



Connectivity research in Iceland

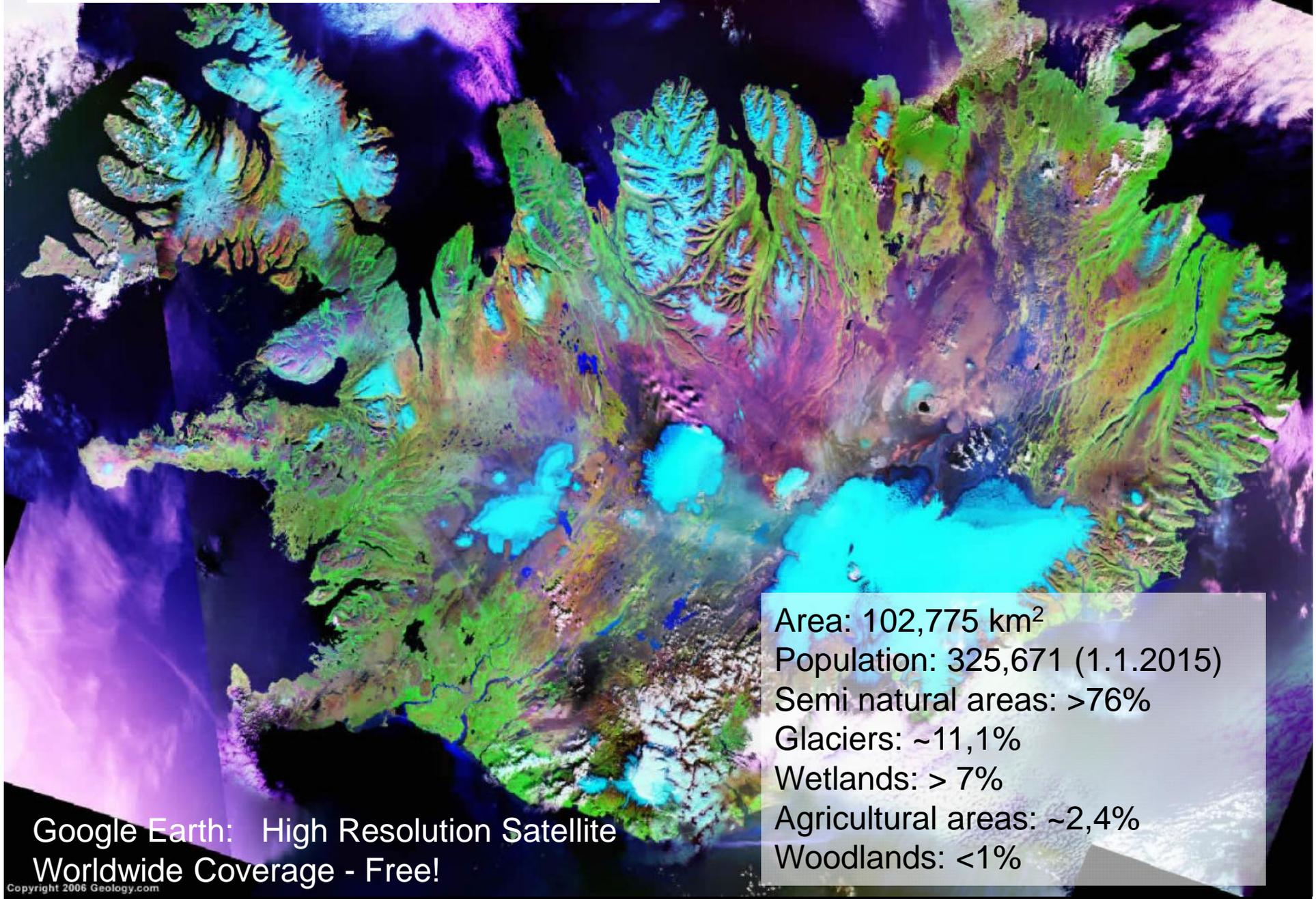
Using scientific tools to establish sustainable water management strategies

EGU2015
David C. Finger
Reykjavik University



HÁSKÓLINN Í REYKJAVÍK
REYKJAVIK UNIVERSITY

Iceland: Land of Fire and Ice

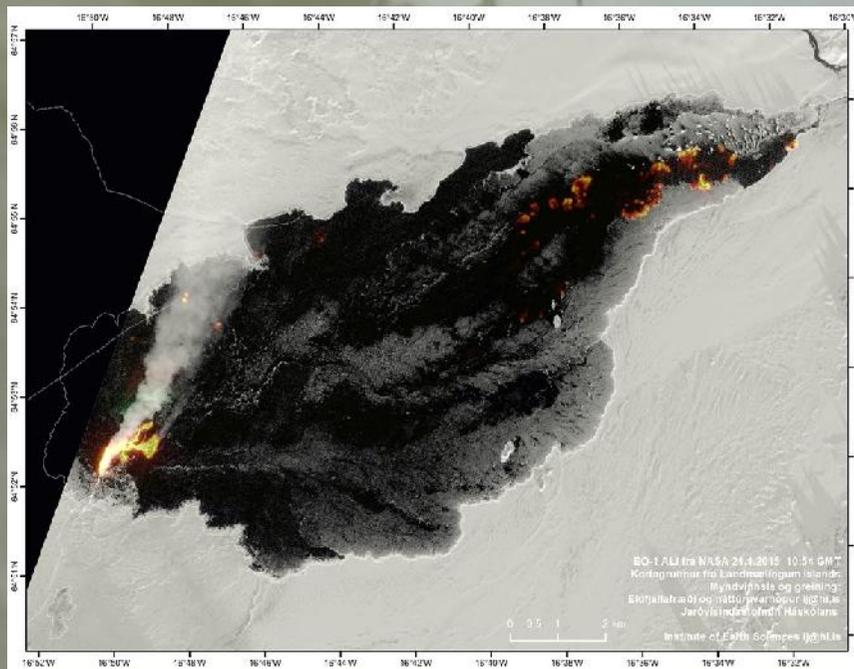


Area: 102,775 km²
Population: 325,671 (1.1.2015)
Semi natural areas: >76%
Glaciers: ~11,1%
Wetlands: > 7%
Agricultural areas: ~2,4%
Woodlands: <1%

Google Earth: High Resolution Satellite
Worldwide Coverage - Free!

