

Implementation of Sustainable Solutions to Protect Wilmington's Water Source

Chris Oh

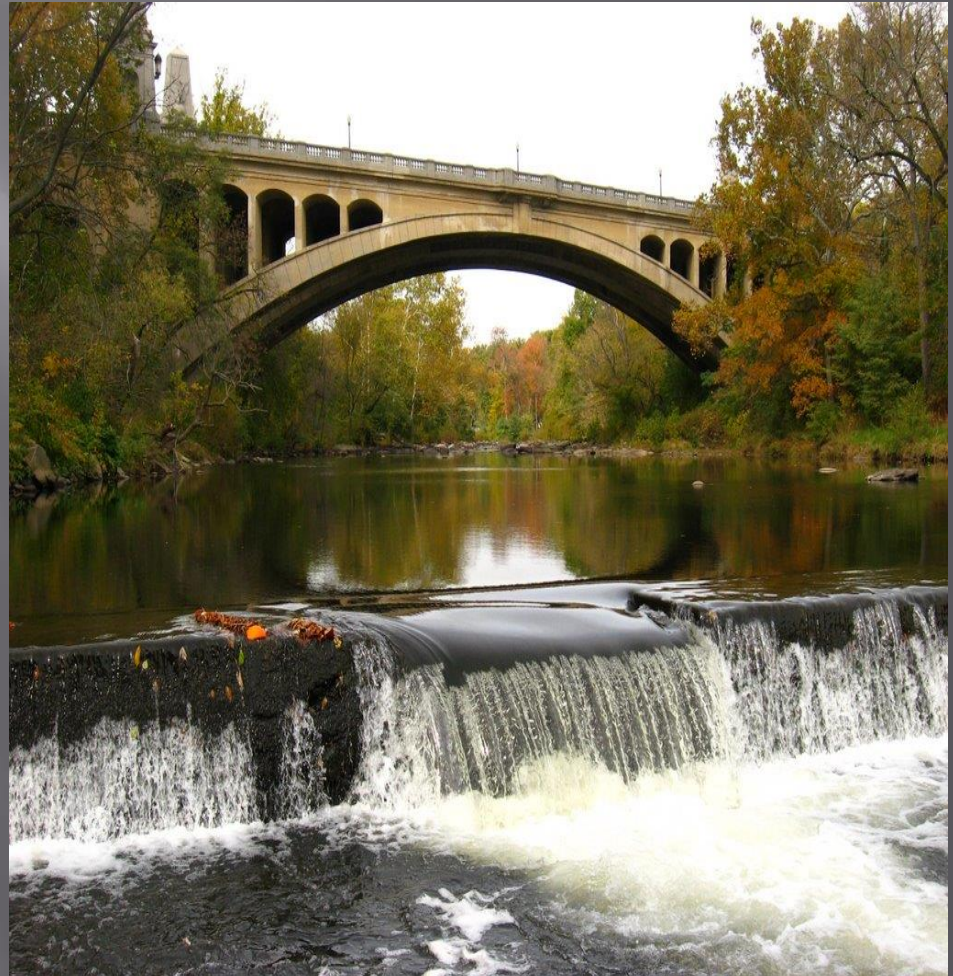
Assistant Water Division Director

City of Wilmington, Delaware

Wilmington, Delaware

Raw Water Source

- ▣ Primary source is the Brandywine Creek
- ▣ Secondary source is Hoopes Reservoir
 - ▣ 2.2 billion gallons of storage



Wilmington, Delaware Treatment

▣ Porter Filter Plant

- 36MGD design flow
- 16 MGD average flow
- Conventional filtration plant since the early 1950s
- Can service the entire service area if needed



▣ Brandywine Filter Plant

- 14 MGD design flow
- 4-6 MGD average flow
- Began filtering water in 1909.
- Was originally sand filtration, now microfiltration (membranes)



