



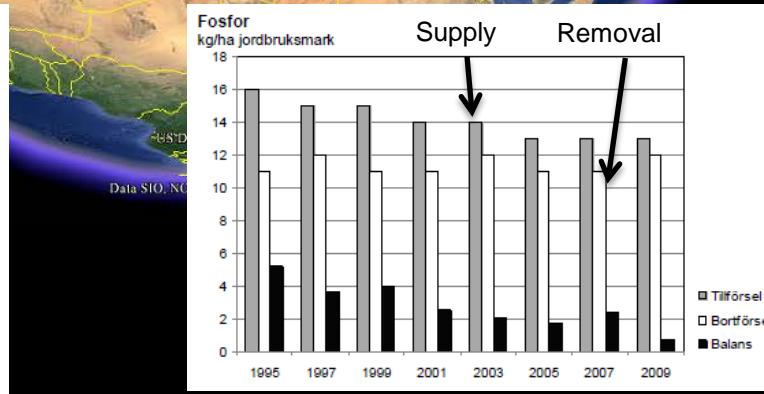
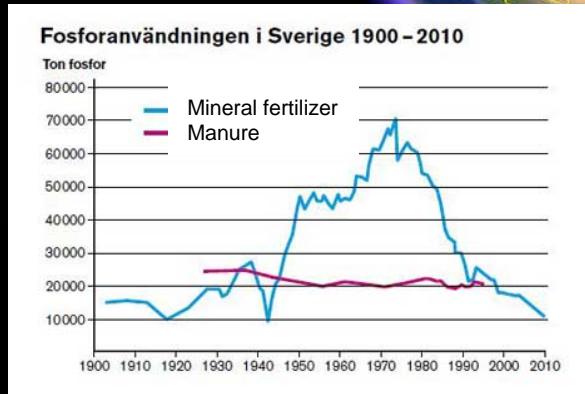
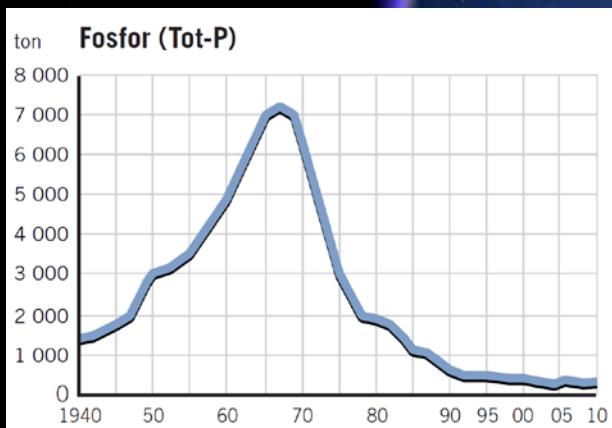
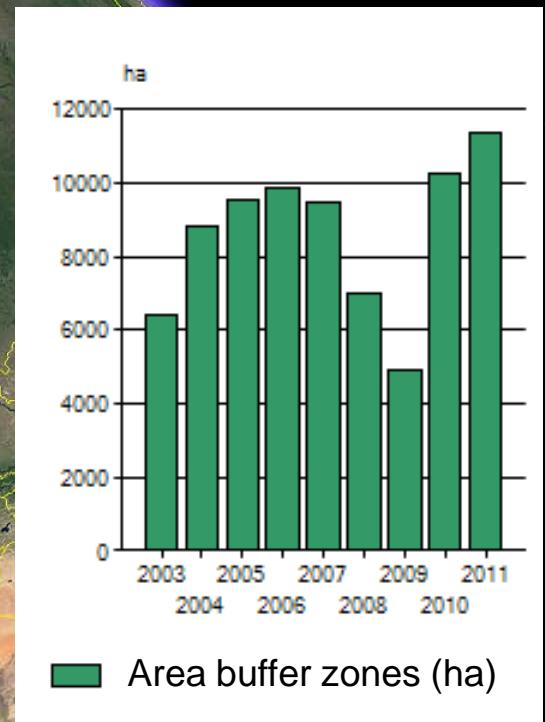
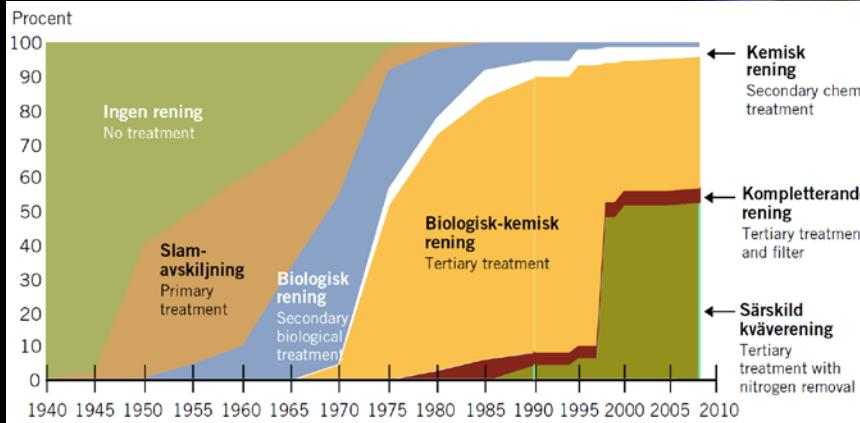
Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Department of Aquatic Sciences
and Assessment

INTEGRATING SCALES – DISTRIBUTED, HIGH-RESOLUTION MODELING OF EROSION AND PHOSPHORUS LOSSES

Faruk Djodjić

What have we done so far?