Fire and Ice:

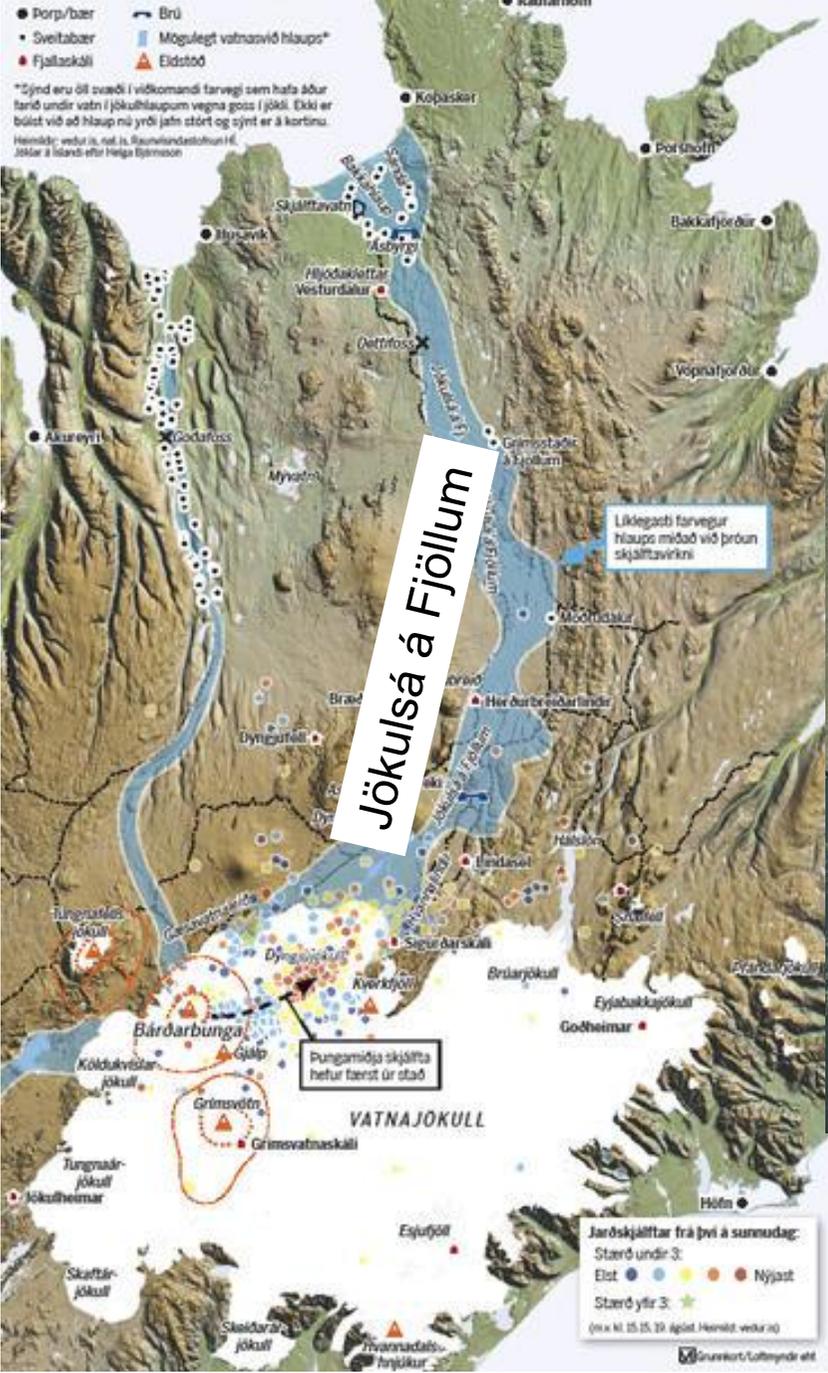
- The 2014 eruption of Bárðarbunga
- active lava flow field at Holuhraun
- Size: Manhattan Island (~84 km²)