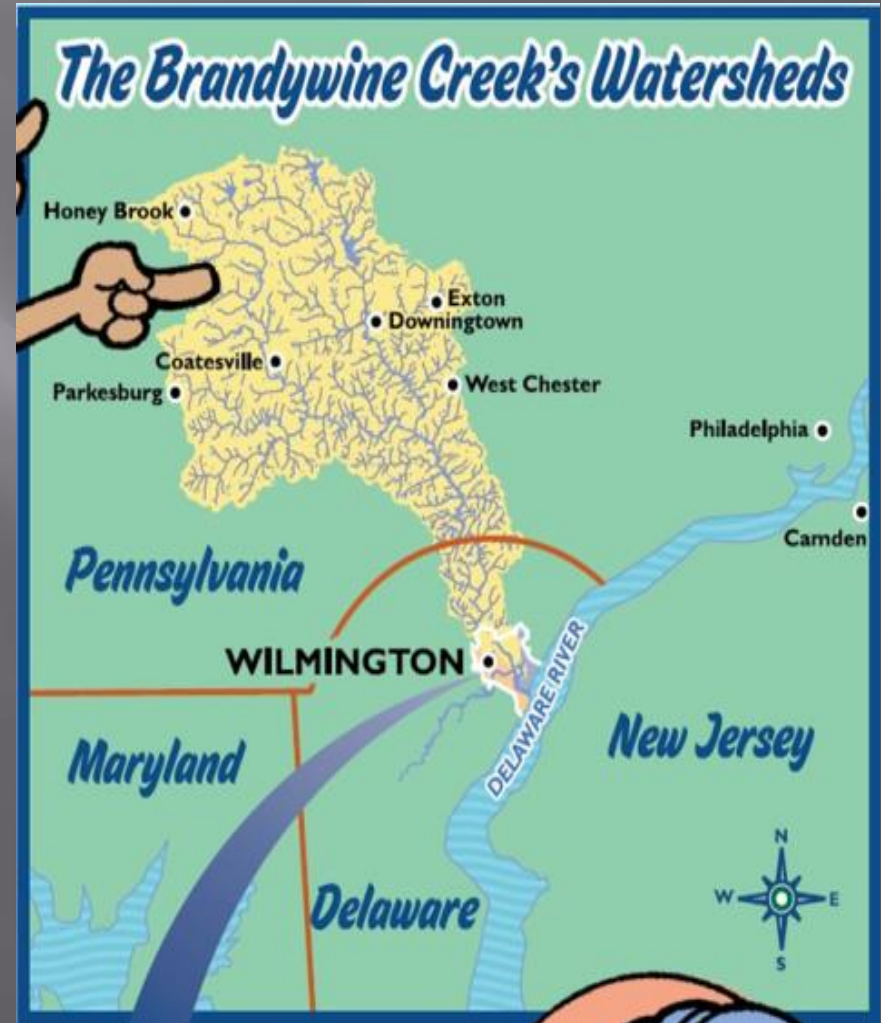
Specific Concerns

- ▣ Bacteria-Crypto, Giardia, E.coli, etc.
- ▣ Organics
- ▣ Chlorides (salts)

