

Center for
ARKTISK TEKNOLOGI



Feasibility Study for Small-scale Hydropower in Sarfannguaq, West Greenland

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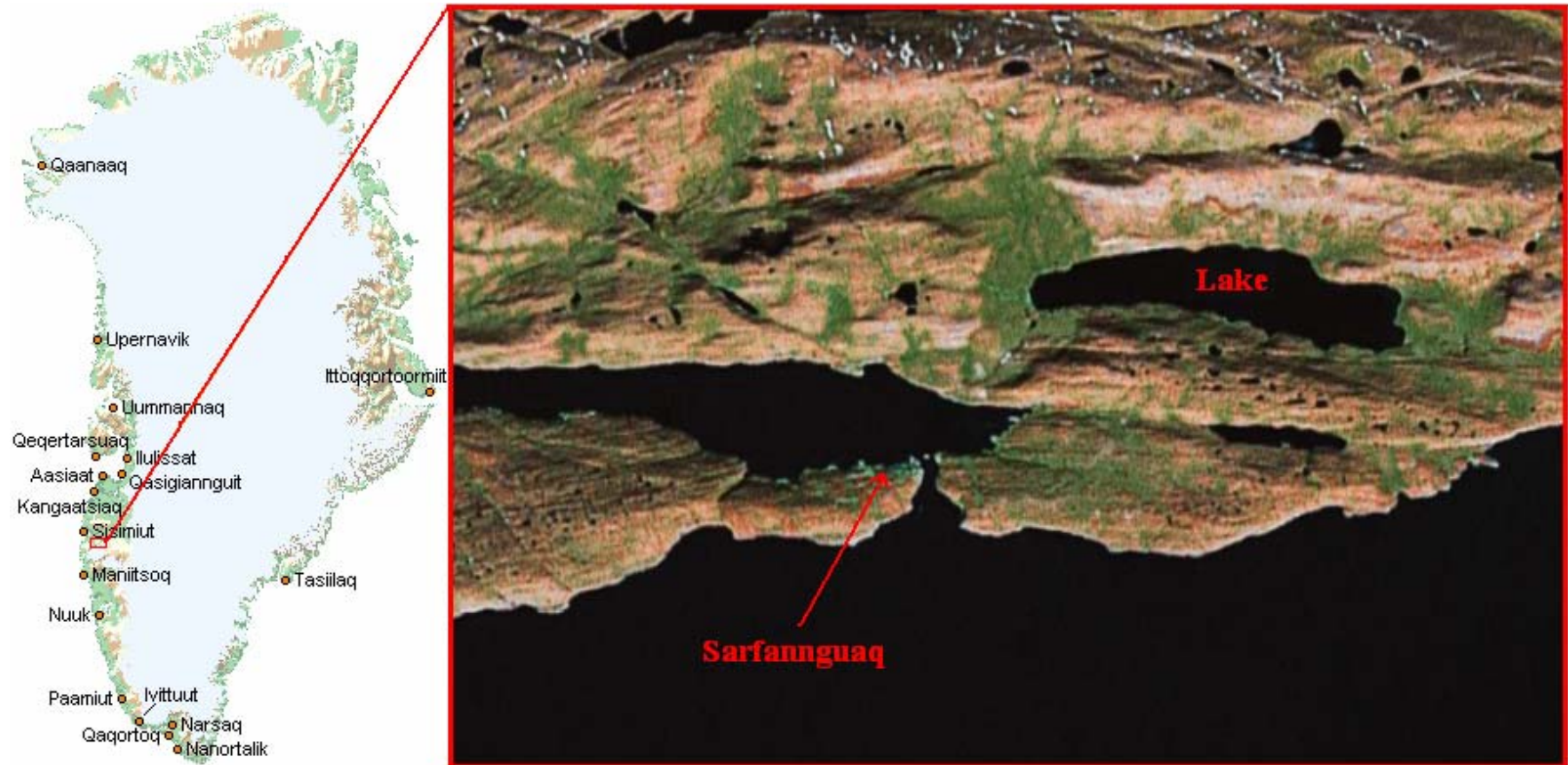
Small-scale Hydropower in Sarfannguaq, West Greenland

The Lighthouse Project

- a cooperation between ARTEK and Nukissiorfiit
- exploring the possibilities of sustainable energy in villages
- test and demonstrate solutions to various technical issues