MODIS: January 18, 2015
Bollí Pálmason, Veðurstofa Íslands



Bárðarbunga

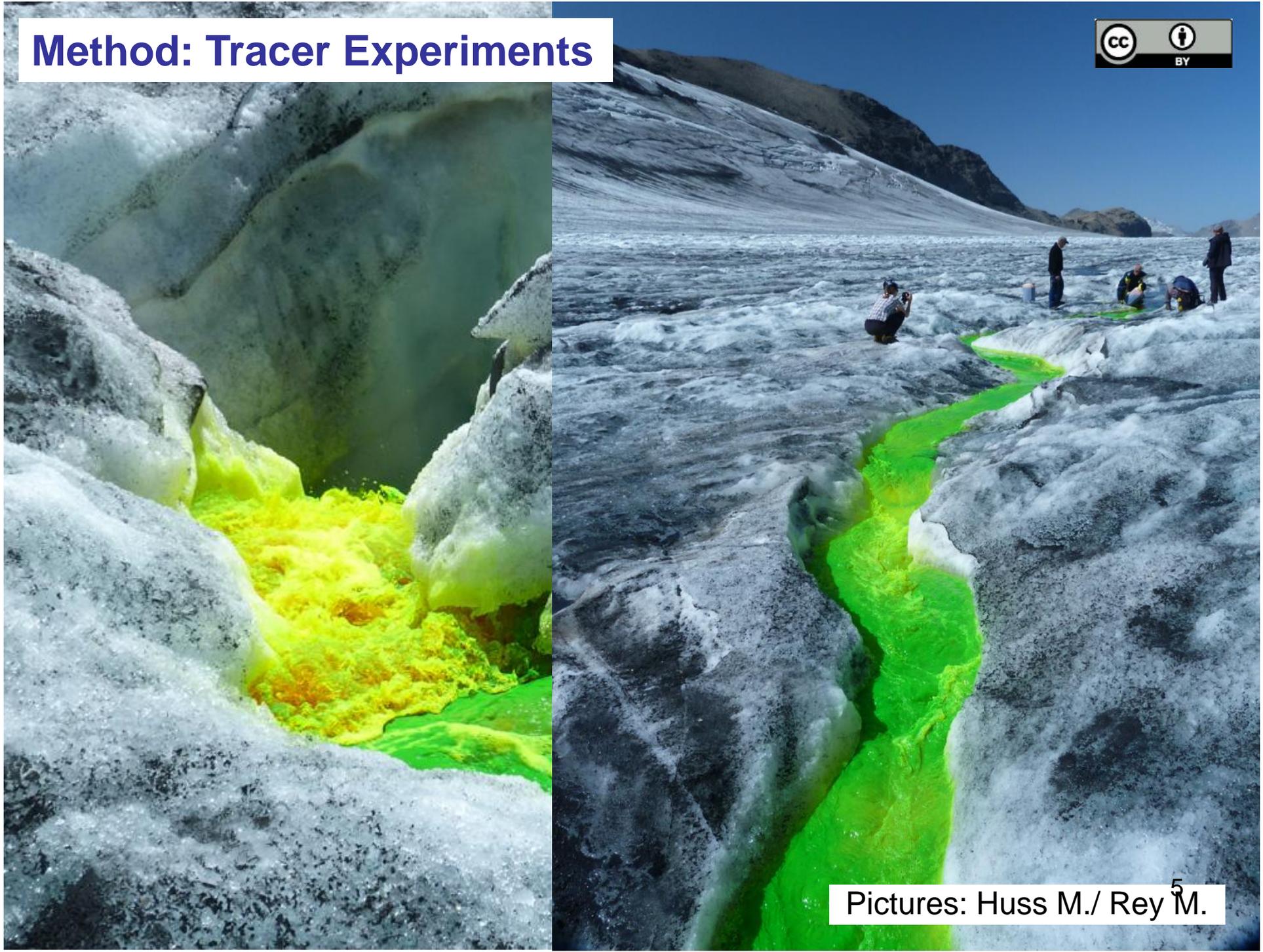


Estimates:
 In case of full eruption the Jökulsá á Fjöllum river might increase 10 or 20 times (to 2,000 – 4,000 m³ s⁻¹) by Guðmundsson (2015)



Hydrological Connectivity?

