Flow Management in the Delaware River Basin

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Meerwald Legislative Education Sail
Flow Management

- Storage – Drought and Flood Mitigation
- Low Flow Augmentation
- Flow Objectives
- Allocations – Conservation
In very dry periods, flow at Trenton can be 60 percent or more from reservoir releases.

1,750 cfs
1,130 mgd

3,000 cfs
1,940 mgd

Sources of Water

* Decree
* DRBC Storage in USACE Reservoirs
* Emergency
* Consumptive Use Make–Up
* Dockets
Water Management Schematic for the Delaware River Basin

Out-of-Basin Diversion
Primarily Water Supply Reservoirs
Multi-Purpose (Flood/Power/WS/Recreation) Reservoirs
Primarily Flood Control Reservoir
Flow Management Objective

WS is Emergency only
F.E. Walter 6.8 BG WS + Rec
Jadwin Outflow or Spill

Prompton Outflow or Spill
Beltzville Release or Spill

Montague Non Drought Target = 1750 cfs (1130 MGD)

Cannonsville Inflow
Pepacton Inflow
Neversink Inflow

DELAWARE AND RARITAN CANAL

To NYC Water Supply Up to 800 MGD

To New Jersey Water Supply Up to 100 MGD

DELWARE RIVER

LEHIGH RIVER

SCHUYLKILL RIVER

EUSTUARY and “Salt Line”

Non Drought Target = 3000 cfs (1940 MGD)

Note: Not all reservoirs, tributaries, and diversions are shown.
1960s - Drought
Designing Reservoir Releases

* Timing
* USGS Gages
* River Master’s Office (Montague)
  * Balancing Adjustment (over/under adjustments)
  * Post-Release Montague Prediction
  * Hydropower changes to schedule
* Quantitative Precipitation Forecasts (Day 1, Day 2, Day 3, Days 1-2, Days 1-3, Days 4-5, Days 6-7 and 5- and 7-day totals)
* Observed Precipitation
* Meteorologic Model Ensemble River Forecasts (MMEFS)
  * Flow
  * Precipitation
<table>
<thead>
<tr>
<th>Reservoir</th>
<th>To Montague</th>
<th>To Trenton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannonsville</td>
<td>48 hours</td>
<td>96 hours</td>
</tr>
<tr>
<td>Pepacton</td>
<td>60 hours</td>
<td>108 hours</td>
</tr>
<tr>
<td>Neversink</td>
<td>33 hours</td>
<td>84 hours</td>
</tr>
<tr>
<td>Prompton</td>
<td>48 hours</td>
<td>96 hours</td>
</tr>
<tr>
<td>Wallenpaupack</td>
<td>16 hours</td>
<td>64 hours</td>
</tr>
<tr>
<td>Mongaup</td>
<td>8 hours</td>
<td>56 hours</td>
</tr>
<tr>
<td>FE Walter</td>
<td></td>
<td>60 hours</td>
</tr>
<tr>
<td>Beltzville</td>
<td></td>
<td>48 hours</td>
</tr>
<tr>
<td>Merrill Creek</td>
<td></td>
<td>24 hours</td>
</tr>
<tr>
<td>Nockamixon</td>
<td></td>
<td>12 hours</td>
</tr>
<tr>
<td>Blue Marsh</td>
<td></td>
<td>38 hours (Estuary)</td>
</tr>
</tbody>
</table>
How quickly will baseflow drop?

Montague Trenton Montague Trenton
Cannonsville 48 96 2 4
Pepacton 60 108 2.5 4.5
Neversink 33 84 1.4 3.5
Wallenpaupack 16 64 0.7 2
Rio 8 56 0.3 2
Merrill Creek 24
FE Walter 44 60 2.5
Beltzville 32 2
Nockamixon 12 0.5
Philadelphia
Blue Marsh 38

Will it get there on time?

Is it really going to rain?
(NWS graphic)

Will scheduled hydropower release occur?
Water Resource Management in the DRB

- System developed over a long time with competing objectives
- Finite resources (water and storage)
- Operations can be designed to:
  - Use the resource when available
  - Conserve the water when becoming scarce
  - Be more drought resilient
- Uncertainties in real-time management – some irreducible
- Future uncertainties: *today could be the first day of the next drought of record*