

The background of the slide is a dark blue map of New York City and its surrounding water supply area. The map shows the Hudson River, the Harlem River, and the East River, along with the city's coastline and major waterways. The text is overlaid on this map.

Past & Future Water Quality Challenges for New York City

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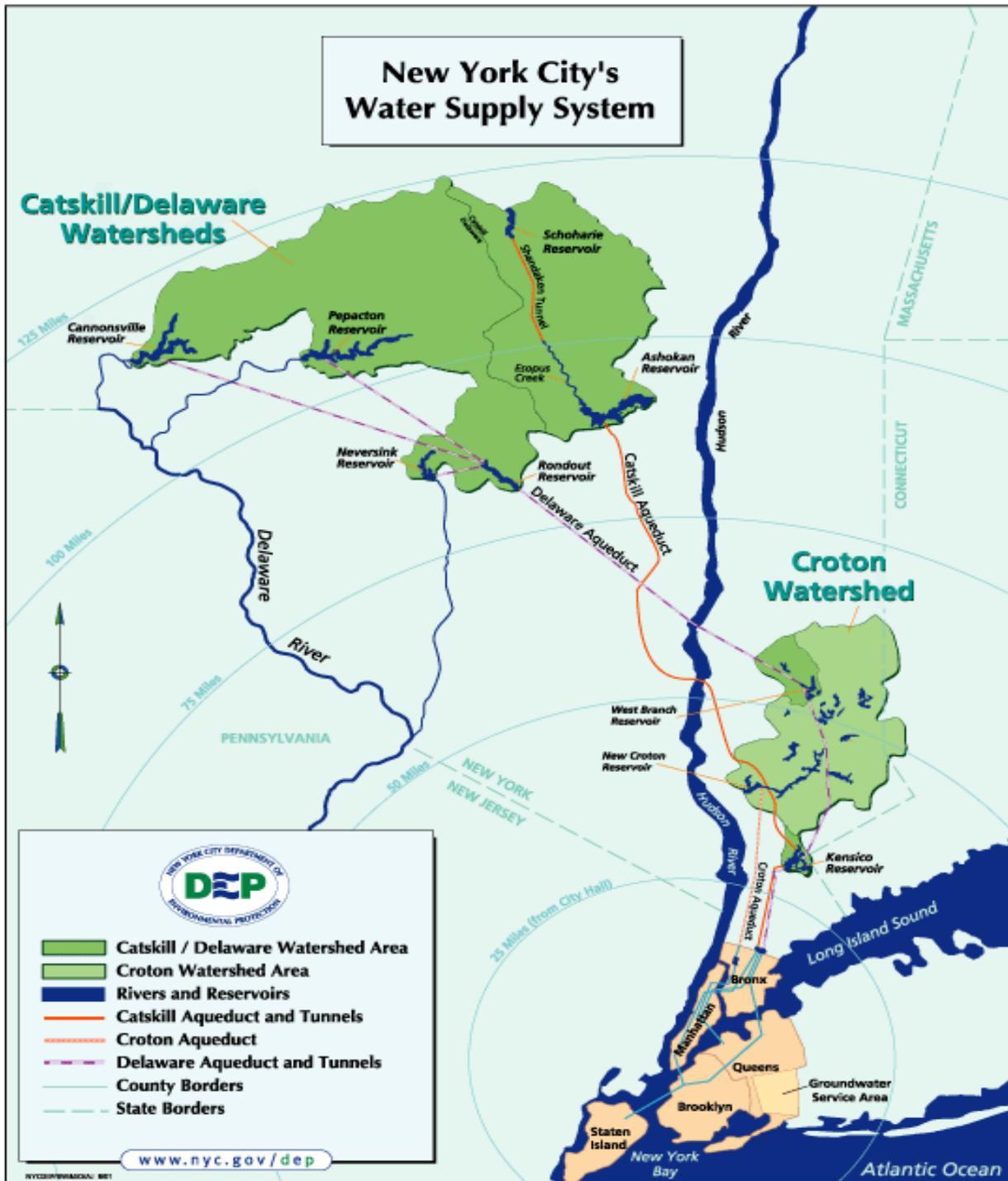
Acknowledgments: Dave Warne & Salome Freud

Presentation Outline

- Historic Water Quality Challenges
- Recent Challenges and Actions Taken
- Future Challenges (near-term and long-term)
- Key Issues Moving Forward

