



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

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

Four basic components:

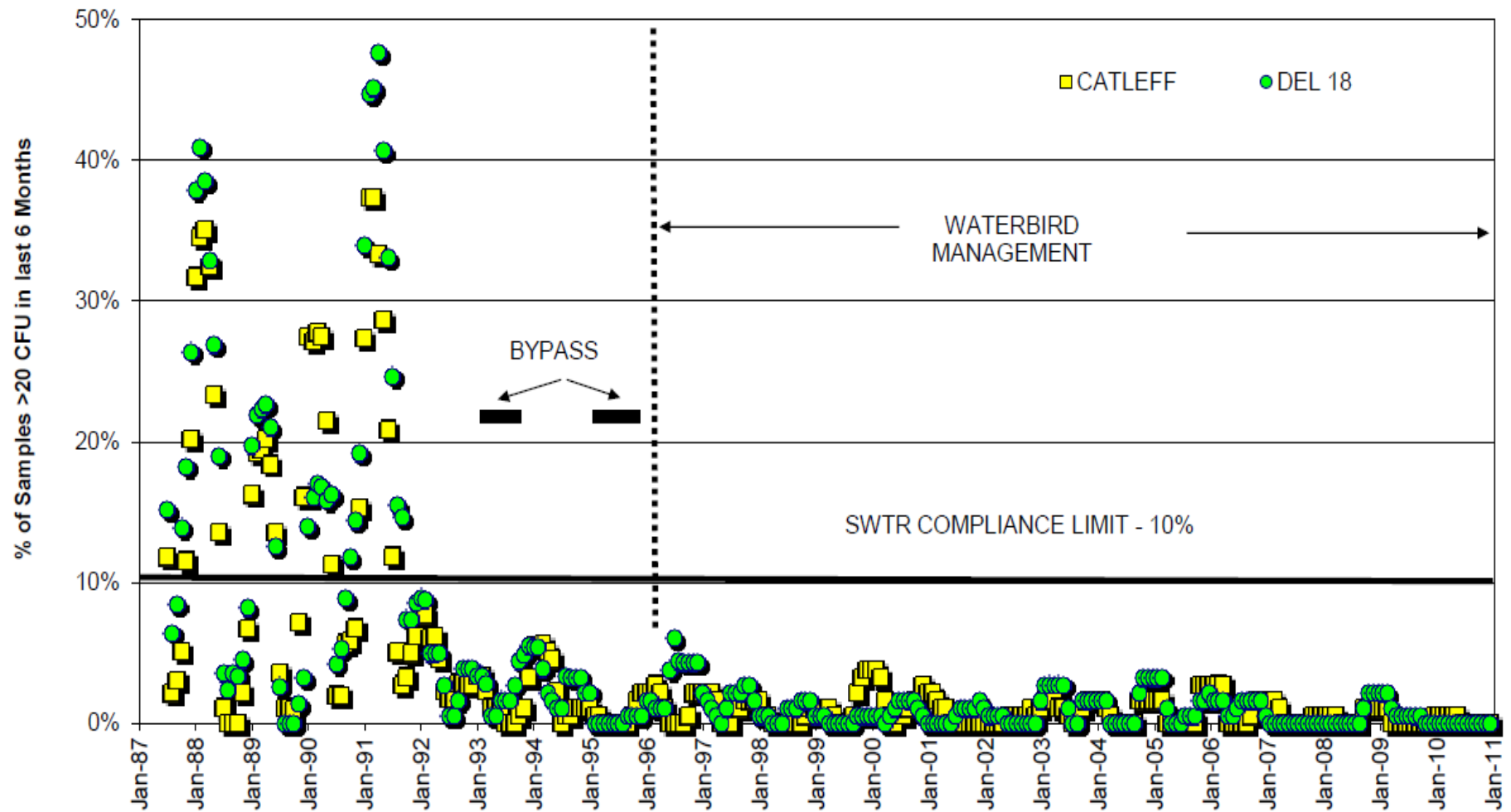
1. Waterfowl management program started at Kensico (1992)
 - Program includes waterbird surveys, harassment, and deterrence measures
 - Expanded to include five additional reservoirs (2002)
2. Kensico Cryptosporidium Action Plan-Response Actions for elevated oocysts (have not ever activated the plan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

A lesson learned:

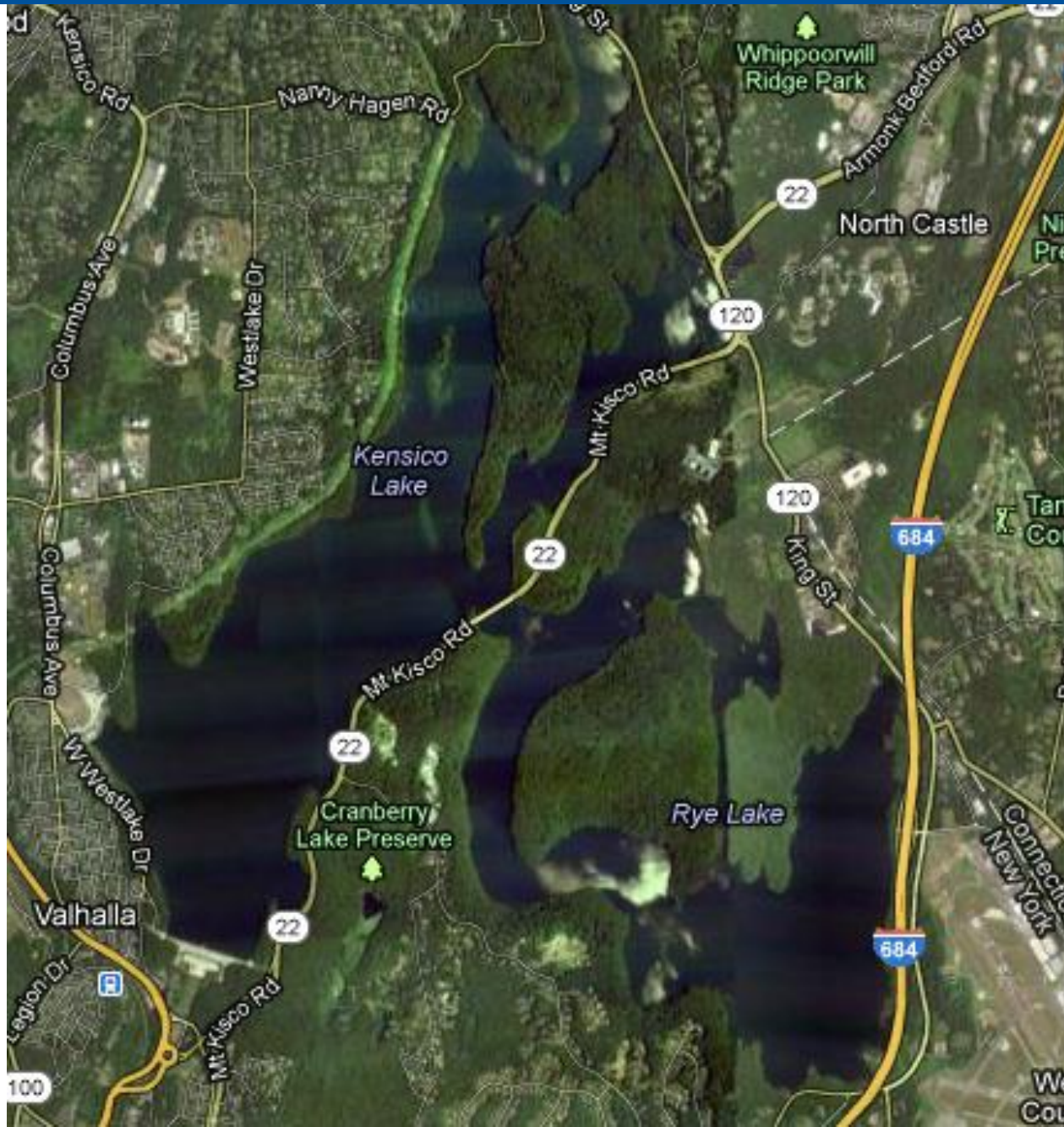
- Birds can be a significant source of fecal coliform concentrations in Kensico
- DEP has been able to implement an effective waterfowl management program to control fecal coliforms
- Waterfowl management is a key component of the City's continuance of Filtration Avoidance



