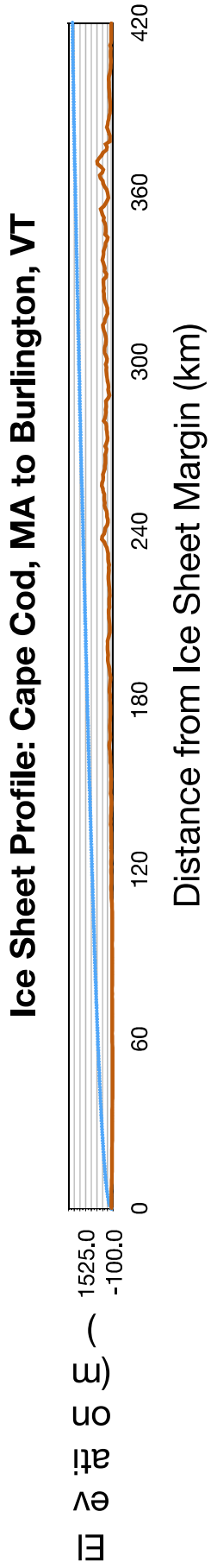
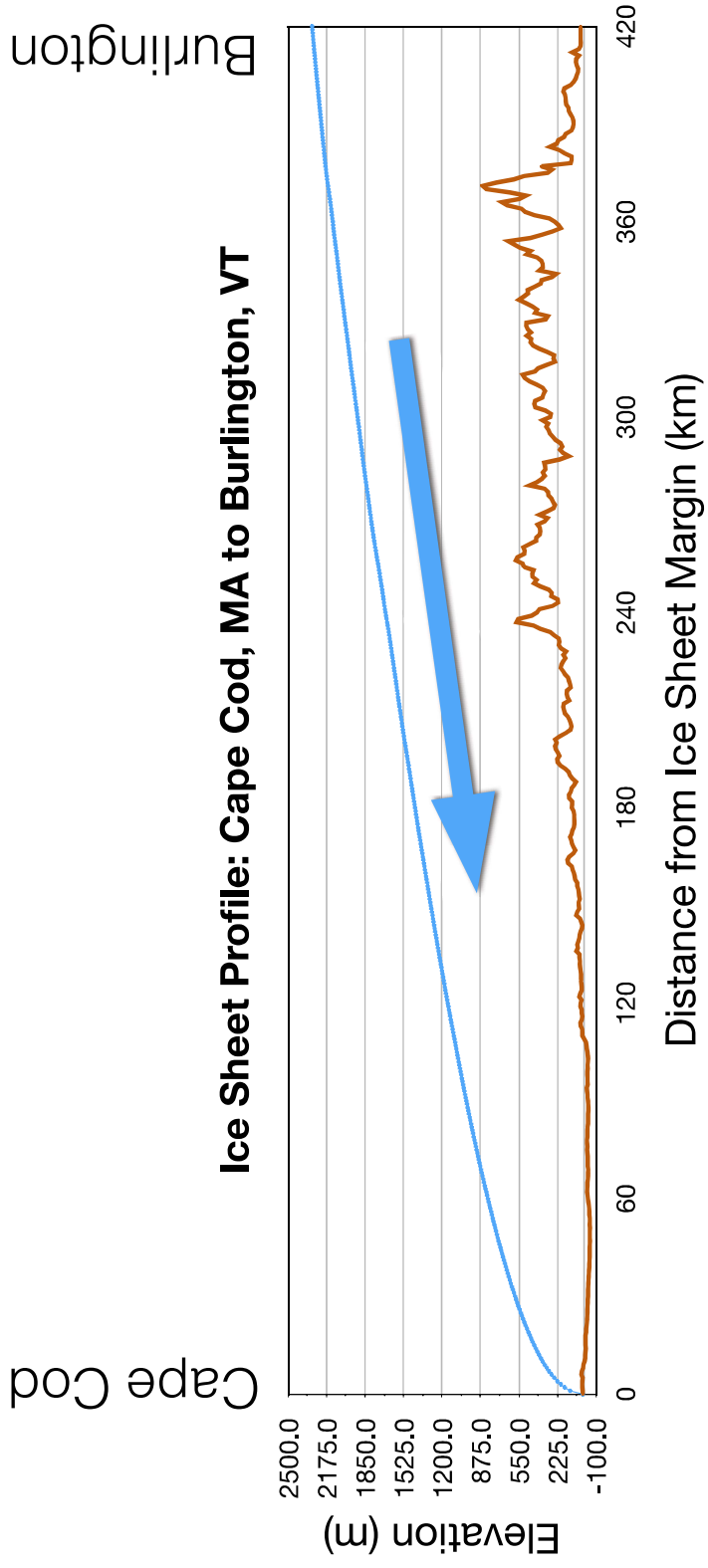


Map shows the maximum extent of the Laurentide Ice Sheet during the last (Wisconsinan) glacial period.









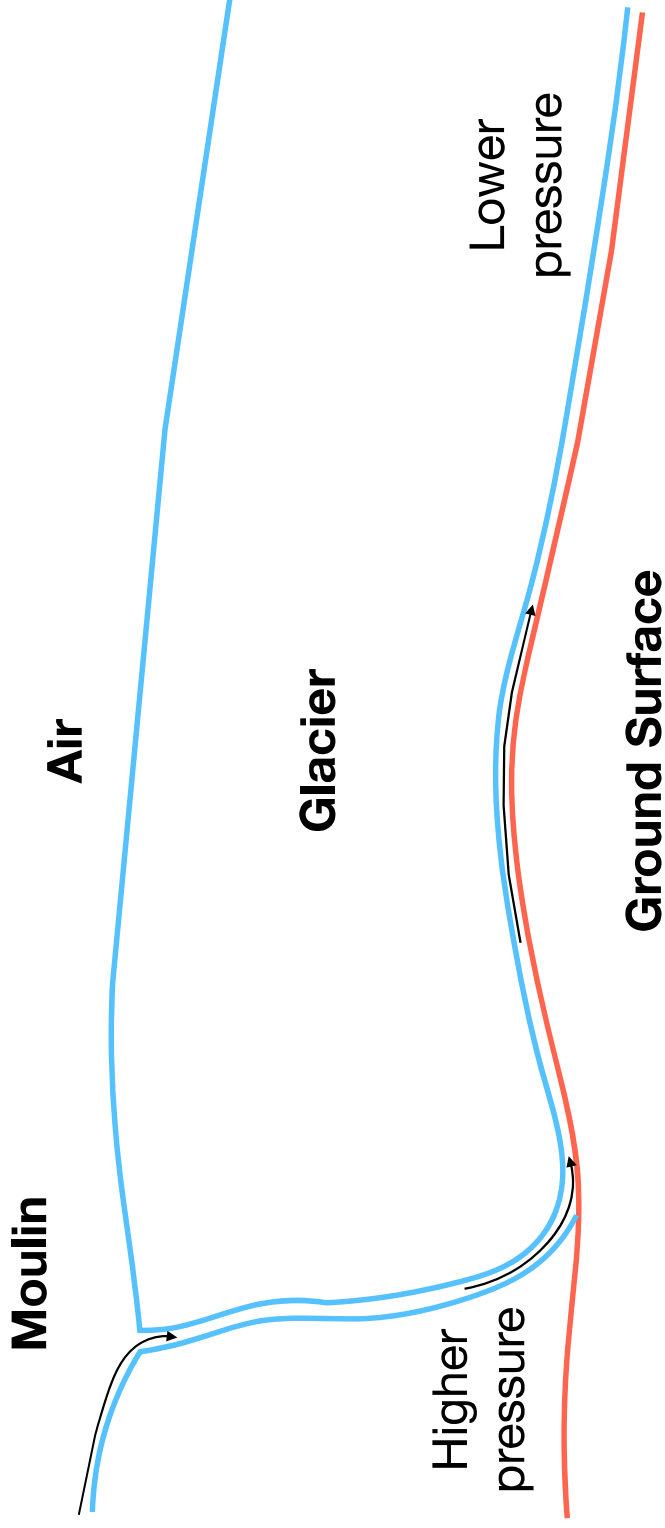


Stream exiting a tunnel in the Castner Glacier, Alaska

Movie: Water exiting a tunnel (below ground surface), Matanuska Glacier, Alaska

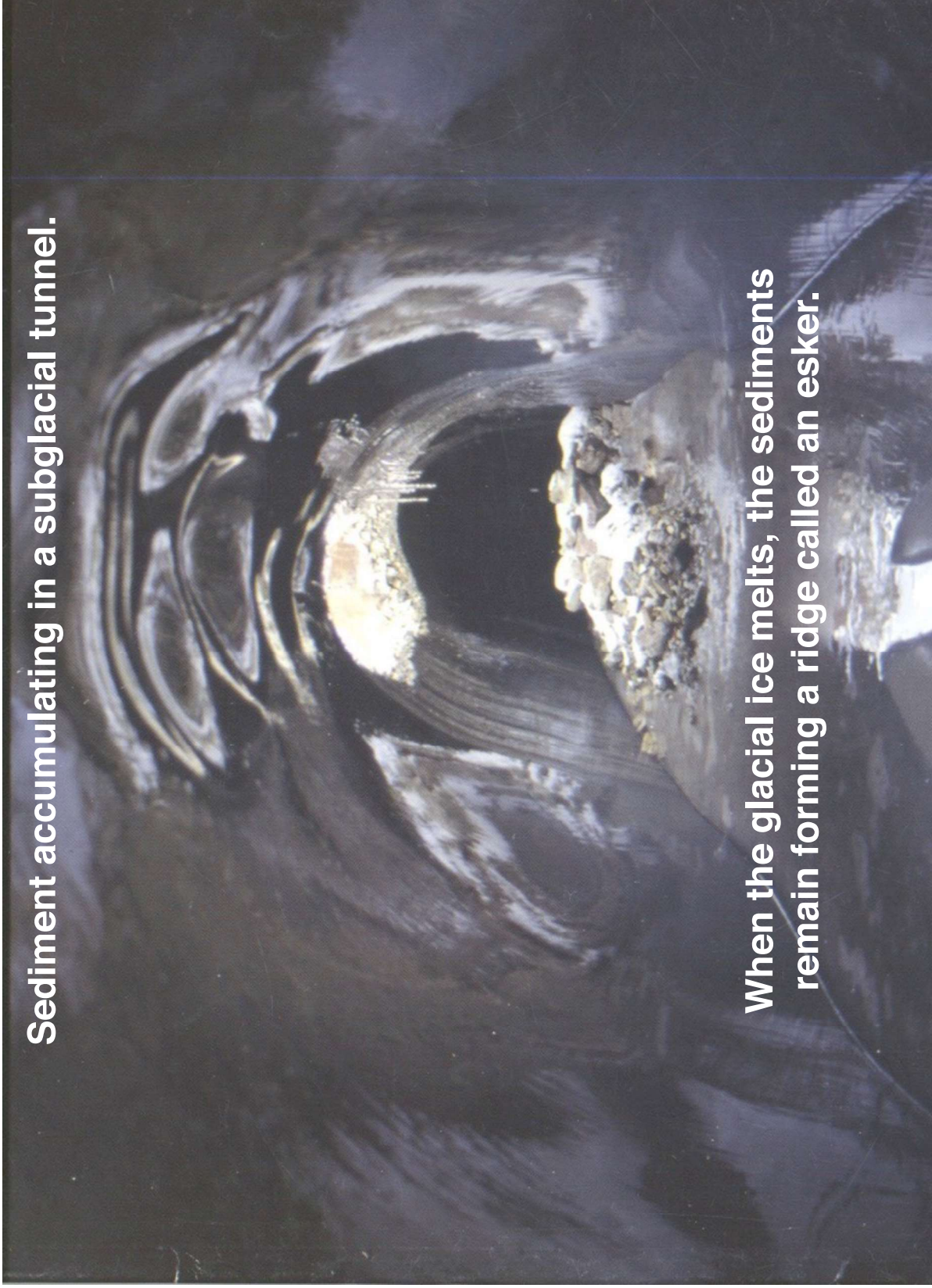


Water flowing in a tunnel always moves down pressure gradients, i.e. from higher pressure areas to lower pressure areas.