Historical Water Quality Challenges

- Early on during the development and expansion of both the Croton and Catskill Systems water quality challenges arose
- 1902 “Burr-Hering-Freeman Investigation”: recommended selection of the Catskills (Esopus) due to excellent quality (no filtration); all other additional sources recommended should be filtered



- Primarily a surface water supply
- 19 reservoirs & 3 controlled lakes
- System Capacity: 550 billion gallons
- Serves 9 million people (1/2 of population of New York State)
- Delivers approx. 1.2 billion gallons per day to the City
- Source of water is a 2,000 square mile watershed in parts of 8 upstate counties
- Operated and maintained by NYCDEP

Early Water Quality Concerns

- Disinfection/Filtration
- Turbidity
- Reliance on natural processes for purification
- Aesthetics
- Development of a comprehensive monitoring program

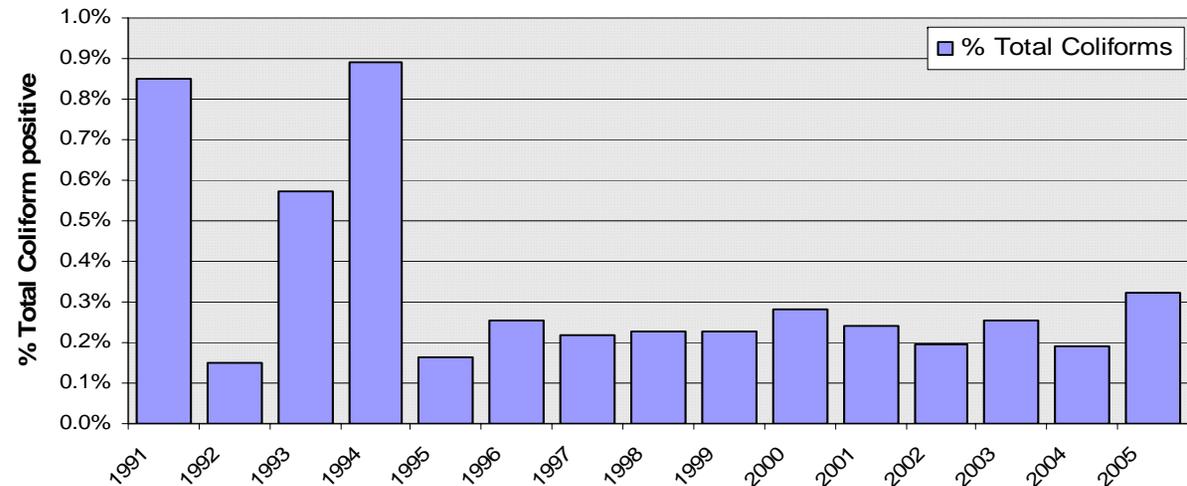
Recent Challenges and Actions Taken

- Resulting from 1986 SDWA Amendments:
 - Total Coliform Rule
 - Lead & Copper Rule
 - Surface Water Treatment Rule & Filtration Avoidance Requirements

