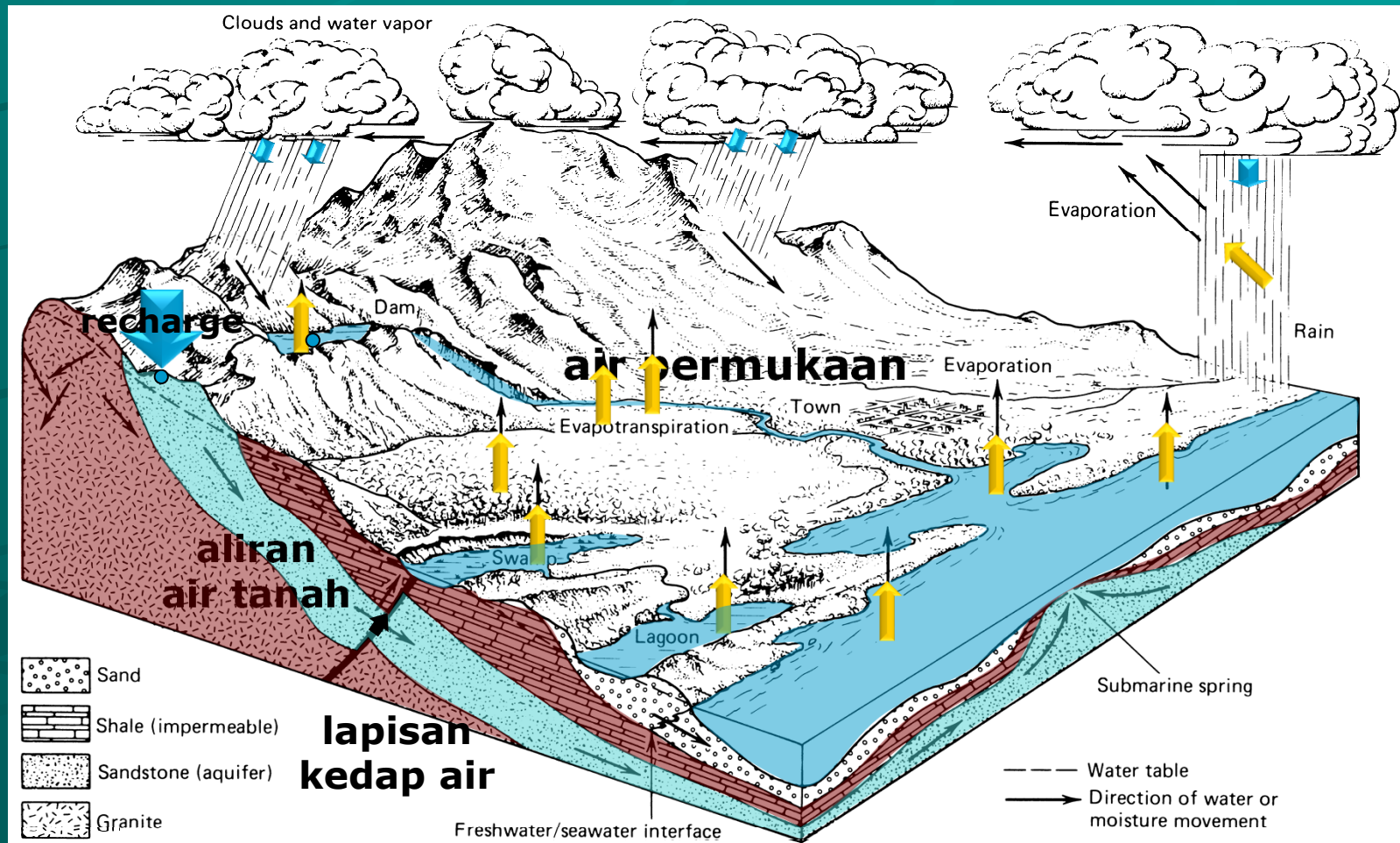


Water Resources Modeling

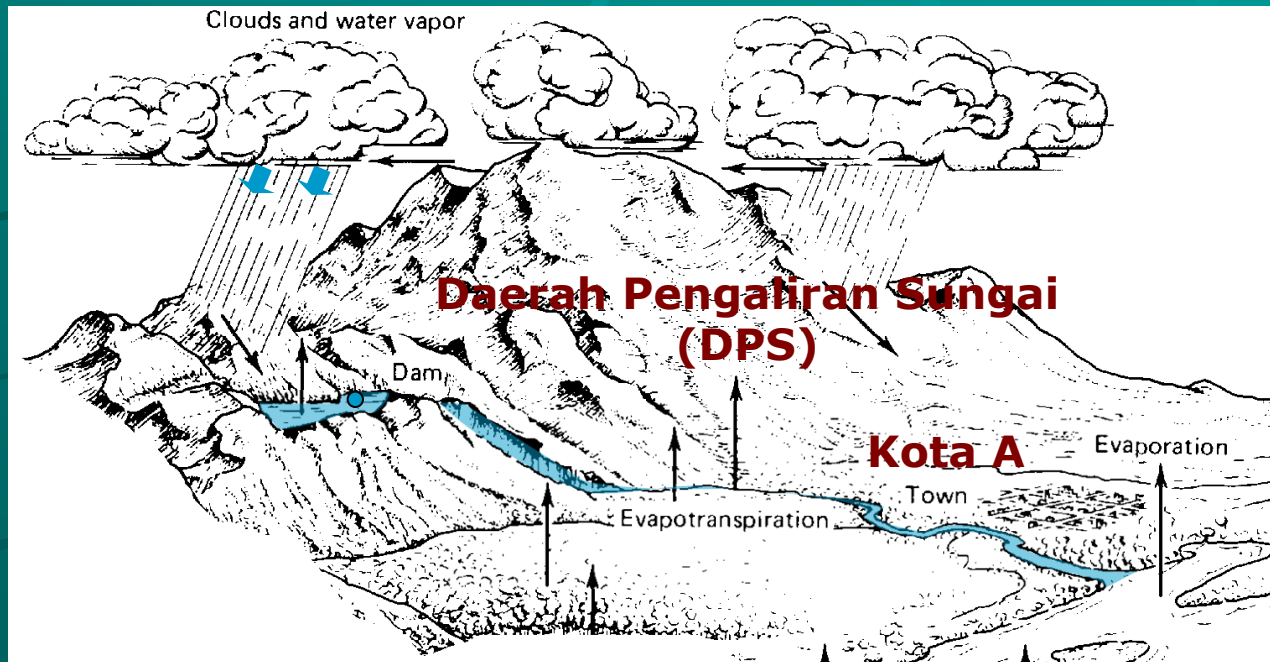
Ir. Djoko Luknanto, M.Sc., Ph.D.

