

«Ūdens kvalitātes modelēšana upju baseinu apsaimniekošanas plānu izstrādei Lietuvā»

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Contents

1. Background

2. SWAT model of LT

1. Background

.... Having made SWAT model for LT ...

Would be great to have the same for BY, LV, EE

Transboundary issues, joint approach, comparable evaluations, joint baseline, comparable measures.

RBMP, Nitrates, WFD, all national WQ issues

5 failed applications: 2x INTERREG, 1x ERAF, 2x LCS

(nordic countries object, soil scientists object, too interdisciplinary, too theoretical, too practical)

1. Background

2011/12 –

SWAT model for LT. Source apportionment.

2014/15 – (presentation)

Renewal and upgrade. Use for RBMP. Translation of policies and measures into model data. Scenarios incl baseline. Optimisation tools. Optimisation of measures.

2019/20 – (ToR ready)

Renewal. Transfer to SWAT+. Scenario modelling.

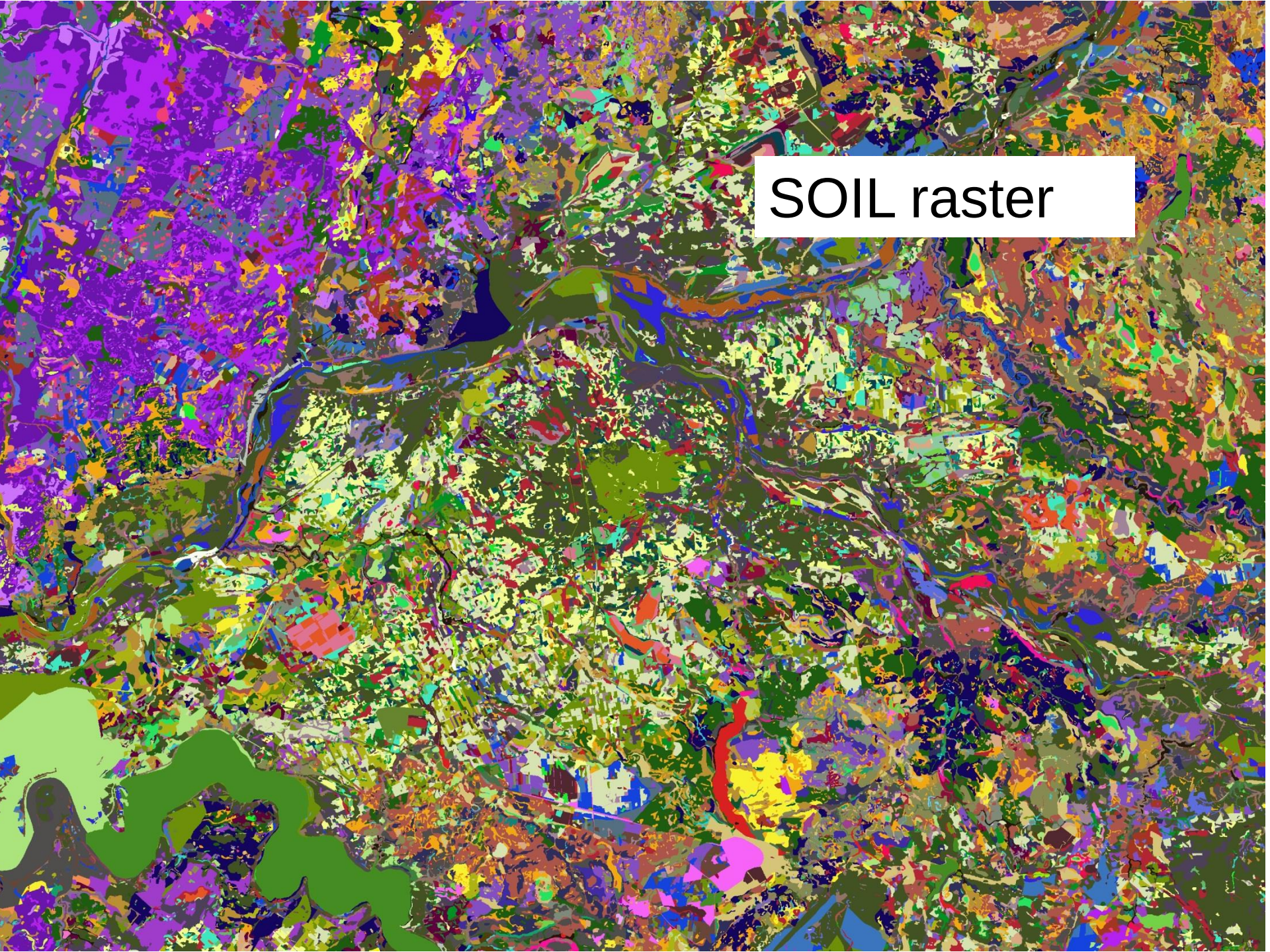
1. MODEL

SPATIAL ELEMENTS: HRU -> CATCHMENTS / RIVER NETWORK -> WATERSHEDS -> LT

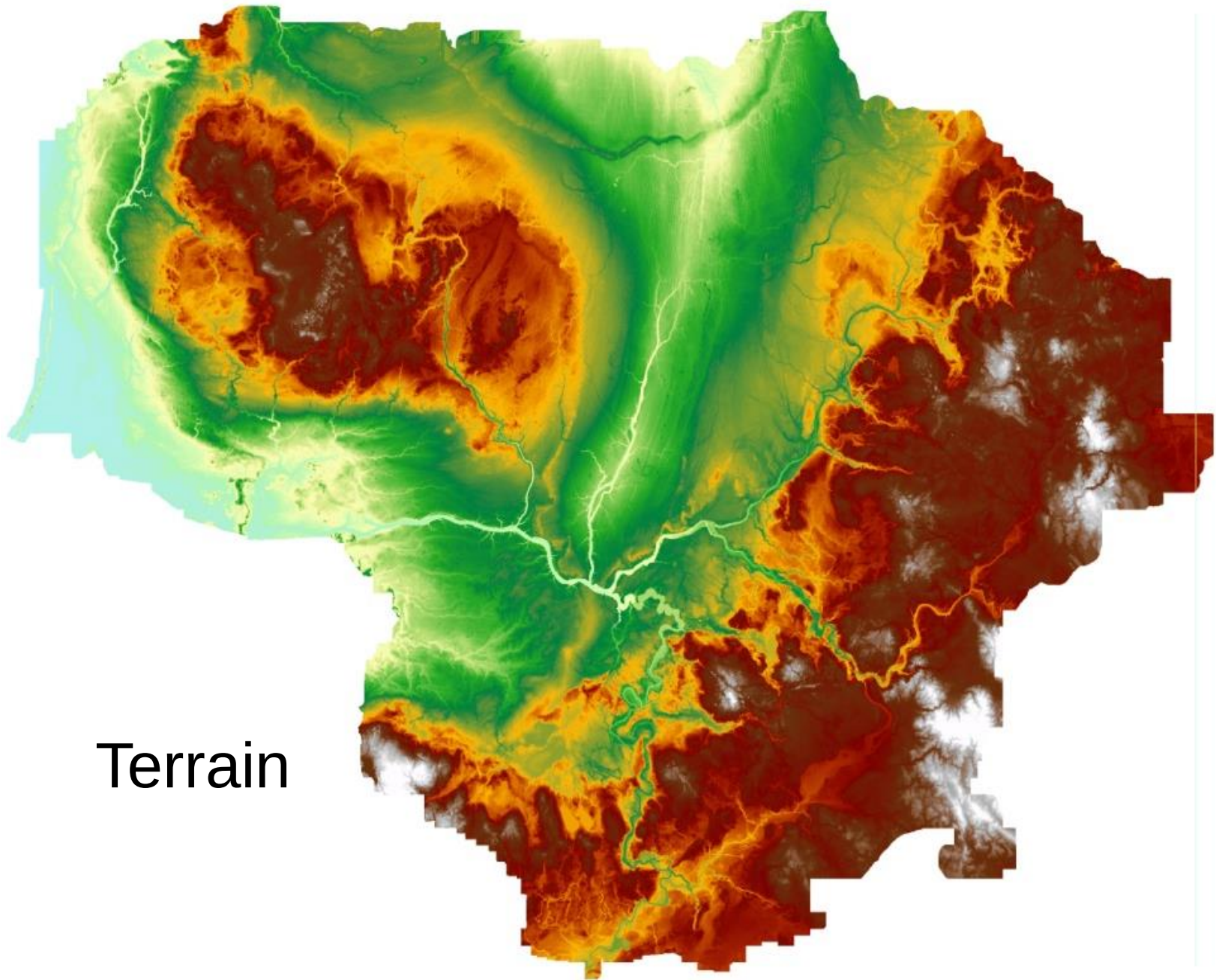
HRU: SLOPE (3) vs SOIL (86) vs LAND USE (56 incl crops)

Meteorology, Point sources, Agricultural management

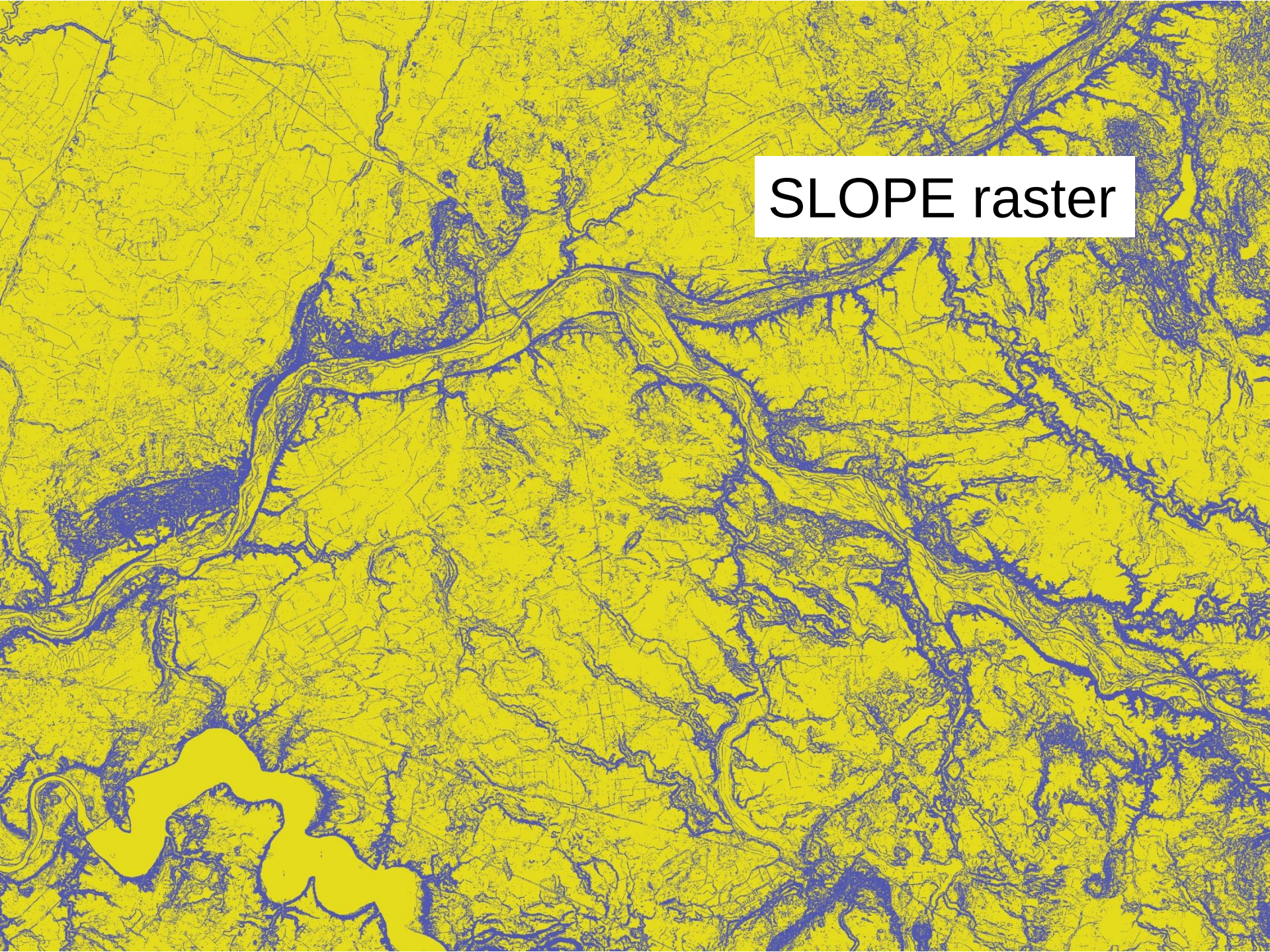
System for enabling data logistics through SWAT numerical engine

The image is a complex, multi-colored map representing a soil raster. It features a dense mosaic of colors including purple, blue, green, yellow, orange, red, and brown, which likely correspond to different soil classifications. The map shows a network of winding lines and irregular shapes, possibly representing rivers, roads, or topographical features. A white rectangular box is overlaid on the upper right portion of the map, containing the text "SOIL raster".