Small-scale Hydropower in Sarfannguaq, West Greenland

The village of Sarfannguaq



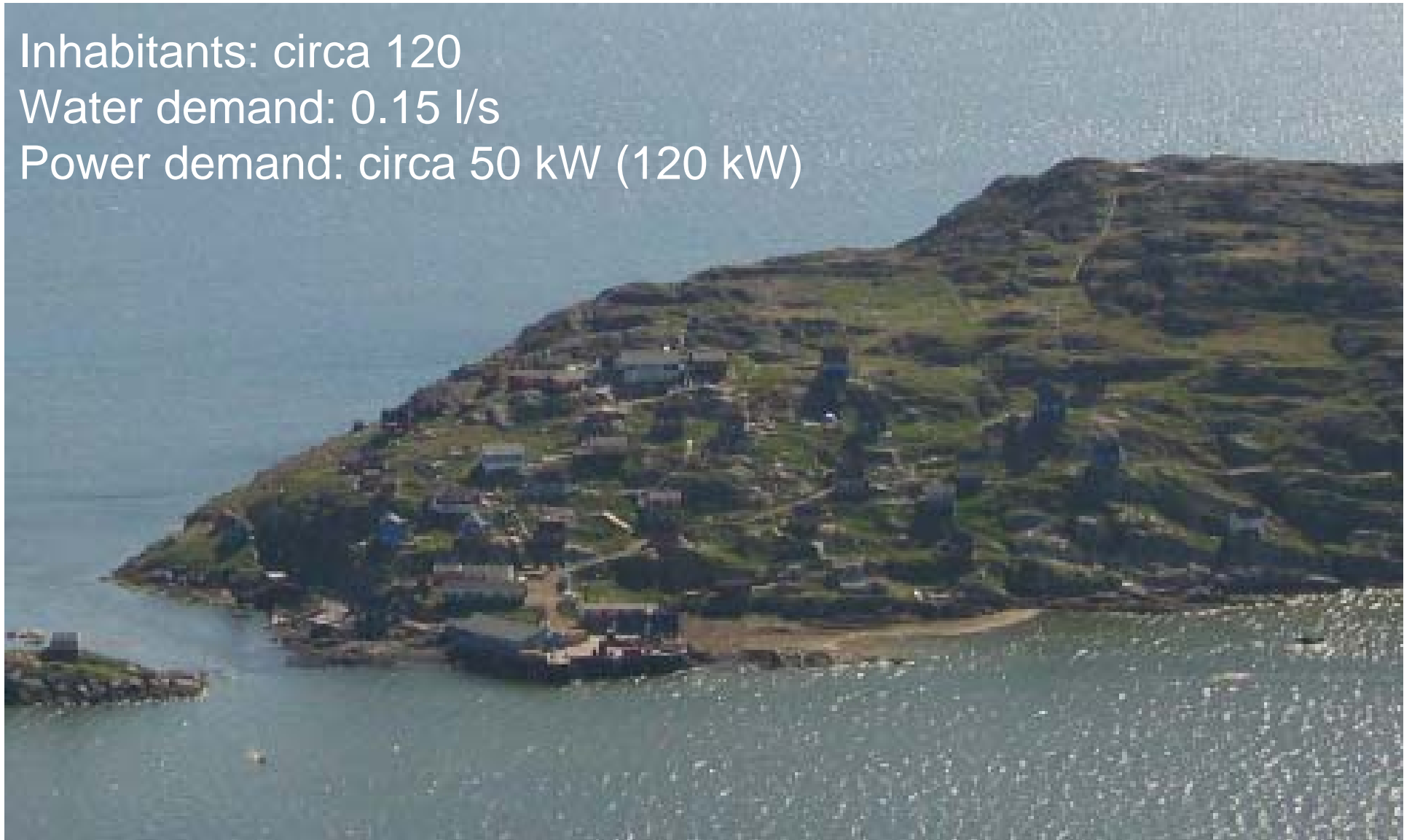
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Small-scale Hydropower in Sarfannguaq, West Greenland

Inhabitants: circa 120

Water demand: 0.15 l/s

Power demand: circa 50 kW (120 kW)



