USE OF A REGIONAL GROUNDWATER MODEL FOR SOURCE WATER ASSESSMENT AND PROTECTION
SUFFOLK COUNTY, LONG ISLAND, NY

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SCWA GENERAL INFORMATION

- Location: Suffolk County, Long Island, NY
- Largest Supplier on Long Island (2nd largest in N. Y.)
- SCWA serves approx. 1.3 million people

- 2014 Avg. Day = 202 million gallons
- 2014 Peak Day = 459 million gallons
- 2014 Annual Total = 74 BILLION gallons
Location of SCWA Well Fields

Local supply, Local distribution

- 586 Active Wells
- 237 Well Fields
- 64 Storage Tanks
- Wells range from 50 ft. to 850 ft. deep
  - 50 gpm to 2400 gpm
Local supply, local distribution

SCWA well fields

Steve’s house
Local supply, local distribution
3 principal aquifers: unconsolidated sand and gravel

Estimated **70 trillion gallons** stored within Suffolk County’s aquifers

All groundwater derived from **precipitation** – no other sources

Designated a Sole source aquifer – EPA - 1978
Water table elevation and groundwater flow – upper glacial aquifer
Long Island Groundwater Divide
Cross Section - groundwater flow through the L.I. aquifer system
Early Attempts at Source Water Delineation

Flat water table - Simplest case

Zone of Influence

Groundwater influenced = Groundwater captured
Early Attempts at Source Water Delineation

Sloping water table (more realistic)

Contributing Area OR Zone of Capture

Groundwater influenced is NOT equal to Groundwater captured
REALITY: Source areas and flow paths
shallow v. deep wells
DELINEATING THE SOURCE AREAS FOR LONG ISLAND WELLS

- REALIZATION - Simple Shapes Don’t Work:
  - radius around well OR
  - Parabola based on flow rate
SUFFOLK COUNTY GROUNDWATER MODEL

Developed between 1996 and 2002
CDM Smith consultant
SCWA, SCDHS cooperators
Dynflow software
Simulating groundwater flow

Carmans River

Brookhaven Nat’l Lab

Groundwater flow paths

SCWA Country Club Drive wells (glacial)

SCWA Lambert Ave. wells (Magothy)
Modeling groundwater flow
vertical view

SCWA Lambert Ave. wells
(Magothy)

Groundwater flow path
Modeling groundwater flow

vertical view

SCWA Country Club
Drive wells (glacial)

Groundwater flow path
• Utilized **Suffolk County Groundwater Model** to delineate **Source Areas** to public supply wells

• Assumed simultaneous, annualized avg. pumping of all wells

• Maps of contributing areas were then provided for every Public Supply Well in Nassau and Suffolk (1300 + wells)
SUBGRIDS for better detail over smaller areas
Lincoln Ave. well no. 1 contributing area

25 year contr. area

5 year contr. area

Land uses within cont. area

Macarthur Airport

L.I.R.R.

C.R. 19
Lincoln Ave. #2 and #3 contributing areas
Lincoln Ave. well field – all 3 wells
Source Water Assessment:
Case Studies
Source Water Assessment Study using GIS data:
Nitrates in local wells vs. historical land use

Greenlawn WD well: Nitrates < 1 ppm

2013

Nitrates > 10 ppm

100 yr. capture zone for All wells at S. Spur Dr.
Source Water Assessment Study using GIS data:
Nitrates in local wells vs. historical land use

Greenlawn WD well

1947
Source Water Assessment Study using GIS data:
Nitrates in local wells vs. historical land use
Regional analysis: 100 yr. contributing areas – multiple well fields
Preventing water quality problems before they start:
Lakeview Avenue, Bayport
SWAP Map
Lakeview Avenue well field

- Contributing Area for shallow wells
- Parcel to be developed
Site Plan – Lakeview Ave.

STP located outside contrib. Area of glacial wells
Lakeview Ave. well field and Apt. complex
as constructed

New well #6 (Magothy)
SUMMARY

- Regional groundwater models were developed in the past 20 years to accurately determine groundwater flow in Nassau and Suffolk Counties under real world conditions.

- This model was utilized to determine the source areas to every Public supply well in Nassau and Suffolk Counties, and

- Focus preservation or remediation efforts for maximum benefit to public water supply.

- Model continues to be used to determine the potential impacts for a variety of land use and management decisions.
THE END