New York City's Risk Mitigation Program for Protozoans-Hillview Reservoir

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David Lipsky, Ph.D., Chief

Bureau of Water Supply

Distribution Water Quality Science and Research Division

Outline

- DEP's approach to risk mitigation under the FAD
- Description of Hillview Reservoir
- Current risk mitigation program at Hillview Reservoir

Risk Mitigation Efforts Under the FAD

Four basic components:

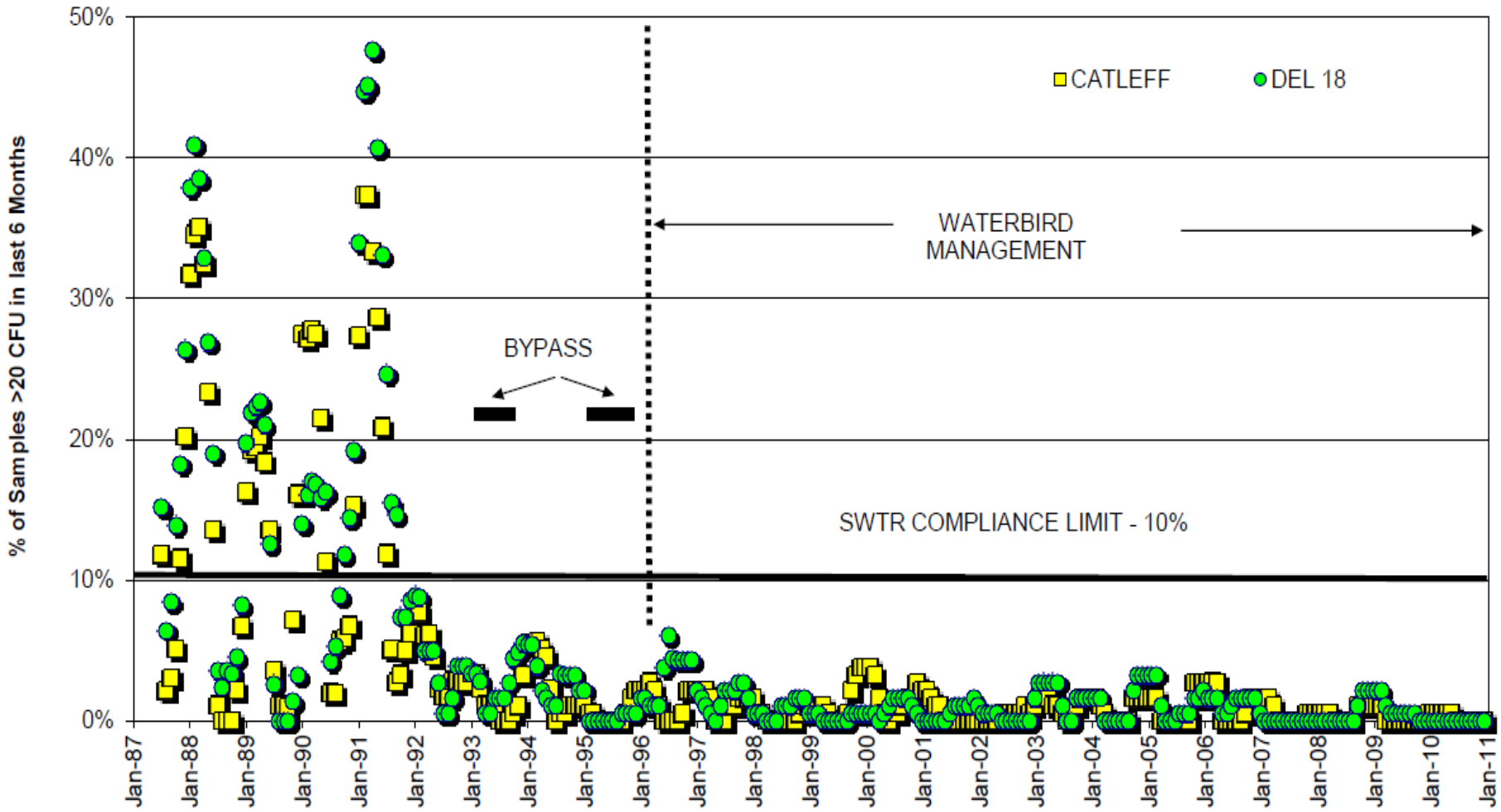
1. Waterfowl management program started at Kensico (1992)
   - Program includes waterbird surveys, harassment, and deterrence measures
   - Expanded to include five additional reservoirs (2002)
2. Kensico Cryptosporidium Action Plan-Response Actions for elevated oocysts (have not ever activated the plan for Cat/Del based on valid cryptosporidium data)
3. Waterborne Disease Risk Assessment Program (WDRAP)
4. Monitoring, modeling and research

