Managing the Delaware River

The 1954 Supreme Court Decree, the Good Faith Agreement, and the Flexible Flow Management Program

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The New Jersey Perspective

Part 1

August 22, 2014
Water Supply Advisory Council

Three-Part Presentation to WSAC

1) History: Part 1 (8/22/14)
   - Background, 1954 Decree and 1960's Drought

2) History: Part 2
   - Drought response, Good Faith Agreement, and Flexible Flow Management Program

3) Core Issues and Status of Negotiations
   - Unresolved/ongoing issues and options for resolution

Goals: Educate NJ stakeholders

Gain support for NJDEP position and actions

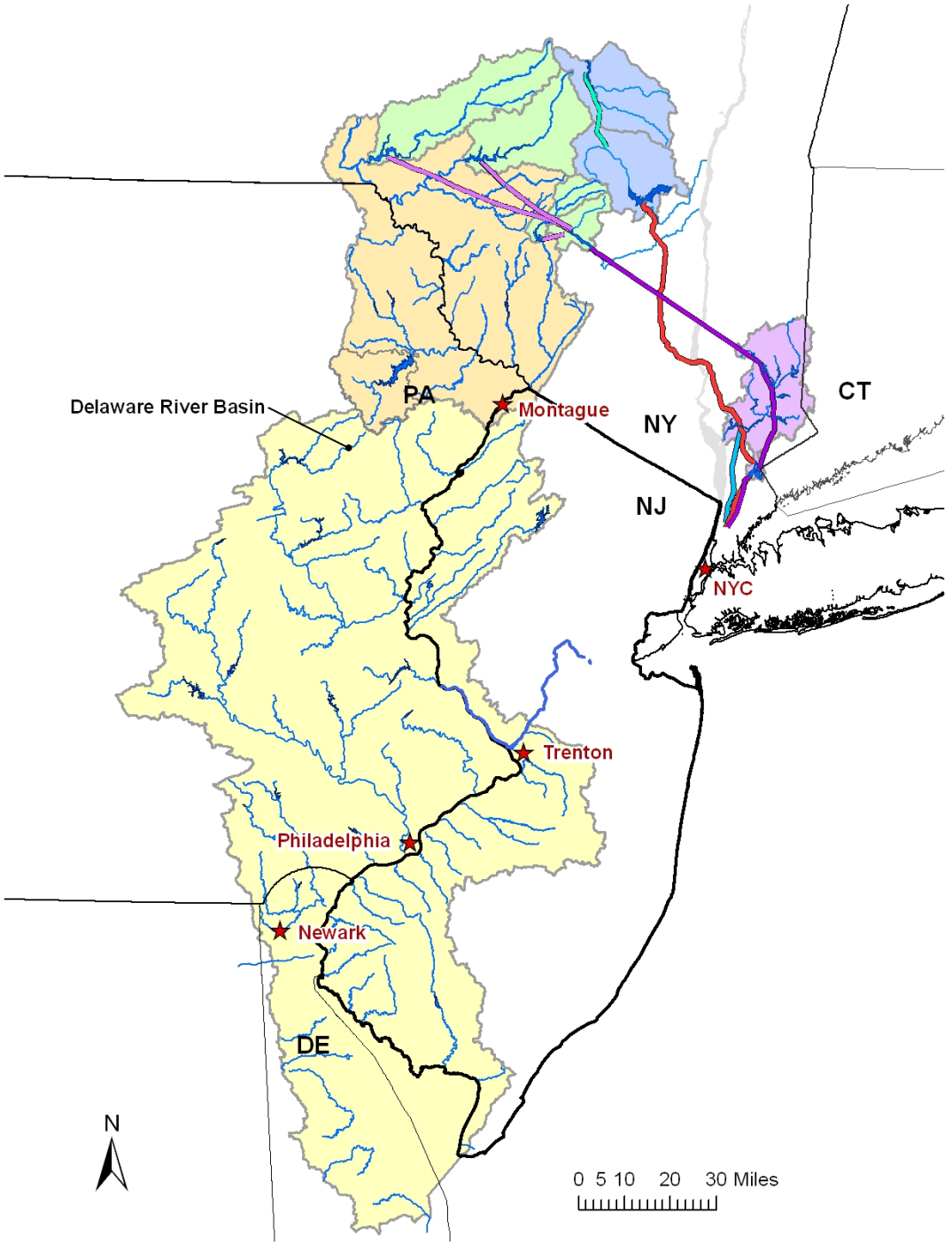
History - Part 1

- Overview of Delaware Basin and NYC Water Supplies
- Basics of NYC Water Supply Operations
- 1954 Decree
  - Decree Parties vs DRBC
  - Safe yield
- 1961 to 1967 Drought of Record

