




“Norway in Red, White and Grey”: Empowering civil society with big data and ecosystem extent accounting methods to stop nature loss

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Session 6: Issues in ecosystem accounting and forest accounts

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For bare fem år siden var dette en frodig eikeskog.

«Only 5 years ago this was a rich oak forest»

An aerial photograph of a construction site. The scene is dominated by a network of winding, light-colored dirt roads that cut through a rugged, rocky landscape. Several pieces of heavy machinery, including excavators and trucks, are visible on the roads and in various areas of the site. In the upper left corner, there is a dense forest of green trees. The overall terrain is uneven and appears to be a mix of natural rock formations and man-made earthworks.

Her stod sjeldne trær, 150 år gamle.

«Here stood rare, 150 year old trees»

An aerial photograph showing a large-scale construction or mining site. The terrain is heavily disturbed, with large areas of greyish-brown earth and gravel. Several yellow excavators and other heavy machinery are visible, working on the site. The surrounding area appears to be a mix of natural and man-made structures, with some roads and possibly a dam or embankment visible. The overall scene is one of intense industrial activity.


**Dette var en svært
viktig myr ...**

**«This was a very
important mire...»**



... et villreinområde på fjellet ...

«...a wild reindeer area in the mountains...»



... og en svært viktig hundremeterskog for barn, ifølge Miljødirektoratet.

«...and an important neighbourhood forest for children according to the Environment Agency.

Hver dag hogger og sprenger vi bare *litt til ...*

Every day we demolish and chop down just *a little bit more...*»




... og litt til ...

«...and a little more...»



... og litt til.

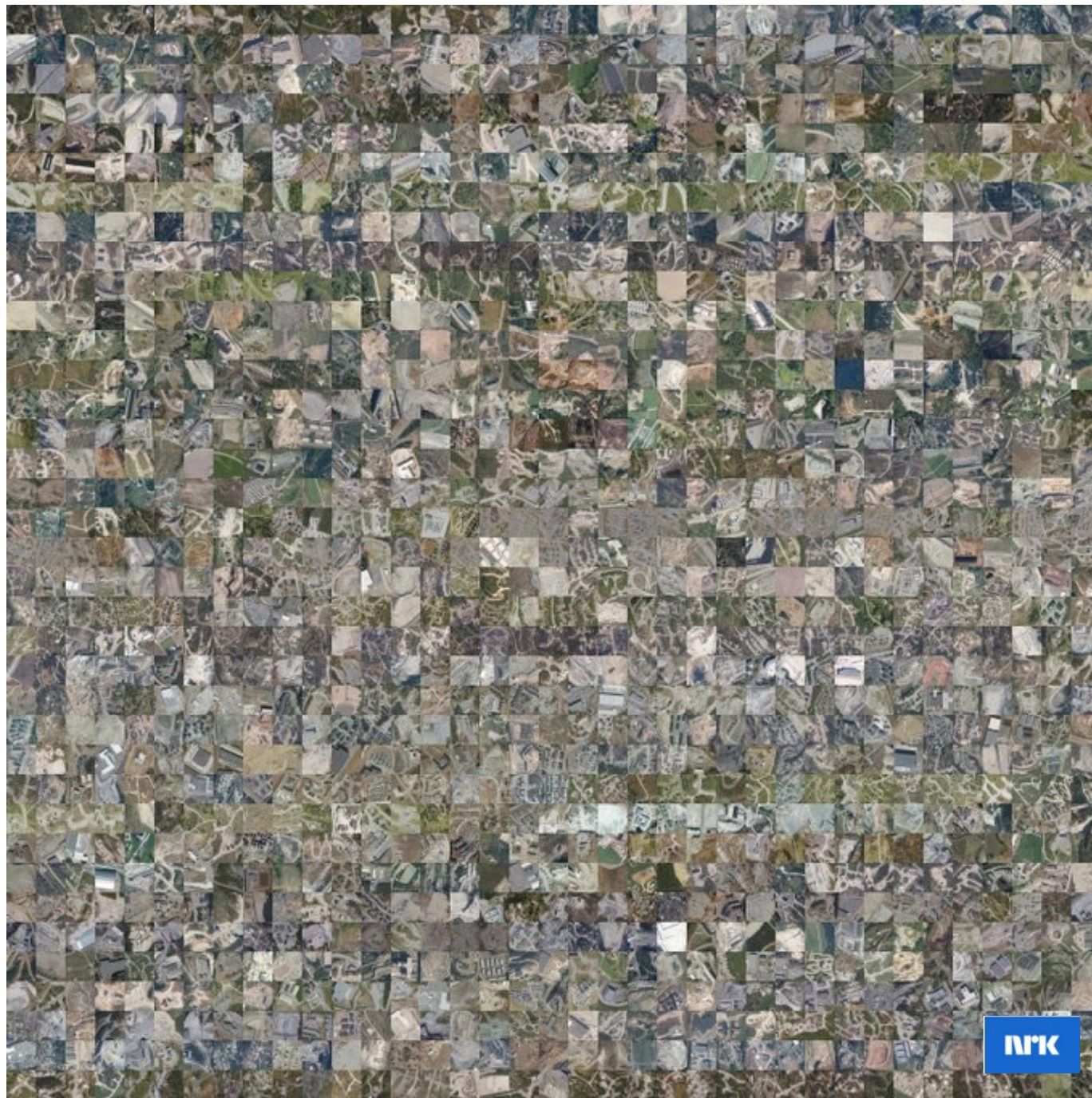
«...and little more...»

The background of the entire slide is a dense, repeating mosaic of small, square aerial photographs. These photos show various types of land use, including urban areas with buildings and roads, agricultural fields, and natural landscapes with trees and water bodies. The mosaic is arranged in a grid pattern, creating a complex, textured visual effect.

Dette er historien om hvordan vi ofrer tusenvis av naturområder vi har blitt enige om å ta vare på.

Hvordan vi svikter den sårbare naturen vår, uten at vi merker det, uten at vi greier å stoppe.