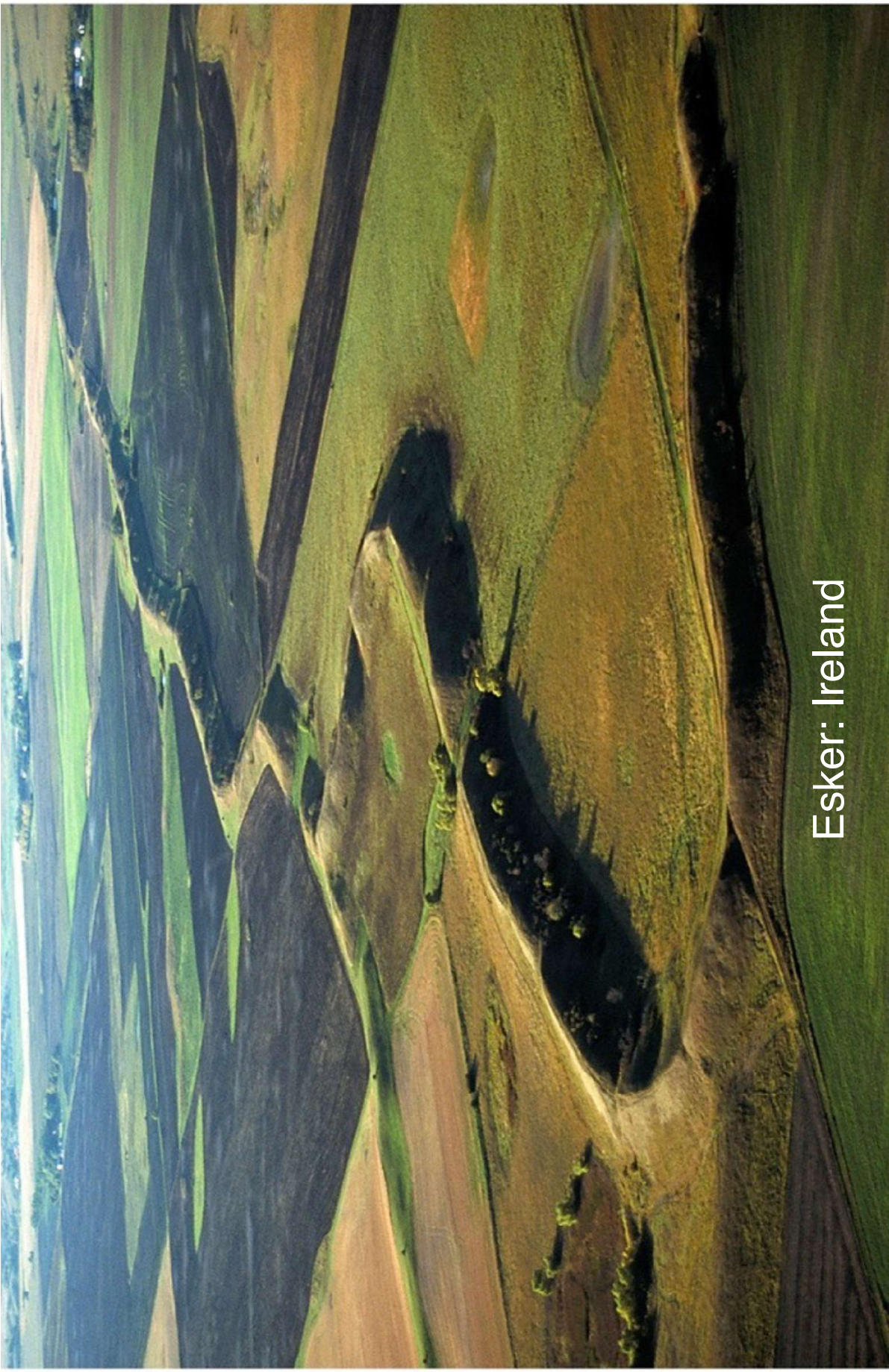


Water flowing in a tunnel can flow up and over hills as long as it's flowing from higher pressure areas to lower pressure areas.

Sediment accumulating in a subglacial tunnel.



When the glacial ice melts, the sediments remain forming a ridge called an esker.



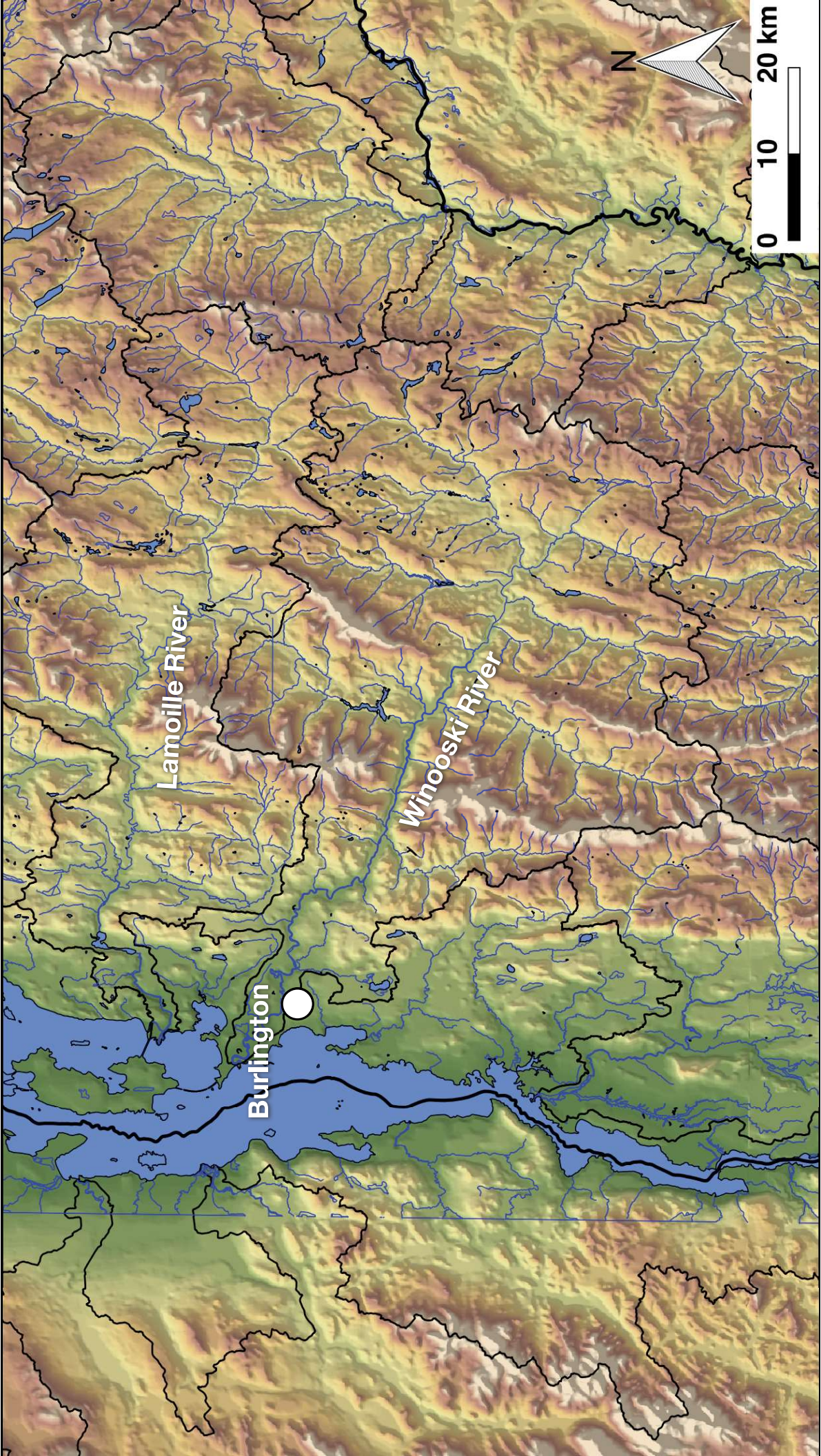
Esker: Ireland



The Evolution of Glacial Lakes in the Winoooski River Valley, Vermont

Stephen Wright
Department of Geology
University of Vermont

Lake Evolution
Outburst Flood Events
Timing
Isostatic Tilt of Winoooski River Basin