Method: Tracer Experiments

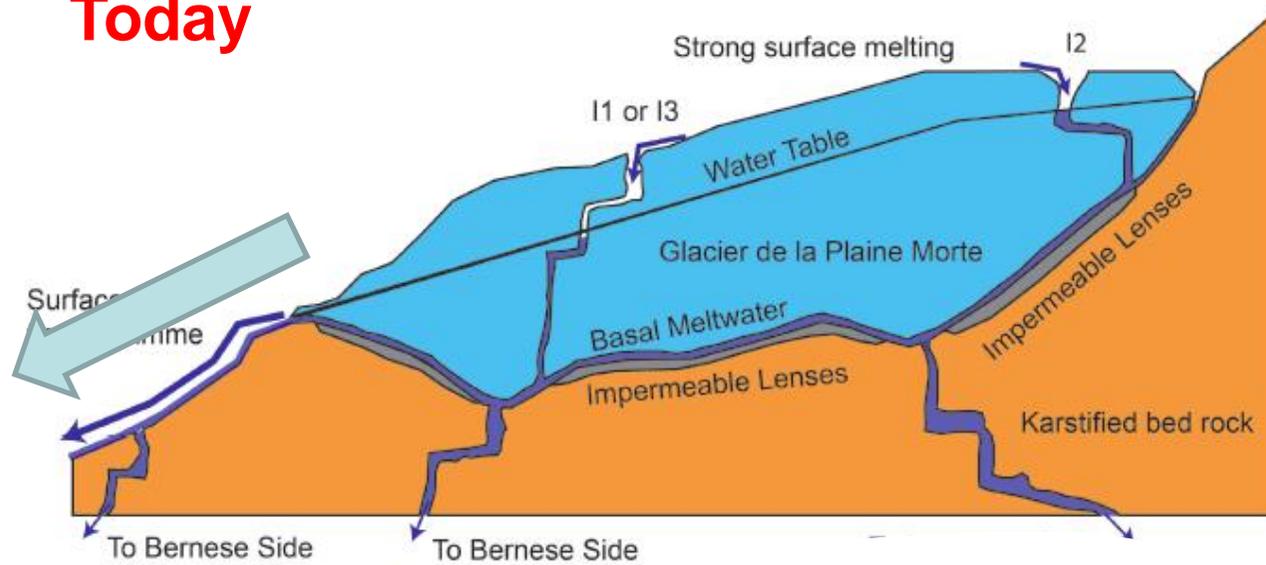


Pictures: Huss M./ Rey M.⁵

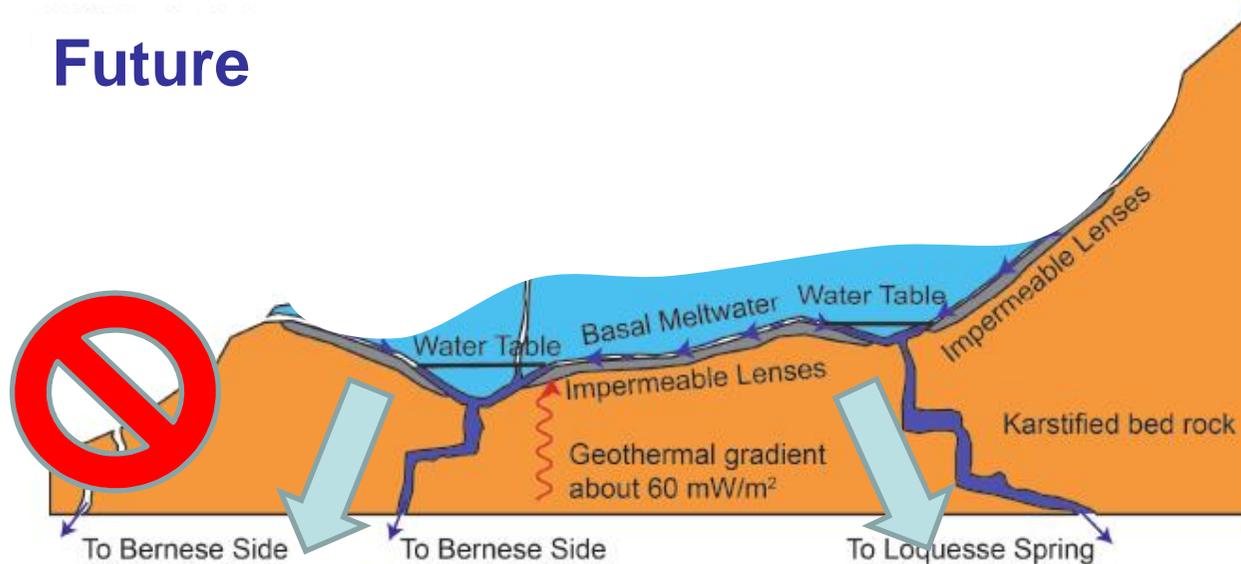
Implications for the future



Today



Future



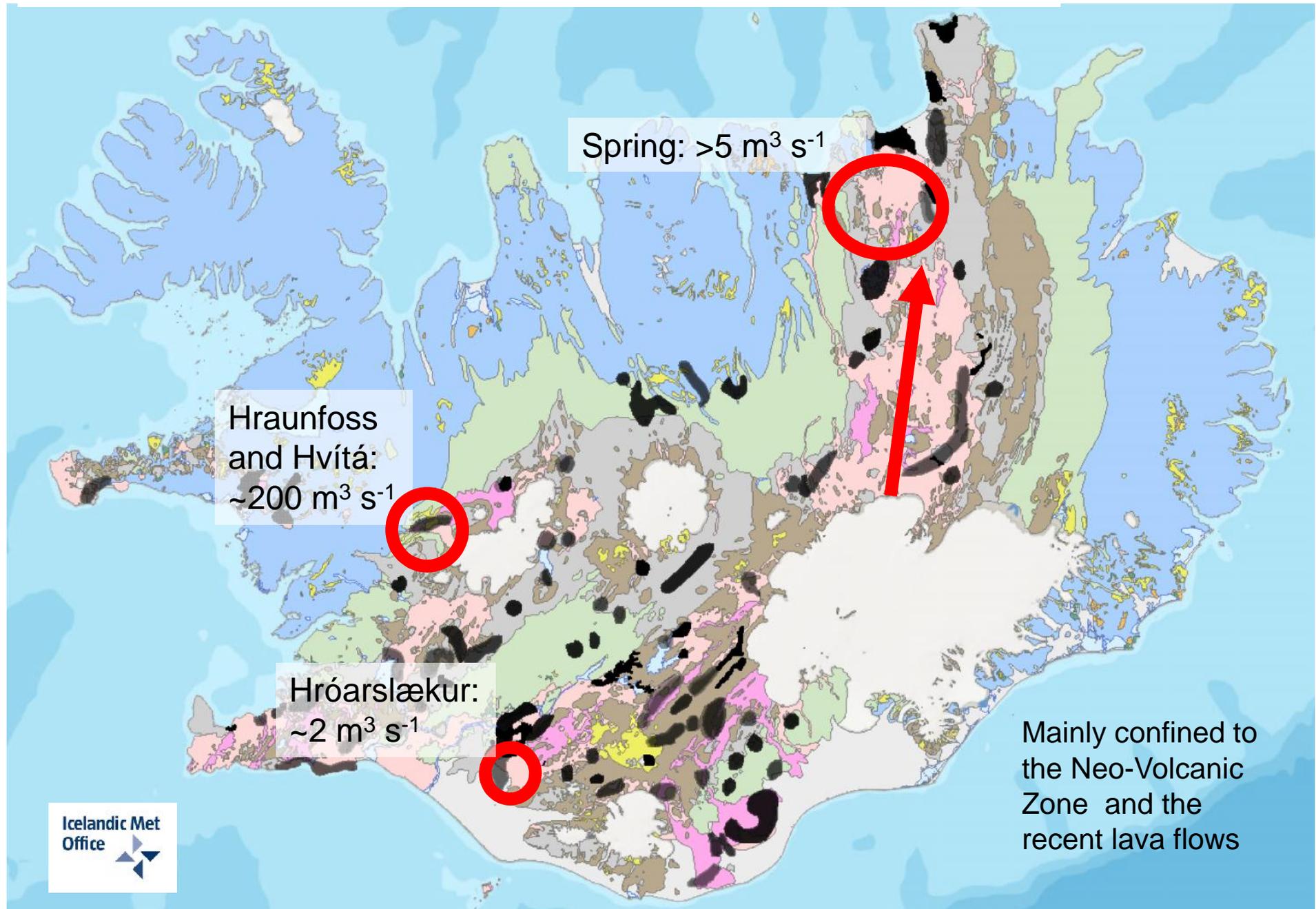
Þrándarjökull – estimations of water resources



