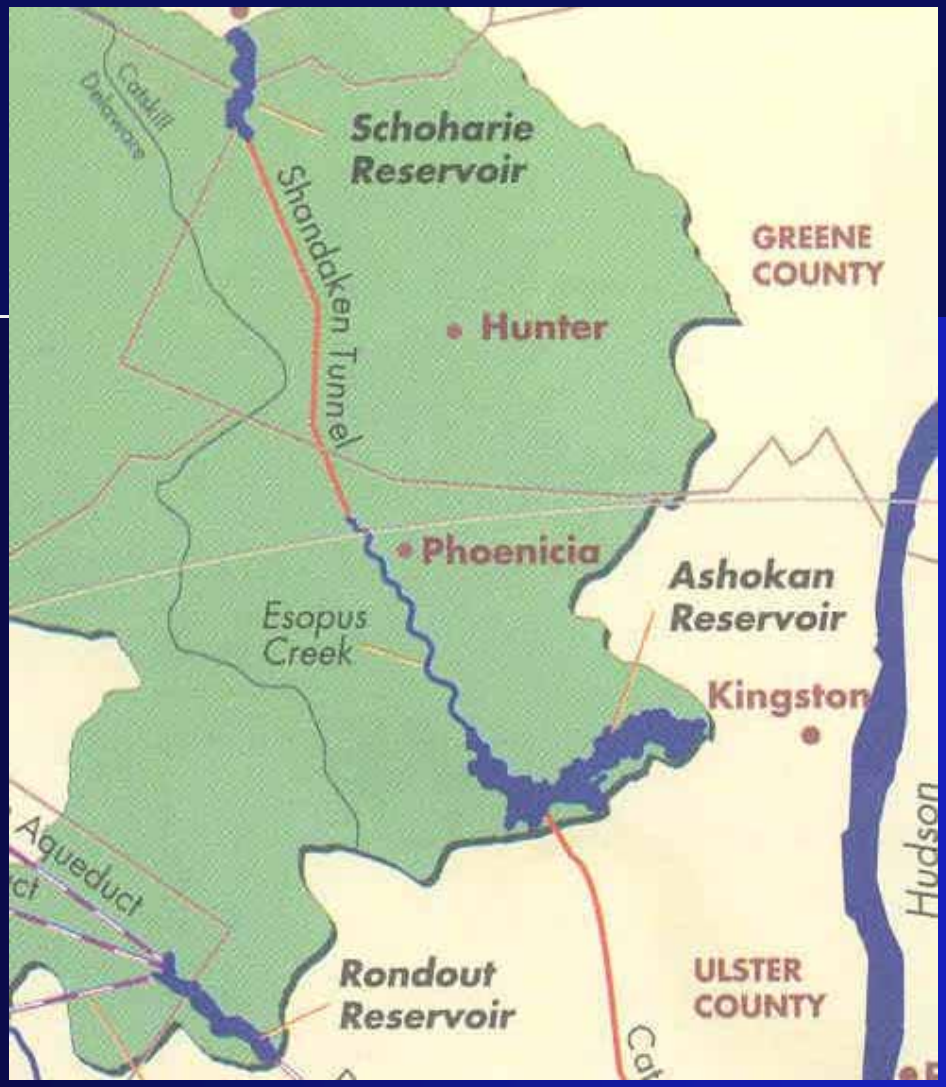
Gilboa Dam Safety Improvements
Lower Esopus Impacts



