

Biologists in regulated rivers

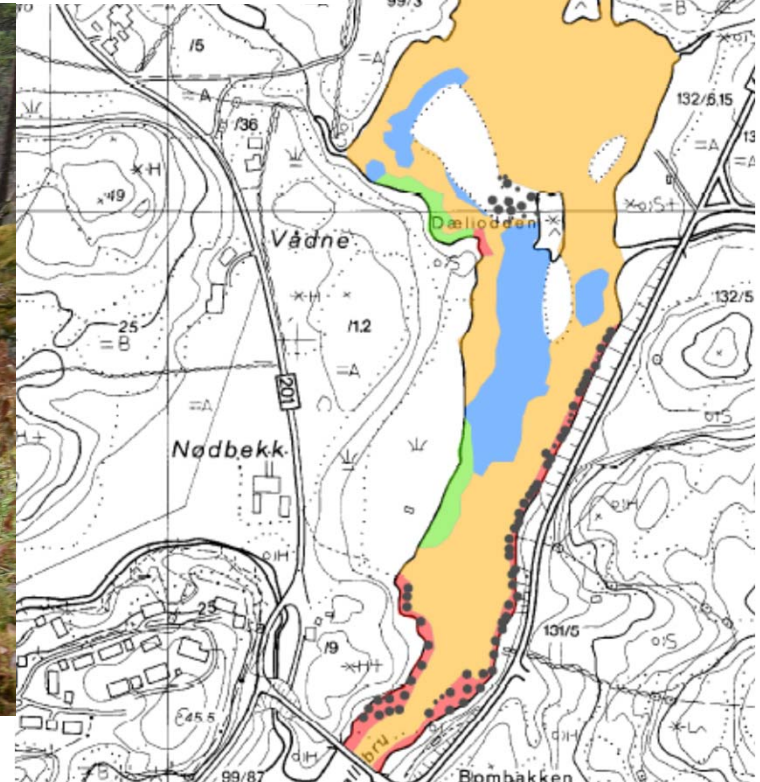
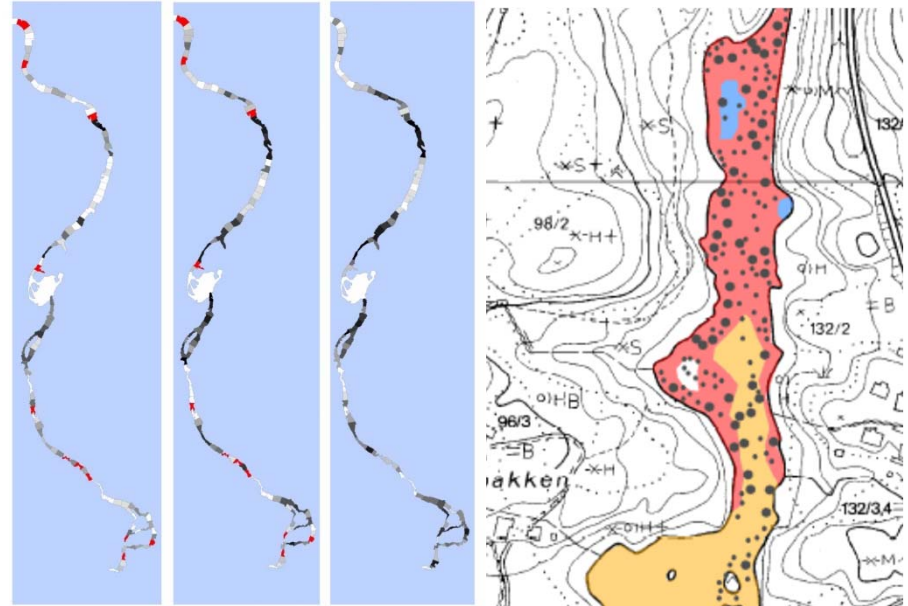