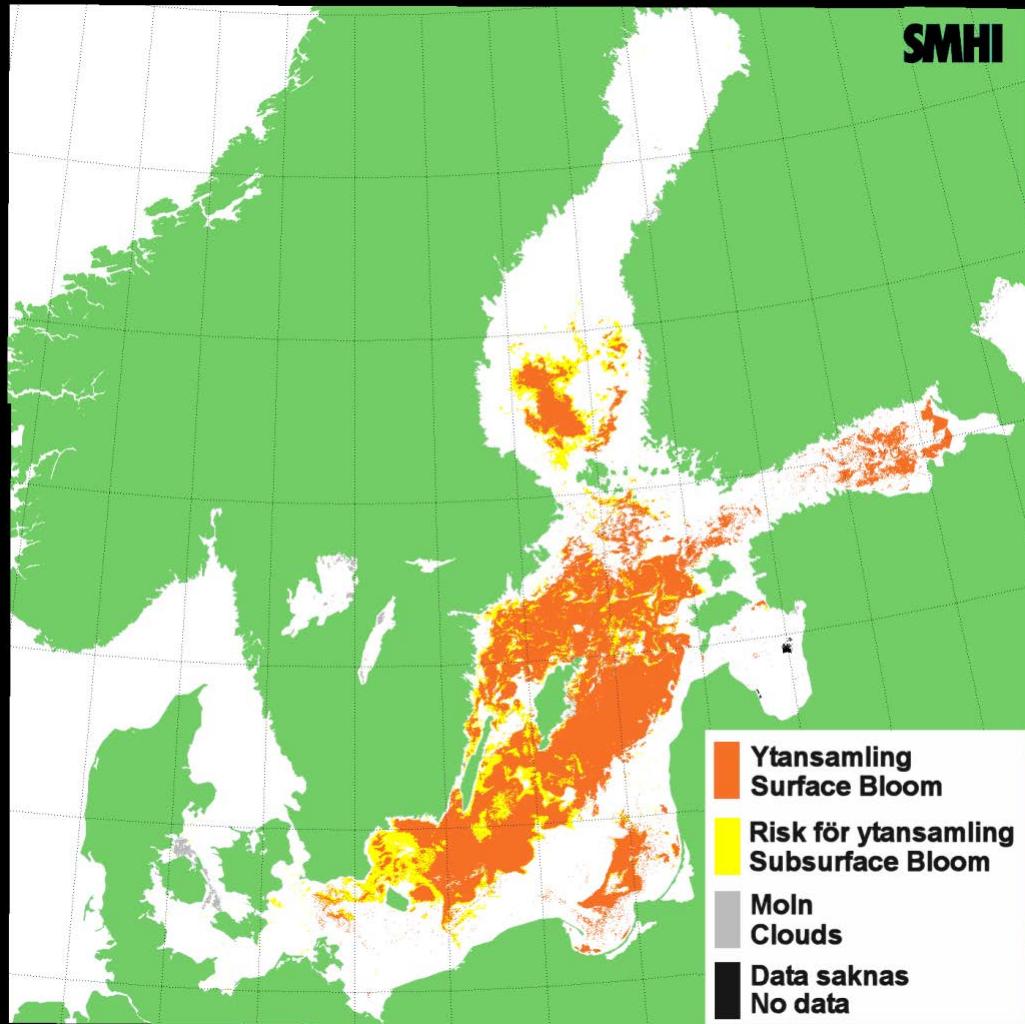


Google earth

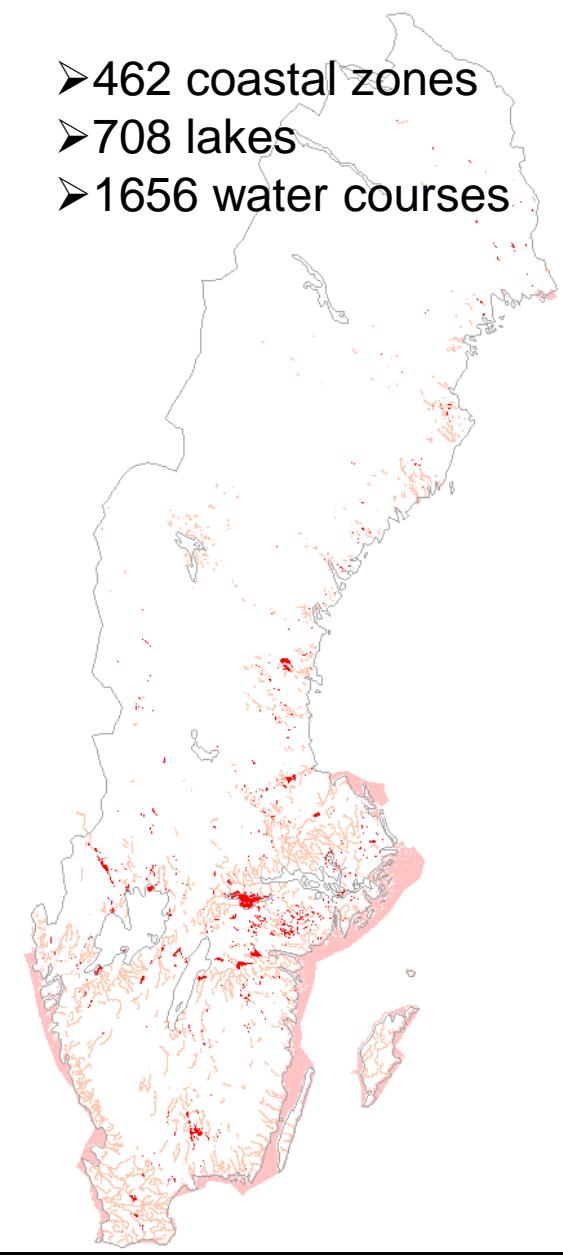
Visningshöjd 12672.06 km



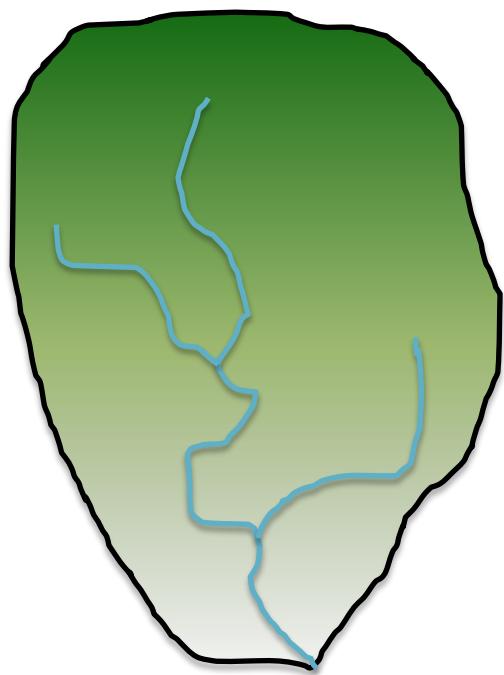
Status



