Streamflow-Hydrograph Methods for Estimating Ground-Water Recharge

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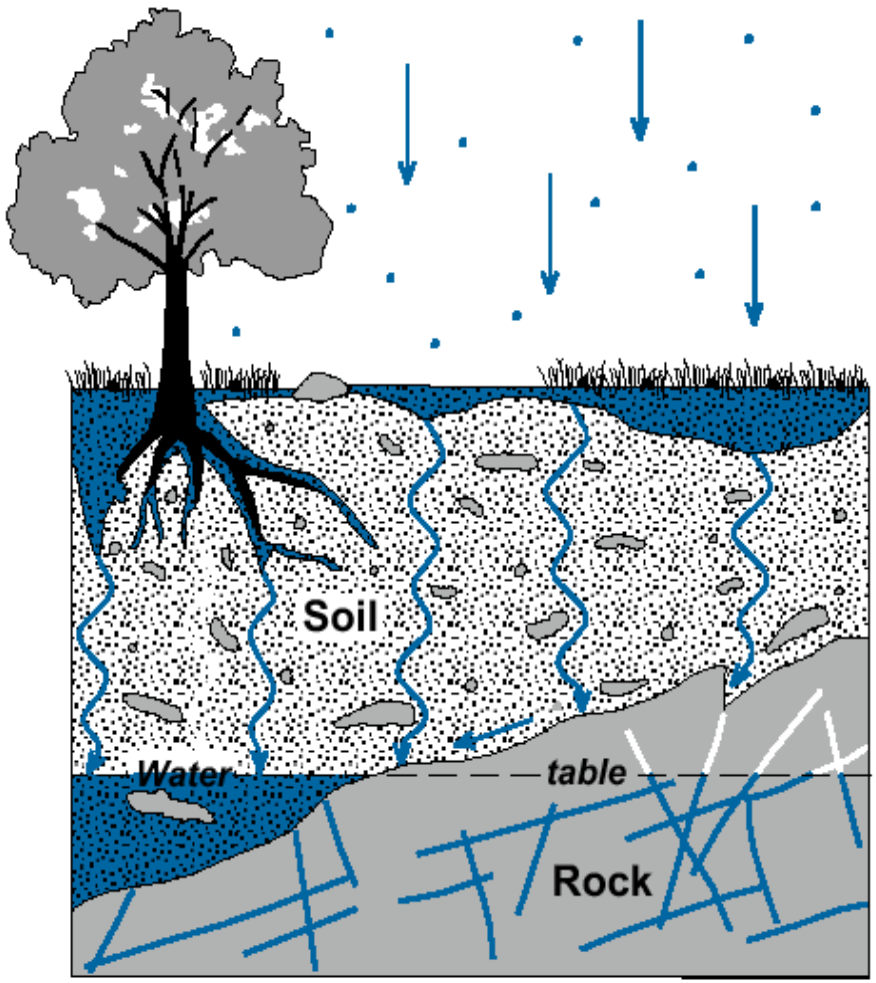
GROUND-WATER RECHARGE

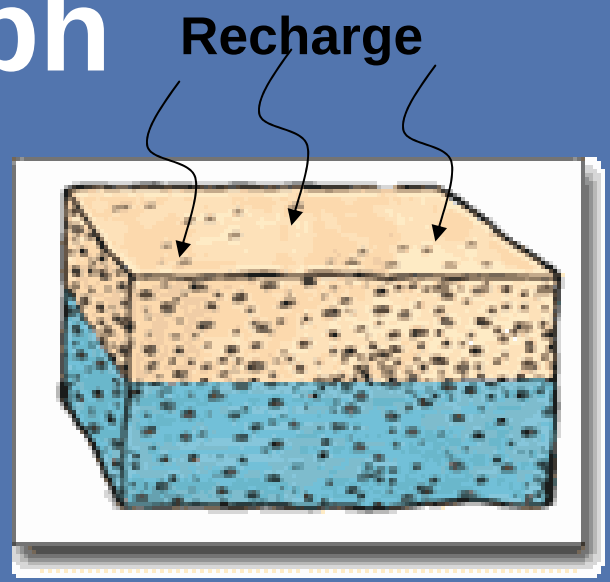
Recharge is the addition of water to the saturated zone.

It is difficult to measure directly.



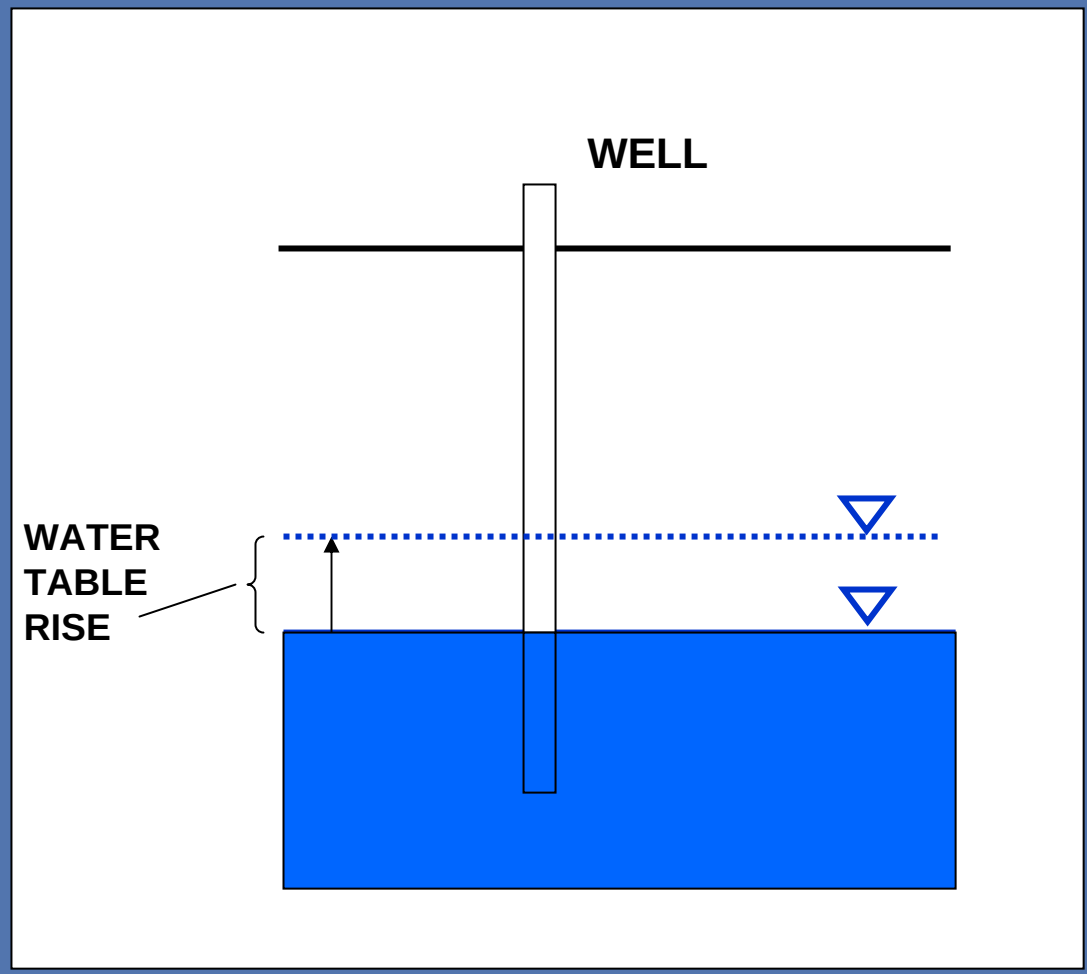
POPULAR METHODS FOR ESTIMATING GW RECHARGE

- Water-Table Rise
- Water Budget
- Stream-Hydrograph



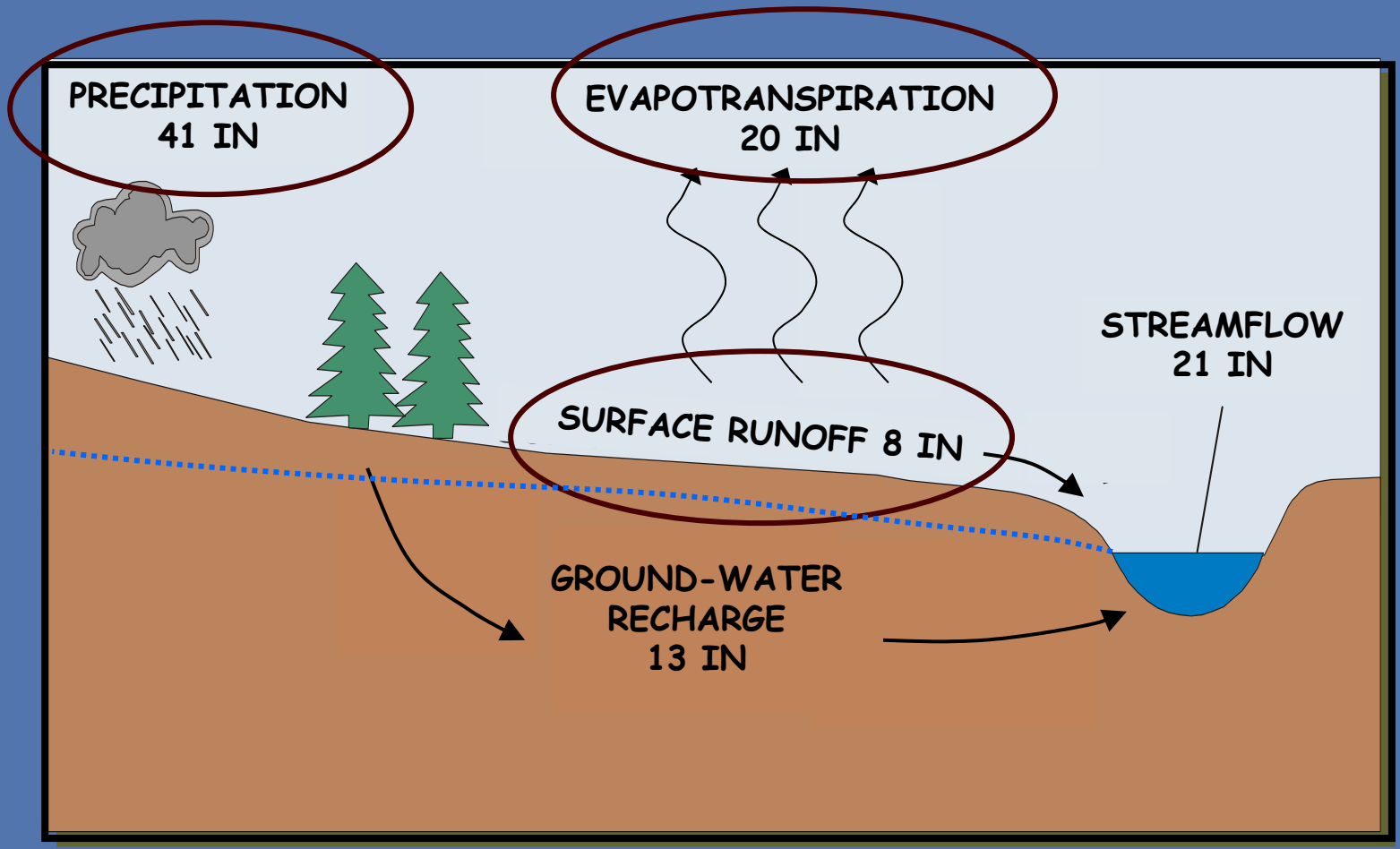
WATER-TABLE RISE

Estimating ground-water recharge with wells.