Laboratorium Hidraulika
Departemen Teknik Sipil dan Lingkungan
FT UGM

Siklus Hidrologi



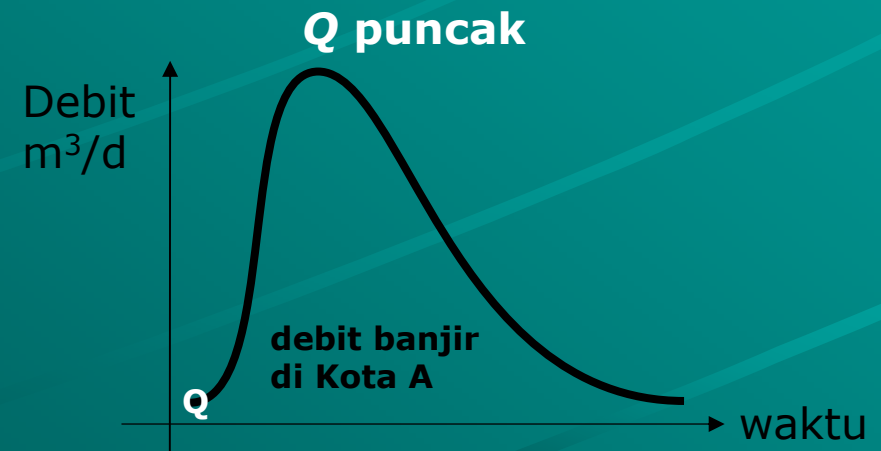
Transformasi Hujan-Debit



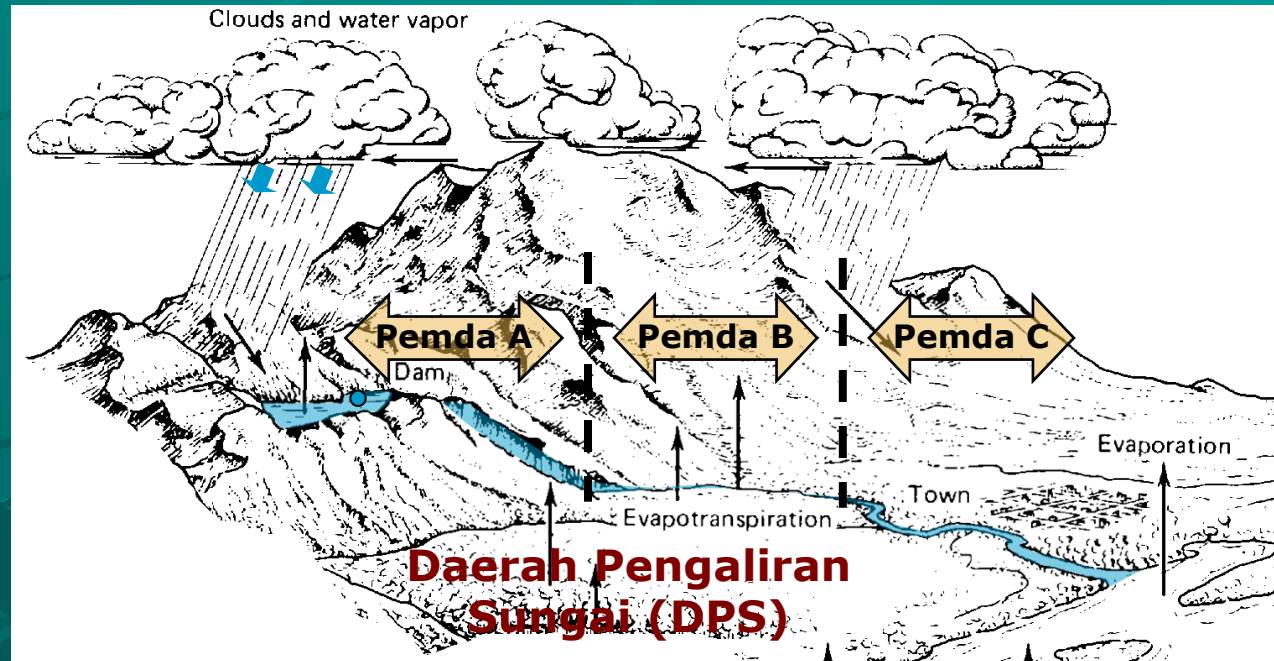
♦ Jawab: belum tentu, tergantung dari kondisi DPS.

♦ karena:
 $Q = f(h, DPS)$

- ♦ Jika hujan (h) yang turun mempunyai karakter klimatologis konstan,
- ♦ apakah Q puncak banjir mempunyai nilai konstan?