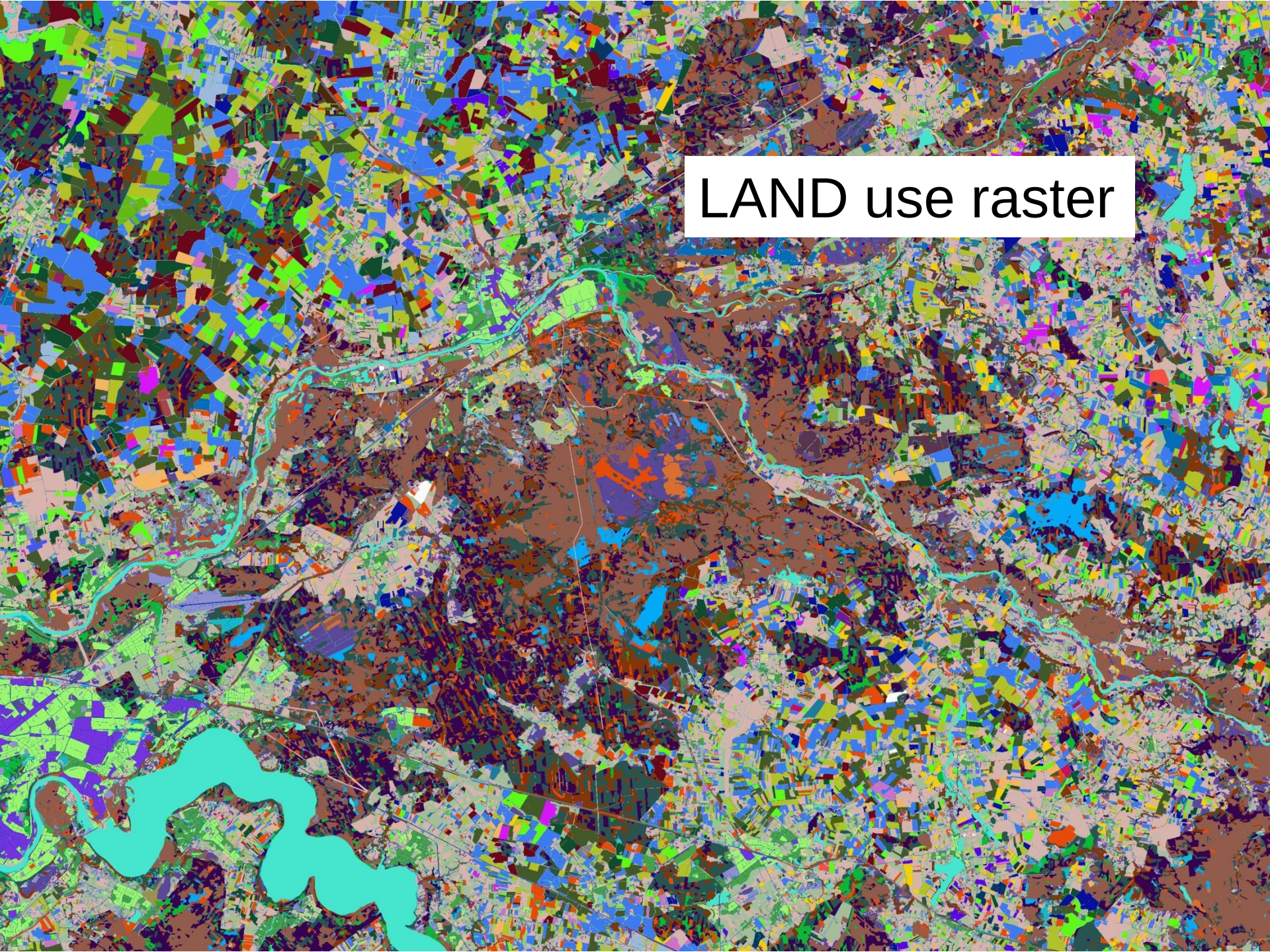
SOIL raster



Terrain

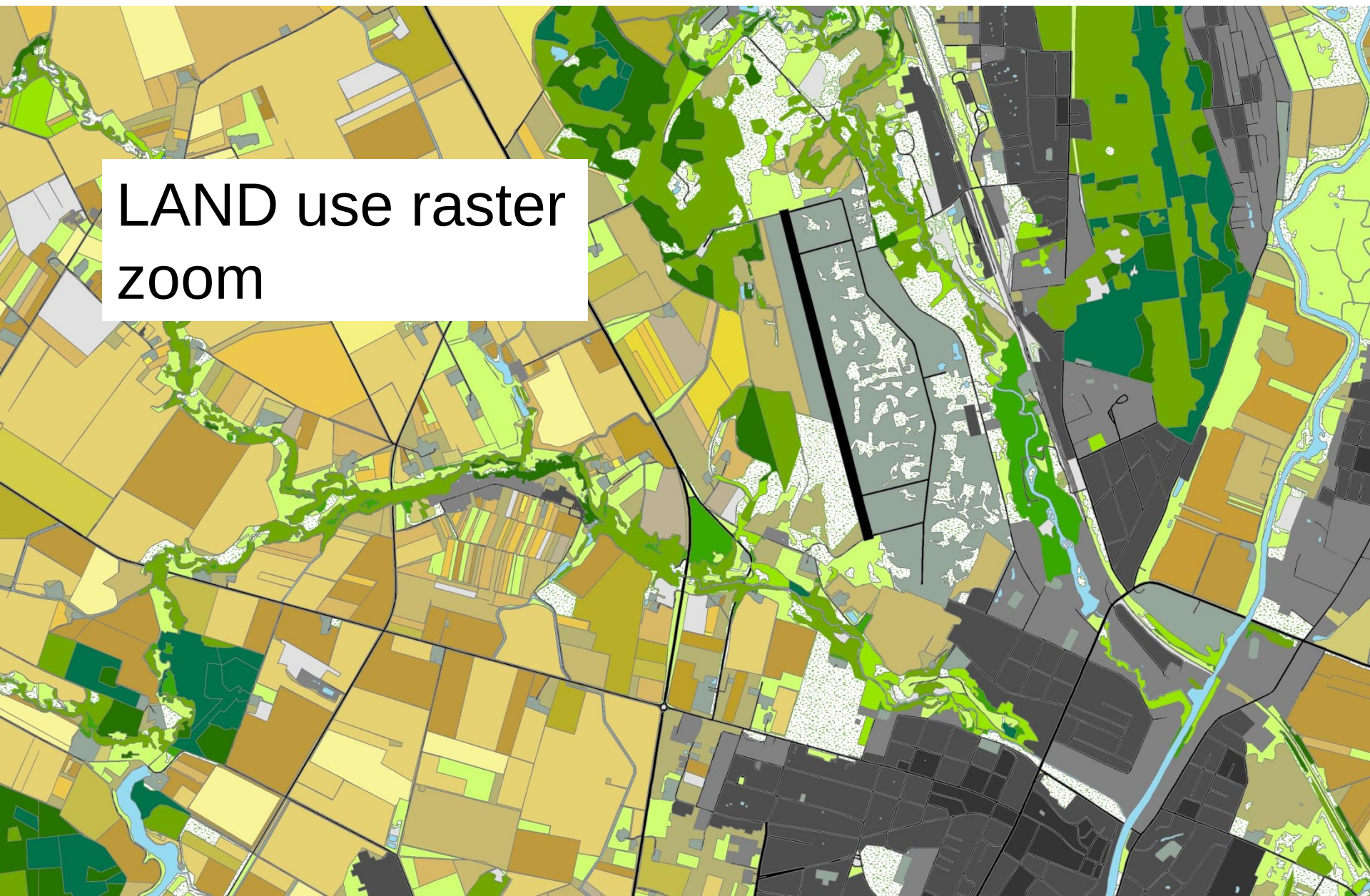


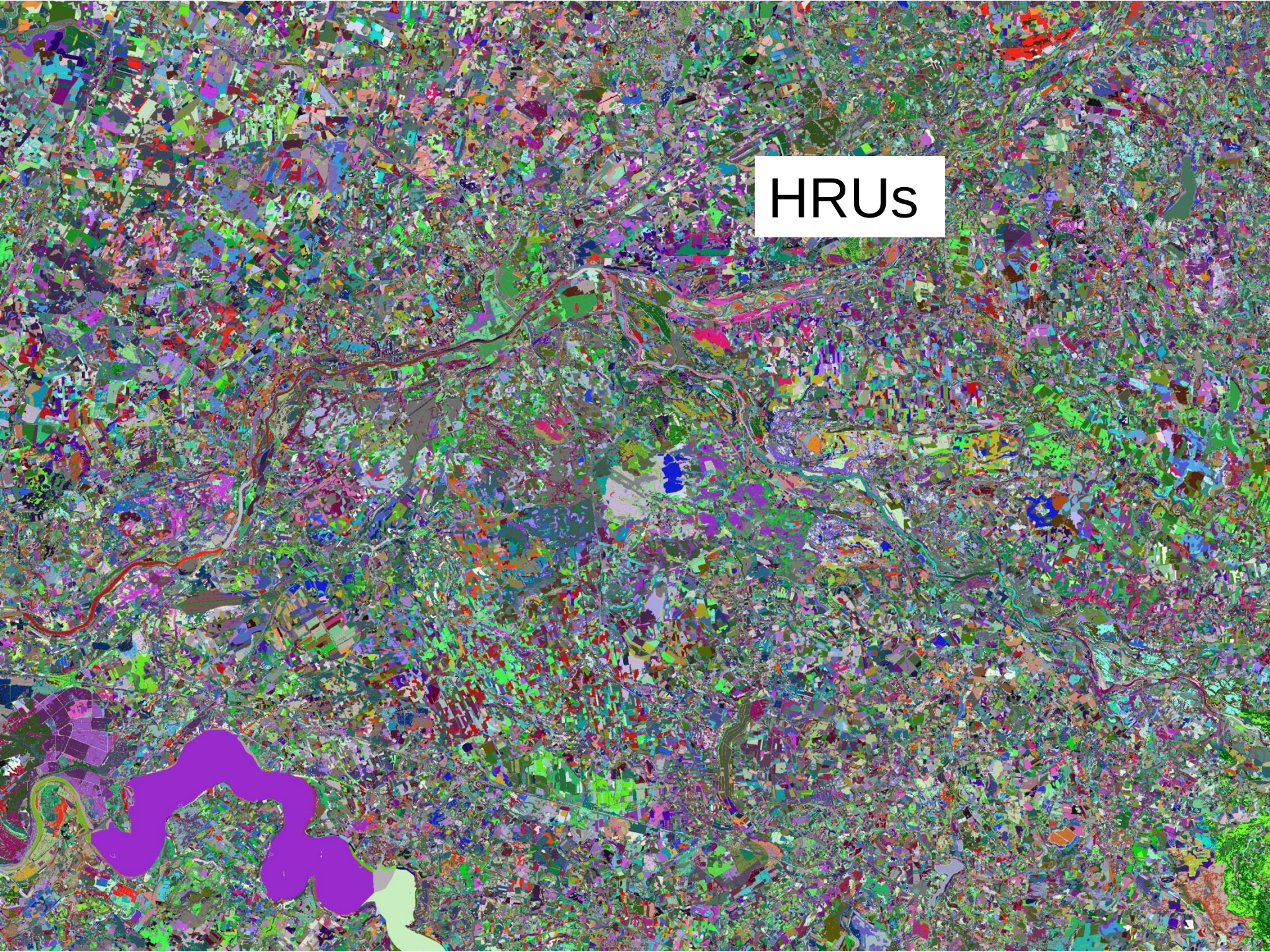
SLOPE raster

The image is a high-resolution aerial photograph overlaid with a land use raster. The raster consists of numerous small, irregular polygons, each filled with a different color. These colors represent various land cover categories: green for vegetation, brown for bare soil or urban areas, blue for water bodies, and a wide variety of other colors (red, orange, yellow, purple, etc.) for different types of agricultural land or specific land use classifications. The overall effect is a complex, colorful mosaic that represents the spatial distribution of land use in the area shown. The text 'LAND use raster' is overlaid on the upper right portion of the image.