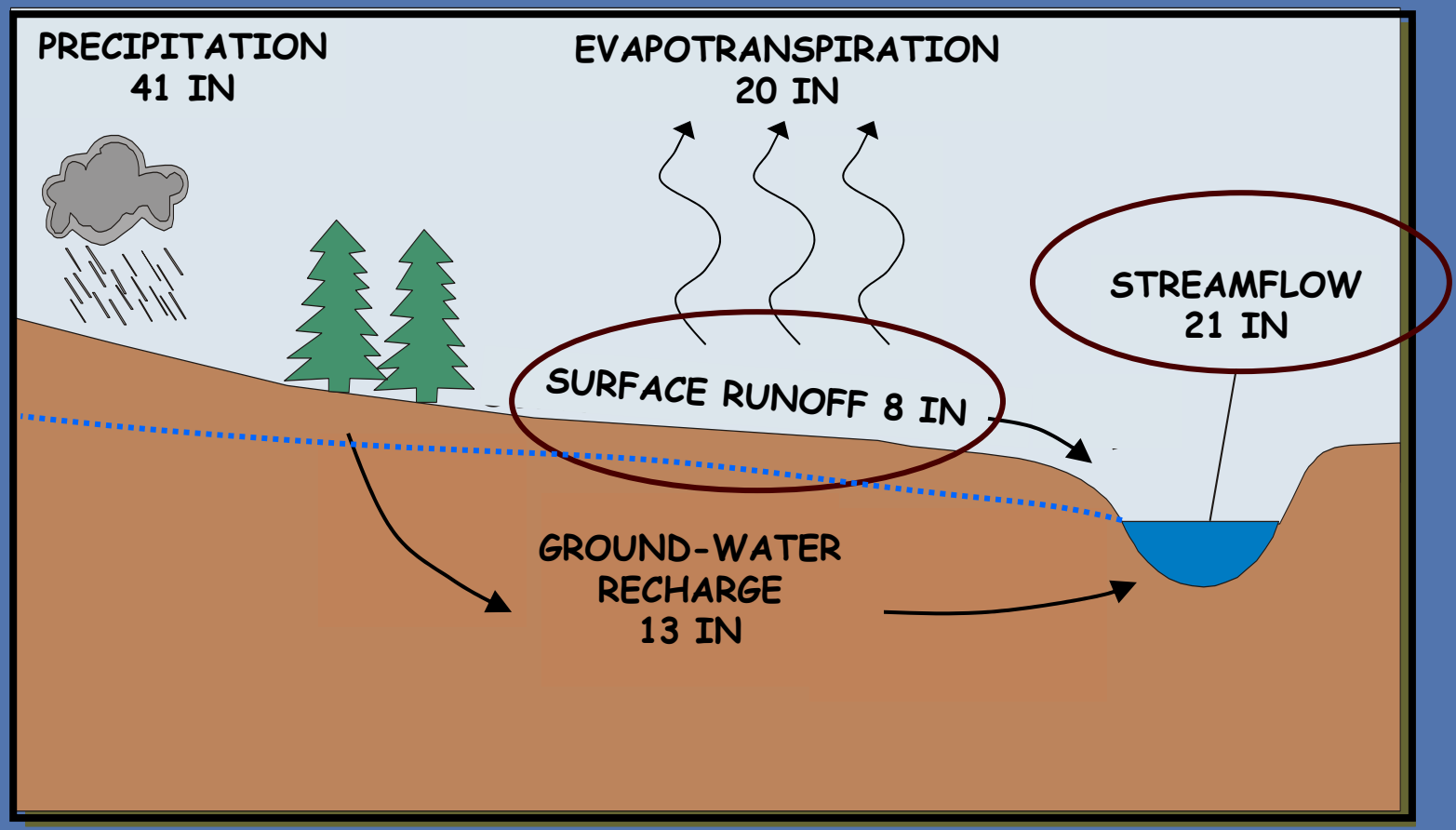


Recharge = Rise x Sy

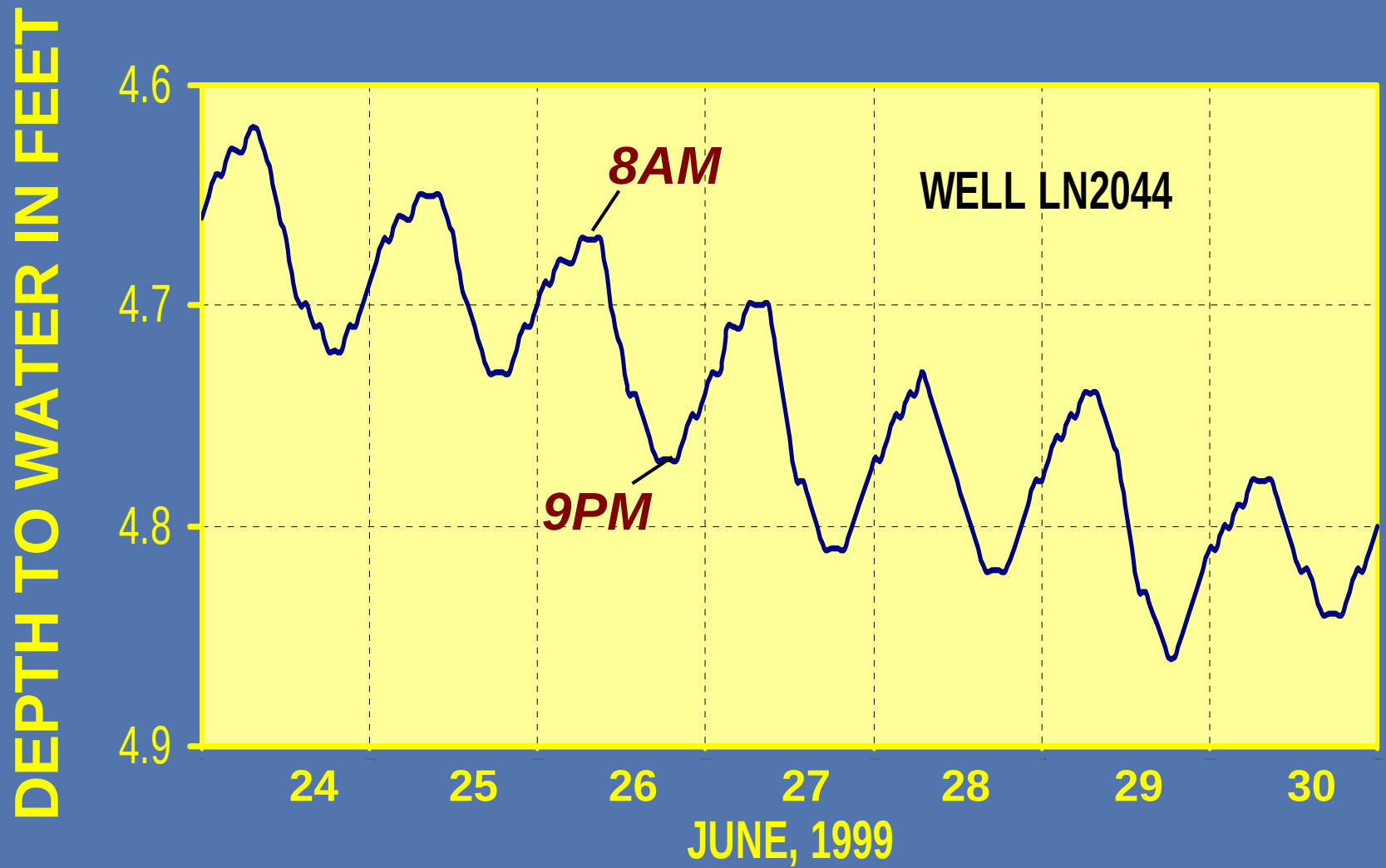
WATER BUDGET METHOD



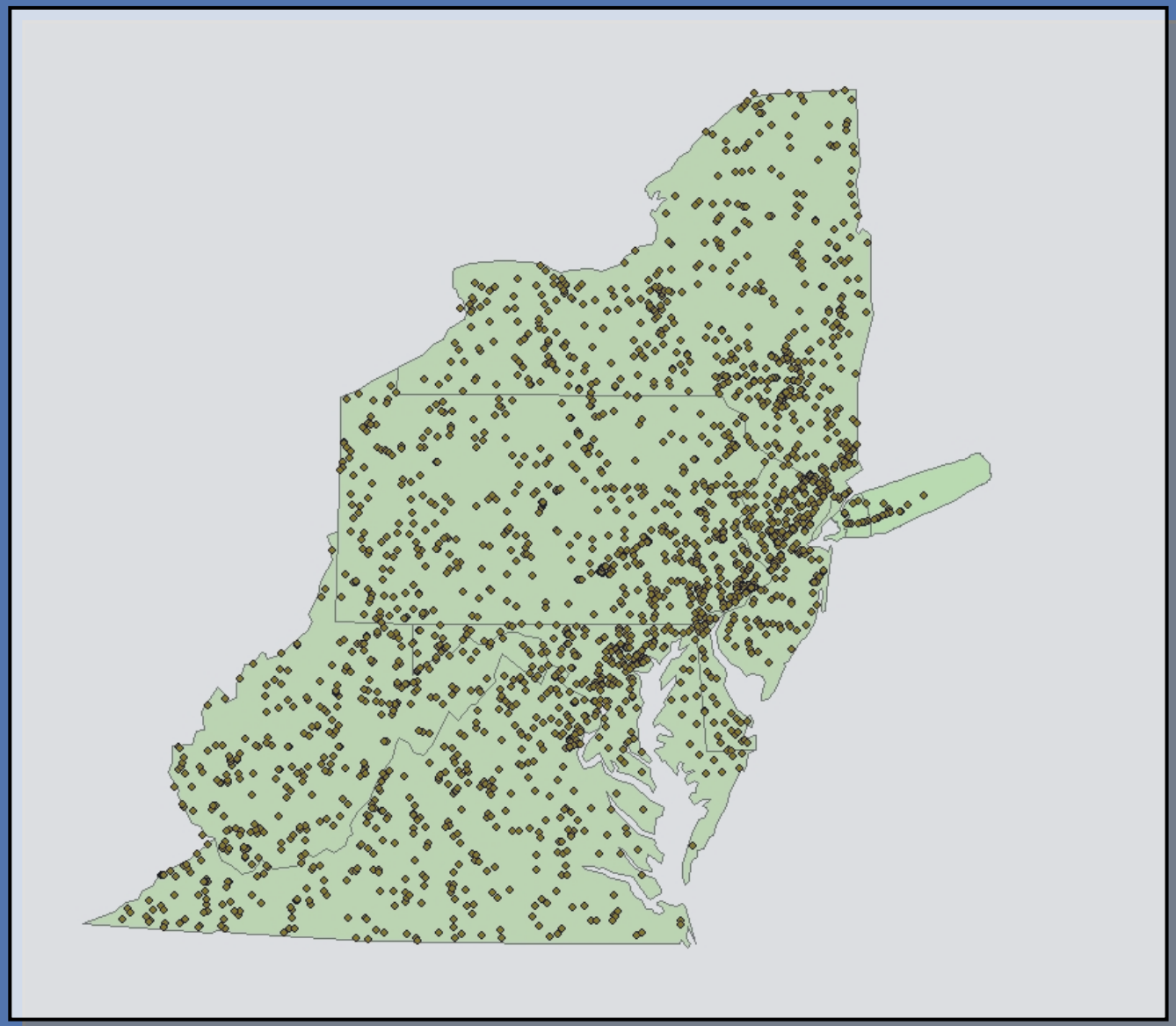
STREAMFLOW-HYDROGRAPH METHODS



