



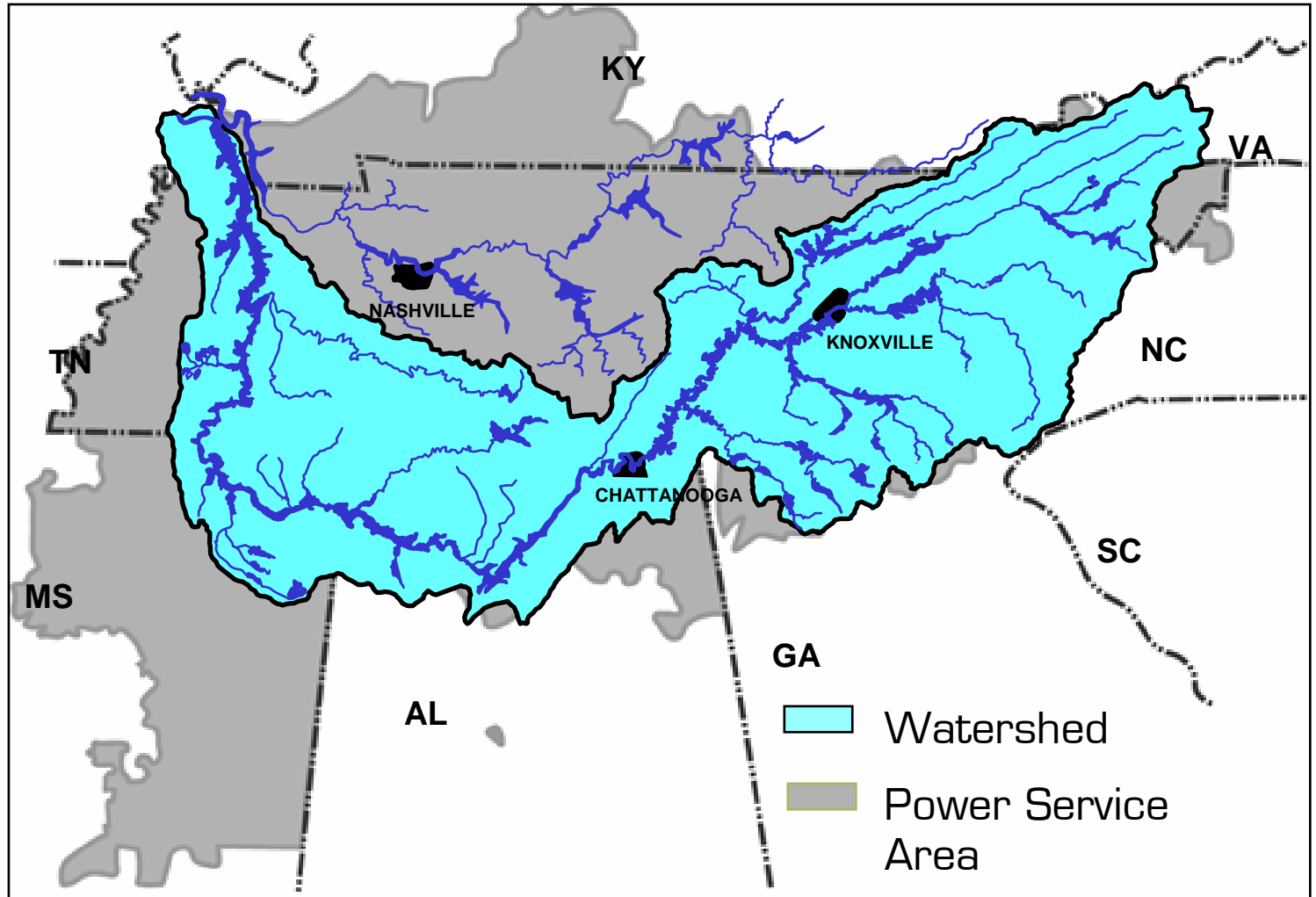
Optimizing TVA's Hydro System Using RiverWare

Suzanne Biddle, P.E.
Tennessee Valley Authority





TVA Region Covers 40,000 sq Miles





Reservoir Operations Study (ROS) Reviewed Operation of TVA Reservoirs

- Initiated in October 2001
- Implemented in June 2004
- Comprehensive review of how TVA operates the 49 dams and reservoirs in the Tennessee River system
- Purpose: to determine if changes in TVA's reservoir operating policy would produce greater overall public value



Integrated Operation of the River System Provides Overall Value

- Year round commercial navigation
- Reduced risk of flooding
- Affordable and reliable electricity
- Improved water supply
- Improved water quality
- Recreation opportunities





What Changed on the Tributaries?

