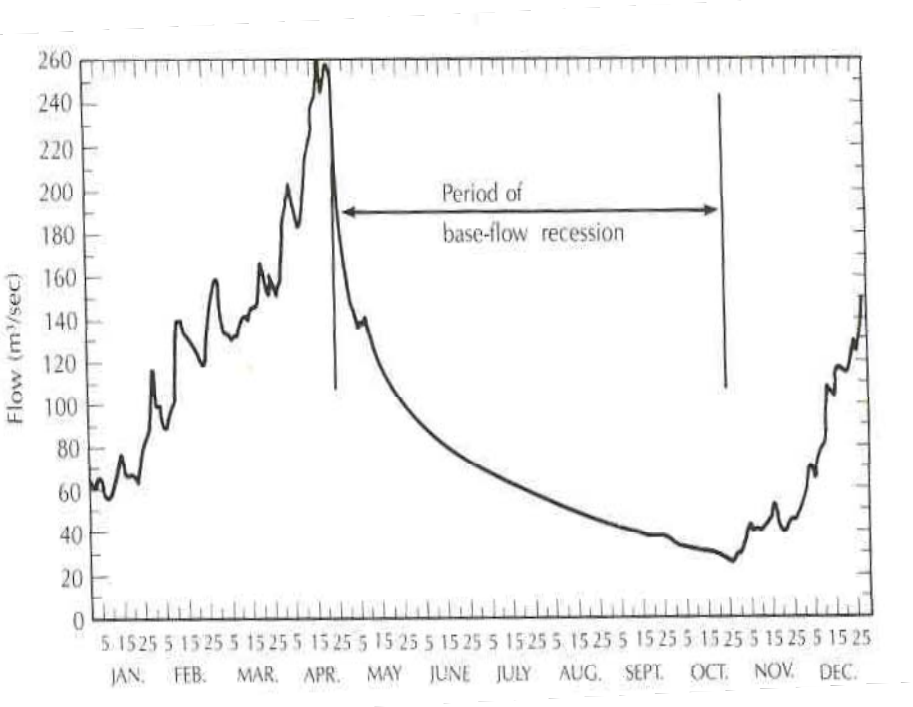
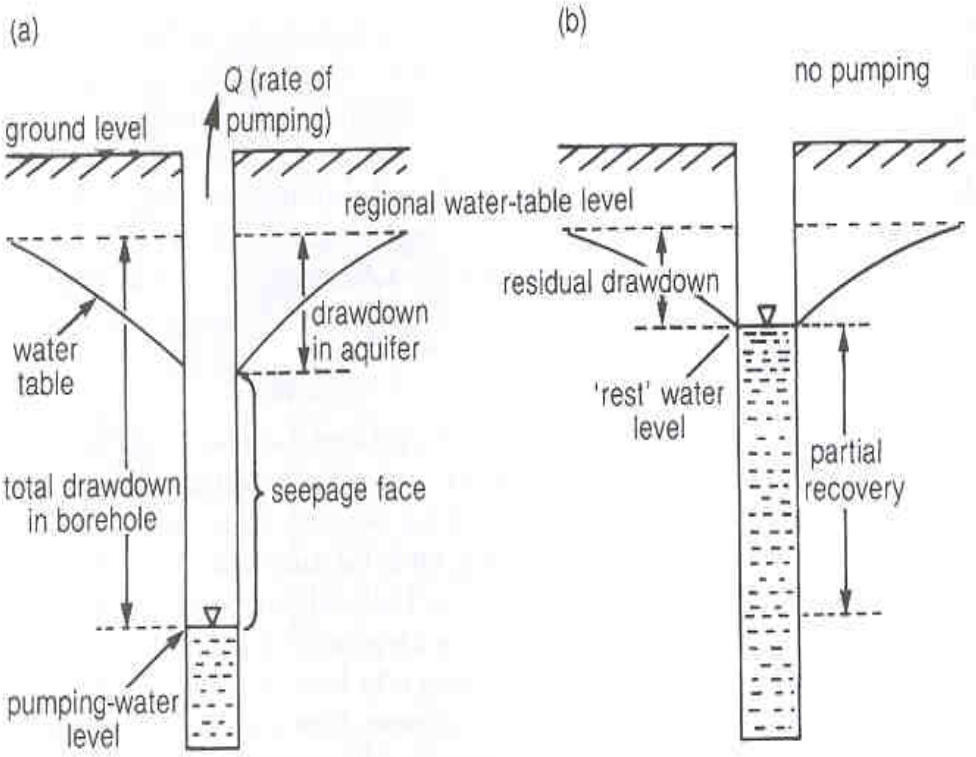
The Hydrograph

- A graphical tool that shows the discharge or change in water level in a well or a stream as a function of time.



