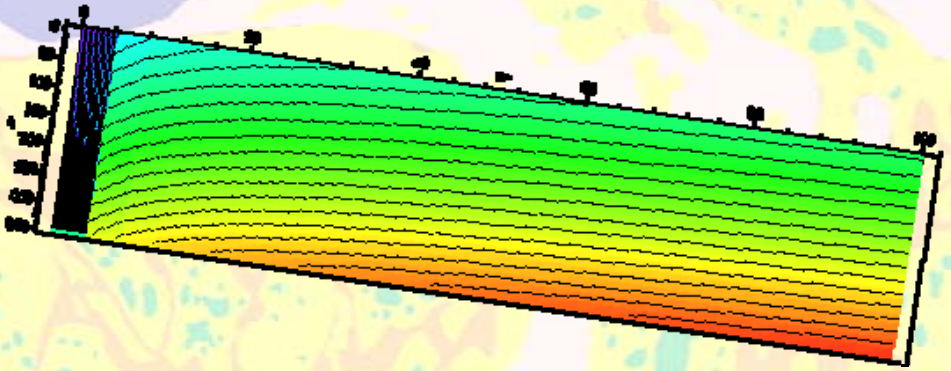
Introduction to WATCLASS

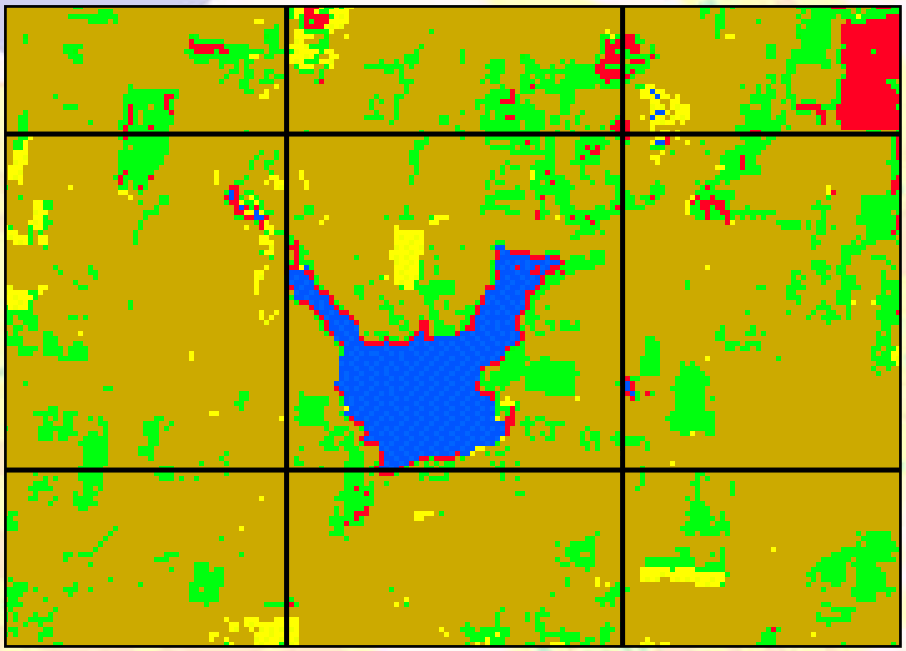


Class Landscape Unit
(footprint)

← WATDRAIN
(lateral processes)

WATFLOOD
(routing)

Introduction to WATCLASS



Class Landscape Unit
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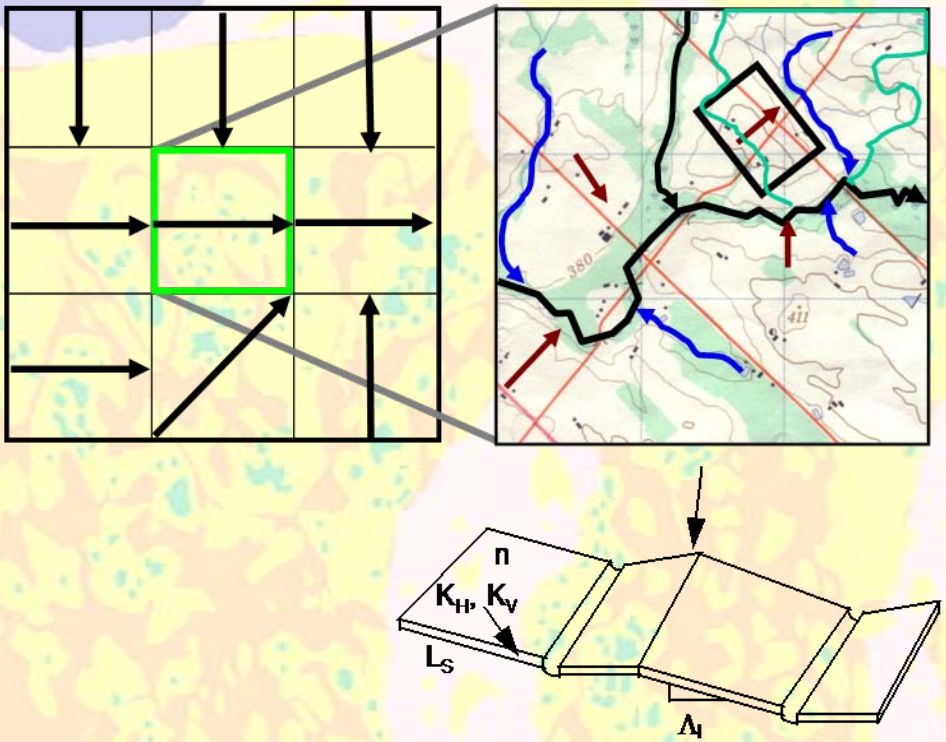
Introduction to WATCLASS