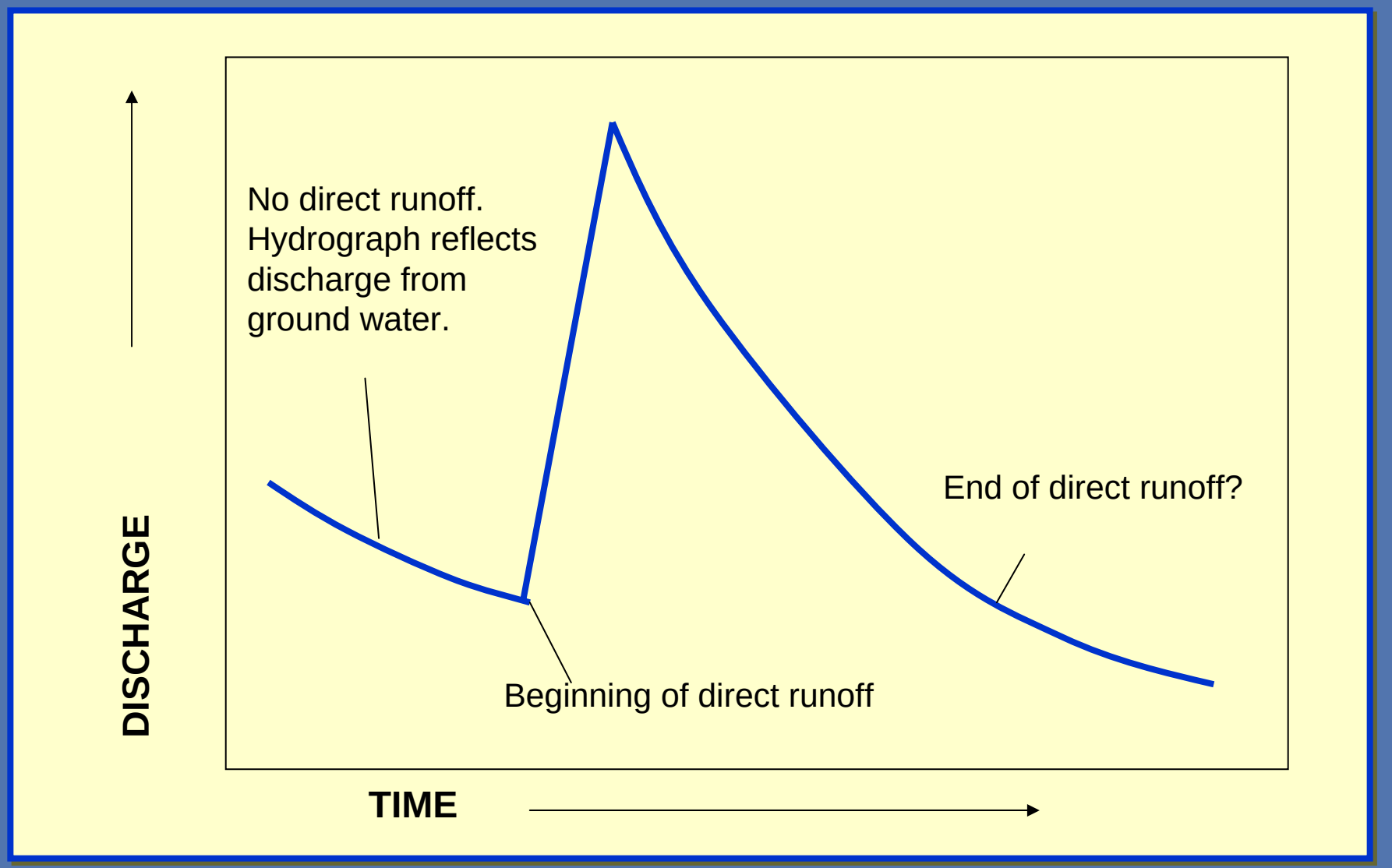
ET FROM GROUND WATER



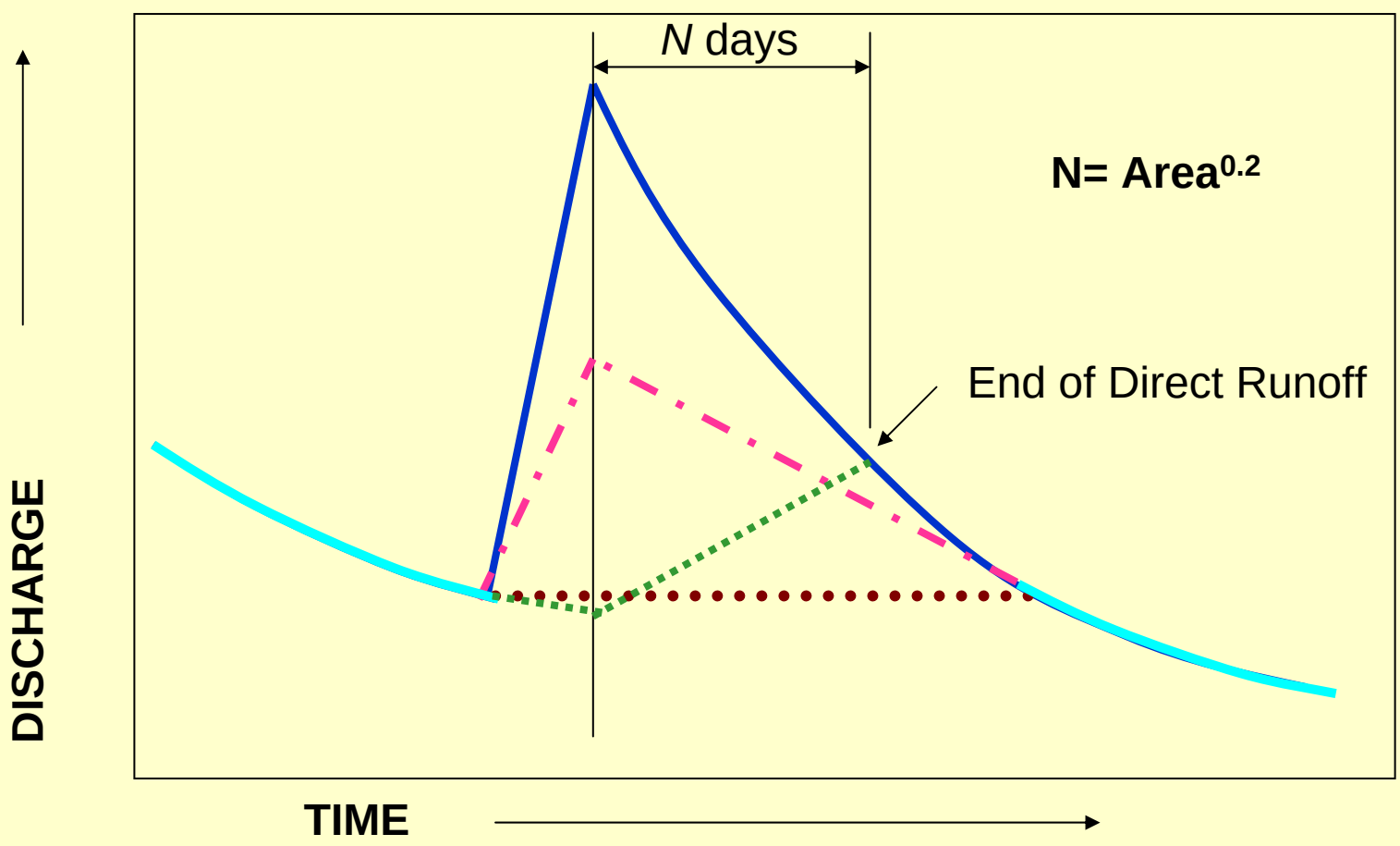
1,600 STREAMFLOW GAGES



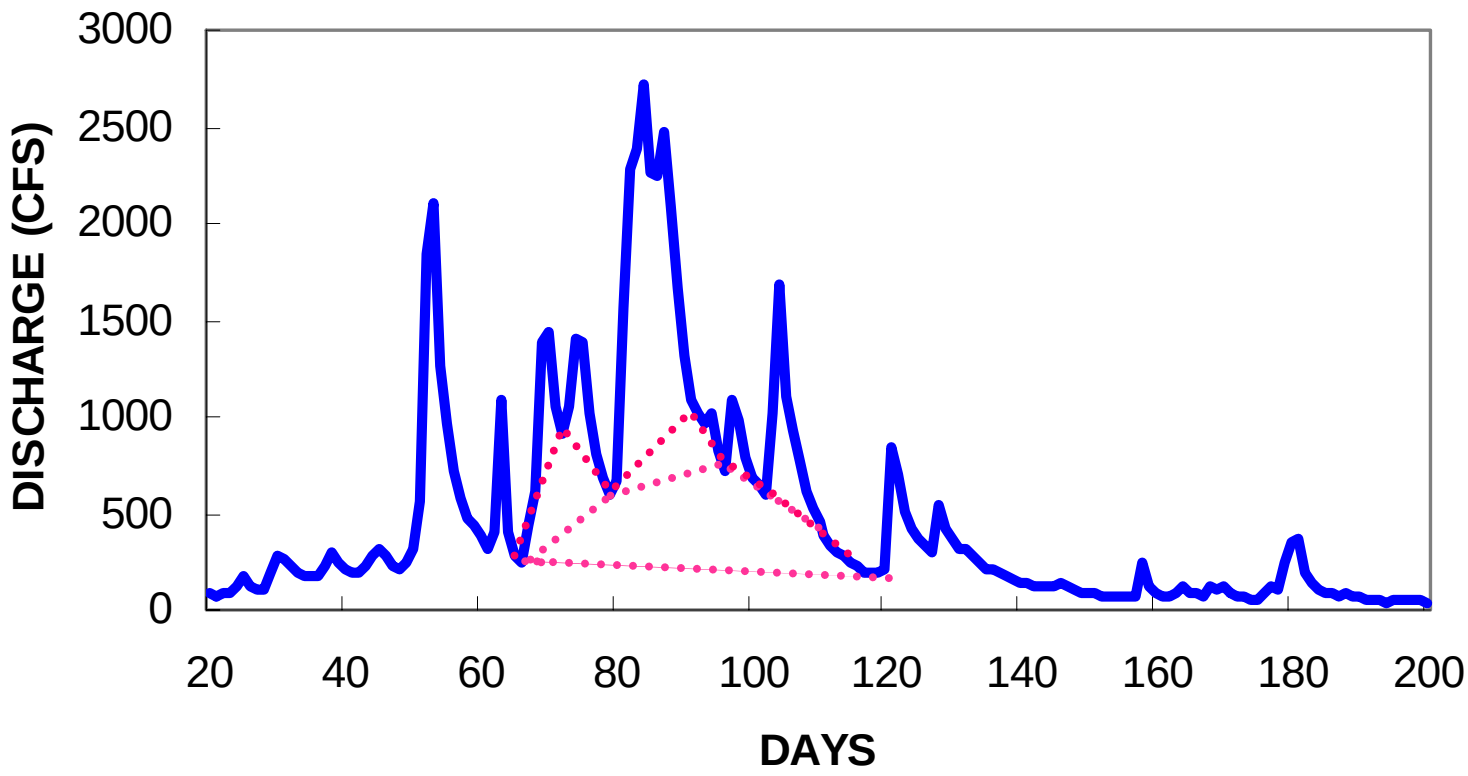
STORM HYDROGRAPH



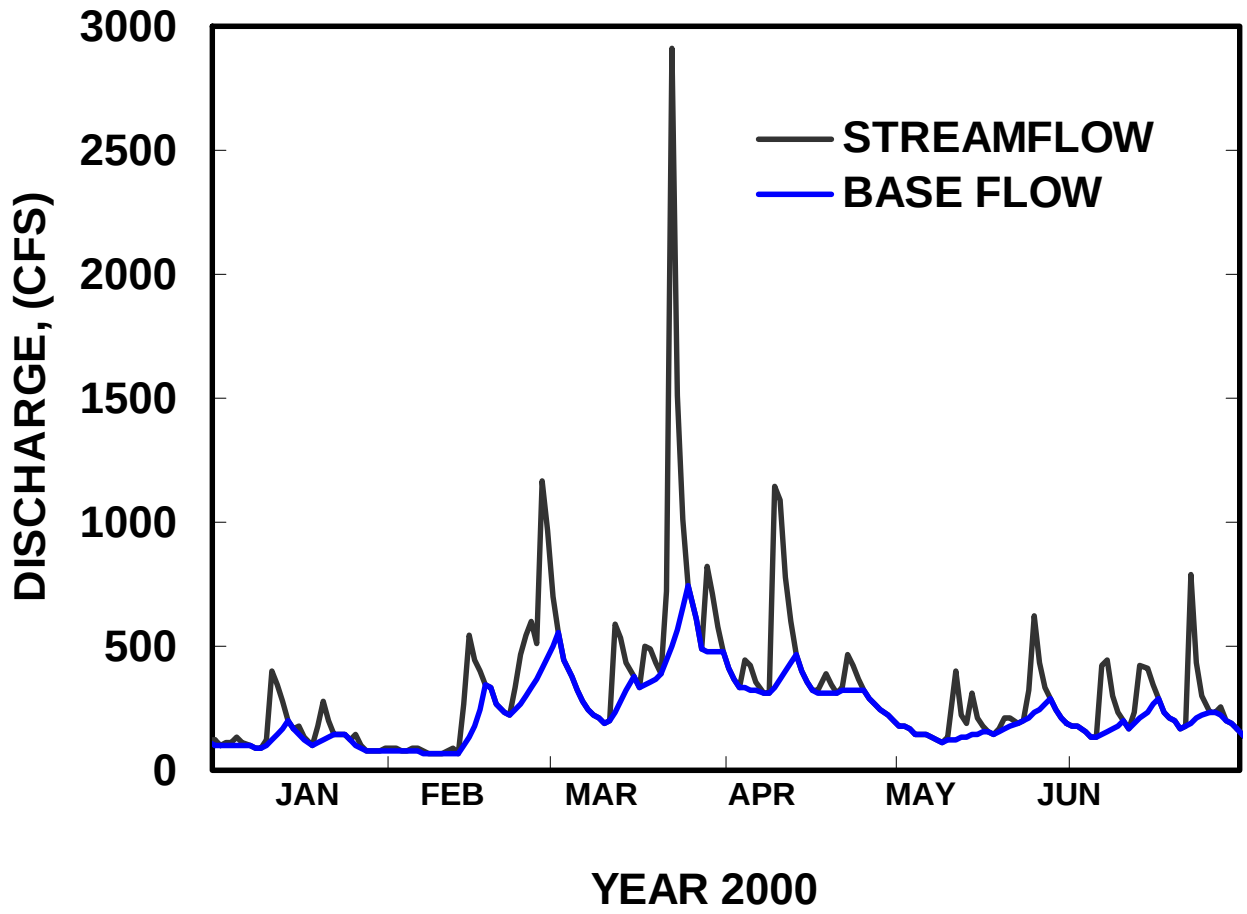
