Metadata form of Silva Fennica

This form is designed for writing the elements of metadata, which are used in the description of research materials such as data and codes. The form is based on the work done in the Work Group "Description of research materials" under the Finnish Open Science Coordination.

Item	Description	Responsible
Name of the data / code	The research data and code for the article "Impacts of reduced ditch network maintenance and ditch shallowing on ecosystem services of peatland forests in Finland"	Author
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Owner of the material	Authors	Author
Publisher	Zenodo	Author
Funder	Maj and Tor Nessling Foundation (https://ror.org/047egay20) Maa- ja vesitekniikan tuki ry (https://ror.org/019pxzh98) Research Impact Foundation (https://www.vaikuttavuussaatio.fi/en/)	Author
Description	Input files: - Daily weather data for the four study regions from 2004 to 2023. - Allometric road maps produced by the MOTTI stand simulator. The processing code that includes other input parameters used in the analysis, as well as the simulator implementation. The simulation outputs are in site-specific NetCDF files.	Author
Methods	The forest data was calculated using Python 3.10 from open data sources provided by the Natural Resources Institute Finland (NFI computing service) and the Finnish Forest Centre as explained in Section 2.1 and illustrated in Figure 2. Allometric road maps for different study sites were processed using the MOTTI 3.0 simulator. The weather data were aggregated from the open database of Finnish Meteorological Institute to obtain daily temperature, precipitation, radiation, and water vapor pressure values using Python 3.10. Simulations were performed using the peatland simulator SUSI (https://doi.org/10.3390/f12030293) using the processing code that is shared in Zenodo (written using Python 3.10).	Author
Variables	<u>Water table (WT) depth:</u> strip/dwtyr — Annual WT below soil surface [m] strip/dwtyr_latesummer — July-August WT below soil surface [m] strip/dwtyr_growingseason — May-October WT below soil surface [m] <u>Stand level forest attributes:</u> stand/biomass — Stand dry biomass [kg/ha] stand/basalarea — Stand basal area [m^2/ha] stand/volume — Stand total volume [m^3/ha] stand/logvolume — Stand sawlog volume [m^3/ha] stand/pulpvolume — Stand pulpwood volume [m^3/ha] stand/volumegrowth — Stand volume growth [m^3/ha/yr]	Author

	Stand level litterfall (dry biomass) [kg/ha/yr]: stand/nonwoodylitter Nonwoody litter (leaves + fineroots) stand/nonwoody_lresid Nonwoody litter from logging residue stand/non_woody_litter_mort Nonwoody litter from dead trees stand/woody_litter Woody litter (leaves + fineroots) stand/woody_lresid Woody litter from logging residue stand/woody_litter_mort Woody litter from dead trees Ecosystem carbon (C) [kg/ha/yr]: balance/C/stand_litter_in C in stand litterfall balance/C/gv_litter_in C in ground vegetation (gv) litterfall balance/C/stand_change Change in C storage of biomass balance/C/gv_change Change in C storage of gv Carbon outflows (mass of C) [kg/ha/yr]: balance/C/co2c_release CO_2 emission from mor humus and peat balance/C/ch4c_release CH_4 emission from peat balance/C/LMWdoc_to_water Low-molecular-weight (LMW) dissolved organic carbon (DOC) transport to ditches balance/C/LMWdoc_to_atm LMW DOC biodegraded to atmosphere balance/C/HMW_to_water High-molecular-weight (HMW) DOC transport to ditches balance/C/HMW_to_atm HMW DOC biodegraded to atmosphere Carbon balance (mass of C) [kg/ha/yr]: balance/C/stand_c_balance_c Ecosystem carbon balance balance/C/soil_c_balance_c Soil carbon balance Nutrient export [kg/ha/yr]: balance/N/to_water Nitrogen export to ditches balance/P/to_water Phosphorus export to ditches	
Author keywords	carbon balance; drainage; ecosystem modelling; nutrient export load; stand growth; water table	Author
Vocabulary keywords (community standard)		Author
Discipline		Archive/Repository/Publisher
Type of material	Research data, model code, simulation outputs.	Author
Language	eng	Author
Time range covered	2004-01-01 – 2023-12-31	Author
Geographic region	FIN	Author
Version		Author
File format(s)	.csv, .py, .nc	Author
Availability of the materials (open, embargo, registration, limited, registration required)	The materials are openly available in Zenodo.	Author
Justification for access restrictions		Author
Licence	CC BY-SA 4.0	Author
Connections with other research materials	The forest data were derived from the database of the Finnish Forest Centre (FFC) and the NFI Computing Service of the Natural Resources of Finland. First, the NFI service was used to calculate the average stand	Author

