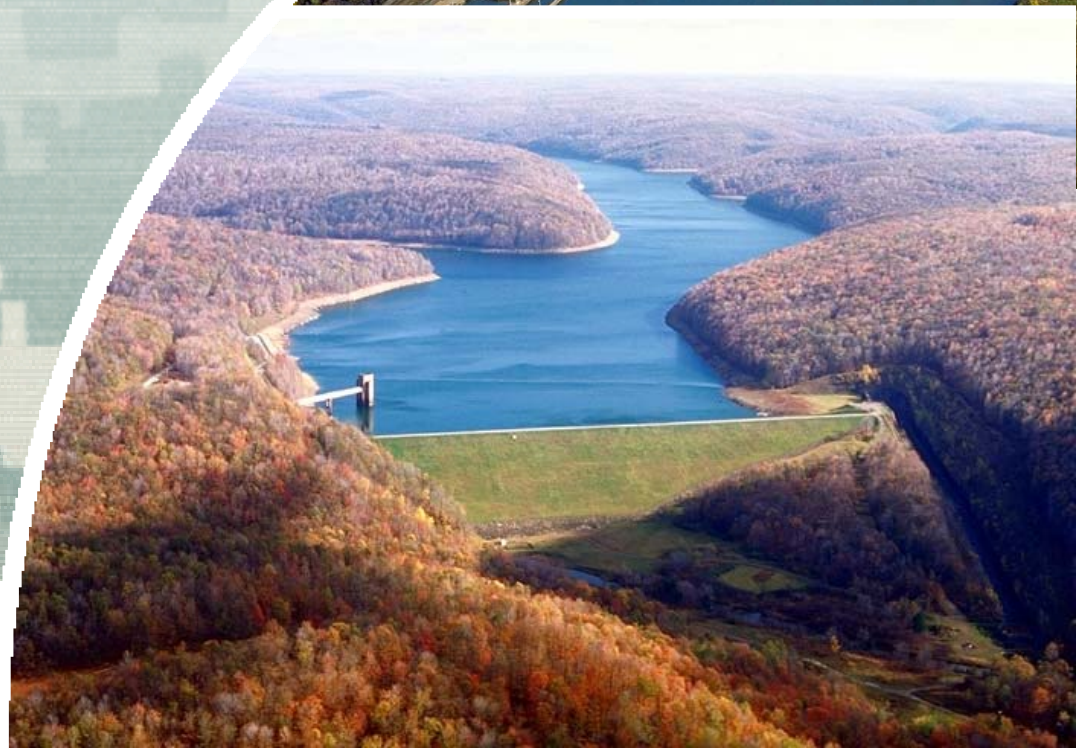
South Cumberland Plateau Regional Water Supply Planning Pilot Study

05 November, 2010



Benjamin L. Rohrbach, P.E.
Chief, Hydrology and Hydraulics
U.S. Army Corps of Engineers
Nashville District

US Army Corps of Engineers
BUILDING STRONG®

Presentation Outline

- Regional Need Statement
- Alternatives Under Consideration
- Tier 1 Alternative Screening Protocol
- Tier 1 Screening Summary and Results
- Tier 2 Alternative Screening Protocol
- Tier 2 Screening Summary and Results
- Open Discussion – Next Steps

Regional Need Statement

- Current Raw Water Supply in Region Barely Sufficient During Recent Drought
  - Existing Sources Are Vulnerable to Drought Due to Small Drainage Areas
  - Monteagle Hardest Hit - Purchased Water From Sewanee and Tracy City, Established Several Emergency Raw Water Sources
- Interconnections Between Utilities Well Established
  - Existing Formal Contracts Between Tracy City and Big Creek, Tracy City and Monteagle
  - Maintenance and Improvement of Water Sharing Ability Key to Meeting Demand During Drought
- Raw Water Demand Project to Grow from 2.1 MGD to 2.2 MGD in 2030
  - Composite Firm Yield of Existing Sources Barely Sufficient to Meet Existing Demand
  - Additional Source Development Justified