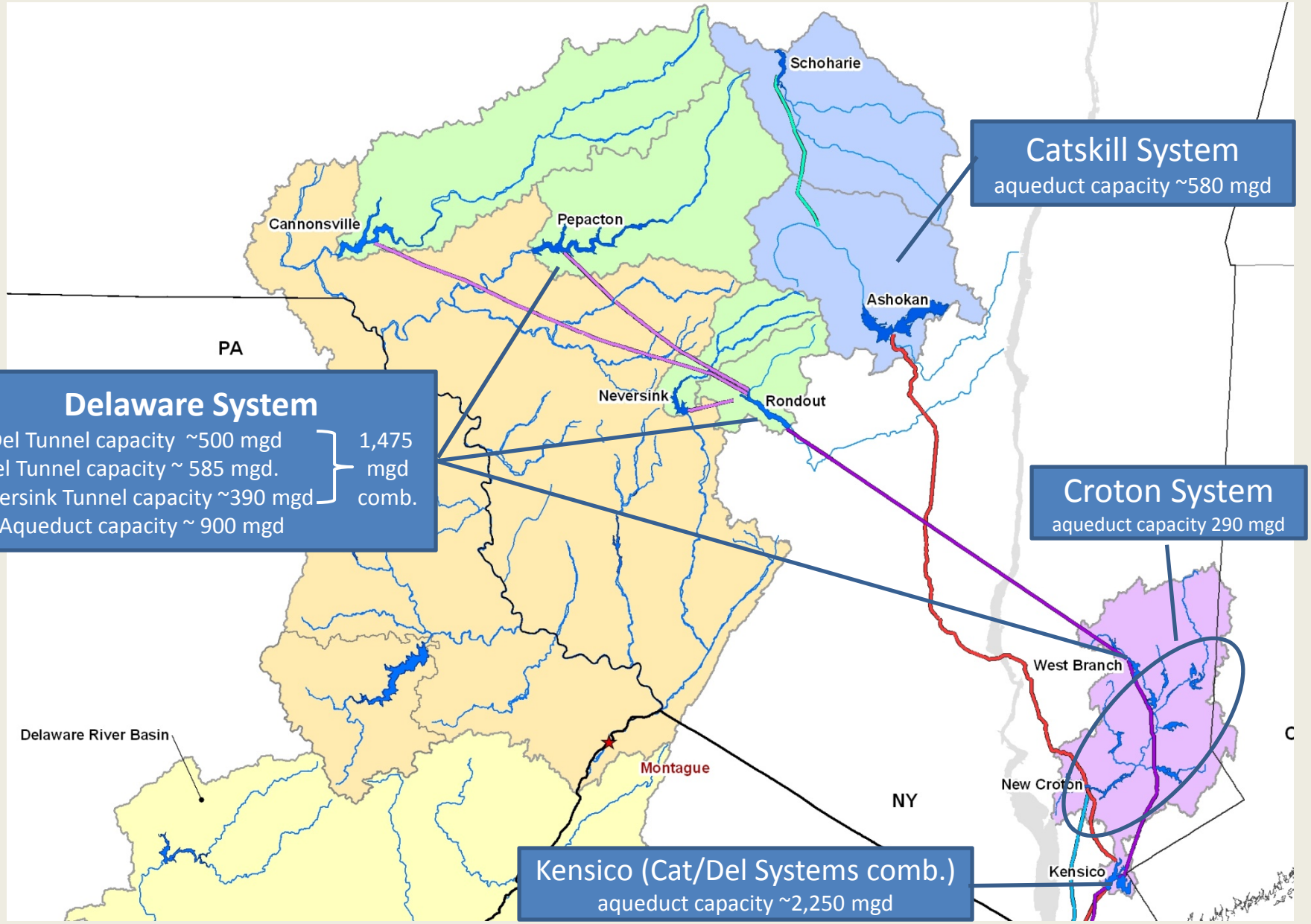
Reservoir Systems

- ***NYC Croton System***
  - 10 reservoirs, 77BG
  - built ~1850 to 1905
- ***NYC Catskill System***
  - 2 reservoirs, 141 BG
  - built ~1907 to 1927
- ***NYC Delaware System***
  - Rondout Reservoir, 50 BG
  - built 1928 to 1937