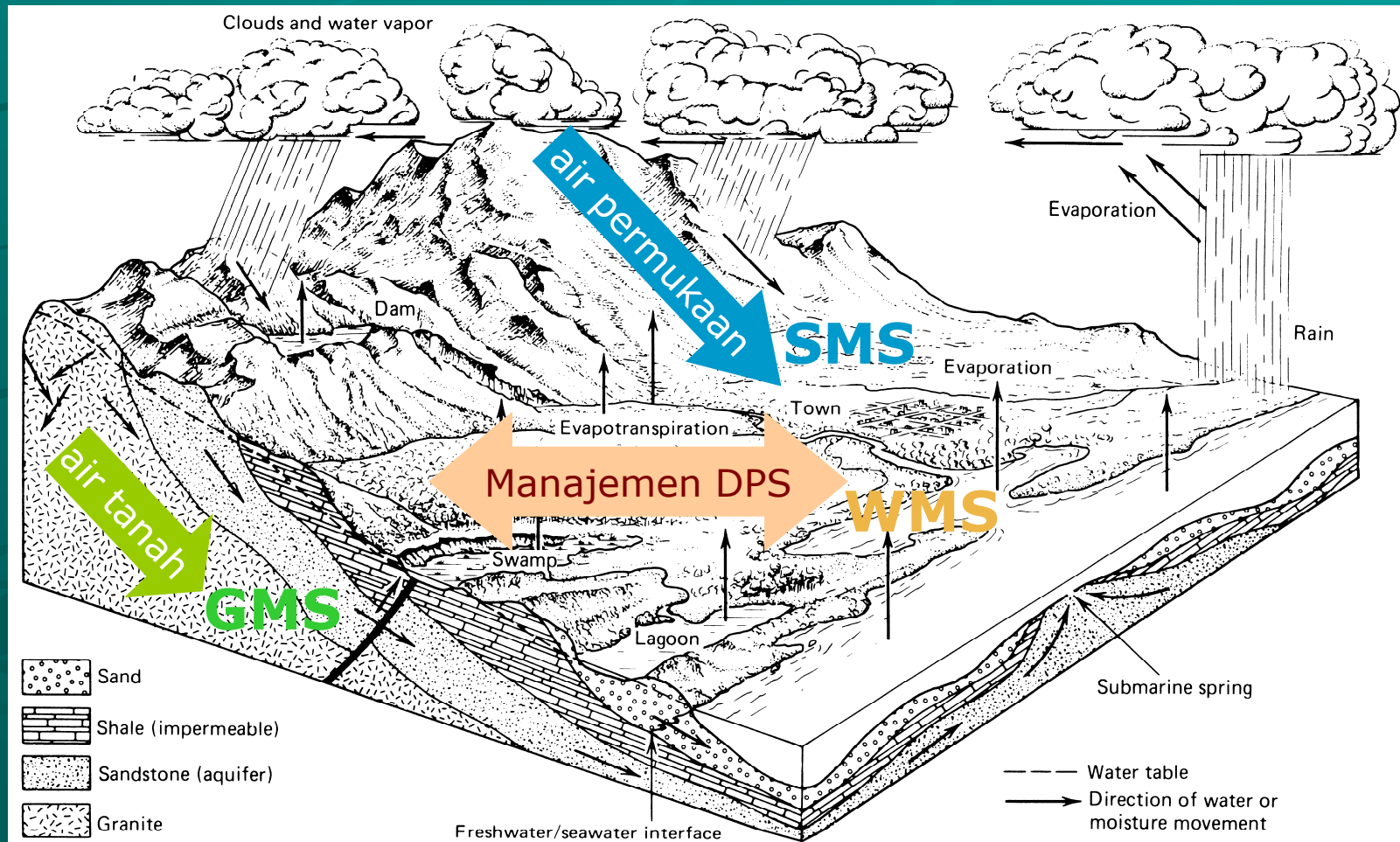


... always one ...



- Secara alami DPS tidak mengenal batas administrasi buatan manusia ☺

Hydro Softwares



Hydro Softwares

- ◆ Surface-water Modeling System (SMS)

Memodelkan hidrodinamika gerakan air permukaan dan polusinya baik di sungai maupun di laut

- ◆ Groundwater Modeling System (GMS)

Memodelkan gerakan air tanah dan polusinya

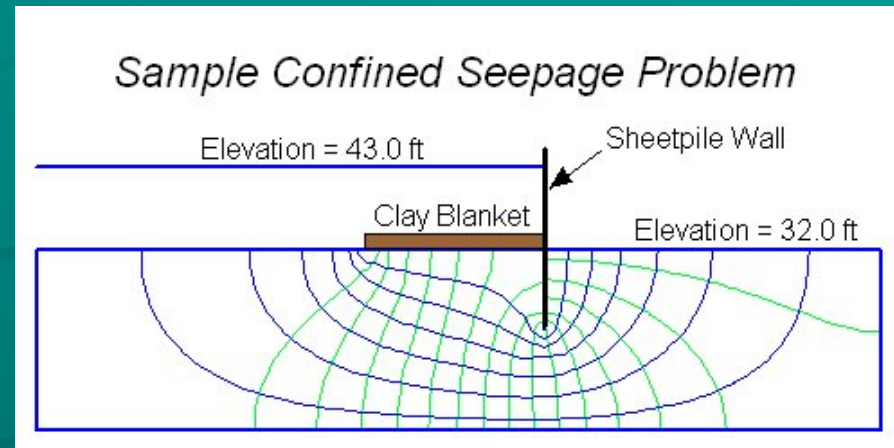
- ◆ Watershed Modeling System (WMS)