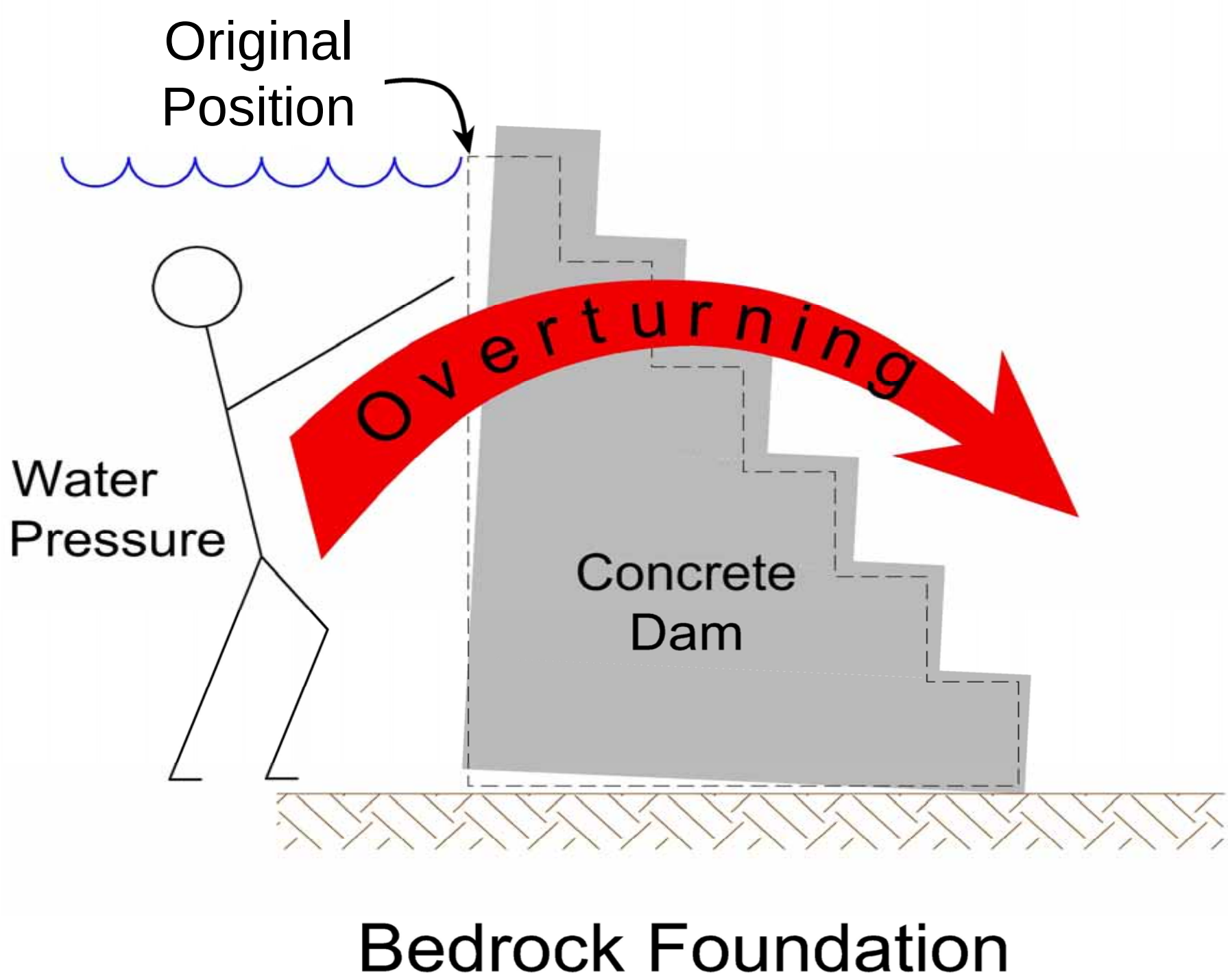
New York City Water Supply System

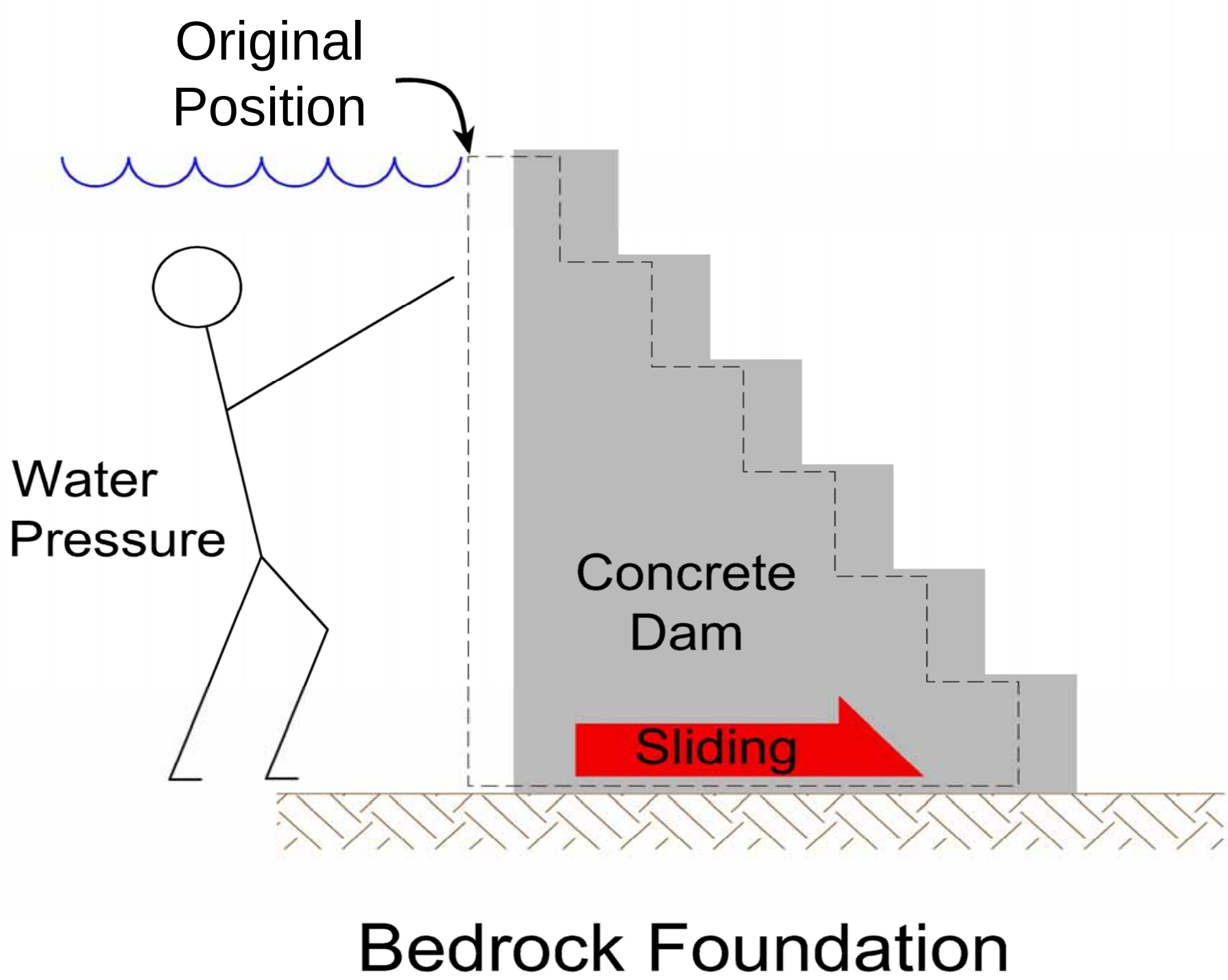
Olive Bridge Dam

- Olive Bridge (Impounds Ashokan)
  - Completed 1916
  - Good Condition
  - Factors of Safety above NYS Standards