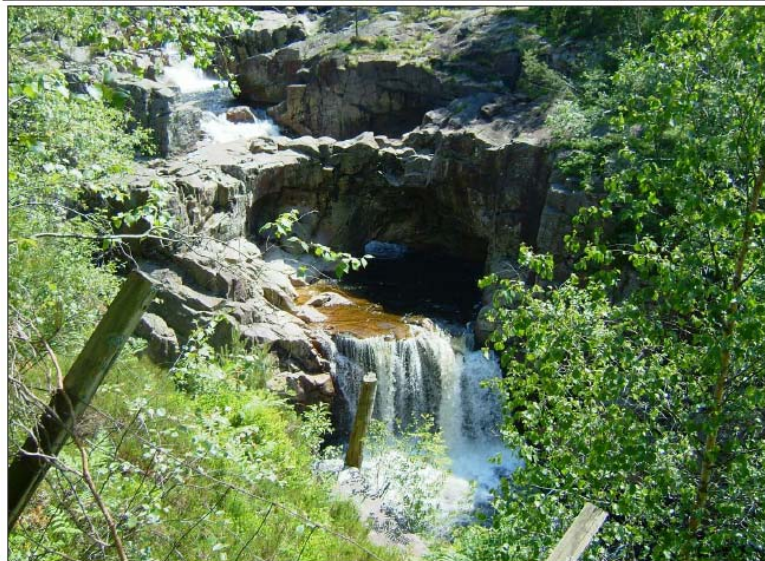
What data do we want?



Habitat data

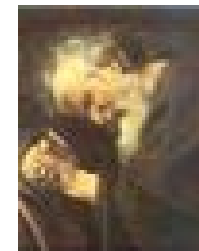
- Area
- Quality

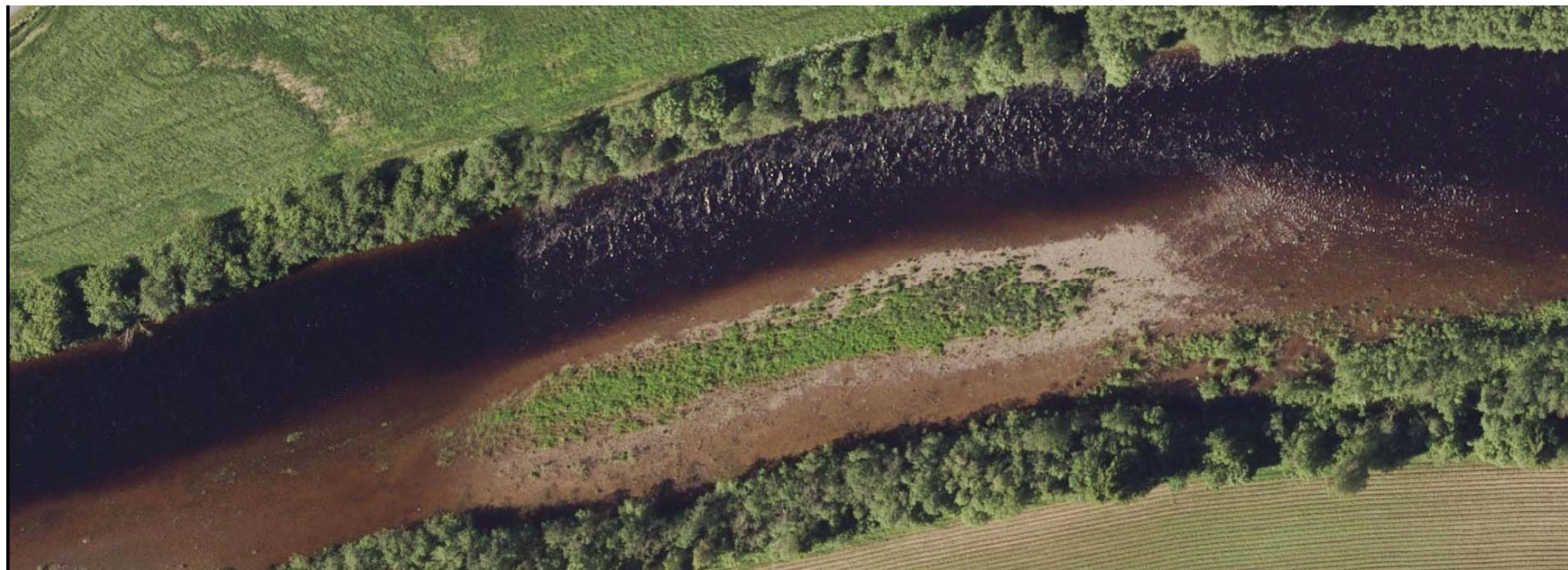




“No man ever steps in the same river twice, for it's not the same river and he's not the same man.”