Memodelkan manajemen Daerah Pengaliran Sungai (DPS) untuk melakukan pengelolaan air tanah dan air permukaan

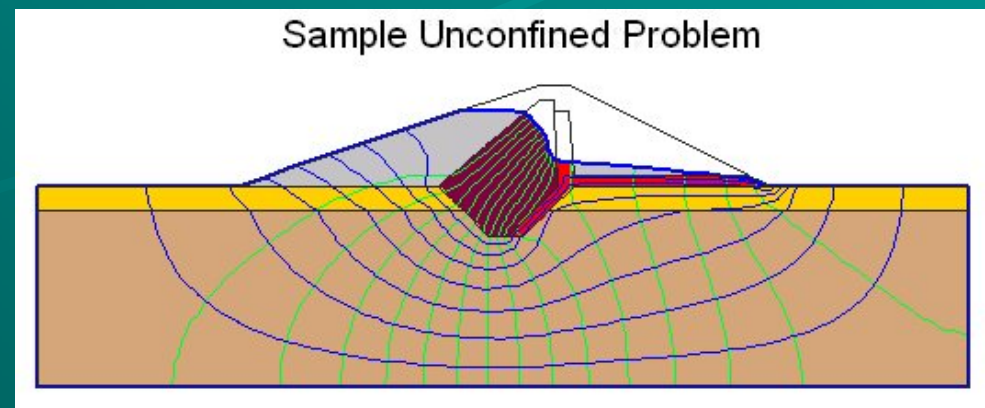
Aplikasi Persamaan Laplace

$$\frac{\partial^2 h}{\partial x^2} + \frac{\partial^2 h}{\partial y^2} = 0$$

◆ Rembesan di bawah sheetpile



◆ Rembesan di bendungan



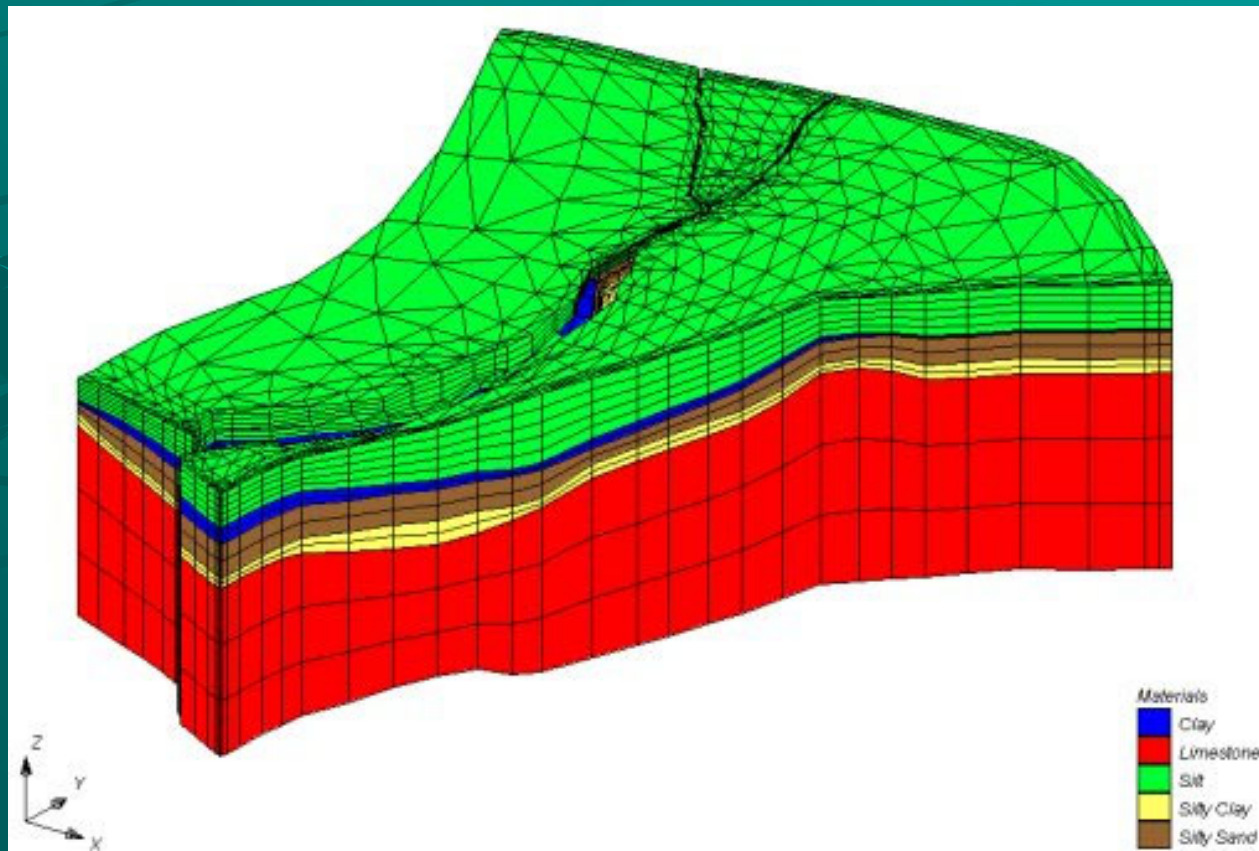
Aplikasi Software GMS

- ◆ Memodelkan aliran air tanah pada suatu kawasan



