Updating the NJ Statewide Water Supply Plan: Planning With Uncertainty

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NJDEP and Rutgers

Chapter Headings (DRAFT)

1. Introduction
2. Water Use Characterization and Trends
3. Climate Change Driven Water Availability Impacts
4. Statewide Water Availability
5. Statewide Demands and Balances
6. Safe Drinking Water Issues
7. Statewide Water Resource Protection and Planning Efforts
8. Regional Planning for Deficit Mitigation and Avoidance
9. Planning for an Uncertain Future
10. Water Supply Action Plan
11. Summary, Conclusions, and Recommendations

Planning Around Uncertainty

- All water supply planning involves models
- Models are simplifications of reality
- No perfect knowledge of current and past conditions
- No perfect knowledge of the future
- Planning must acknowledge uncertainty (NOT “error”)

Lessons from Other States

- **Evaluation of key large states**
- **Jillian Drabik, PhD**
  - California, Florida, Massachusetts, Texas
- **Chumba Koech, MCRP Candidate**
  - Georgia, North Carolina, Virginia, Washington

Key Findings: Modeling Approaches

- Population Projections: Target year only, 5-year increments
- Water Demands: Water use categories, High/Low demands
- Surface Water Availability: safe yield models
- Aquifer Availability: Regional models, primary or supplemental
- Integrated Water Availability: Regional models such as CA Central Valley, MA MODFLOW models (with biological factors, similar to NJ approach), FL water districts, GA regions
- Climate Change: Downscaled global models
- Source Water Protection: MA
- Economic Impact: CA

Key Findings: Presentation of Uncertainties

- Limited: MA
- Moderate: Methodology discussions, statements of key assumptions and uncertainties,
- Detailed: detailed appendices (VA) or model reports, e.g., North FL Regional WS Partnership, Seattle and Orange Water and Sewer Authority (Monte Carlo simulations), Tacoma (climate simulations)
- Population and Water Demand Projections: limitations of projections based on trends; price elasticity
- Water Modeling: Acknowledge complexities, water system interactions, land use change implications, data limitations, modeled v observed flows, margin of safety use
- Climate Change: Frequent concern. Difficulty of downscaling global models for rainfall, etc. CA, FL, MA, TX. Use of multiple simulations (Seattle, VA).

Key Findings: Planning for Uncertainty (1)

- **Planning Horizons: 20 years (FL, MA) to 50 years (CA, TX) and comparison to prior planning and modeling**
- **Scenarios: Multiple projections based on differing model assumptions (e.g., population projections; drought v average demands; future demand patterns by sector; land development projection models)**
- **Regional Models: Improve on statewide analyses (most states)**
- **Local Planning: By local purveyors (NC)**

Key Findings: Planning for Uncertainty (2)

- Research Agendas: regional studies, monitoring, updated statistics and modeling approaches, collaborative research
- Multiple Metrics: e.g., flow trends with water availability model results with water quality concerns
- Climate Change: Central tendency models plus observed
- Peer Review: Ensure appropriate “state of practice”
- Policy Options: Focus on obvious beneficial steps first, use multiple distinct approaches
- Adaptive Planning: Routine updates to models and plans

Thank You

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