GILBOA DAM

DAM IS COMPRISED OF AN EARTHEN EMBANKMENT AND CONCRETE SPILLWAY


Original
Position
Overturning
Water
Pressure
Concrete
Dam
Bedrock Foundation

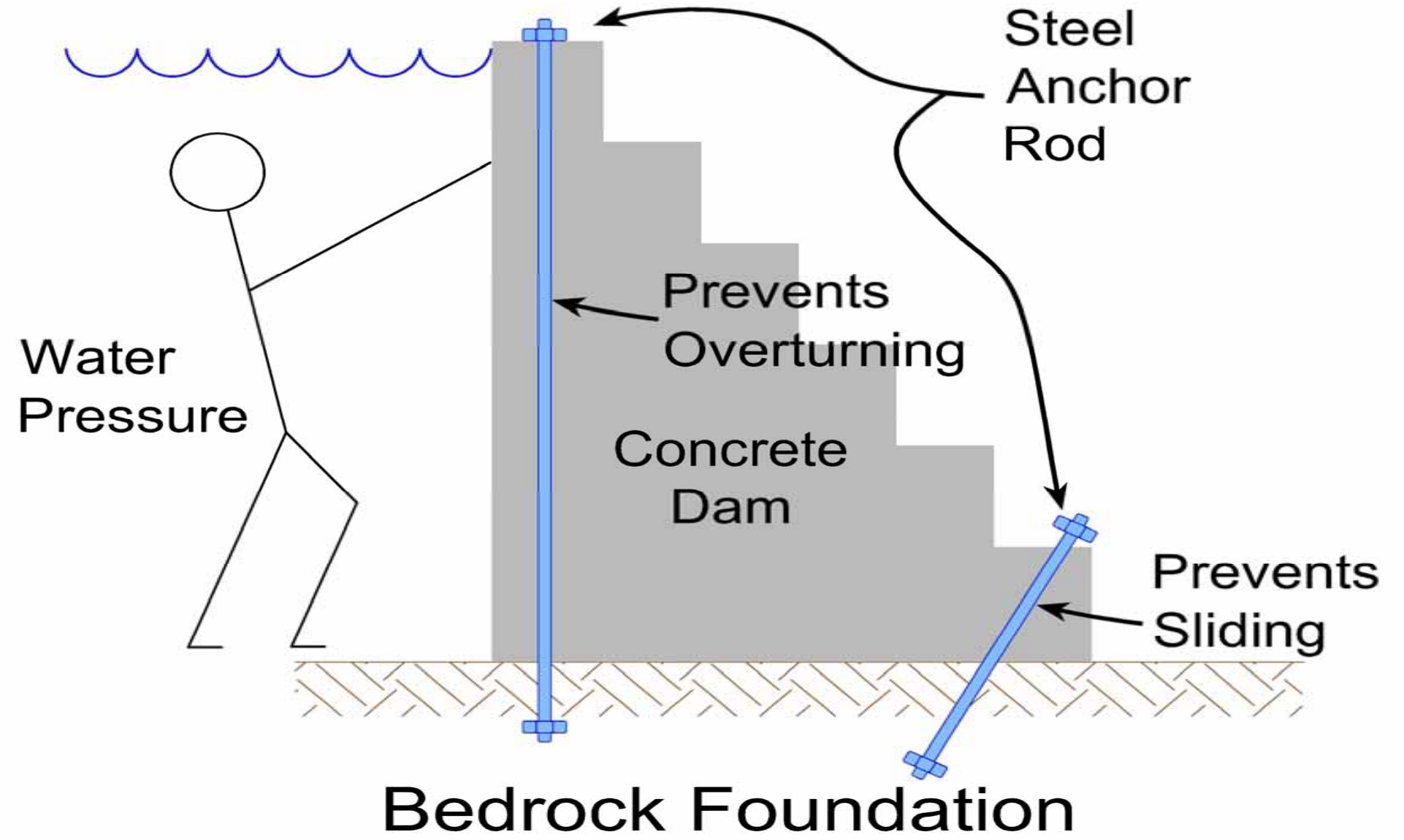

Original
Position
Water
Pressure
Concrete
Dam
Sliding
Bedrock Foundation

NYCDEP Response to Safety Concerns at Gilboa Dam

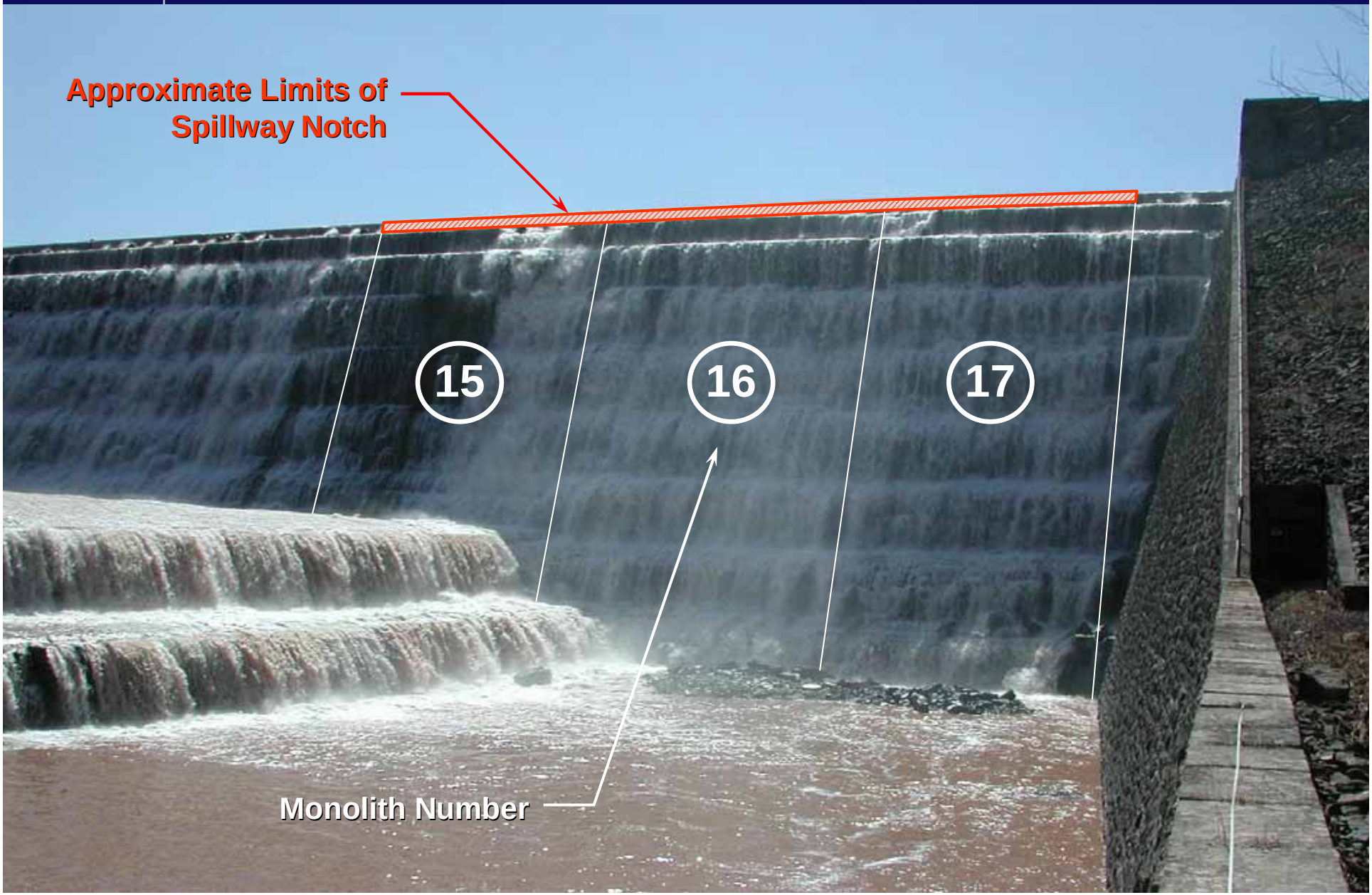
Response to Safety Concerns at Gilboa Dam

- Maximize diversion from Schoharie Reservoir
- Maximize diversion from Ashokan Reservoir