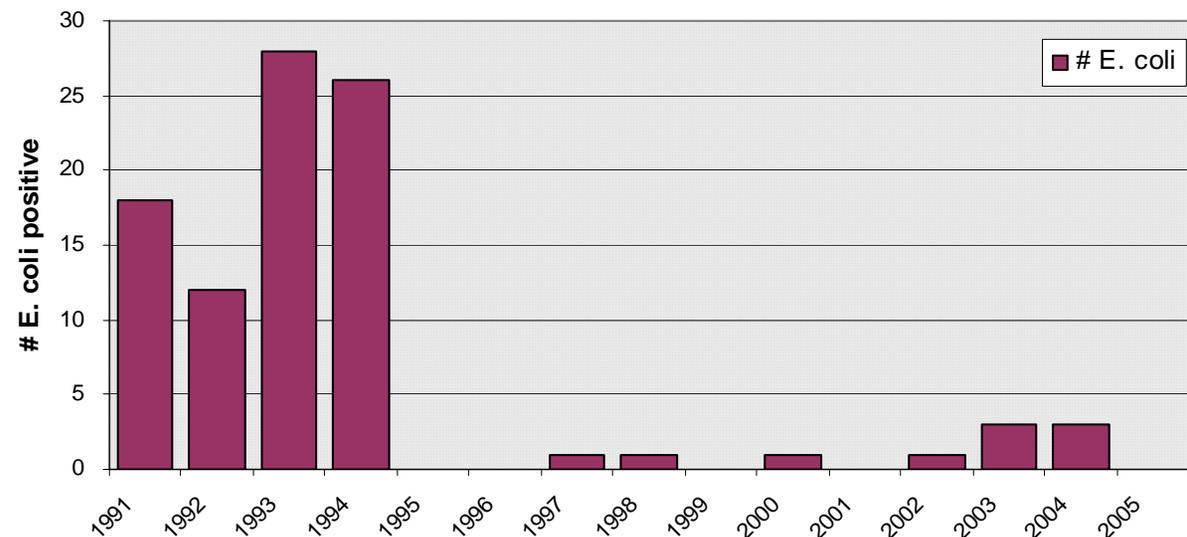
Recent Challenges & Actions Taken

- TCR: Reduction in Total Coliform and E. coli detections in distribution system

Annual % Total Coliform - Jan 1991 through Sept 2005
NYCDEP Distribution Compliance Monitoring

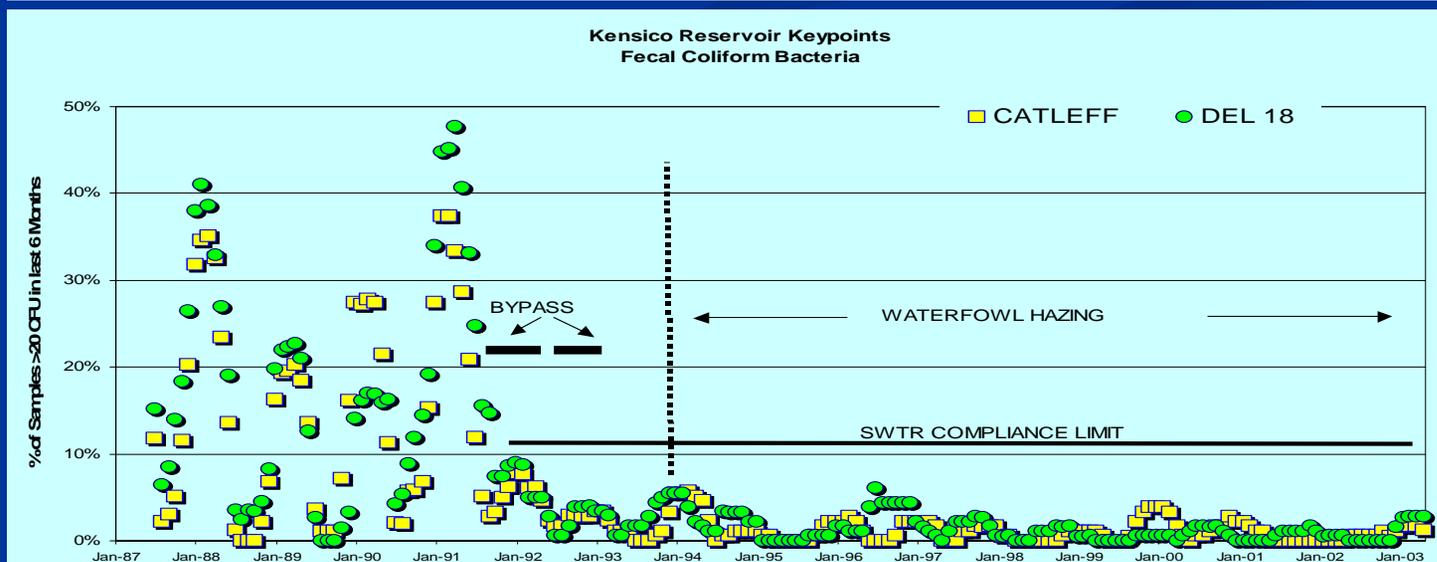
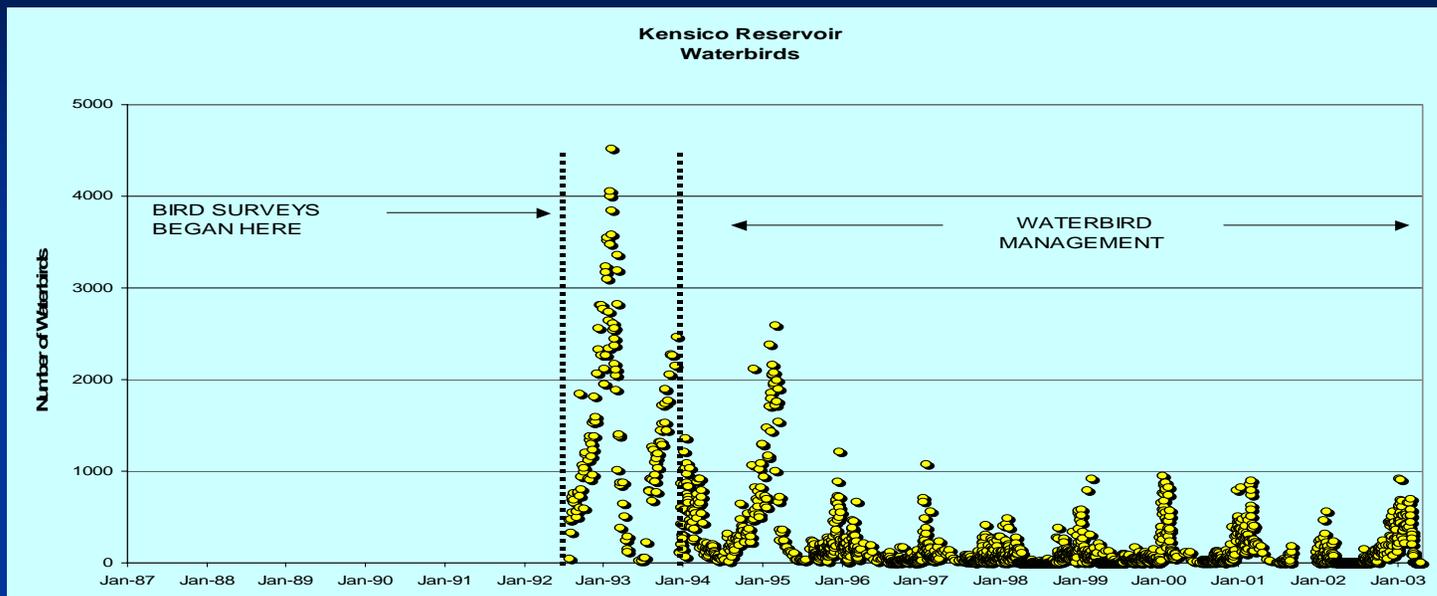


