Developing a Meaningful Drought Contingency Plan

Virginia Thornton & Pat Caulfield, P.E.

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Pottsville System

- Origins in 1834
- 30,000 customers across 25 municipalities
- 6 surface water reservoirs totaling 1.675 Billion Gallons of Storage
- 4 groundwater wells
3 Raw Water Supply Systems

- Mount Laurel WTP
- Broad Mountain WTP
- Indian Run WTP

Mount Laurel
Kauffman
Pine Run
Eisenhuth
Wolf Creek
Indian Run
## Broad Mountain Raw Water Supply System

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Eisenhuth</th>
<th>Pine Run</th>
<th>Wolf Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Constructed</td>
<td>1875</td>
<td>1933</td>
<td>1909</td>
</tr>
<tr>
<td>Drainage Area (mi²)</td>
<td>1.95</td>
<td>0.71</td>
<td>1.72</td>
</tr>
<tr>
<td>Normal Pool Storage (MG)</td>
<td>299</td>
<td>190</td>
<td>393</td>
</tr>
<tr>
<td>Normal Pool Area (ac)</td>
<td>49.5</td>
<td>25.5</td>
<td>45.0</td>
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<tr>
<td>Total System Storage</td>
<td></td>
<td></td>
<td>882 MG</td>
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DEVELOPING A MEANINGFUL DROUGHT CONTINGENCY PLAN

Drought Contingency Planning

- **Watch**
  - Voluntary Restrictions

- **Warning**
  - Mandatory Water Restrictions

- **Emergency**
  - Rationing
Traditional Drought Contingency Planning

Drought Management Guidelines for Public Water Suppliers, PADEP
DOING MORE WITH WHAT YOU HAVE –

**USING CUSTOM DAILY FLOW MODELS FOR SOURCE WATER INVESTIGATIONS**

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Safe Yield Study

The max. quantity of water that can be continuously withdrawn from the system during the most severe drought of record without exhausting supply.
What is a daily flow model?

Hydrologic Data (~100 Years)
- River Flow
- Precipitation
- Evaporation

System-Specific Data
- Drainage Areas
- Storage Data
- Transmission Capacity

Operating Rules
- Required Flowby
- Pumping Constraints
- Water Quality

Safe Yield
- Drought Response
- What-if's
- Pumping Statistics

Operating Statistics
- Drawdown Statistics
- Drought Probability
- River Flow Statistics

Answers

Input
What is a daily flow model?

Assumed Operating Condition
- Availability of Water Supplies
- Storage Facilities
- Permit Conditions
DEVELOPING A MEANINGFUL DROUGHT CONTINGENCY PLAN
Model Output

DEVELOPING A MEANINGFUL DROUGHT CONTINGENCY PLAN
Stage III – Drought Emergency
Stage II – Drought Warning

![Graph showing Stage II and Stage III drought levels from 1920 to 2015. The graph indicates total storage remaining in million gallons and days of storage remaining.]
Stage I – Drought Watch

Days of Storage Remaining

Total Storage Remaining, million gallons

Stage I

Stage II

Stage III
Sanity Check

Watch
• Voluntary Restrictions – 5 - 10 years

Warning
• Mandatory Water Restrictions – 20+ years

Emergency
• Rationing – 50+ years
## Sanity Check

### Stage I | Stage II | Stage III
--- | --- | ---
Trigger point, MG remaining | 420 | 320 | 210
Trigger Point, % of Total Storage | 50% | 35% | 25%
Days of Storage Remaining at S.Y. | 120 | 90 | 60
Number of Events Triggered | 12 | 4 | 3
Demand = Safe Yield 3.51 MGD
DEVELOPING A MEANINGFUL DROUGHT CONTINGENCY PLAN

Demand = 2015 Demand 3.22 MGD
# Broad Mountain RWSS Drought Contingency Plan

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