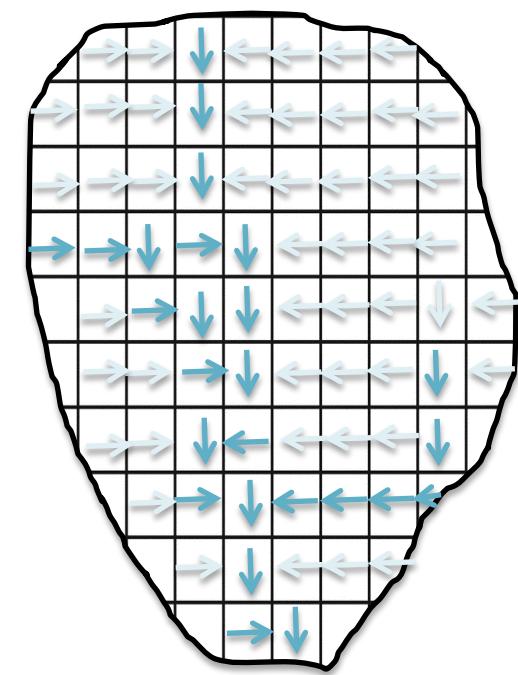
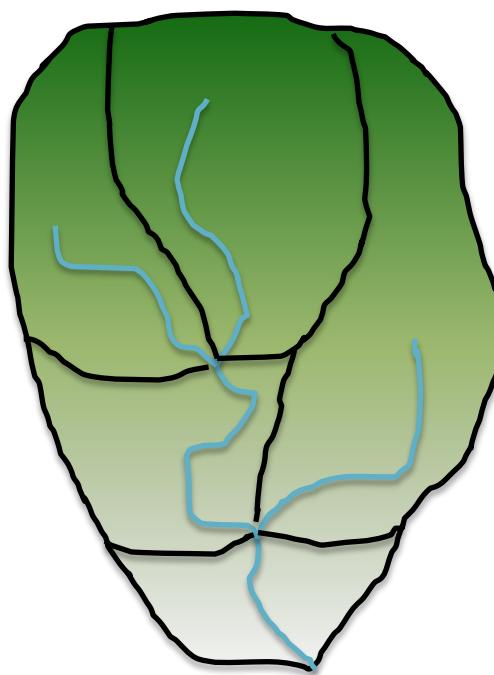
- 462 coastal zones
- 708 lakes
- 1656 water courses



Shifting focus



Why?
How much?



When &
Where?