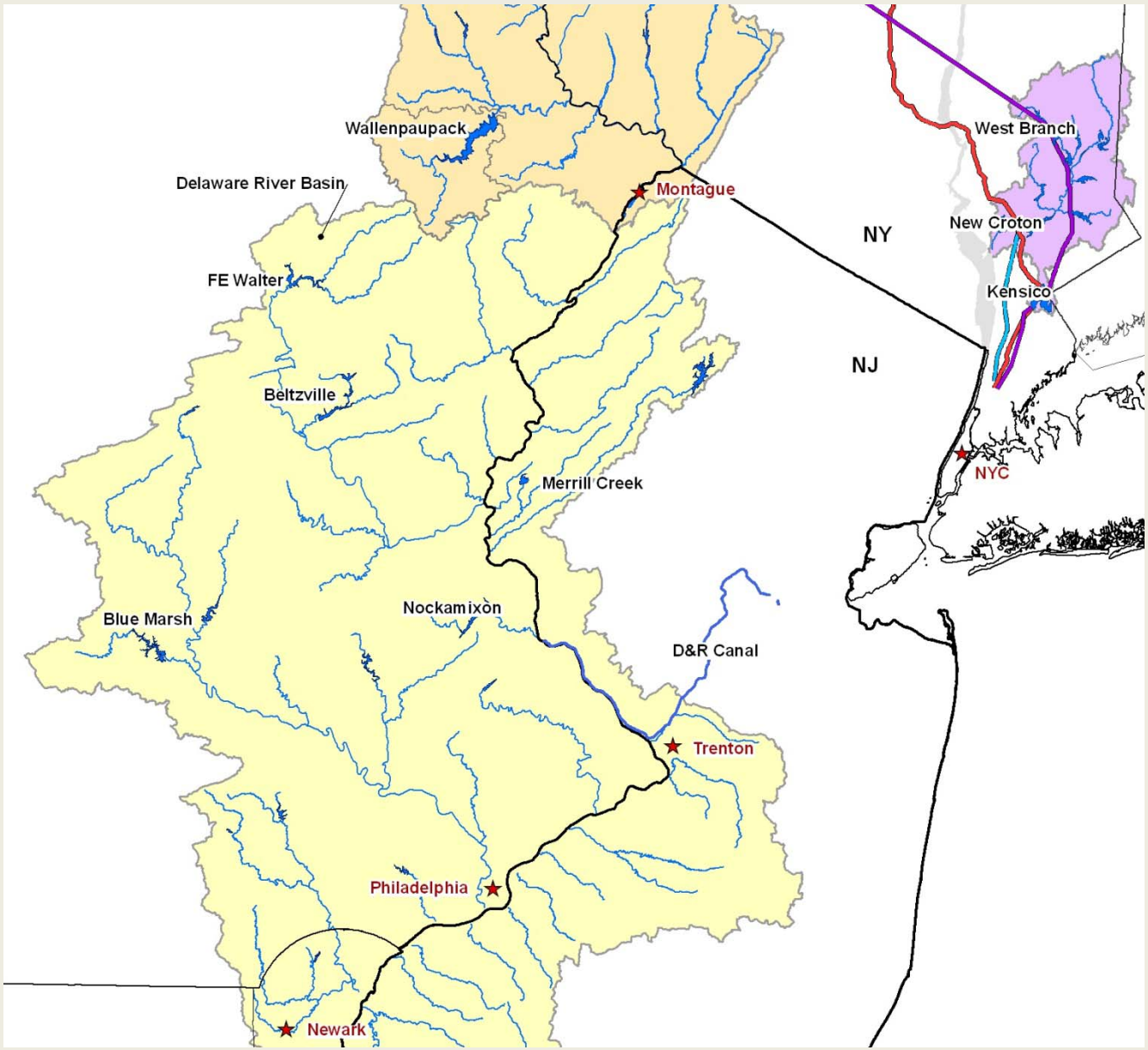
  plus West Branch/Boyds Corner (in Croton WS)
- **Trigger for 1931 Decree**
- ***NYC Delaware System***
  - Cannonsville, Neversink and Pepacton Reservoirs, 175BG
  - built 1947 to 1964
- **Trigger for 1954 Decree**
- ***Non-NYC Delaware Basin***
  - built ~1925 to 1980



NYC Reservoir Systems



Non-NYC Delaware Reservoirs



Conditions Leading Up To 1954 Decree

- NYC's increasing demands
- NYC's expansion in to the Delaware Basin
- History of litigation between states
- Existing and expected NJ and PA Delaware Basin water demand

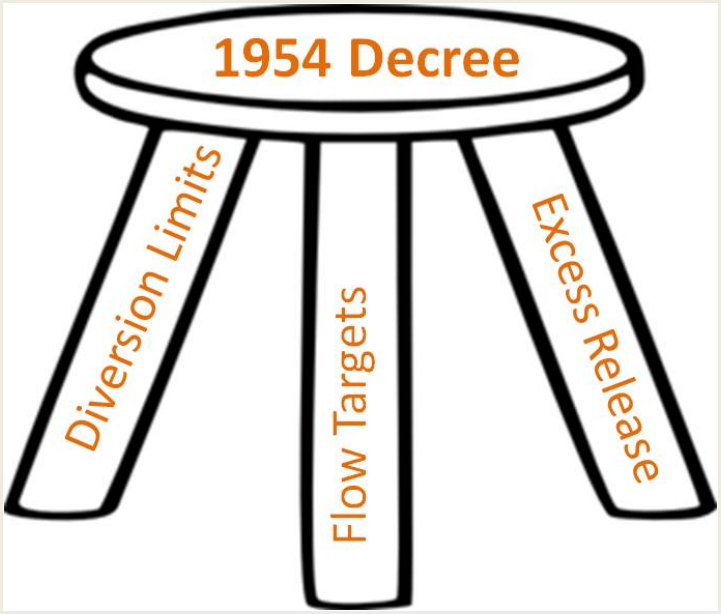
NJ Goes to Court (Again)

- In 1952 NJ again goes to the Supreme Court
- Primarily regarding Cannonsville Reservoir
- Files suit against NYC and NYS
- PA and Del join as intervenors
- Court appoints Special Master Kurt Pantzer
- Special Master's Report becomes basis for 1954 Decree

Core Equity Principles of the Decree

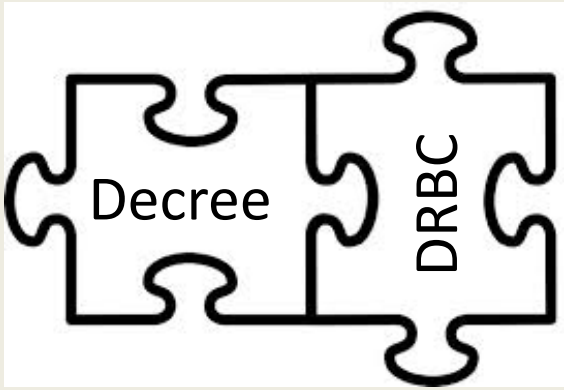
1. Out of Basin Diversion Limits
   - NYC at 800 mgd and NJ at 100 mgd
2. Instream flow requirement
   - NYC maintains 1,750 cfs in Delaware River at Montague NJ
3. Excess Release Quantity

