



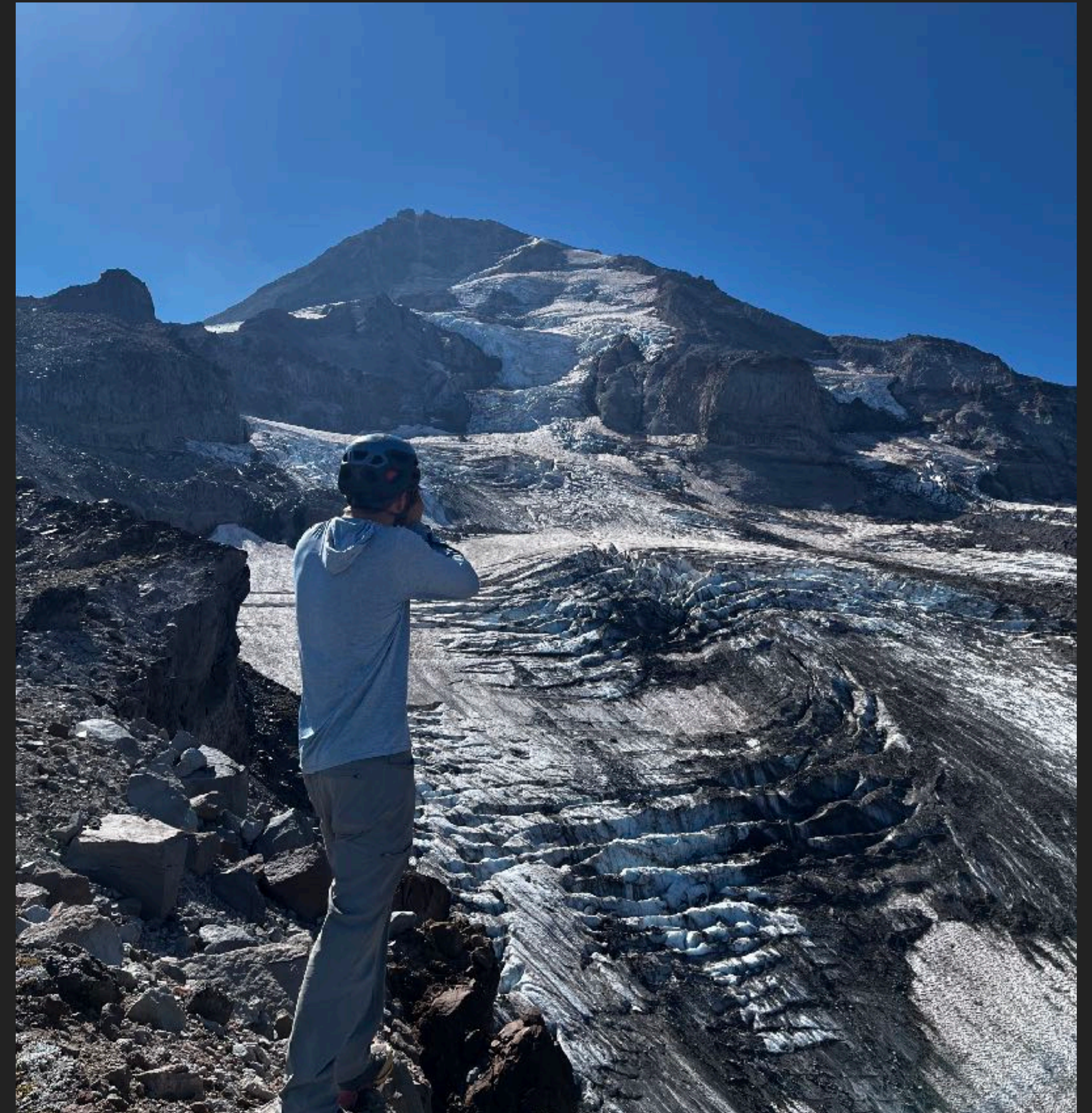
OREGON GLACIERS INSTITUTE

20 YEARS OF 21ST CENTURY GLACIER CHANGE ON MT. HOOD



DOCUMENTING 20 YEARS OF CHANGE

- ▶ In the fall of 2003, Dr. Steve Boyer of the Mazamas Mountaineering Club took a series of photos and ice-margin location measurements
- ▶ In the fall of 2023, OGI repeated this photographic series and mapped the extent of glaciers on Mt. Hood in the field and using satellite imagery
- ▶ Results are combined with mapped ice extents on Mt. Hood from 1901/1907 up to 2003/2004 by Jackson & Fountain (2007) for a 120-year record of glacier change