Alternatives Under Consideration

- Regionalization – Water Sharing Among Utilities
- Big Creek Reservoir
- Raise Big Fiery Gizzard Dam
- Raise Big Fiery Gizzard Dam with Modified Release Schedule
- Ramsey Lake
- Raise Big Fiery Gizzard Dam Plus Ramsey Lake
- South Pittsburg Finished Water Pipeline

Alternative Screening Protocol

- Tier 1:
  - Reliable Capacity
    - Need met with minimal risk
    - Preserve 20% Storage
    - Drought Restrictions no More Often than Once Every 7 Years
  - Anticipated Project Cost
    - Feasibility, Design, Construction
  - Implementability
    - Permitting, Public Acceptance, Property Acquisitions, Constructability
  - Flexibility
    - Phased Implementation, Drought Resistance

Tier 1 Screening Summary

- Regionalization
  - Increased Water Sharing Between Utilities Using Existing or Improved Connections
  - Drought Mitigation Measures Enacted by all Utilities Based Upon Total Regional Storage
- Reliable Capacity
  - Preserves Storage in Regional Reservoirs
  - Requires Frequent and Long Duration Drought Plan Restrictions – Every 2 to 4 years, 215 Day Maximum
- Anticipated Project Cost – Present Value
  - Costs Not Developed
- Implementability
  - No Concerns with Infrastructure Construction
  - Would Require Extensive Cooperation and Coordination Between Utilities
- Flexibility
  - Perhaps the Most Flexible – Phase Implementation and Spread Costs Over Time
  - No Resistance to Drought
  - No Ability to Expand Beyond Projected Need

Tier 1 Screening Summary

- Big Creek Reservoir
  - Earthen Embankment Dam
- Reliable Capacity
  - Preserves Storage in Regional Reservoirs
  - No Drought Restrictions
- Anticipated Project Cost – Present Value
  - $26.4 M including Operation and Maintenance for 50 yrs
- Implementability
  - Environmental Impacts to ONRW in Big South Fork
  - Permitting
  - Affordability
- Flexibility
  - Single Phase Project
  - Highly Drought Resistant

Tier 1 Screening Summary

- Raise Big Fiery Gizzard Dam
  - Raise Dam and Normal Reservoir Pool 7 feet
  - Crushed Rock Fill
- Reliable Capacity
  - Does not Preserve Storage in Regional Reservoirs
  - Frequent Drought Restrictions
- Anticipated Project Cost – Present Value
  - $3.5 M including Operation and Maintenance for 50 yrs
- Implementability
  - ARAP Issued
- Flexibility
  - Single Phase Project, Limited Yield
  - Not Drought Resistant
  - No Ability to Expand Beyond Projected Need

Tier 1 Screening Summary

- Raise Big Fiery Gizzard Dam with Modified Release Schedule
  - Raise Dam and Normal Reservoir Pool 7 feet
  - Crushed Rock Fill
- Reliable Capacity
  - Preserves Storage in Regional Reservoirs
  - Drought Restrictions no More than Once Every 7 years
- Anticipated Project Cost – Present Value
  - $3.5 M including Operation and Maintenance for 50 yrs
- Implementability
  - ARAP Issued
  - Relies on Development of Revised Minimum Release Schedule
- Flexibility
  - Single Phase Project
  - Fairly Drought Resistant
  - No Ability to Expand Beyond Projected Need

Tier 1 Screening Summary

- Ramsey Lake
  - Purchase and Conversion of Existing Recreation Lake
- Reliable Capacity
  - Preserves Storage in Regional Reservoirs
  - Drought Restrictions no More than Once Every 7 years
- Anticipated Project Cost – Present Value
  - $10 M to $15 M including Operation and Maintenance for 50 yrs
- Implementability
  - Purchase of Property Not Guaranteed
  - Environmental Impacts – Minimum Flow Requirements
- Flexibility
  - Single Phase Project
  - Fairly Drought Resistant
  - No Ability to Expand Beyond Projected Need

Tier 1 Screening Summary

- Raise Big Fiery Gizzard Dam Plus Ramsey Lake
  - Combination of Alternatives
- Reliable Capacity
  - Preserves Storage in Regional Reservoirs
  - Drought Restrictions no More than Once Every 7 years
- Anticipated Project Cost – Present Value
  - $13.5 M to $18.5 M
- Implementability
  - ARAP Issued for Big Fiery Gizzard
  - Purchase of Ramsey Lake in Question
- Flexibility
  - Ability to Phase Projects
  - More Drought Resistant Than Individual Projects