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Height above sealevel: 55 m

Surface area: 2 km²

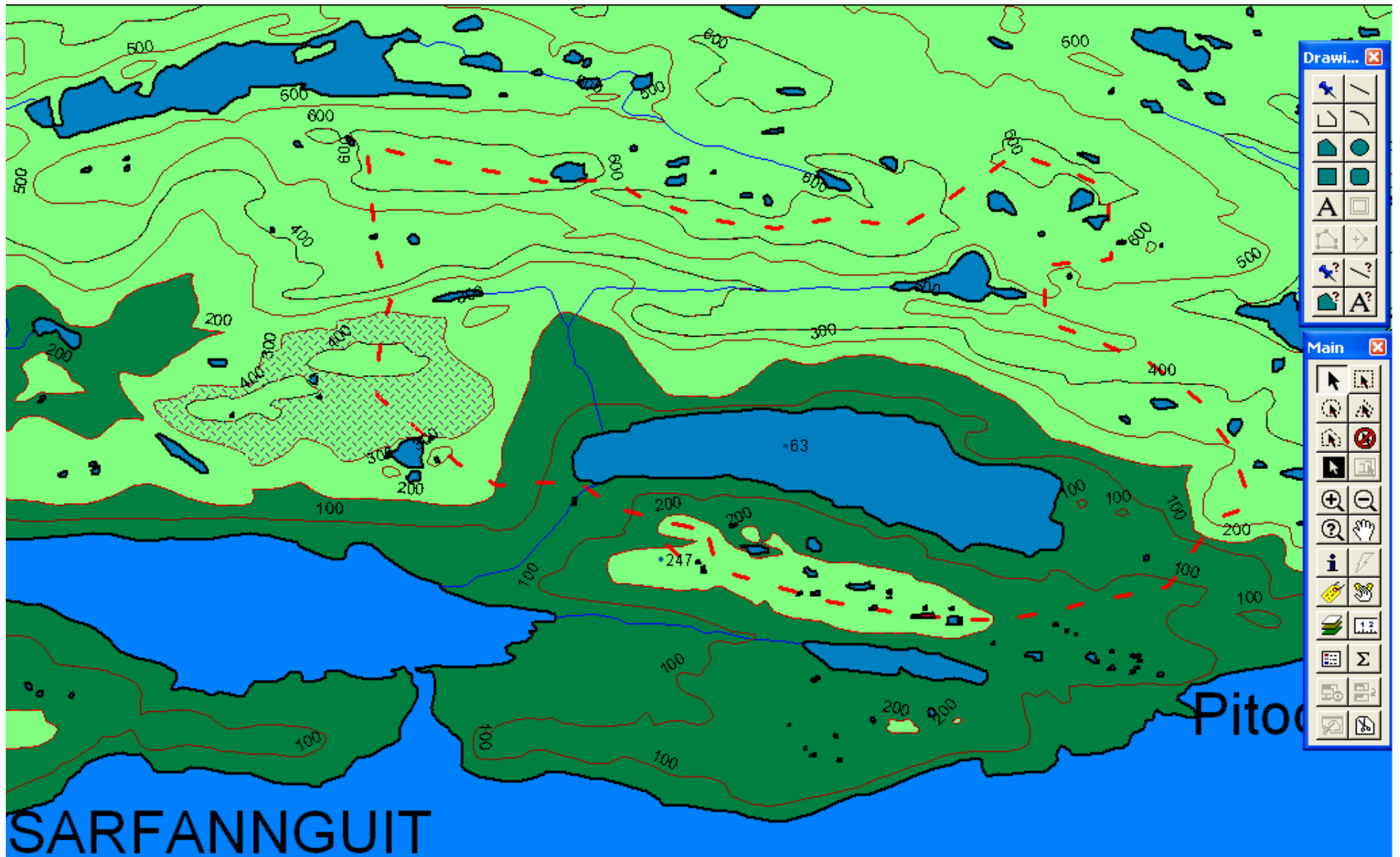
Max. Depth: 32 m

Total flow: ?