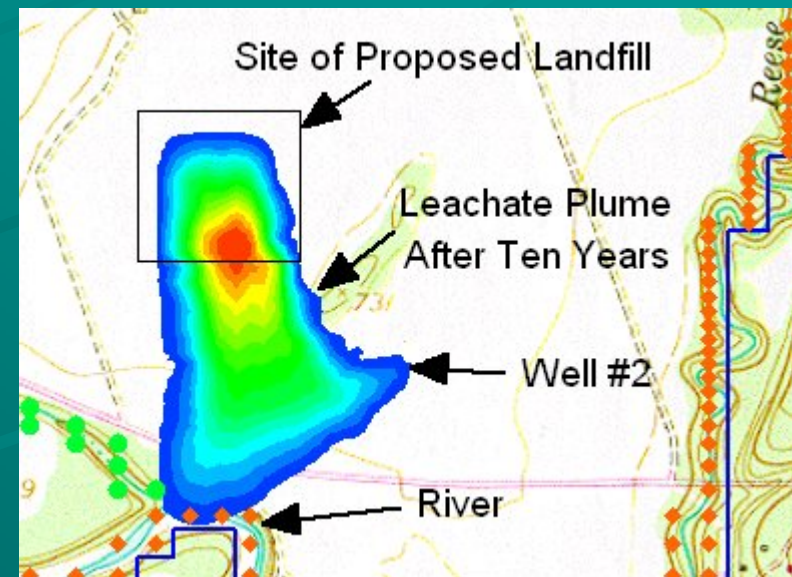
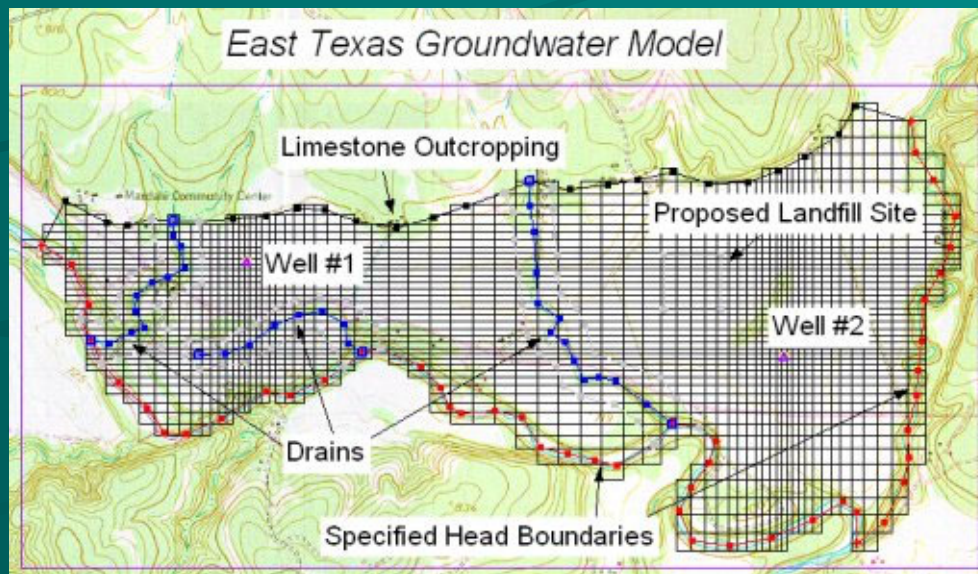
Aplikasi Software GMS

- ◆ Penggunaan metode elemen hingga dalam GMS



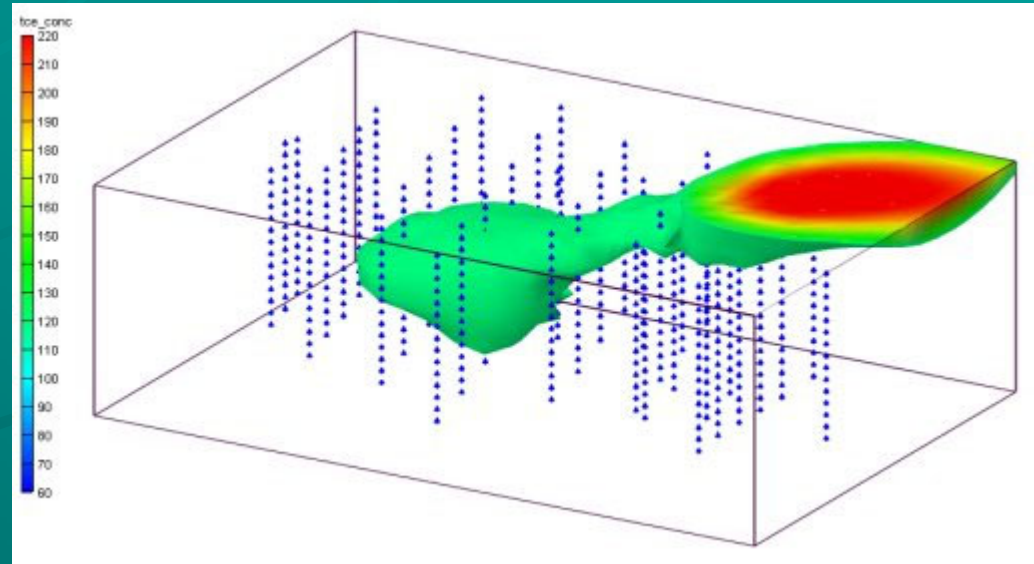
Aplikasi Software GMS

◆ Pengaruh Pembuangan Akhir Sampah terhadap air tanah

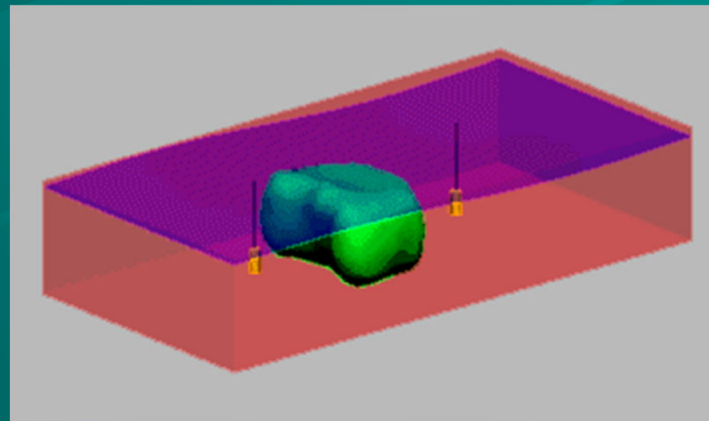


Aplikasi Software GMS

◆ Memodelkan sebaran polusi dalam air tanah 3-D (3 dimensi)