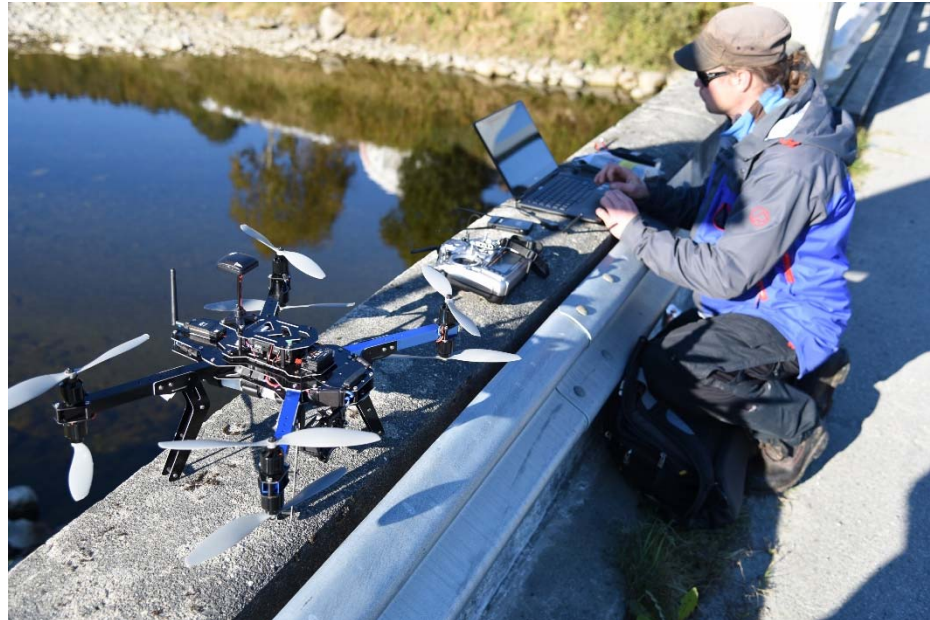
– Heraklit







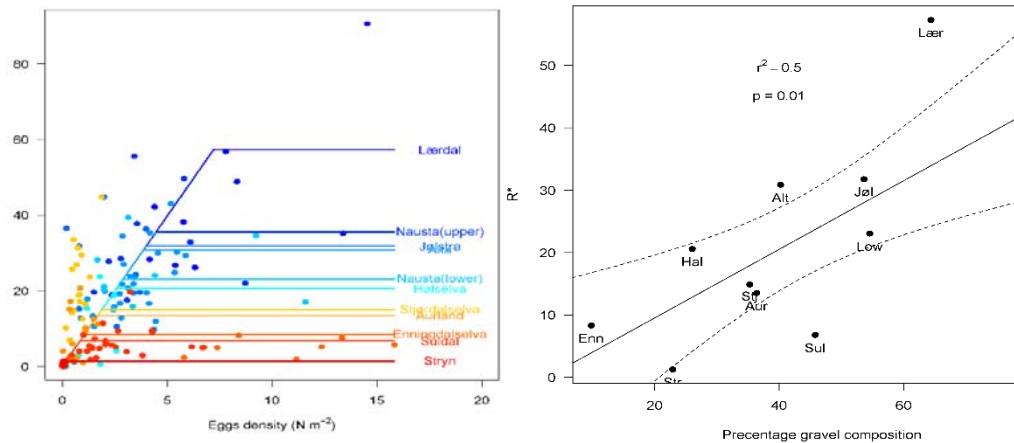
Aerial mapping



Extent Time
Resolution Cost

Temporal dimensions- science

- Time series



Linking watershed and microhabitat characteristics: effects on production of Atlantic salmonids (*Salmo salar* and *Salmo trutta*)