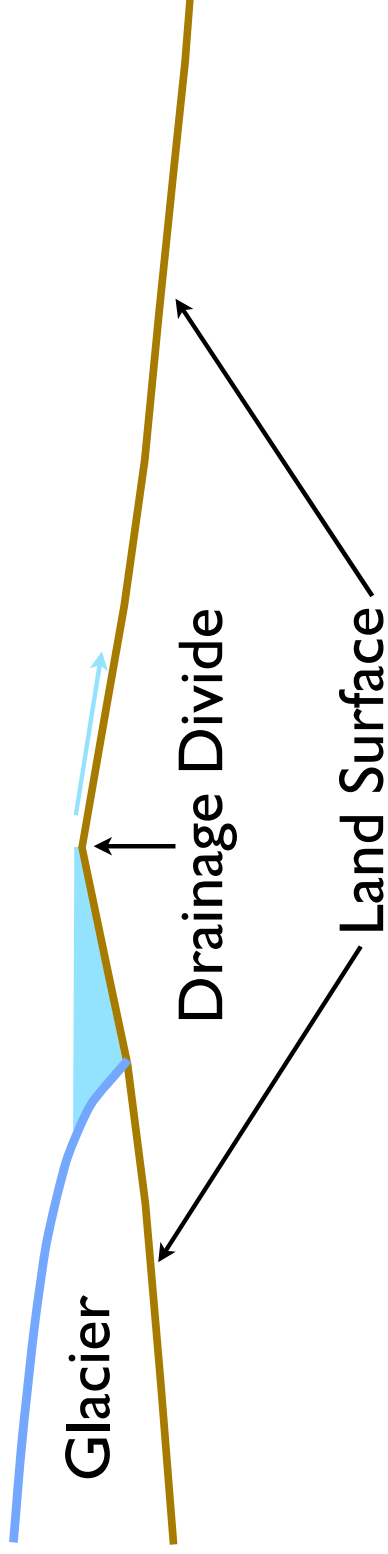
Lamoille River

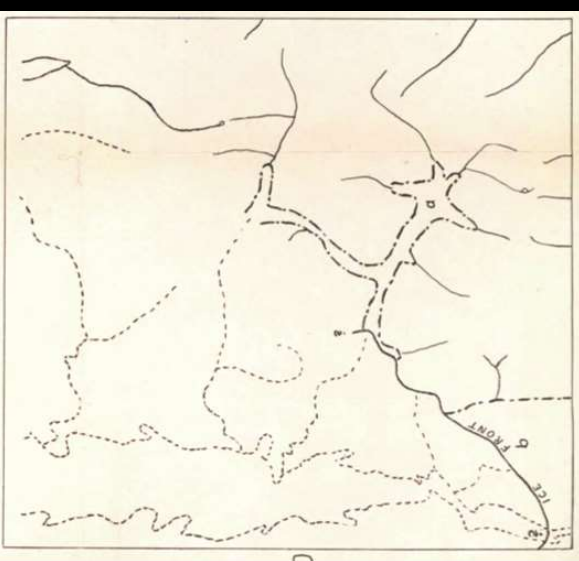
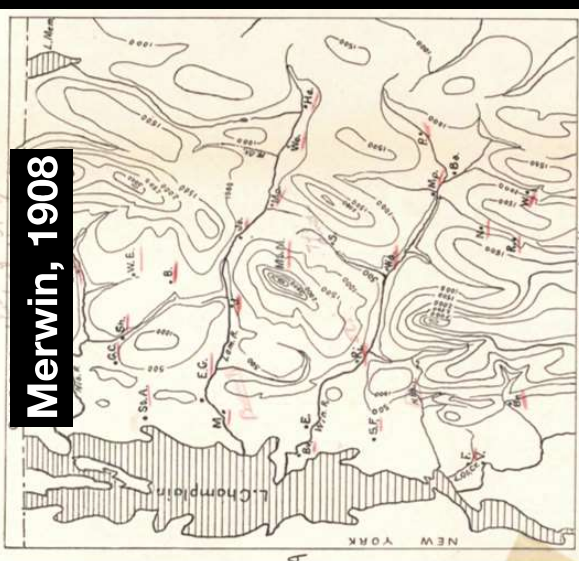
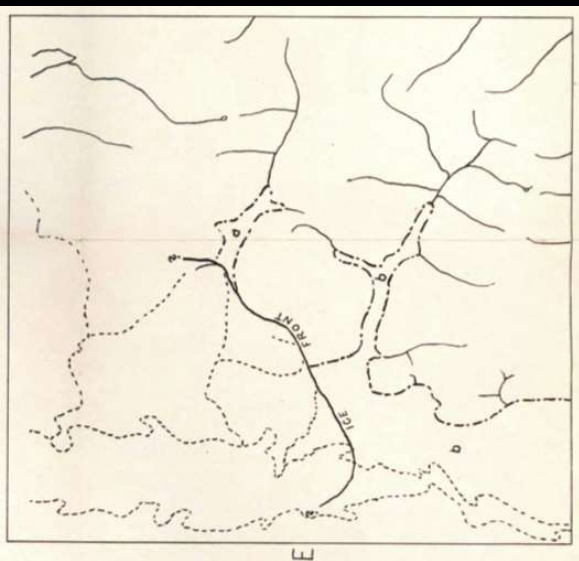
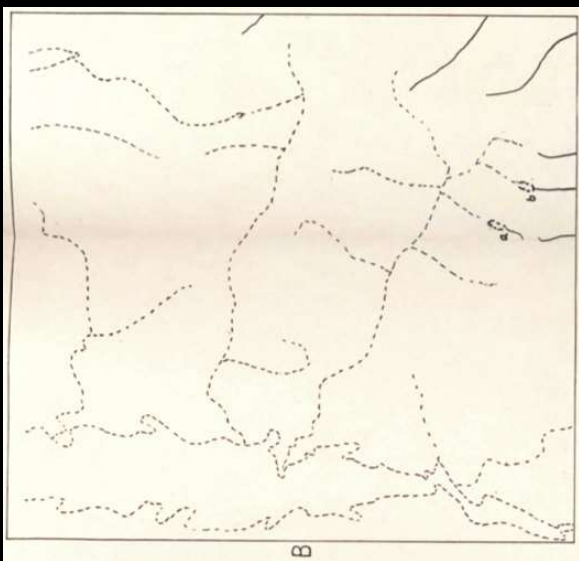
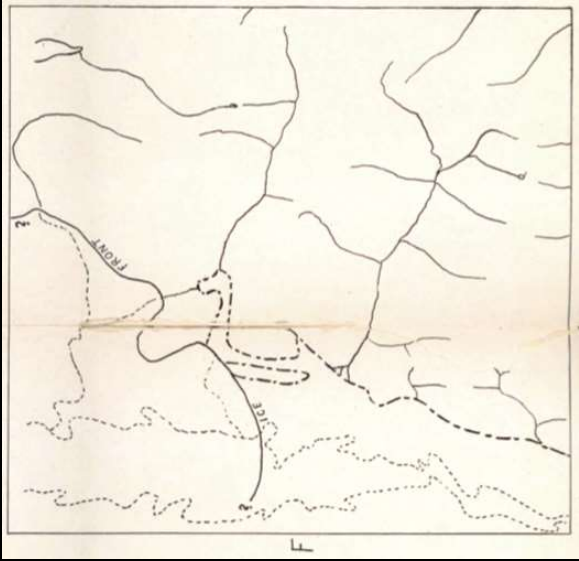
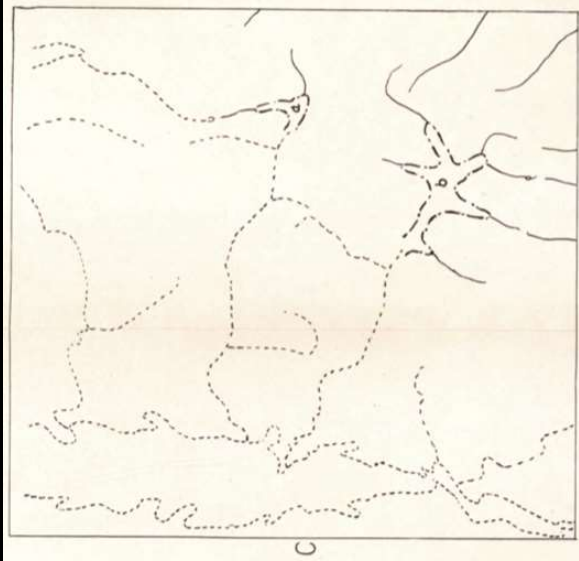
Winooski River

Burlington

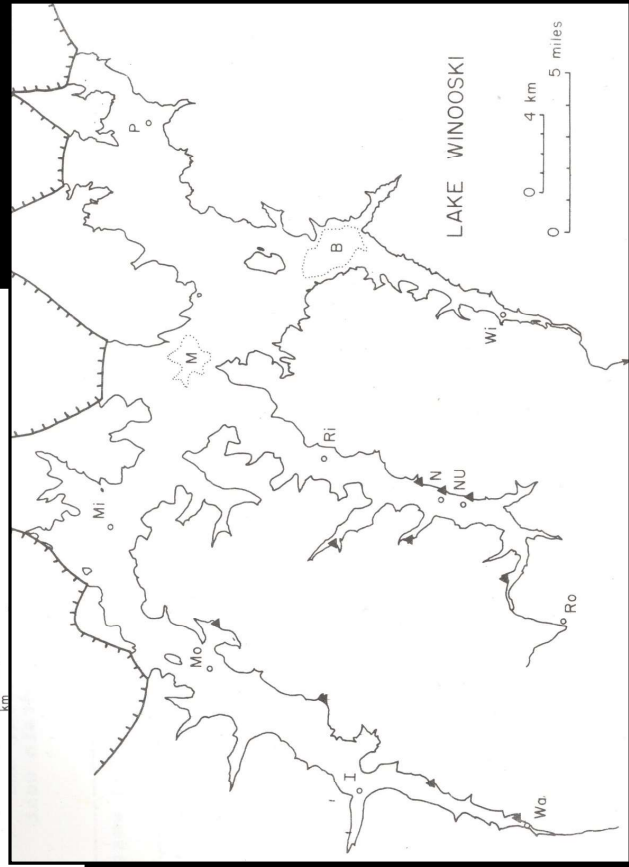
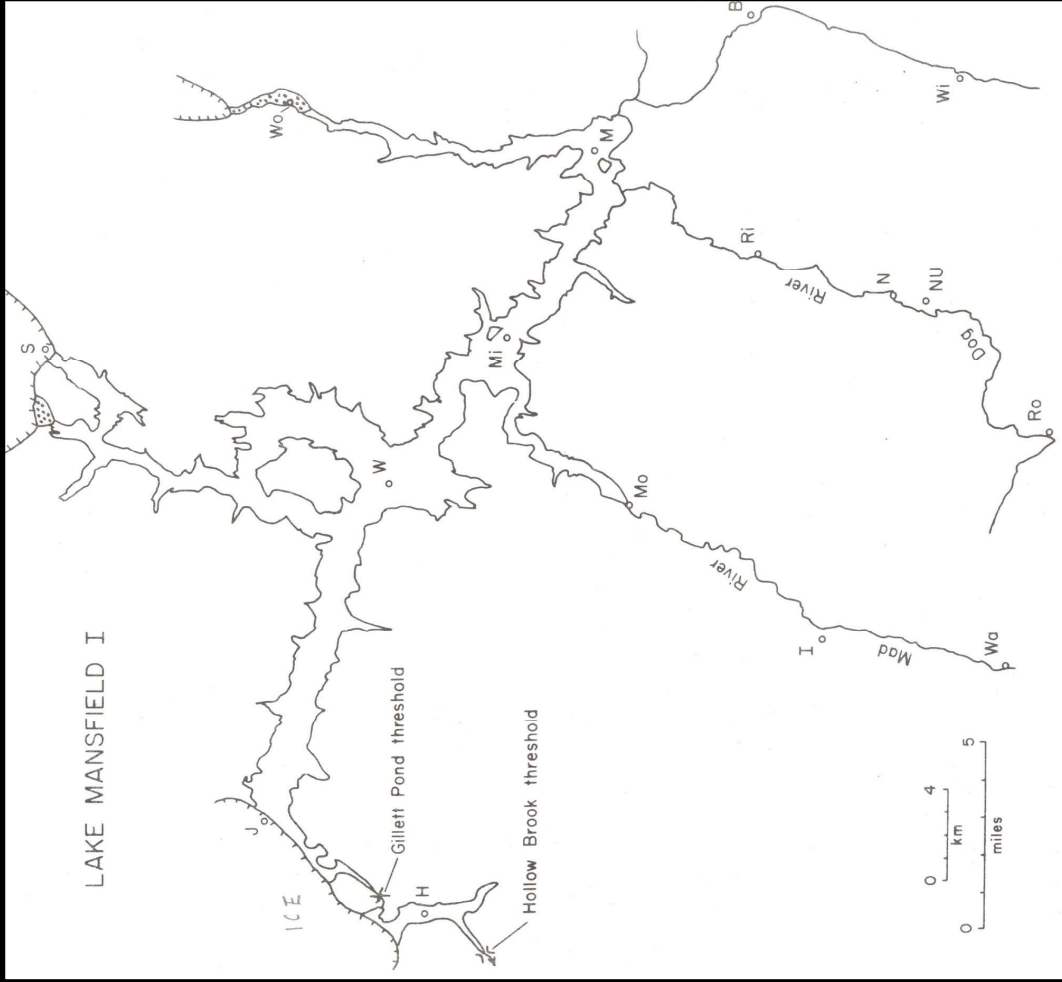
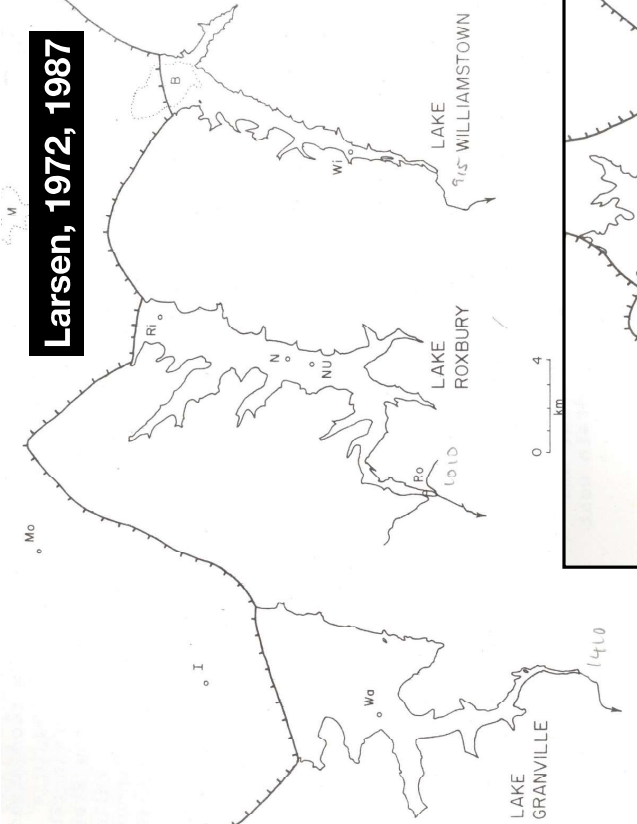