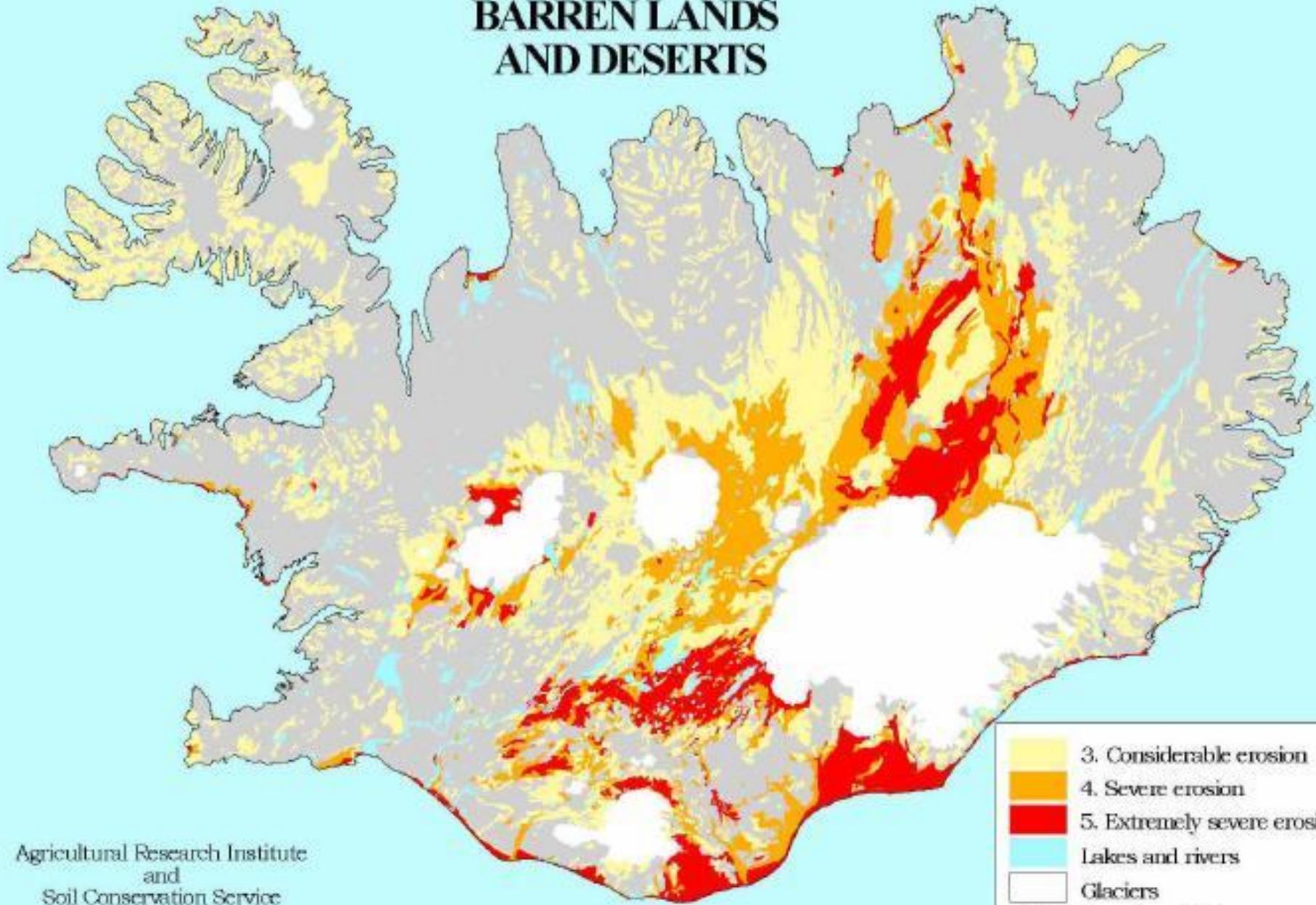
Hraunfossar,
Borgarfjörður, western Iceland



Hydrologic connectivity: Spring areas in Iceland



BARREN LANDS AND DESERTS



	3. Considerable erosion
	4. Severe erosion
	5. Extremely severe erosion
	Lakes and rivers