LAND use raster

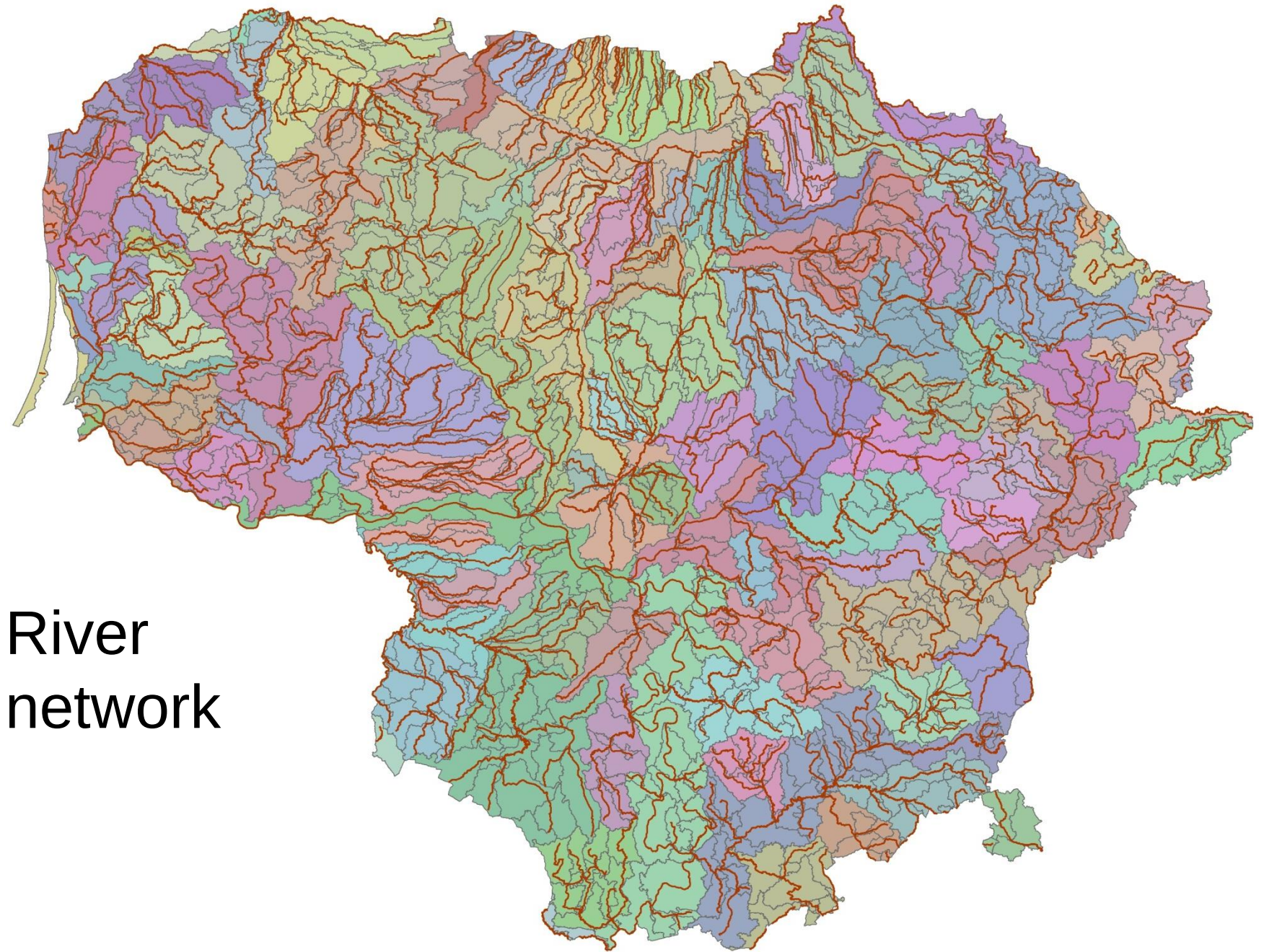
LAND use raster
zoom





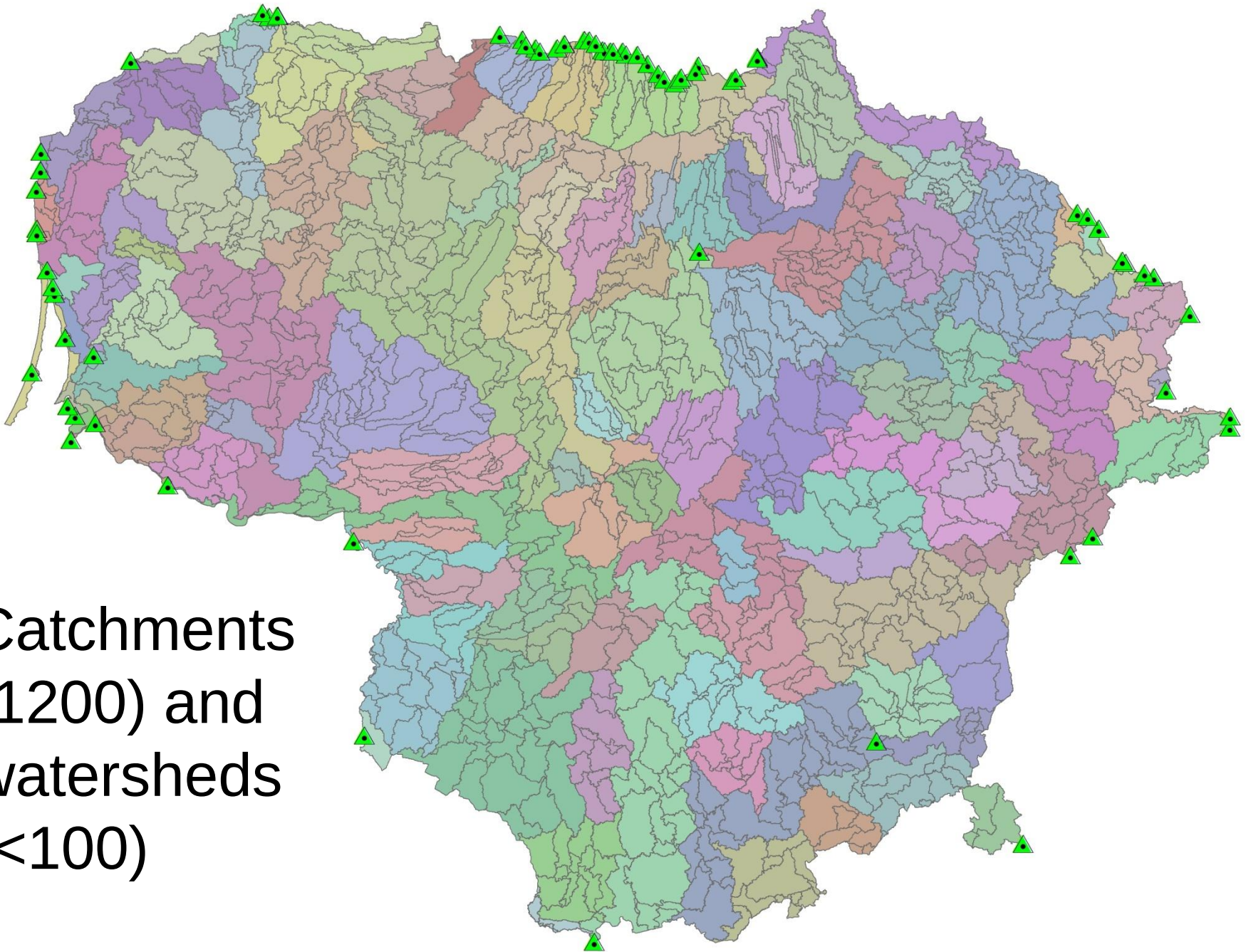
The image is a high-resolution aerial photograph of a landscape, likely a watershed, overlaid with a grid of small, irregular polygons. These polygons are colored in a variety of colors, including shades of green, blue, purple, red, and brown, representing different land use or land cover categories. The colors are distributed across the landscape, with some areas showing more uniform colors and others showing a mix. The overall pattern is complex and fragmented, reflecting the natural heterogeneity of the landscape. A white rectangular box is positioned in the upper right quadrant of the image, containing the text 'HRUs' in black, sans-serif font. The text is centered within the box and is clearly legible against the background of the map.

HRUs



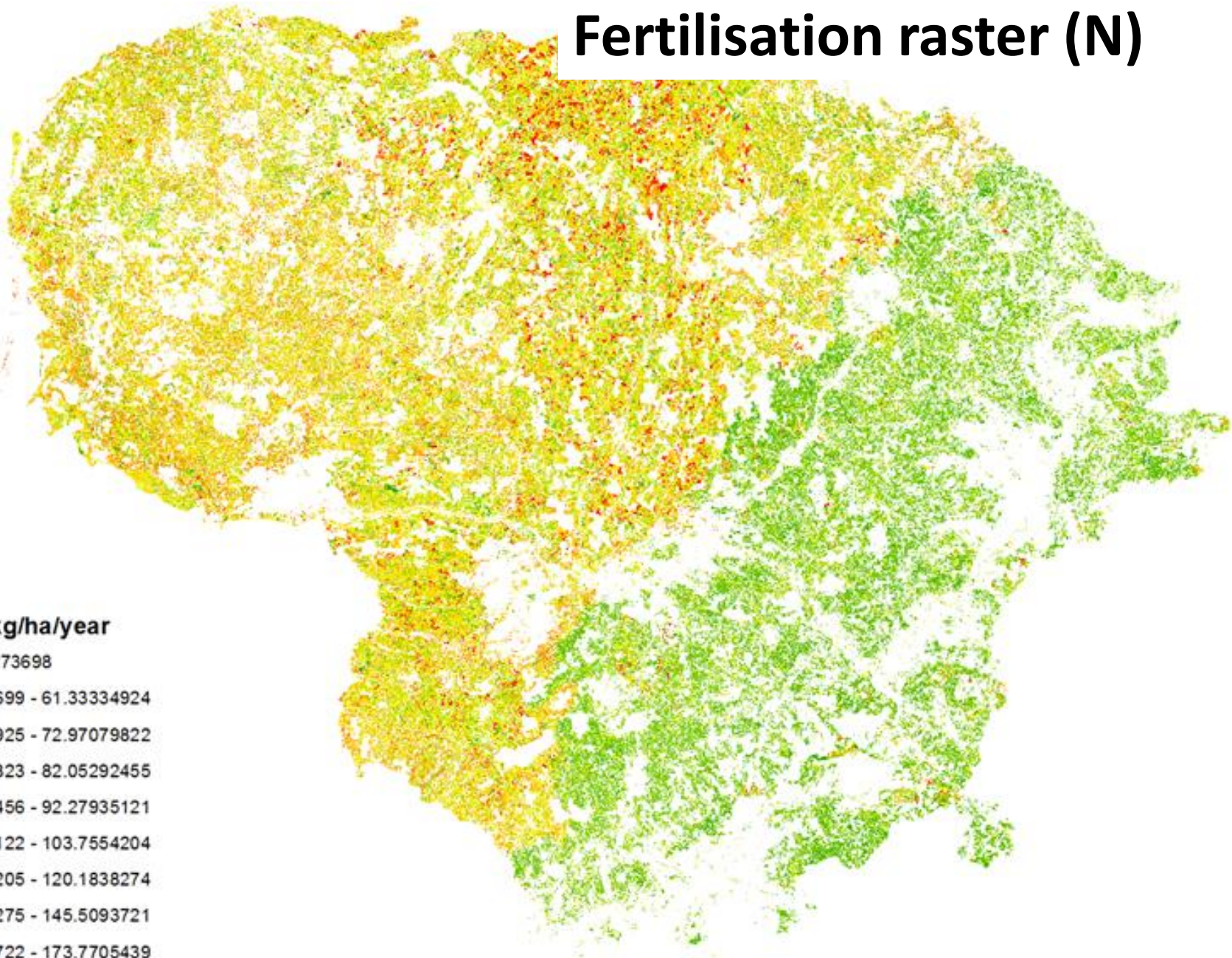
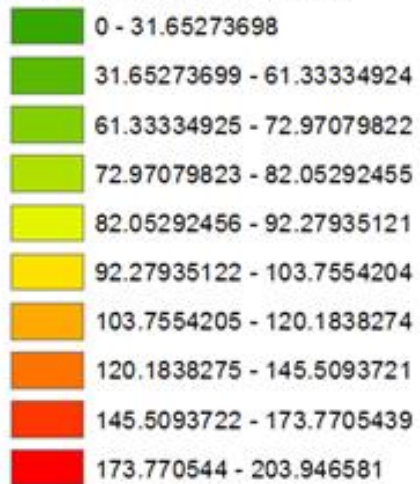
River
network