All three required to maintain equity between Parties



Decree Party vs. DRBC

- Parties to the 1954 Supreme Court Decree:
  - NJ, NYC, NYS, Pa, Del
  - Relates to diversions and releases from the NYC reservoirs, and NJ's out of basin diversions (aka D&R Canal)
  - Office of the Delaware River Master - USGS
- DRBC includes:
  - NJ, Pa, NYS, Del, Feds
  - Established in 1961 via a federal-interstate compact
  - Fairly broad water resource jurisdiction, but specifically exempts Decree areas
  - Delaware River Basin Commission



1954 Decree Provisions for NYC

- "***enjoined***" from diverting water from Delaware Basin unless it meets certain conditions
- diversion out of the Delaware Basin is limited to 800 mgd (running average since June 1st)
- "***shall***" release water to maintain flow in the Delaware River at Montague at 1,750 cfs all the time
- "***shall***" release some of its unused water (in addition to Montague releases)
  - ERQ: Excess Release Quantity
  - 83% of difference between NYC's total demand and its "*continuous safe yield… of all its sources obtainable without pumping*"
  - Consumption can not exceed 7 ¼ BG from any previous year
  - ERQ can not exceed 70 BG or cause flow to be greater than 2,650 cfs at Montague
  - Safe yield is 1,665 mgd

What is Safe Yield?

- No universal definition of safe yield exists
- Generally defined as the amount of water available to a water supply system during a repeat of the drought of record (or some other return period) while meeting all other requirements, e.g. passing flows or minimum storages
- 1954 Decree uses terms “safe yield” and “continuous safe yield”
- Definition not in 1954 Decree, but:
  - 1,665 mgd based upon the 1930s drought
  - no pumping
  - includes a 25% reserve in the Hudson basin
  - 0% reserve in the Delaware basin
  - negotiated number with actual hydraulic/hydrologic yield up to 1,800 mgd

"***Without Pumping***"

- A detailed reading of Special Master's Report and supporting 1954 Decree documents indicates:
  - Pumping refers to distribution system or service area pumping to get water to higher elevation buildings in NYC
  - Does NOT refer to pumped storage, raw water pumping, or pumping through treatment facilities
  - Phrase has caused confusion

Excess Release Quantity

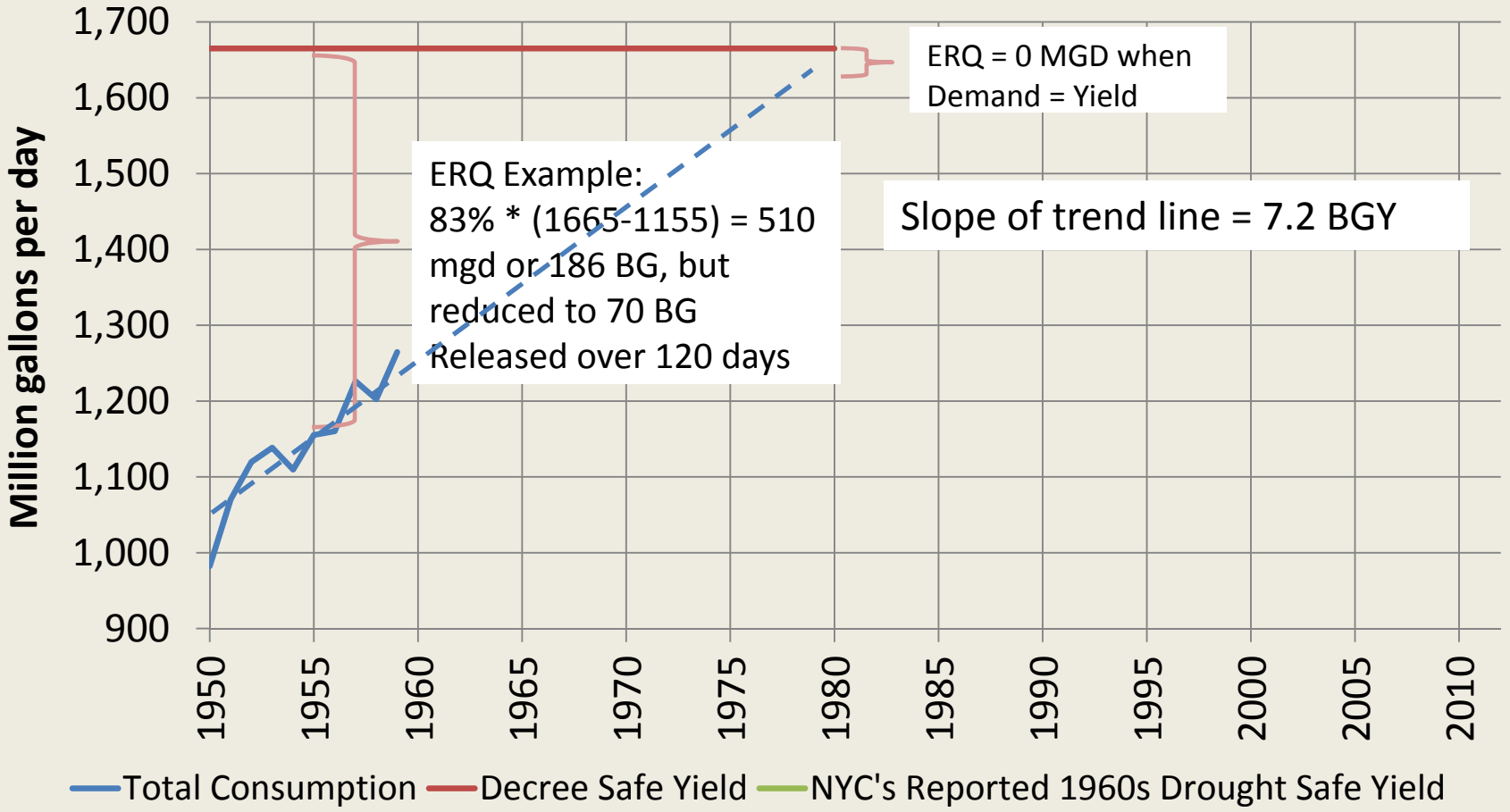
- Prevents overdrafting the Delaware Basin Reservoirs, i.e. NYC's selective use of one source of water over another.