Risk Mitigation Efforts Under the FAD

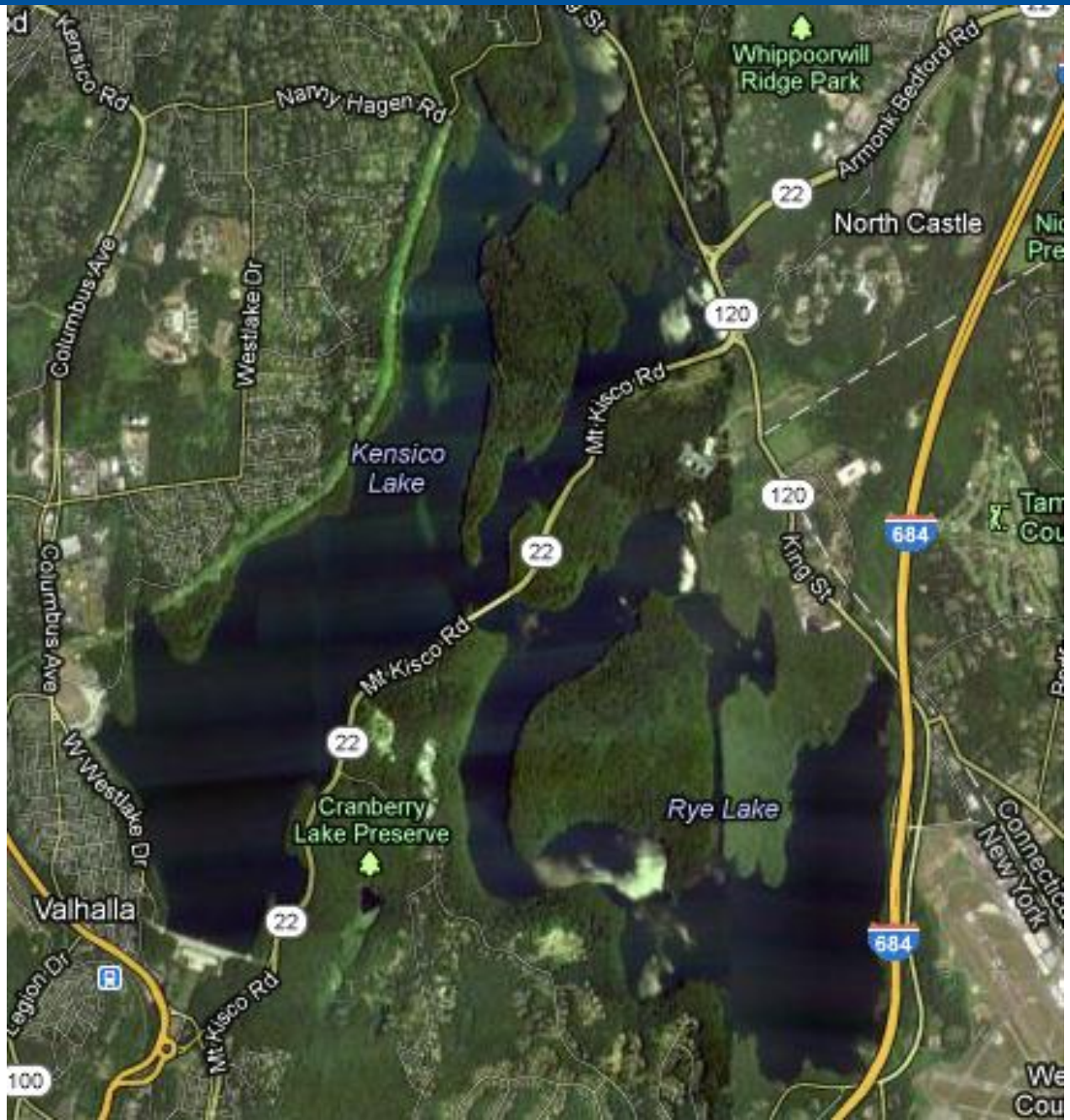
A lesson learned:

- Birds can be a significant source of fecal coliform concentrations in Kensico
- DEP has been able to implement an effective waterfowl management program to control fecal coliforms
- Waterfowl management is a key component of the City's continuance of Filtration Avoidance

Waterbirds and Fecal coliform-Kensico Reservoir



Kensico Reservoir



Hillview Reservoir

Hillview Reservoir

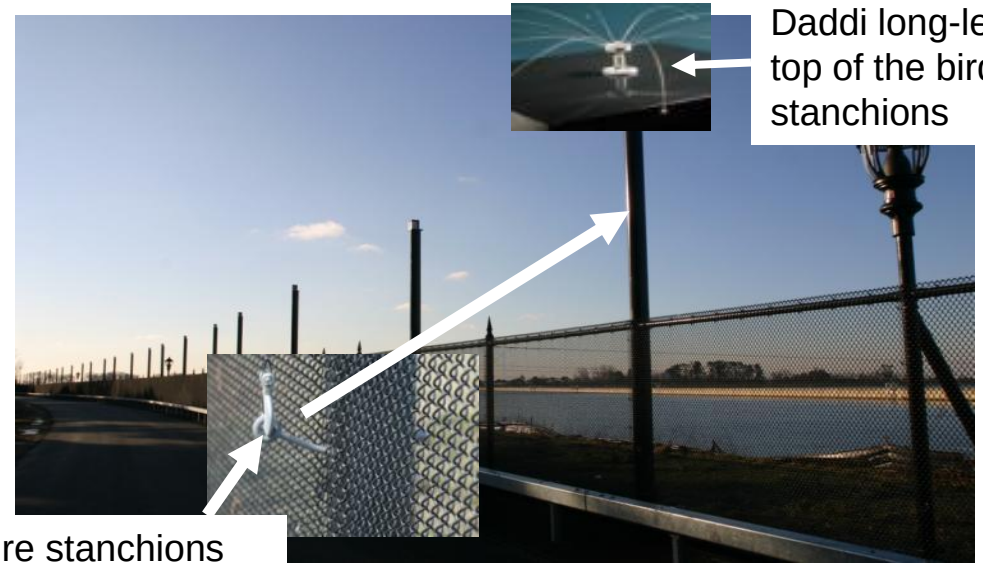
- Balancing reservoir that has been in operation - 90 years
- Surface area of 90 acres
- 900 MG capacity
- Average 450 MGD input
- Water residence time - 2 days
- 24/7 security and security barriers
- Elevated basin with drainage controls
- Chlorine used to provide at least 4-log virus inactivation for water leaving Hillview Reservoir

Risk Mitigation Efforts at Hillview

Wildlife Management at Hillview Reservoir:

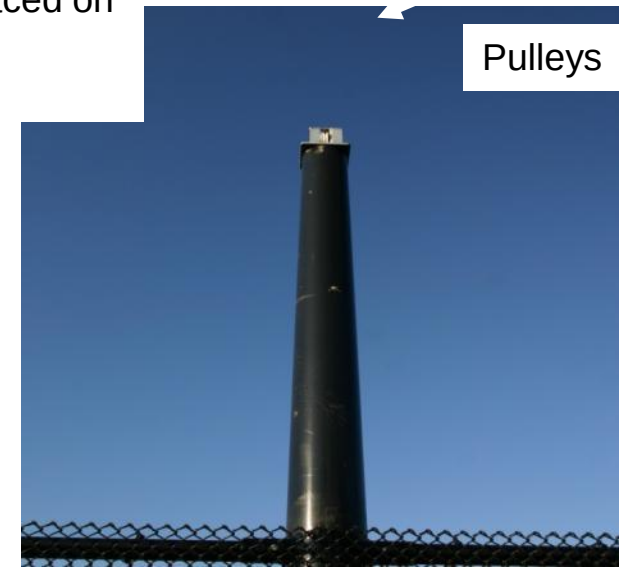
- Initiated in 1993
- Enhanced as a result of FAD (2007) and Hillview Administrative Order (2010)
- Daily waterbird census and harassment program
  - Pyrotechnics and physical chasing on dividing wall
  - Remote-operated propane cannons
  - Remote-controlled motorboats
- Inspection, maintenance, and repair of bird wiring, Daddi-long-legs, and deterrence systems
- Daily sanitary inspection and clean-up program