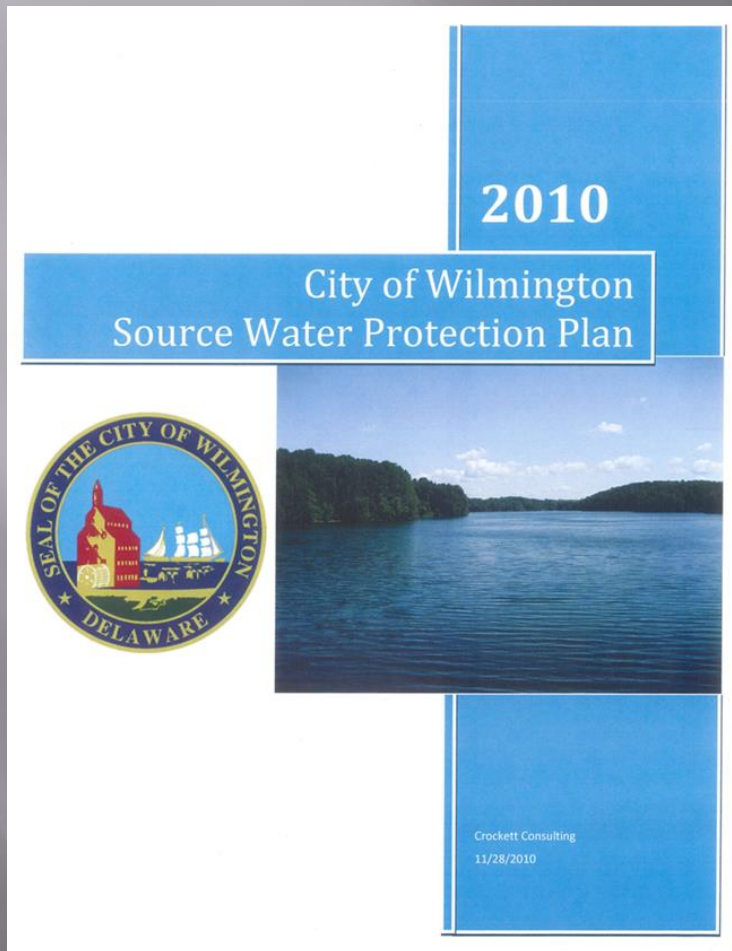


What did we do?

- ▣ 90% Drainage area is in another state
 - Need to depend on other's actions?
- ▣ The City of Wilmington needed to take action.
In 2006 we initiated the development of a Source Water Protection Plan



City of Wilmington Source Water Protection Plan



SWPP Developed to:

1. Better protect the water supply for future generations
2. Reduce long term operating costs while avoiding future treatment improvement costs through proactive watershed planning
3. Improve early warning and emergency communications
4. **Leverage upstream investments to protect the water supply through agricultural mitigation and farmland preservation**

City of Wilmington–SWPP

- ▣ Key Non Point Source Findings:
 - Contaminant loading estimates suggest non point sources are the most significant sources of pollution in the watershed.
 - Livestock and dairy cattle in particular are potentially the most significant source of pathogens and certain emerging contaminants in the watershed.

SWPP – Agricultural Preservation

- ▣ “The 2,700 acres of farmland along first order streams in the Honey Brook area on the West Branch represents prime agricultural parcels that should be the primary preservation target area of the initial 5 to 10 year period.”

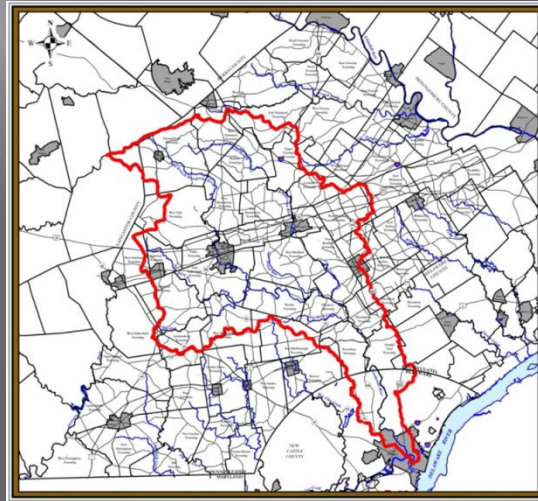
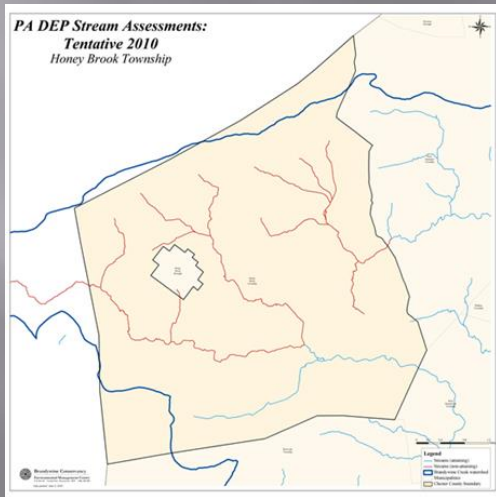


SWPP – Agricultural Mitigation

- ▣ “Mitigating agricultural impacts provides benefits to the water supply. It prevents and reduces pathogens such as *Cryptosporidium*, sediment, livestock pharmaceuticals, ammonia, nitrate, and phosphorus. A study by AWWA and the Trust for Public Lands of water supplies suggested that for every 4 percent increase in raw water turbidity, treatment costs increase 1 percent.”