**«This is the story about how we sacrifice thousands of natural areas we have agreed to look after.
How we are failing our fragile nature, without noticing it, without being able to stop.»**



You are looking at
3 % of nature
encroachment due to
land clearing & building
in Norway 2017-2022

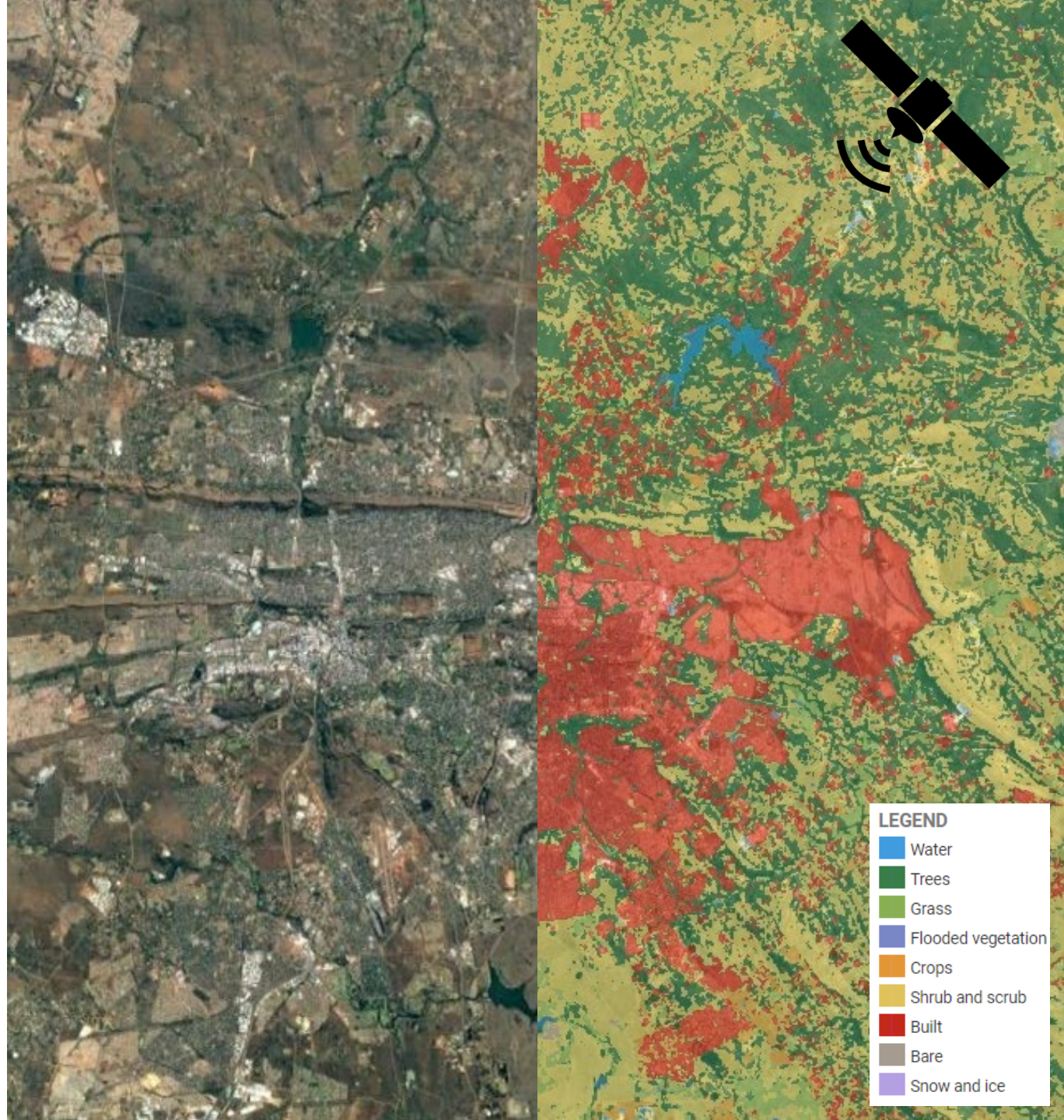


**Norge i rødt,
hvitt og grått**

**NRK avslører: 44.000
inngrep i norsk natur på fem
år**

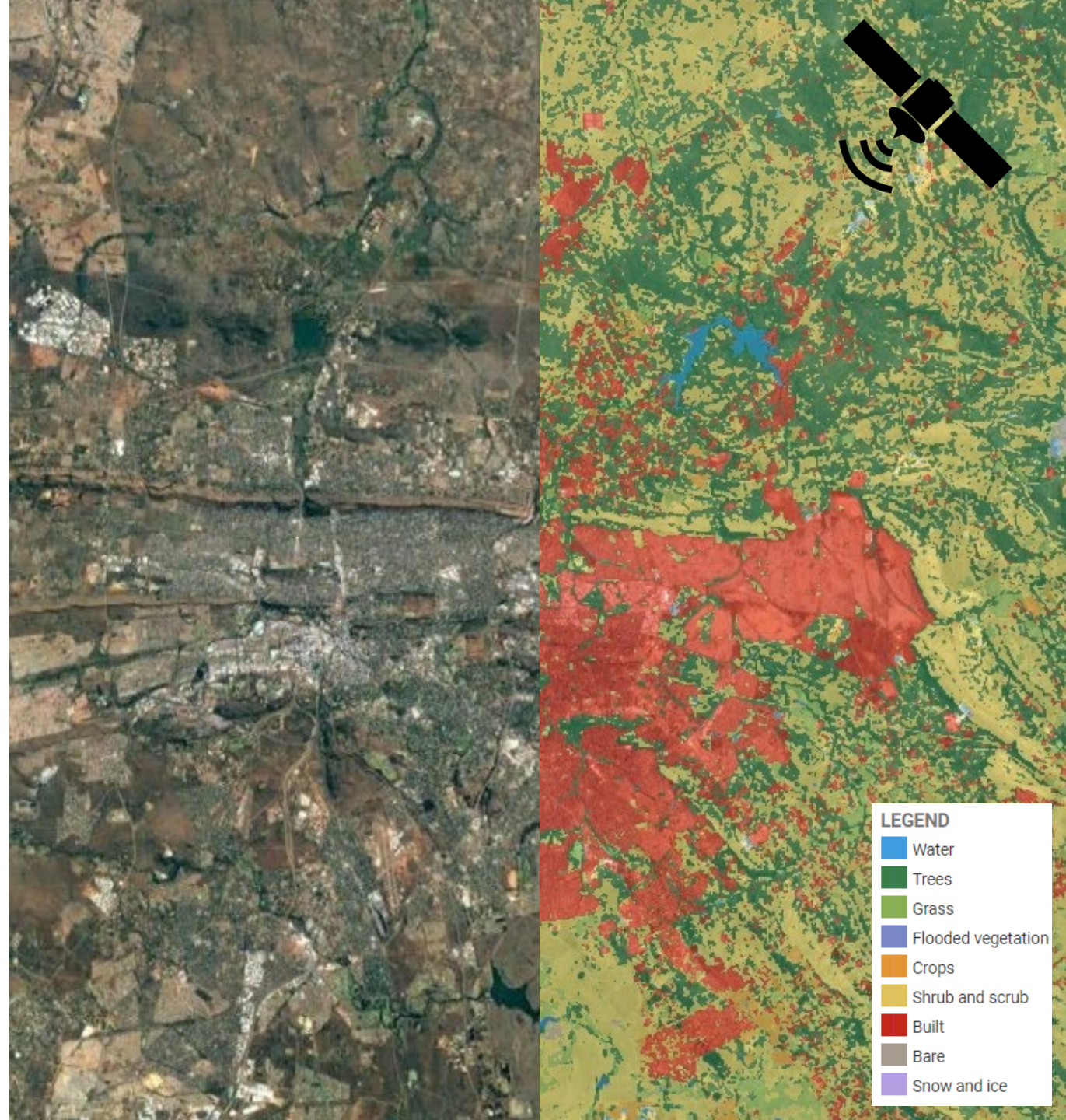
Timeliness
Salience
Credibility
Legitimacy