Gilboa Dam Interim Repair Design



Gilboa Dam Notch Design

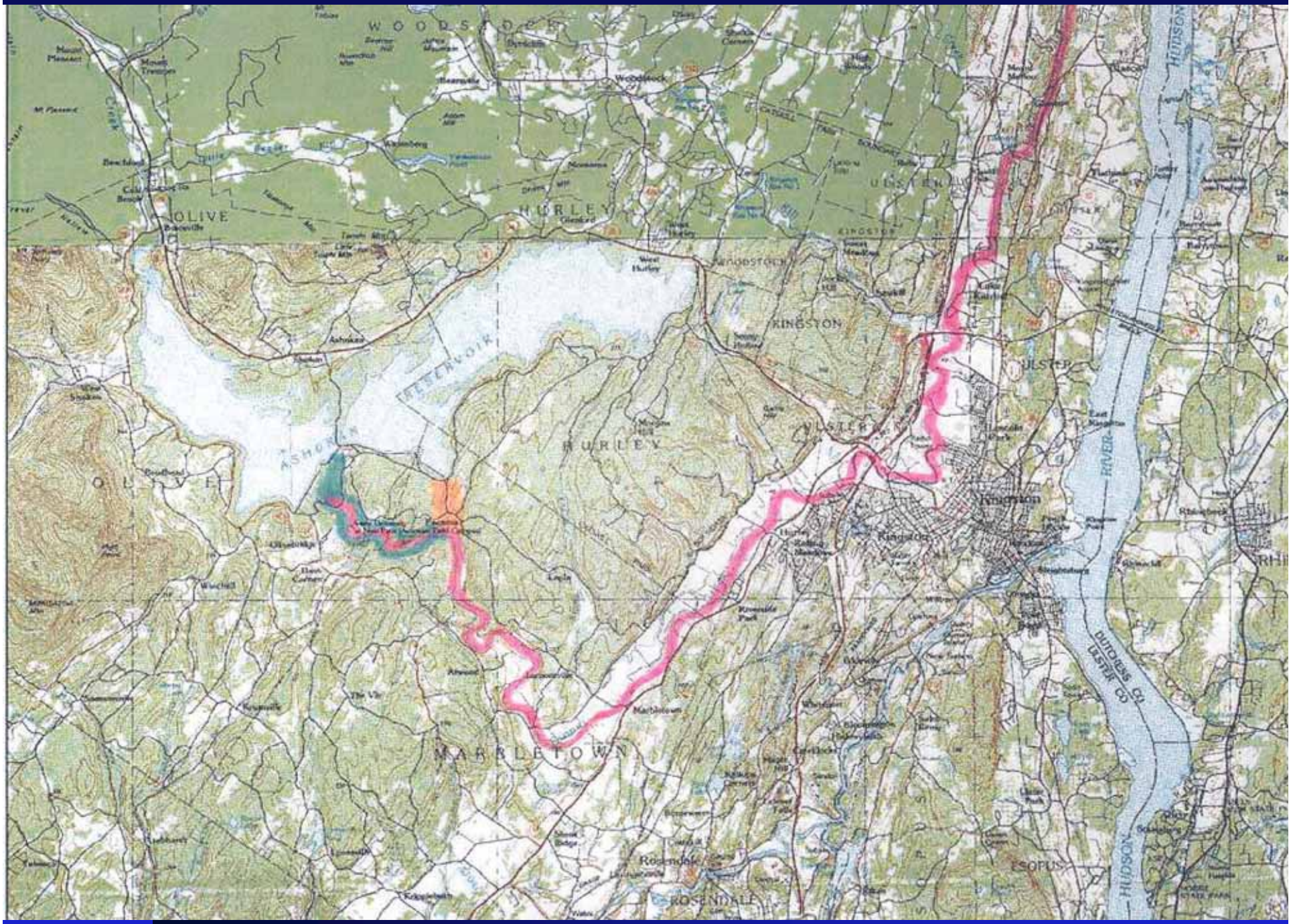


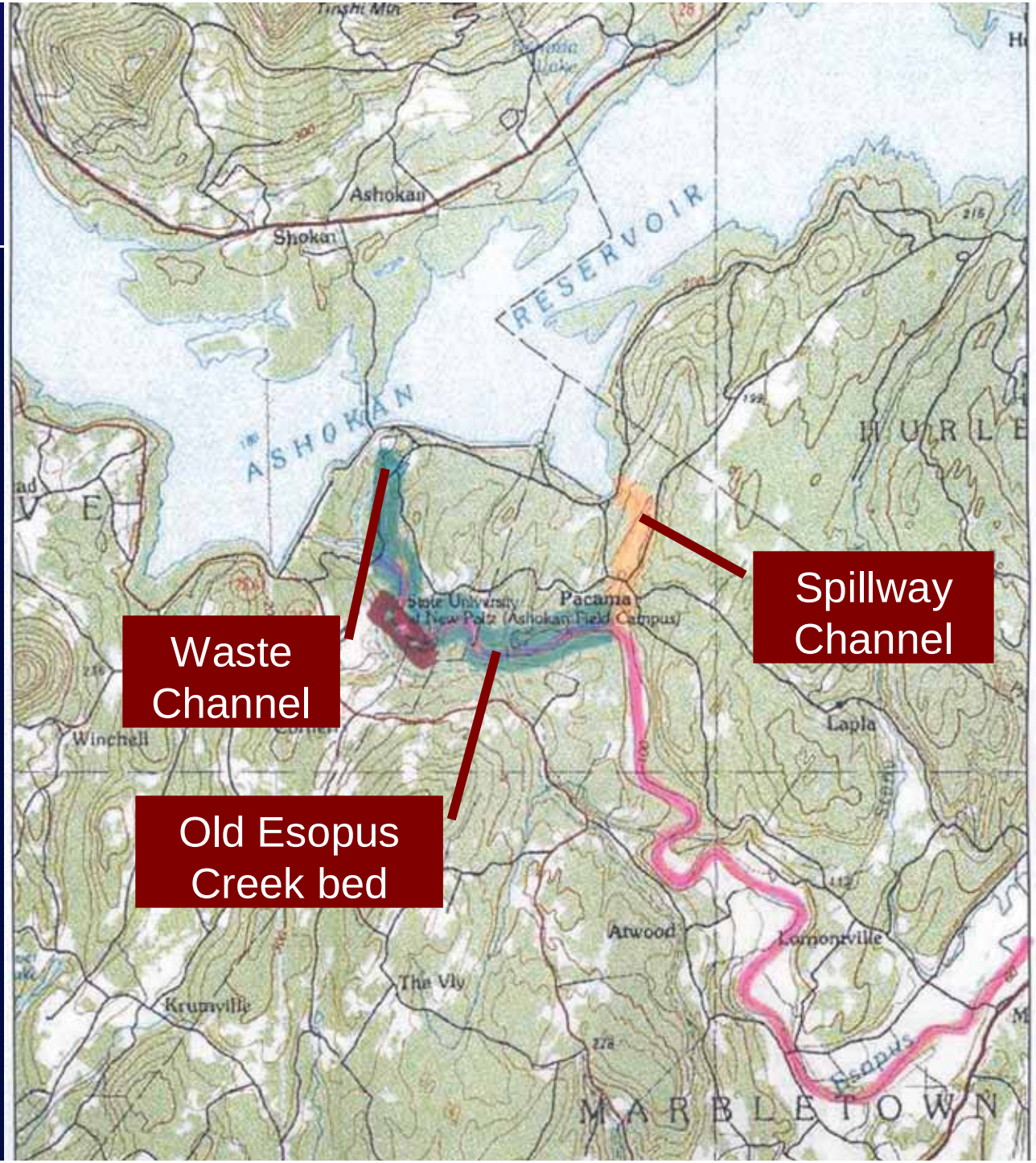
Impact on Lower Esopus

- Ashokan Reservoir may be operated at a higher elevation than normal

Operational Actions to Reduce Flooding Risk

- Maximize diversion from Ashokan to NYC
- Dividing Weir Operations
- Waste Channel Operations