Annual # E. coli - Jan 1991 through Sept 2005
NYCDEP Distribution Compliance Monitoring



Recent Challenges & Actions Taken

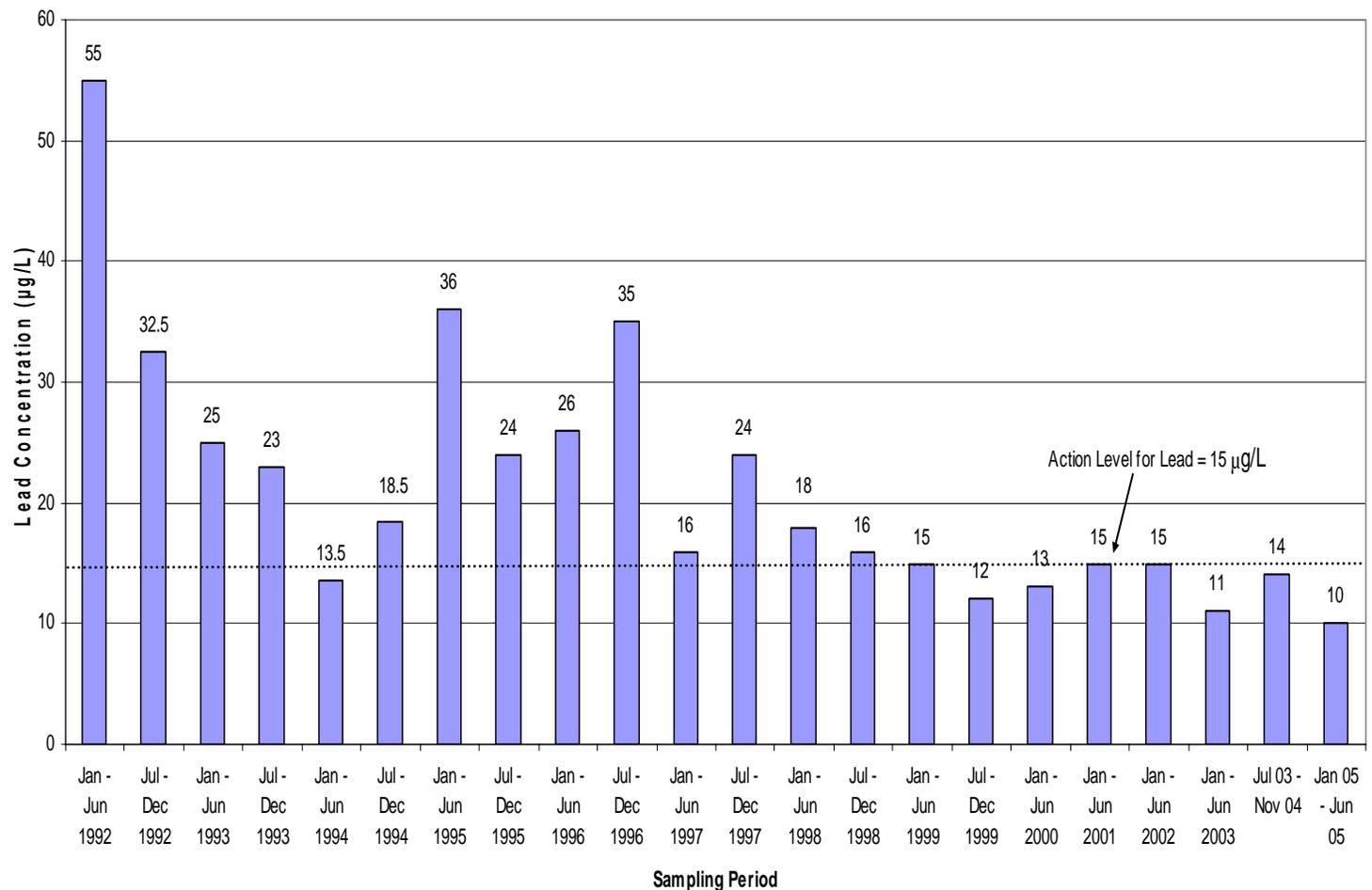
- Reduction in waterfowl counts at Kensico Reservoir and fecal coliform counts at effluents



