

**Subject:** RE: Description of catchment variables

**Date:** Monday, 13 November 2023 at 14:33:44 Central European Standard Time

**From:** Jenny Hansen

**To:** Kim Magnus Bærum

**CC:** Kwaku Peprah Adjei

Hi Kim Magnus and Kwaku,

I'll maybe start with a brief description of the procedure I used to extract the variables and then follow with a description of the variables. I obtained the lakes data from government GIS repositories, either by matching names or by locations. I then intersected each lake with each country's catchments layer (also obtained from government GIS repositories) to find our catchments of interest. I subtracted the lake area from the catchments prior to variable extraction. Variables were extracted primarily in Google Earth Engine or R (in the case of Corine landcover and roads data). Landcover data is calculated by each cover type found across all the lakes in each country's dataset. The values represent the percent cover of that landuse type in the catchment. Not all cover types are present, which is why Norway, Finland, and Sweden have different representations of Corine landcover types. The other variables are aggregated over the area of each catchment, typically represented by a mean value, e.g. with NDSI, NDVI, and gHM, or by summation. Roads and ditches (Norway only) have two representations- total length and density, which accounts for the size of each catchments. The settlement density variables (unbuilt/built residential/built commercial) are a representation of the percent cover in each catchment. Human population density is the total people living in the catchment area; population density is people per square kilometer. gHM is the global human modification index, which ranges from 0 to 1, based on the degree to which humans have transformed the catchments.

Here is an explanation of the variables present in the dataset:

CORINE landcover data (from the 2018 raster dataset, percent cover of each type represented in a catchment)

mean\_ndsi (from Sentinel 2 imagery: mean normalized difference snow index)

fractional\_snow\_cover (from Sentinel 2 imagery: percent of area covered in snow, image averaged over winter months)

mean\_ndvi (from Sentinel 2 imagery: mean normalized vegetation index, image averaged over summer months)

total\_road\_length (from national roads databases: summed road length over a catchment)

road\_density (same source, but total lengths divided by the area of the catchment)

total\_ditch\_length (only for Norway from the national GIS repository, total length of man-made ditches in the catchment- these are typically for draining wetlands)

ditch\_density (same source, but divided by the catchment area)

unbuilt (from the Global Human Settlement Layer, percent unbuilt area in a catchment)

res\_built (same source, percent residential settlement coverage in a catchment)

nres\_built (same source, percent commercial settlement coverage in a catchment)

total\_population (from the High Resolution Settlement Layer, total number of residents in a catchment)

population\_density (same source, but total is divided by the area of the catchment)

gHM (from Global Human Modification Index, value between 0 and 1 representing 'human footprint' in the catchment)

I hope that this is helpful! Please do not hesitate to contact me if you have further questions. 😊

Cheers,  
Jenny

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**From:** Kim Magnus Bærum <[Kim.Barum@nina.no](mailto:Kim.Barum@nina.no)>  
**Sent:** Thursday, November 9, 2023 11:21 AM  
**To:** Jenny Hansen <[jenny.hansen@nina.no](mailto:jenny.hansen@nina.no)>  
**Cc:** Kwaku Peprah Adjei <[kwaku.p.adjei@ntnu.no](mailto:kwaku.p.adjei@ntnu.no)>  
**Subject:** Description of catchment variables

Hi Jenny,  
hope you had a good time at NINA-dagan. My plan was to interact more with a lot of people...but two days is rather short given the “a lot of people”-aspect, so did not manage that to the extent I planned 😊

I had a meeting with Kwaku yesterday, who is going to analyze the fish data together with the catchment data (i.e., construct the fish population model), and it would be very useful for him to have a description of the different variables (i.e., what they are/represents).  
Can you help me with that, I guess there are already some existing descriptions that could be used?

Cheers

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