WOODSTOCK
OLIVE
HURLEY
KINGSTON
ULSTER
RESERVOIR
ASHOKAN
MARBLETOWN
ROSENDALE
ESOPUS
HUDSON
RIVER
DUTCHESS CO
ULSTER CO

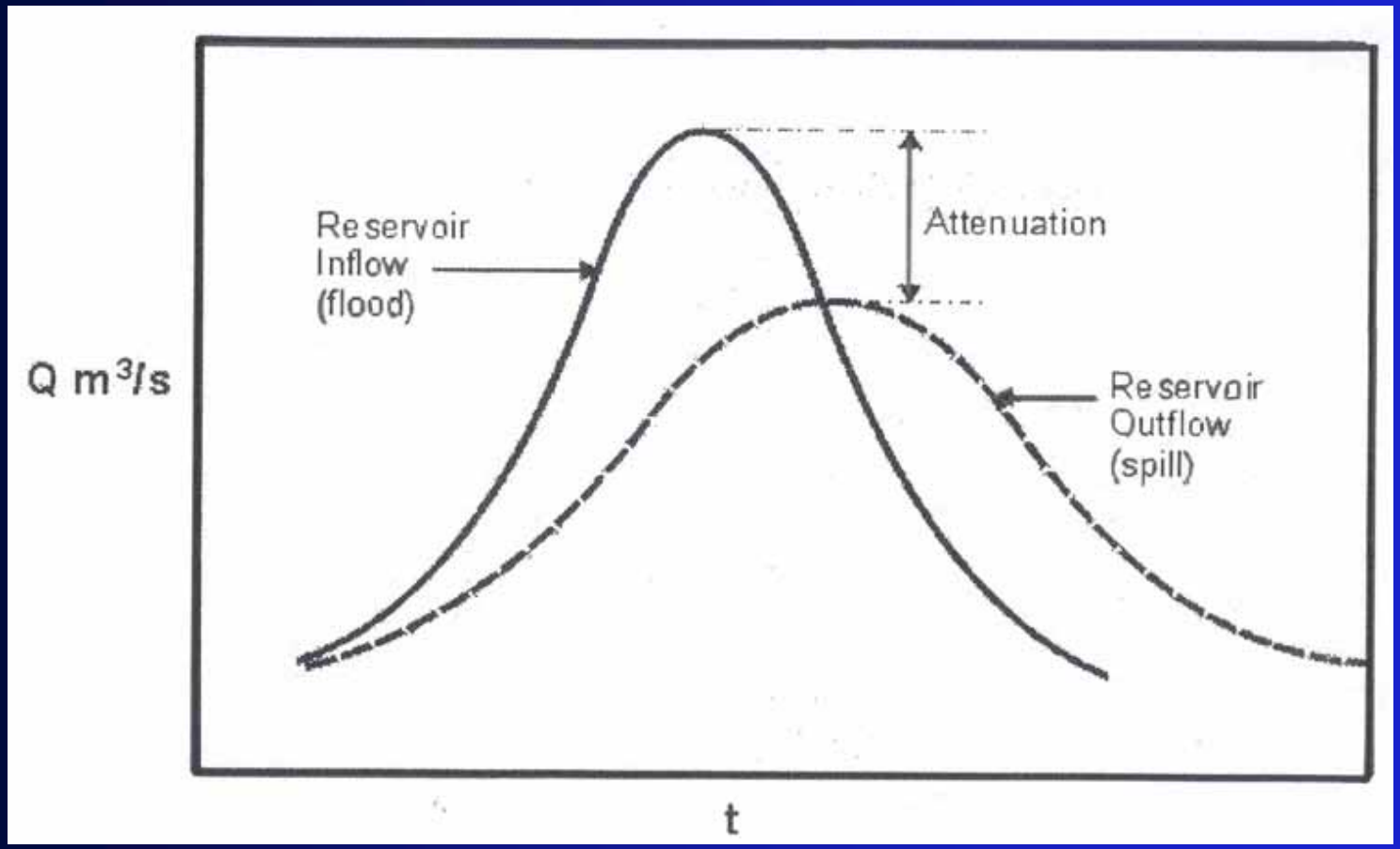

Ashokan
Shokan
RESERVOIR
ASHOKAN
Pacama
Winchell
Lapla
Atwood
Lomontville
The Vly
Krumville
MARBLETOWN
Waste Channel
Old Esopus Creek bed
Spillway Channel

NYC Reservoirs

- All NYC reservoirs are single purpose water supply reservoirs
- No capability to release large amounts to create short-term void
- Reservoirs provide attenuation

Reservoir Attenuation

Reservoirs provide attenuation even when full.



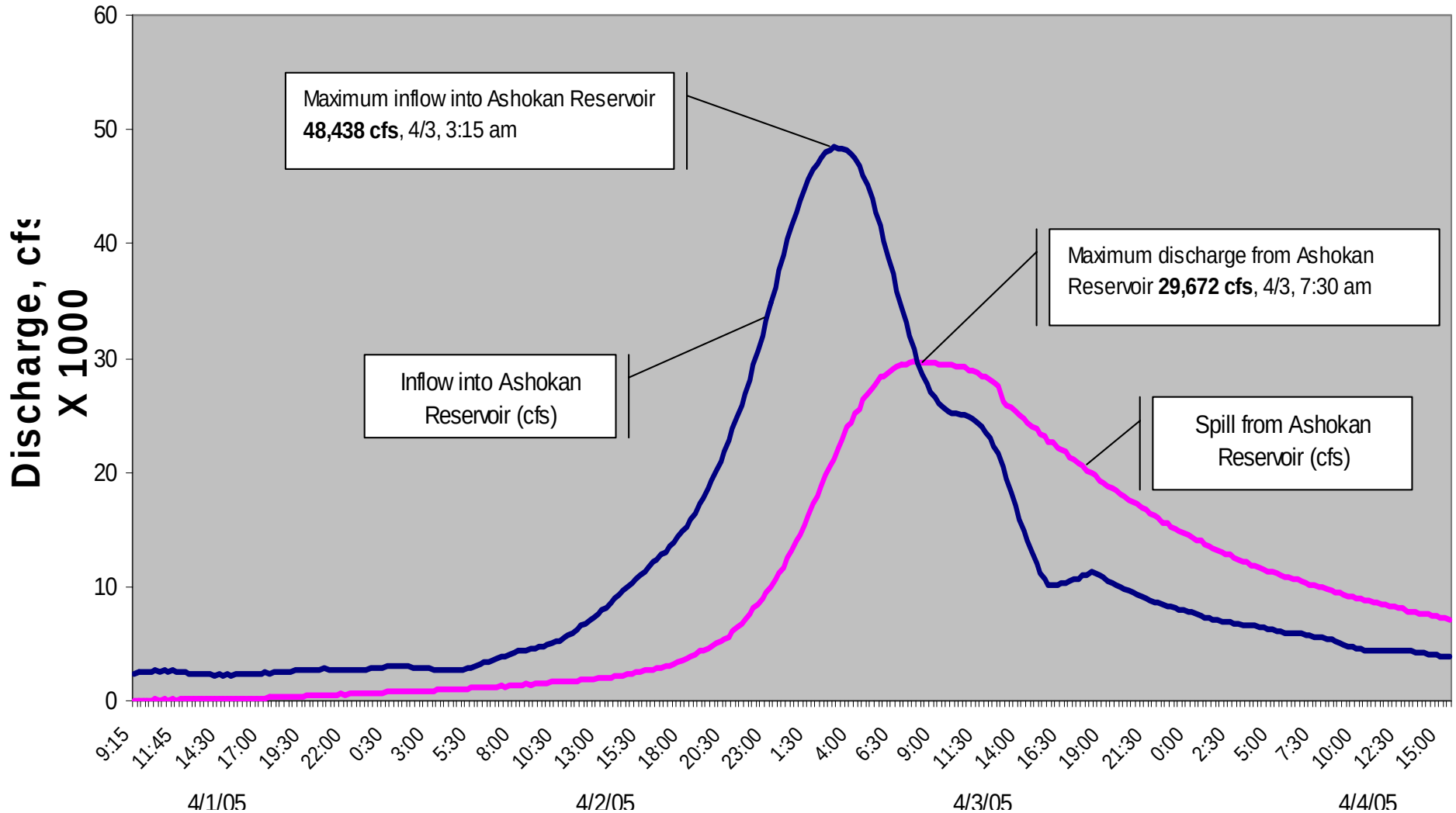
From " *A Review of the Role of Dams in Flood Mitigation*", a paper submitted to the World Commission on Dams (www.dams.org) in March 2000 by Peter Hawker