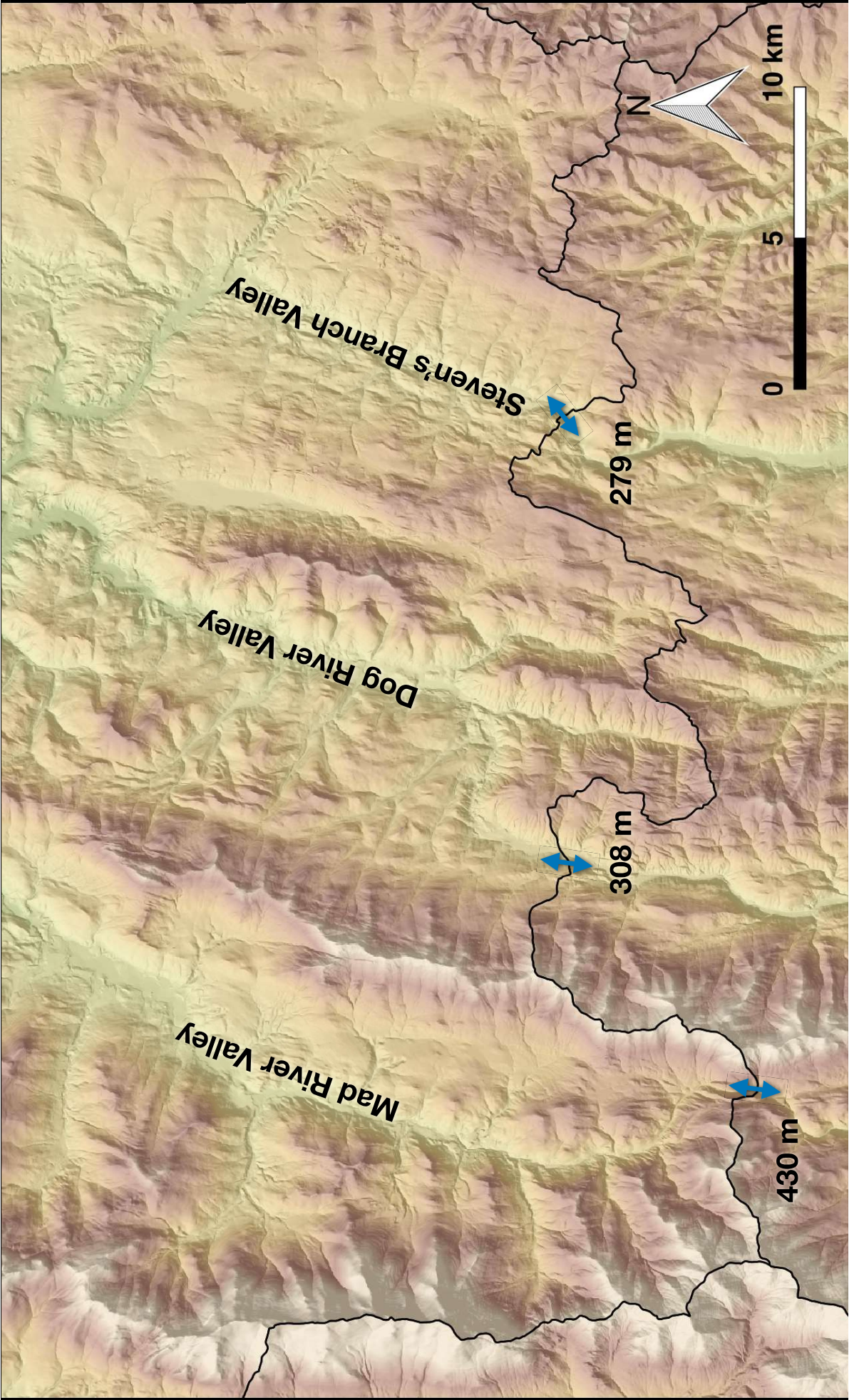
As the ice sheet retreated across drainage divides, lakes formed, dammed by the retreating glacier.