◆ Animasi gerakan polutan



Penggunaan Air

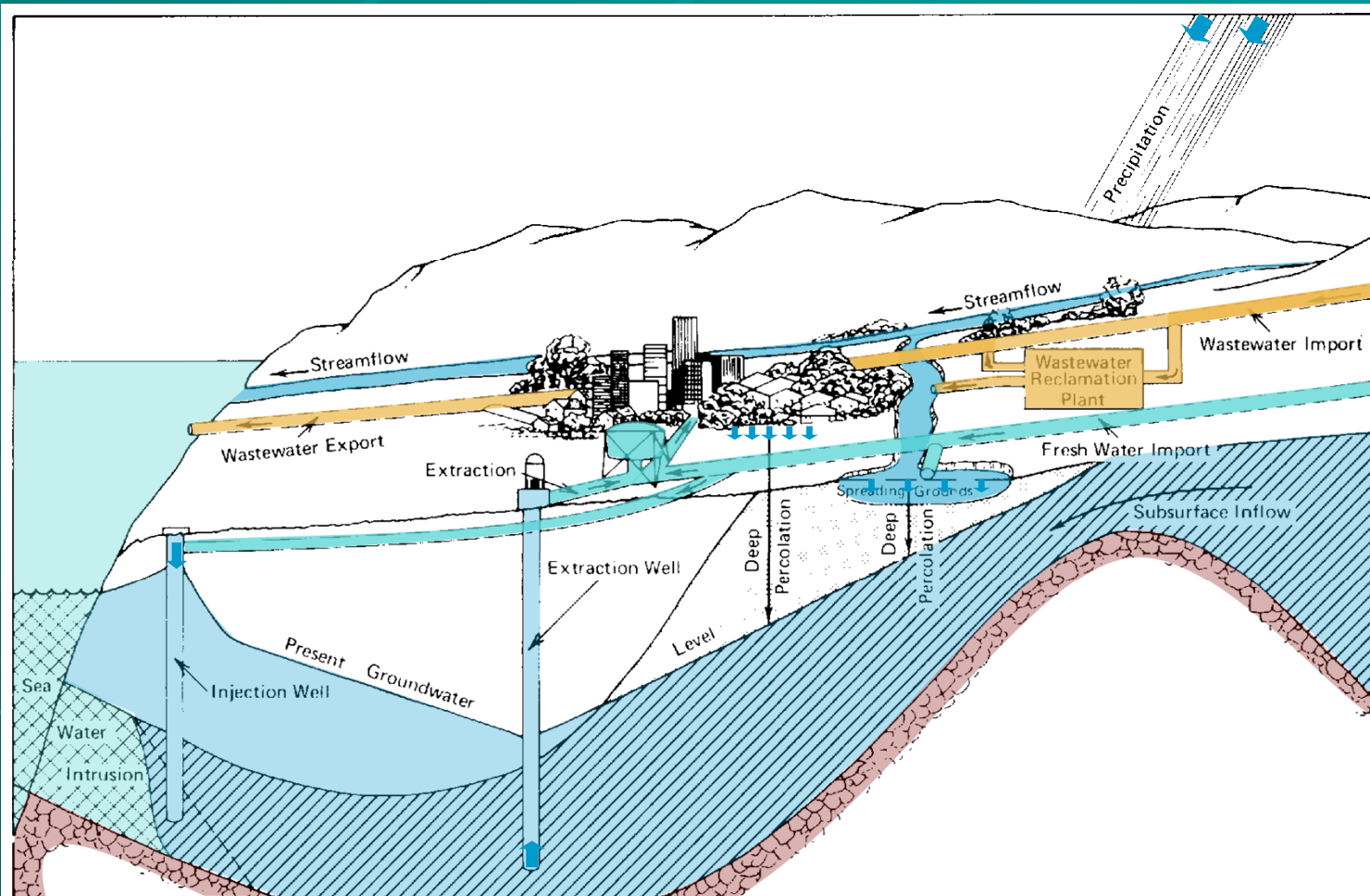