BASEFLOW SEPARATION



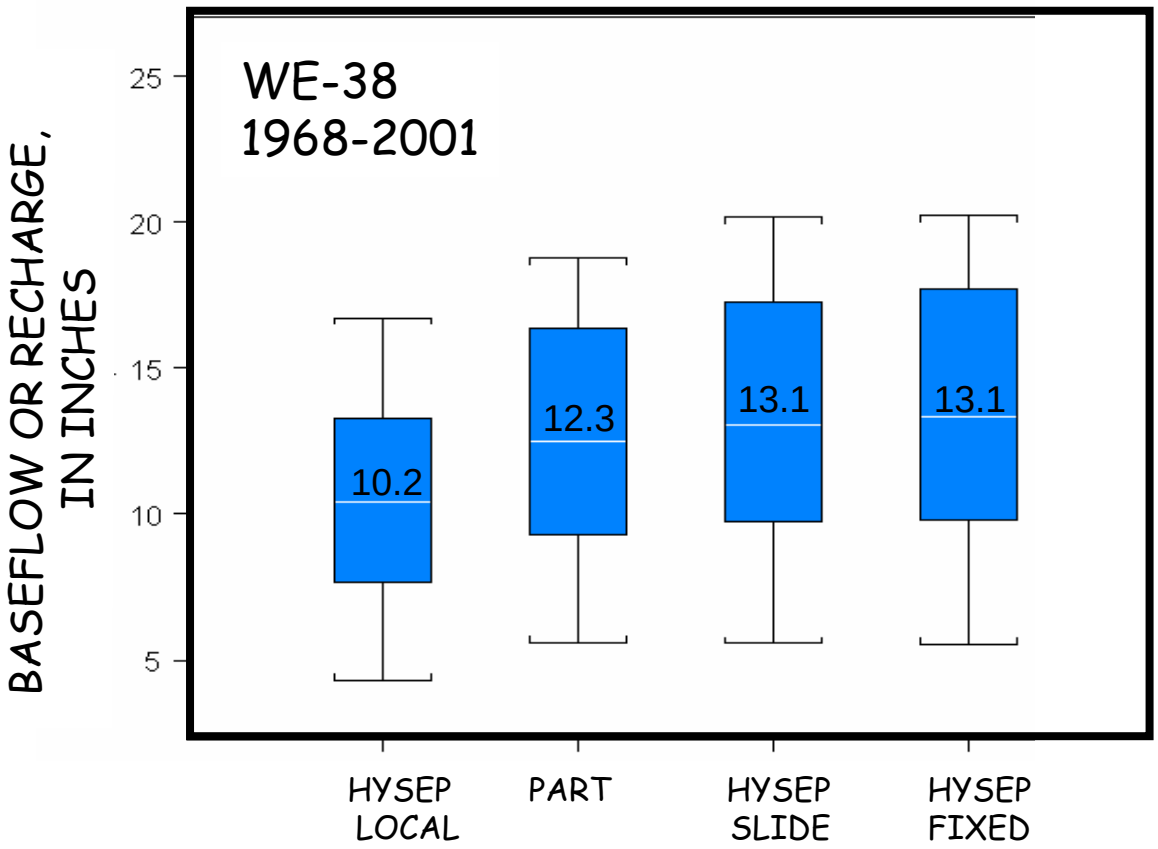
COMPLEX HYDROGRAPHS



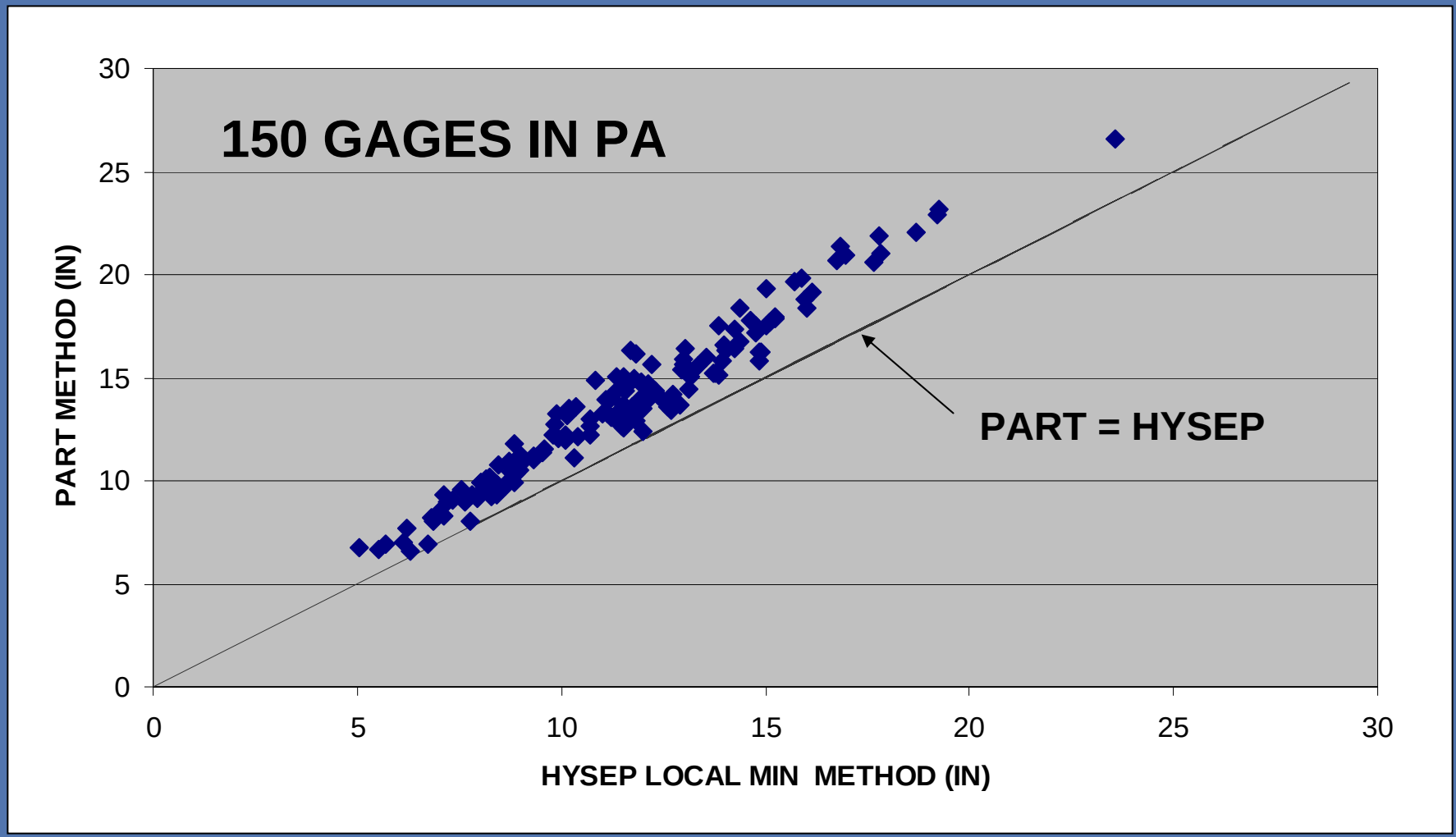
AUTOMATED BF SEPARATION PART PROGRAM



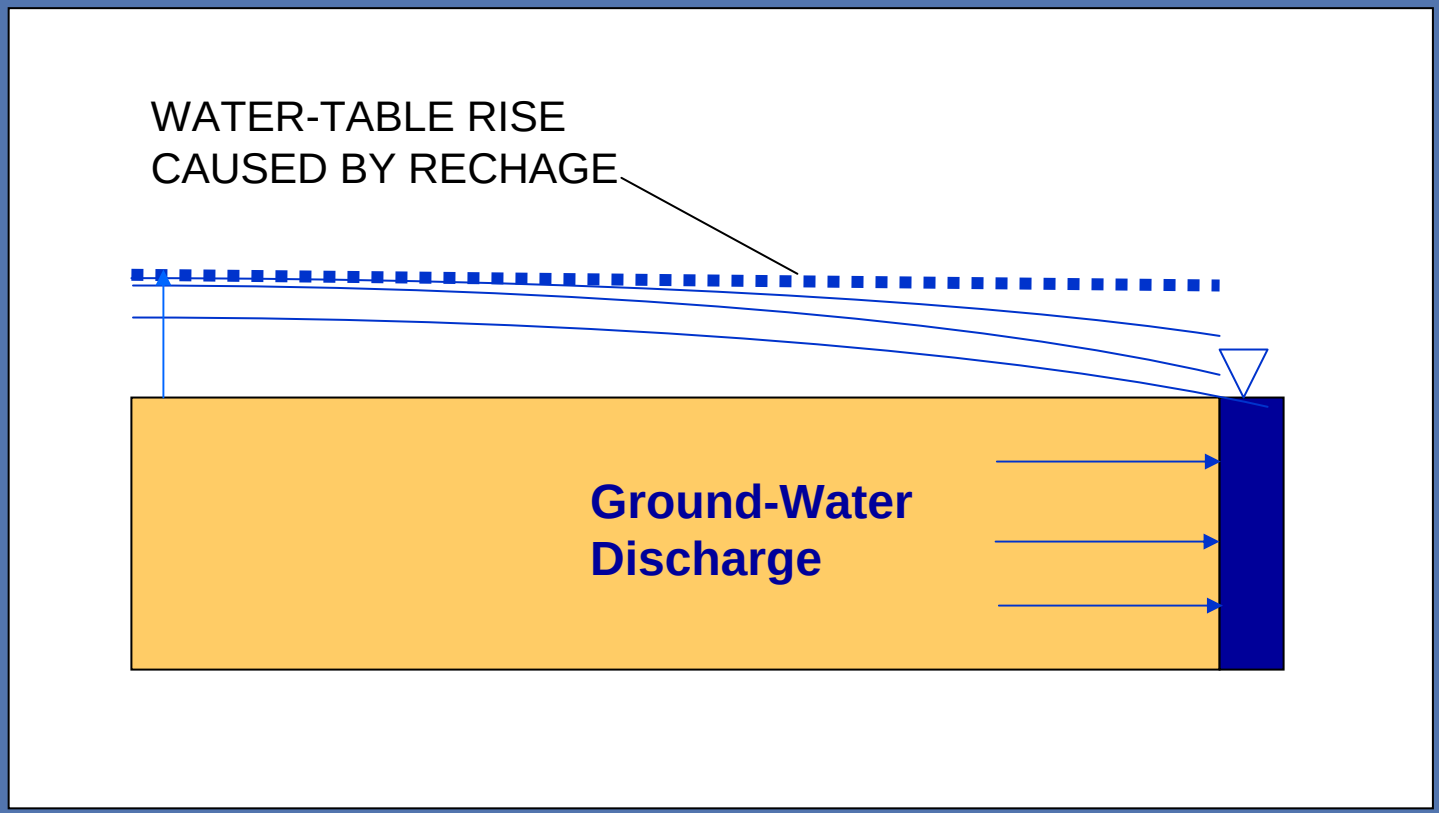