High resolution data



Approach and Method

USPED

$$ED(r) = \operatorname{div} qs(r) = Kt \{ [\operatorname{grad} h(r)] \cdot s(r) \sin b(r) - h(r) [kp(r) + kt(r)] \}$$

Div – divergence (tendency to act as a source or a sink)

qs(r) – sediment transport

Kt - transport coefficient ~ C & K

h(r) – water flow depth ~ flow accumulation

s(r) – slope

Kp – profile curvature

Kt – plan (tangential) curvature

PCRASTER – GIS programming language

+	+	+
-	+	-
-	-	-

←	←	←
→	↑	←
→	↑	←

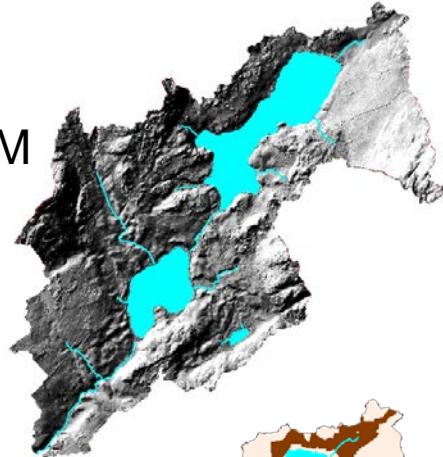
INPUT

Approach and Method

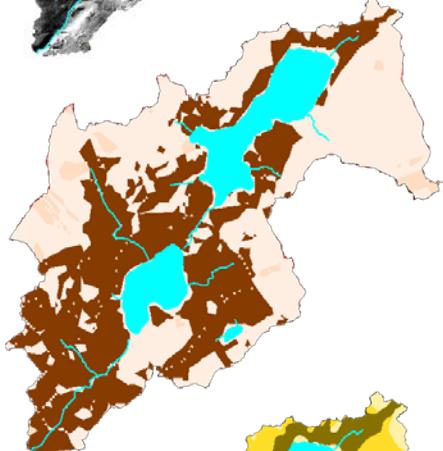
OUTPUT

R = climate / runoff effect

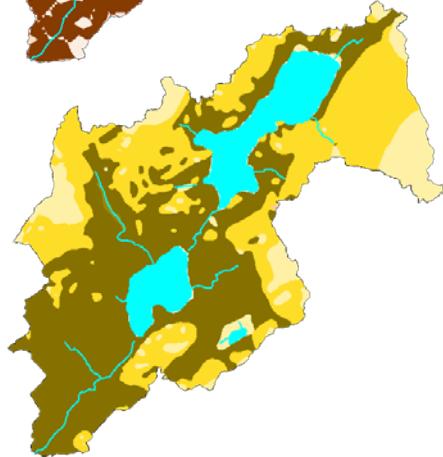