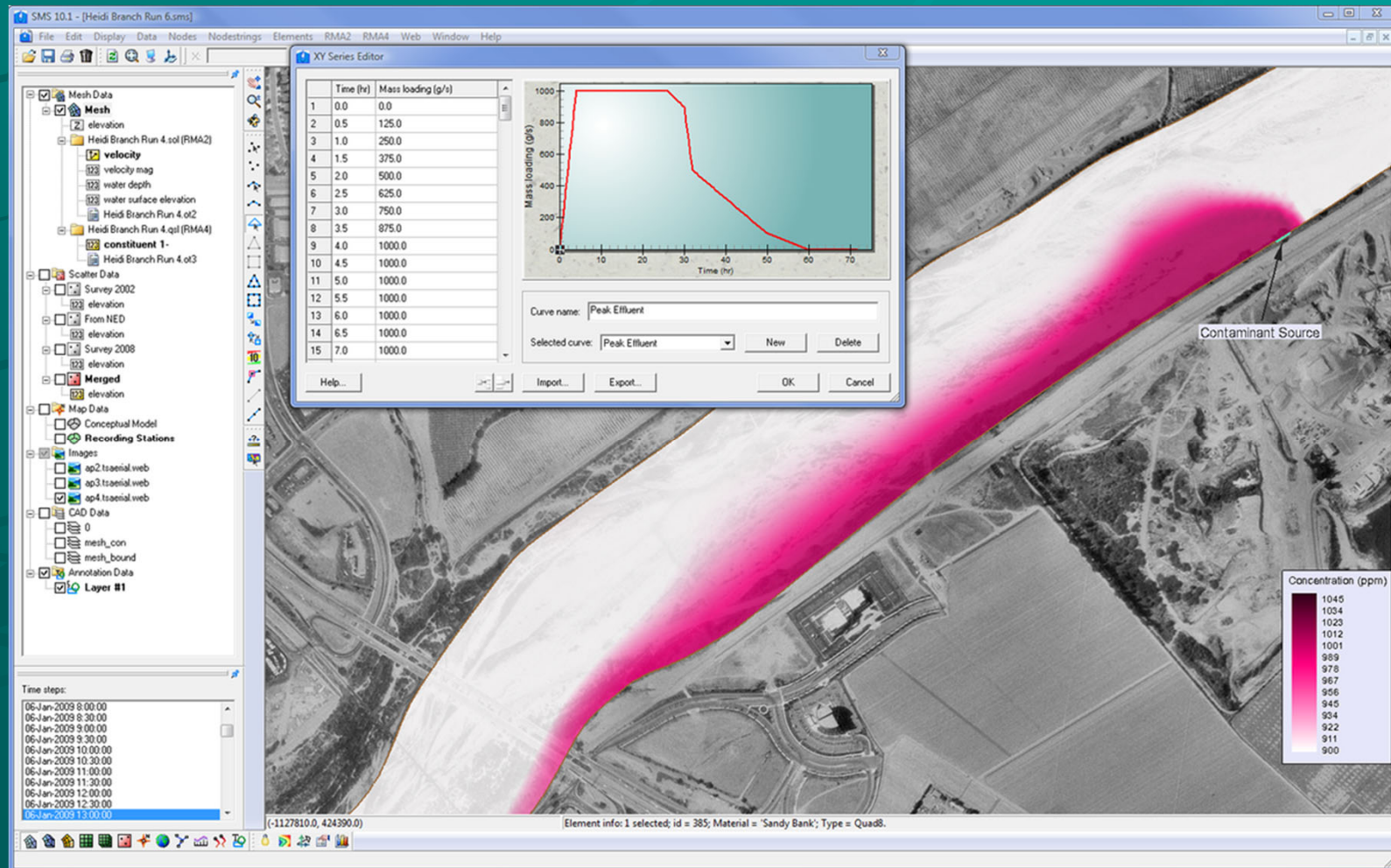
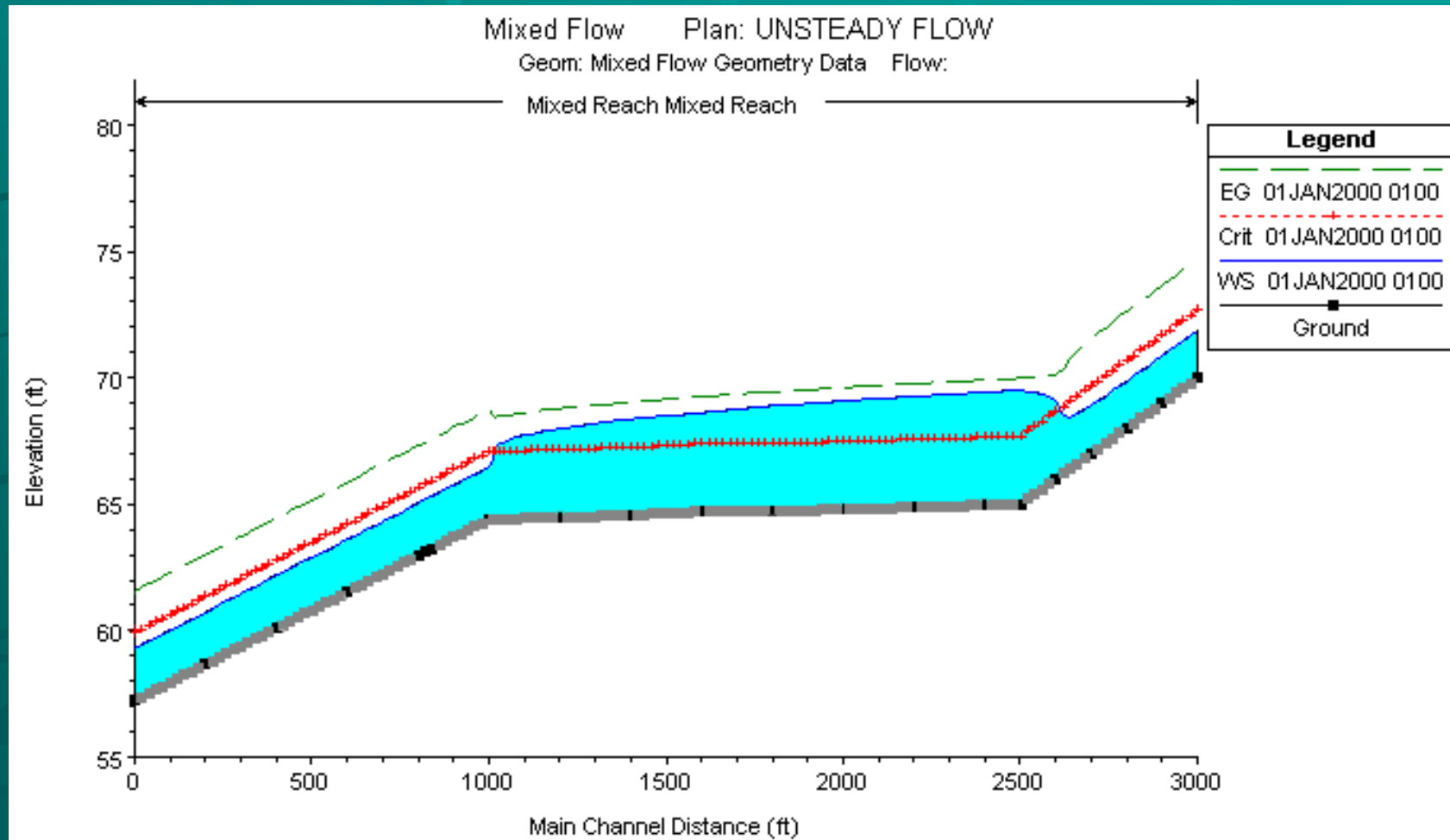