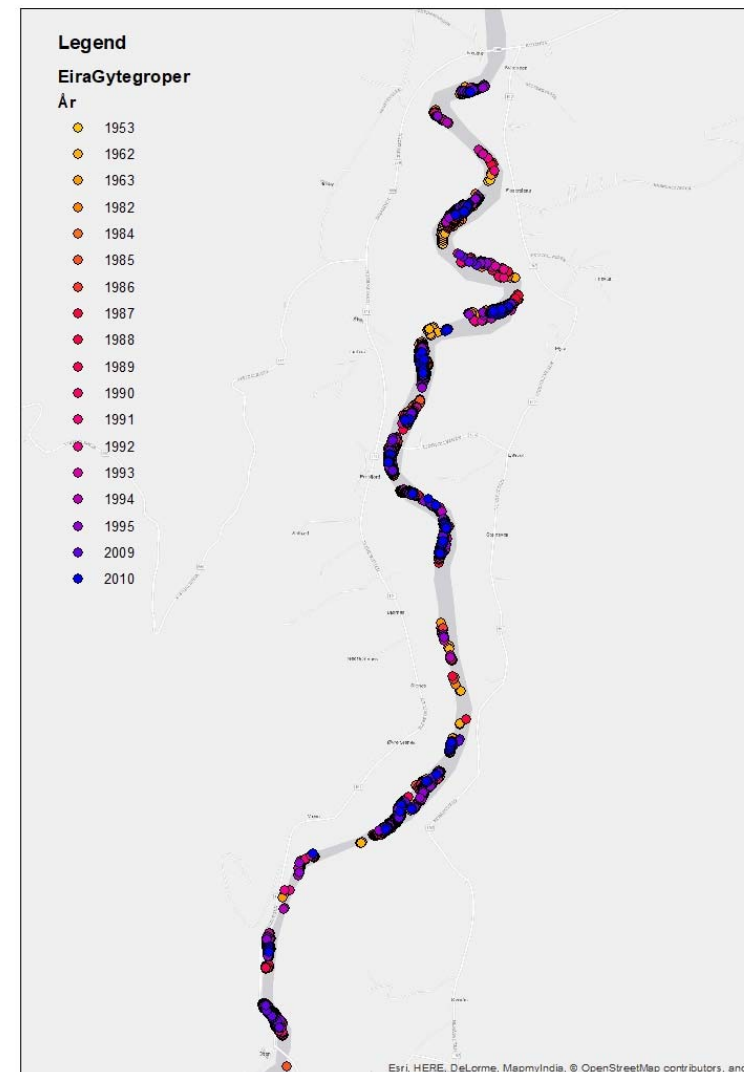
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Abstract – The spatial scale of environmental factors influencing population dynamics ranges from microhabitat to continental or even global scales. Integration of multiple spatial scales is important in order to understand links between environmental variation and population processes. In the present study, we investigate how multiscale drivers influence the production of stream-rearing Atlantic salmonids (Atlantic salmon, *Salmo salar* L. and brown trout, *Salmo trutta* L.) measured in terms of abundance. Variation in juvenile production was studied using data from single-pass electrofishing surveys (measured as biomass per m²) from nine rivers. These data were combined with habitat data ranging from an important in-stream microhabitat variable (shelter availability) to properties of the catchment. Variation in productivity within and among rivers was affected by both properties of in-stream habitat and catchment properties. Shelter availability and the proportion of the catchment consisting of cultivated land and lakes influenced biomass positively, while catchment area had the opposite effect. For a different set of rivers (*N* = 20), river gradient and catchment area were shown to positively affect the amount of shelter. Finally, the variables identified in the two preceding analysis were included in the analysis of population productivity using

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Temporal dimensions-restoration



Temporal dimensions-restoration



Cause of change



Cause of change



Cause of change



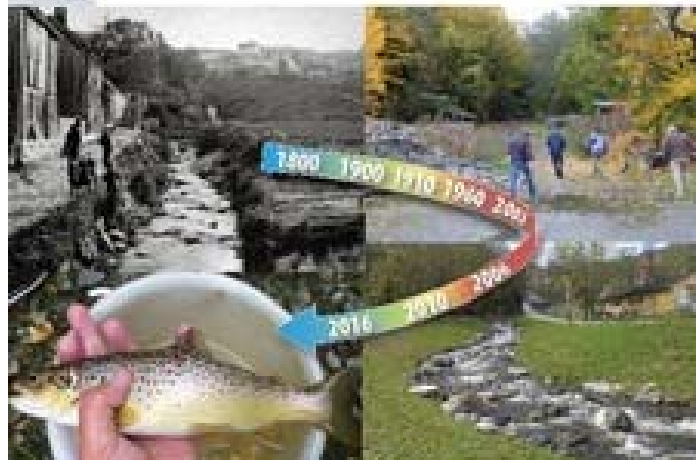
Natural conditions

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1354
NINA Rapport

Tapt areal og produksjonsevne for sjørretbekker i Trondheim kommune

Morten A. Bergan & Terje H. Fjell



The cover features a photograph of a stream with a rainbow trout being held in a white bowl. A colorful, curved timeline of years is overlaid on the image, starting at 1800 and ending at 2016. The years are: 1800, 1900, 1910, 1960, 2000, 2010, and 2016. The background shows a stream flowing through a wooded area.