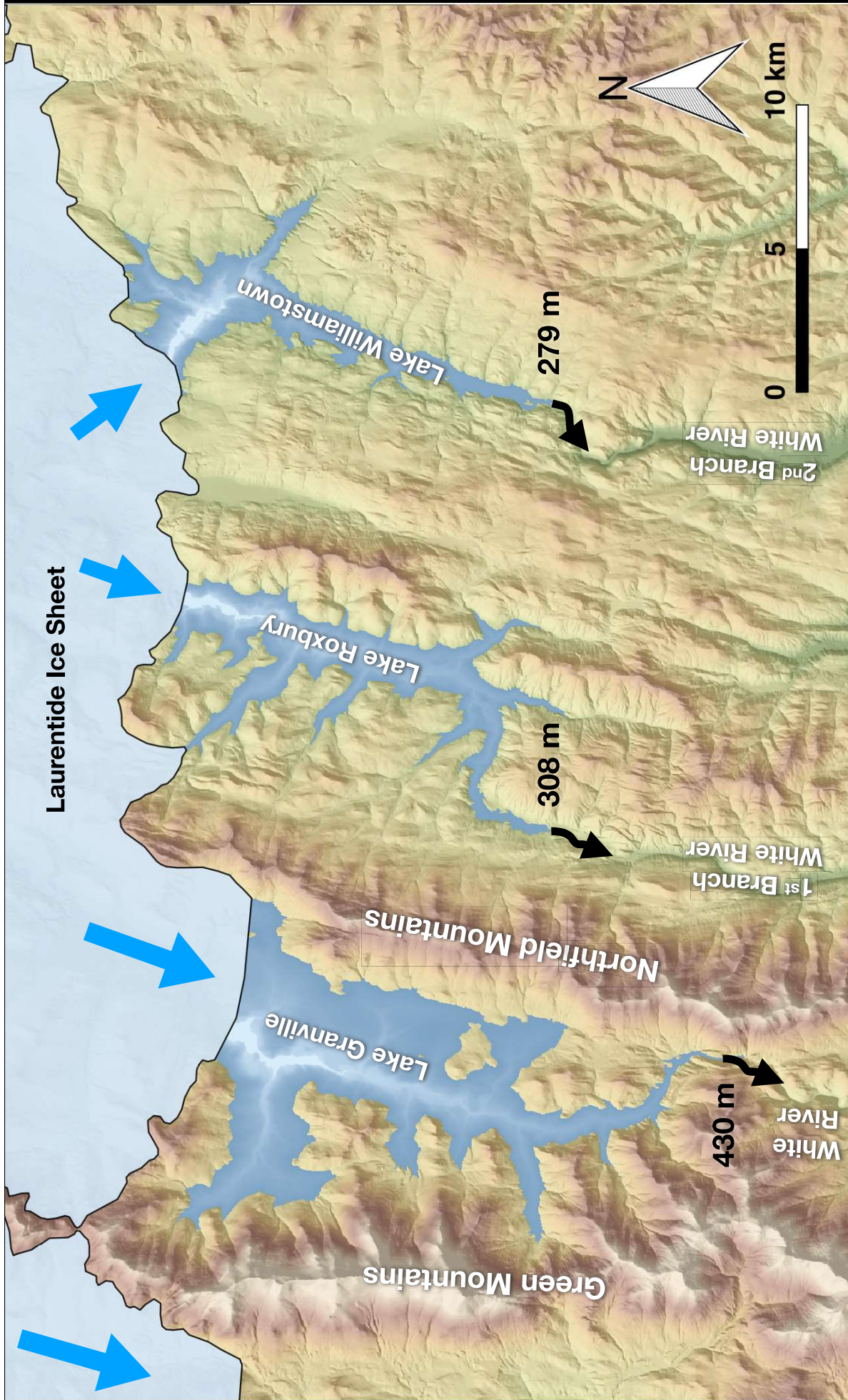


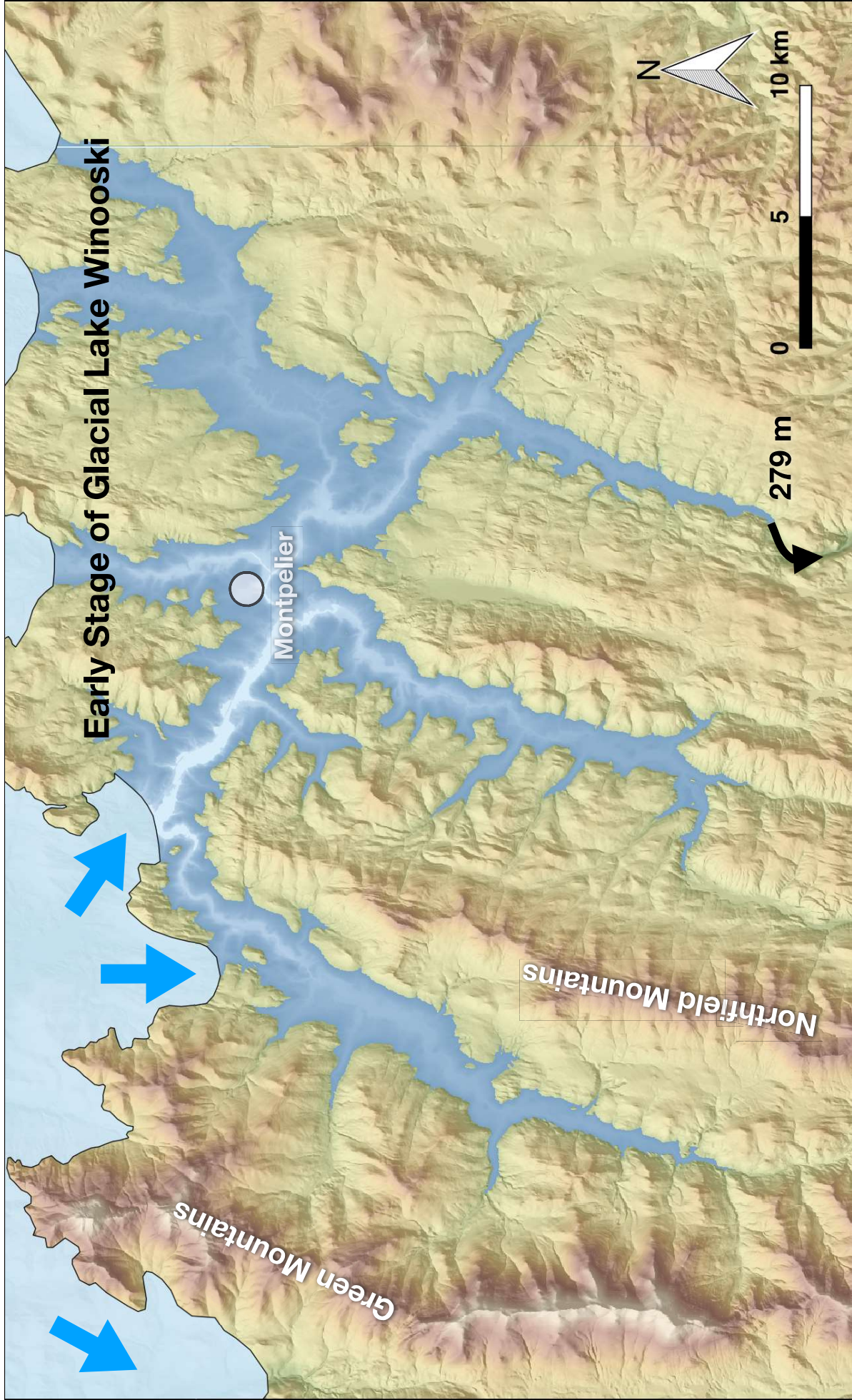


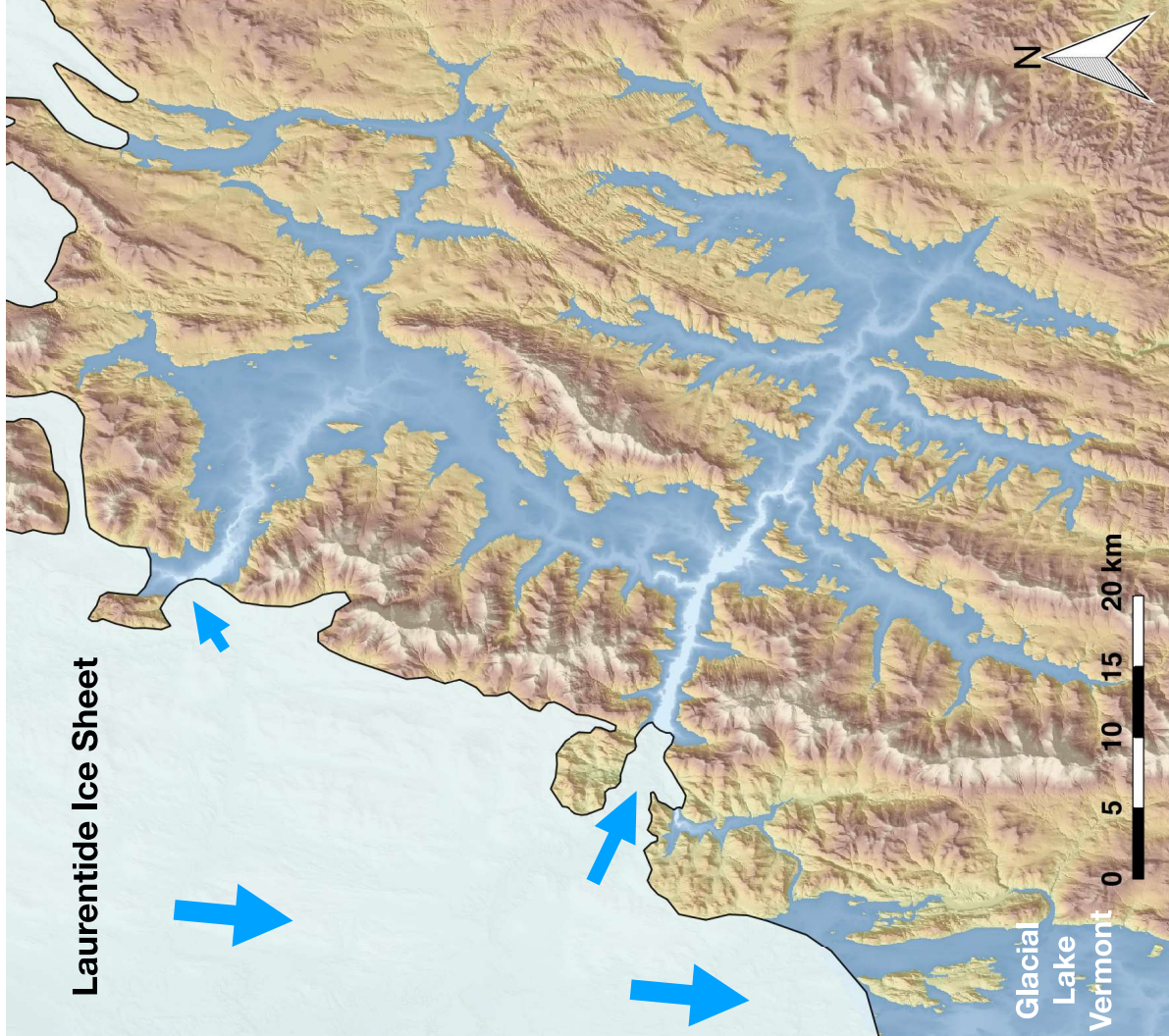
Larsen, 1972, 1987











Maximum extent of Glacial Lake Winooski in the Winooski and Lamoille River Valleys

- Glacial Lake Winooski existed as long as the Winooski River Valley was dammed.
- Rapid northward growth of Glacial Lake Winooski east of the mountains indicates how quickly the ice sheet was retreating east of the mountains compared to ice in the Champlain Valley.



Measured Varve Sections

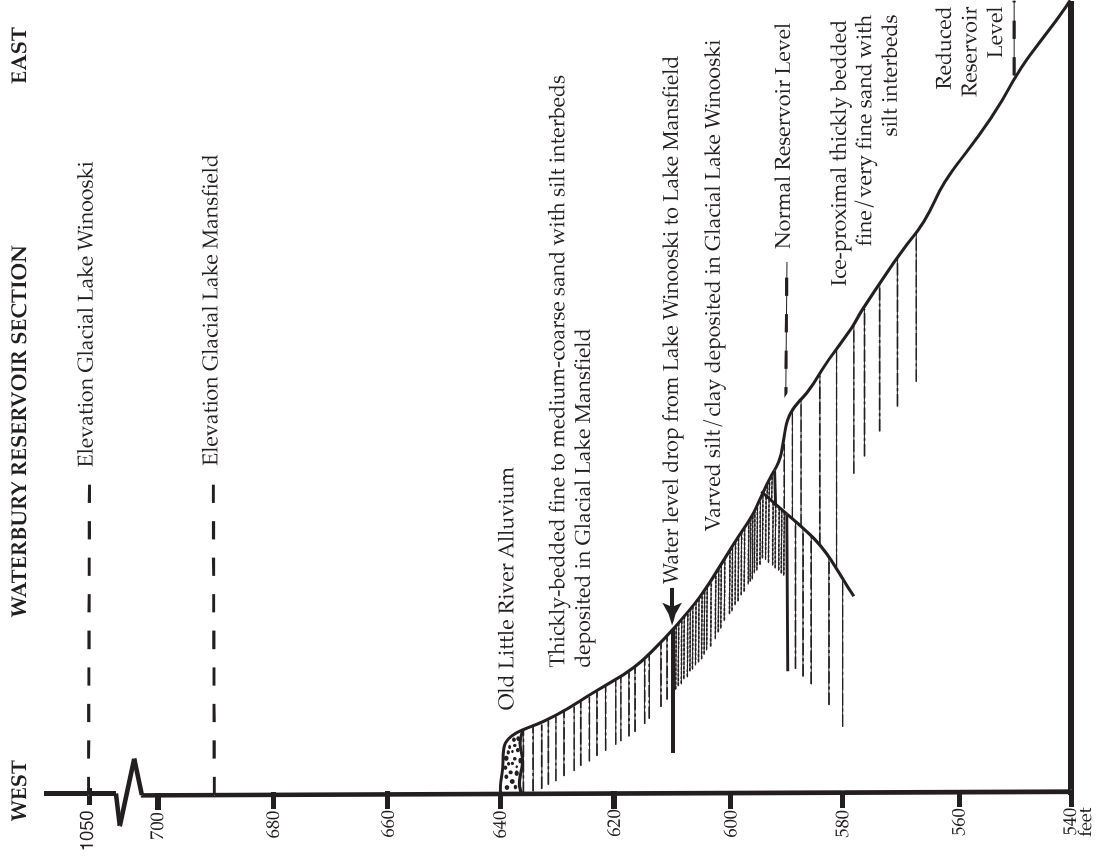
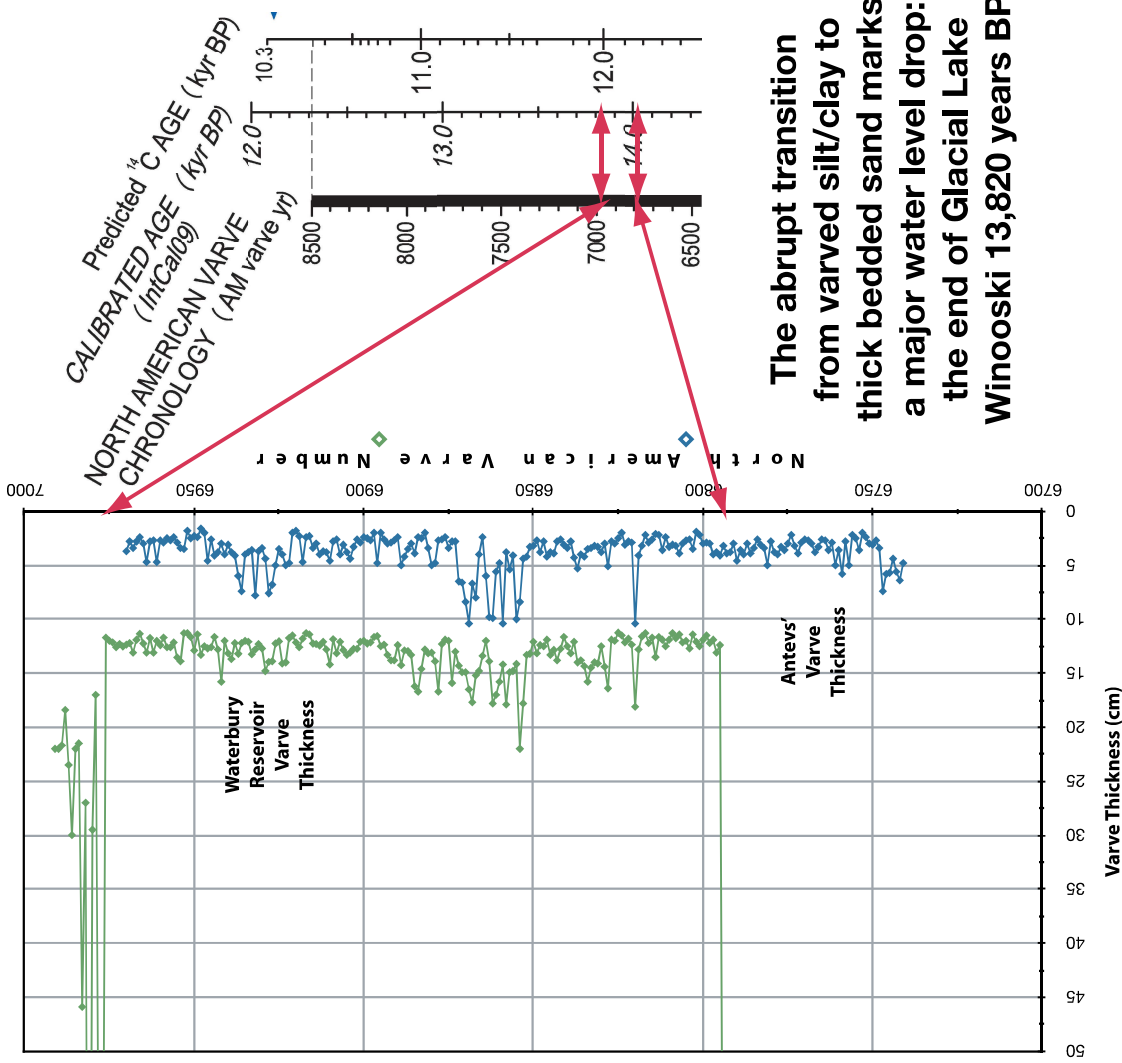
- Three good measured varve sections
- Timing of Glacial Lake Winooski
 - Varve sections correlated to the North American Varve Chronology
 - Ice-Proximal varves deposited at Muzzy Brook ~14,100 years BP
 - Glacial Lake Winooski partially drains ~13,800 years BP
 - Lake duration ~280 years
- Ice Sheet Retreat Rate
- Muzzy Brook to Wrightsville Reservoir
 - 11,700 m/132 years
 - ~89 m/year
- Ice Sheet Retreat Rate
- Muzzy Brook to Waterbury Reservoir
 - ~125 years
- Conclusion
 - Wrightsville and Waterbury Reservoirs deglaciated at about the same time
 - The ice sheet east of the mountains retreated rapidly northward up these tributary valleys





