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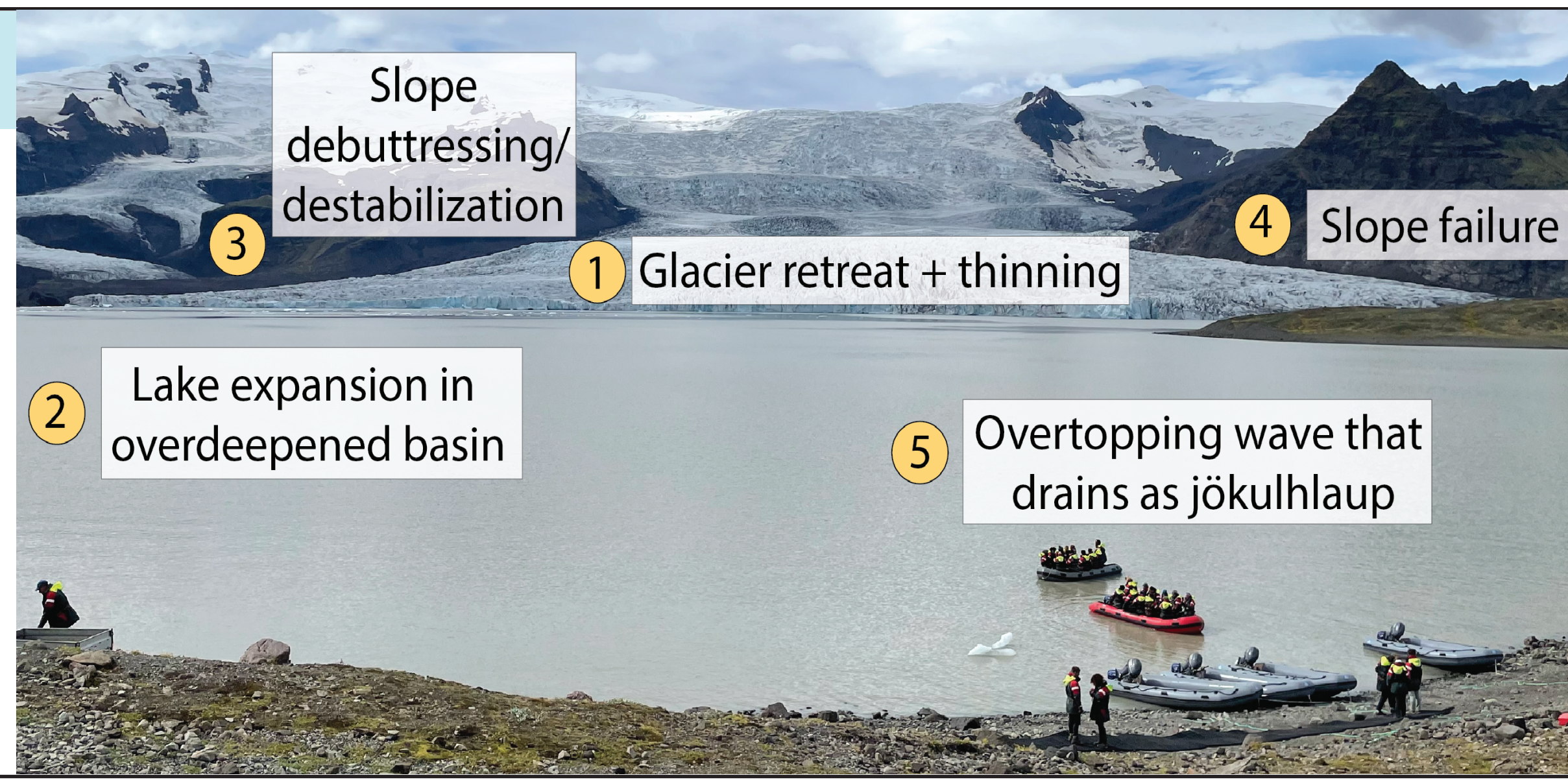
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## An emerging hazard in Iceland

- Glacier mass balance has decreased nearly 20% since 1890 (Aðalgeirsdóttir et al., 2020)
- Proglacial lakes are expanding at most outlet glaciers (Guðmundsson et al., 2019; Magnússon et al., 2012)
- Largest ice caps are predicted to lose ~20% of current volume by 2100 (Schmidt et al., 2020)



## Research questions

- 1) How will proglacial lakes evolve in a warming climate?
- 2) How will lake development affect outburst flood risk?
- 3) How will this hazard impact downstream infrastructure and communities?