Class Landscape Unit
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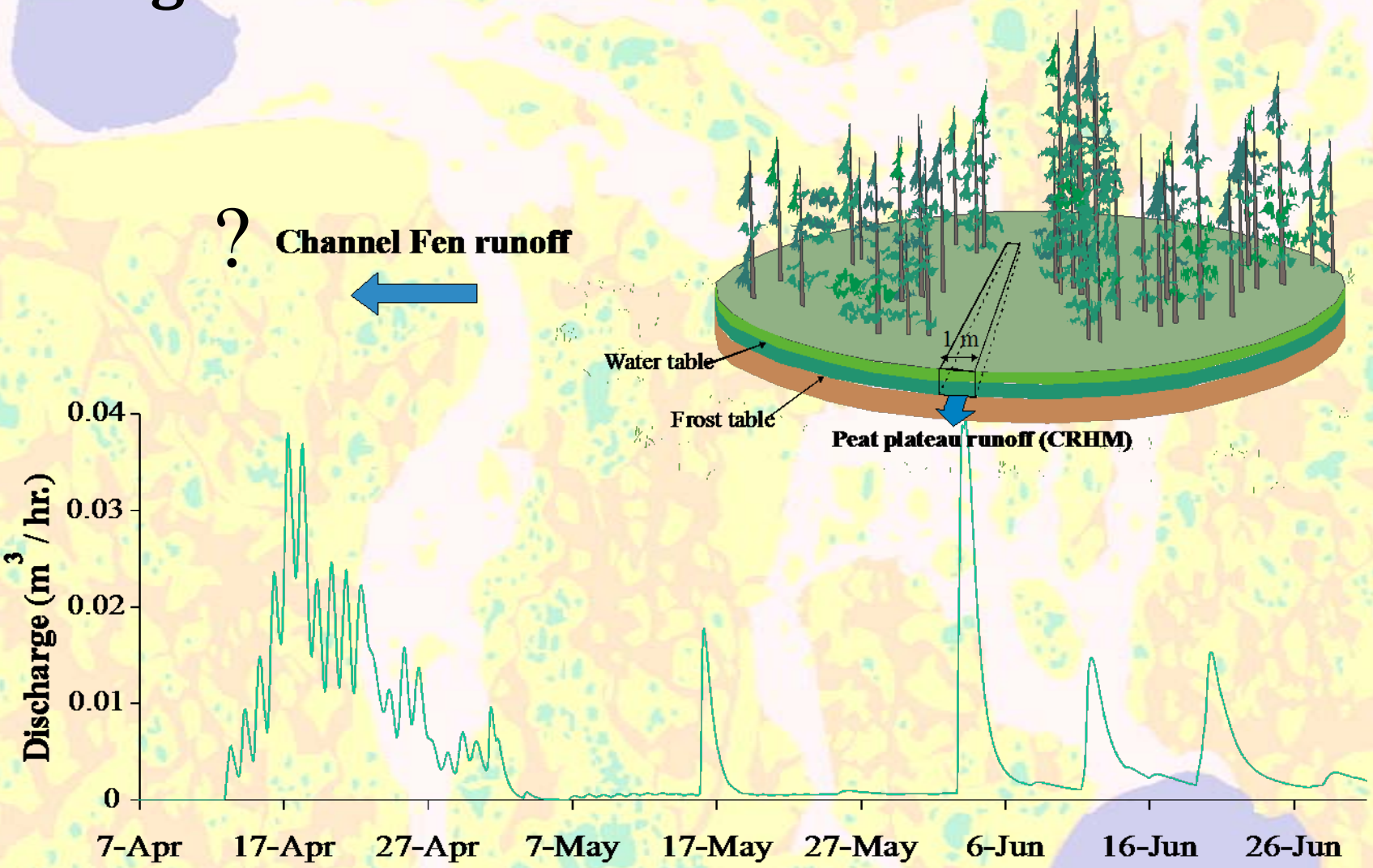
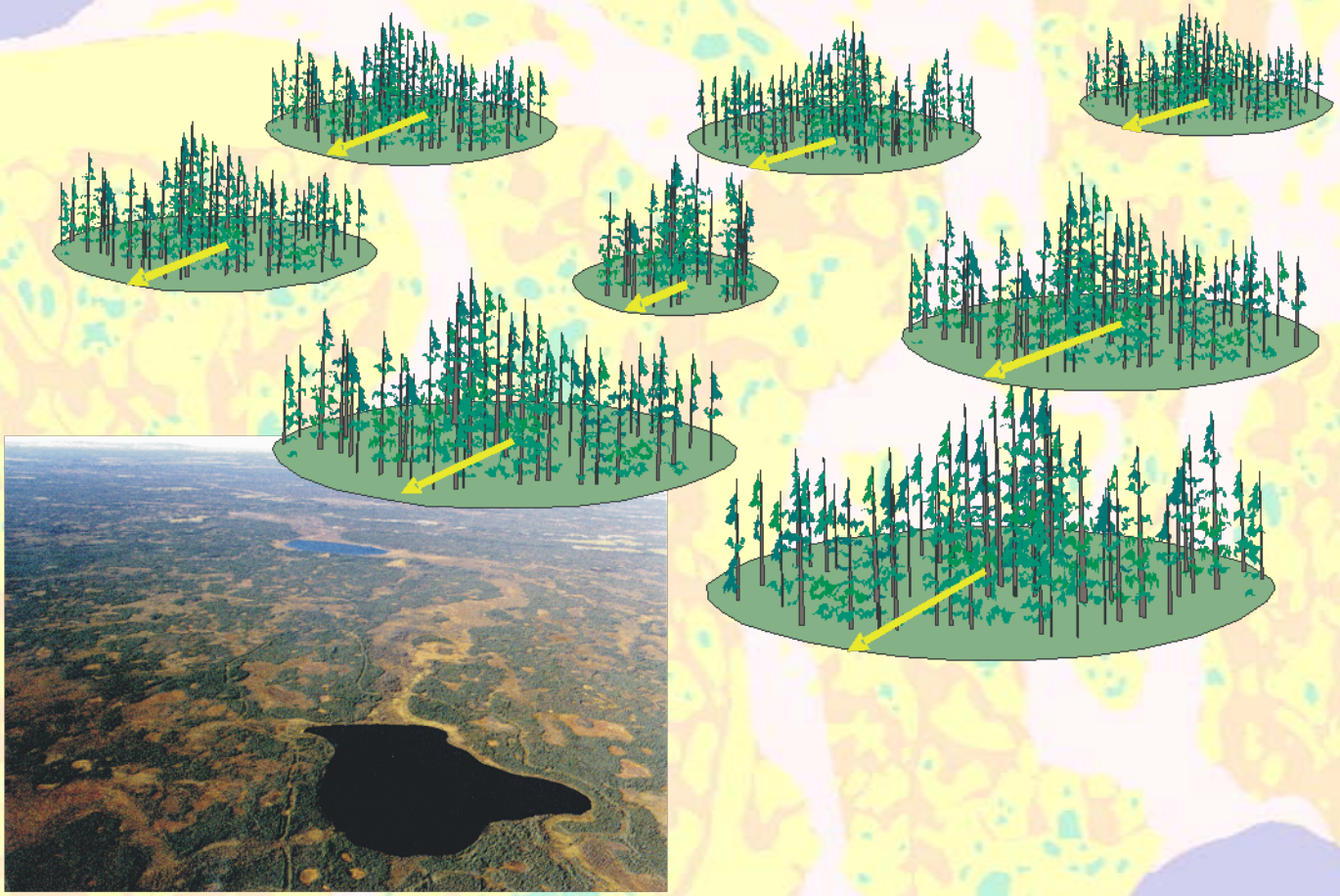
← WATCLASS
Tile Approach