ZIGZAG GLACIER

- ▶ Zigzag Glacier on the south side of Mt. Hood is still flowing but is almost completely gone and will disappear in the very near future
- ▶ Palmer snowfield also now disappears in late summer



NEWTON-CLARK GLACIER

- ▶ Newton-Clark's active glacier ice has retreated out Clark Creek drainage
- ▶ Newton Clark has lost 53% of its 1907 area, of which 20% occurred in the last 20 years



ELIOT GLACIER

- ▶ Eliot has disconnected from its debris covered terminus
- ▶ Eliot has lost 47% of its 1901 area, of which 28% occurred in the last 20 years



COE GLACIER

- ▶ Coe's terminus has melted over a cliff, losing an ice fall in the last 20 years
- ▶ Coe has lost 51% of its 1907 area, of which 36% occurred in the last 20 years



LADD GLACIER

- ▶ Ladd has broken up into one glacier and several separate small ice masses
- ▶ Ladd has lost 79% of its 1907 area, of which 41% occurred in the last 20 years



SANDY GLACIER

- ▶ Sandy's ice caves have migrated upslope; rockfall onto the glacier has increased
- ▶ Sandy has lost 61% of its 1907 area, of which 21% occurred in the last 20 years



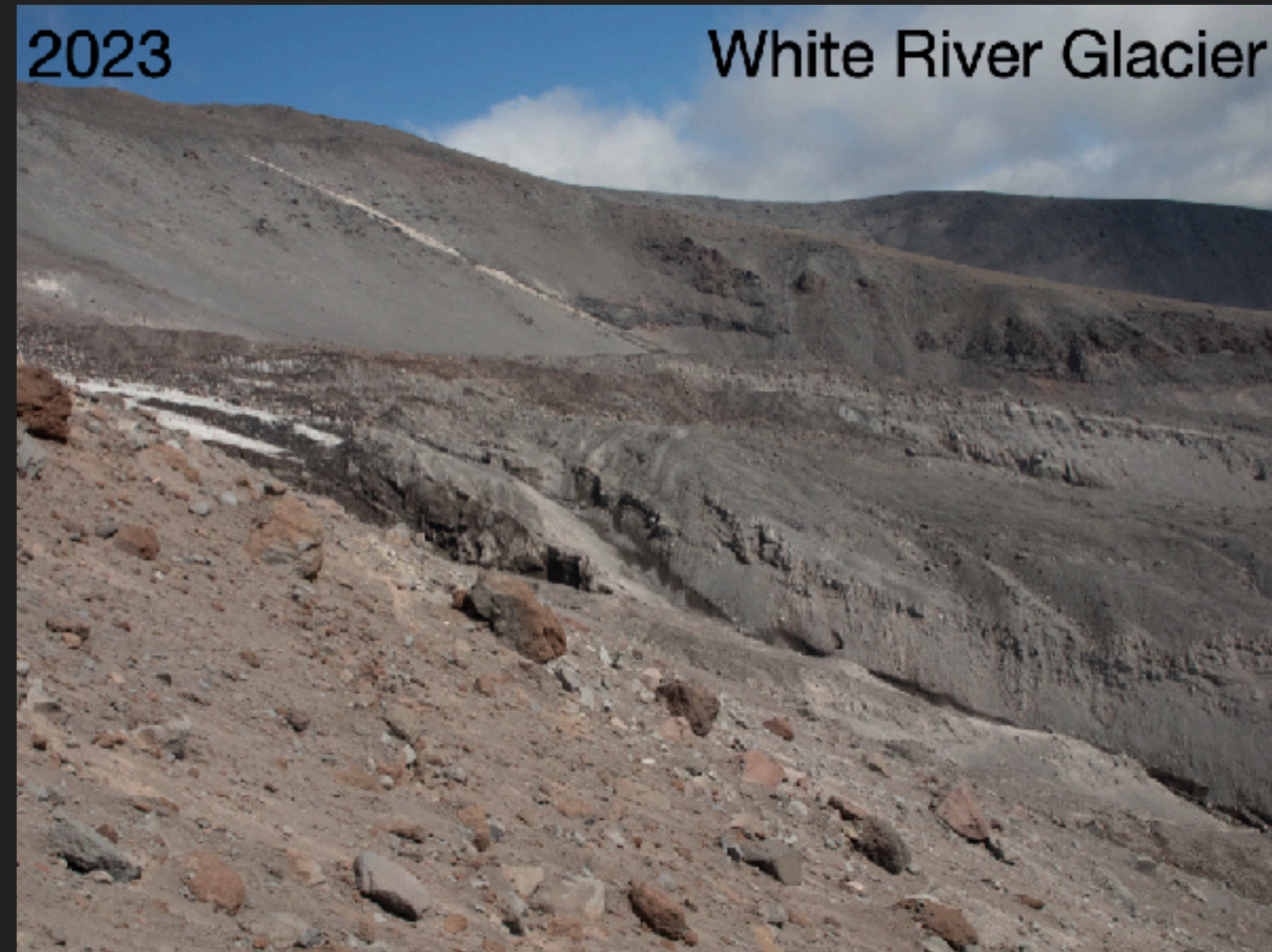
REID GLACIER

- ▶ Reid's two ice falls have nearly completely disappeared
- ▶ Reid has lost 47% of its 1907 area, of which 11% occurred in the last 20 years