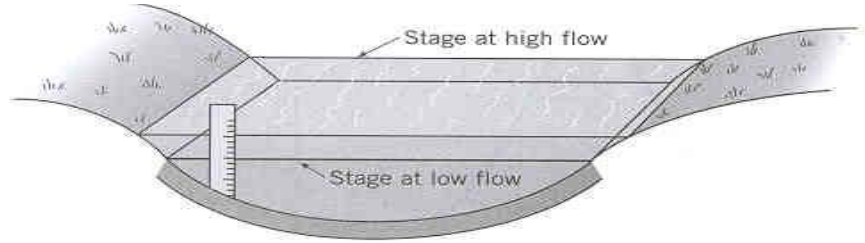
How to construct a hydrograph?

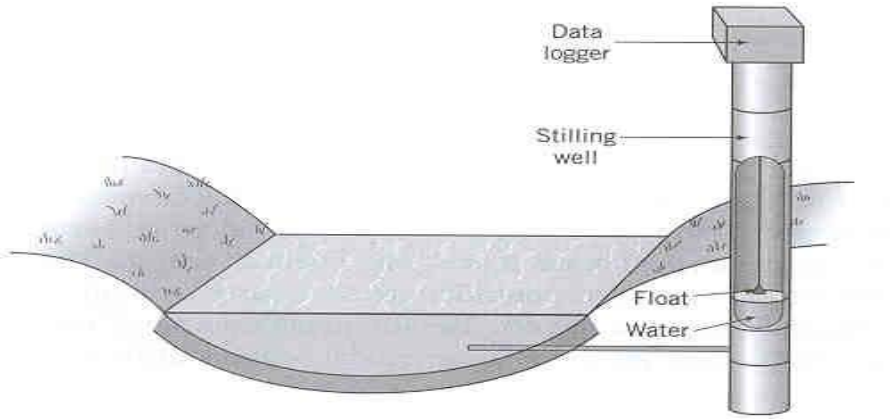
- Well (pumping records, water level …etc.) readings
  - Pumping wells
  - Observation wells



How to construct a hydrograph?