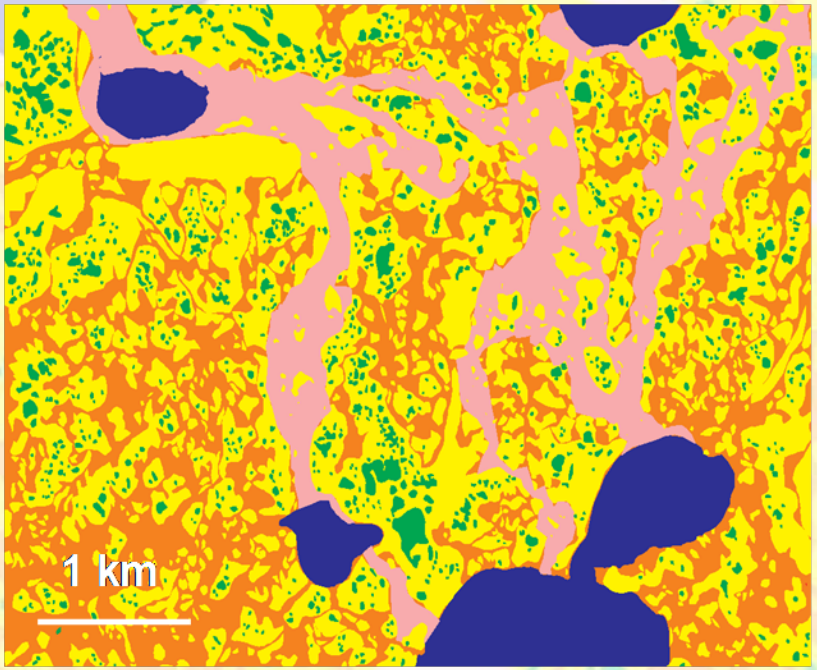
Single Plateau Runoff



Disturbing Plateau Runoff

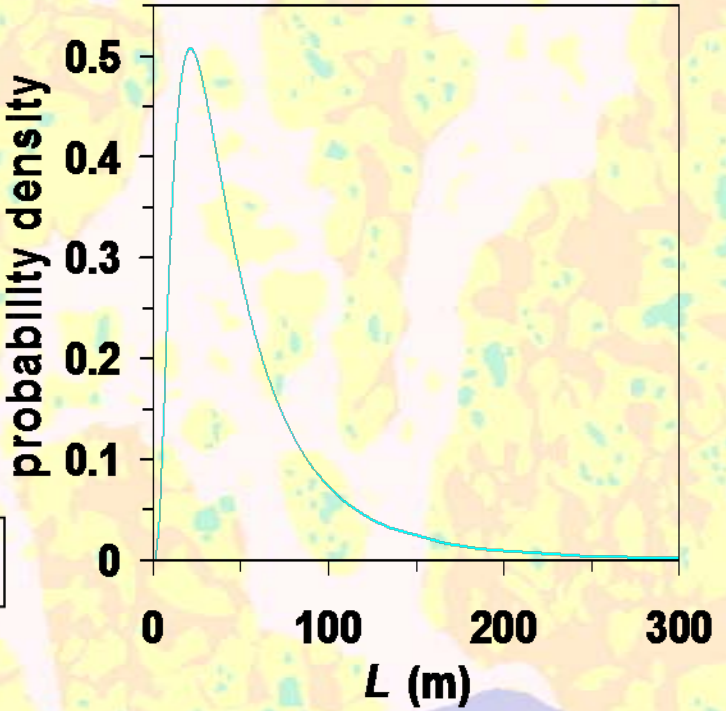


Site Distribution of Peat Plateaus

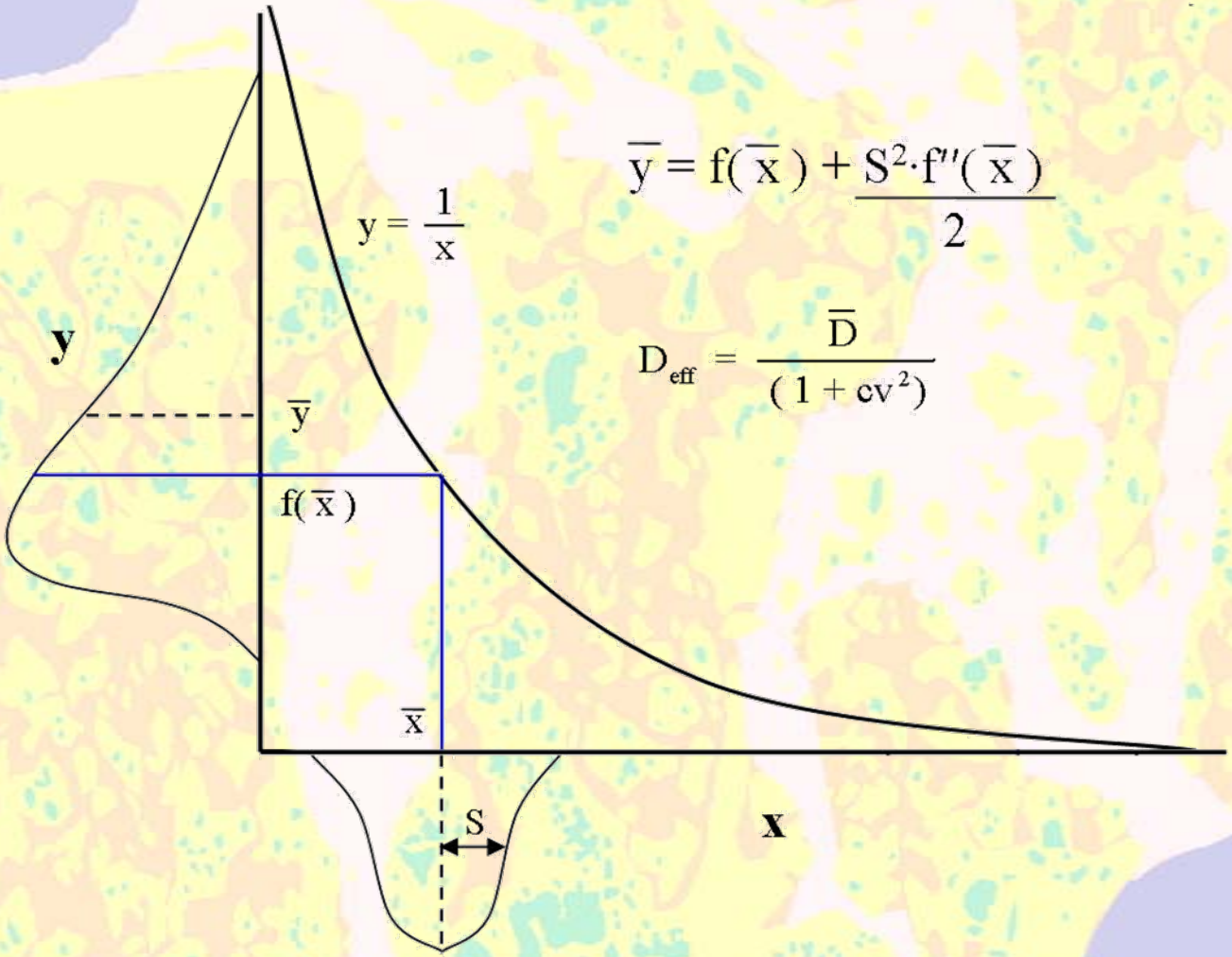


Lake
Isolated bog
Connected bog
Peat plateau
Fen

Hydraulic radius
$L = 2 * \text{area} / \text{perimeter}$



Transformation of a Random Variable