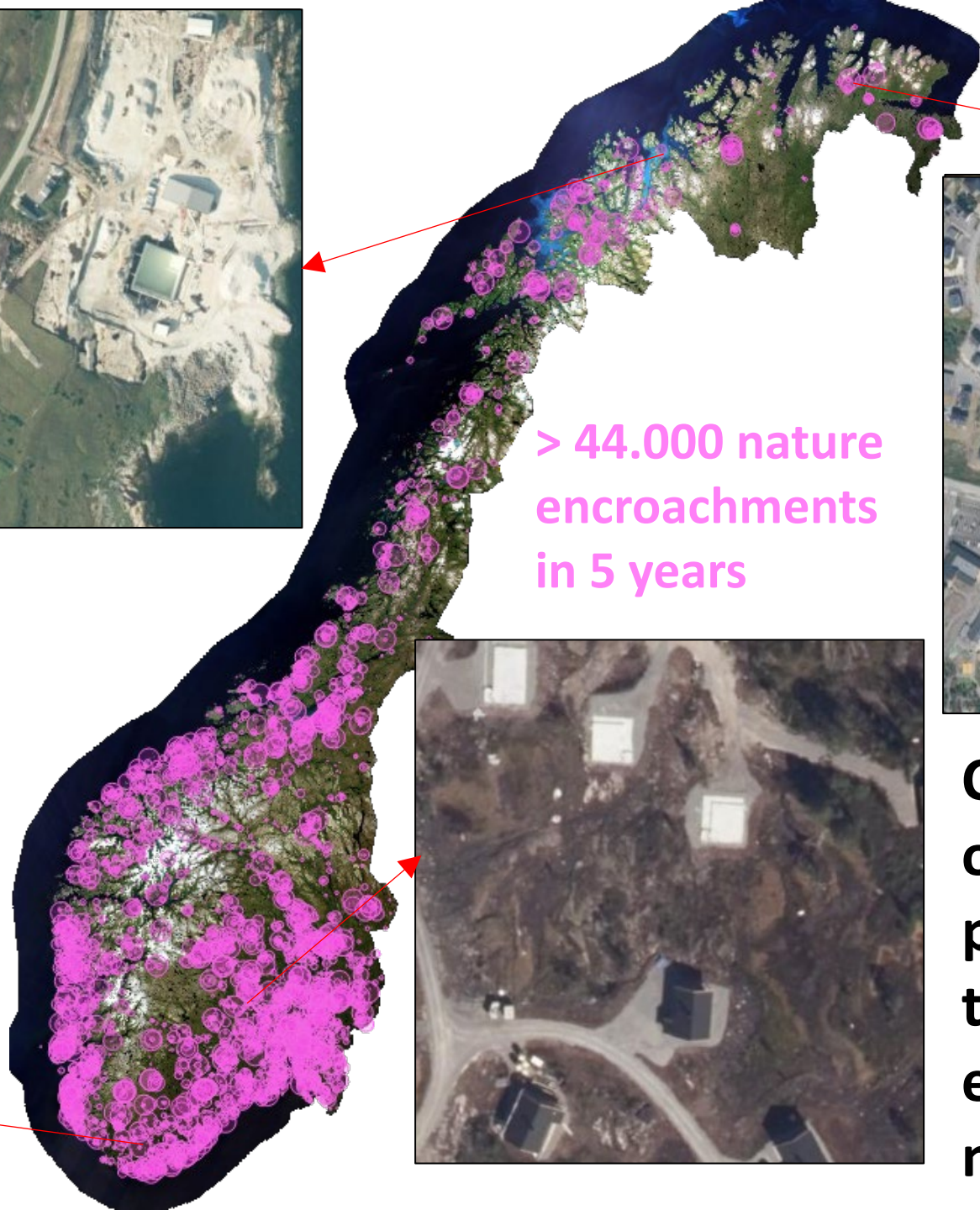
> uptake



Saliience

Why was the nature encroachment reporting of NRK journalists so impactful ?