	Glaciers

0 20 40 80 km

Agricultural Research Institute
and
Soil Conservation Service
1997

Þórsmörk – the forest of Thor



Þórsmör, Markarfljó, Landeyjahöfn

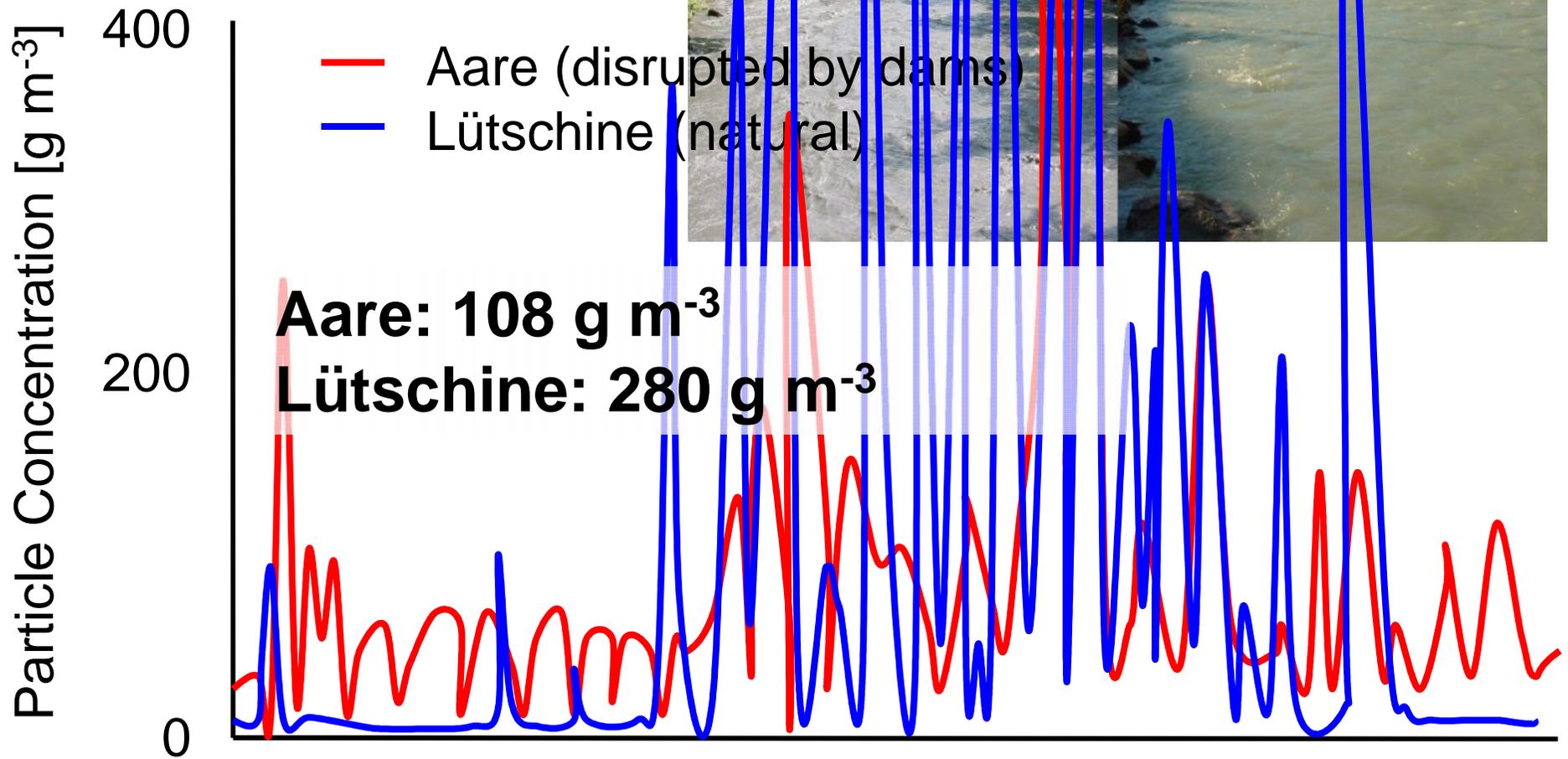
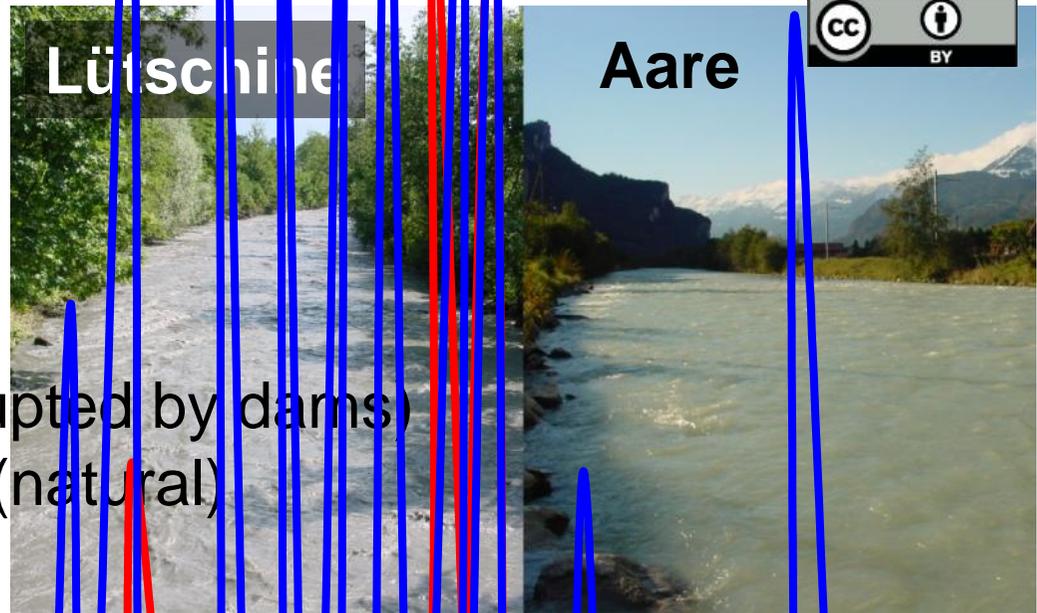