Recent Challenges & Actions Taken

- Reduction in at-the-tap lead concentrations

NYCDEP Reported At-the-Tap 90th Percentile Lead Concentrations



Recent Challenges: Development of an Extensive Monitoring Program

- Expansion of water quality monitoring program using state-of-the-art techniques and equipment
- Multiple Objectives – Operational, Regulatory & Specialized Research
- Many different spatial and temporal scales
- Watershed-based approach
- Pathogen monitoring – 1623 method
- Improved distribution sampling program – over 1,000 sample station installed
- Process Control/Remote-Continuous Monitoring System



Recent Challenges: Development of an Extensive Watershed Protection Program (Filtration Avoidance)

- Implementation of multi-faceted watershed protection program
 - 68,000+ acres of land protected through fee purchase or easement
 - 100+ wastewater treatment plants being upgraded to provide tertiary treatment
 - 2,000+ septic systems repaired
 - 7 new wastewater treatment plants being constructed to address areas with failing septic systems
 - Thousands of best management practices installed to control farm runoff
 - Thousands of projects reviewed for compliance with enhanced regulations

Future Water Quality Challenges

- Near Term – Challenges that can be defined with a reasonable degree of certainty; 10-15 year timeframe looking forward
- Long Term – Challenges that are predicted based on limited information – less certainty; 15-50 year timeframe

Near Term Water Quality Challenges

- Lead and Copper Rule – anticipate continued success through corrosion control program, lead service line replacement and public outreach
- Watershed Protection: FAD renewal 2007
- Filtration (SWTR)
- Meeting Disinfection Requirements (LT2)
- Meeting Disinfection By-product Requirements: Stage 2 D/DBP Rule
- Security: Physical Hardening & Early Warning Detection

Croton Filtration: Mosholu Site New Design (2011)



Catskill/Delaware UV Facility (2010)

- Located at Eastview
- Design Capacity = 2 billion gallons per day
- 40-mgd Disinfection Chambers undergoing full-scale validation
- Low Pressure High Output technology selected

UV Disinfection Chamber



Stage 2 Disinfectant/Disinfection By-Products (D/DBP) Rule

- Expected to be promulgated in 2006
- Intended to reduce TTHM and HAA5 levels beyond the Stage 1 Rule and address localized concerns
- Stage 2 D/DBP Rule will have the same MCLs as the exiting Stage 1 Rule
 - TTHM MCL of 80 $\mu\text{g/L}$
 - HAA5 MCL of 60 mg/L
- But regulate as Locational Running Annual Averages (LRAA) for individual sites instead of as System-wide Running Annual Averages
- This means compliance at locations of peak TTHM and HAA5 concentrations and not as an average across the system