Measured
Section

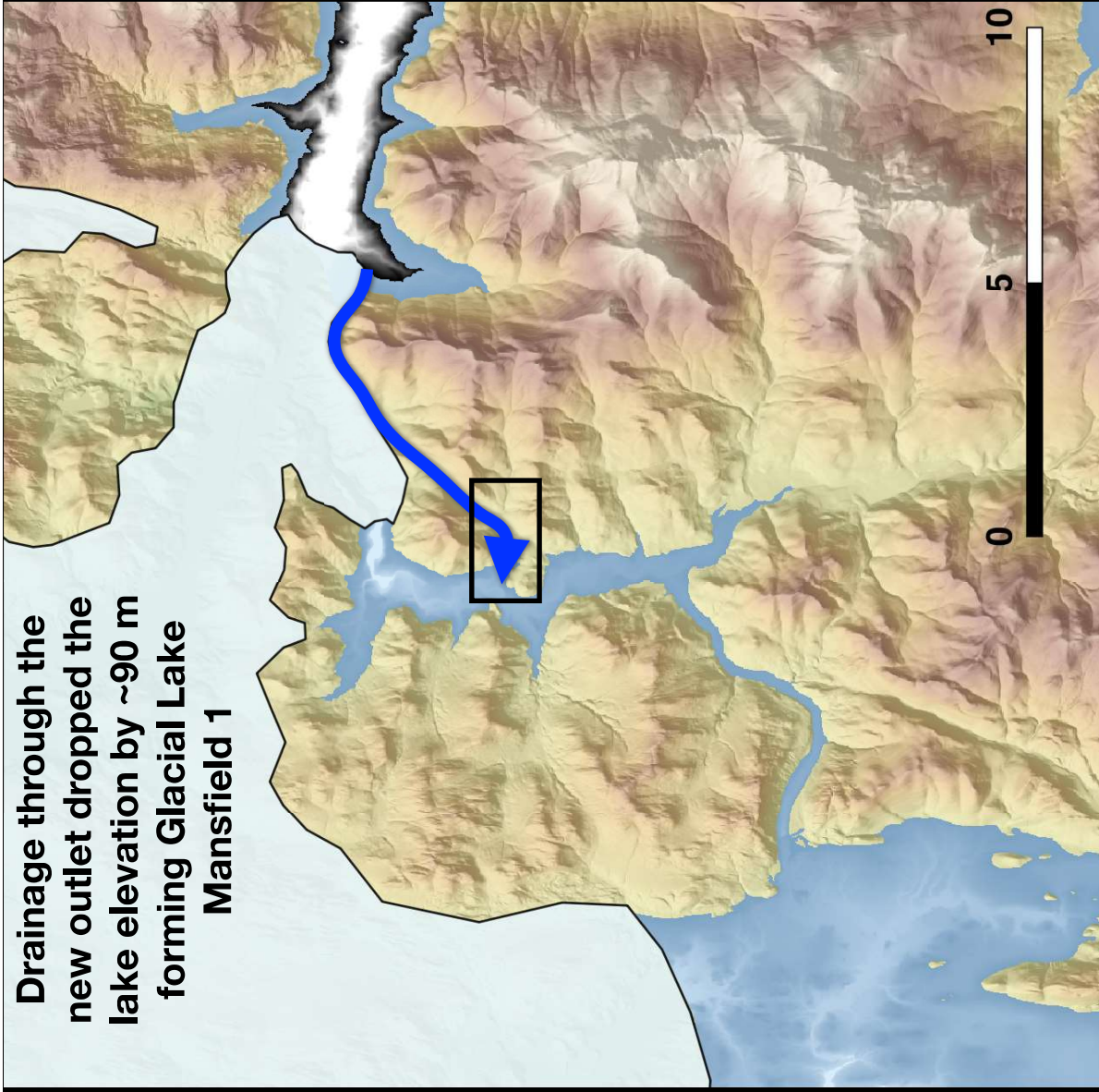
Correlation of Waterbury Reservoir Varves with the North American Varve Chronology



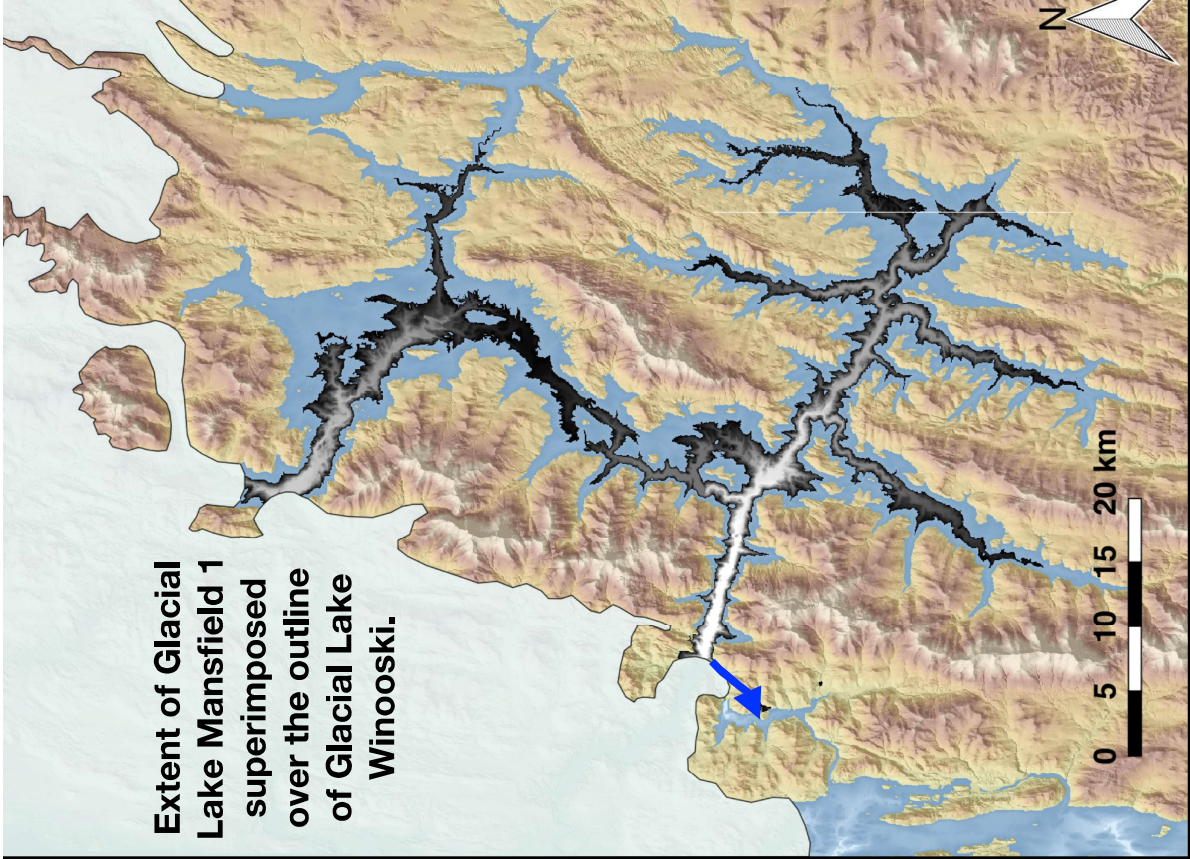
Glacial Lake Winooski partially Drained when ice sheet retreat uncovered a lower outlet: Gillette Pond.