- Directly links safe yield of reservoirs outside of the Delaware Basin to the Delaware Basin and the 1954 Decree

  From *Notes of NYC Chief Engineer Kennison on Provisions of the Decree*: (1955, DRBC files, unpublished)

  > "We also agreed to the wording which in effect makes it impossible for New York to overdraw its Delaware account, since Pratt and I both concluded that it is merely a matter of New York's adjustment of its storage drafts between the different reservoirs in all the City's systems, and not only something which New York could easily regulate, but also something which New York can do just as well as not, and without damage or inconvenience."

NYC Consumption and Supply



1954 Decree Provisions for NJ

- NJ "*may*" divert outside the Delaware Basin without compensating releases 100 mgd as a monthly average and up to 120 mgd on any one day

- "if and when" NJ builds new storage for compensating releases it "may" increase its out of basin diversion, but the diversion to those compensating release reservoirs can not exceed a 100 mgd monthly average in July through September

Other 1954 Decree Provisions

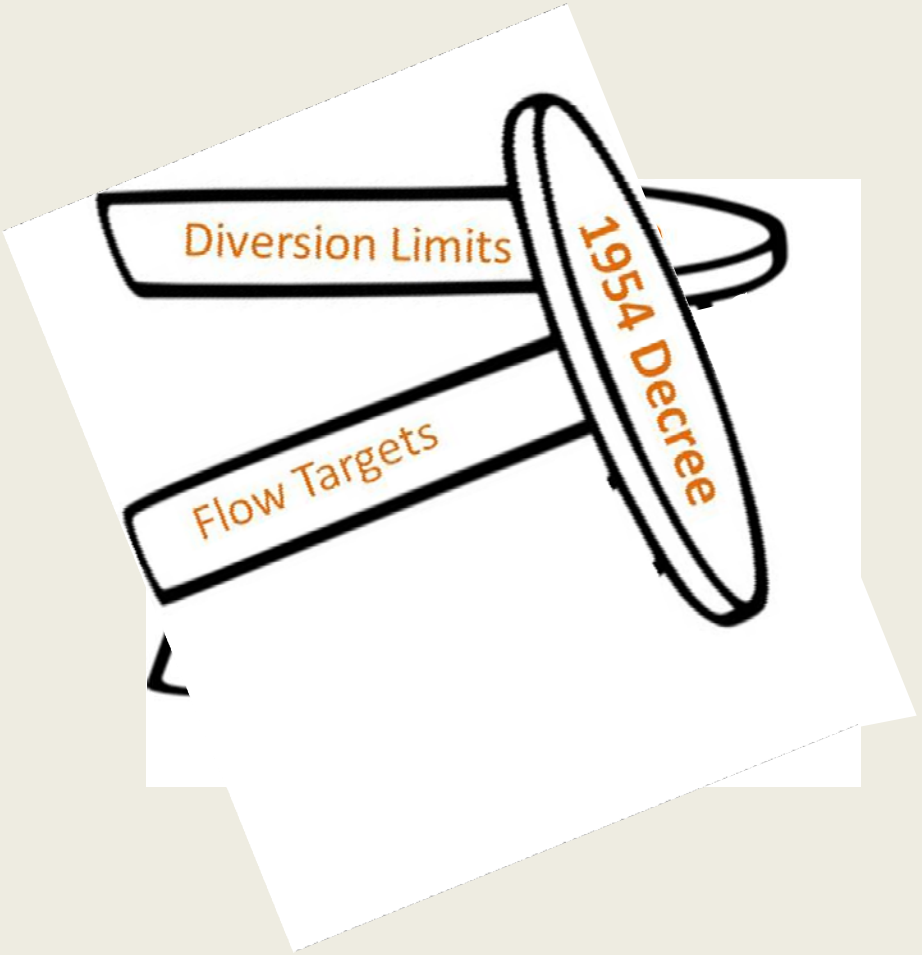
- Court established the Office of the Delaware River Master with "*general*" and "*specific*" duties:
    - Designated USGS Chief Hydraulic Engineer as RiverMaster
    - "Administer the provisions of this decree relating to yields, diversions and releases so as to have the provisions of this decree carried out with the greatest possible accuracy"
    - Oversee release program, compile data, report to Court, etc

