

## Project information

### Keywords

Sedimentary DNA, vegetation mapping, point-intercept, biomass

### Project title

ECOGEN - Ecosystem change and species persistence over time: a genome-based approach

### Year

2018

### Project leader

Dilli Prasad Rijal, UiT

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

We mapped and sampled surrounding vegetation of 24 lakes in Nordland, Troms, and Finnmark.

### Participants

Kari Anne Bråthen (UiT-The Arctic University of Norway)

Kelsey Lorberau (UiT-The Arctic University of Norway)

Leif Einar Støvern (UiT-The Arctic University of Norway)

Jutta Kapfer (Norwegian Institute of Bioeconomy Research-NIBIO)

### Flagship

Terrestrial

### Funding Source

Fram Centre

NFR

## Summary of Results

We hypothesized that the dominant species of the most abundant habitat types in the contributing area of a lake will be the most abundant species in the sedimentary DNA (*sedDNA*). Furthermore, we hypothesized that species abundance relations in the contributing area will be reflected in the *sedDNA*.

To address these hypotheses, we aimed to:

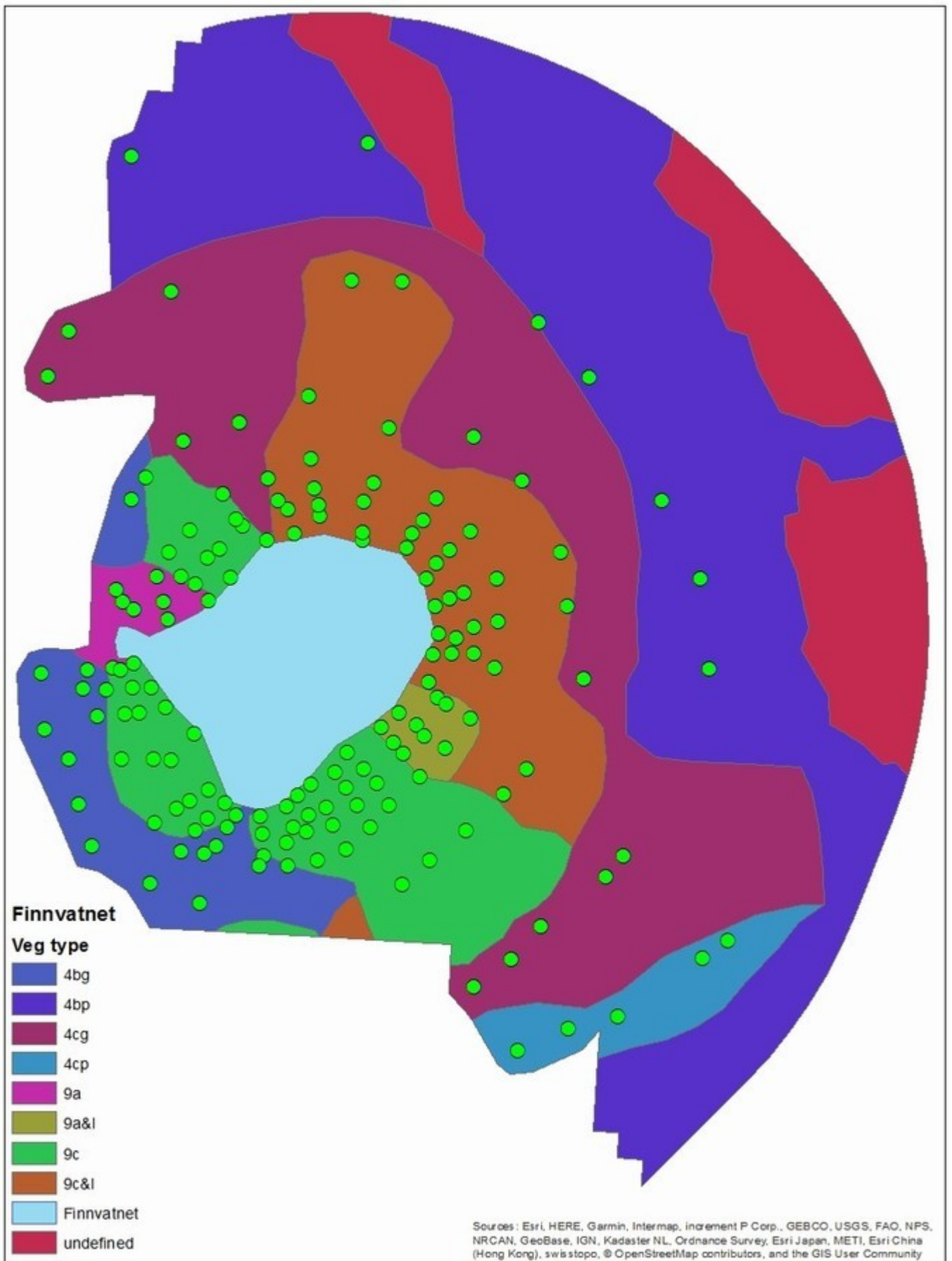
- Assess the contributing area surrounding the ECOGEN lakes,
- Characterize landscapes and habitat types/vegetation types in the contributing area including species abundances of the most common species and functional groups, and
- Compare abundances of species in the contemporary vegetation to that of their abundance in the contemporary *sedDNA* of each lake (as provided by ECOGEN).