Waterbirds and Fecal coliform-Kensico Reservoir



Kensico Reservoir



Hillview Reservoir

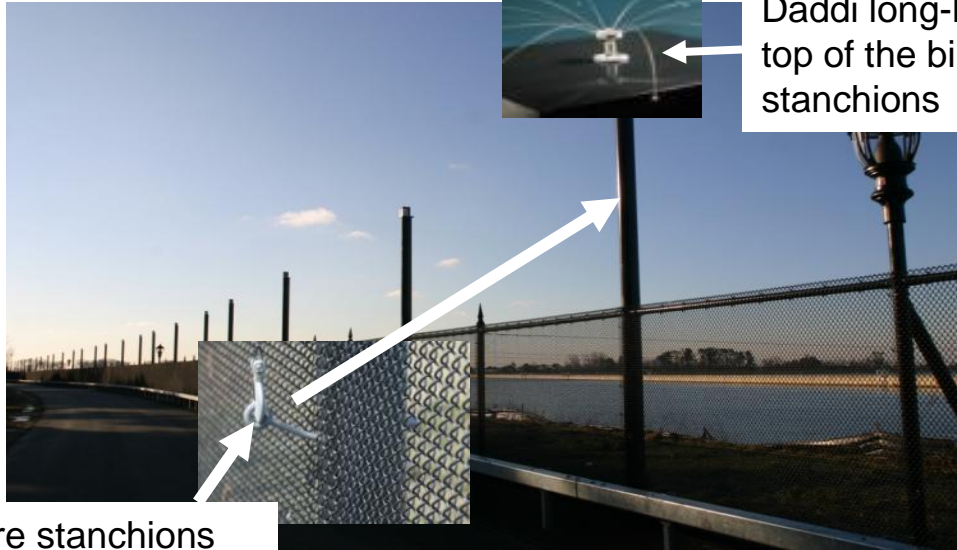


- ❖ Balancing reservoir that has been in operation - 90 years
- ❖ Surface area of 90 acres
- ❖ 900 MG capacity
- ❖ Average 450 MGD input
- ❖ Water residence time - 2 days
- ❖ 24/7 security and security barriers
- ❖ Elevated basin with drainage controls
- ❖ Chlorine used to provide at least 4-log virus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

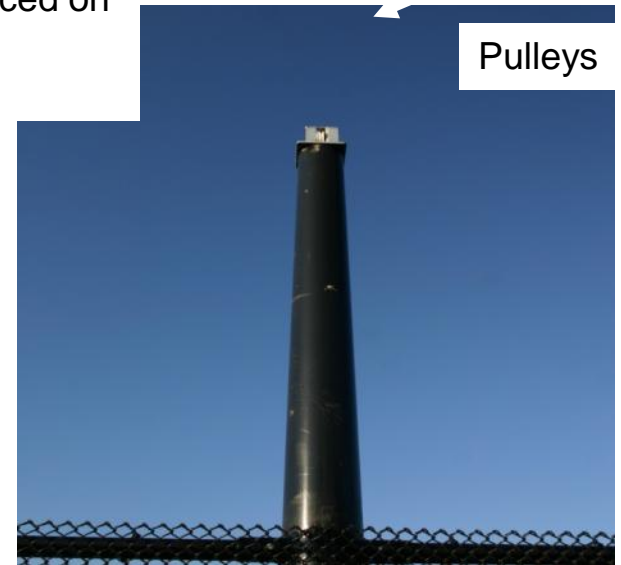
Wildlife Management at Hillview Reservoir:

- ❖ 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

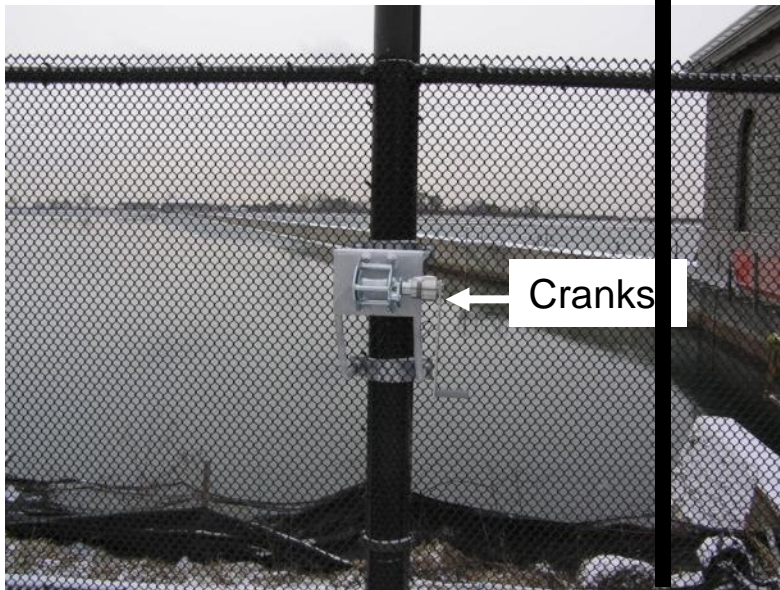


Daddi long-legs placed on top of the bird wire stanchions



Pulleys

Bird wire stanchions with pulleys & cranks



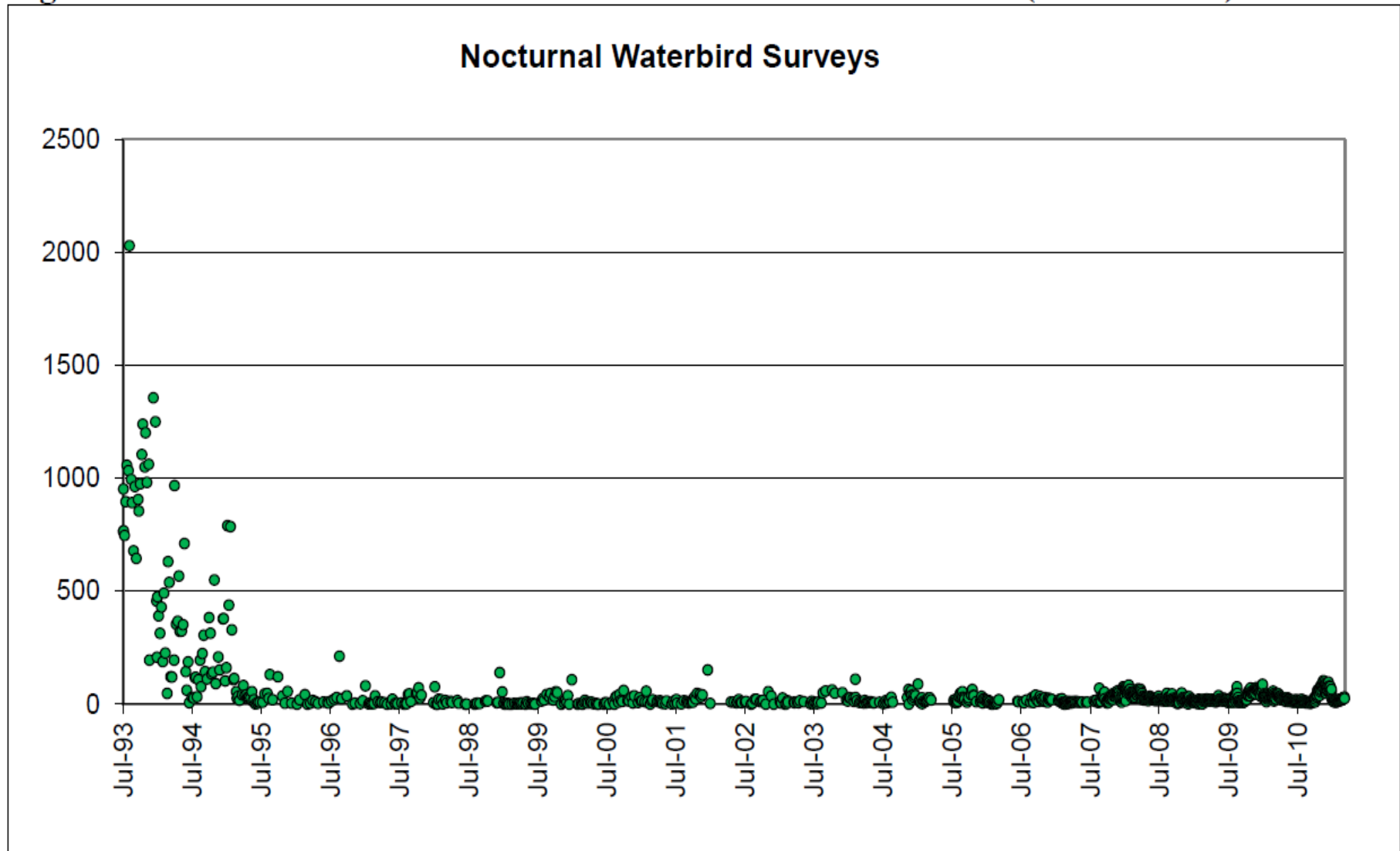
Cranks



Propane cannons with solar panels on the dividing wall

Hillview Reservoir-Waterbird Counts

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



- ❖ 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)