FOUR AUTOMATED BASE-FLOW METHODS COMPARED AT ONE SITE



TWO AUTOMATED BASE-FLOW METHODS COMPARED AT 150 SITES



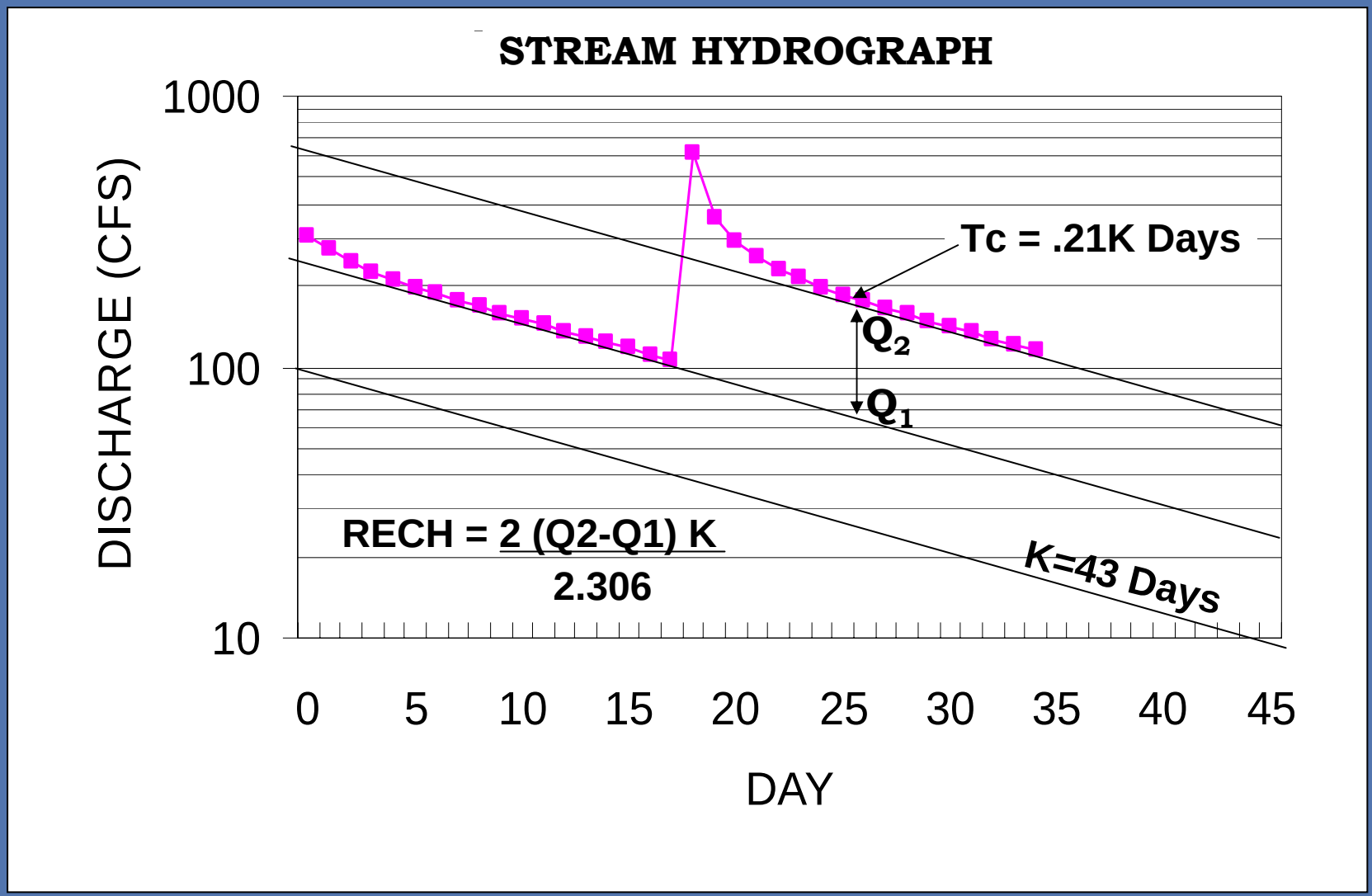
STREAMFLOW-RECESSION-DISPLACEMENT METHOD