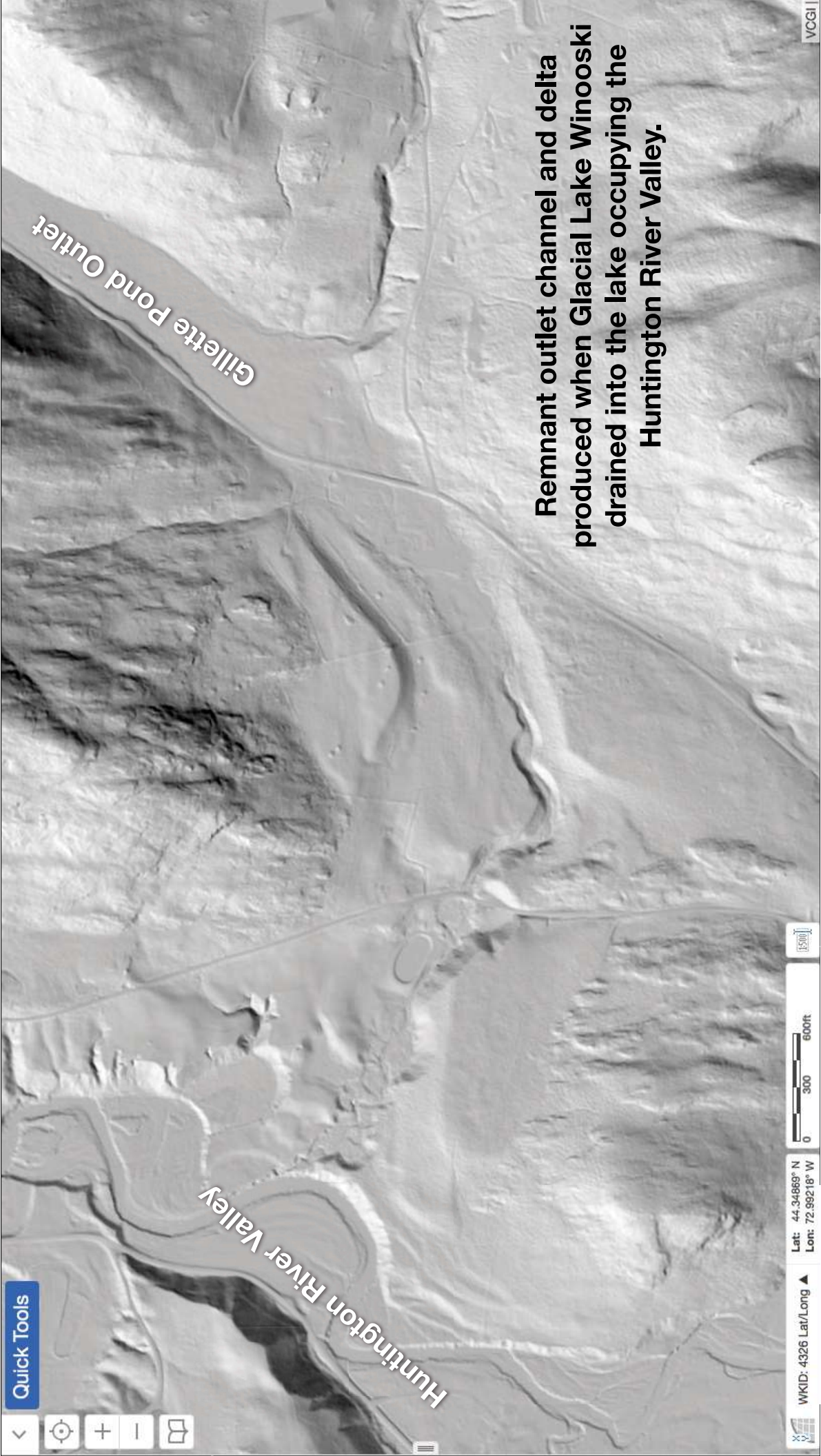


Drainage through the new outlet dropped the lake elevation by ~90 m forming Glacial Lake Mansfield 1



Extent of Glacial Lake Mansfield 1 superimposed over the outline of Glacial Lake Winooski.

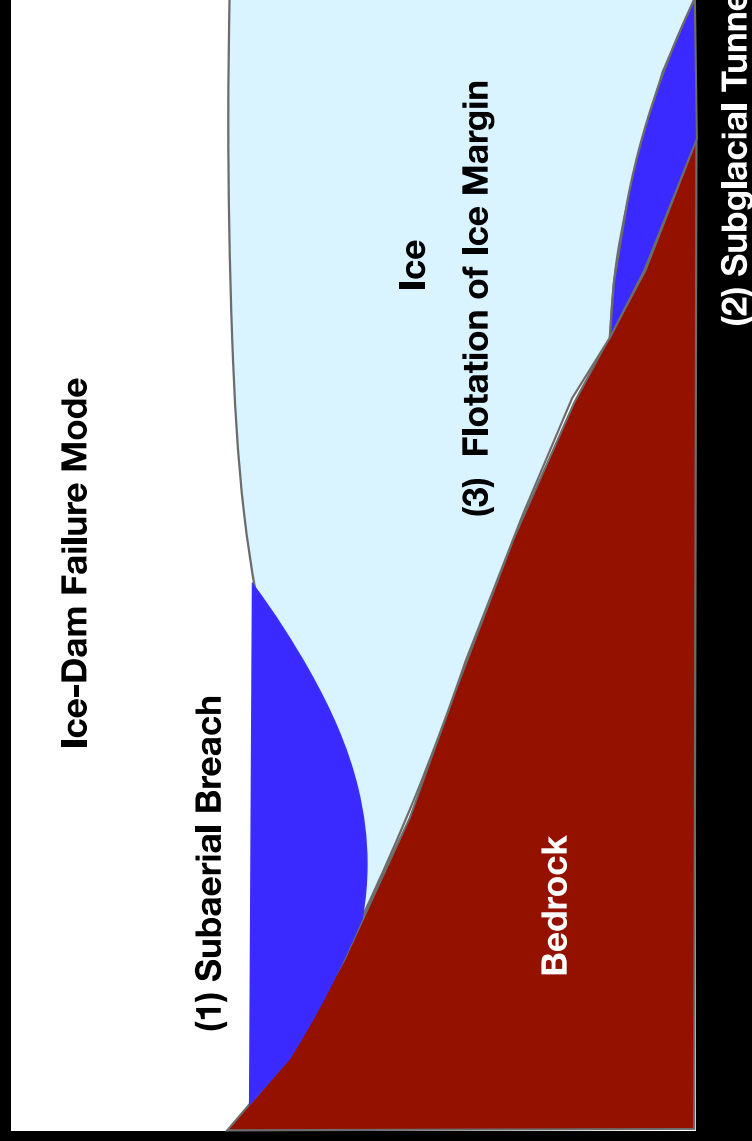




Remnant outlet channel and delta produced when Glacial Lake Winooski drained into the lake occupying the Huntington River Valley.

Flood Volume Estimate

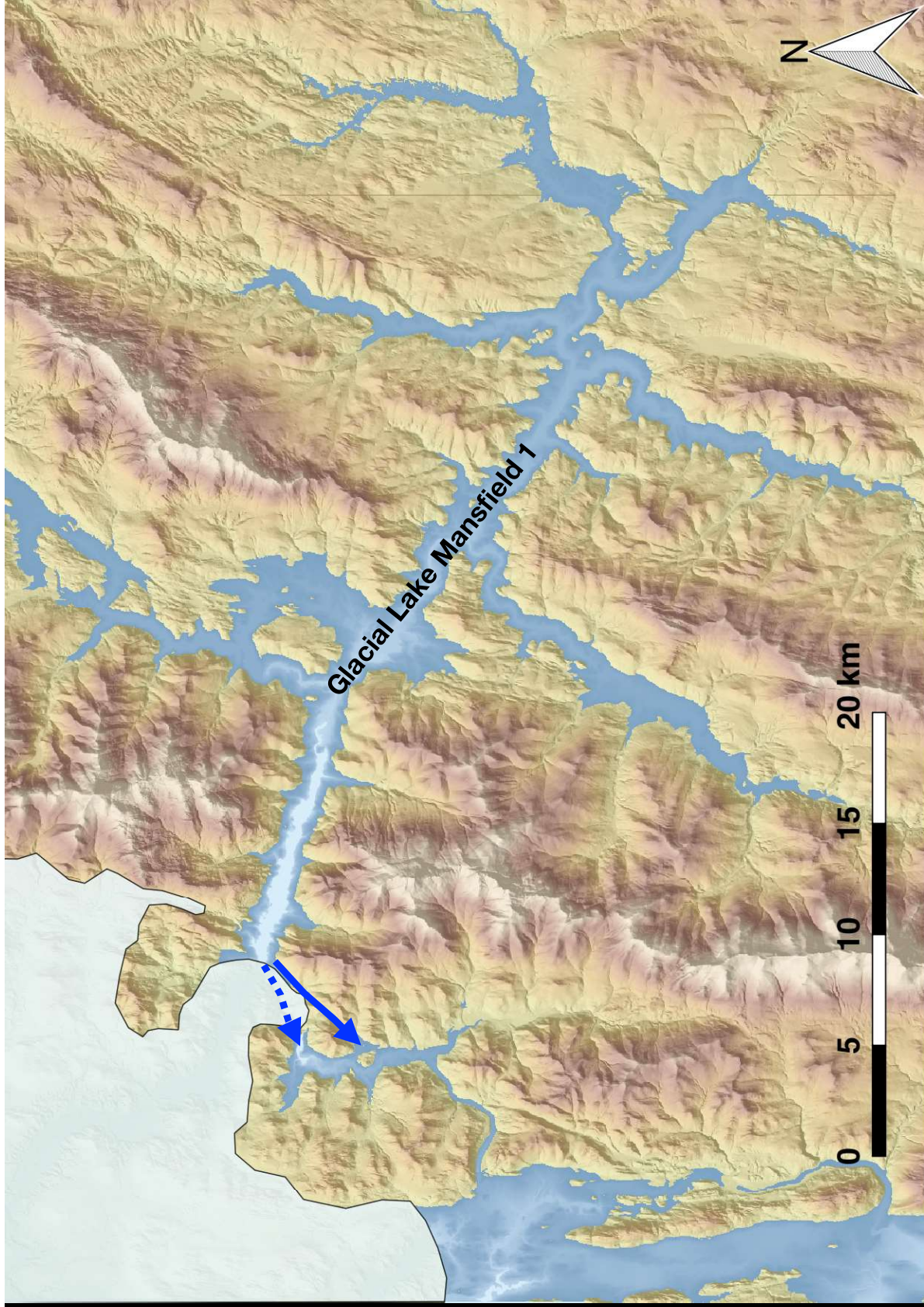
- Volume of Glacial Lake Winooski
 - 1,206 km³
- Volume of Glacial Lake Mansfield 1
 - 829 km³
- Flood Volume
 - 377 km³