$$\bar{y} = f(\bar{x}) + \frac{S^2 \cdot f''(\bar{x})}{2}$$

$$D_{eff} = \frac{\bar{D}}{(1 + cv^2)}$$

Step 1B: Adjusting for tile geometry

The effective D is calculated as the ratio between the average diameter (D-bar) and a function of the coefficient of variation (cv ≈ 1.33)

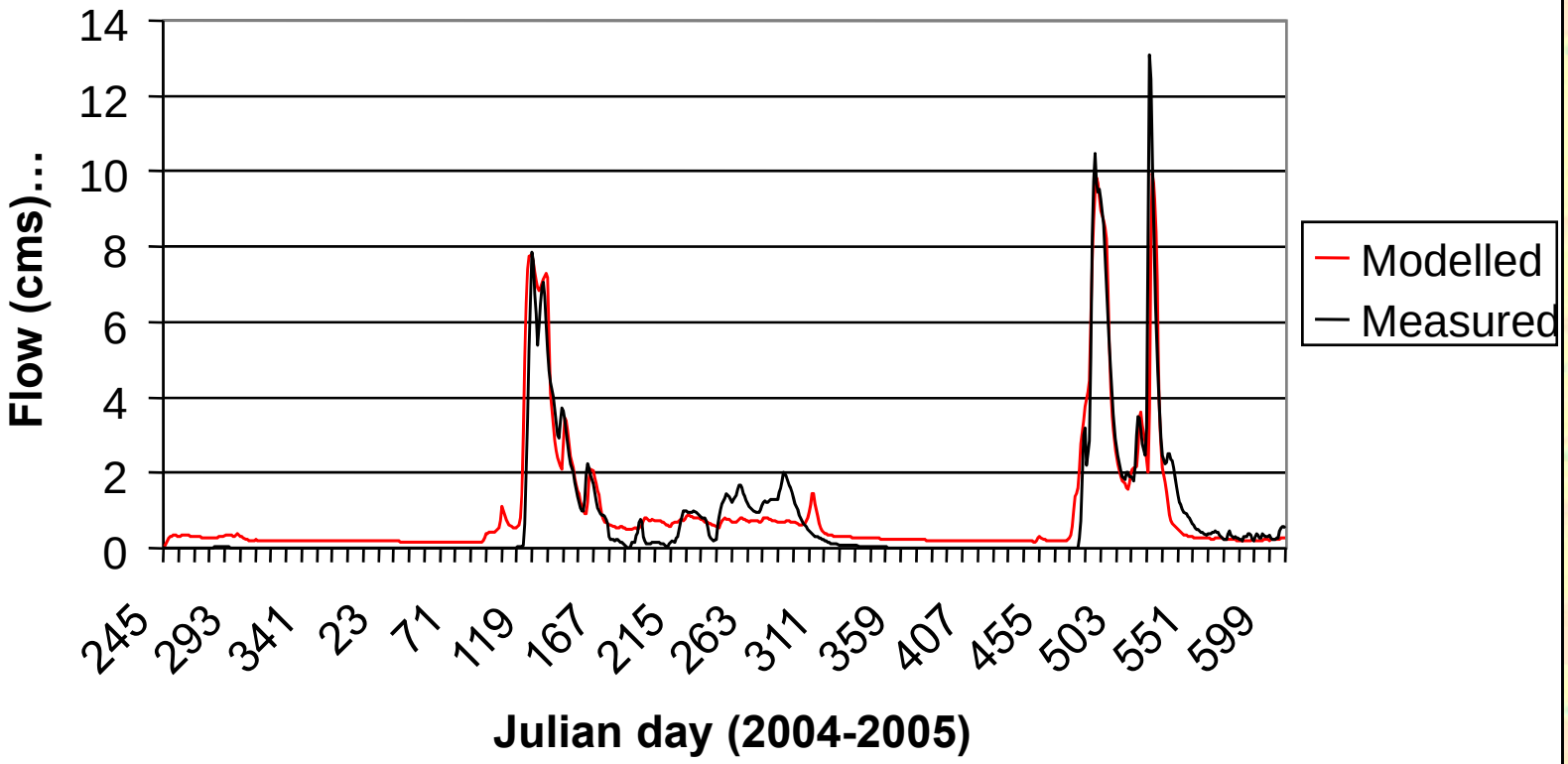
$$D_{eff} = \frac{\bar{D}}{(1 + cv^2)} = \frac{\bar{D}}{2.77}$$