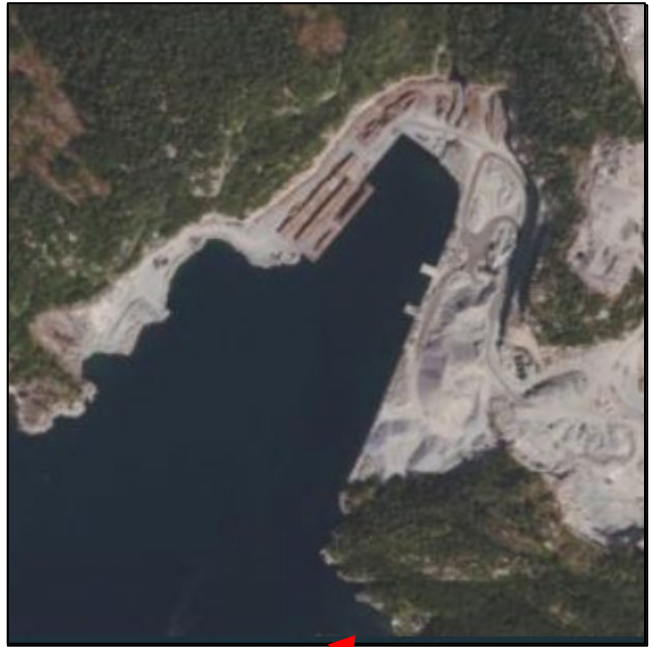




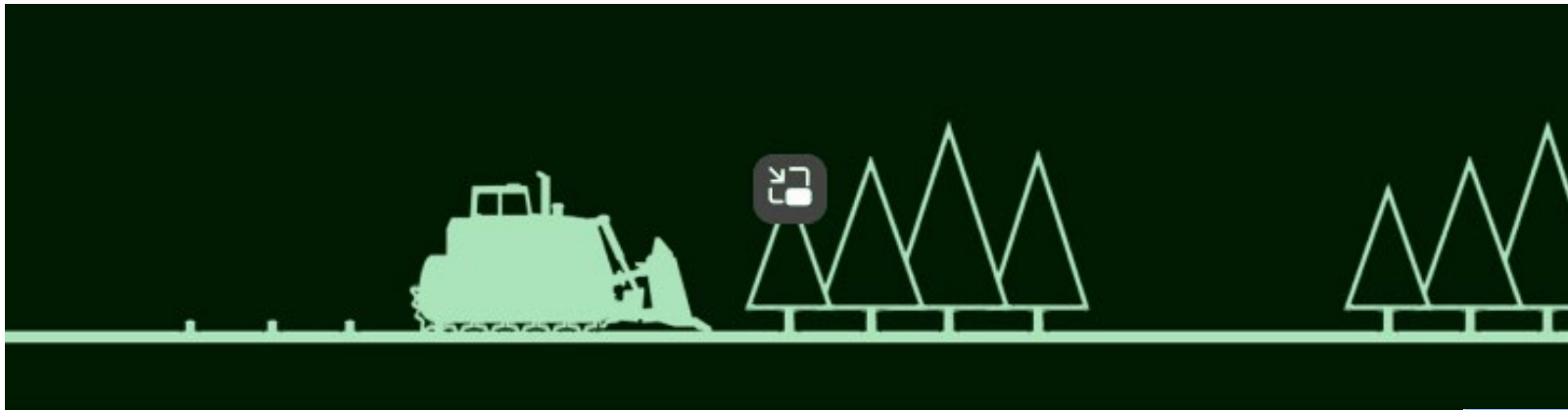
> 44.000 nature encroachments in 5 years



Connecting the dots of individual loss-of-place to an account of total nature encroachment at national level



Journalistic methods in reporting results from 'nature encroachment' accounting 2017-2022



NRK

- > 44,000 contiguous locations
- 208 km² in 5 years
- = 79 m² per minute on average
- = Ca. 1 football pitch / hour nature loss



«Football pitch area metric»

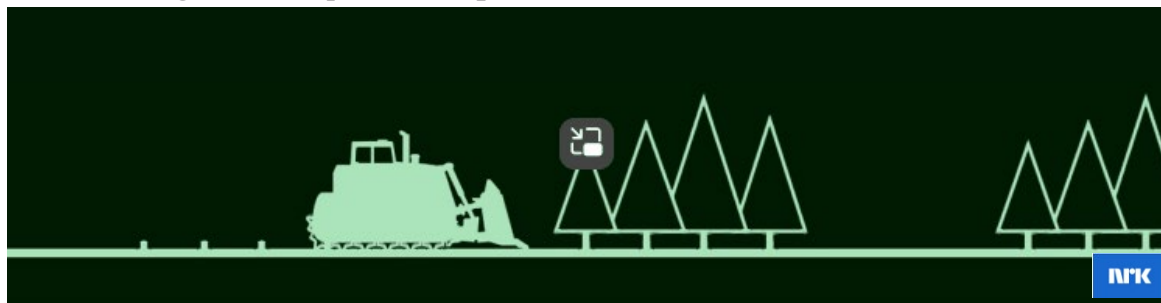
Accounting for «particularly valuable nature» as defined by democratically elected national governments...

...Guidance to regional and municipal planning authorities on conservation expectations in planning...

- Prioritised red listed nature types
- Mires
- Wild reindeer migration areas
- Pressure areas in the coastal zone
- Infrastructure free areas (wilderness)
- Riparian nature

Accounting news headline:

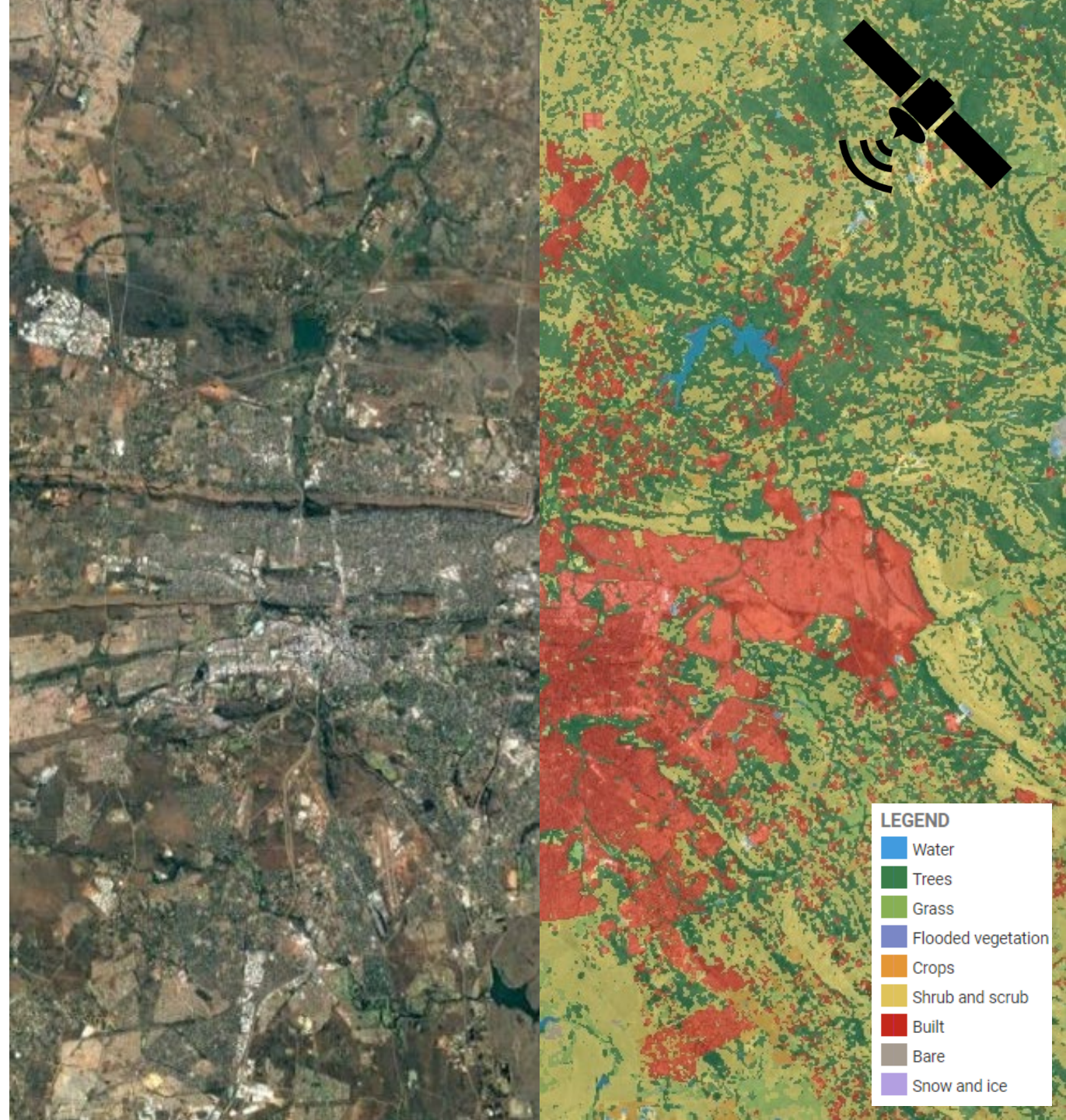
Ca. 2 football pitches/day of «particularly valuable nature» were lost on average in 2017-2022, 10 new building sites per day



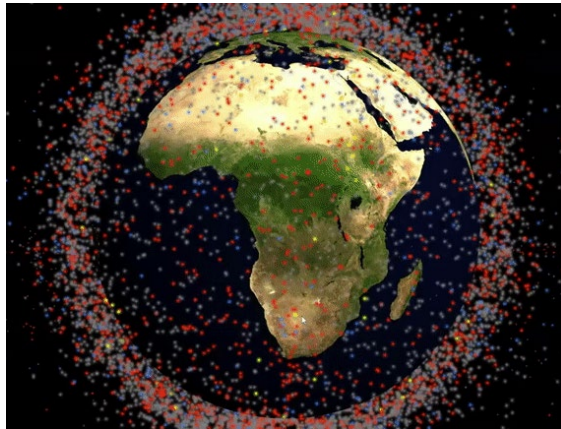
Credibility

Why was the satellite data and mapping perceived as credible?

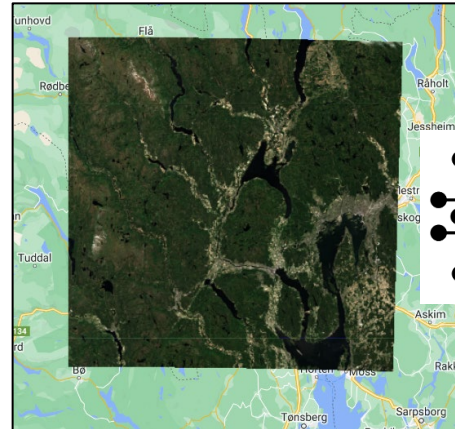
Why did the uncertainty in the big data and artificial intelligence not discredit the science?



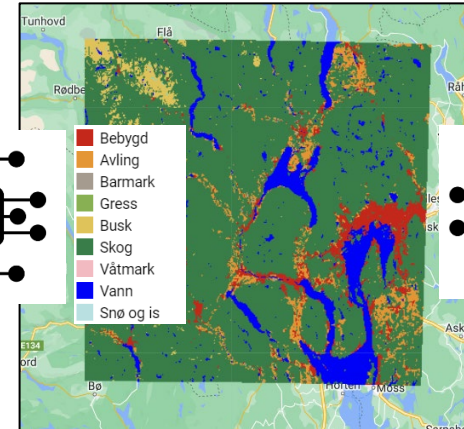
Satellites mapping changes over time – a new and “credible” source of big data for nature encroachment mapping...