## Project results

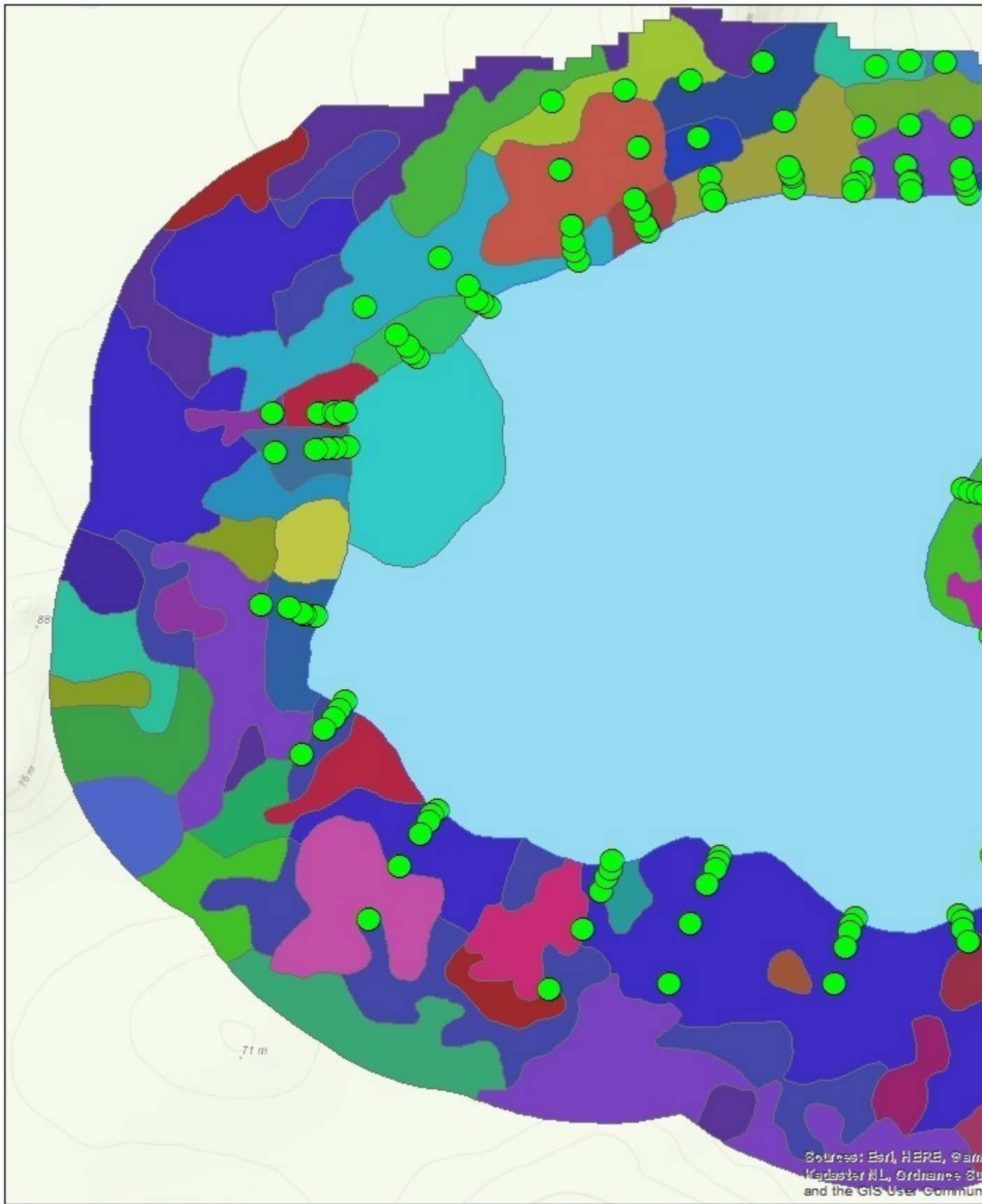
By the end of the summer 2018, point-intercept sampling and vegetation mapping was performed within 200 m perimeter from the lakeshore of 24 lakes in northern Norway (see table 1). A minimum of 48 and a maximum of 277 point-intercept samples were collected for estimating biomass of dominant vegetation growing around each lake. All the lakes mapped in the field were digitized and vegetation maps are prepared. A few examples of vegetation maps, each from Finnmark, Troms, and Nordland counties, are provided below (figures 1-3).