DEM



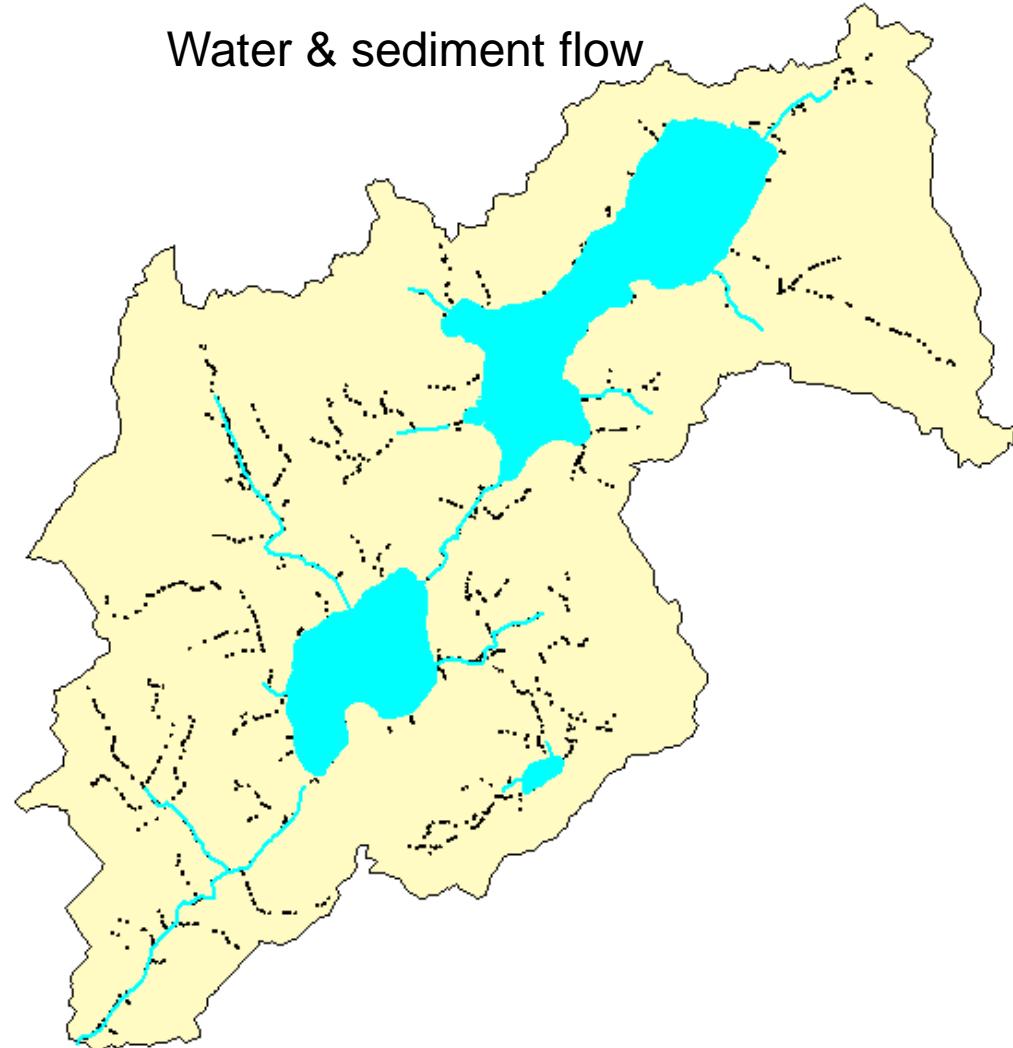
C



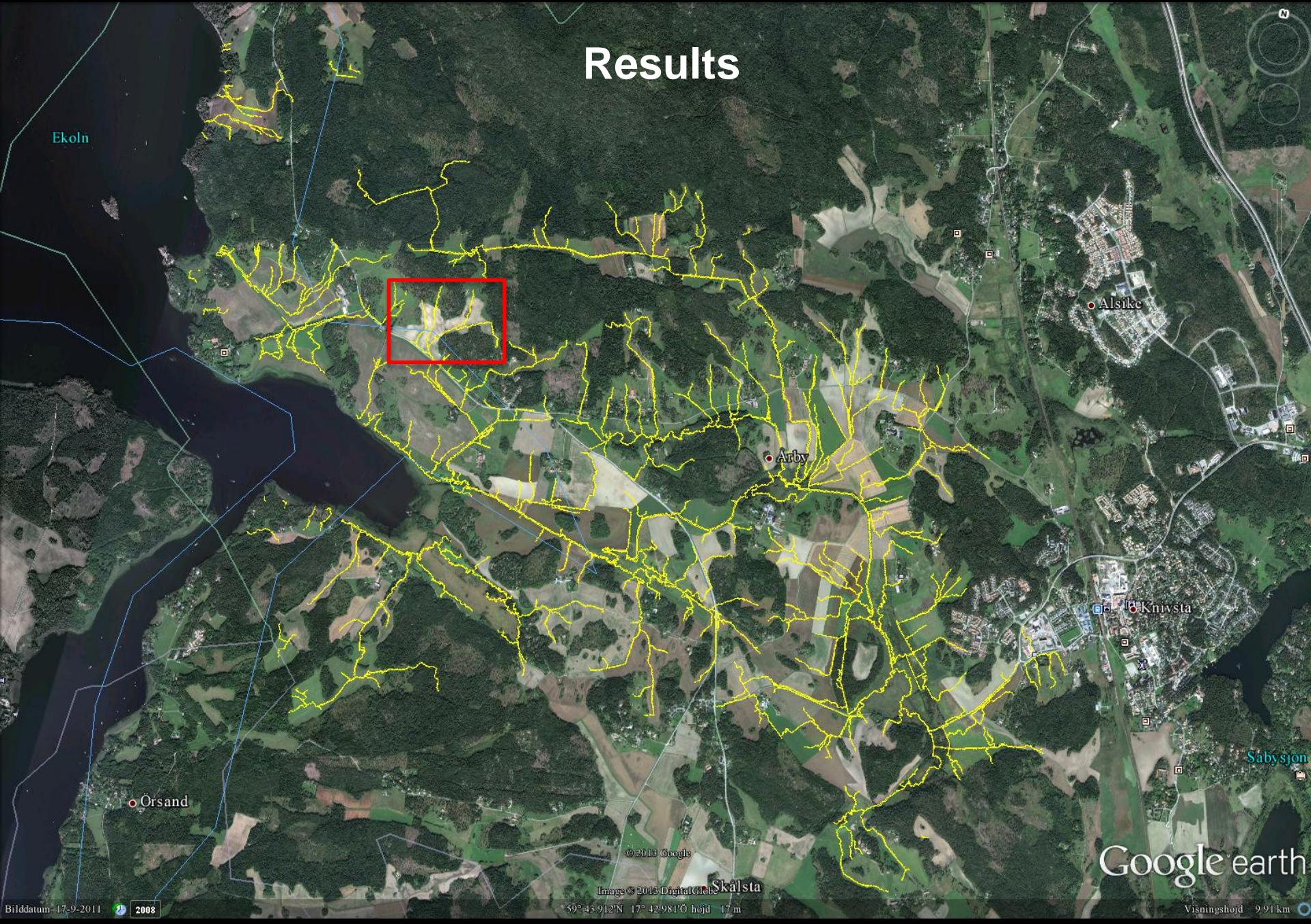
K



Water & sediment flow



Results



Modelled surface runoff and erosion pathways in autumn 2012

Results



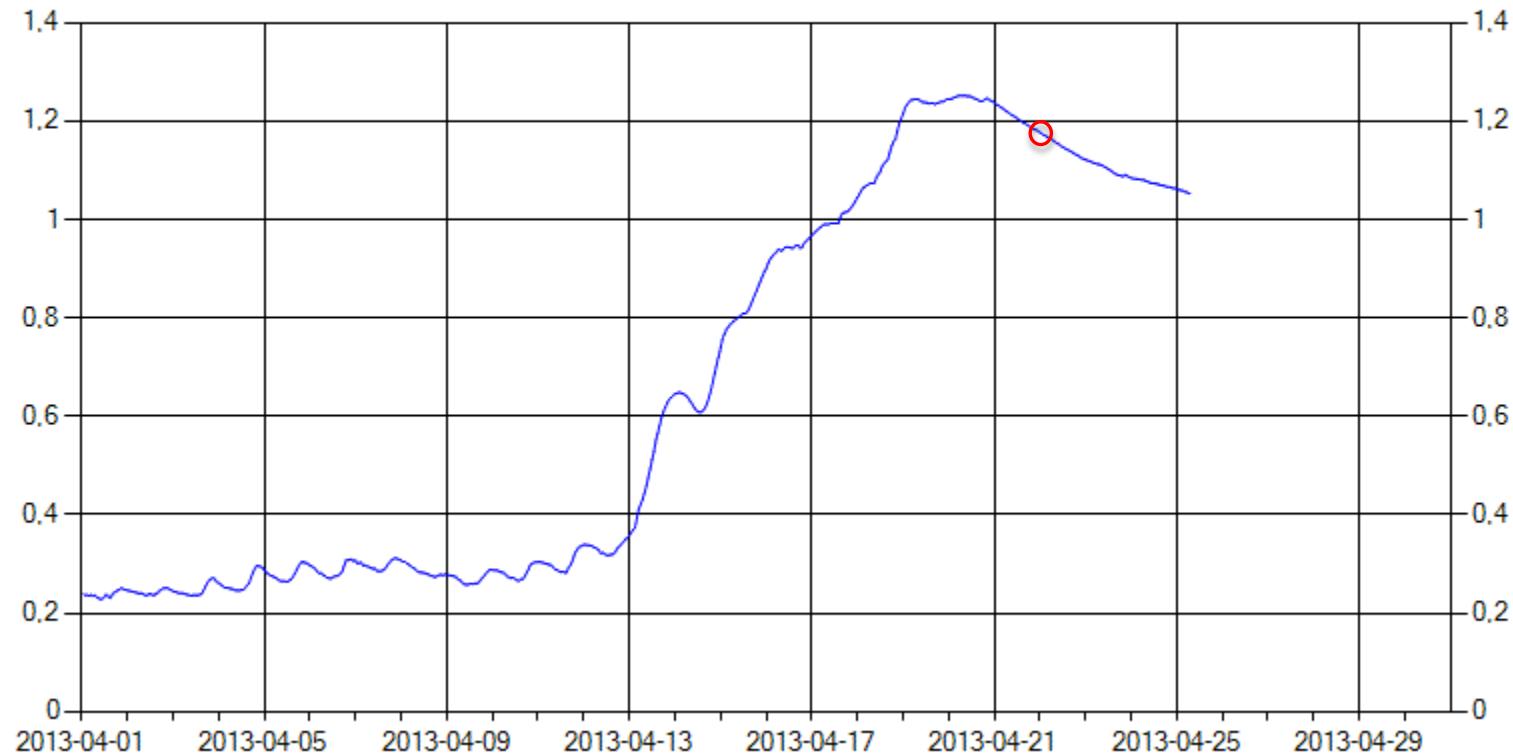
Results



October 2012

Results

Water level in river Fyrisån (m)