Catchments
(1200) and
watersheds
(<100)



Fertilisation raster (N)

N-fertilizer, kg/ha/year



2. MODEL RESULTS

TEMPORAL: daily values, 1997-2012 (16 years)

SPATIAL: HRU output traceable

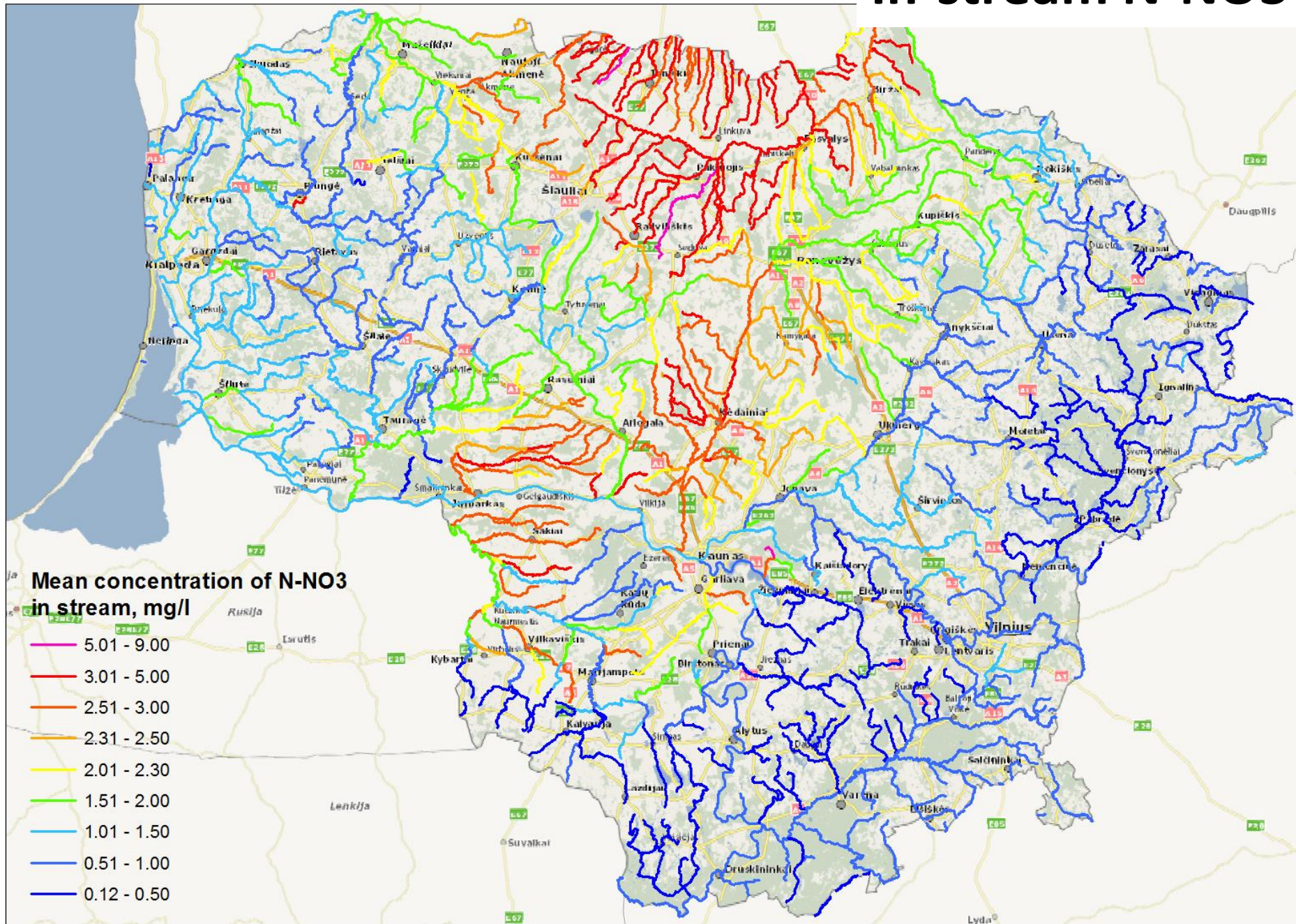
Catchments ~ water bodies (~1200)

Calibrated parameters: Q, N-NO3, TotalN, TotalP in rivers

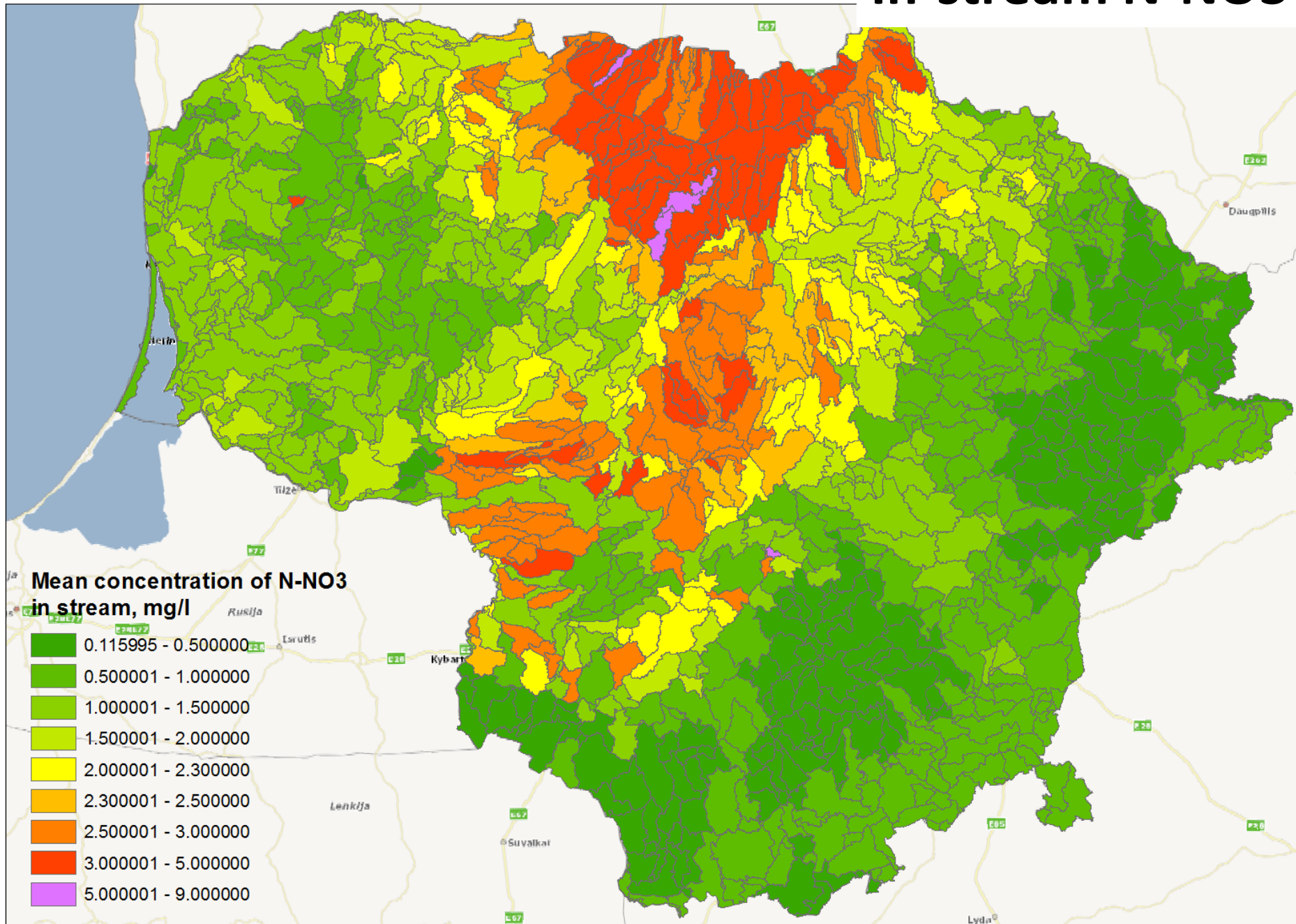
Other results:

- All parameters elsewhere**
- Other WQ parameters**
- Crop yields**

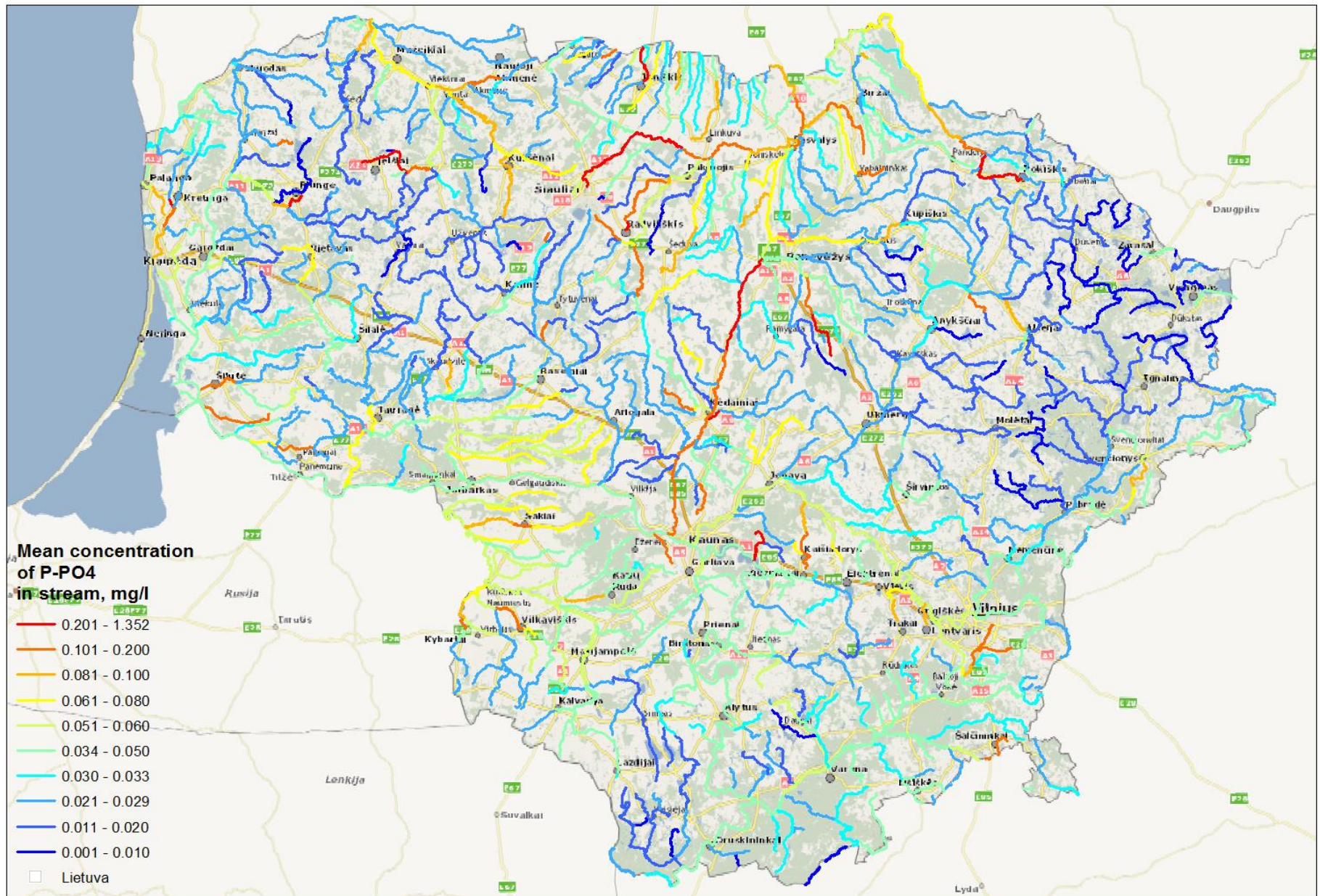
In-stream N-NO3



In-stream N-NO3

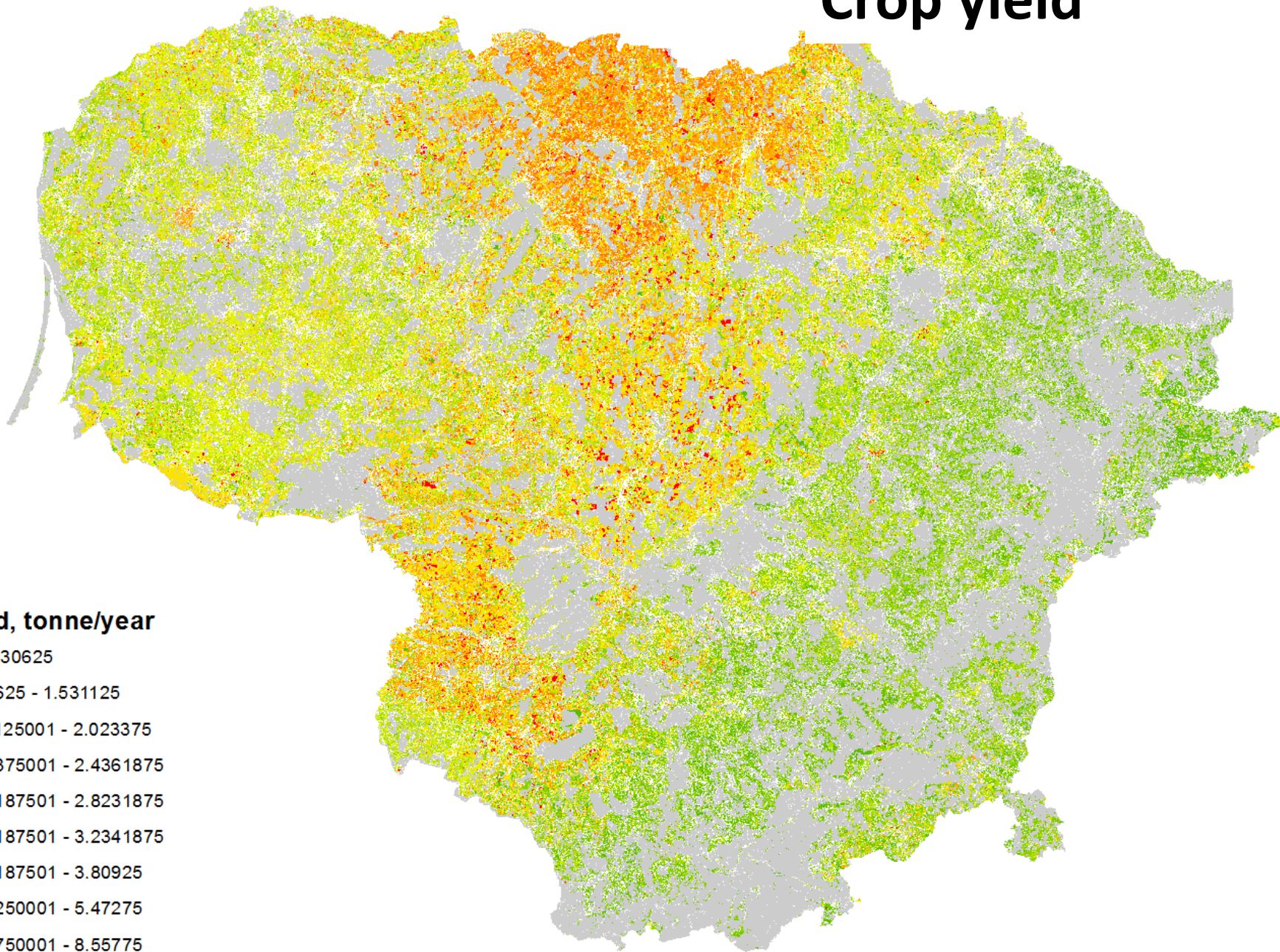
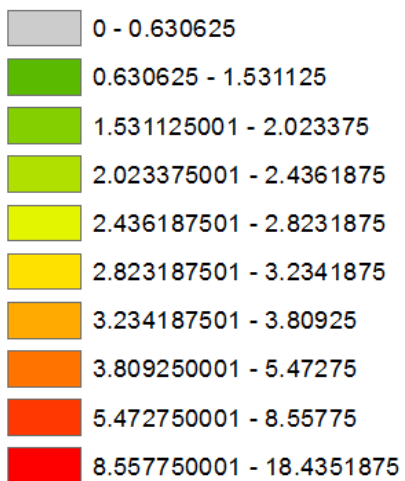


In-stream P-PO4



Crop yield

Crop yield, tonne/year



3. EXPECTED USE OF MODEL RESULTS IN RBMP

Use of reference (1997-2012) run for the assessment of the present situation

Numerical exercises:

- Source apportionment - Scenario calculation

Definition and running a baseline scenario (16 years assuming situation as of 2020)

Optimisation of agricultural measures in WB at risk on top of baseline scenario

4. CAL/VAL STAGE of the project

CAL / VAL STRATEGY and Target Definition; balance of quantitative targets and process description