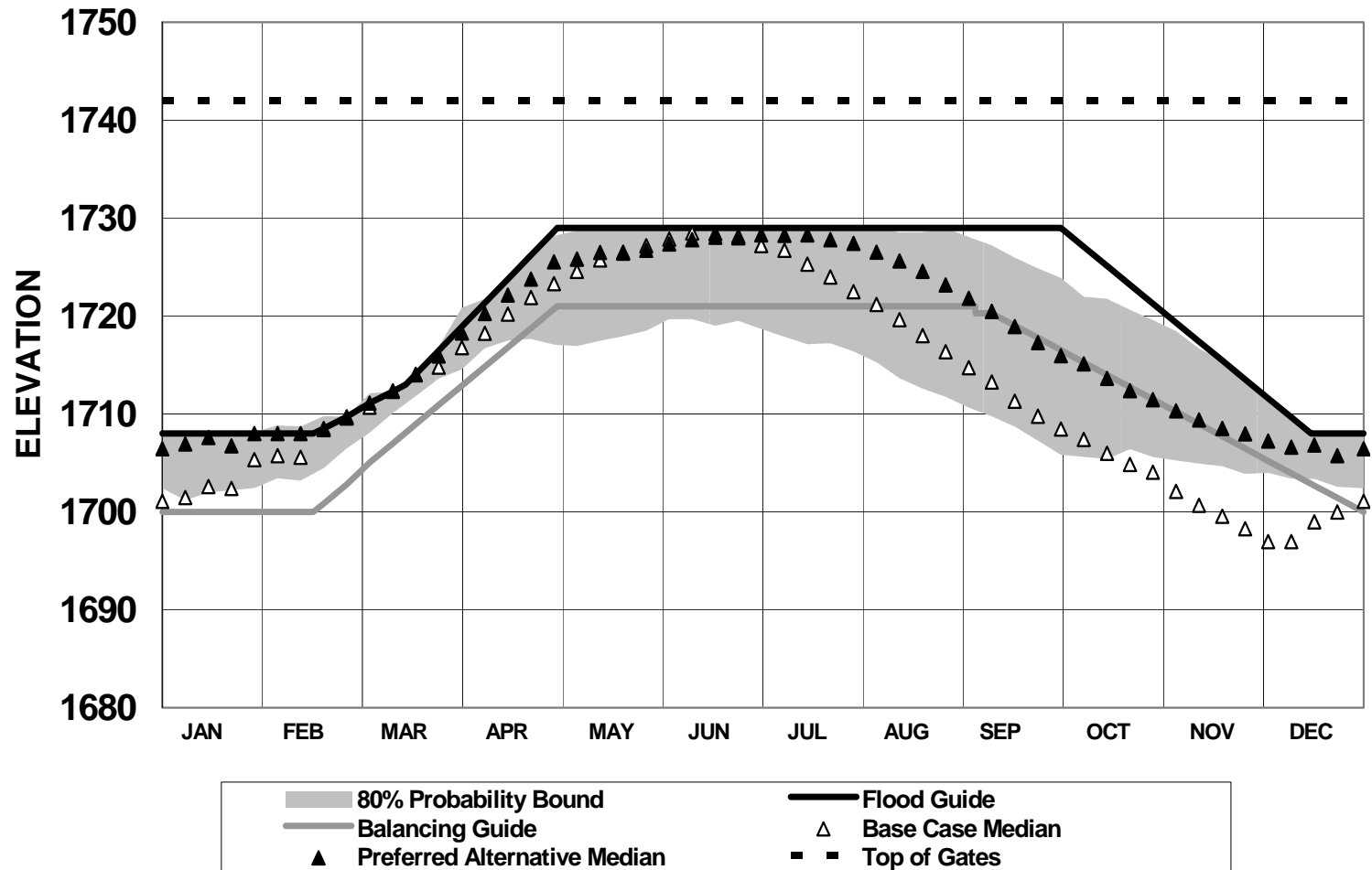
- Drawdown is limited from June 1 through Labor Day on 10 major tributaries
- Winter operating zone raised on 11 tributaries
- Expanded and more dependable scheduled releases for tailwater recreation will be provided at 5 reservoirs