Available power: $P = \eta \cdot \rho \cdot g \cdot H \cdot Q$

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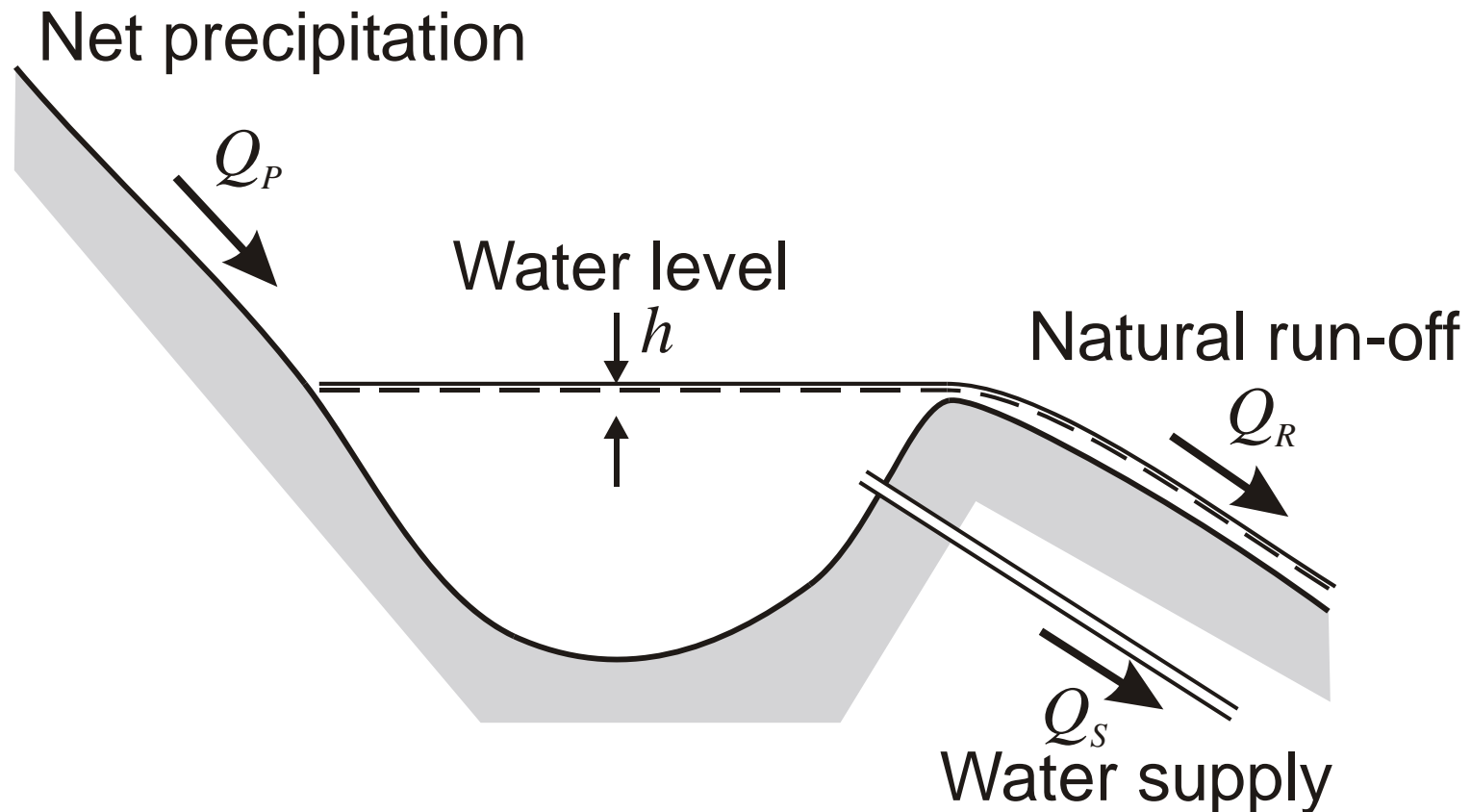
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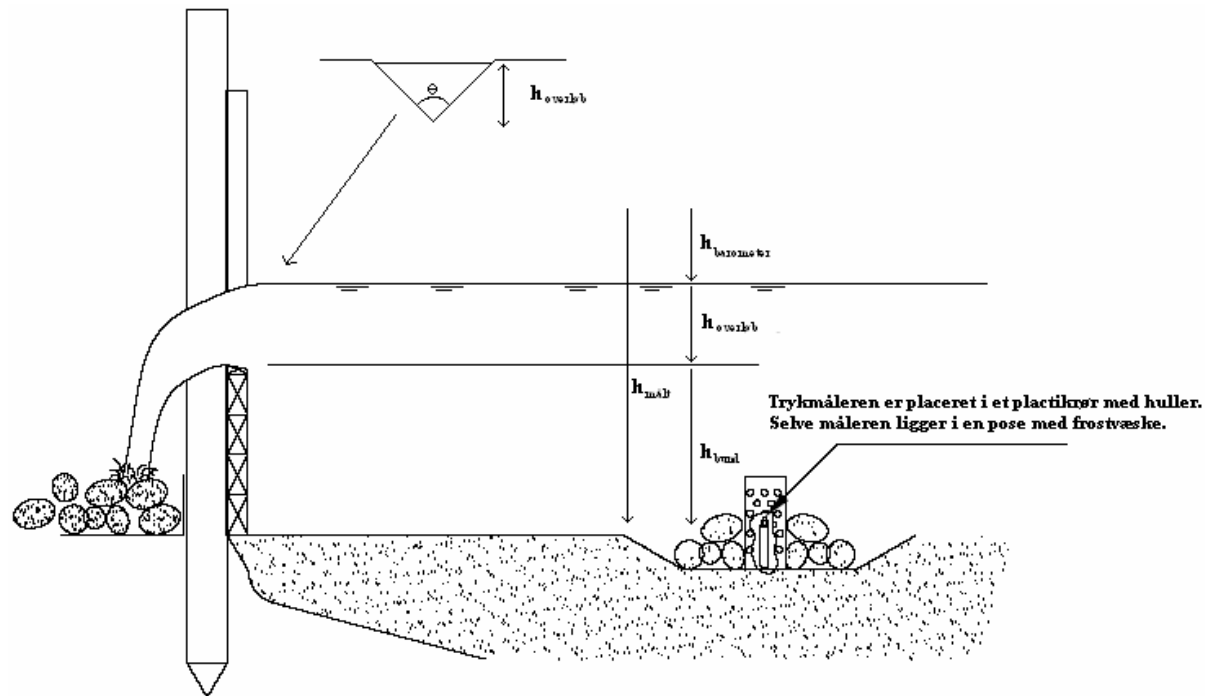
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Volume-balance for the lake: $Q_P - Q_R - Q_S = A \frac{dh}{dt}$