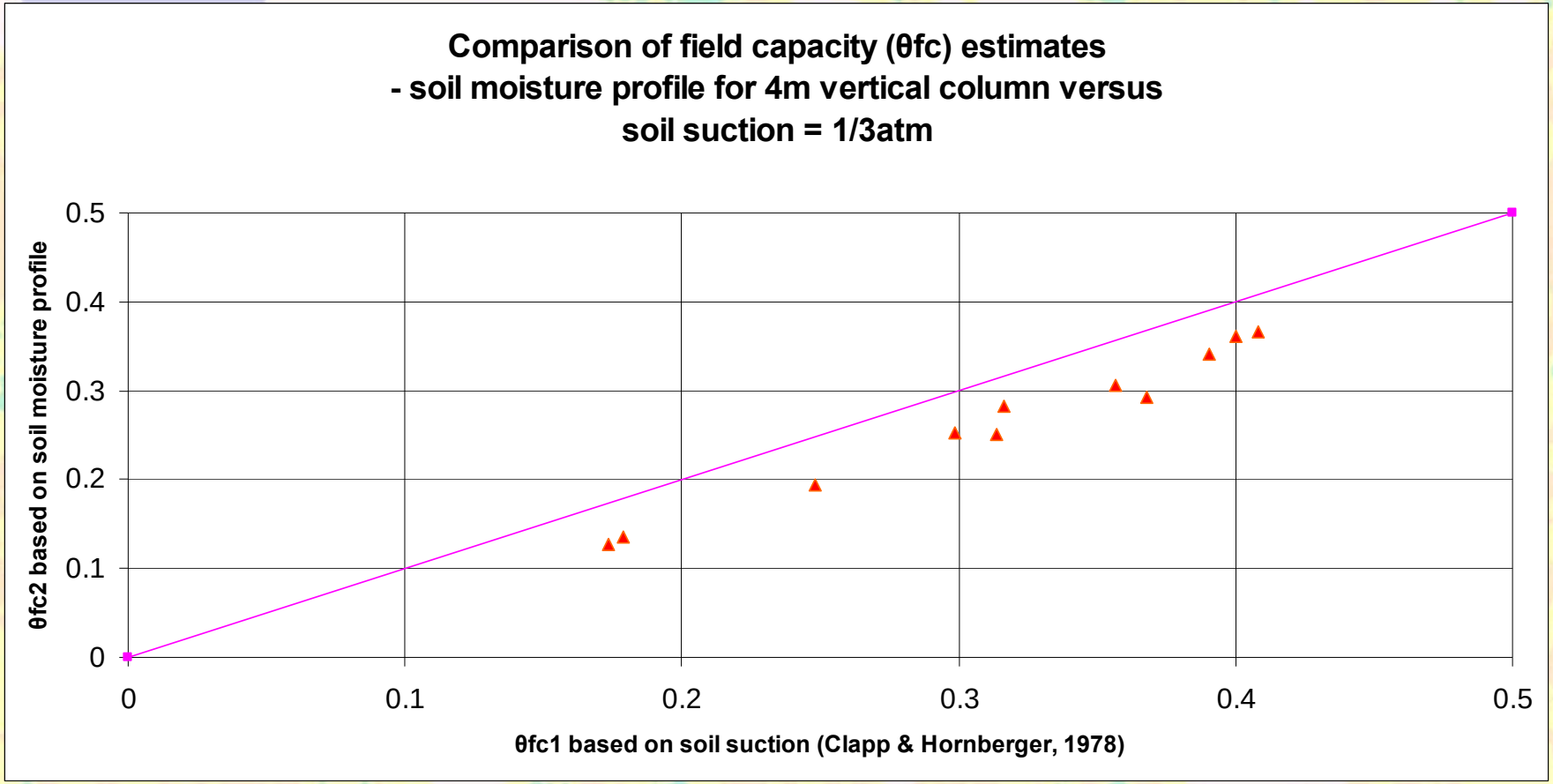
Effective values for drainage density will be higher than those that are measured