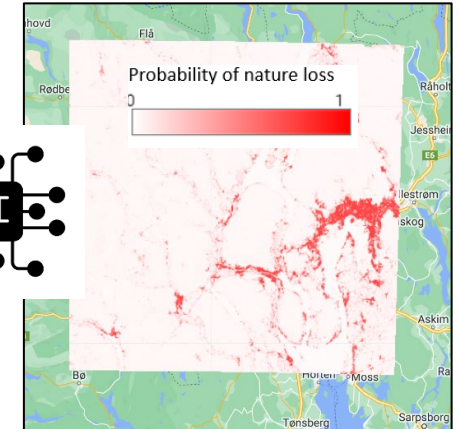
Increasing use of satellites



Near real-time Sentinel-2 images



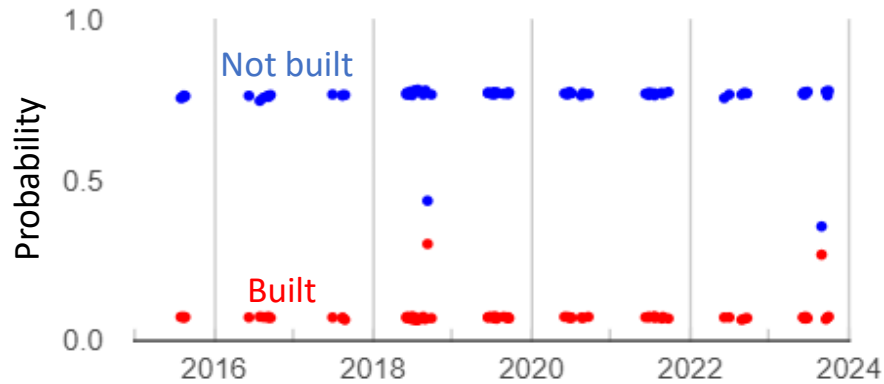
Google Dynamic World landcover



Probability of change

Artificial intelligence – a new and powerful tool for interpreting satellite images...

Satellite+AI based estimates with uncertainty are conservative and close to official registration based statistics...



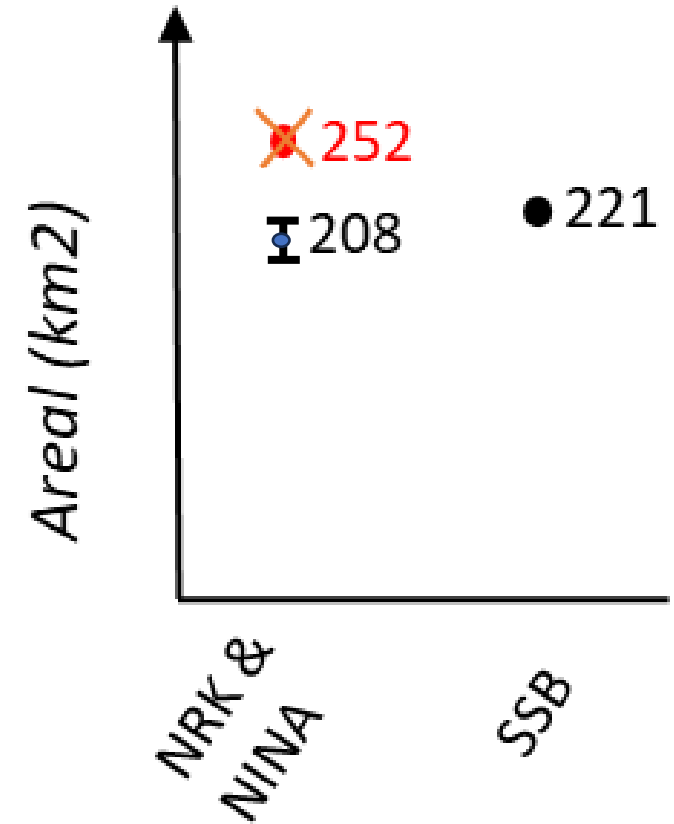
Uncertainty audit: False positives in AI generated Google Dynamic World maps: 18%



Full Length Article
 'Uncertainty audit' for ecosystem accounting: Satellite-based ecosystem extent is biased without design-based area estimation and accuracy assessment

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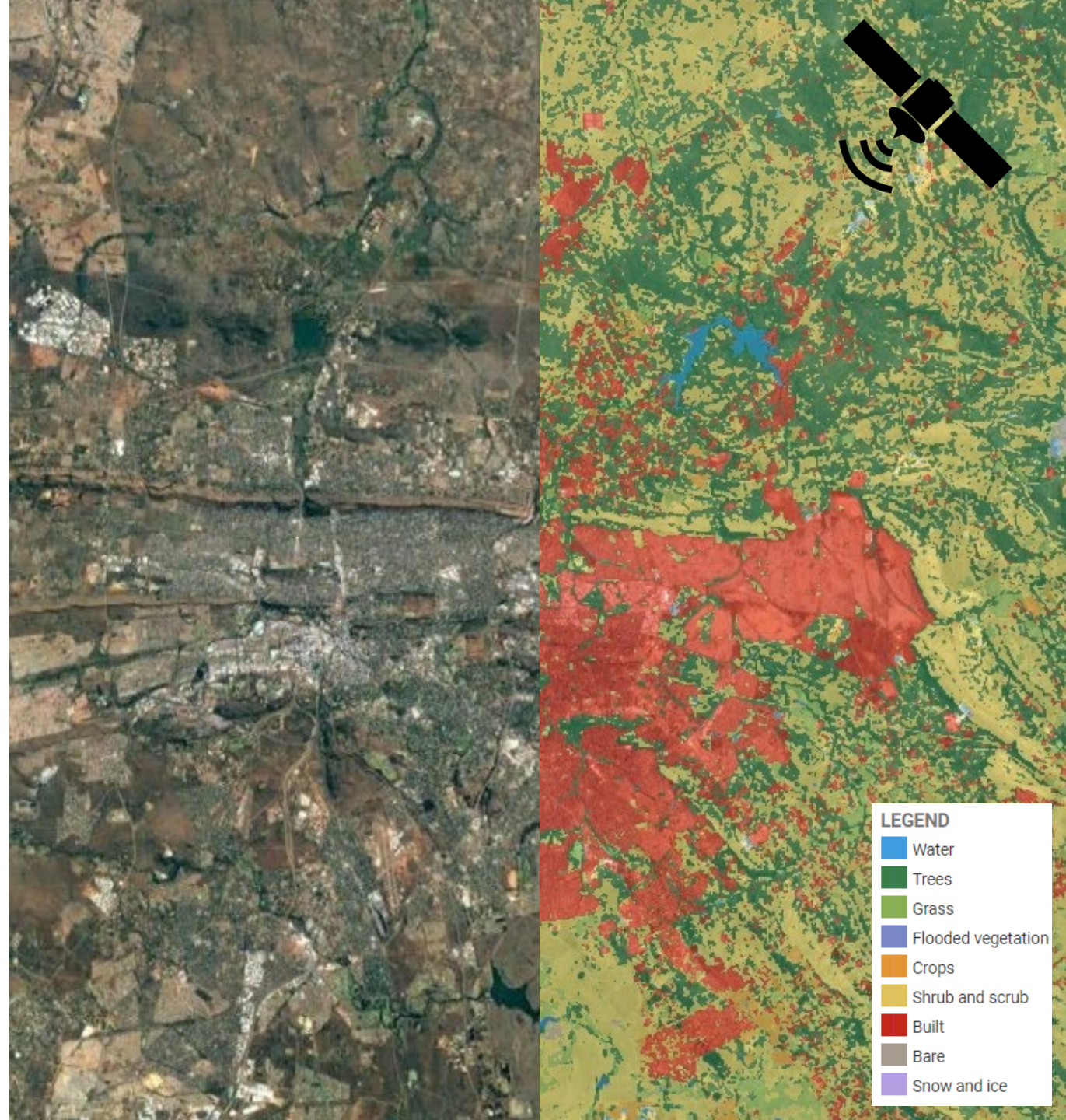