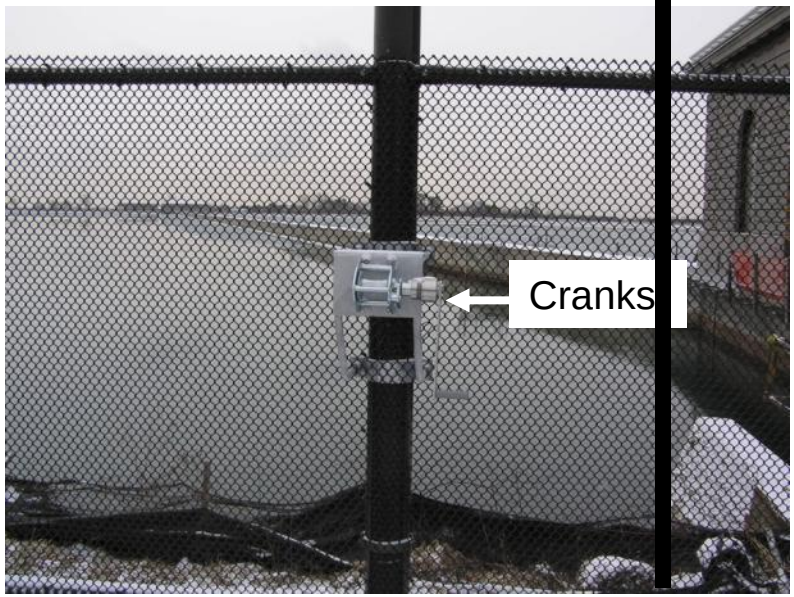
Waterfowl Deterrence-Hillview Reservoir



Daddi long-legs placed on top of the bird wire stanchions

Bird wire stanchions with pulleys & cranks

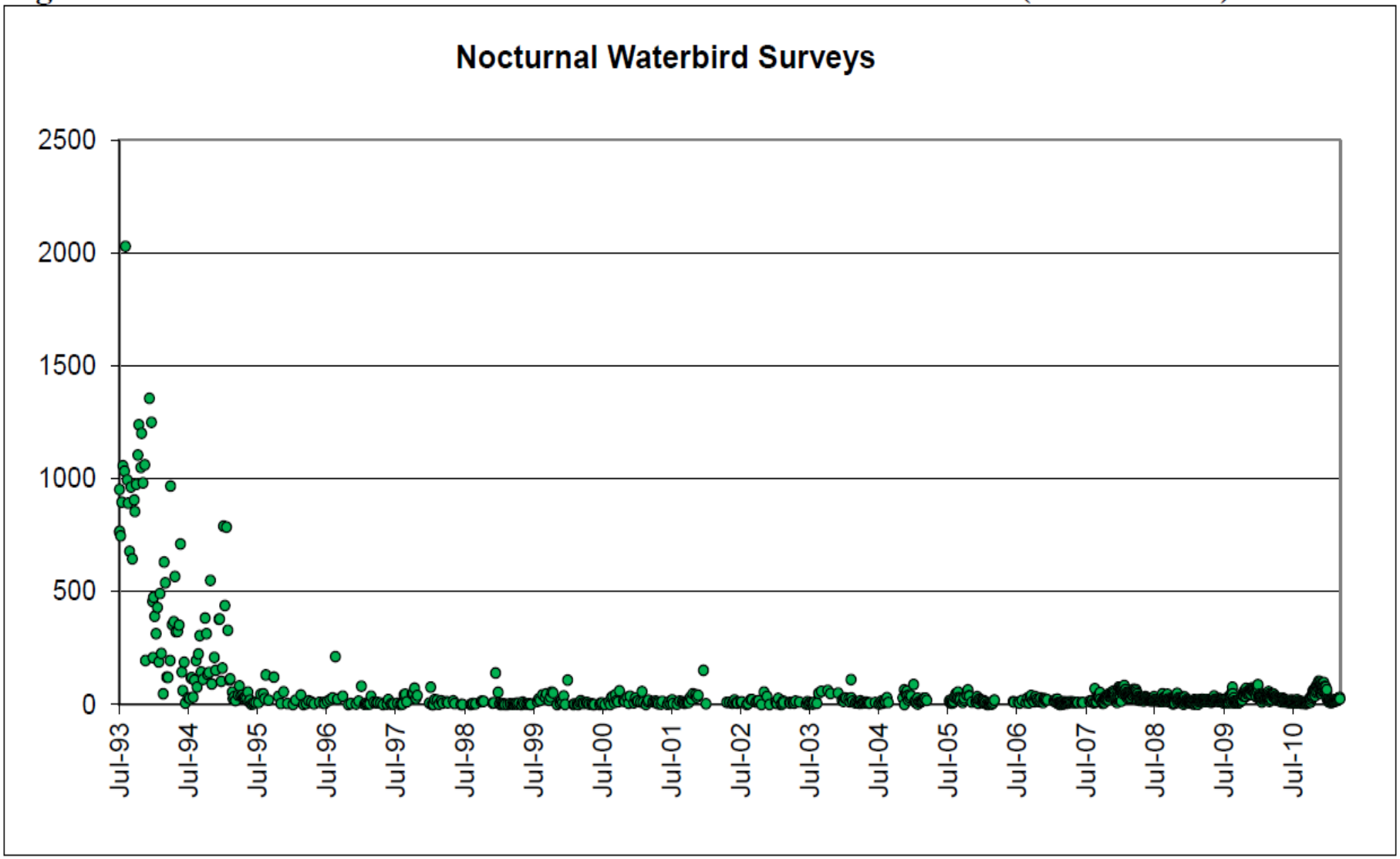




Propane cannons with solar panels on the dividing wall

Hillview Reservoir-Waterbird Counts

Figure 31. Hillview Reservoir Total Waterbirds Nocturnal Counts (1993 to 2011)



Risk Mitigation Efforts at Hillview (cont'd)

- Weekly mammal trapping and population monitoring
  - Raccoons, rodents, etc.
- Targeted programs "as needed"
  - USDA contract for Ruddy Duck removal program
  - Baitfish monitoring and collections
  - Cliff swallow and Barn Swallow management (nest depredation)

Risk Mitigation Efforts (Cont'd)

- Disinfection
  - Inflow disinfected with chlorine and UV upstream (beginning in 2012)
  - 4-log virus inactivation of water leaving Hillview
- Monitoring
  - Weekly monitoring of Hillview outflow for protozoans
  - Daily composite samples of Hillview outflow for TC/EC
  - Ability to expedite protozoa sampling and analysis
  - Genotyping capabilities

Risk Mitigation Efforts (Cont'd)

- ❖Cryptosporidium and Giardia Action Plan
  - Provides response actions for elevated cysts or oocysts at Hillview
  - Functional exercise of plan was completed (3/1/12)
  - Annual updates

New York City
Department of Environmental Protection

Environmental Protection

HILLVIEW CRYPTOSPORIDIUM AND GIARDIA ACTION PLAN

Guidelines for Inter-Agency Notifications and Coordination

Effective Date: August 1, 2011
(Revision 1-01/20/12)