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NINA Rapport

Endring i leveområder for elv sandjeger og stor elvbreddedekning ved Gaula

Forkomst og dynamikk av elvseier fra 1947 til 2014

Jens Aström
Frode Østgaard
Oskar Hanssen
Sandra Aström

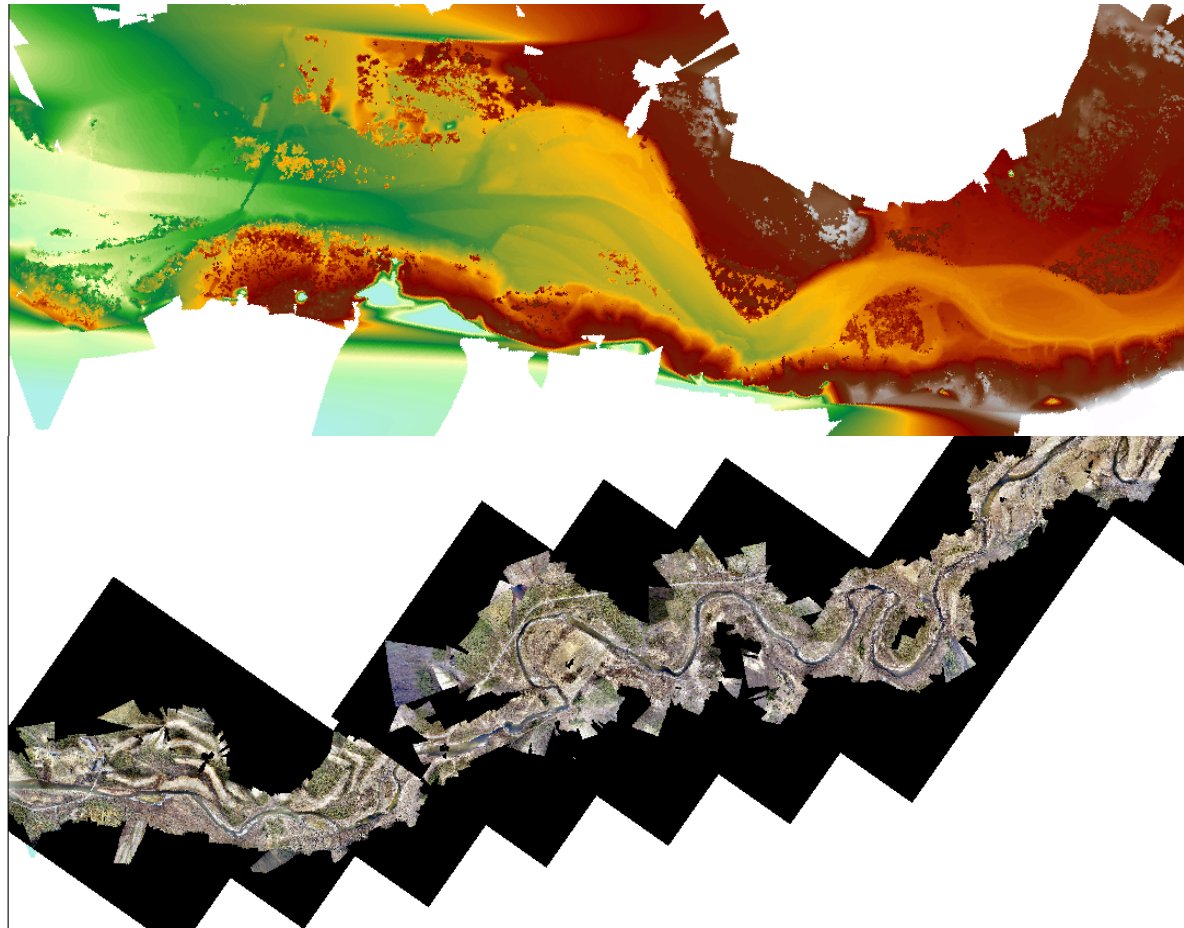


The cover features a photograph of a river landscape with a large sandbar in the foreground. A close-up of a stone is shown in the bottom right corner. The background shows a wide river valley with green fields and a forested area.