Impacts of disrupted hydrologic connectivity due to Hydropower operations

Finger et al., 2006, WRR

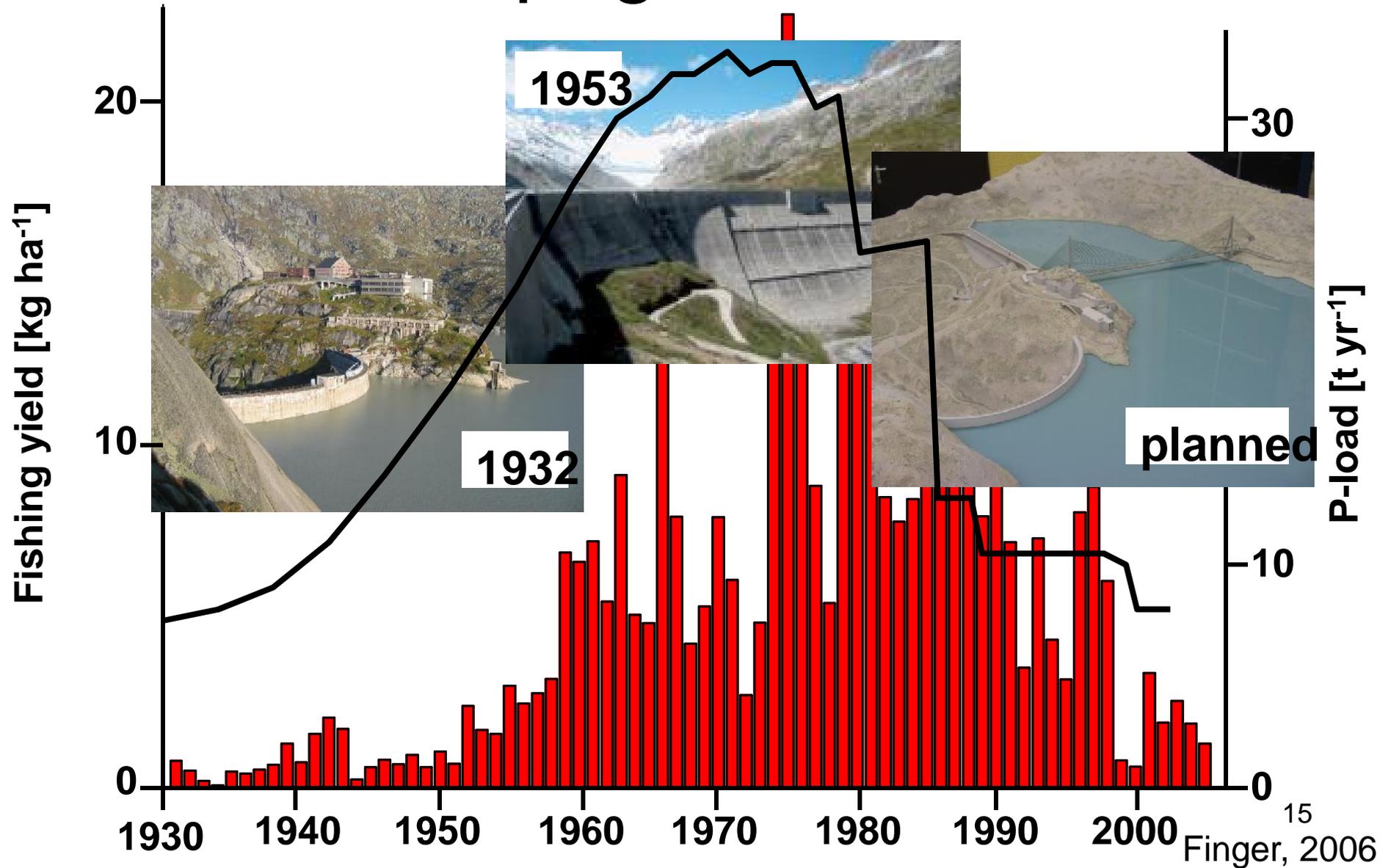
Suspended load



Year 2004

~2 day average
Finger, 2006

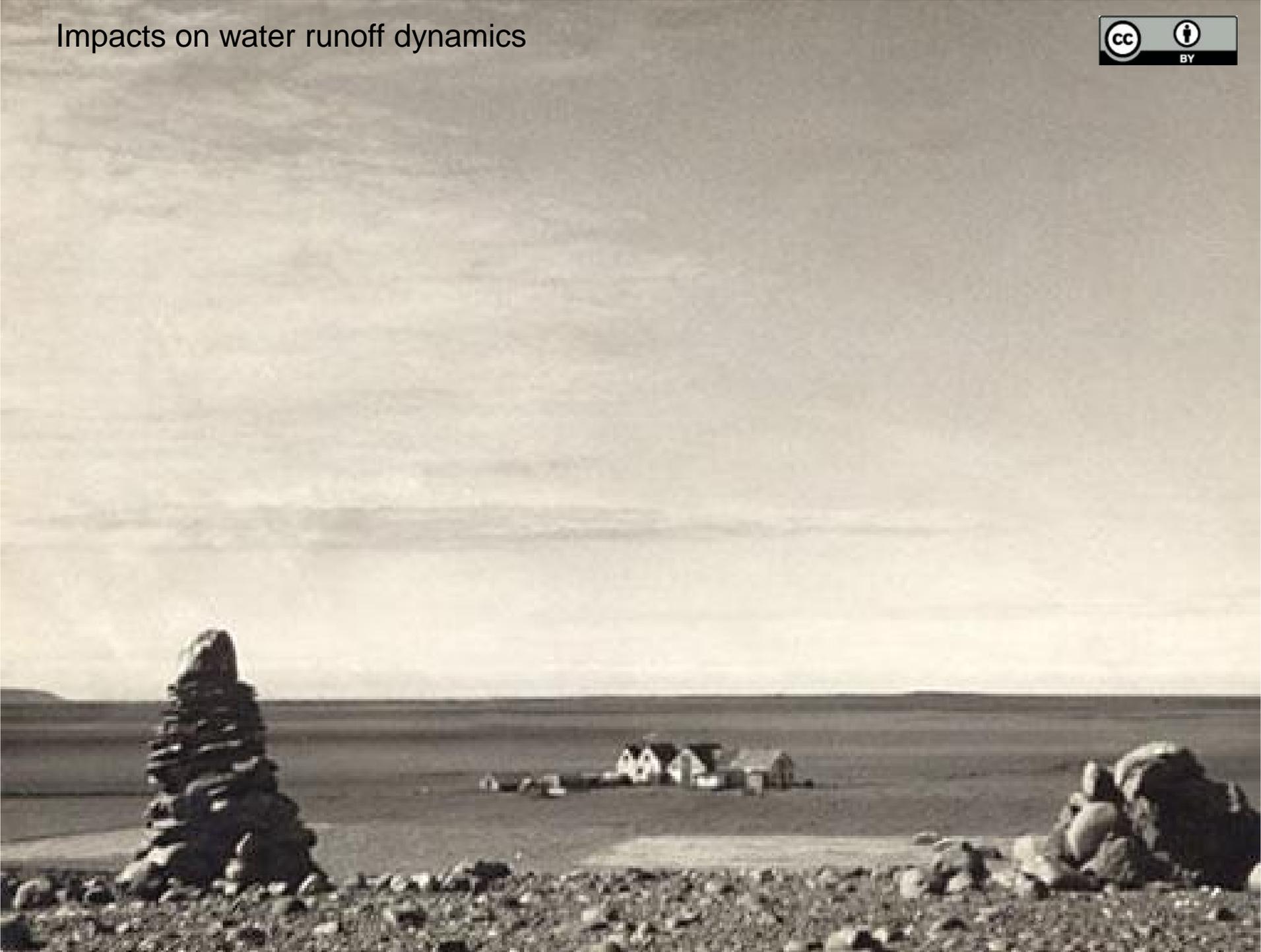
Anthropogenic effects?