	volumes for each forest site type in the study region. Then, the FFC inventory plots (4781 in total, measured between 2020 and 2022) were filtered by stand development class (thinning stage and mature forests), soil type (peat), and stand volume within 10 m^3 ha^{-1} of the NFI-derived stand volume, in order to calculate representative structural forest attributes for the simulations. In both datasets the locations were filtered by administrative region (Southern Finland (SF): Uusimaa, Varsinais-Suomi, Satakunta, Pirkanmaa, Päijät-Häme, Kanta-Häme, Kymenlaakso, South Karelia and South Savo; Central Finland (CF): South Ostrobothnia, Central Ostrobothnia, Central Finland, North Savo and North Karelia; Northern Ostrobothnia-Kainuu (NOBK): Northern Ostrobothnia and Kainuu; Lapland: Lapland region) Daily weather data from 2004 to 2023 were derived from the open database of Finnish Meteorological Institute. Daily temperature, precipitation and humidity were acquired from the weather observation stations of Hämeenlinna Lammi Pappila (FMI station id (fmisid) 101154), Alajärvi Möksy (fmisid 101533), Vaala Pelso (fmisid 101800), and Rovaniemi Apukka (fmisid 101933) to the study regions of SF, CF, NOBK, and Lapland, respectively. Daily global radiation values were interpolated by latitude from all available FMI stations measuring radiation, i.e. Helsinki-Vantaa airport (fmisid 100968), Jokioinen Ilmala (fmisid 101104), Jyväskylä airport (fmisid 101339), Sotkamo Kuolaniemi (fmisid 101756), Sodankylä Tähtelä (fmisid 101932), and Utsjoki Kevo (fmisid 102035).	
Access to the connected research materials	The inventory plots of Finnish Forest Centre are available here: https://www.metsakeskus.fi/fi/avoin-metsa-ja-luontotieto/aineistot-paikkatieto-ohjelmille/paikkatietoaineistot (OGC GeoPackage 1.2). The NFI Computing Service, produced by the National Resources Institute Finland (https://ror.org/02hb7bm88), is available here: https://vmilapa.luke.fi/ Open data from the Finnish Meteorological Institute (https://ror.org/05hppb561) is available here: https://en.ilmatieteenlaitos.fi/open-data. Access to Motti can be requested from here: https://www.luke.fi/en/services/lukes-motti-software-predicts-the-future-development-of-forests Development version of SUSI is available here: https://github.com/annamarilauren/susi_2024	Author
Codes only: hardware/software requirements for running the code	There are no special hardware requirements for running the code. The code works with at least Python 3.10 version.	Author
Connections to other products of research	Niemi, M.T., Palviainen, M. & Laurén, A. Enhanced multi-objective decision support in peatland forestry using Peatland simulator SUSI. Submitted to Silva Fennica 20 May 2025, manuscript id. SF-D-25-00025	Author
Personal data		Author
Confidential or secret data		Author
Publication date	16.9.2025	Archive/Repository/Publisher

Preservation policy	Zenodo offers permanent preservation of the research data.	Author
Permanent identifier (PID)	https://doi.org/10.5281/zenodo.17130513	Archive/Repository/Publisher