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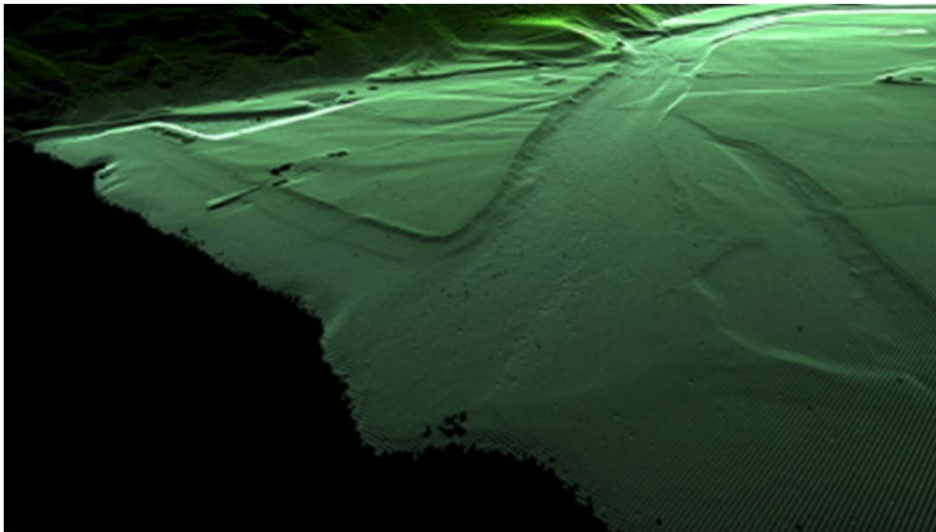
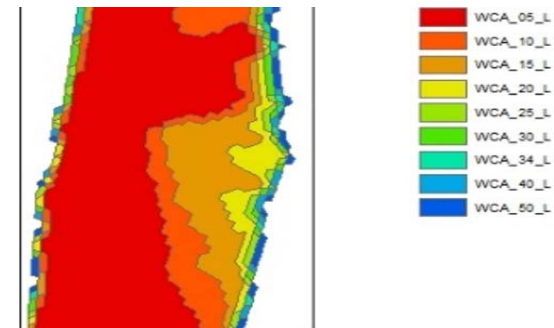
Data storage and standard