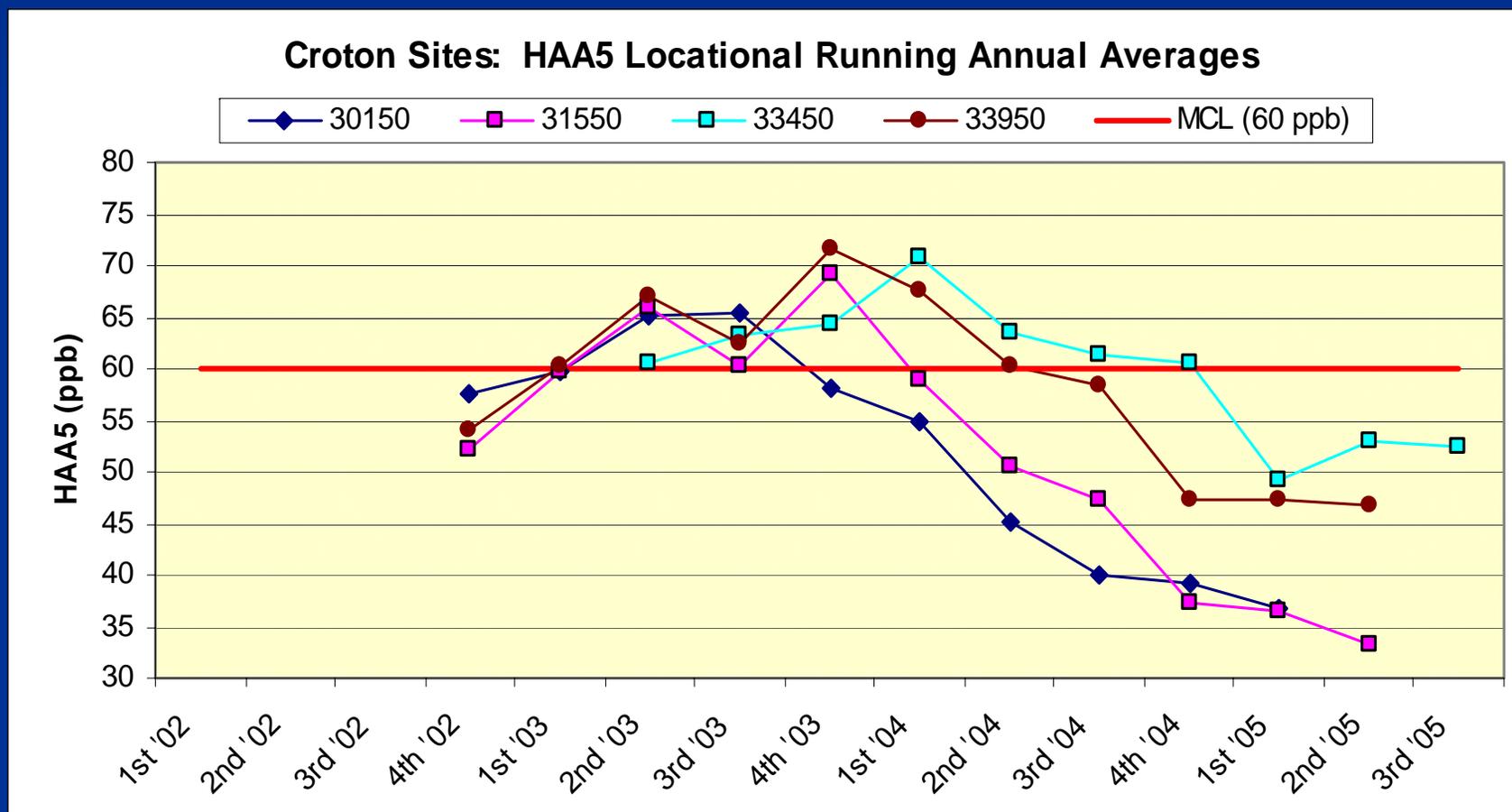
Evaluation of Potential Impacts of Stage 2 Rule on NYC Water Supply

- Began monitoring TTHM and HAAs levels throughout the distribution System in 2002
 - HAA levels determined to be of concern
- Croton System HAA levels do not currently comply with the Stage 1 D/DBP Rule and thus will not meet Stage 2 requirements
 - Croton Filtration Plant will enable compliance
- Potential for Catskill/Delaware System to exceed Stage 2 Rule HAA MCLs at specific locations within the distribution system with current conditions and configuration - need to evaluate and modify delivery operations