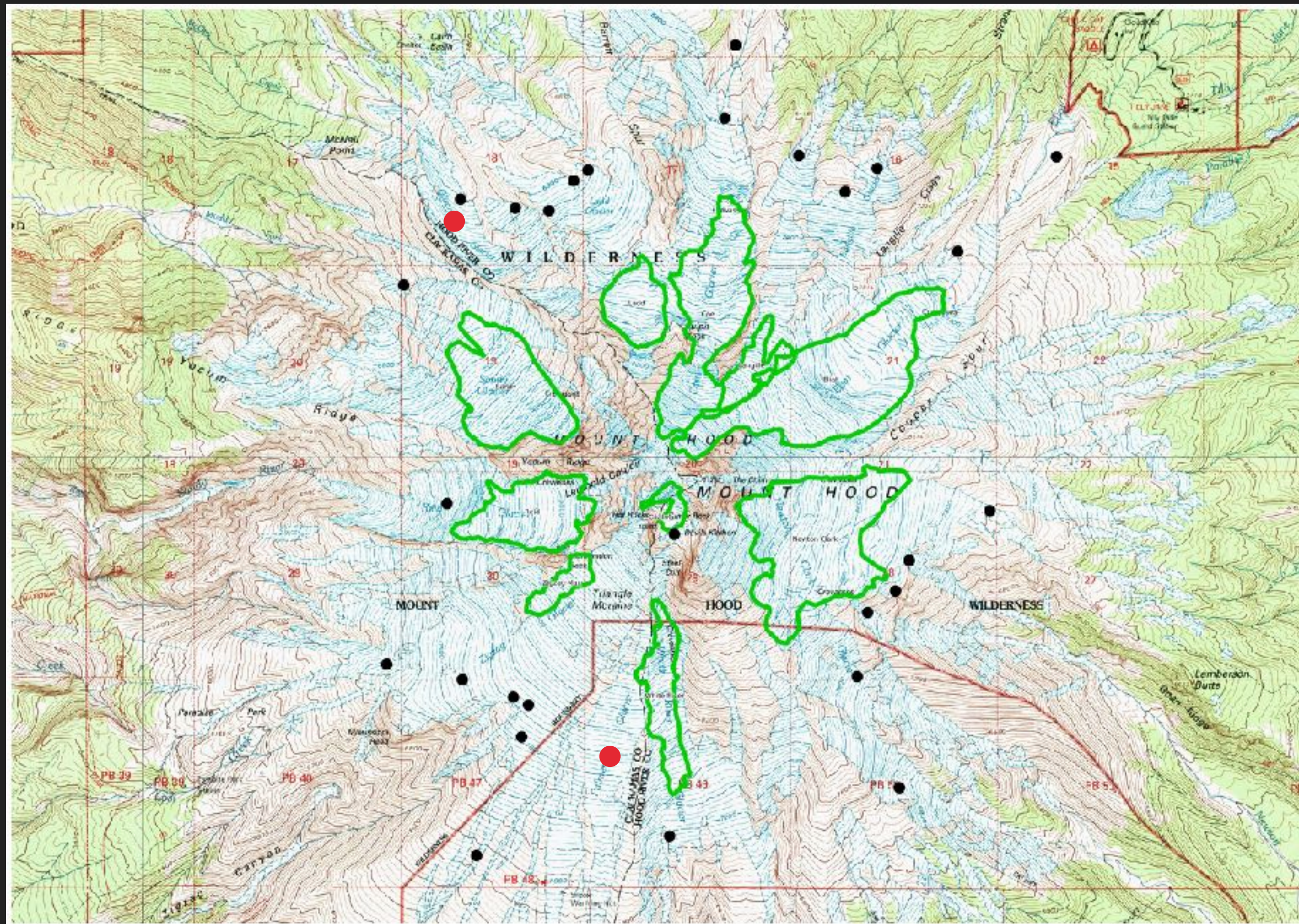
WHITE RIVER GLACIER GLISAN GLACIER

- ▶ White River has lost 74% of its 1907 area, of which 13% occurred in the last 20 years
- ▶ Glisan is no longer a glacier, ceasing to flow in the last 20 years; its remnant ice will soon be gone