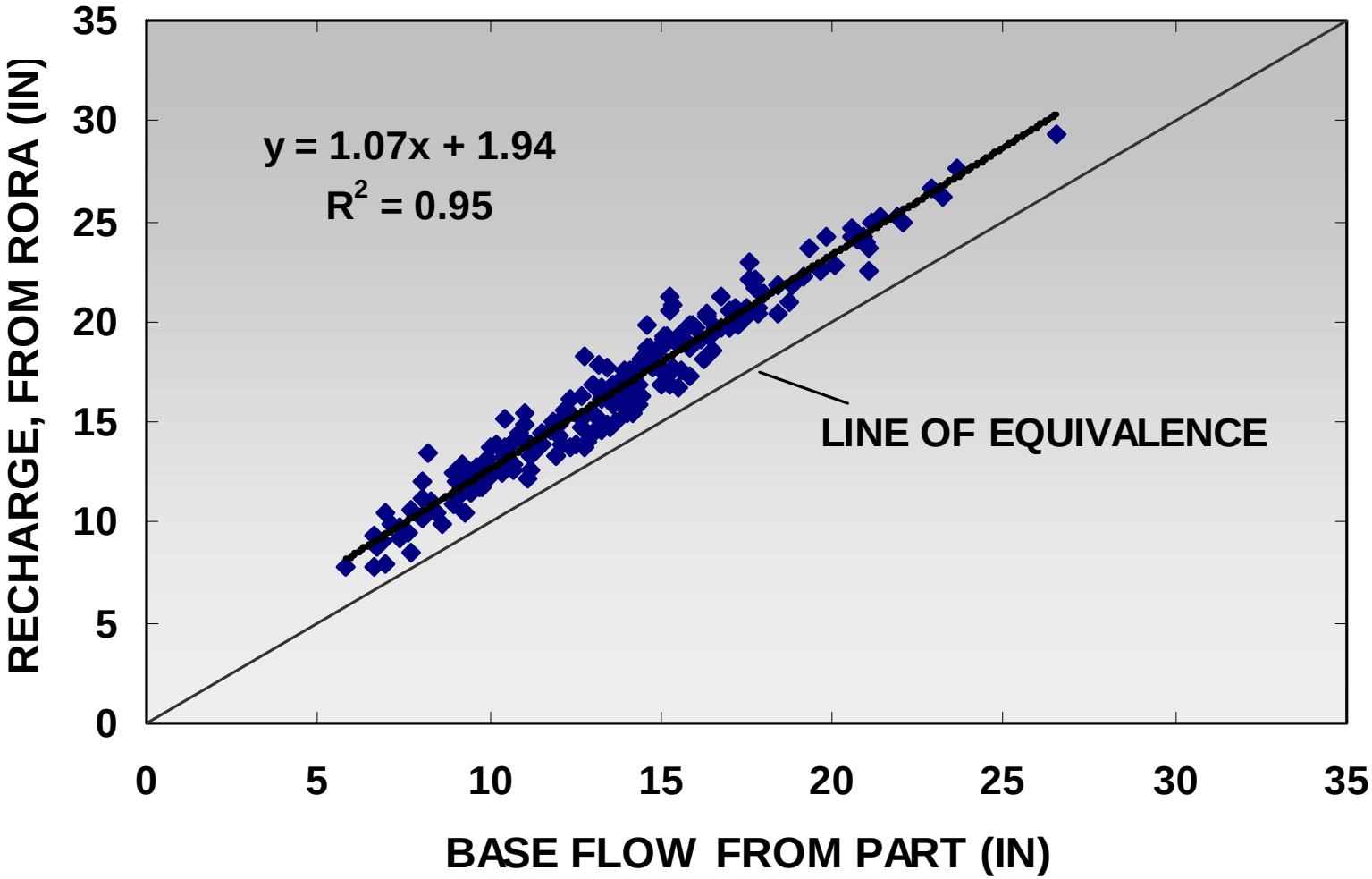
STREAMFLOW-RECESSION-DISPLACEMENT METHOD

- ✓Instantaneous Recharge
- ✓Diffuse Areal Recharge
- ✓Idealized Aquifer
- ✓Ground-Water Discharge to Stream
- ✓Negligible Diversions or Regulation

STREAMFLOW-RECESSION-DISPLACEMENT METHOD

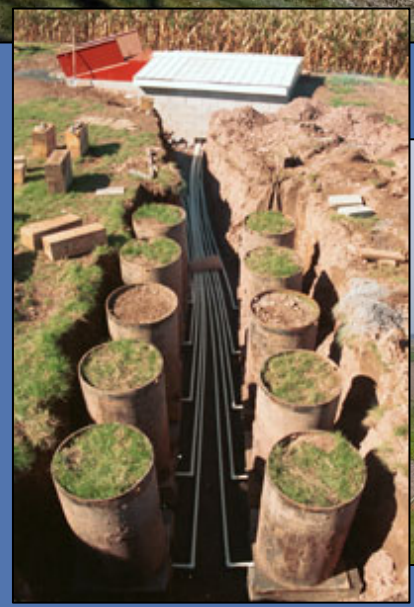


RECHARGE AND BASEFLOW ESTIMATES -- 150 STREAMS

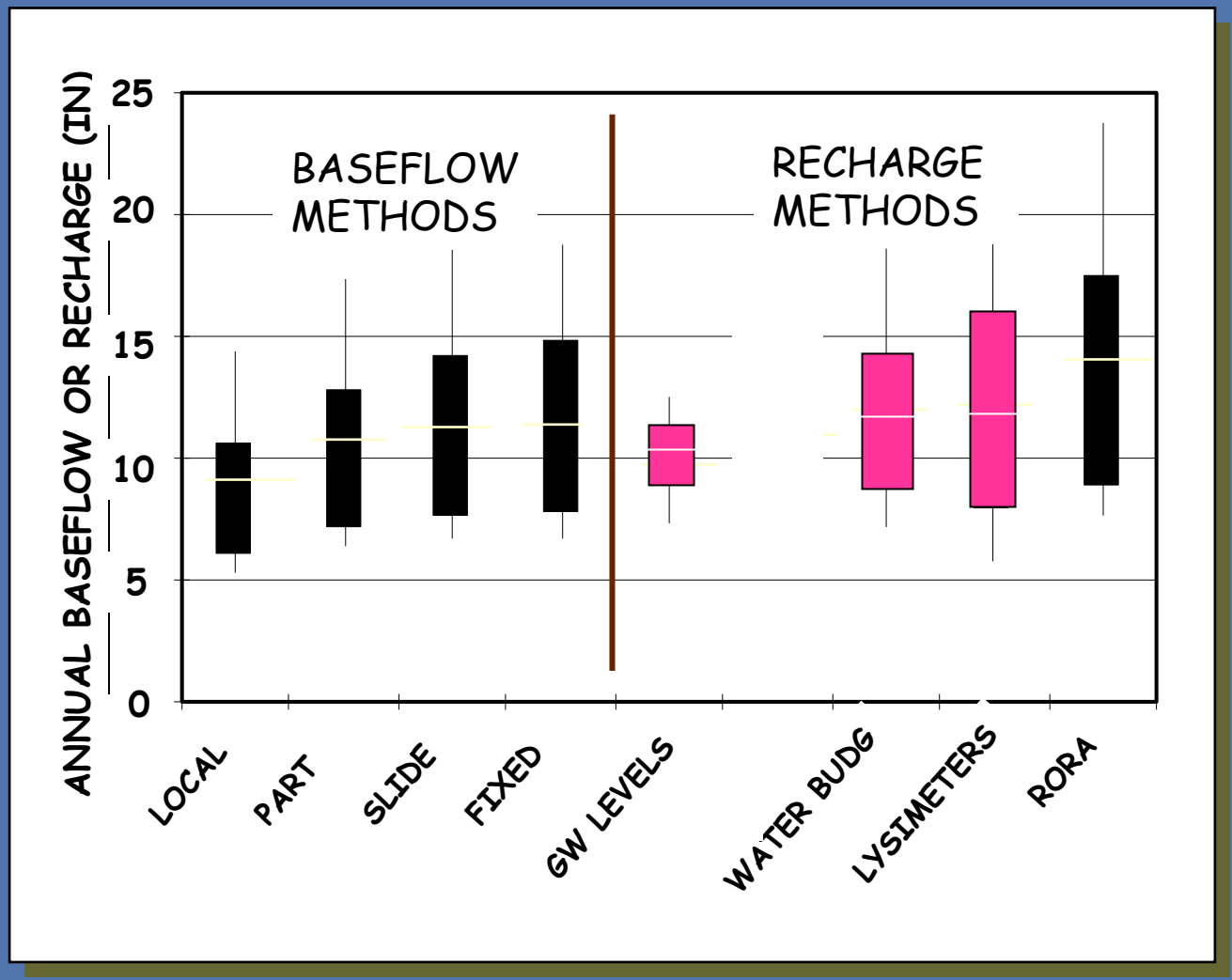


COMPARISON OF METHODS AT ONE SITE

- Stream Hydrograph Methods
  - HYSEP
  - PART
  - RORA
- Lysimeters
- Ground-Water Levels
- Water Budget