Reservoir Performance During April 2005 Storm

Reservoir Status April 1, 2005

- Ashokan
  - West Elevation 590.32’
  - East Elevation 587.20’
  - 100.4%

Ashokan Reservoir, Runoff vs. Spill Discharge
Storm Event April 1-4, 2005

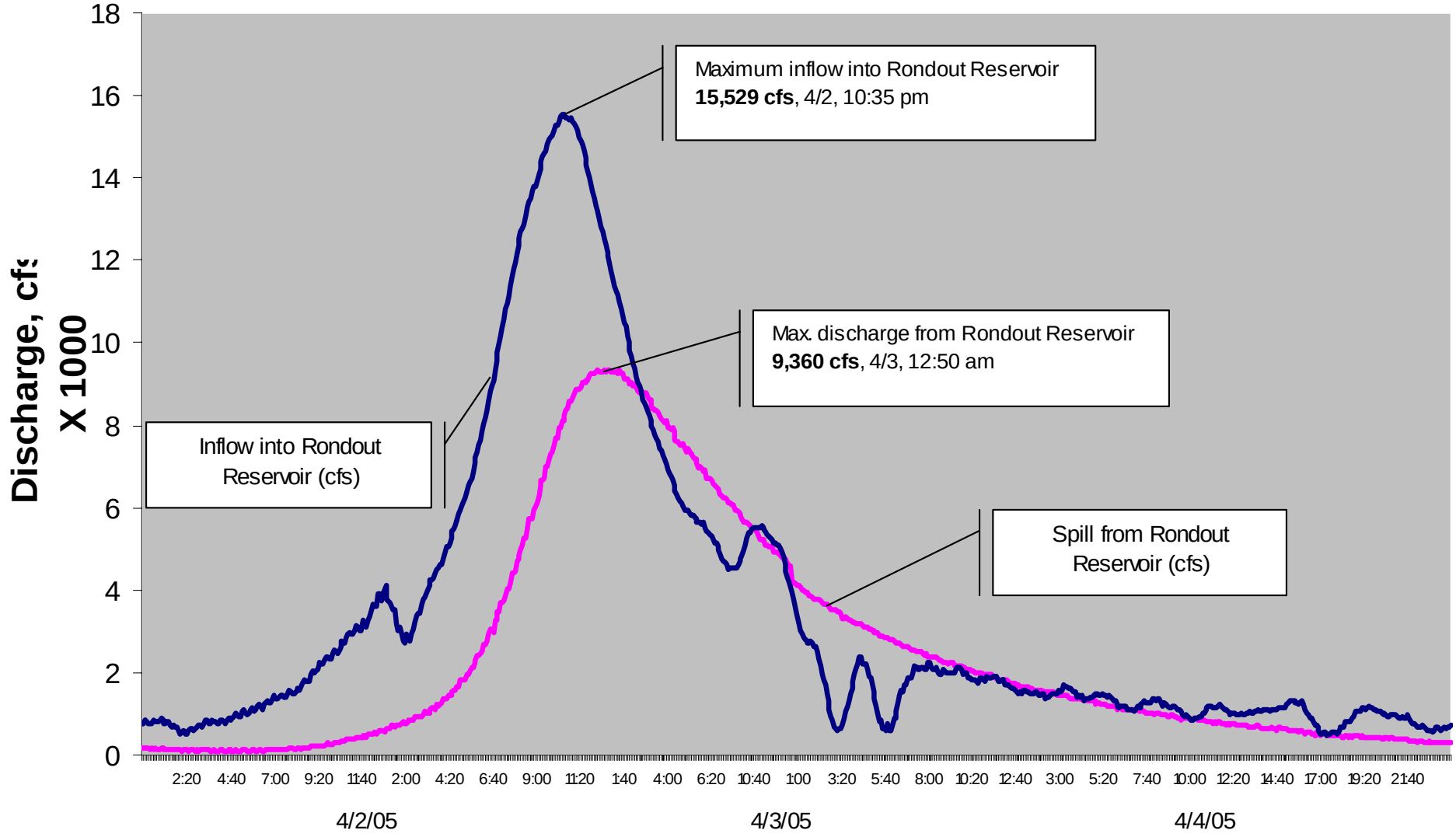


Reservoir Status April 1, 2005

- **Rondout**
  - **Elevation 840.49’**
  - **100.7%**

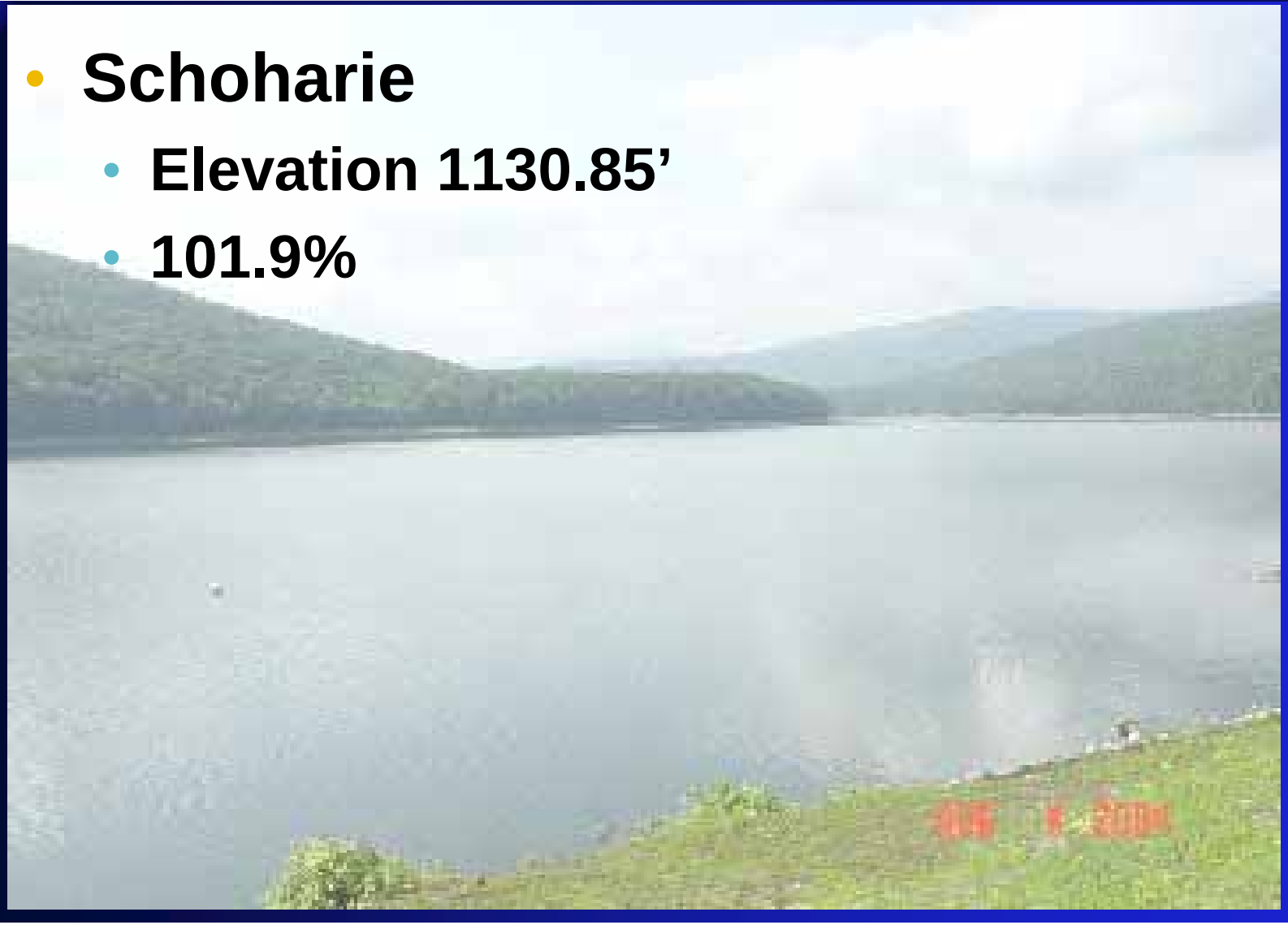
Rondout Reservoir, Runoff vs. Spill Discharge