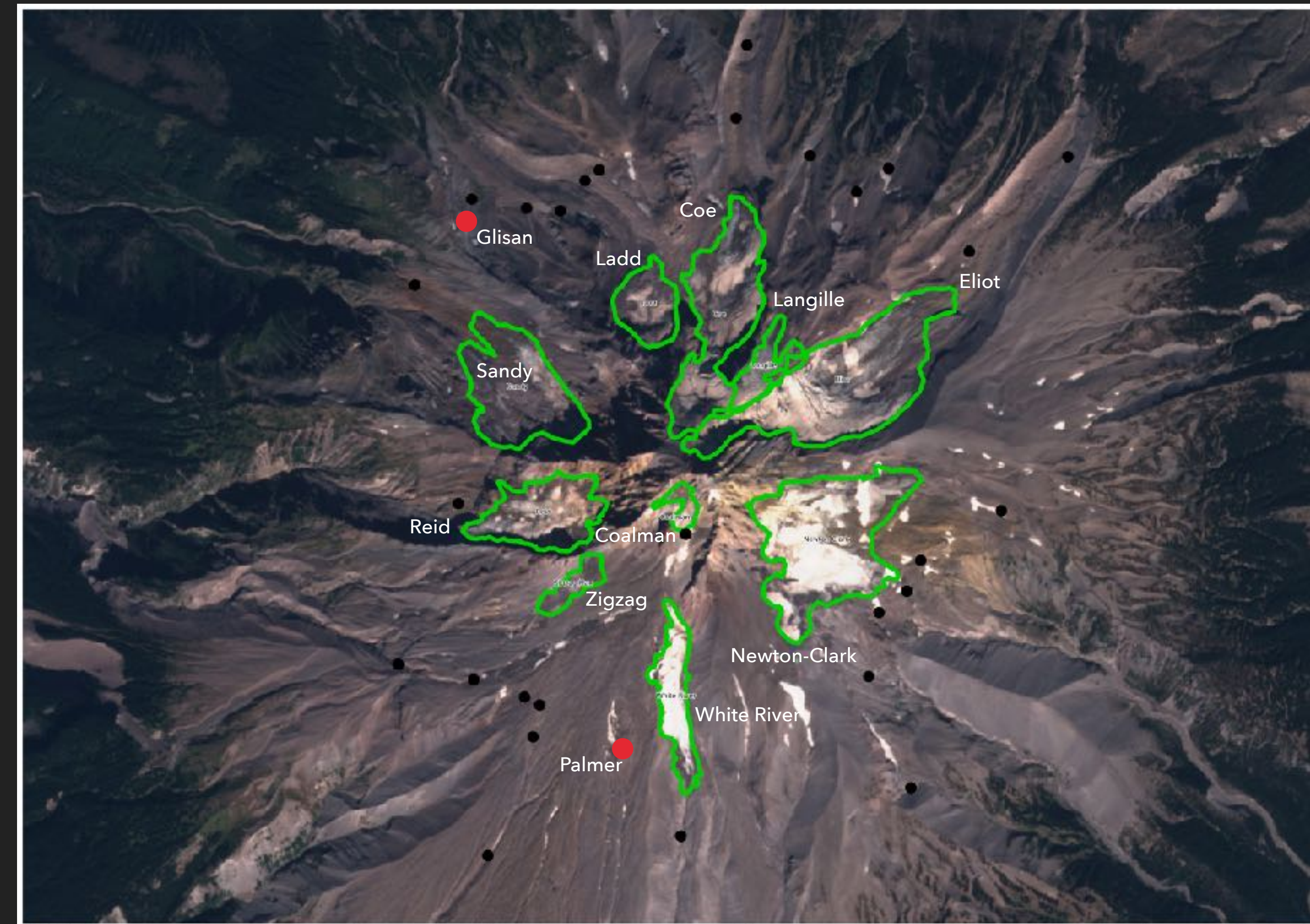


20 YEARS OF 21ST CENTURY GLACIER CHANGE ON MT. HOOD

USGS MAPPED ICE EXTENT



2023 ACTUAL ICE EXTENT