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Measuring the natural run-off from the lake

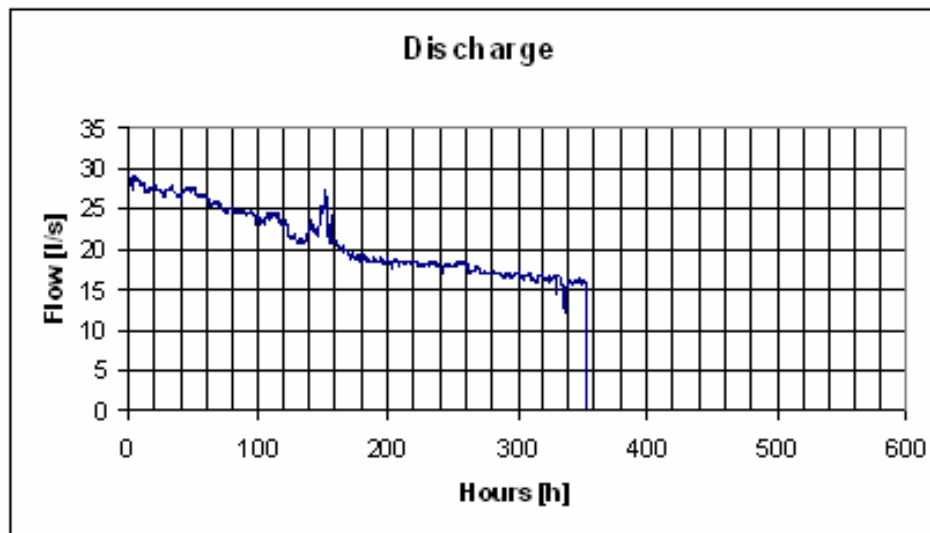
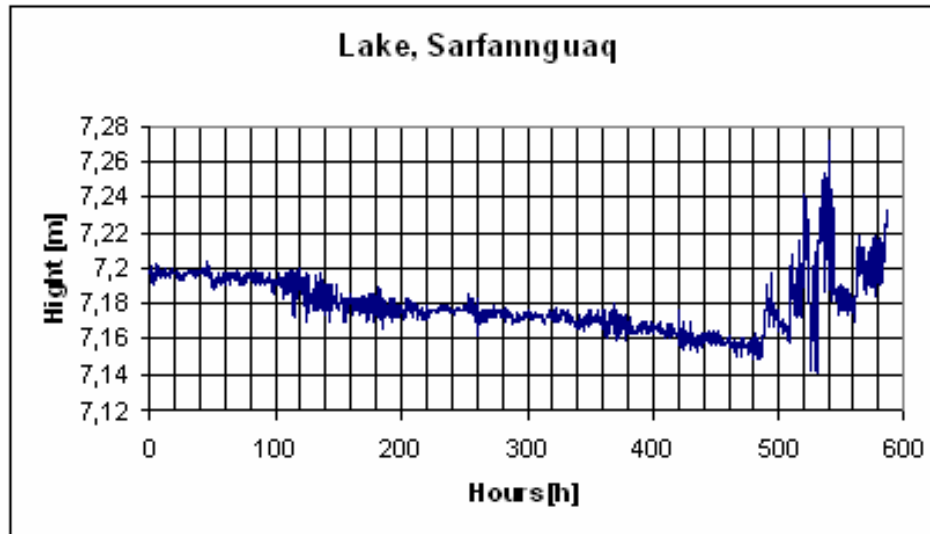