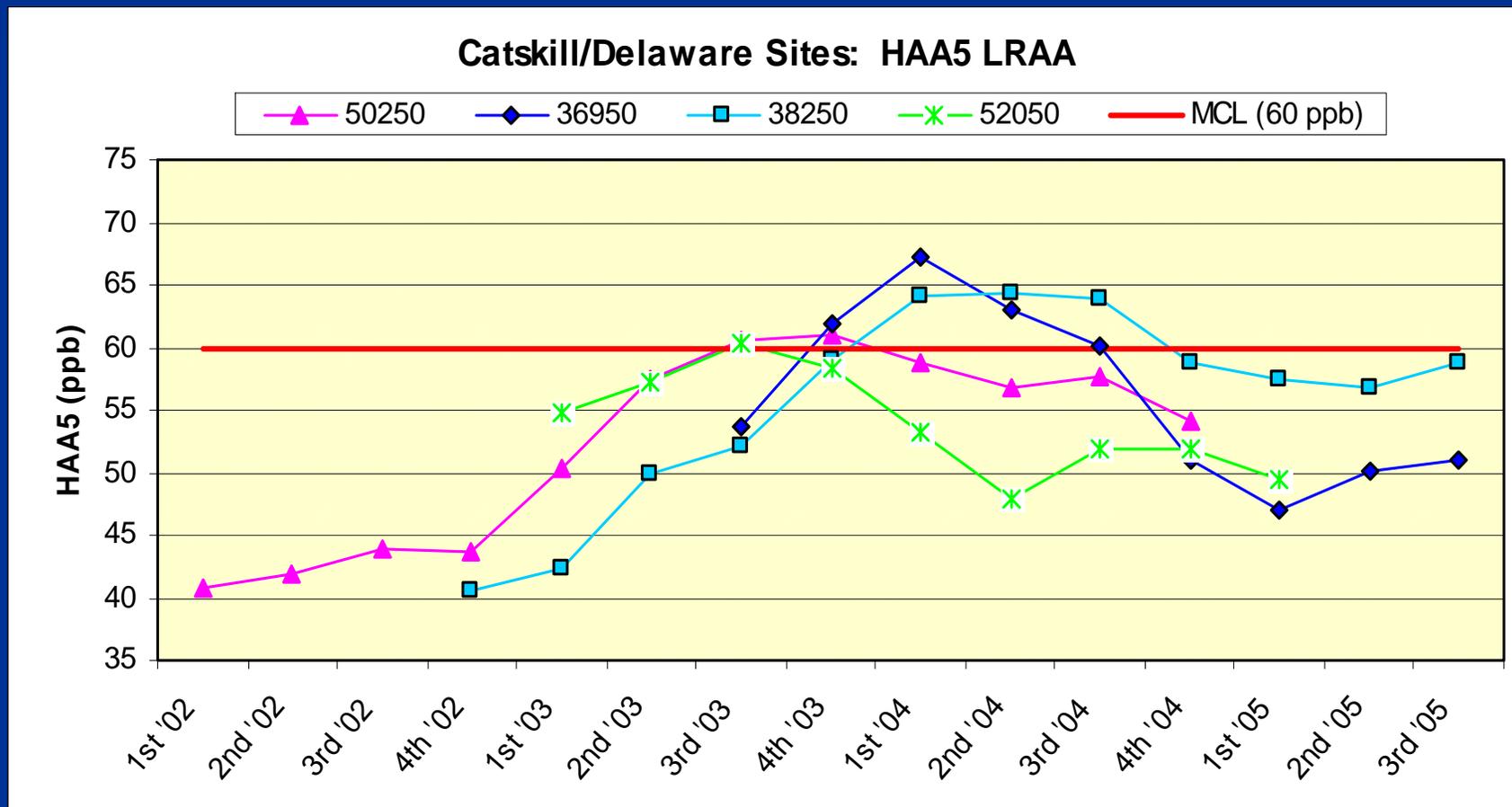
Water Supply Capital Projects will Impact DBP Levels

- City Tunnel 3, Stage 2
 - Impacts water age and thus DBP Levels
 - Queens/Brooklyn (completion 2008)
 - Manhattan (completion 2013)
- Kensico-City Tunnel
 - Impacts water age and thus DBP Levels
- Dependability
 - DBP Formation Potential may change based on source water
 - Impacts water age from new sources and maintenance activities
- UV Disinfection
 - Disinfection requirements may impact chlorine concentration