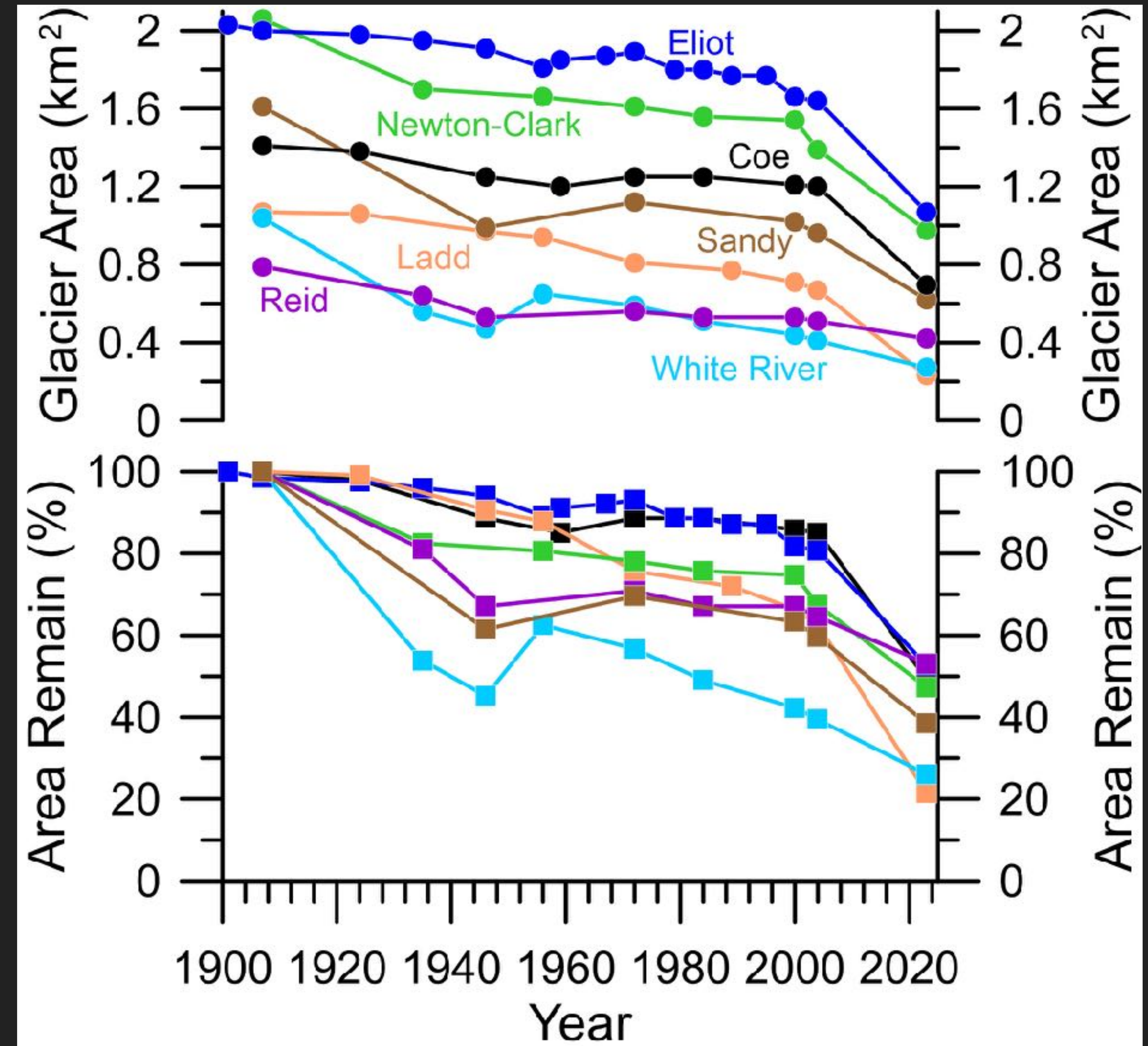


Black symbols are Boyer's 2003 measurements; green lines are 2023 extent; red symbol = gone glacier

