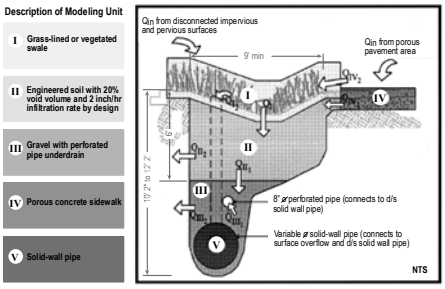
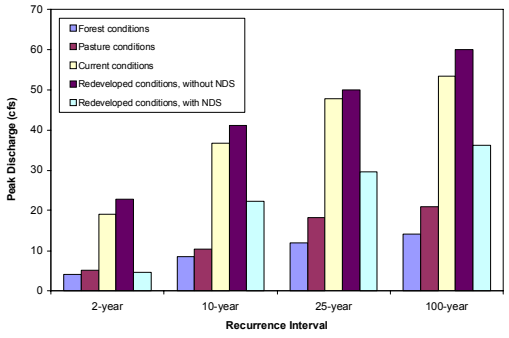
Bioretention Swale Modeling

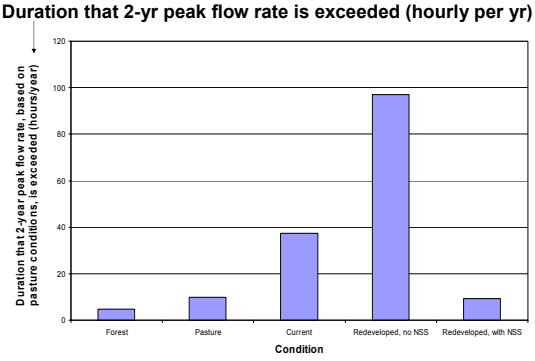


Comparison of Peak Flows



Comparison of Flow Duration

Duration that 2-yr peak flow rate is exceeded (hourly per yr)

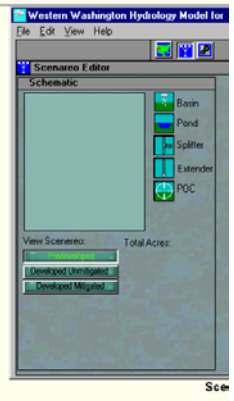


Bioretention Flow Credits

- Represent as a pond with consistent infiltration rate
- Pond equals above ground and soil storage
- Facilities with under-drains: only storage below under-drain considered
- Determine infiltration rate
  - **Use the lower of:**
    1. **the estimated long-term rate for the planting soil mix; or**
    2. **the initial (short-term) rate of the underlying soil**

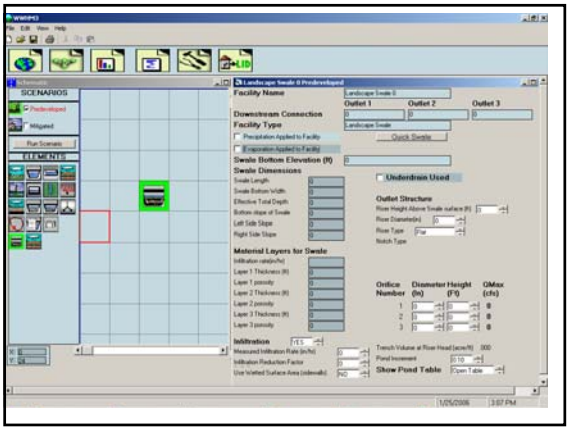
Bioretention modeling

- SBUH Single event methodology- Darcy's law to represent water movement through soils. Numerous spreadsheets!
- Recommend using continuous modeling methodology (HSPF, KCRTS, WWHM).
  - Only means of comparing duration in addition to peaks
  - Only mean to represent water storage availability for variety or antecedent conditions



Western Washington Hydrologic Model (WWHM2)

- Model bioretention as pond
  A) with native soil as restricting lense. Add voids in bioretention soil as extra ponding depth.
  B) with bioretention soil as restricting lense. Make sure maximum ponding depth from A not exceeded.



WWHM3 Model Input

- Bioretention Soil Depth: 12 - 48 inches
- Bioretention Infiltration Rate: 1 - 2 in/hr
- Bioretention Porosity: 30 – 40%

Simplified Modeling