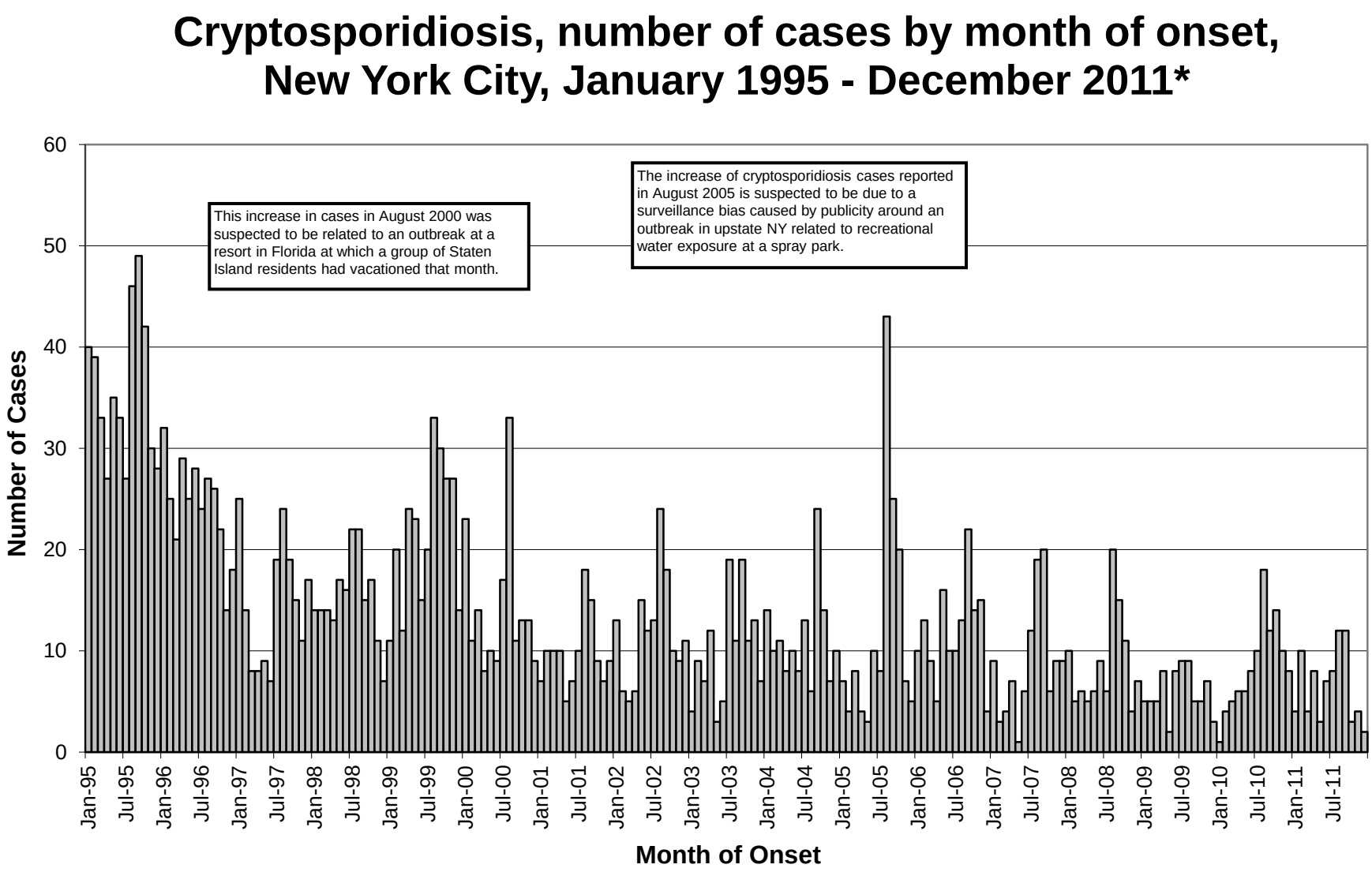
Prepared by
Dr. David Lipsky
Chief, Distribution Water Quality Science & Research

Carter H. Strickland, Jr., Commissioner
Paul V. Rush, P.E., Deputy Commissioner Bureau of Water Supply
Steven C. Schindler, Director of Water Quality