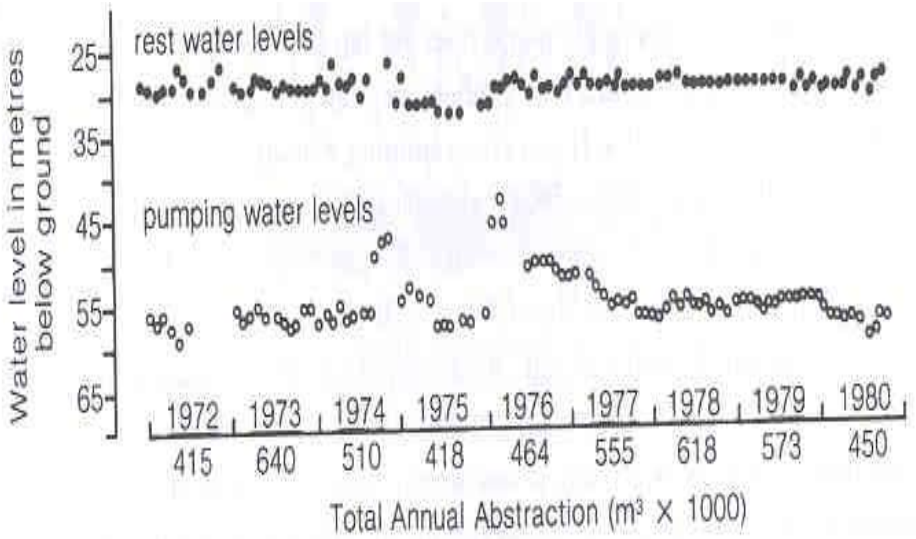
- Stream measurements





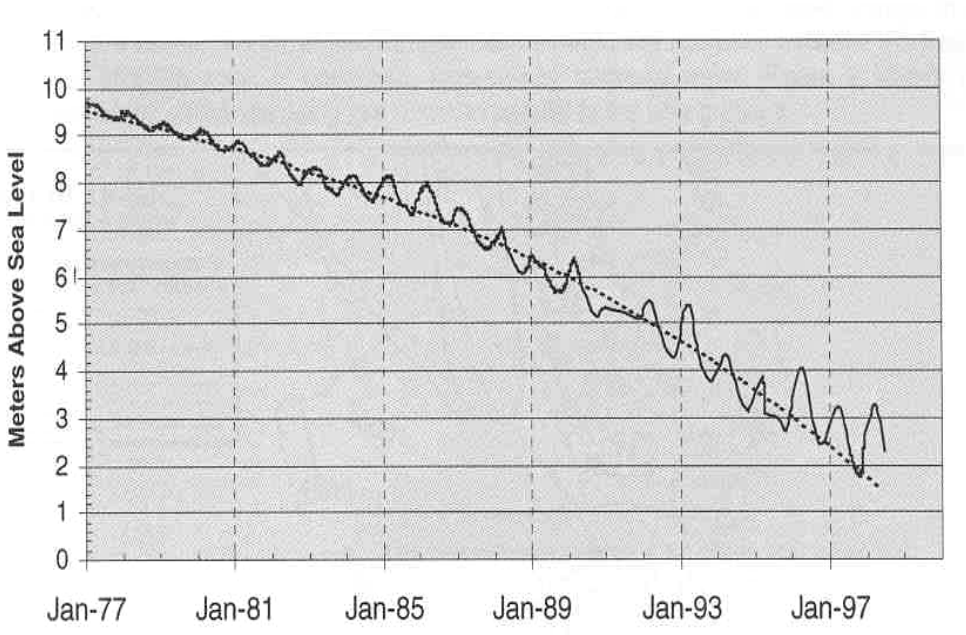
Why hydrograph?

- Reflects the affect of pumping on groundwater aquifers (no groundwater decline due to controlled pumping)



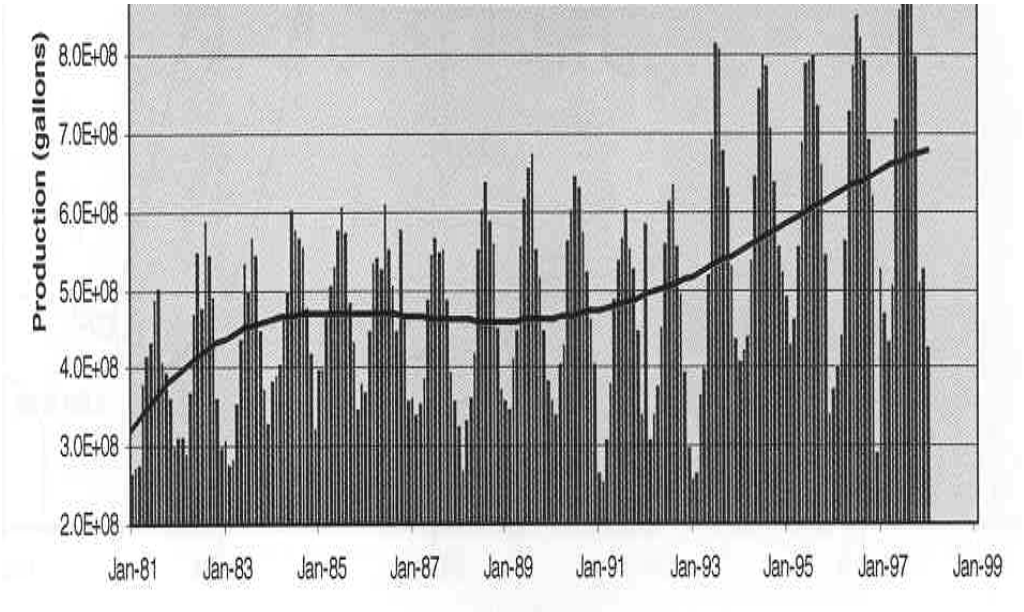
Why hydrograph?