1954 Decree

- Did not include:
  - Conservation/minimum releases
  - Flood mitigation procedures
- Did not envision reductions in demand
  - water conservation
  - changes in demand patterns
- Requires unanimous consent from all parties to modify

Core Equity Principles of the Decree

- Out of basin diversion Limits
- Instream flow requirements
- Excess Release Quantity
- All three required for equity among the Parties



1961-1967 Drought of Record

- Severe drought conditions for multiple years across the NJ/NY and the entire northeastern US region
- What happened…
  - Salt front at RM 102, 8 miles from Philadelphia intake
  - NYC releases suspended
  - Numerous Montague flows below 1,000 cfs and as low as 550 cfs.
  - NYC reservoirs below 10 % usable storage
  - Cannonsville Reservoir not completed
  - Water use cutbacks imposed
  - Salt water intrusion into aquifers
- Became apparent that the 1,665 mgd safe yield was not sustainable and new drought of record had occurred

NY Times Archives

U.S. Declares 4-State Drought Disaster; City Allowed to End Delaware Diversion

200 Million Gallons a Day to Be Put in 'Bank' for Use in an Emergency

By WARREN WEAVER, Jr.
Special to The New York Times

WASHINGTON, Aug. 18—New York City was relieved today of its obligation to pour 200 million gallons of water into the Delaware River system every day.

What Drought Hath Wrought

This weekend's torrential rains brought only minor abatement in the metropolitan area's desperate shortage of water. The shortage both here and throughout the Northeast is compounded of nature's inconsistency and man's reckless profligacy, with man most to blame. Ten years ago the Board of Water Supply was saying here: "New York City is assured a plentiful supply of the finest water for the rest of this century." A four-year drought has upset all calculations.

Meanwhile, until the present scare, the city has been using water like a spendthrift. Even now, as the whole surrounding area is in dire emergency, Mayor Wagner is reported to have made the complacent comment—though he cannot really be complacent at this point—that "I don't think anyone will have to go without a bath."

Drought in Northeast

When the statistics are all in, they may well indicate that this year's drought in the Northeast may be approaching a long-term record for regional dryness. A drought last year was broken in August, but the current dry spell persists, with no relief in sight.

The reason is a shift in the winds. Ordinarily they blow counterclockwise from the South, bringing moisture from the Gulf of Mexico. In the last few weeks they have been blowing clockwise from Canada, bringing little but dehydration. The dry Canadian winds are in turn associated with a high-pressure system that has been diverting any moist low-pressure systems from the West.