> 44,000 encroachment locations
 208 km² +/- 95% confidence interval

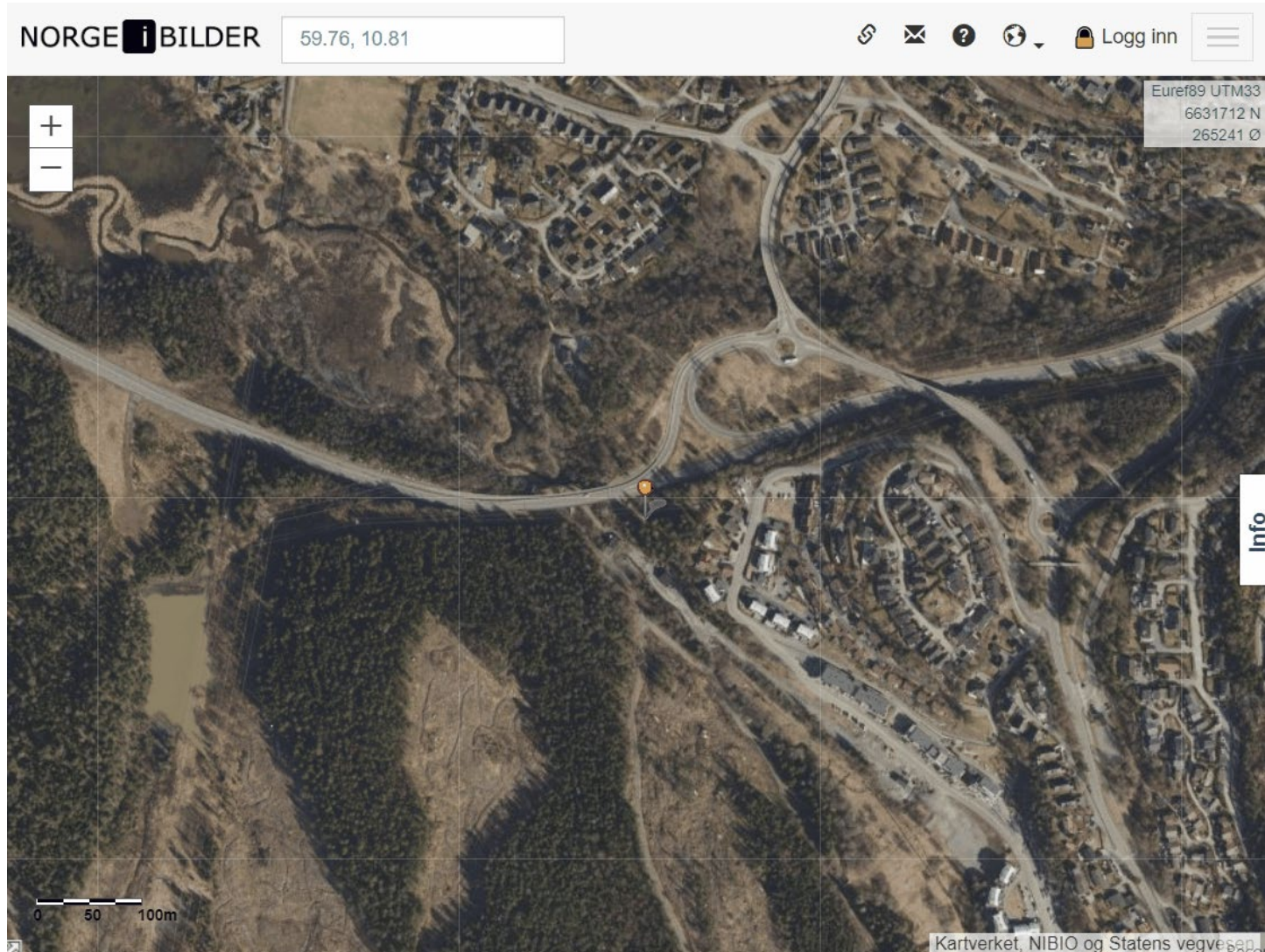
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Legitimacy

How did citizen science increase the legitimacy of satellite “big data” and mapping with AI for ecosystem accounting?