**Figure 1** The digitized vegetation map around Nordvivatnet close to Mortensnes in Finnmark. Different colors represent unique vegetation type around the lake. Green circles indicate point-intercept samples



**Figure 2** The digitized vegetation map around Finnvatnet near Grøtjord in Troms. Different colors represent unique vegetation type around the lake. Green circles indicate point-intercept samples.



**Figure 3** The digitized vegetation map around Øvre Årsvatnet near Andenes in Nordland. Different colors represent unique vegetation type around the lake. Green circles indicate point-intercept samples

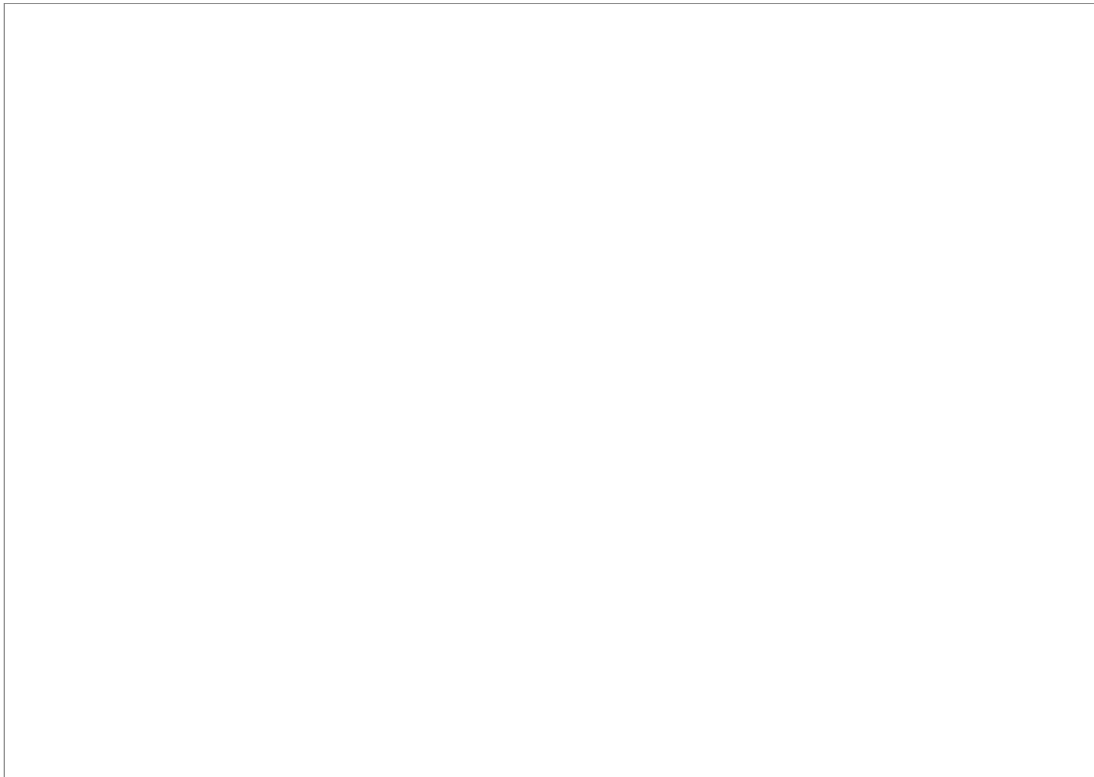
**Table 1** Geographical coordinates and other location information about the 24 lakes sampled and mapped by ECOGEN