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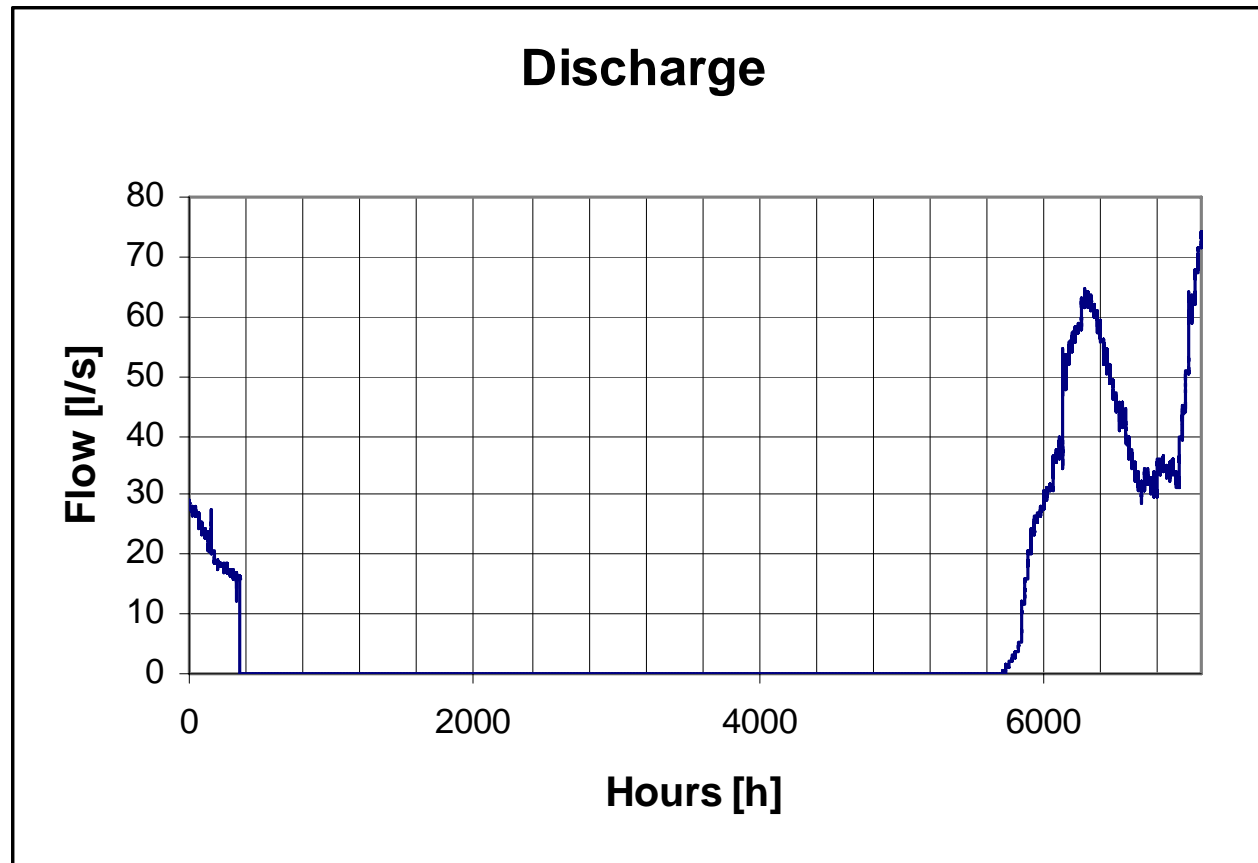


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Results for 2006–2007

Run-off: $520 \times 10^3 \text{ m}^3$

Supply: $410 \times 10^3 \text{ m}^3$

Total: $930 \times 10^3 \text{ m}^3$

Power: 15 kW

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A sustainable solution for Sarfannguaq

- a combination of hydro and wind power?

Practical issues to consider

- coupling the two?
- operation with varying wind conditions?
- energy storage in the lake?
- efficiency of turbine(s)?
- increase of the volume of the lake?