ENGINEER WARNS CITY CAN RUN OUT OF WATER IN 1966

Commission Told of Danger in Measures to Protect Philadelphia Supply

By McCANDLISH PHILLIPS
Special to The New York Times

UDALL FINDS CITY FACES A DISASTER ON WATER SUPPLY

'We're Walking on Edge,' He Tells Session Here, Ending 2-Day Tour

EXCHANGES ARE SHARP

Secretary Promises to Act Rapidly—Mayor Defends Measures in Crisis

Suburbs Attempting To Counter Drought

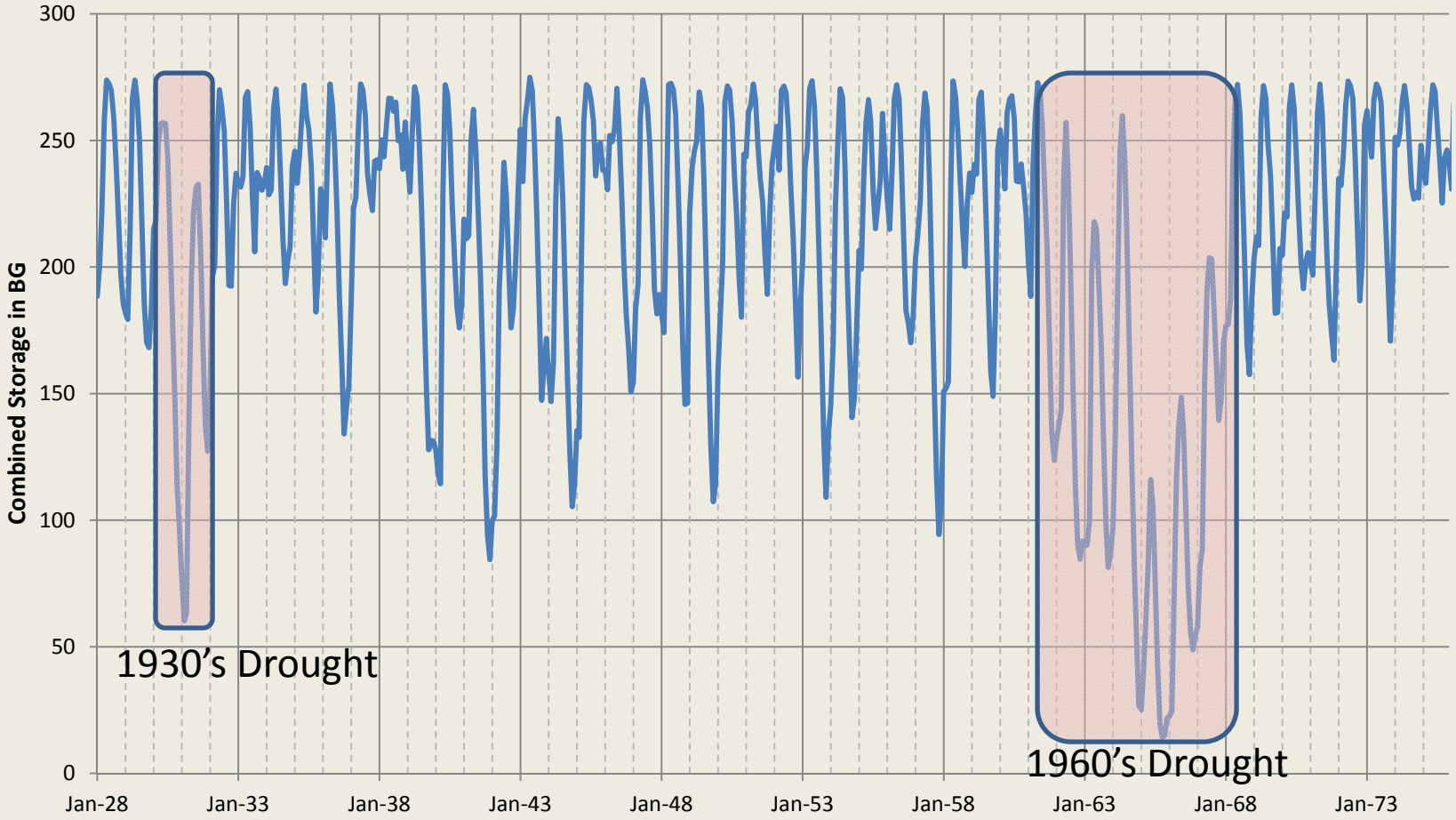
By HOMER BIGART

The forecast of continued drought drove some suburban communities to drastic attempts to conserve water yesterday.

Mayor Thomas J. Whelan of Jersey City proclaimed a "dire water emergency."

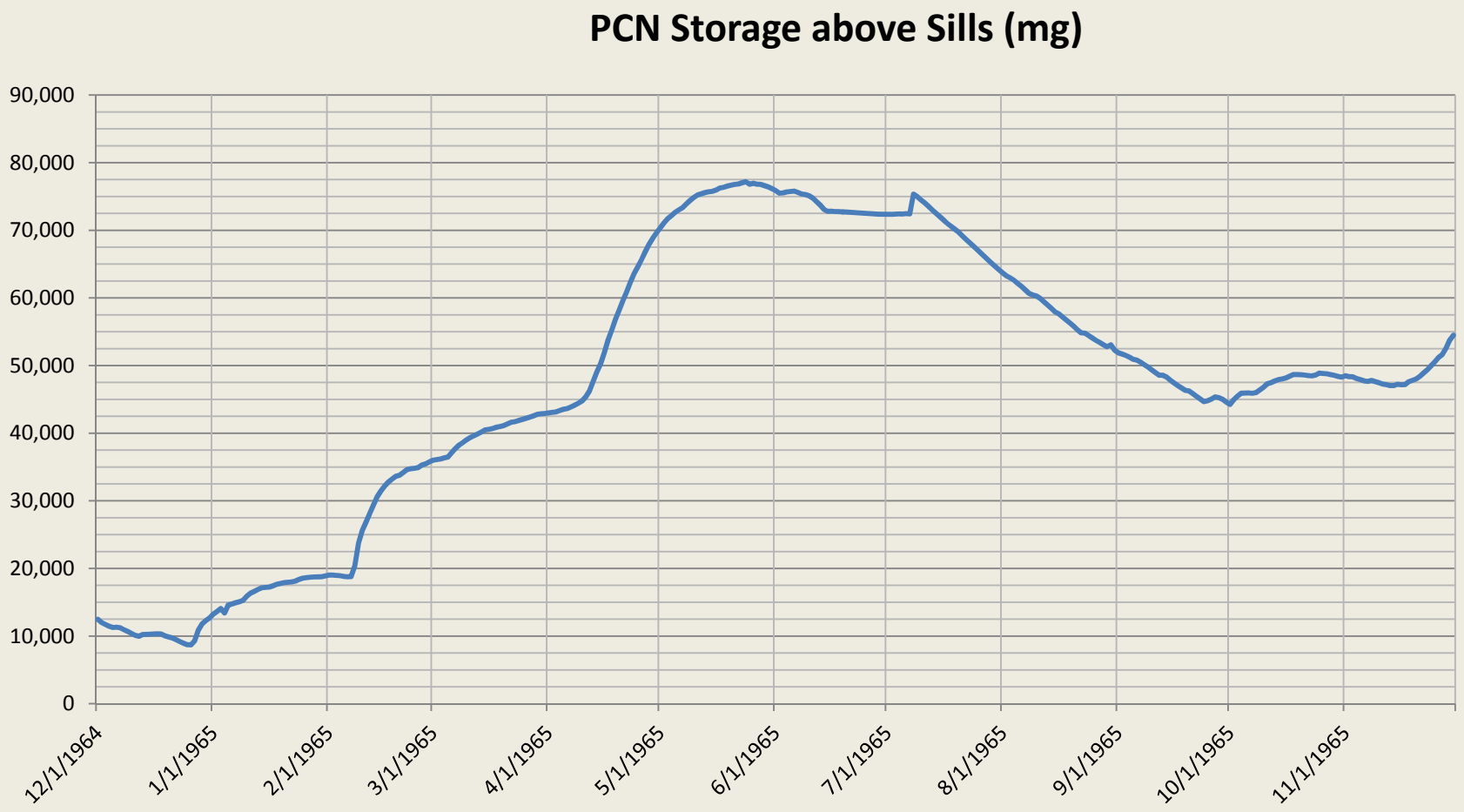
He threatened fines of up to $200 for persons who flush sidewalks, water lawns, wash autos or allow their household pipes to freeze. He acted as the city's reservoir at Boonton, N. J., fell to 36 per cent of storage capacity.