## Work packages

Topographic map (subglacial, subaqueous, + subaerial terrain)

Future lake volume and extent (present to 2100)

Map of potential slope failure "hot spots"

Hydraulic models of flood drainage routes and dynamics

## Sólheimajökull: Vegagerðin funding

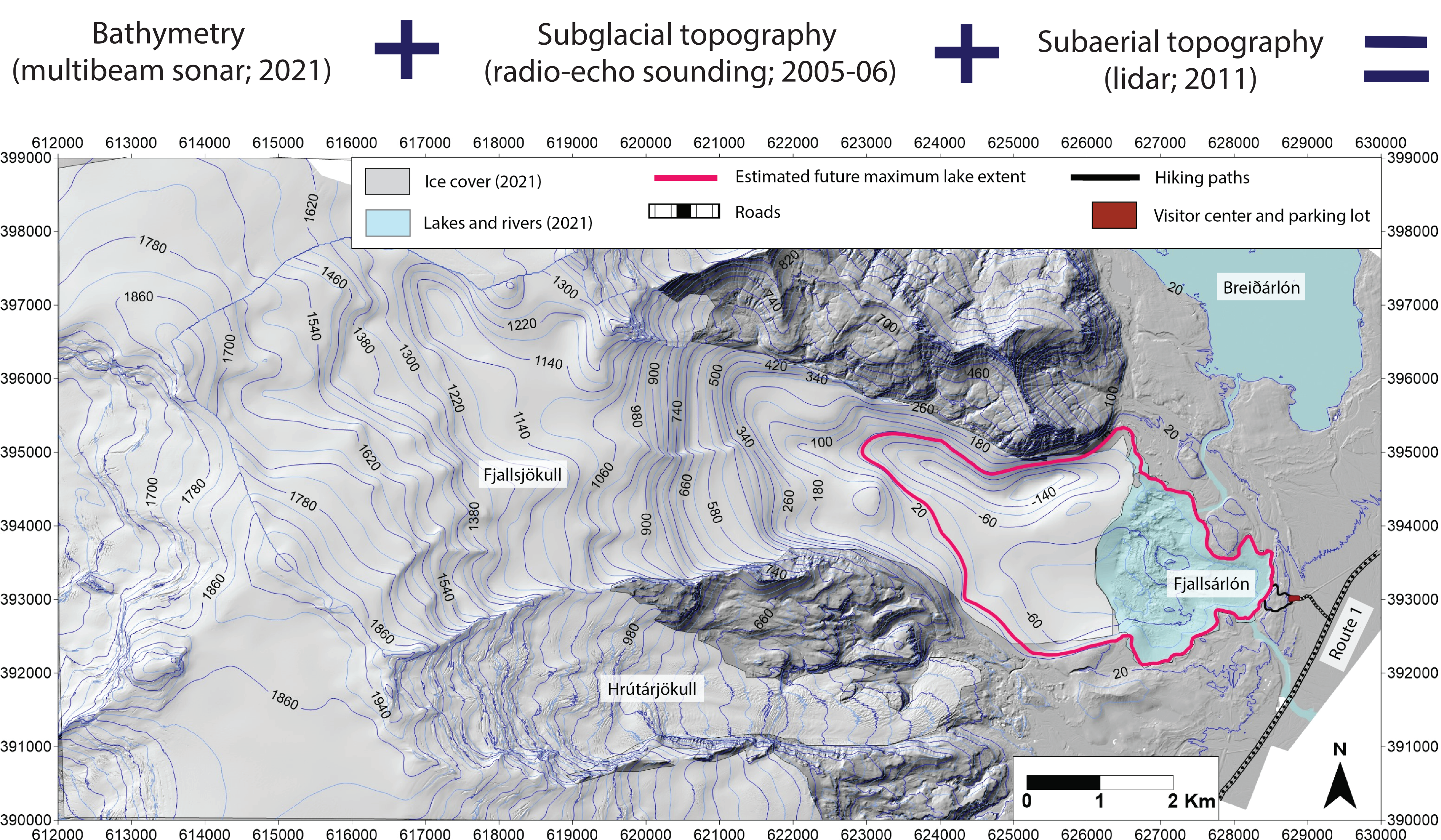
## Next steps + anticipated outputs

- Combine datasets --> timeline for glacier retreat, lake expansion, and flood risk
- Hydraulic modeling (HEC-RAS) --> flood drainage routes, inundation depth, and flow dynamics
- Estimate flood geomorphologic impact (zones of erosion vs. deposition; composition and clast size of deposited material)
- Collaborate with communities, government agencies, and guiding companies --> hazard assessment, mitigation, and communication
- Bathymetric surveys on other lakes in south + southeast Iceland

## How can Vegagerðin use these results?

- Building sites for future roads, buildings, and tourism infrastructure
- Bridge + road strength/material able to withstand predicted flood dynamics
- Construction of flood mitigation structures (i.e. levees)
- Zones of likely post-flood sedimentation vs. erosion --> aids clean-up/repair efforts

## Fjallsjökull: previous study site



Estimated lake change, 2021–future:
Max. depth: 128 m
↓
210 m
Surface area: 0.364 km <sup>2</sup>
↓
0.971 km <sup>2</sup>
Volume: 0.186 km <sup>3</sup>
↓
0.636 km <sup>3</sup>

## References

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