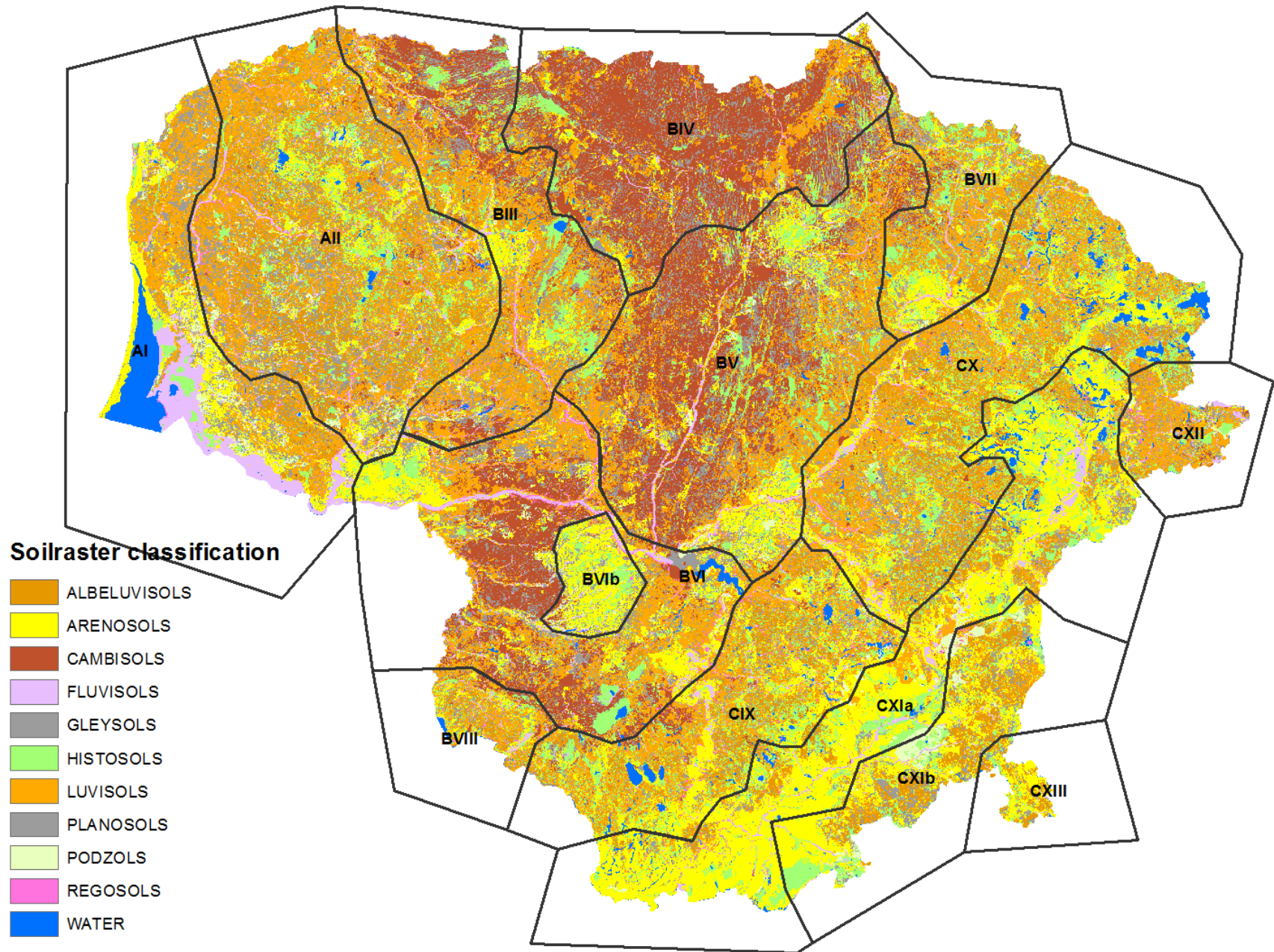
**REGIONALISATION, PICKING REPRESENTATIVE DATA
RICH STATIONS**

**HYDROLOGY: CALIBRATION, VALIDATION
EXTRAPOLATION, REVALIDATION**

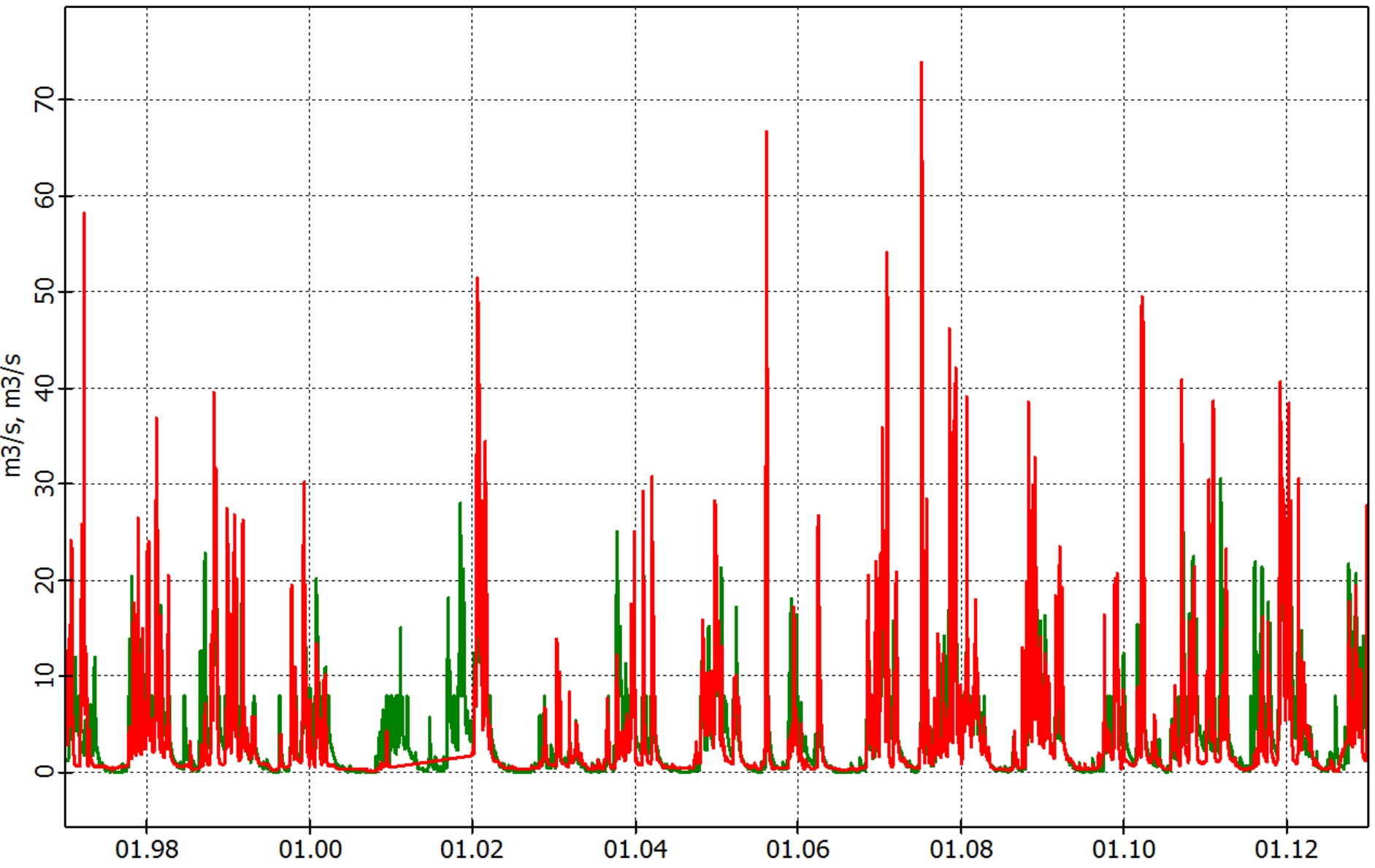
**WATER QUALITY: CALIBRATION, VALIDATION
EXTRAPOLATION, REVALIDATION**

Preparation of model for use and delivery

Regionalisation

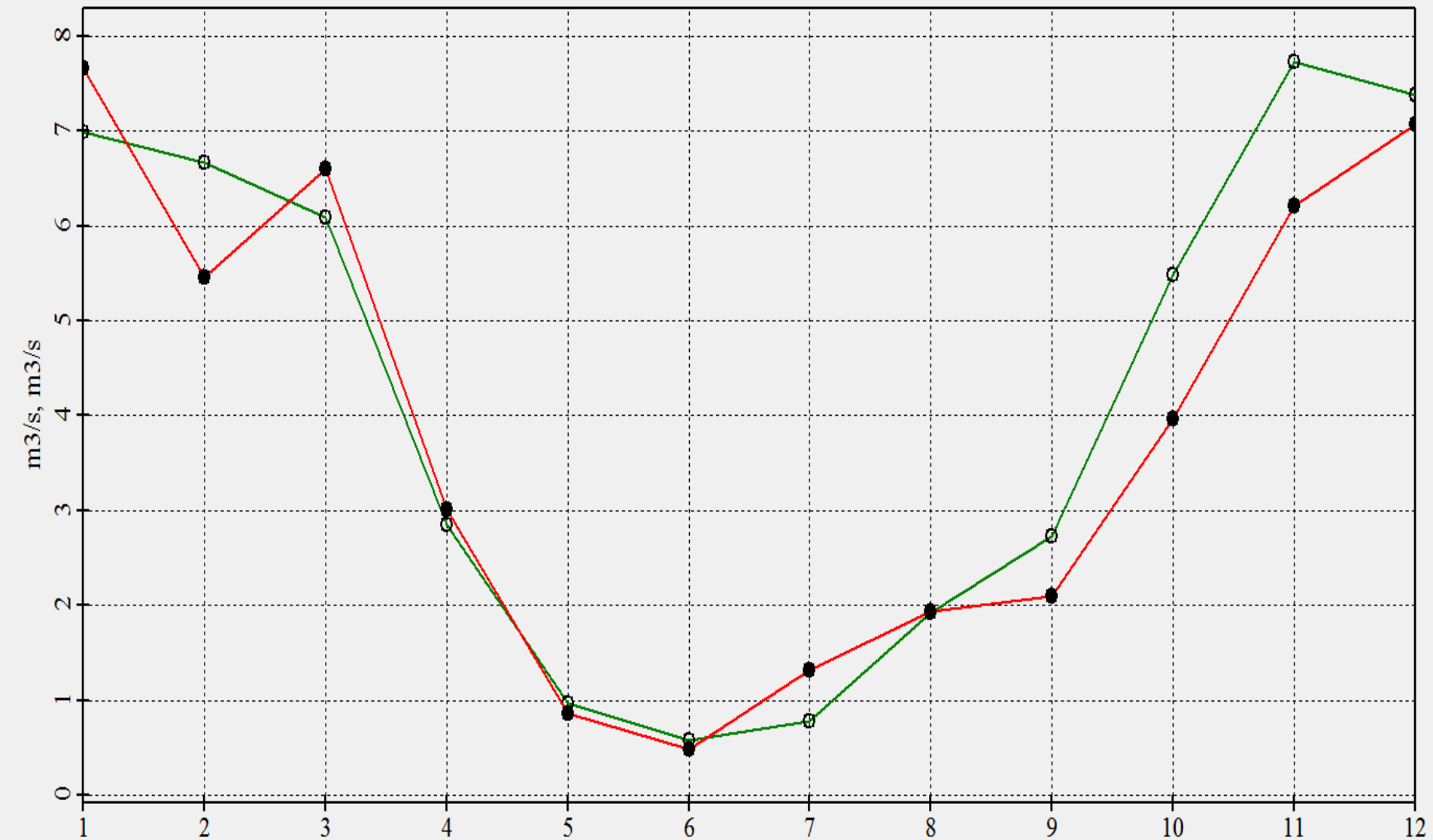


CALVAL: Western Hydrology,Akmena-Dane-Kretinga



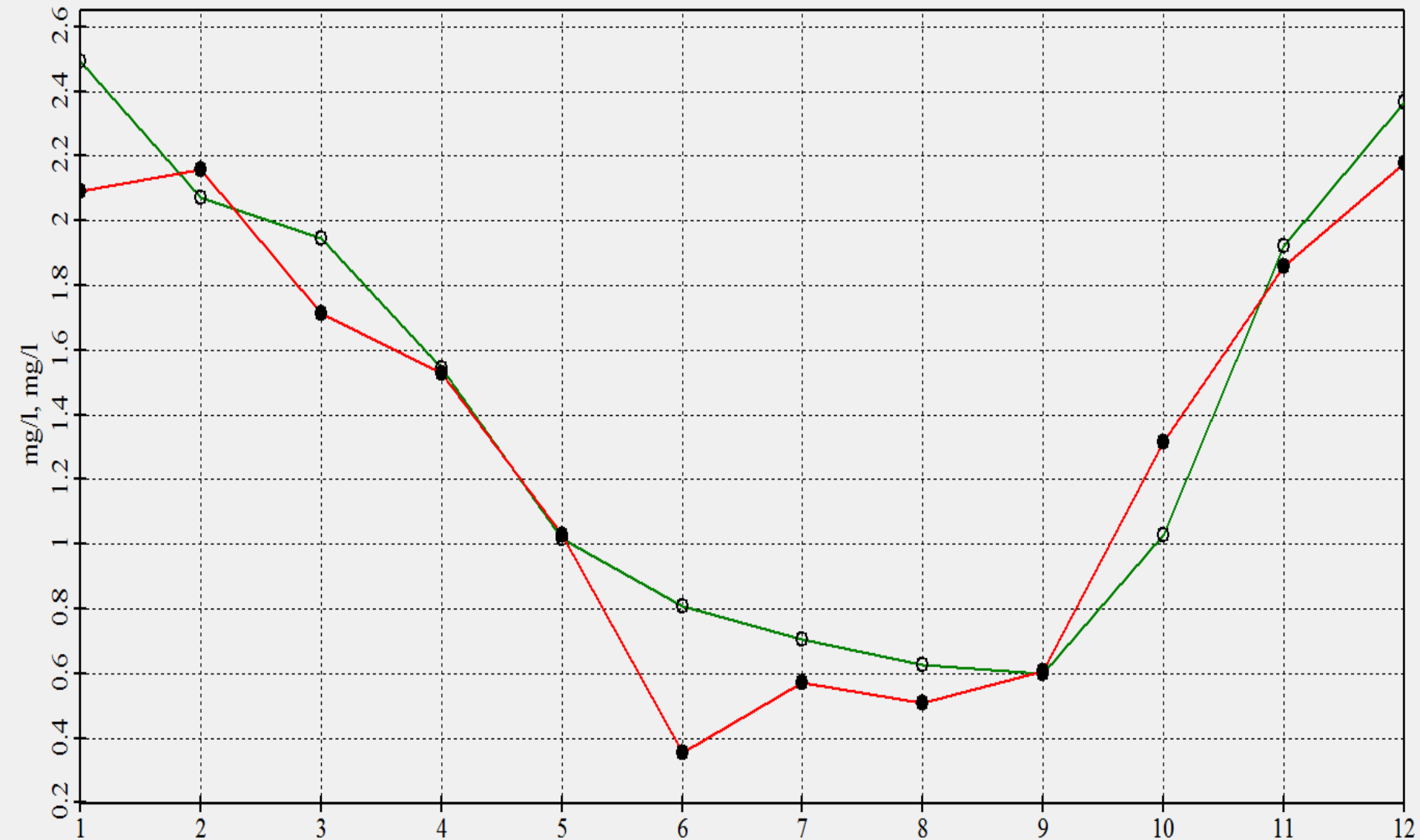
CALVAL: Western Hydrology, Akmena-Dane-Kretinga.

Winter/spring high flow

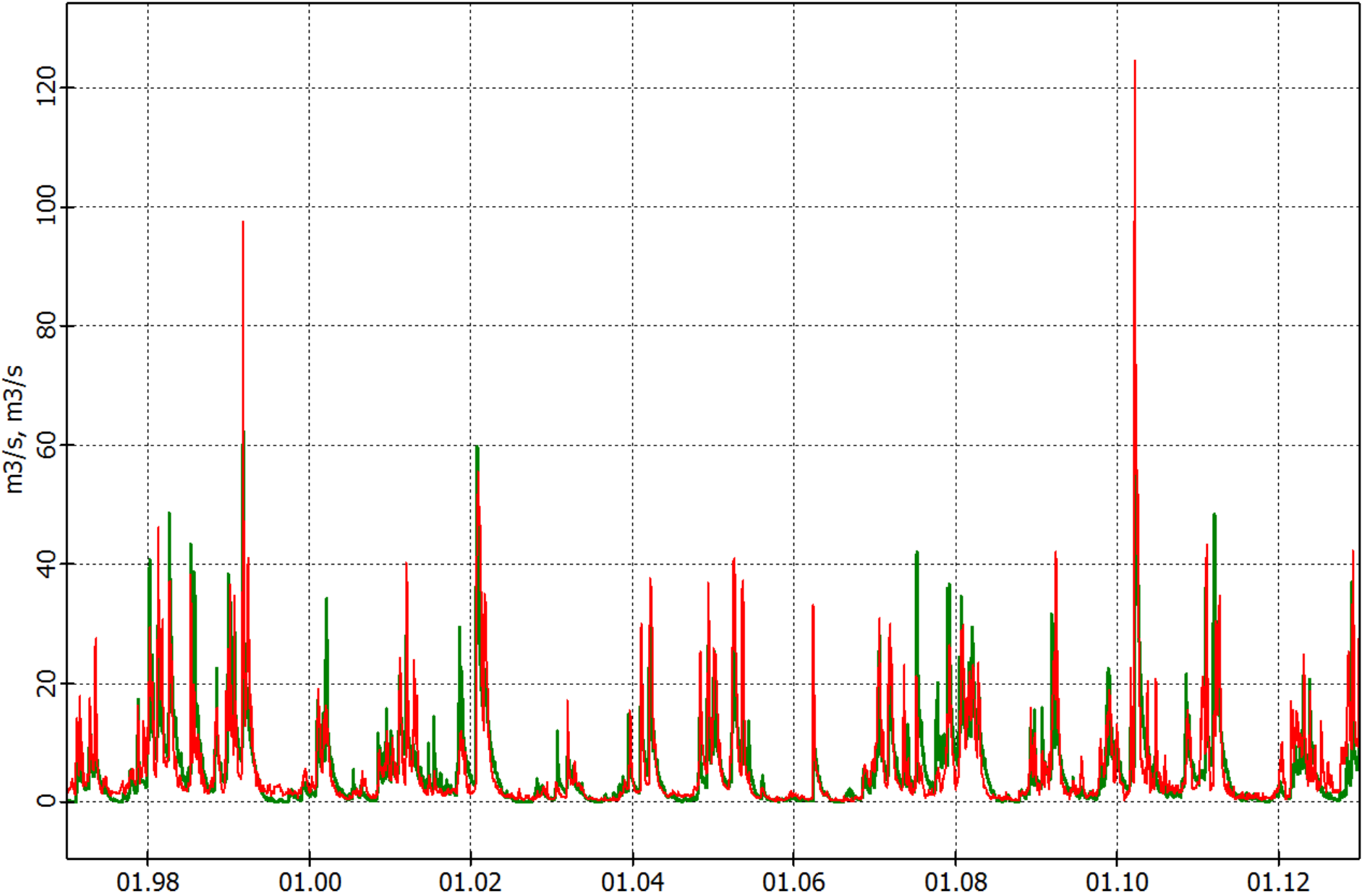


CALVAL: Western WQ, Akmena-Dane-ties-Tūbausiai.