❖ 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

❖ 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



HILLVIEW CRYPTOSPORIDIUM AND GIARDIA ACTION PLAN

Guidelines for Inter-Agency Notifications and Coordination

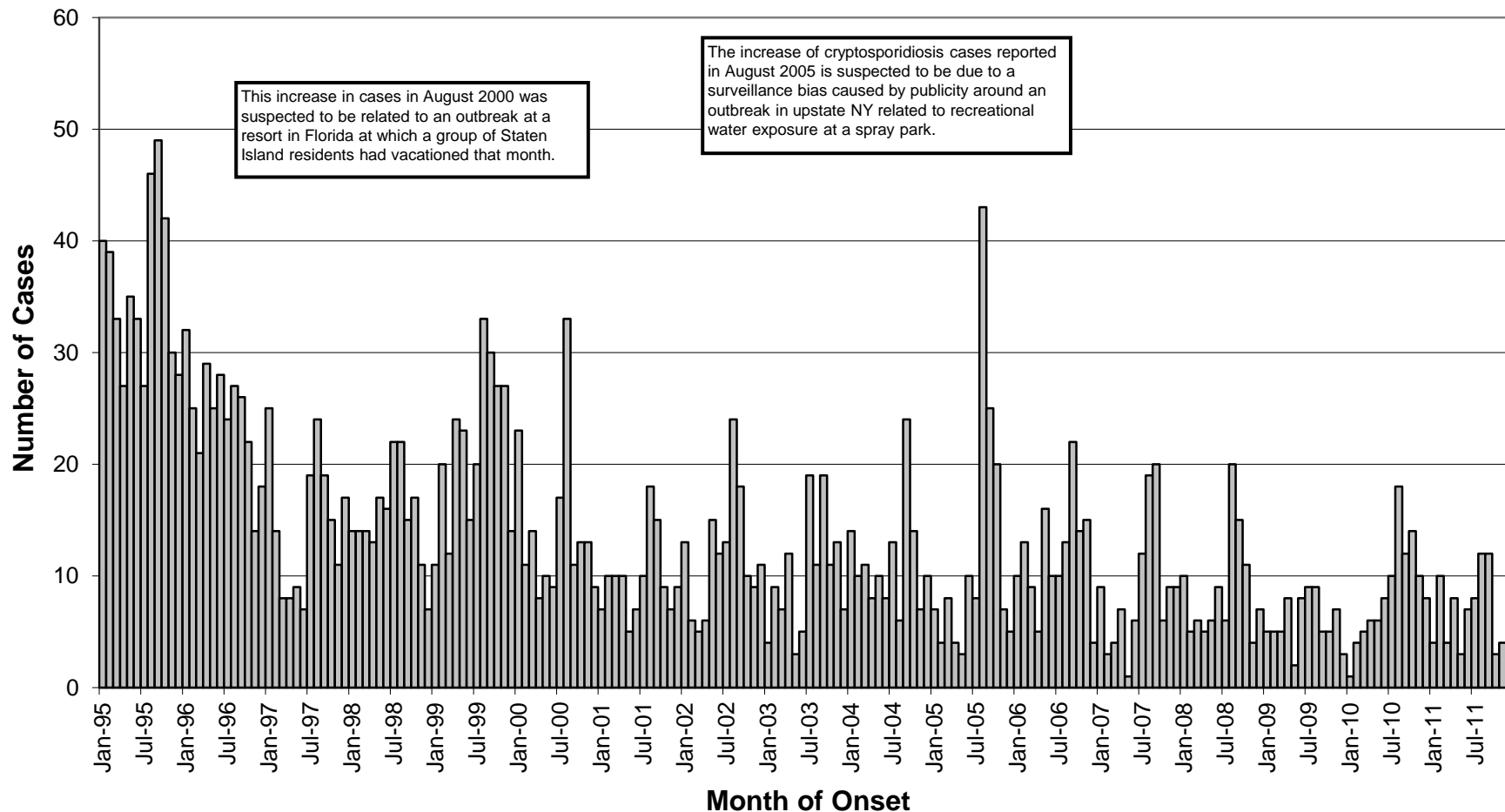
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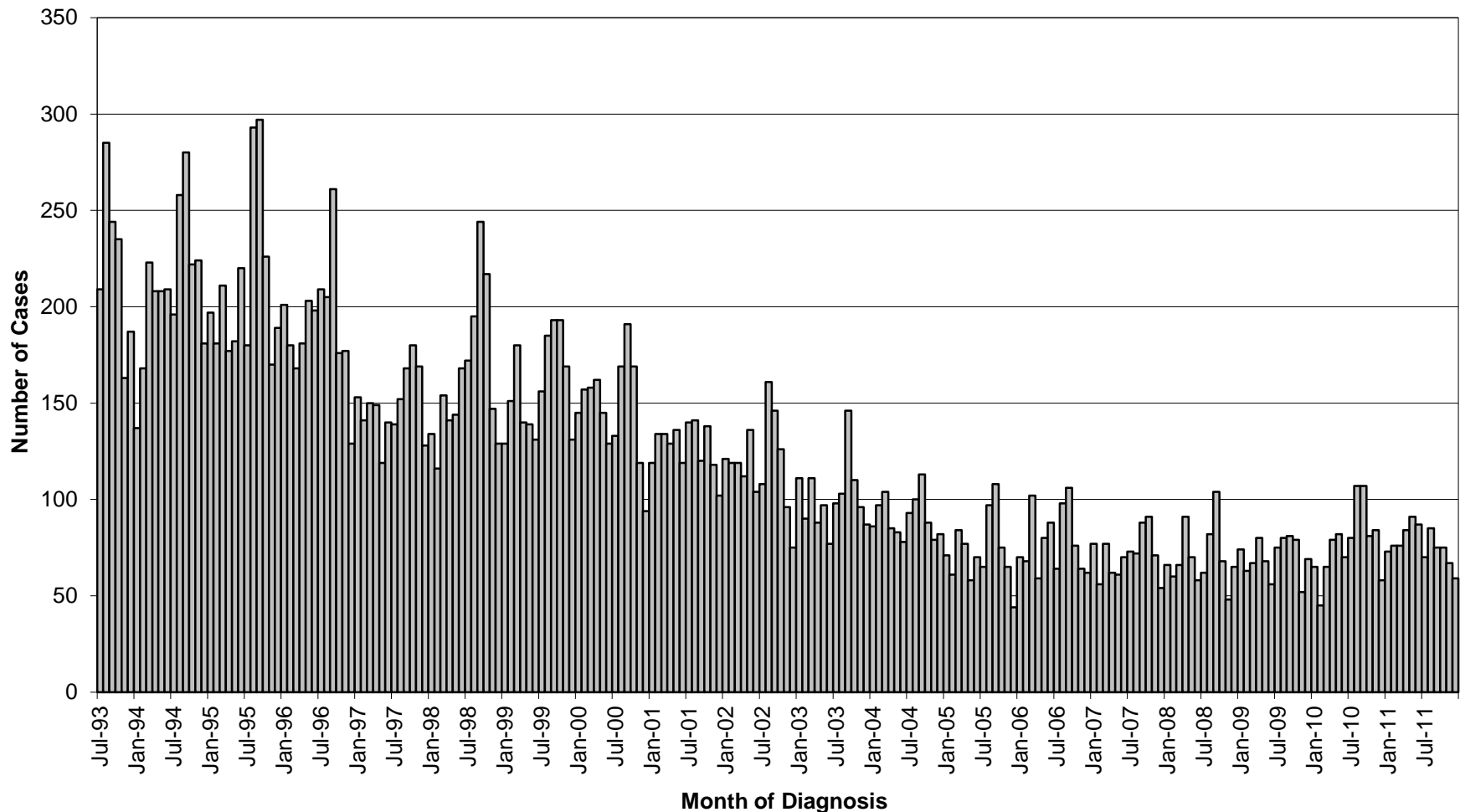
Carter H. Strickland, Jr., Commissioner
Paul V. Rush, P.E., Deputy Commissioner Bureau of Water Supply
Steven C. Schindler, Director of Water Quality

- ❖ 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, New York City, January 1995 - December 2011*



Giardiasis, number of cases by month of diagnosis, New York City, July 1993 - December 2011



❖ 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

- ❖ 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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