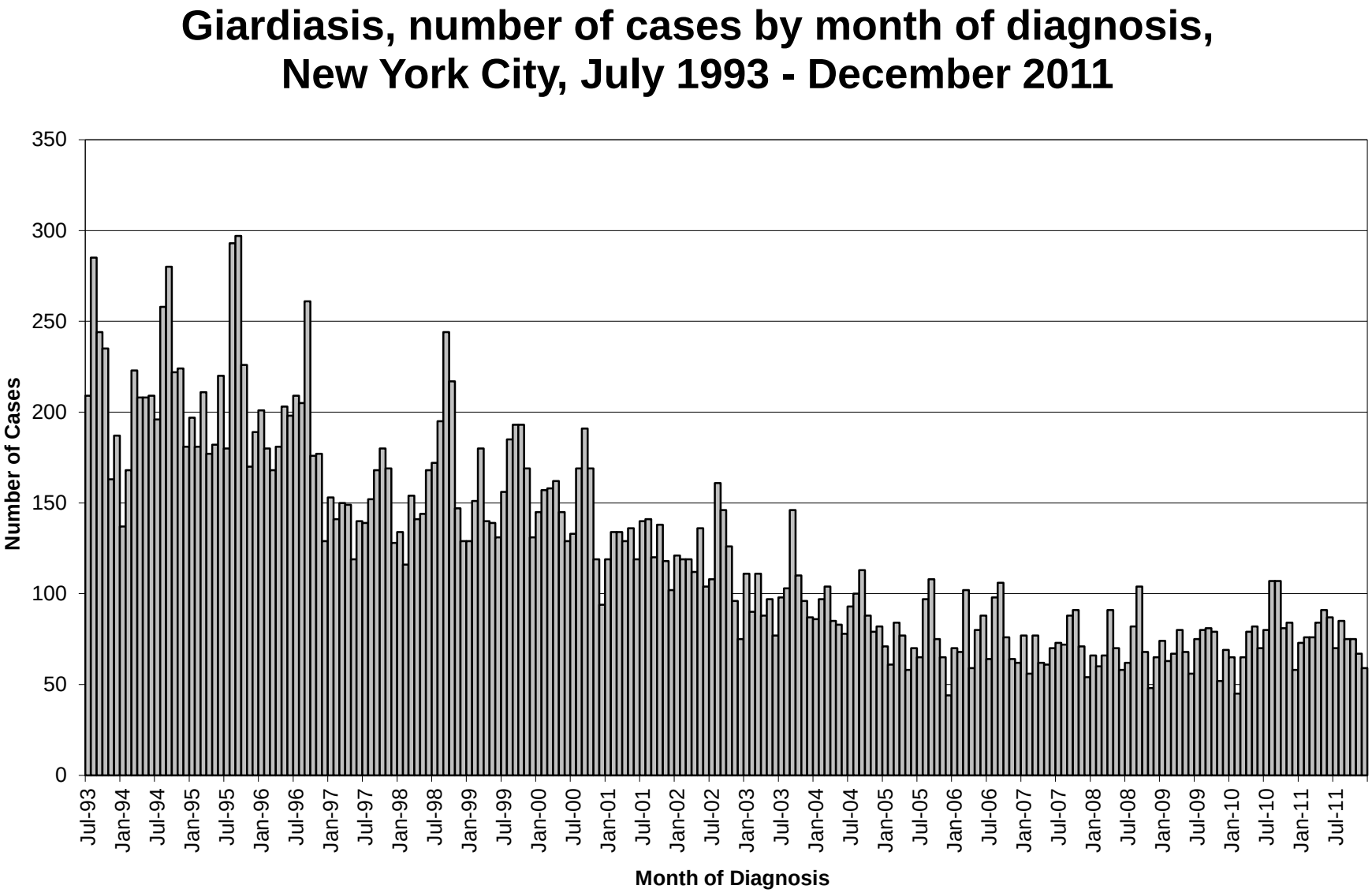
Risk Mitigation Efforts (cont'd)

- Waterborne Disease Risk Assessment Program (WDRAP)
  - Joint DEP and NYCDOHMH Program
  - Funding provided by DEP
  - Elements of Program
    - Active Surveillance
    - Syndromic Surveillance
    - Clinical Labs
    - OTC/ADM
    - Nursing Homes

Cryptosporidiosis, number of cases by month of onset



Giardiasis, number of cases by month of diagnosis



Risk Mitigation Efforts (cont'd)

- Reporting to Regulators
  - Monthly reporting of wildlife management program
  - Protozoan results emailed as soon as available
  - Communication Plan in case of elevated results
    - Cryptosporidium and Giardia Action Plan
  - WDRAP
    - Annual and semi-annual report

Summary

- DEP has been implementing a successful risk mitigation program both in the watershed and at Hillview Reservoir since 1993
- The current program at Hillview is comprehensive and goes beyond the elements of the Draft LT2
- No indication that wildlife provides a source of *Giardia* or *Cryptosporidium* to Hillview Reservoir
- Rates of cryptosporidiosis and giardiasis have been declining in NYC

Acknowledgements

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