Tributary Guide Curves Were Changed

SOUTH HOLSTON RESERVOIR





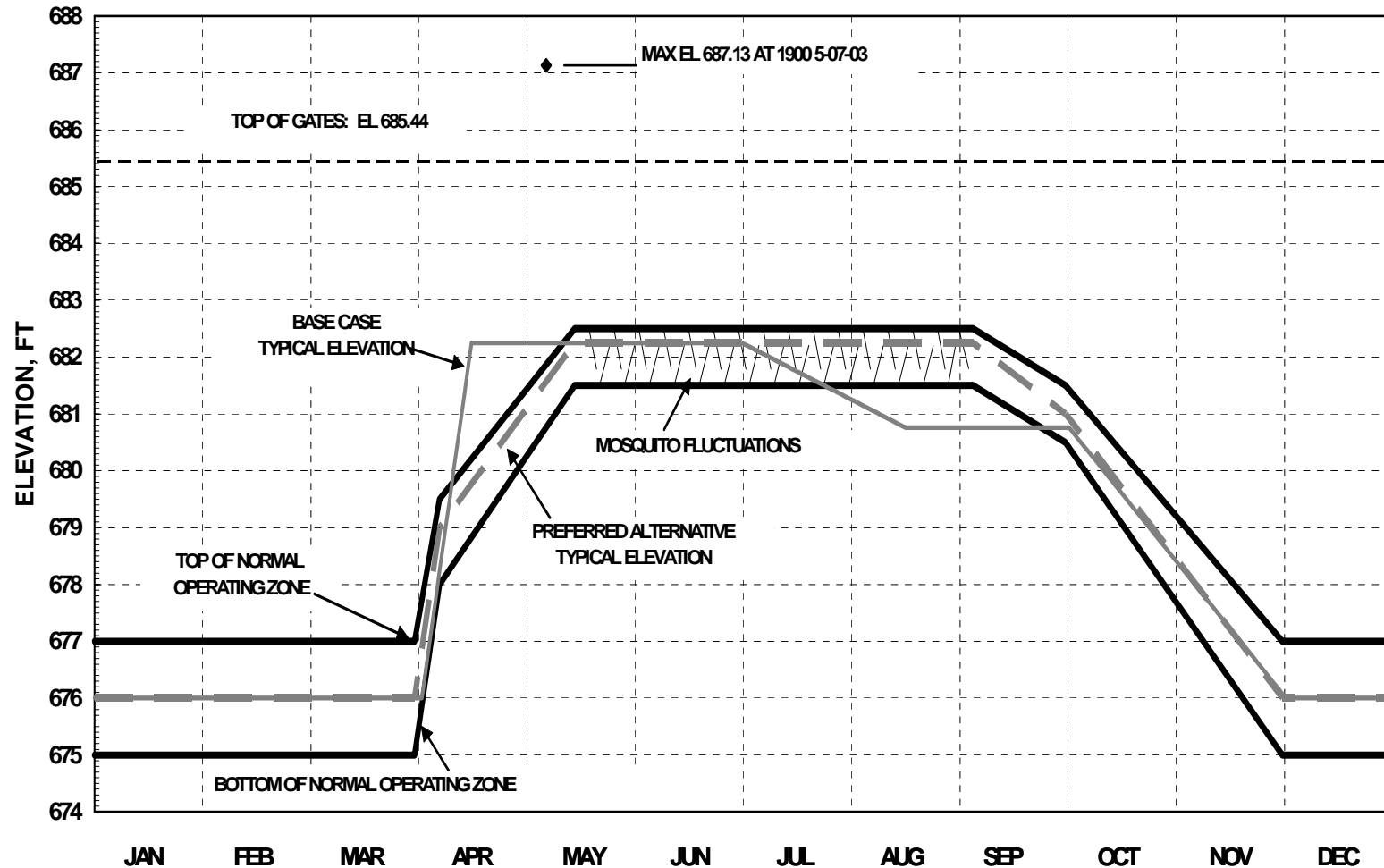
What Changed on the Tennessee River?

- Spring fill operations on upper main river occurs in two stages
- Summer operating zones extended on 5 reservoirs
- Winter pool elevation raised on 1 reservoir



Main River Guide Curves Were Changed

CHICKAMAUGA OPERATING GUIDE





How was Hydro Optimization Impacted by ROS?