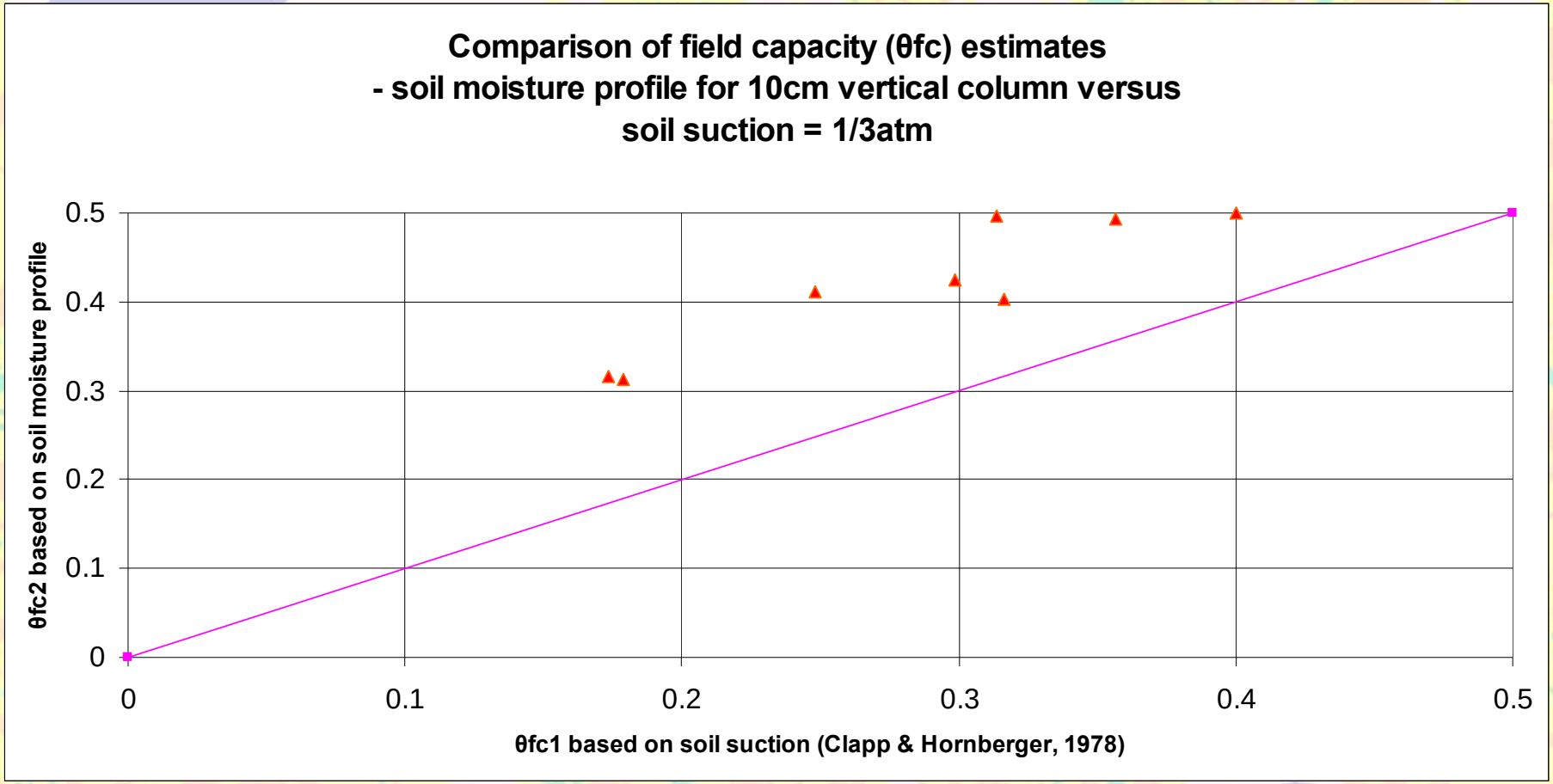
Results from 2004-2005 Model

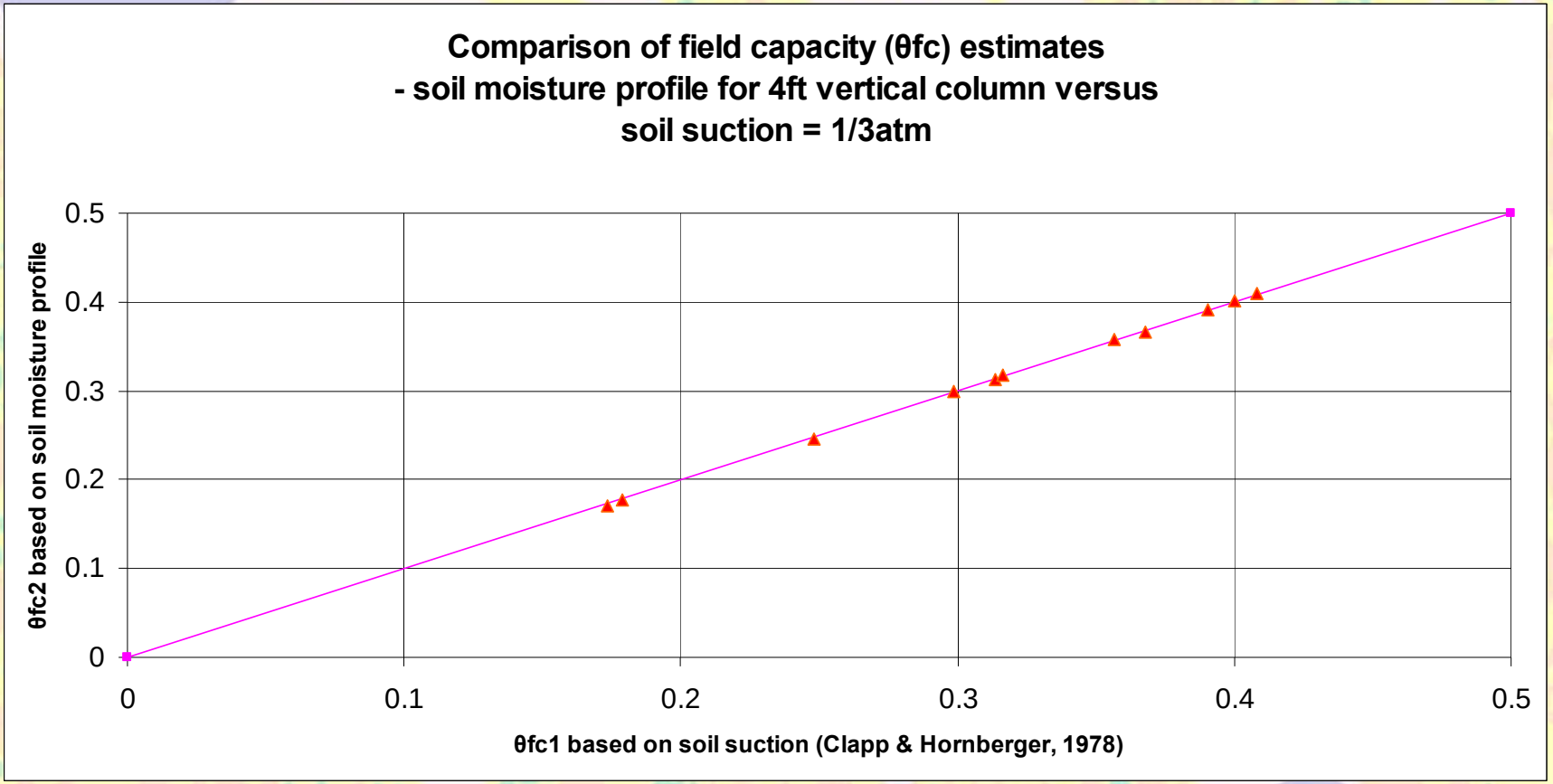
- DDS-optimized parameters
  - drainage density: 0.43 km/ km² (HQ: 0.161 km/ km²)
  - Soil depth in peat plateaus: 1.13 m
  - Soil depth in fens: 0.41 m

Scotty Creek, DA = 177 km²
One grid with 2 tiles (peat plateau and fen),
20% of flow from peat plateau diverted to fen




Comparison of field capacity (θfc) estimates
- soil moisture profile for 4m vertical column versus
soil suction = 1/3atm
θfc2 based on soil moisture profile
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
θfc1 based on soil suction (Clapp & Hornberger, 1978)


Comparison of field capacity (θfc) estimates
- soil moisture profile for 10cm vertical column versus
soil suction = 1/3atm
θfc2 based on soil moisture profile
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
θfc1 based on soil suction (Clapp & Hornberger, 1978)


Comparison of field capacity (θfc) estimates
- soil moisture profile for 4ft vertical column versus
soil suction = 1/3atm
θfc2 based on soil moisture profile
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
θfc1 based on soil suction (Clapp & Hornberger, 1978)