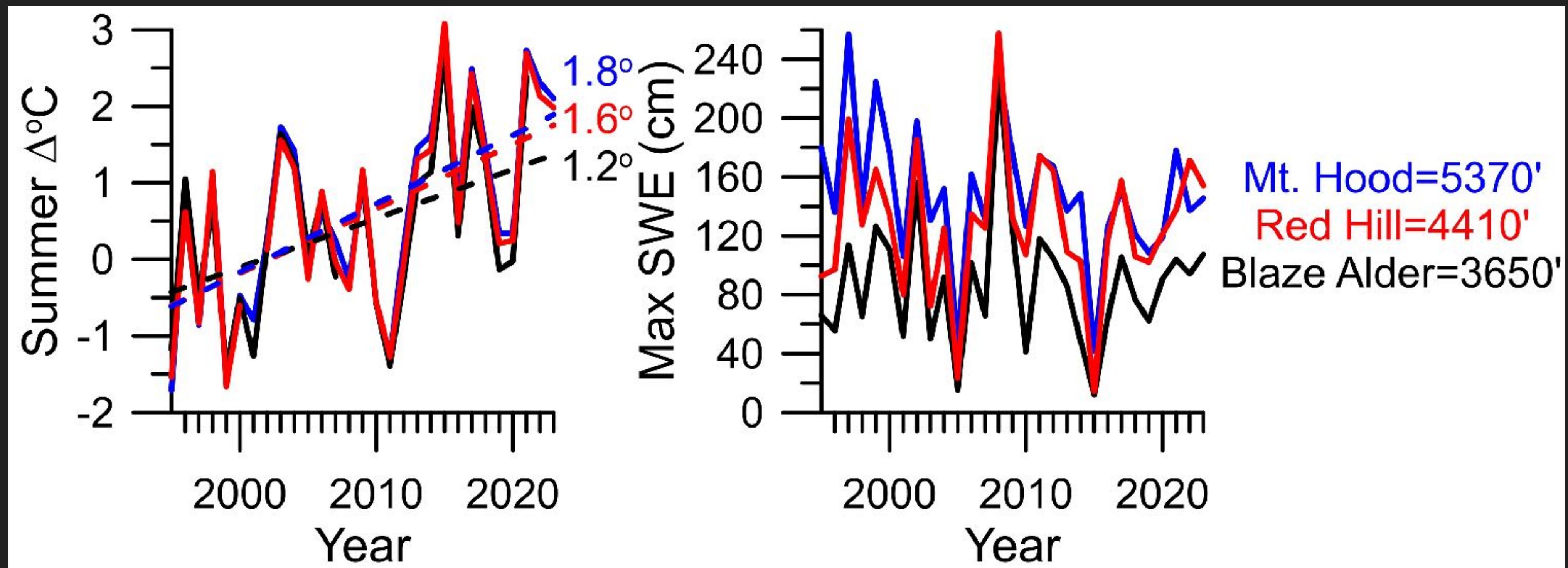
U.S. Geological Survey ice extents from 1950s air photos; satellite image from September 19, 2023

CHANGE IN GLACIER AREA

- ▶ In the last ~120 years, Mt. Hood's glaciers lost on average 60% of their area (min=47%, max=79%)
- ▶ About 25% (min=11%; max=41%) of that area loss occurred in the last 20 years (2003-2023)
- ▶ That is, roughly 40% of all the retreat that occurred in the last 120 years occurred in the last 20 years (min=18%, max=71%)



MT. HOOD SUMMER TEMPERATURE & PEAK SNOWPACK



- ▶ Mt. Hood snow telemetry sites record significant warming trends over last 20 years that result in summers that are 1.2-1.8°C (2.2-3.2°F) warmer
- ▶ Winter snowpack (snow water equivalent=SWE) has no trend over last 20 years

120 YEARS OF GLACIER CHANGE

- ▶ In the last 20 years, Mt. Hood has undergone unprecedented glacier retreat with respect to the last ~120 years
- ▶ One glacier ceased to exist in the last 20 years and another one is on the cusp of stagnation
- ▶ This loss of glacier ice is in response to the ~2-3°F of summer warming on Mt. Hood over the last 20 years
- ▶ In addition to being direct evidence of human-caused global warming impacts on Oregon, this glacier retreat and loss is increasing geologic hazards on Mt. Hood