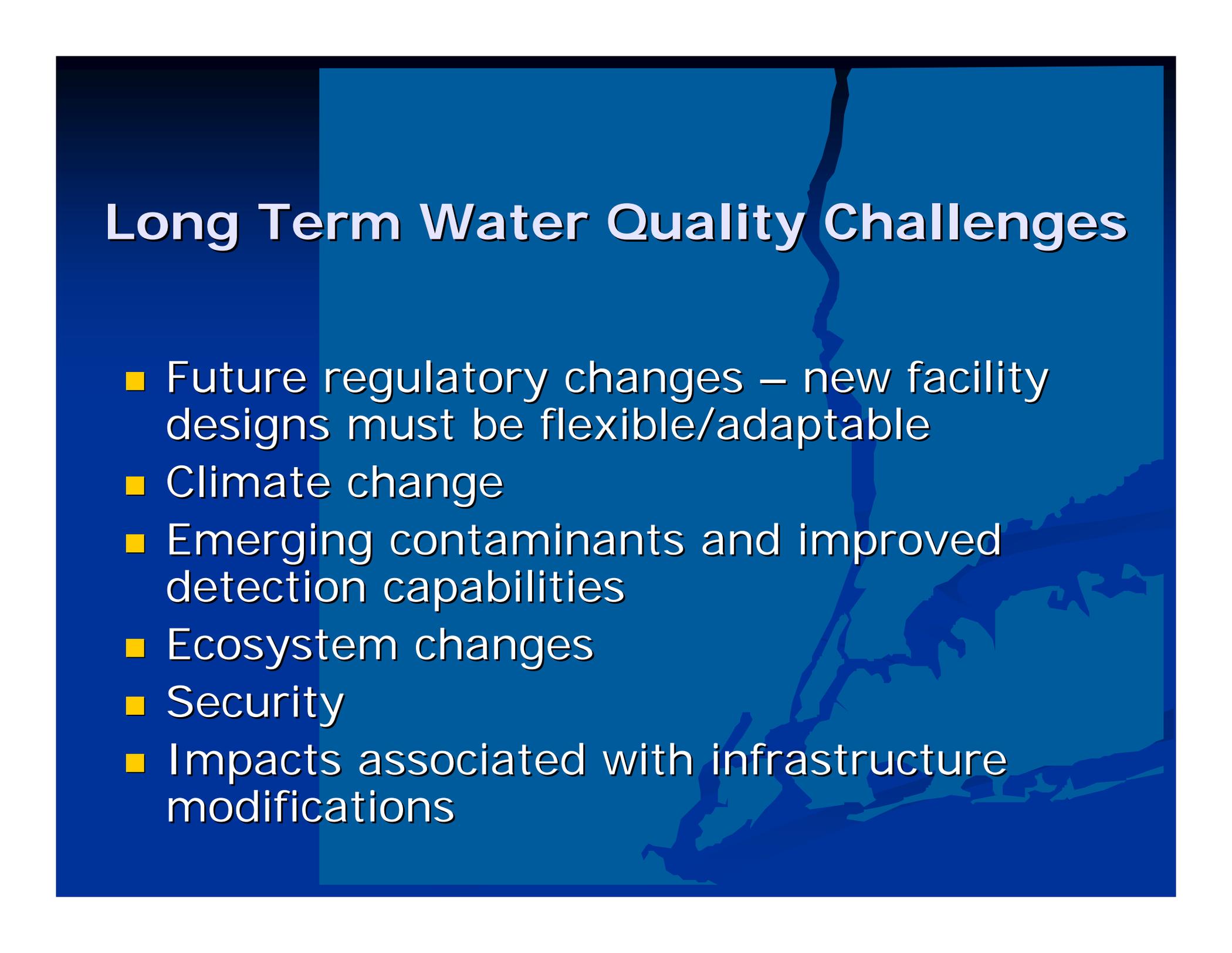
Evaluation of Croton Distribution Sites HAA5 levels for Stage 2/DBP Rule Compliance



Evaluation of Cat/Del Distribution Sites HAA5 levels for Stage 2 D/DBP Rule Compliance



Long Term Water Quality Challenges



- Future regulatory changes – new facility designs must be flexible/adaptable
- Climate change
- Emerging contaminants and improved detection capabilities
- Ecosystem changes
- Security
- Impacts associated with infrastructure modifications

Key Issues Moving Forward

- Need to improve and advance monitoring technologies
- Support for drinking water/health effects research
- Improved public outreach
- Improved management of watershed lands for ecosystem protection

Conclusions

- New York City has met recent water quality challenges – resulting in improved water quality: Pb, microbes, disinfection
- Near-term challenges will be addressed via Croton Filtration, Cat/Del UV disinfection, watershed protection and infrastructure modifications
- Continued source water protection and comprehensive state-of-the-art monitoring & assessment programs are essential

Thank You

www.nyc.gov/dep