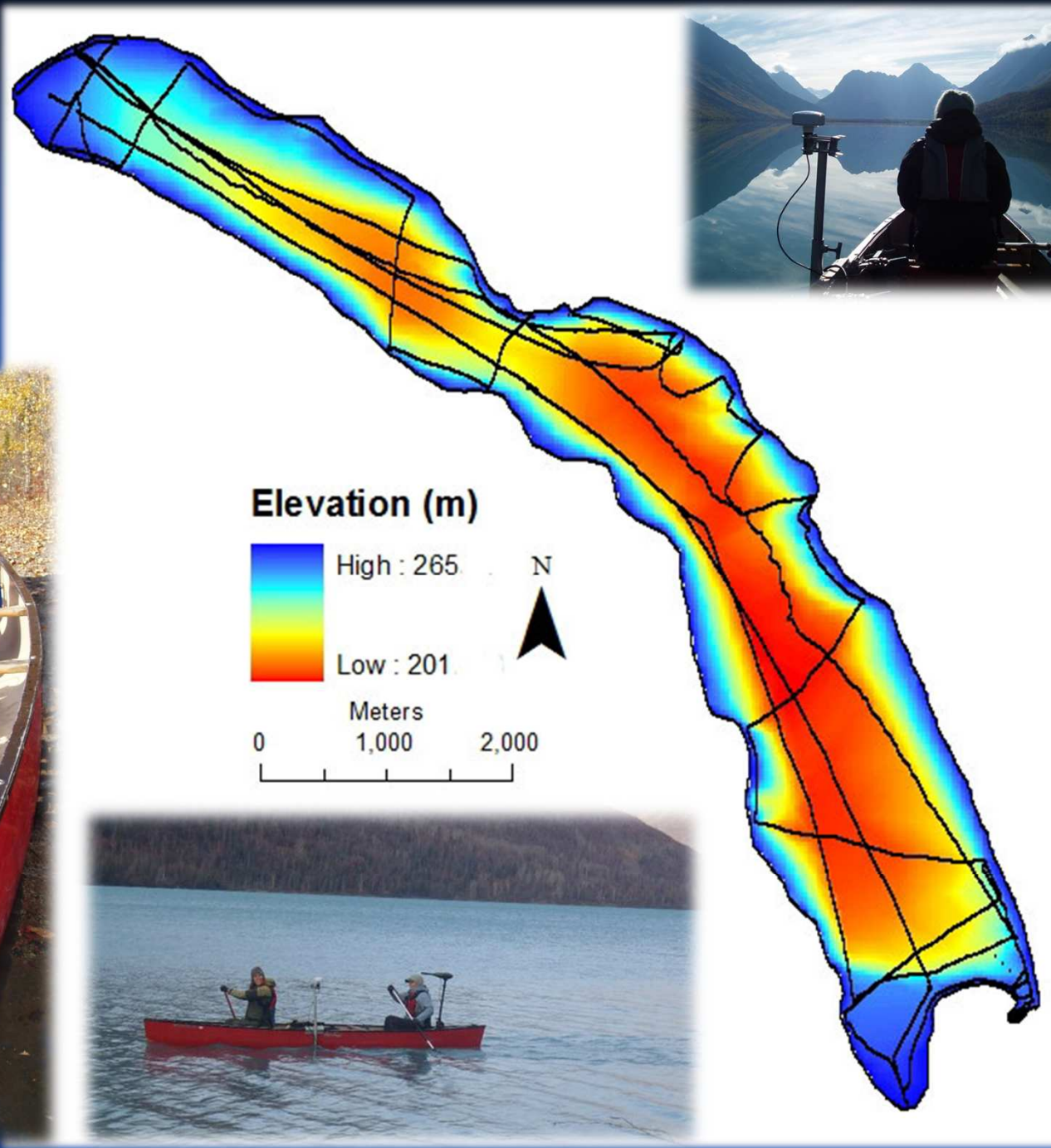





Melt Season Total Runoff
Runoff Volume (acre-feet)
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
East Fork
West Fork
1961
1986
1987
1988
2009
2010


Melt Season Total Runoff per unit area
Runoff Volume (acre-feet)
2,500
2,000
1,500
1,000
500
0
East Fork
West Fork
1961
1986
1987
1988
2009
2010

Eklutna Lake Bathymetry



Conclusions

- Warm melt season, large negative mass balance= 11% increased runoff
- Cool melt season, small negative mass balance= 1.6% increased runoff
- Long term- new glacier equilibrium?
- Implications: cost of energy?

Questions?

Acknowledgements

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