PCN Simulated
Combined Monthly Storage

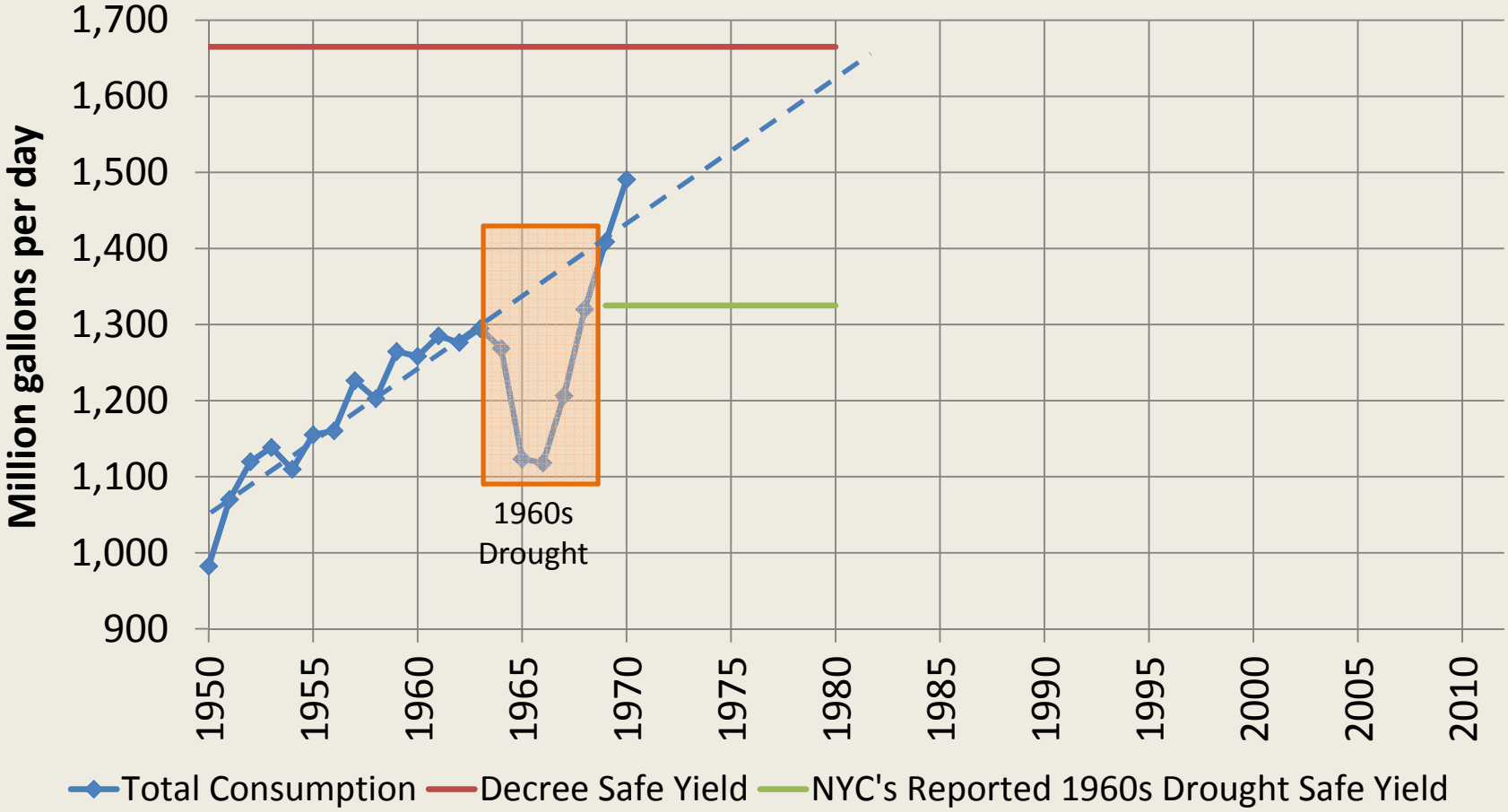


PCN = Pepacton Cannonsville and Neversink
From OASIS Model Output (not observed)

Observed PCN Storage



NYC Consumption and Supply: after the drought



Apparent that the previous upward demand trend continues, that demands now far exceeds supplies and that something needed to be done.
Either increase supply or decrease demand.

History -- Part 2

(next WSAC meeting)

- Drought Response
- Water supply studies and options
- Coordinating Committee Report
- Alternative Release Reports
- Good Faith Agreement
- DRBC Docket D-77-20
- Revisions 1 through 9
- Flexible Flow Management Program

Questions?

Acknowledgements:
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