Results



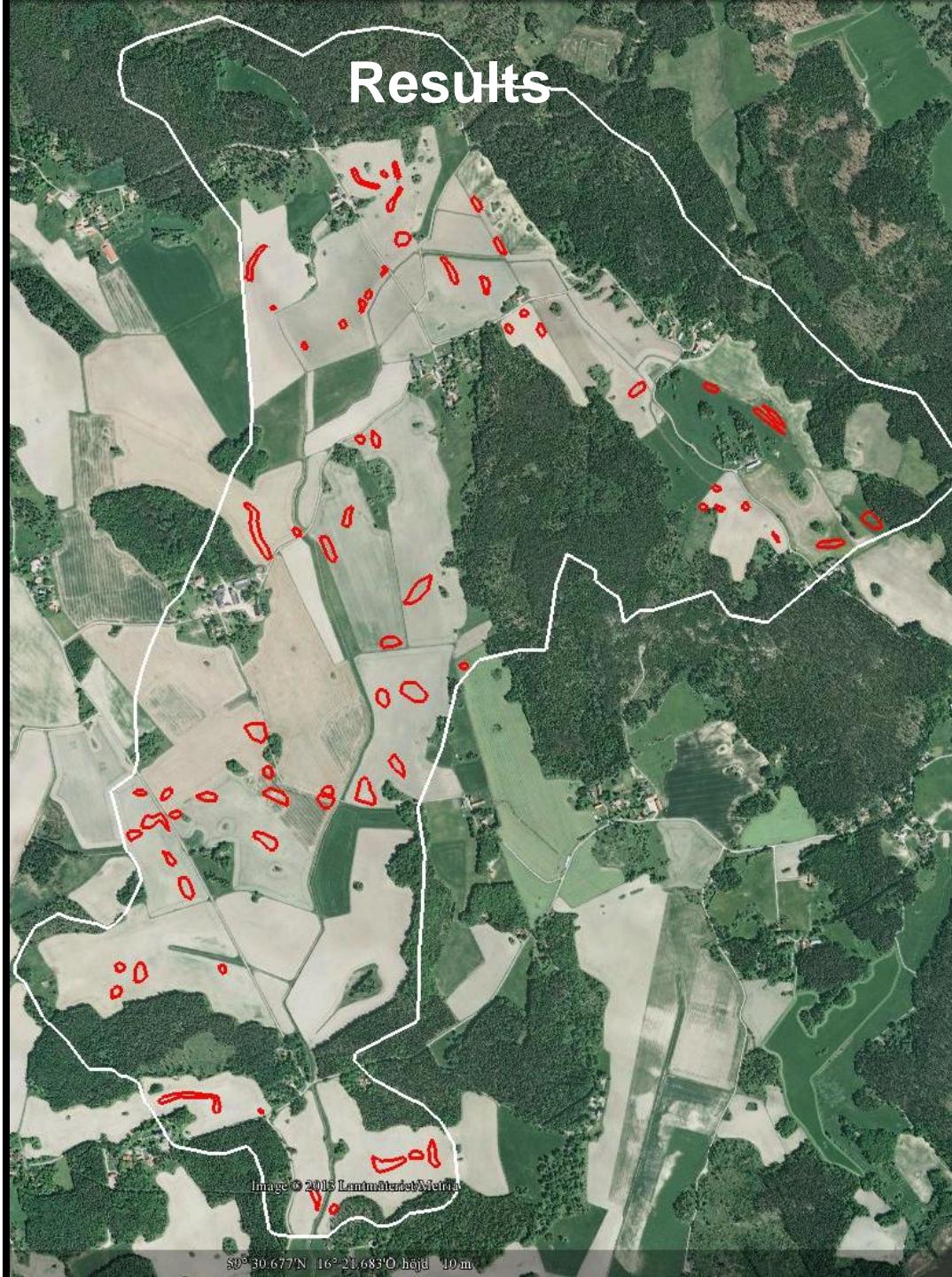
Results



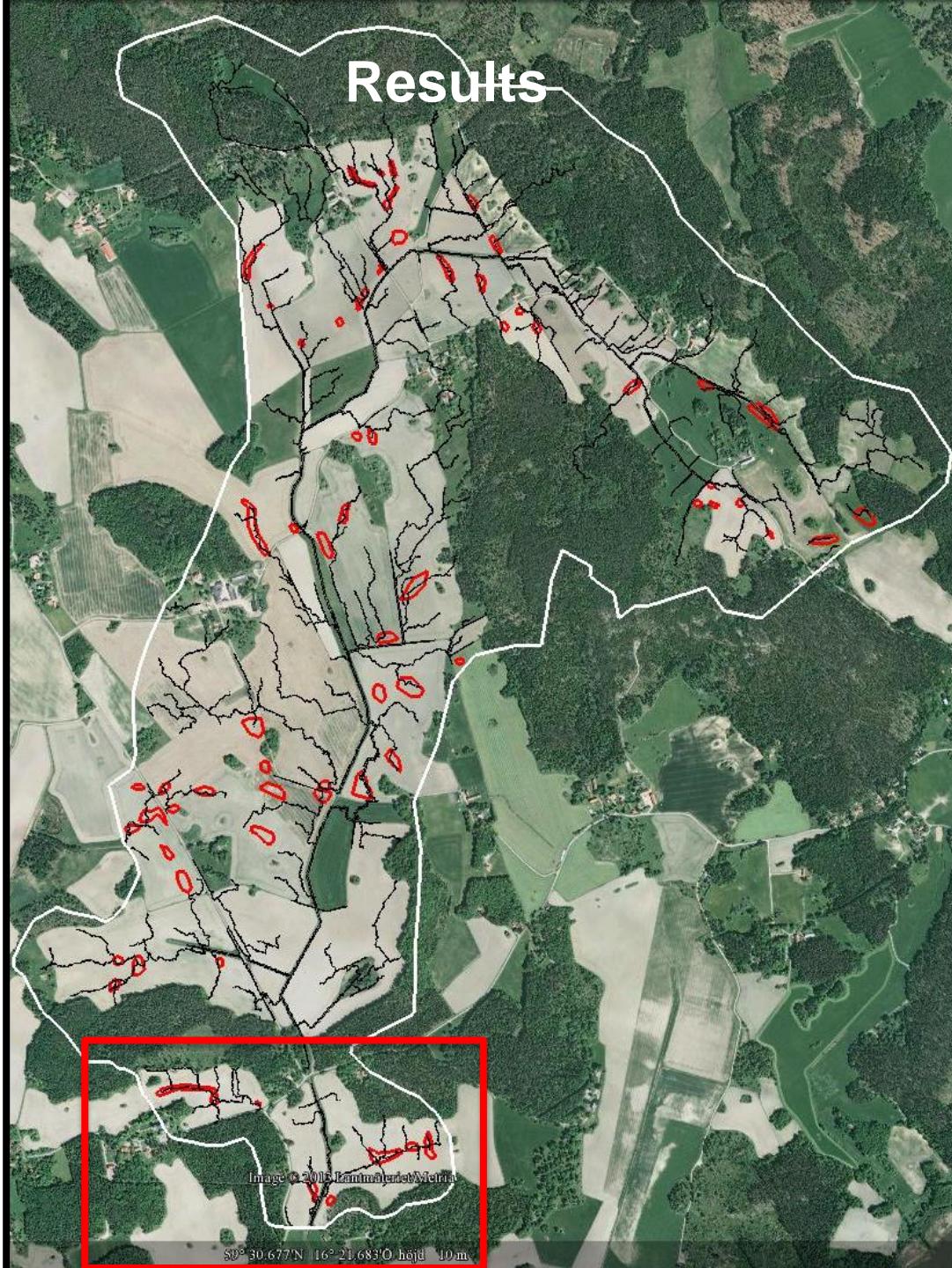
Results



Results



Results



N

Google earth

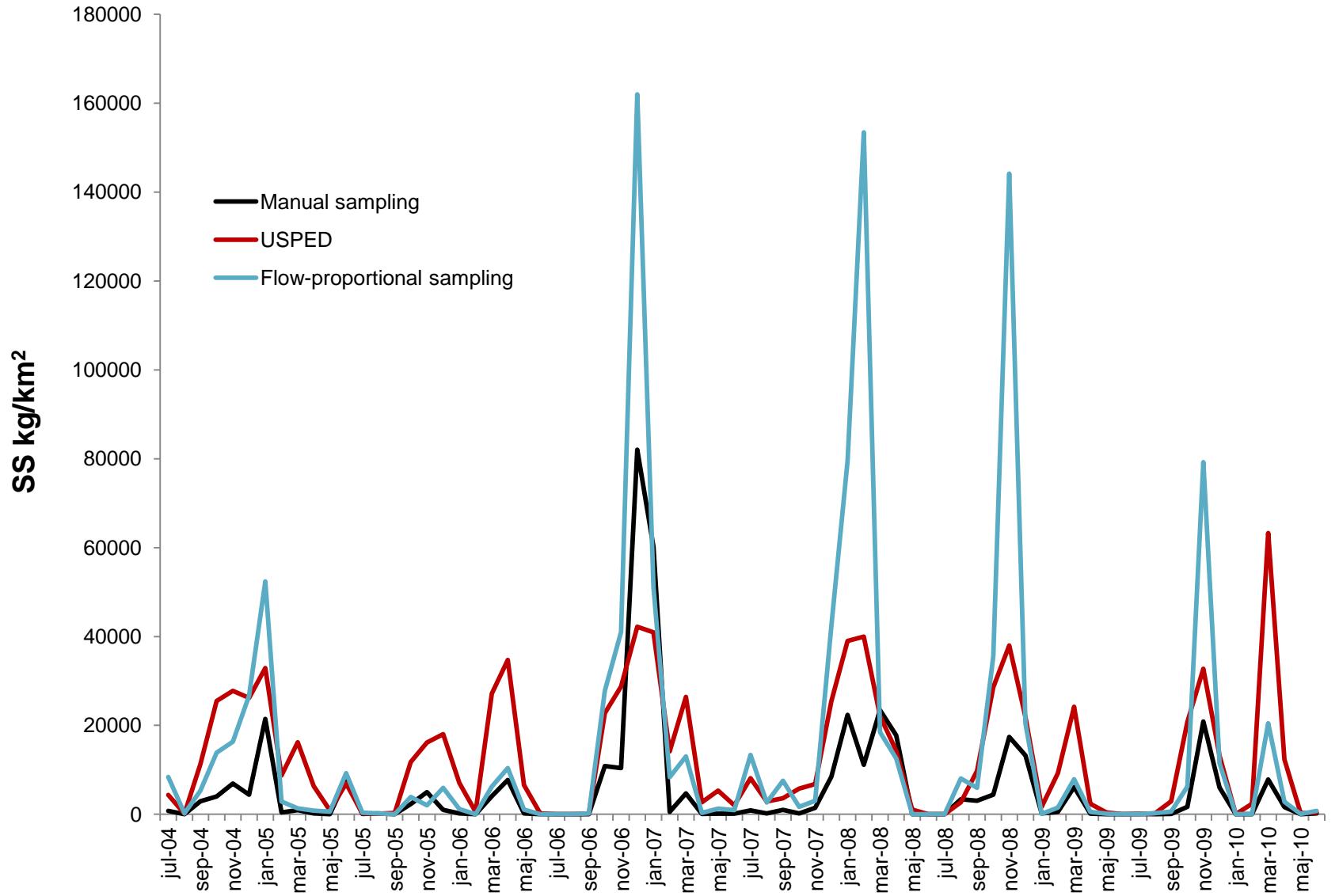
Bildatum: 1-1-2010 2007

59° 29' 7.21"N 16° 21' 52.50"E höjd 15m

Visningshöjd 1.03 km



Results



Instead of conclusions

- If a picture is worth a thousand words...
- ...is a map worth a thousand numbers?
- LIDAR data is already available for large parts of Sweden
- Better soil maps soon?
- Knowledge regarding soil erodibility increases
- High resolution crop distribution with IAKS data
- Dynamic modeling can be further improved
- Water (and SS, and P) does run downhill...