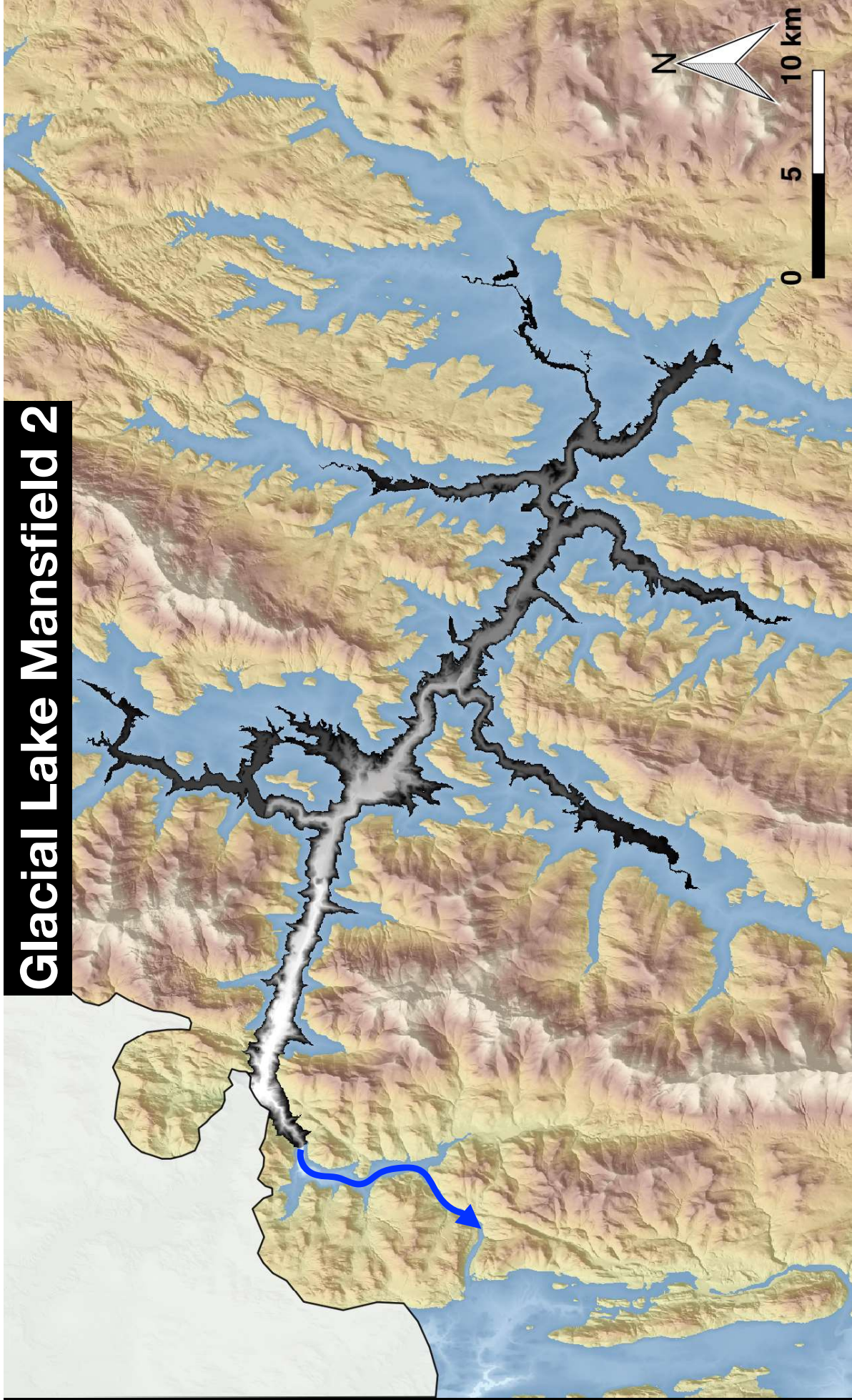
**Transition from
Glacial Lake
Mansfield 1 to
Glacial Lake
Mansfield 2**

**Relatively little
additional retreat of
the ice sheet
uncovers a lower
outlet through the
Huntington River
Valley.**

**Lake level drops
another 26 m.**



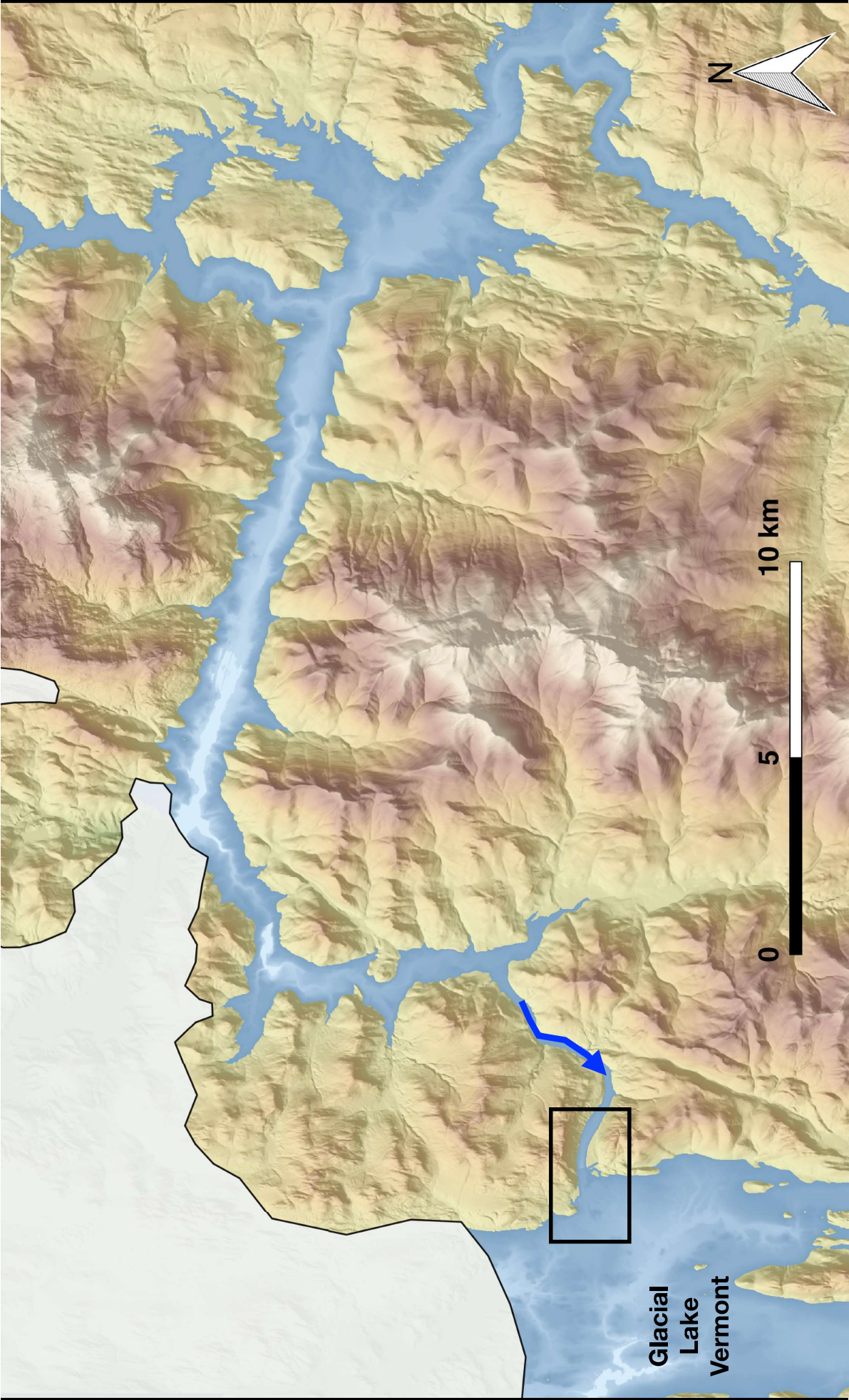
Glacial Lake Mansfield 2



Glacial Lake Mansfield 2



Glacial
Lake
Vermont



10 km

5

0

Glacial
Lake
Vermont

Quick Tools



South Hinesburg Delta

Glacial Lake
Vermont

Hollow Brook
Outlet



WKID: 4326 Lat/Lon ▲
Lat: 44.29986° N
Lon: 73.02256° W



1500'

VCGI | V

Transition from Glacial Lake Mansfield 2 to Glacial Lake Vermont



Quick Tools



Williston Village

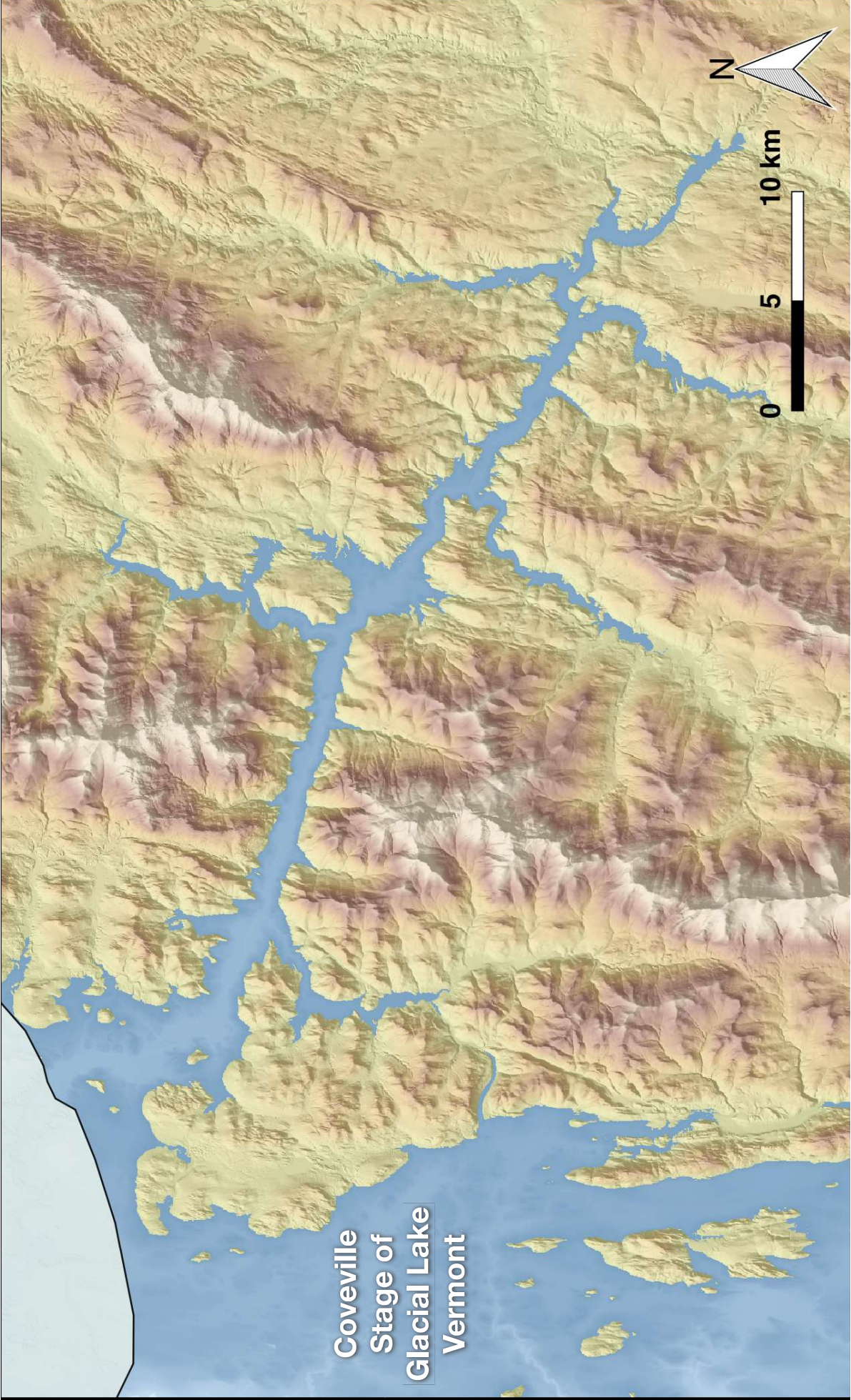
Winooski
River Valley

Williston Outlet Channel



WKID: 4326 Lat/Long ▲
Lat: 44.44555° N
Lon: 73.07698° W





Coveville
Stage of
Glacial Lake
Vermont