N-NO3: distinct seasonal cycle (different from Q)

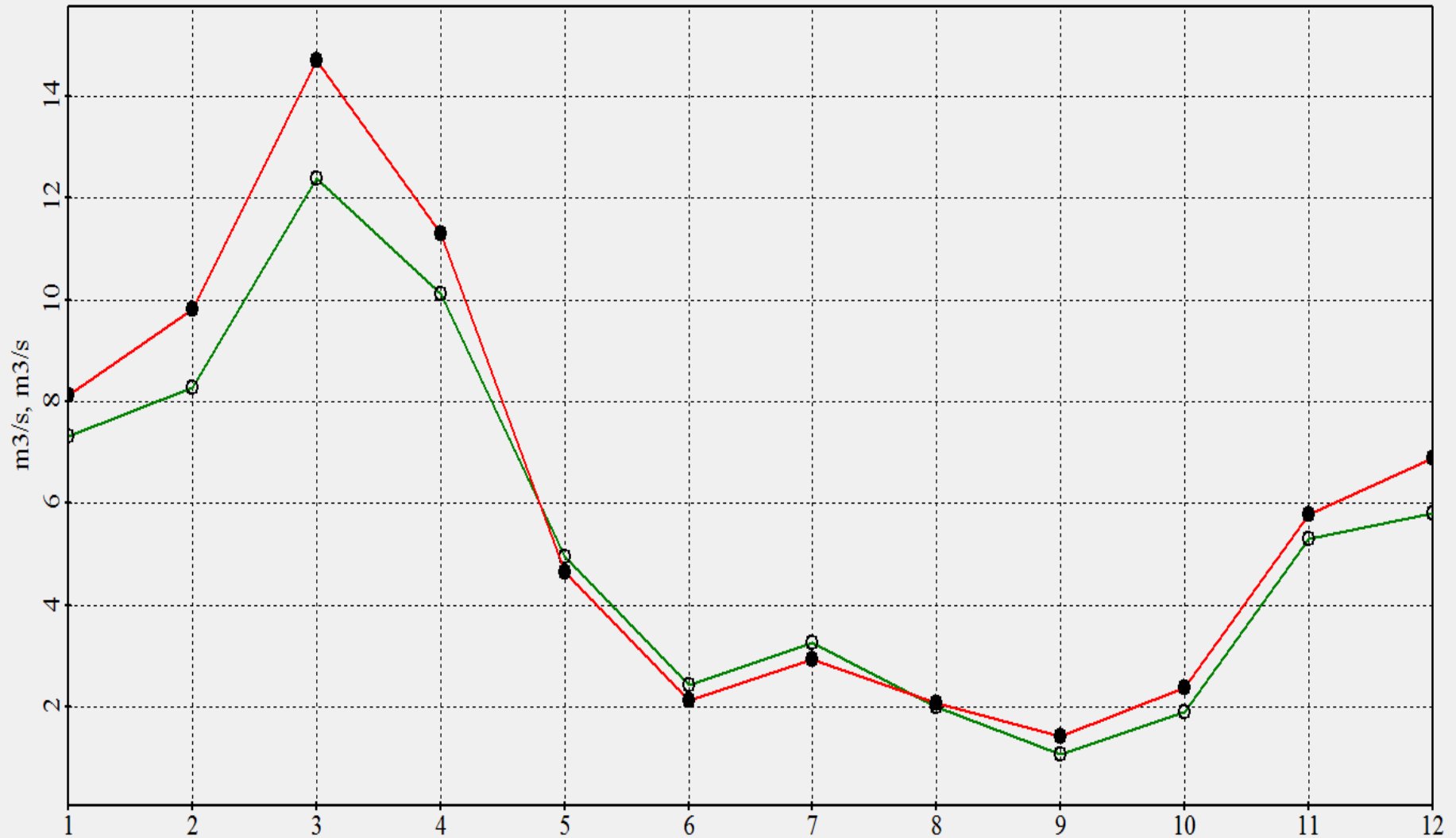


CALVAL: Central Hydrology, Nevežis-Paņevežis



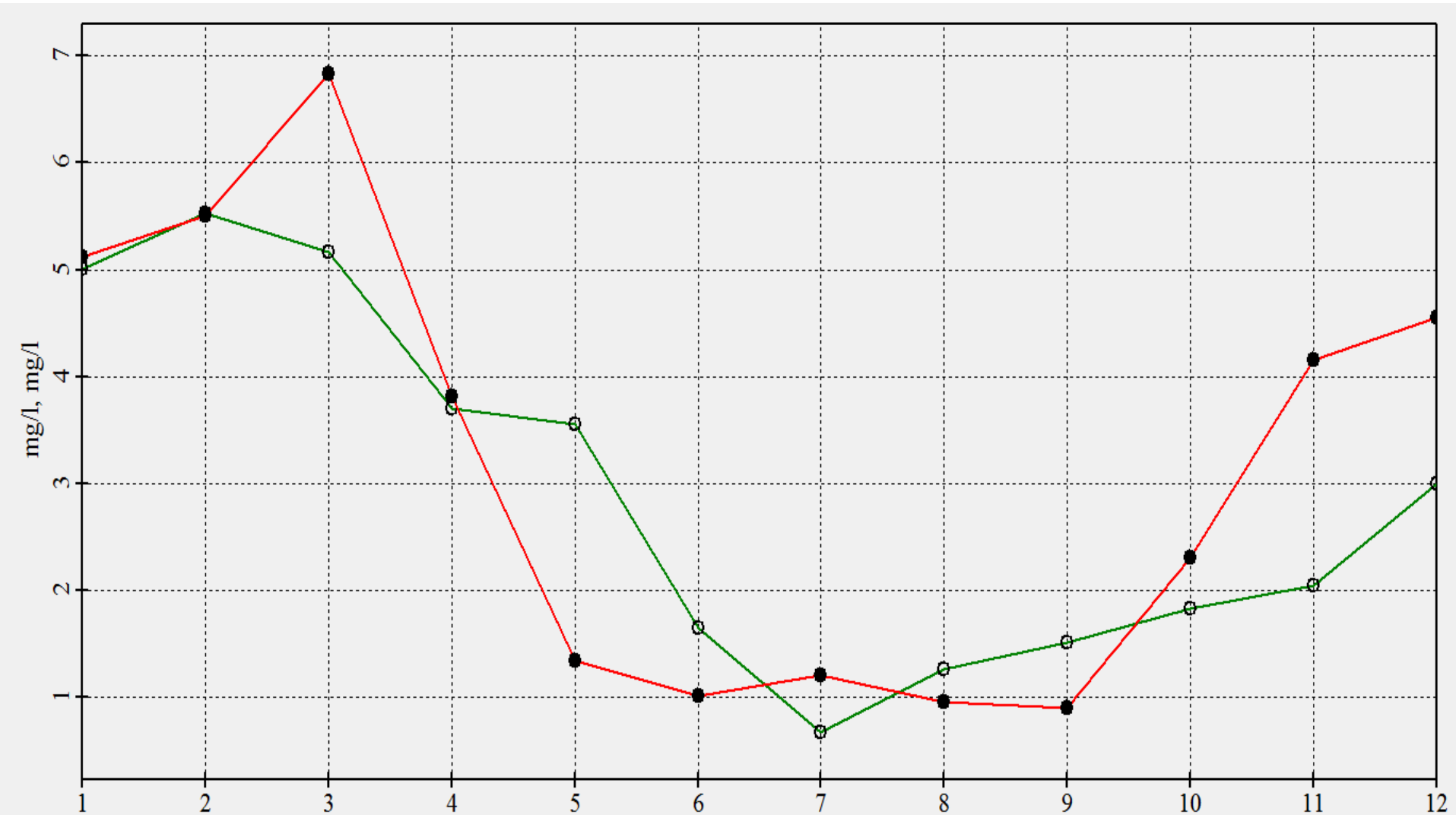
CALVAL: Central Hydrology, Nevežis-Paņevežis.

Distinct snow melt flood.



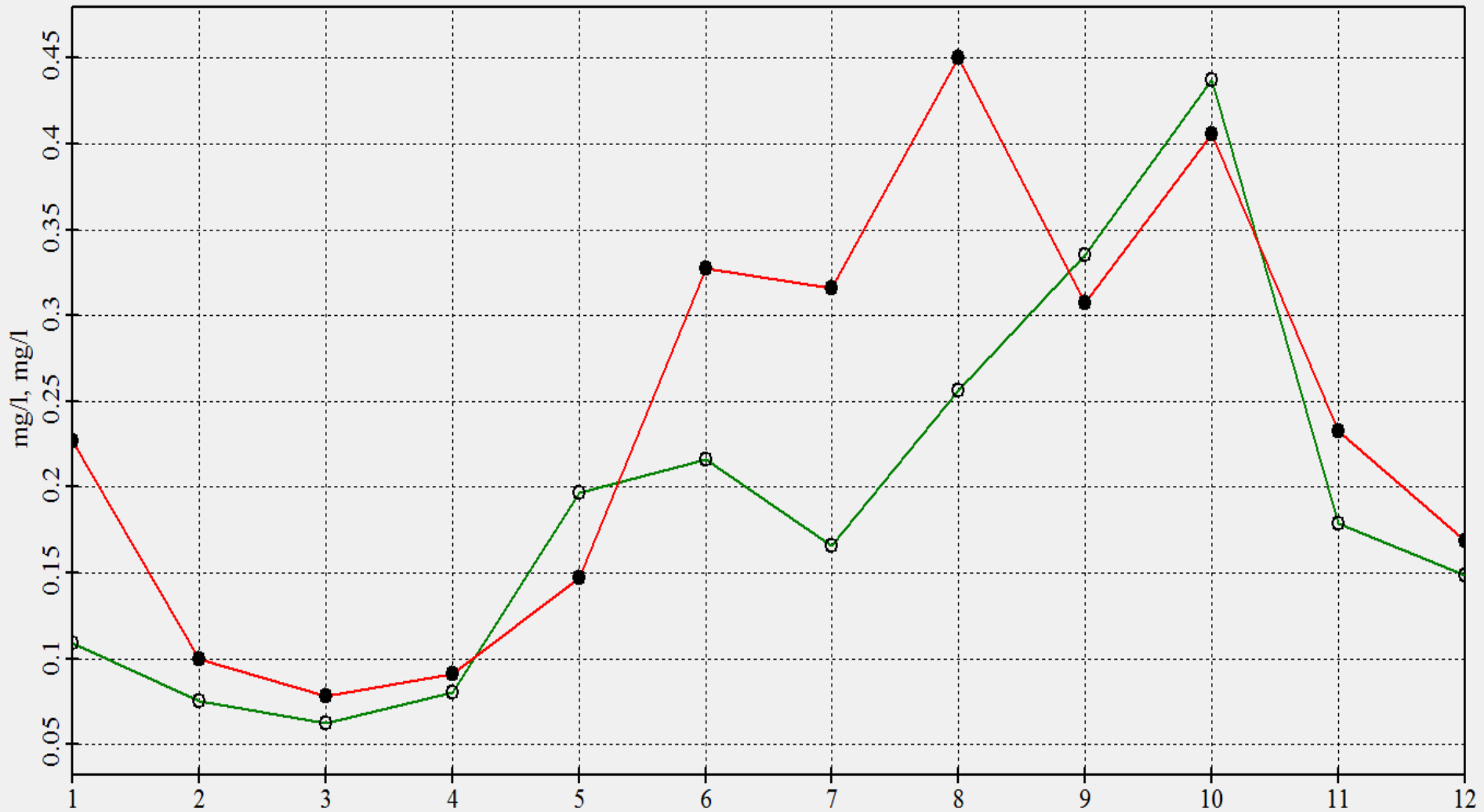
CALVAL: Central WQ, Šeimena - žemiau Vilkaviškio.