- Reflects the affect of pumping on groundwater aquifers (groundwater decline due to increased pumping)



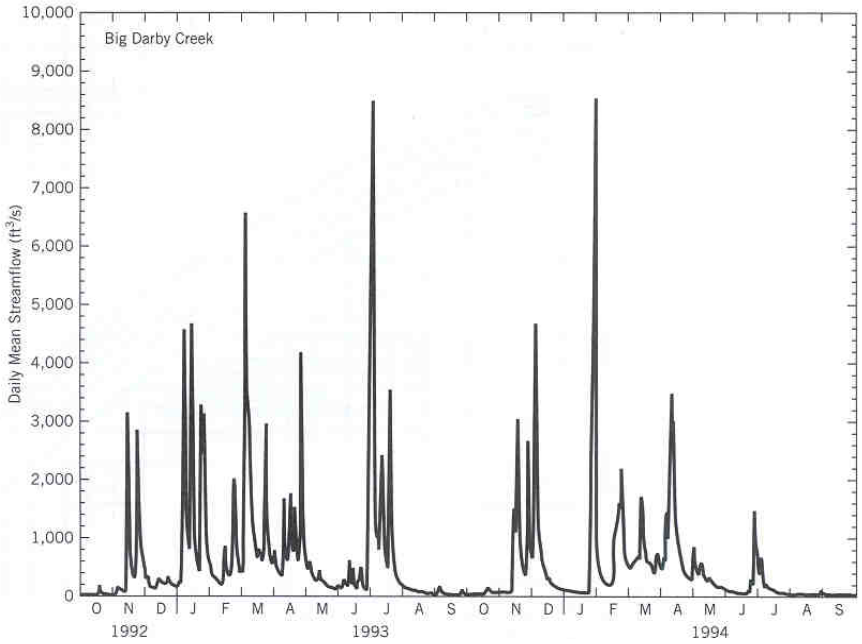
Why hydrograph?

- Displays groundwater production trends
- Models and predicts water production needs in the future



Why hydrograph?

- Measuring stream discharge at a point of interest.

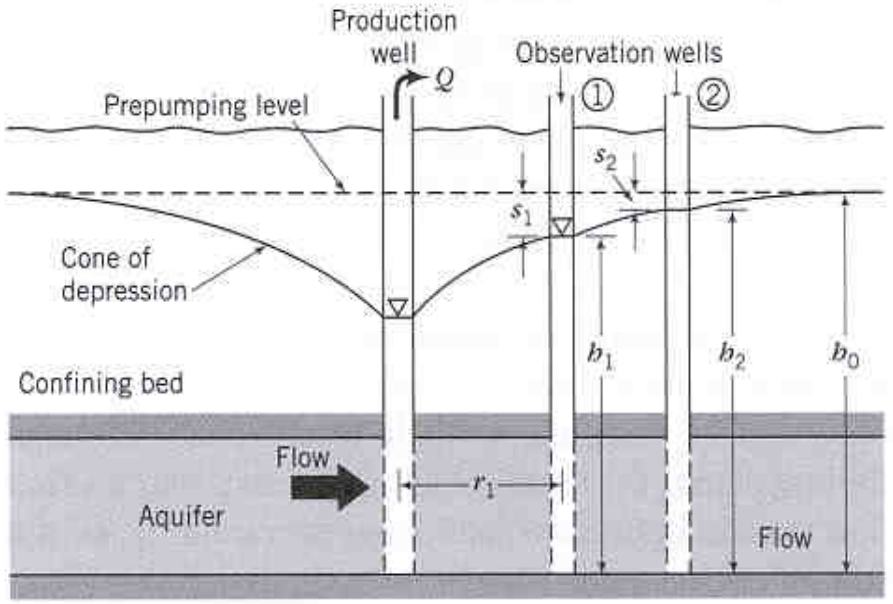


Drawdown and Cone of Depression

- Drawdown is the lowering of water level in a well from its static position due to pumping of groundwater
- Amount of drawdown is dependent on:
  - Aquifer characteristics
  - Ease with which water flows through well face
  - Rate of pumping
  - Pumping duration

Drawdown and Cone of Depression

- Zone around the well in which there is a measurable water level change due to pumping.
  - It has the shape of inverted cone
  - It is centered on the pumped well



Calculating Drawdown

- Thiem's equation
- Theis solution
- Cooper-Jacob method
- Hantush-Jacob formula