Storm Event April 2-4, 2005



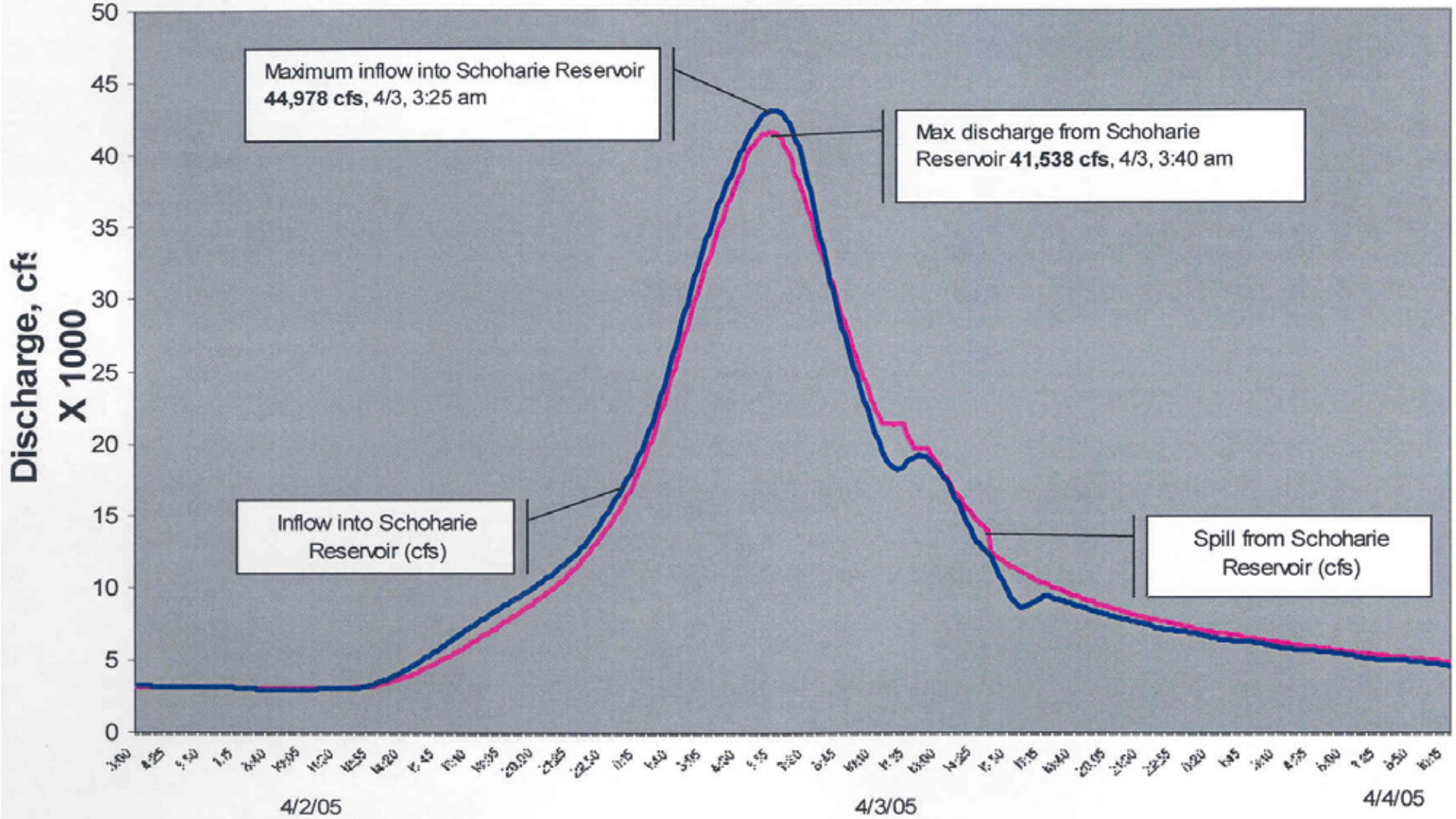
Reservoir Status April 1, 2005

- **Schoharie**
  - **Elevation 1130.85’**
  - **101.9%**

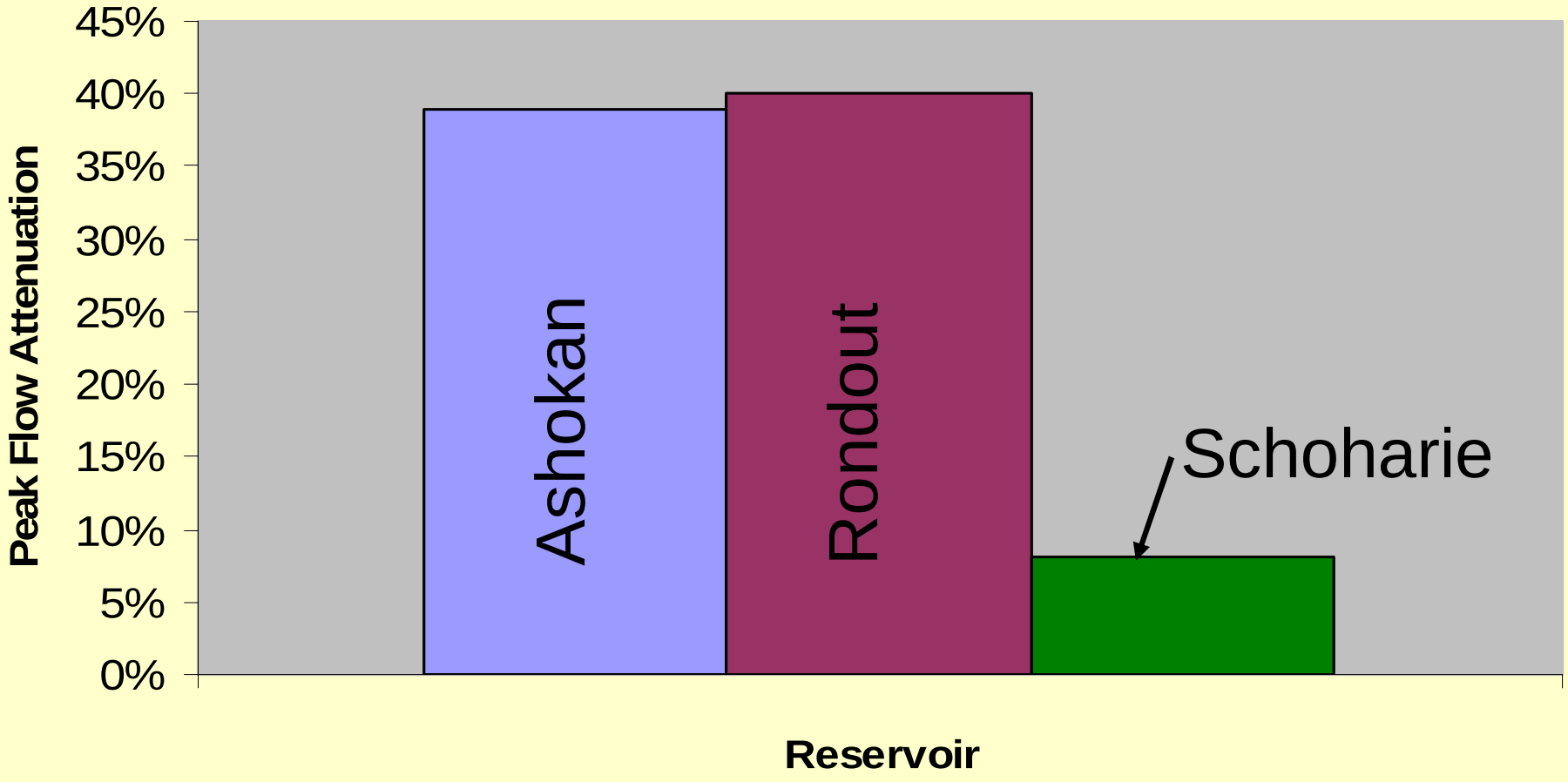


Schoharie Reservoir, Runoff vs. Spill Discharge

Storm Event April 2-4, 2005

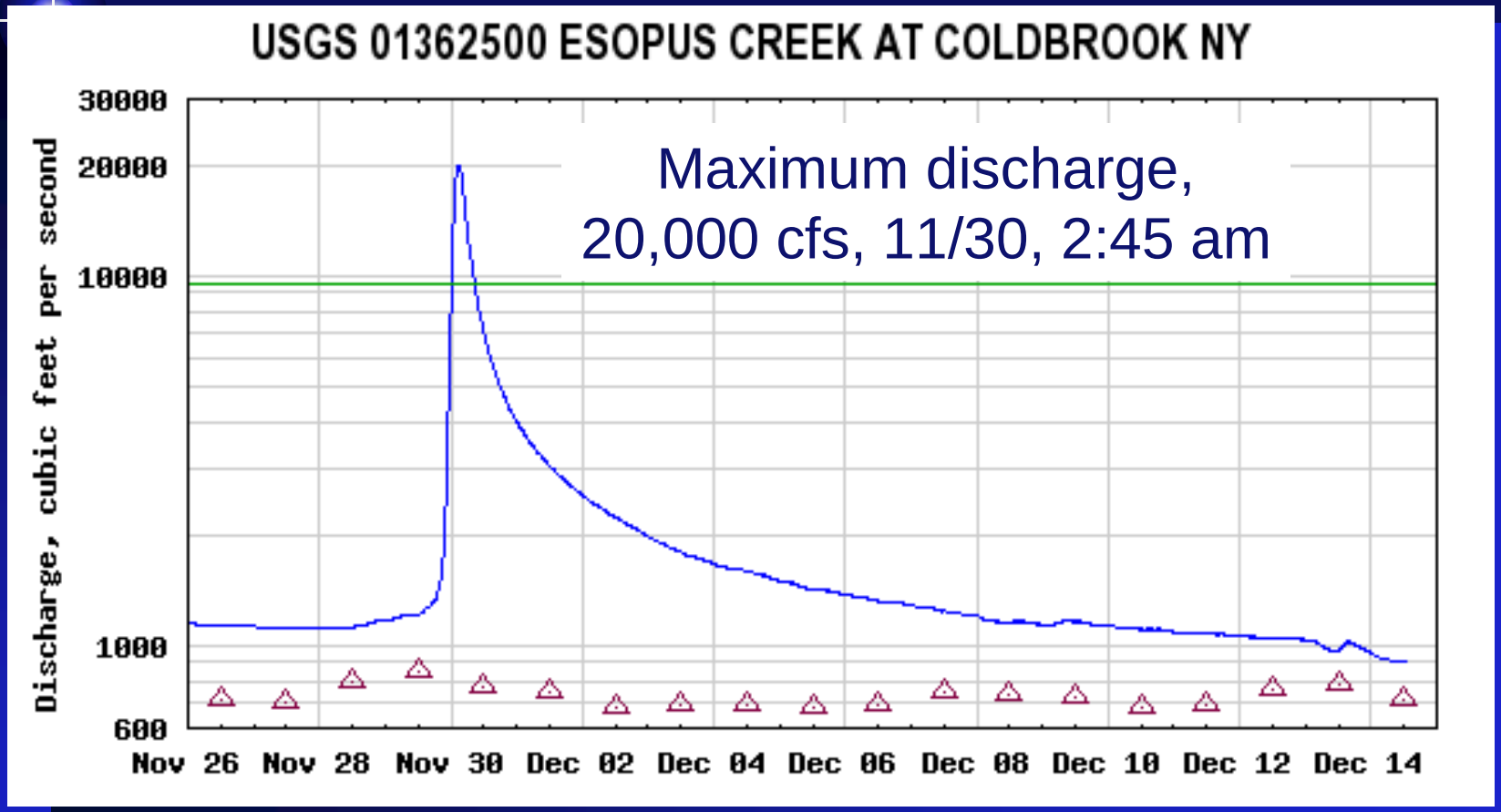


Reservoir Performance April 2005



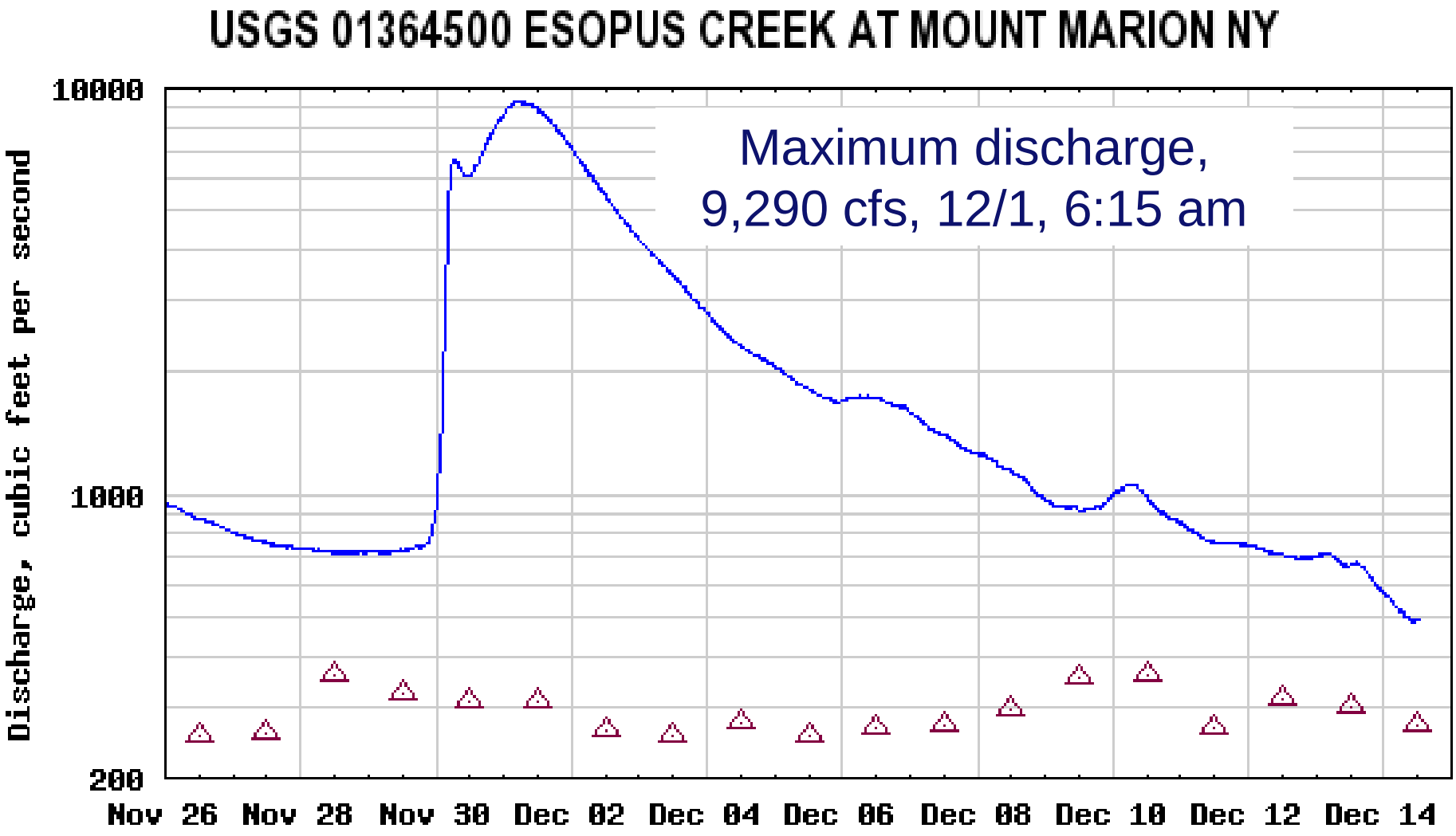
Ashokan Reservoir Performance During November 30, 2005 Storm

Reservoir Inflow



* Maximum spill rate from Ashokan Reservoir was 7,000 cfs, 11/30, 6:00 pm

Flow in Esopus Creek at Mount Marion



Summary

- Engineer analysis shows Gilboa Dam does not meet current safety standards
- Water Supply operations must be altered to allow emergency repairs
- While emergency construction underway, operations at Ashokan will be modified to mitigate impacts