Tier 1 Screening Summary

- South Pittsburg Finished Water Pipeline
  - 26 Miles of 16” Pipe from S. Pittsburg to Monteagle
  - Completion of 3 Phases Results in 3 MGD Capacity
- Reliable Capacity
  - Provides Reliable Capacity
  - Meets Regional Need
- Anticipated Project Cost
  - $22 M Including Operation and Maintenance for 50 years
- Implementability
  - No Immediate Environmental Impacts
  - Local Opposition
  - Affordability
- Flexibility
  - Phased Construction
  - Highly Drought Resistant

Tier 1 Evaluation Results

Alternative	Reliable Capacity	Cost	Implementability	Flexibility
Regionalization	-	N/A[1]	+	+
Big Creek Reservoir	++	$$$$	- -	-
Raise Big Fiery Gizzard Dam	-	$	+	-
Raise Big Fiery Gizzard Dam + Modified Release Schedule	+	$	+/-	-
Ramsey Lake	+	$$	-	-
Raise Big Fiery Gizzard Dam + Ramsey Lake	+	$$$	+/-	+
South Pittsburg Finished Water Pipeline	++	$$$$	+/-	+

(1) Potential construction requirements and costs for infrastructure improvements were not developed for this alternative

- Reliable Capacity, Cost, and Implementability Criterion Most Important in this Evaluation
- Combination Raise Big Fiery Gizzard Dam Plus Ramsey Lake Eliminated for Marginal Performance Increase Over Individual Alternatives
- Only Phase I of the South Pittsburg Finished Water Pipeline Carried Forward

Alternative Screening Protocol

- Tier 2:
  - Anticipated Project Cost
    - Direct Comparison
  - Water Quality
    - Raw and/or Finished
  - Environmental
    - Benefits and Impacts
  - Other Factors

Tier 2 Evaluation Results

Alternative	Storage Remaining [1]	Cost	Finished Water Quality	Environmental Benefits or Impacts	Other
Raise Big Fiery Gizzard Dam + Modified Release Schedule	5.4MG	$3.9 M	neutral	Release study required – may improve downstream reach	Release requirement study funding available – planning underway
Ramsey Lake	70.4 MG	$10 - 15 M [3]	Additional treatment may be needed	Release study required – may Improve downstream reach	Dam safety classification will change
Phase I South Pittsburg Finished Water Pipeline	Undefined [2]	$22 M	Long transmission could cause problems	No Significant Immediate Impacts – Sustainability a Concern	Power dependency could increase cost to consumers more than other alternatives

(1) Above 20% reserve regional storage (2) Relies upon TN River, Highly drought resistant
(3) Includes a range of potential routing options, real estate costs, and costs to improve spillway.

- **Storage Remaining**
  - Each Alternative Preserves Storage in Excess of Reserve – Pipeline Most Drought Resistant
- **Anticipated Project Costs**
  - Raise Big Fiery Gizzard With Modified Release Schedule is Least Expensive and Most Economically Feasible
- **Water Quality**
  - Additional Treatment Processes May be Required For Ramsey Lake Due to Water Quality
  - Transmission Length of S. Pittsburg Pipeline May Result in Formation of Disinfection Byproducts
- **Environmental**
  - Minimum Release Requirement Studies Are Needed for Big Fiery Gizzard and Ramsey Lake Alternatives – Both May Result in Improved Environmental Quality Downstream
  - The Sustainability of the S. Pittsburg Pipeline is a Concern Given the Anticipated Energy Requirements
- **Other Factors**
  - Planning for Big Fiery Gizzard Release Requirement Study is Underway – Funding Available Through USACE
  - Dam Safety Classification of Ramsey Lake will Change with Use – Significant Upgrades to Spillway Required
  - Operation Costs for South Pittsburg Pipeline Have Greater Potential for Increase Compared to Other Alternatives

Next Steps – Open Discussion

- Study Reports Schedule
- OASIS Statewide License Initiative
- Minimum Release Requirement Study for Big Fiery Gizzard
- Other Topics/Questions?