SN	Lake name	Location	State	Latitude	Longitude	Perimeter (m)	# point-intercept samples
1	Bearalveaijohka	Jacobselv	Finnmark	70.2740	29.0146	469	133
2	Sierravannet	Alta	Finnmark	69.8447	23.3767	719	183
3	Eastorjavri	Ifjord	Finnmark	70.4331	27.3337	1530	259
4	Pond 4	Komagdalen	Finnmark	70.3357	29.9339	157	72
5	Pond 3	Komagdalen	Finnmark	70.3362	29.9285	211	101
6	Pond 1	Komagdalen	Finnmark	70.3249	29.9516	950	210
7	Nordvivatnet	Mortensnes	Finnmark	70.1331	29.0120	1090	133
8	Horn tjernet	Pasvik	Finnmark	69.3492	29.4916	540	164
9	Sandfjorddalen	Komagdalen	Finnmark	70.3602	30.0189	1590	277
10	Guossajávri	Sihccajavri	Finnmark	68.7997	23.5789	985	105
11	Nedre Akslavatnet	Vadsø	Finnmark	70.0740	29.8891	1590	96
12	Nesservatnet	Årøya	Finnmark	70.1357	23.2031	555	125
13	Einletvatnet	Andøya	Nordland	69.2580	16.0710	3060	121
14	Øvre Æråsvatnet	Andøya	Nordland	69.2560	16.0340	2260	144
15	Langfjordvatnet	Arnøya	Troms	70.1503	20.5370	3800	48
16	Gauptjern	Dividalen	Troms	68.8565	19.6184	362	160
17	A-tjern	Dividalen	Troms	68.9960	19.4860	683	81
18	Brennskogtjønnna	Dividalen	Troms	68.8590	19.5940	1500	181
19	Rottjern	Dividalen	Troms	68.9830	19.4770	775	98
20	Finnvatnet	Kvaløya	Troms	69.7780	18.6120	407	159
21	Jula Jávri	Kåfjorddalen	Troms	69.3650	21.0990	301	79
22	Paulan Jávri	Kåfjorddalen	Troms	69.3990	21.0150	235	71
23	Leinavatnet	Leinavatnet	Troms	68.4828	19.7323	341	73
24	Kulivatnet	Vågnes	Troms	69.7695	19.2761	873	159

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Currently, we are in the process of estimating biomass of each dominant species and functional group within each vegetation type using point-intercept samples. After calculating area of each vegetation type, we will be able to estimate biomass per unique vegetation type. We will also estimate biomass for different distance categories (0, 5, 10, 20, 50, 100 m) from lakeshore. Finally, these biomass estimates will be correlated with the *sedDNA* based results to evaluate whether or not *sedDNA* captures dominant vegetation growing around each lake. The distance based biomass estimates will be used to test whether or not species and functional groups growing closer to a lake is captured well by *sedDNA*.



#### Master and PhD-students involved in the project

A PhD student was involved during the fieldwork. Results of this study will significantly improve her PhD project. In addition, she will be one of the co-authors of scientific publication we plan to make.

#### For the Management

There is no clear message to managers as the results have not been finalized.

#### Published Results/Planned Publications

Nothing has been published yet. However, a scientific paper will be published in high-ranked scientific journal within 2019-2020.

#### Communicated Results

Lorberau, Kelsey. 2018. Vegetation Ecology Using Ancient Lake Sedimentary DNA. *Crossing the Palaeontological-Ecological Gap (CPEG) Conference 2018*, 2018 August 30-31, University of Leeds, UK.

Cristin publications-ID: 1621773, Institution: UiT

#### Interdisciplinary Cooperation

This was a collaborative project between UiT-The Arctic University of Norway and Norwegian Institute of Bioeconomy Research (NIBIO). We could not have been carried out this project without the involvement of vegetation mapper from NIBIO. This project helped strengthen cooperation between UiT and NIBIO.

#### Budget in accordance to results

Most of the budget was used as planned in the proposal. The budget allocated for publication and external collaboration were used for digitizing vegetation maps, which was underestimated in the original budget.

Could results from the project be subject for any commercial utilization

No

#### Conclusions

This project was supposed to provide additional values to ongoing ECOGEN project. As research is still progressing within ECOGEN, no conclusions could be drawn from this study alone.