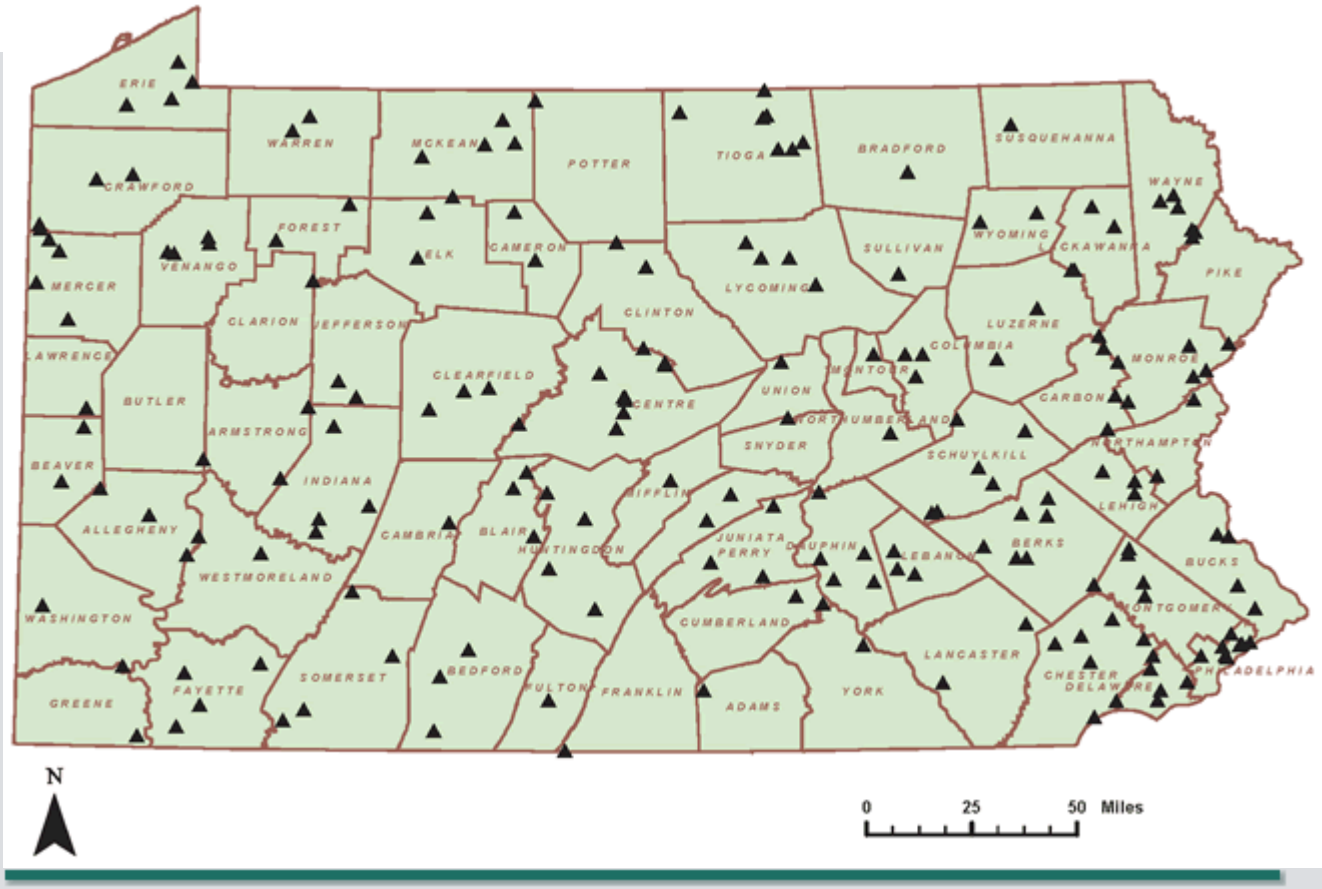


COMPARISON OF BASE FLOW AND RECHARGE METHODS



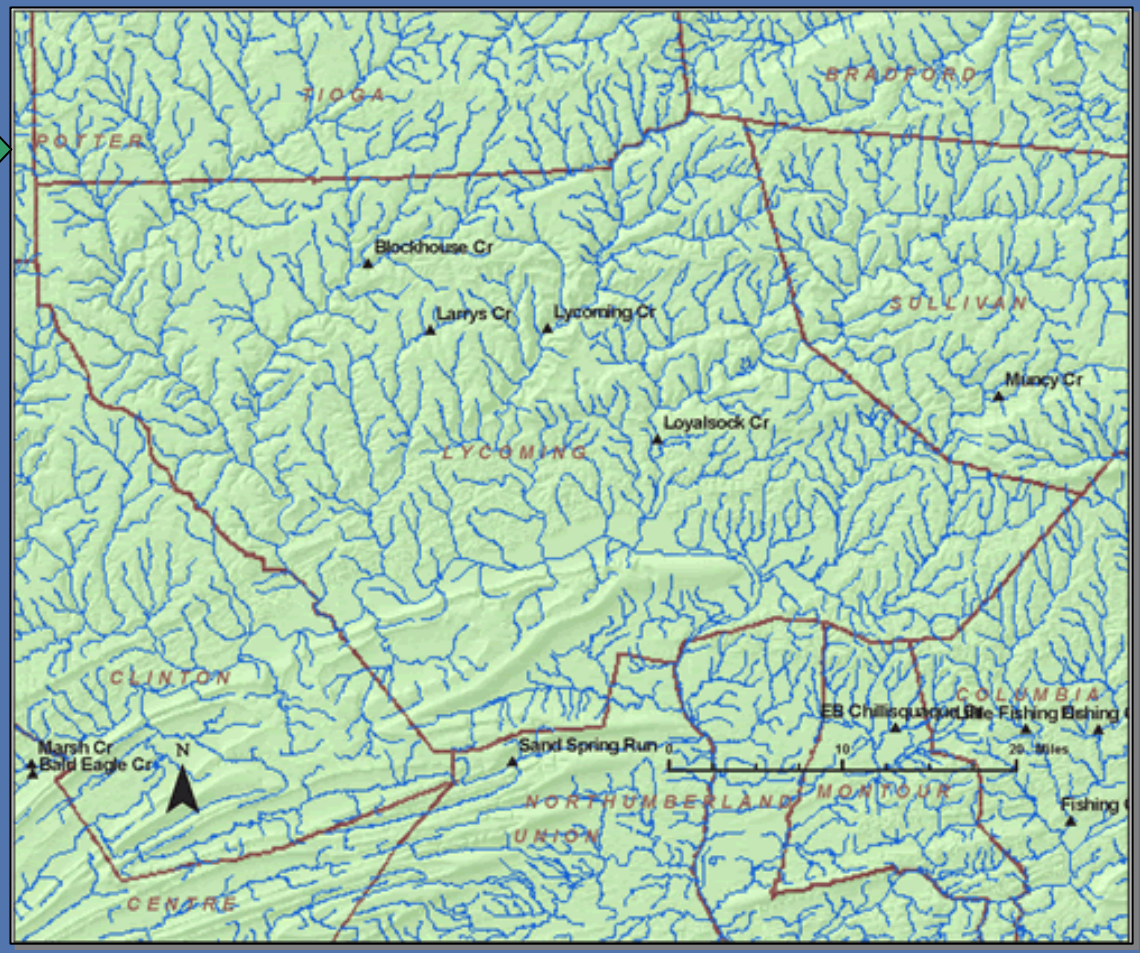
Estimates of Ground-Water Recharge in Pennsylvania by Streamflow-Hydrograph Methods

For a description of the methods, click here



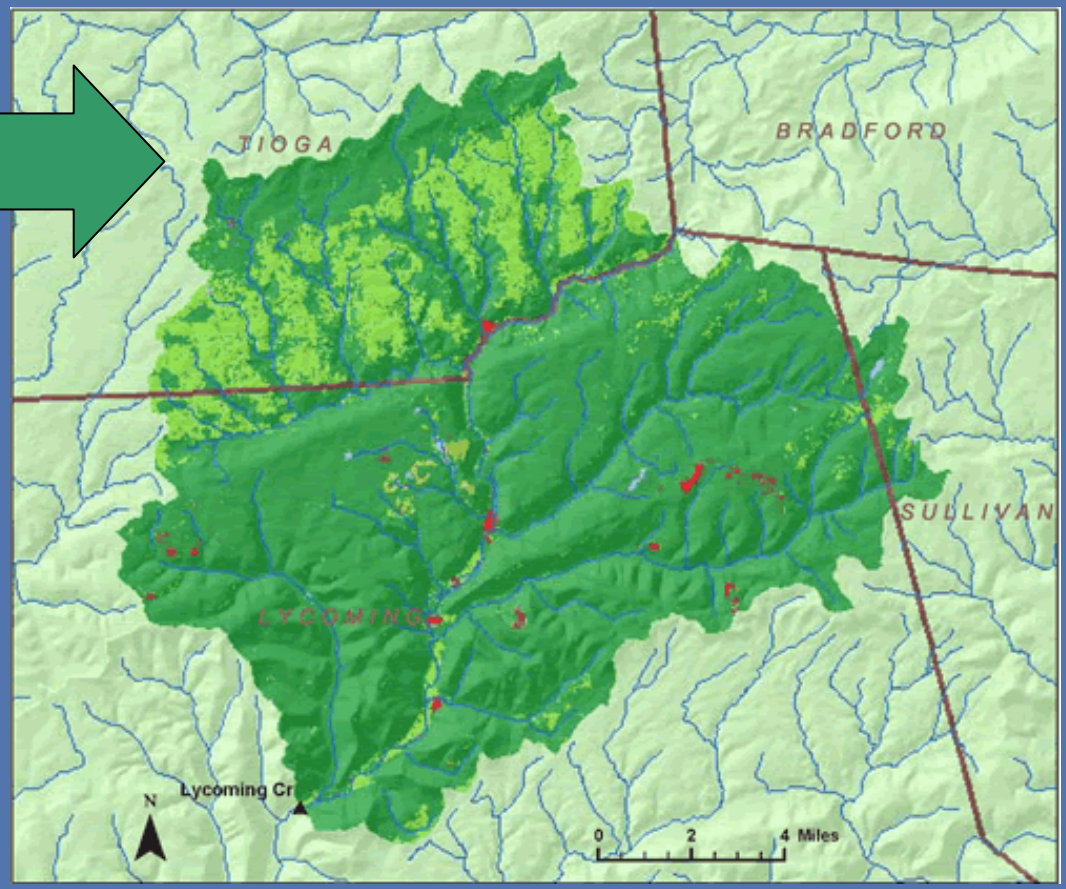
SELECT COUNTY OF INTEREST

SELECT LYCOMING COUNTY FROM MAP



LYCOMING CREEK WATERSHED

SELECT LYCOMING CREEK FROM MAP



LAND COVER

Legend

- STREAMS
- STATE RECHARGE SITES
- PENNSYLVANIA COUNTIES

Land cover

- Agricultural
- Bare Ground-Quarries-Mines-Pits
- Developed
- Forest
- Open Water
- Wetlands
- Pennsylvania counties