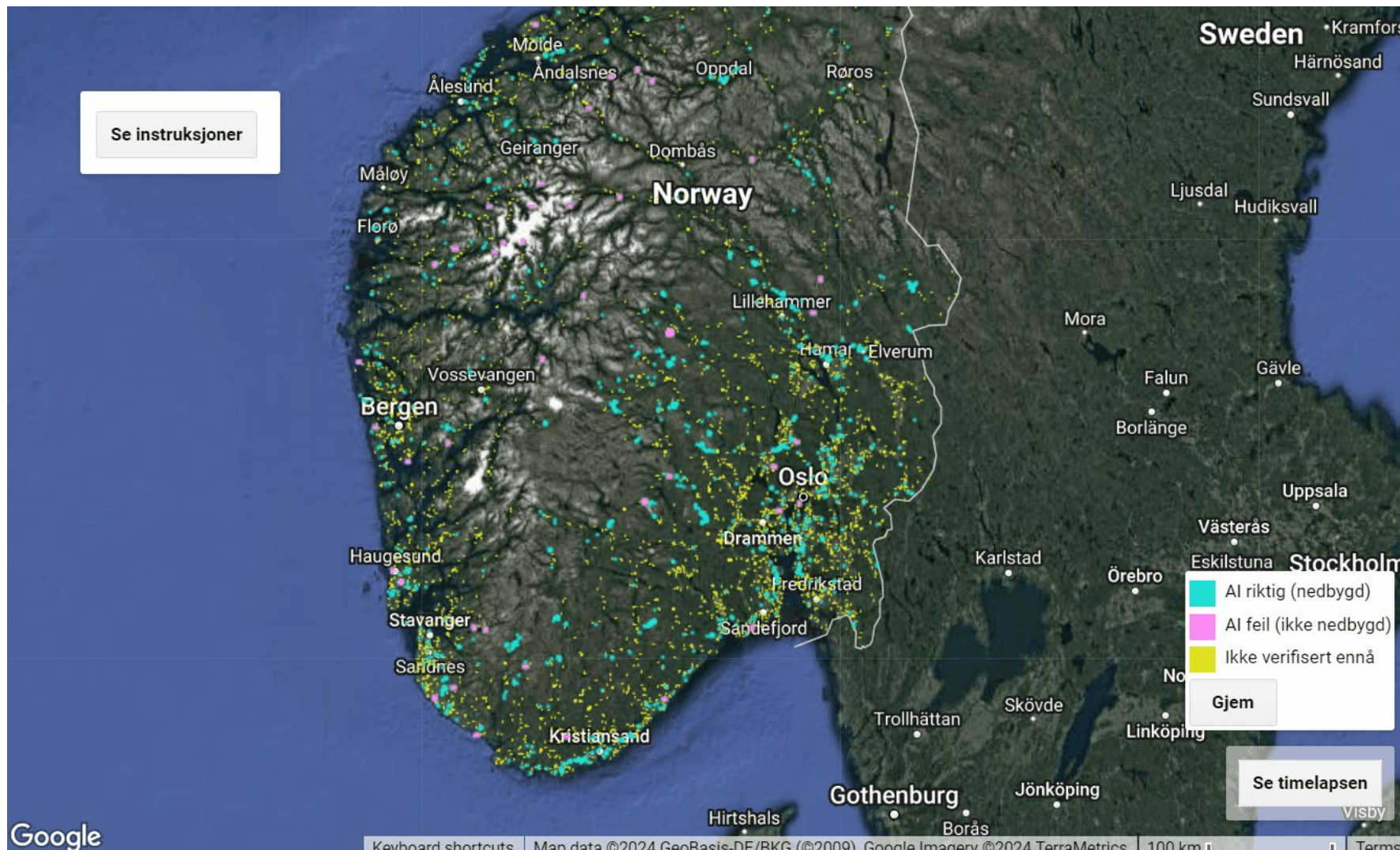
Civil society & citizen science : NRK-journalists validated nature encroachment locations identified by Google Dynamic World



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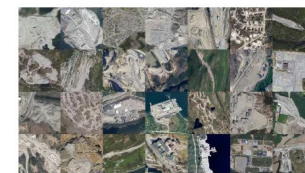


Civil society & citizen science: App for public access to maps and participation in validation of encroachment locations



Her er Norges største naturinngrep

Over hele landet bygges naturen ned. For første gang kan du nå se hvor i ditt distrikt mest natur har gått tapt.



- Anne Linn Kumano-Ensbj Journalist
- Ruben Sølvang Journalist
- Ruben Grøndahl Utaler Journalist
- Su Thet Mon Journalist
- Mads Nyborg Statist Journalist

Dette er noen av de største inngrepene NRKs kartlegging har avdekket. Se før/etter-bilder og les om hvert enkelt inngrep lengre ned i saken.

FOTO: NORGE I BILDER / KARTVERKET

Citizen science

- in 8 weeks
- 26 000 verifications
- 9 000 locations
- 125 km² of map validated

Universal values?:

- fairness (access)
- dignity (agency)

Impact & uptake:

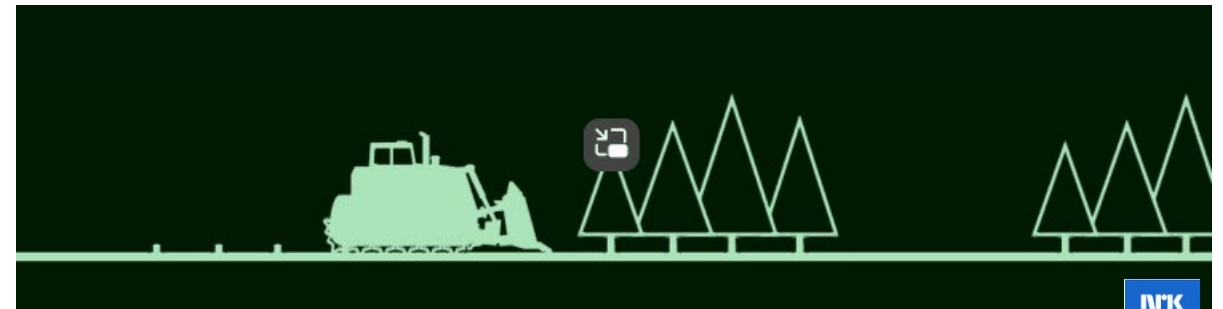
- NRK news piece read >1000 000 times in a country with a population of 5 million
- Over 1000 tips to NRK journalists came in during the weeks that followed
 - > investigative journalism on-site
- NRK shared database with 62 local newspapers
 - > multiple investigative local stories followed
- 1800 online articles cite the original digital story
- Government recently promised ca. 5 million USD extra for ecosystem accounting in 2025

Norwegian nature lost during the 15 minutes of this presentation...

Tapt natur mens du har lest denne saken:

1112m²

NRK





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EcoGaps