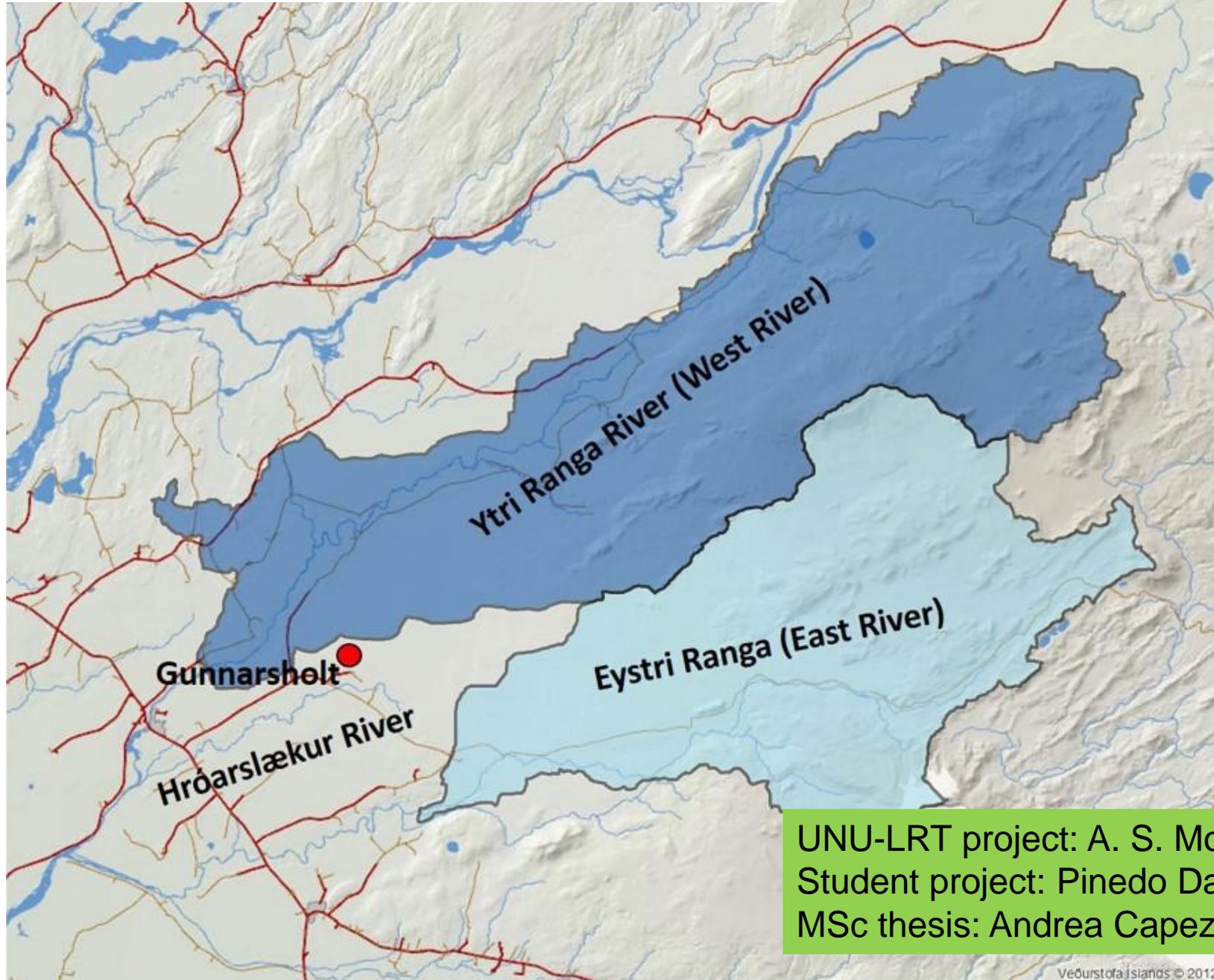
Gunnarsholt - Landgræðsla ríkisins



Impacts on water runoff dynamics



Gunnarsholt - Landgræðsla ríkisins



UNU-LRT project: A. S. Moussa
Student project: Pinedo Daniel
MSc thesis: Andrea Capezio

Ecological connectivity in Hróarslækur



A. S. Moussa, UNU-LRT project

- identify sections with similar ecomorphology
- assess the integrated ecological quality
- describe the ecomorphology

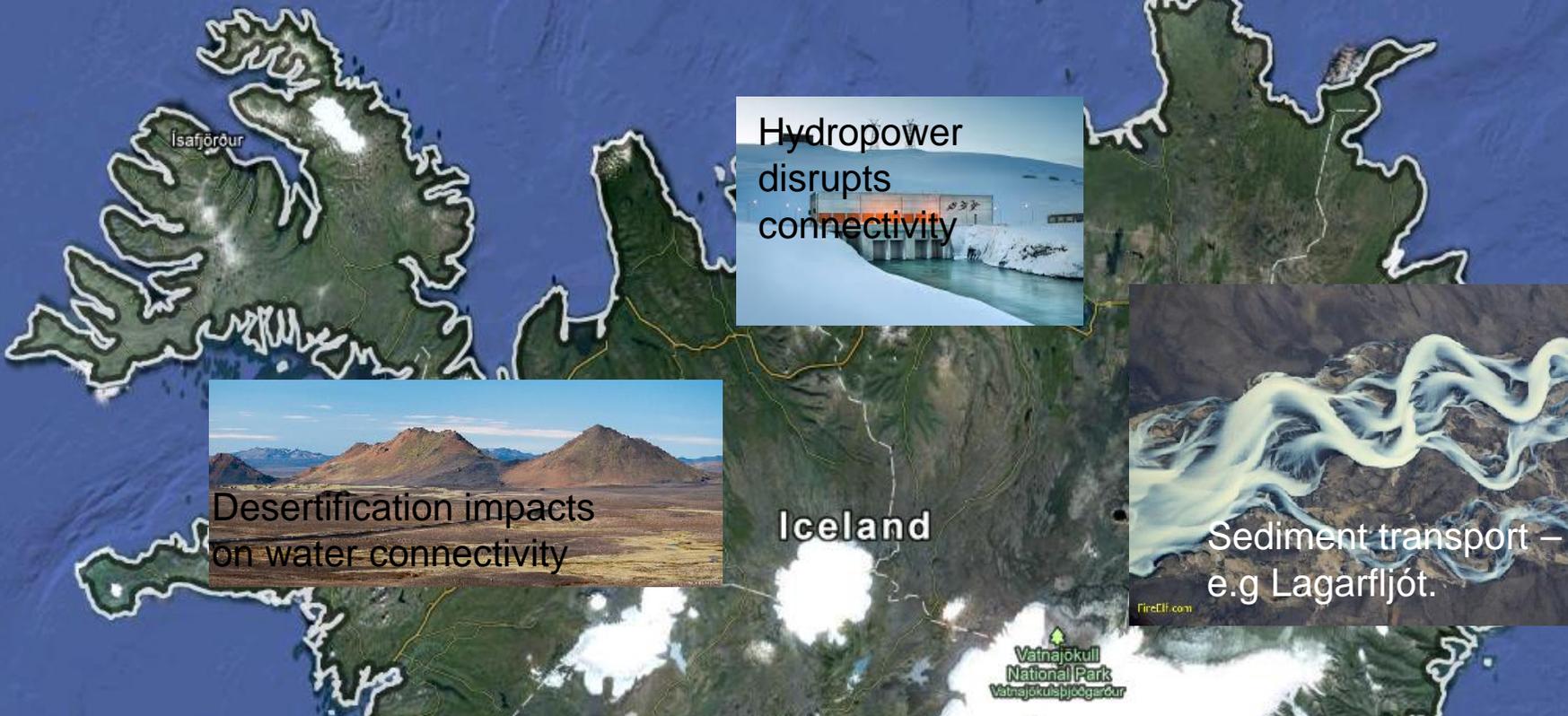




Source of Hróarslækur



Connectivity in Iceland



Hydropower
disrupts
connectivity



Desertification impacts
on water connectivity



Sediment transport –
e.g. Lagarfljót.



Ecological
footprints



Ecological
classification:
WFD



Hydrological
connectivity

Takk fyrir



**Sjáumst á Íslandi
Summer school
registration open now!!!**

Special thanks to:
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