- Higher winter pool levels on tributaries means possibly more spilling – less discretionary generation
- Restricted flows in summer means less flexibility – less discretionary generation



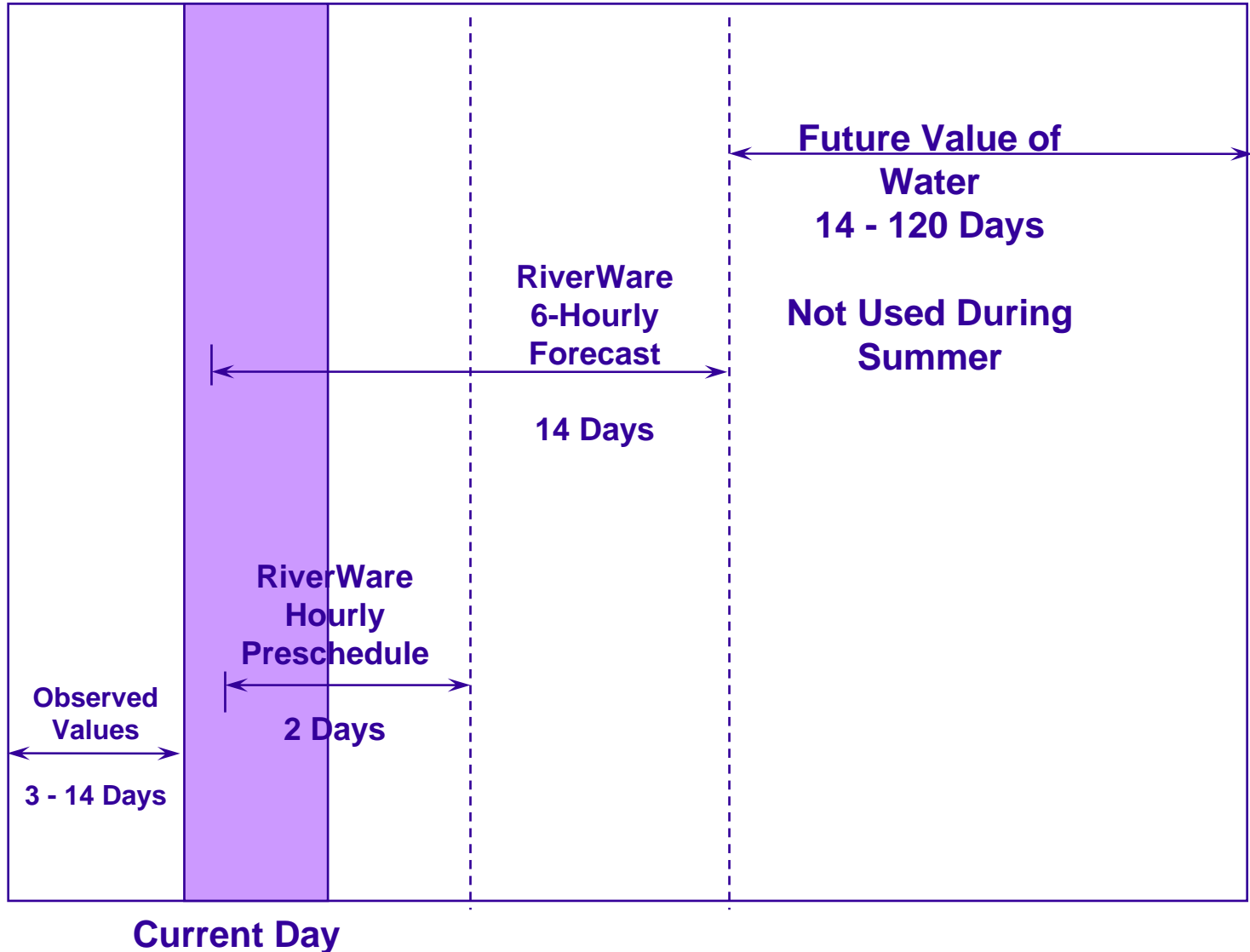


RiverWare Optimization Model was Modified with New Constraints

- Constraints were added to:
 - Balance tributary reservoirs relative to one another within their operating ranges
 - Meet weekly system flow requirements during summer
- Simplified objective function does not consider future value of water during summer



Water Allocation is Optimized Over Short Term





Over 900 Constraints Help Determine Operation of Reservoir System