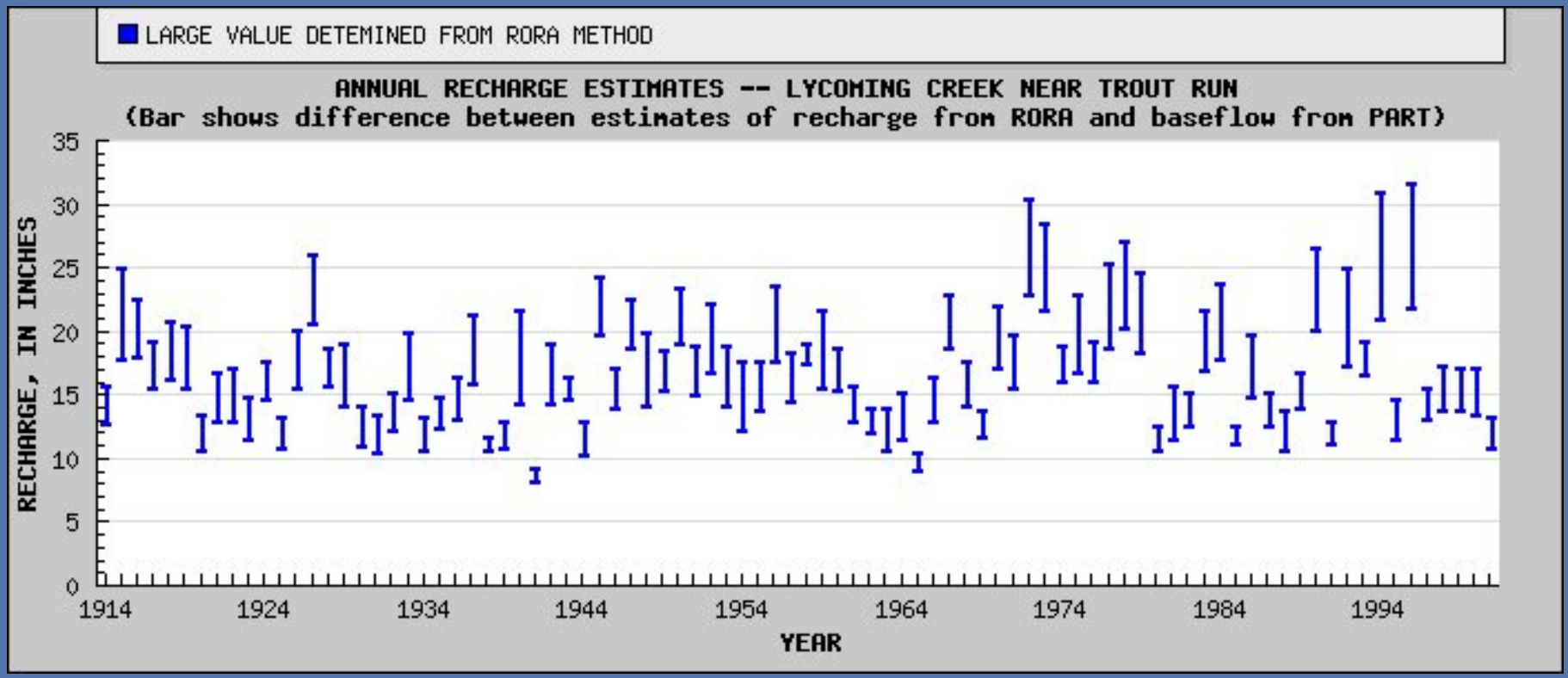
RECHARGE AND BASEFLOW ESTIMATES FOR LYCOMING CR

Available Options							
Graphs	Data Tables	Detailed Station Information	Land Use Map	Geology Map	Back to county map	Back to state map	Main Page

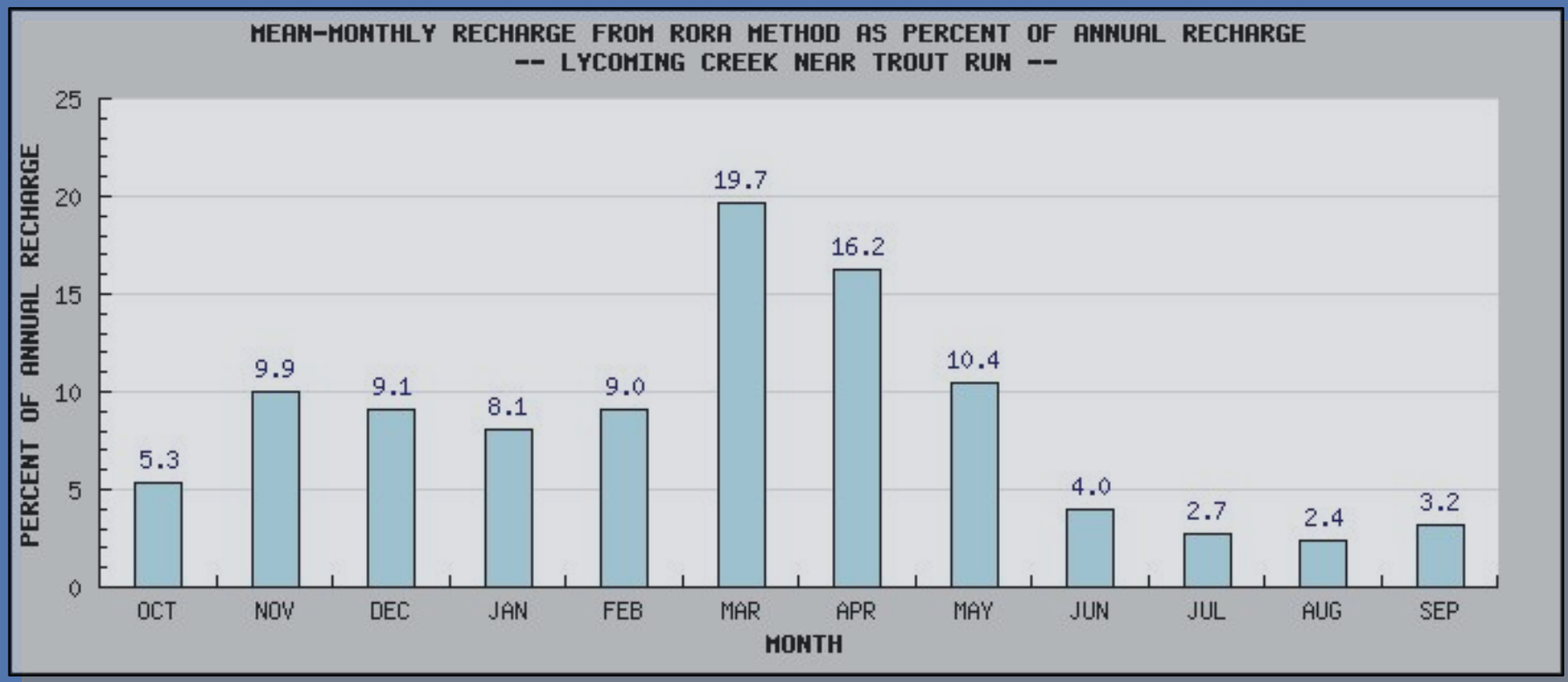
Mean-Annual Recharge Estimates for Period of Record, in inches	
From Recession Curve Displacement (RORA) Method	18.7
From Hydrograph Separation of Baseflow (PART) Method	14.7

Basin Characteristics	
Drainage Area (square miles)	173
Period of Record Used for Estimating Recharge	1914-2001
Land Cover (show map) (Forest/Agriculture/Developed/Other) as % of Area	85.2/13.9/0.5/0.5
Rock Types (show map) (Sandstone and Shale/Carbonate/Crystalline/Unconsolidated Sediments) as % of Area	100/0/0/0

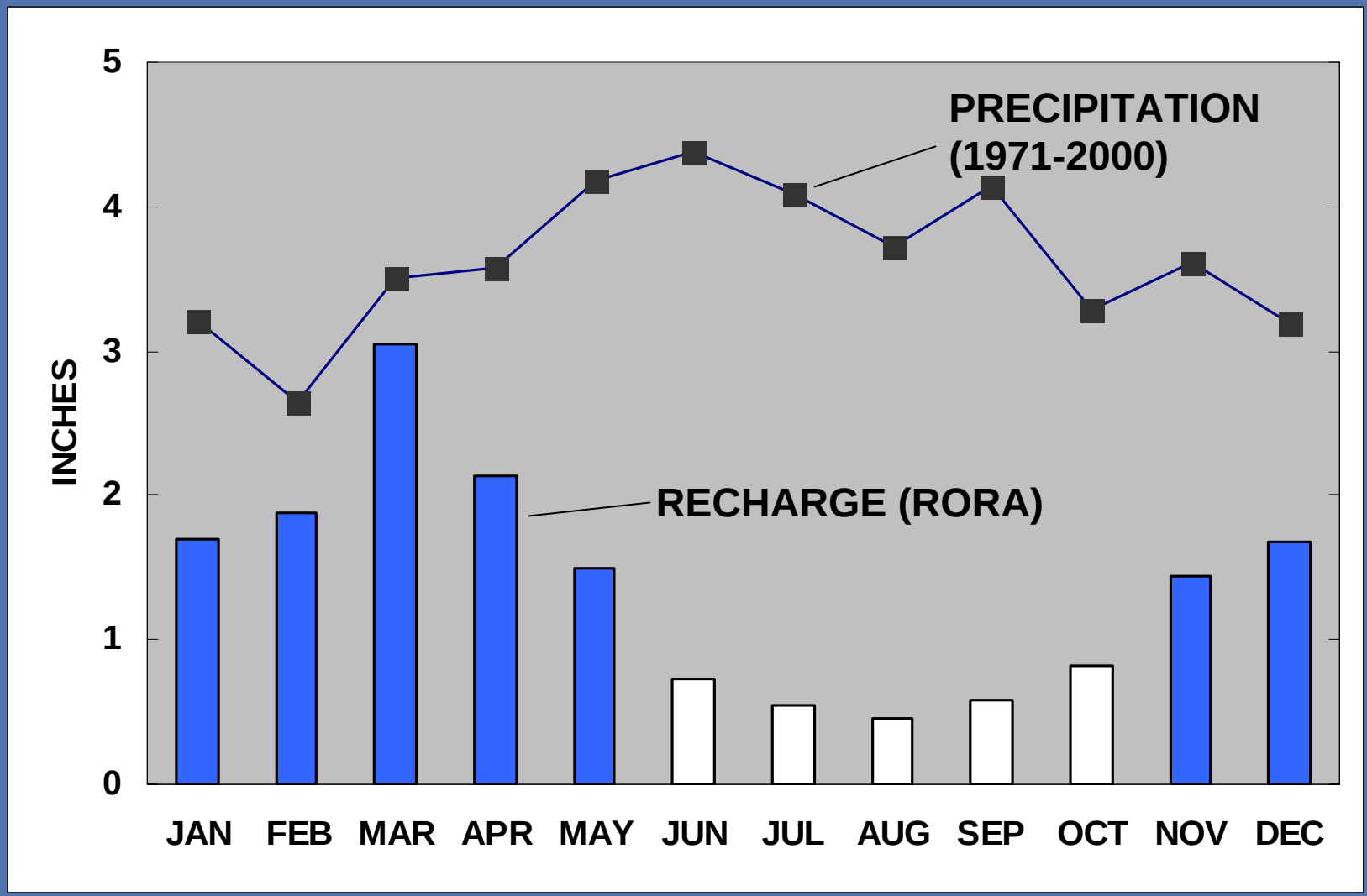
TIME SERIES OF ANNUAL RECHARGE AND BASE FLOW



MEAN-MONTHY RECHARGE LYCOMING CREEK



MONTHLY RECHARGE FOR PA



SPATIAL DISTRIBUTION OF GROUND WATER RECHARGE

MICHIGAN