Fig. 9.9 Pictorial representation of conjunctive use of surface water and groundwater resources, Los Angeles Coastal Plain, California (after Calif. Dept. Water Resources¹⁰).

Simulasi Dinamika Polutan di sungai

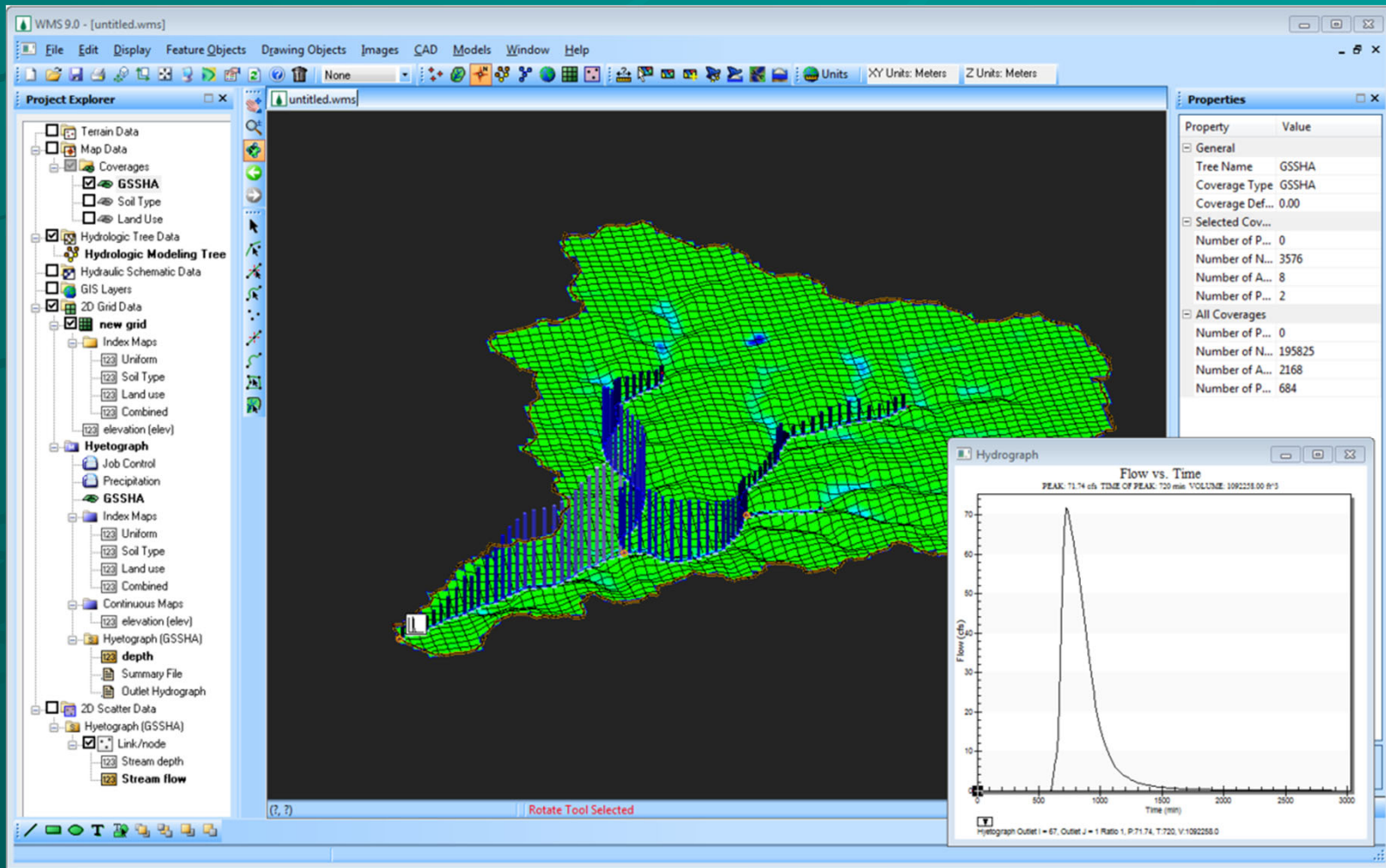


HEC-RAS: Pengaliran Campur



- Simulasi pengaliran saluran terbuka dengan HEC-RAS: aliran sub-, super-, kritis

Hasil Simulasi Run-off



Hasil simulasi dalam Google Earth