N-NO3: distinct seasonal cycle (different from west)

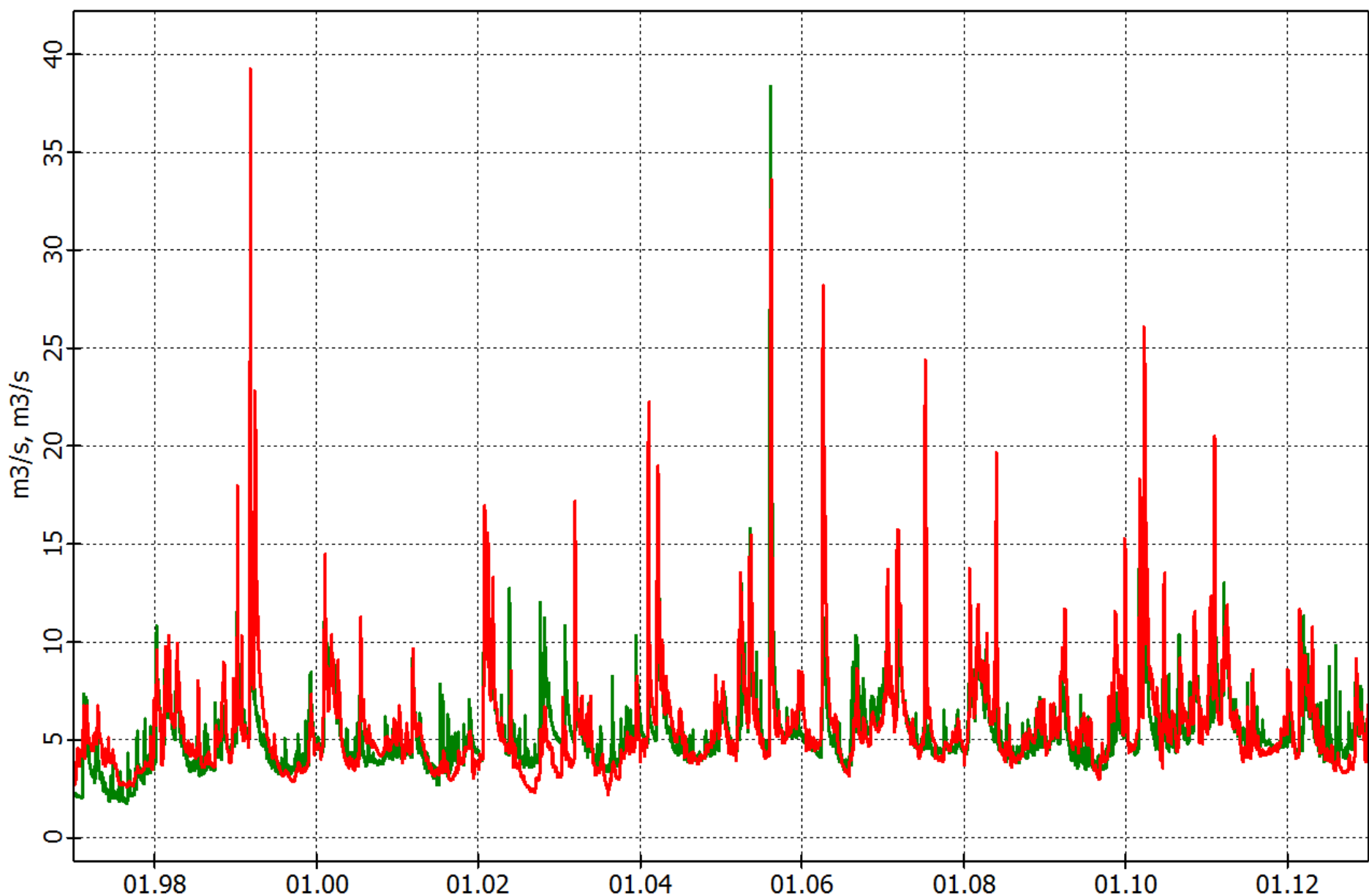


CALVAL: Central WQ, Šeimena - žemiau Vilkaviškio.

P-PO4: effect of point-sources.

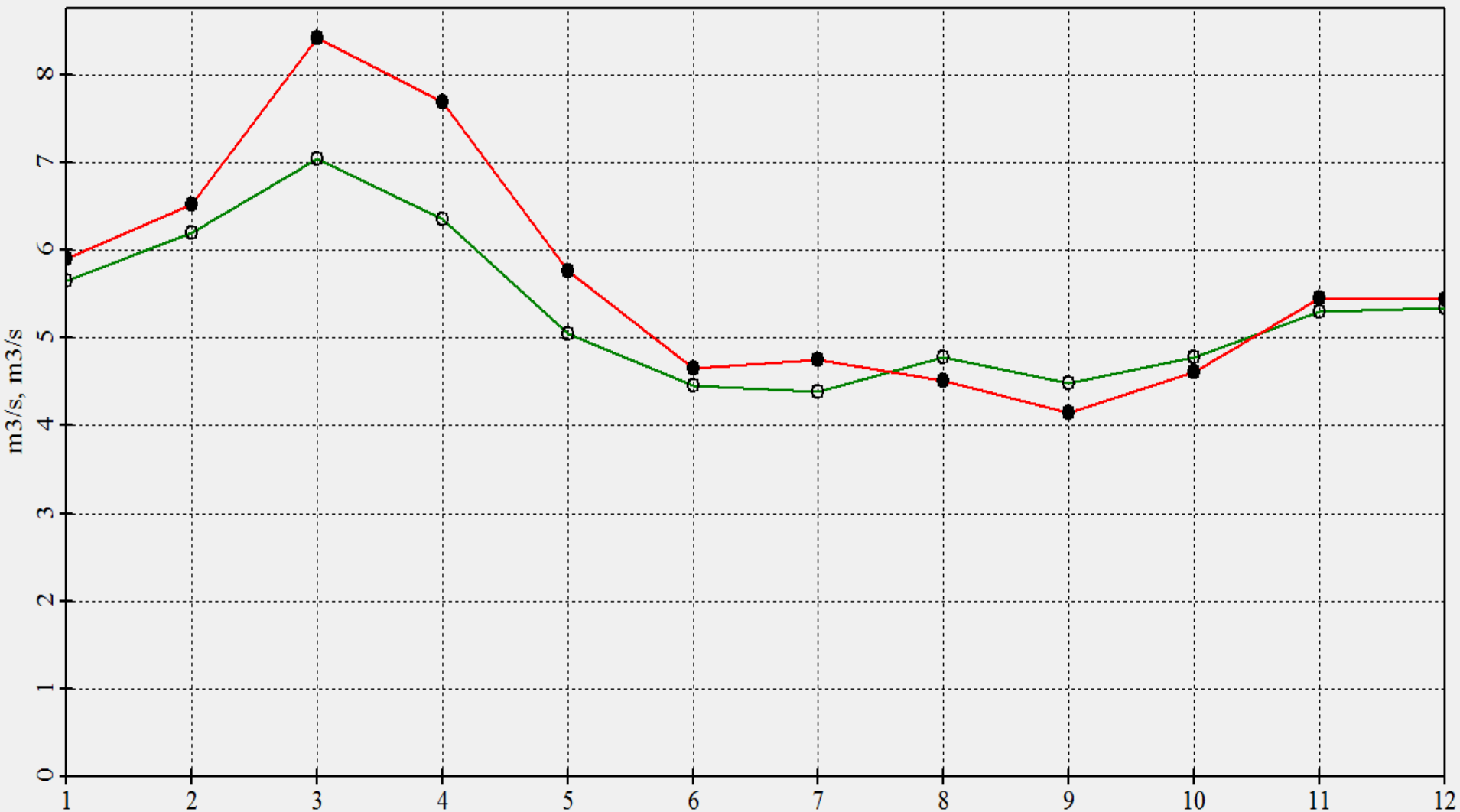


CALVAL: SE Hydrology, Ūla-Pelesa-Zervynos



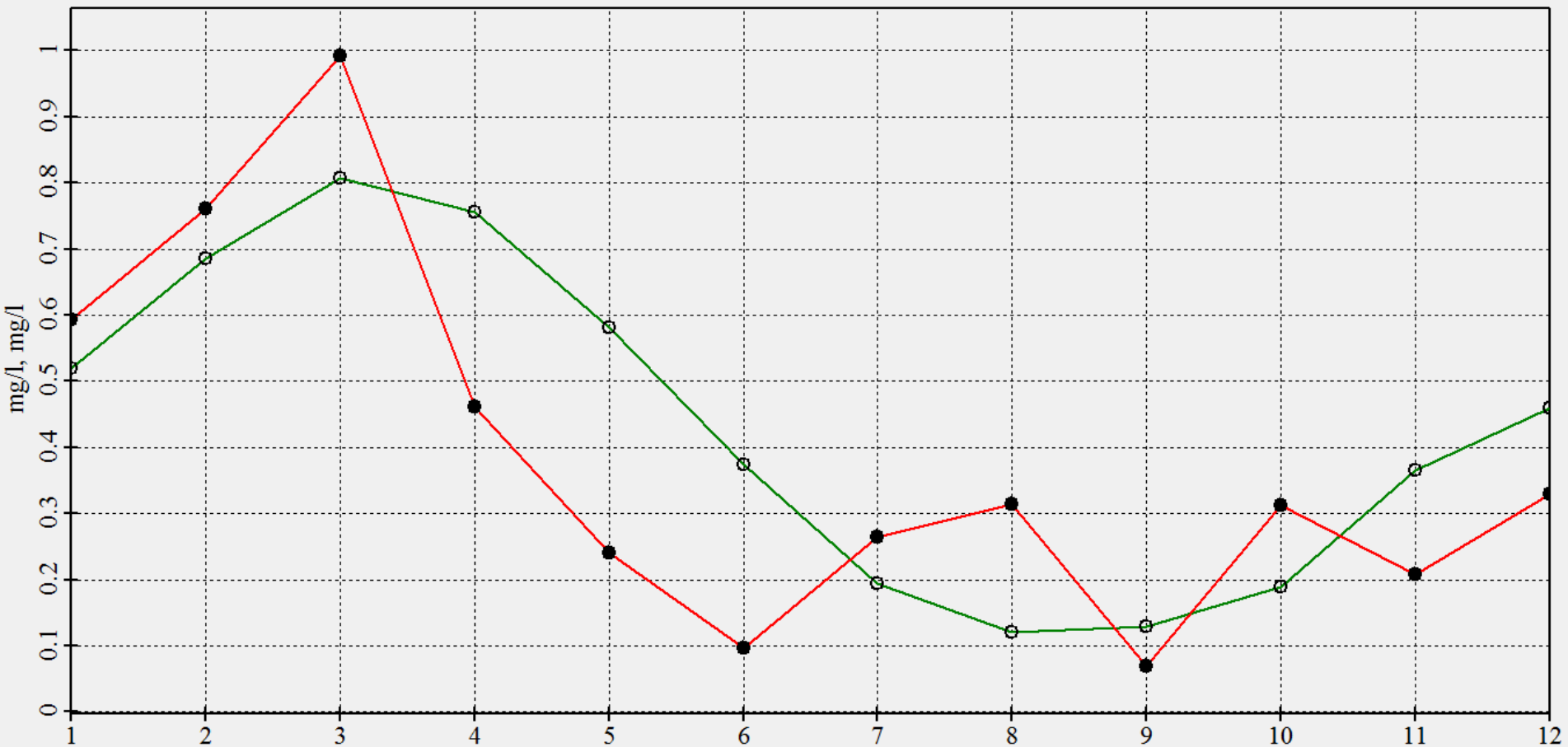
CALVAL: SE Hydrology, Ūla-Pelesa-Zervynos.

Dominance of baseflow.



CALVAL: Southeast WQ, Strėva - žemiau Semeliškių.

N-NO3: less distinct seasonal cycle



Thanks for attention !