- Availability
- Type
- Raw
- GRP



Other data and methods

- ADCP (Sweco)
- Environmental DNA
- LiDAR

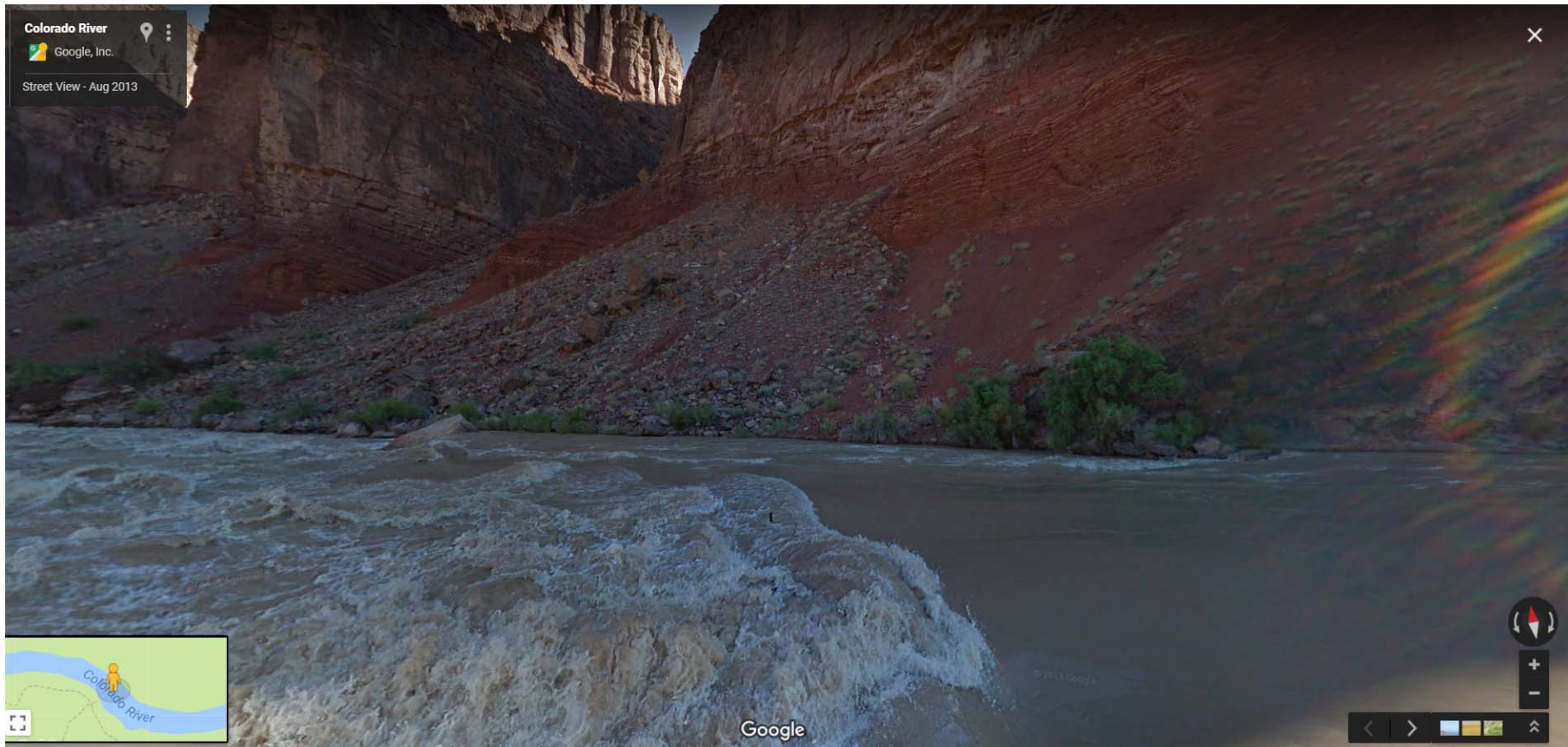


Looking under the surface?

- Georeferenced video of river surveys
 - ▶ 3D
 - ▶ Depth and substrate size
 - ▶ Embeddedness/shelter
 - ▶ Above and below water

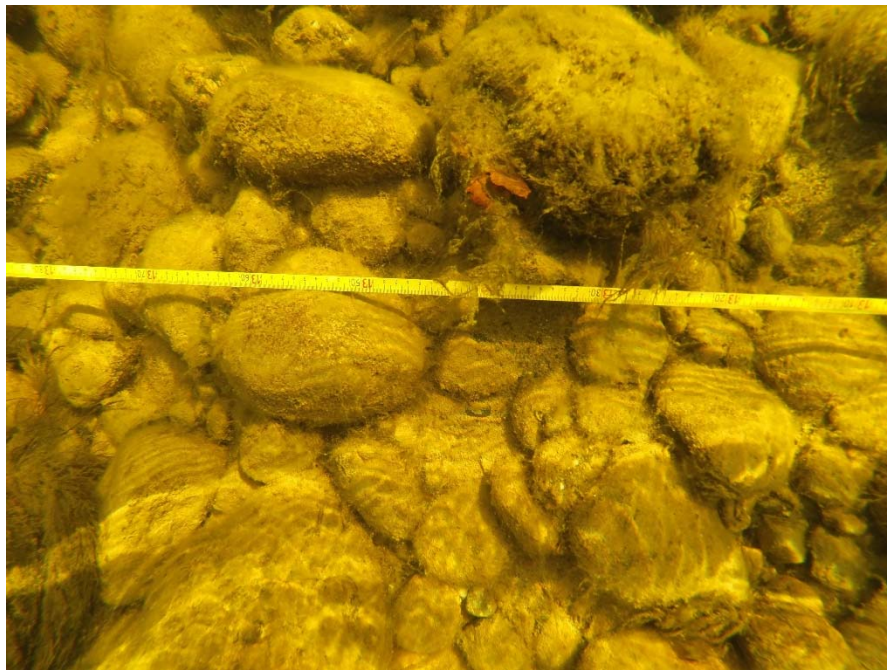


Looking from the surface?



Looking under the surface?

- Linking monitoring of fish and habitat
 - Replace direct shelter measurements?







Samarbeid og kunnskap for framtidens miljøløsninger