To Preserve Water Quality – Target the Headwaters

- Both the east and west branches of the Brandywine Creek form in Honey Brook Township, PA



- ▣ Honey Brook is a top priority!!!

SWPP Honey Brook Investments – Preservation

- ▣ City of Wilmington Investment:
 - 2009 – 2017 = \$25,500
 - 5 Farms, 309.62 acres
 - BC Match = \$1,640,978
- ▣ Total Honey Brook Preservation:
 - \$13,032,397
 - 30.2%
 - 4,870.6 acres

Honey Brook Investments – Conservation

- ▣ City of Wilmington Investment:
 - 2009 – 2017 = \$202,500
 - BC Match = \$1,934,930

- ▣ Total Honey Brook Conservation:
 - Over \$3.2 million
 - Prepared or updated over 21 farm conservation plans, nutrient management plans, or grazing plans.
 - Implemented 85 BMPs on 42 farms, including:
 - ▣ 24.3+ acres of riparian buffers
 - ▣ 4,300+ trees planted
 - ▣ 5.2+ miles of stream bank fencing
 - ▣ 12 stabilized stream crossings
 - ▣ 12 new manure storage structures
 - ▣ 20+ acres HQ stormwater managed
 - ▣ Grass waterways, diversions, belting bars, cover crops, conversion to no-till farming, and a variety of other BMPs implemented

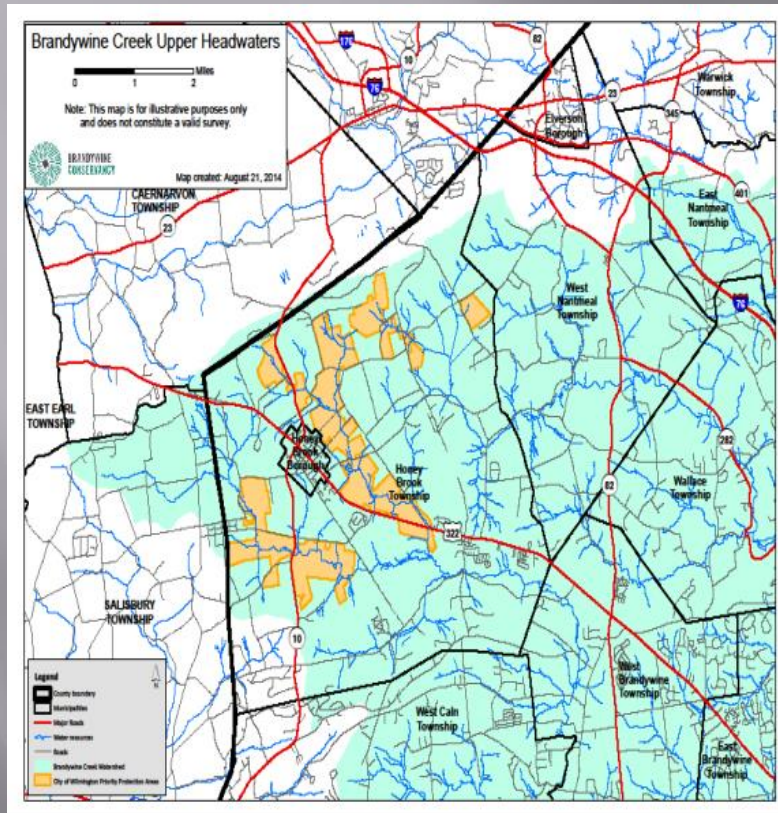
City of Wilmington Investment Leveraging Partners

- ▣ USDA: NRCS, FSA, ACEP
- ▣ Commonwealth of Pennsylvania:
 - ▣ Department of Agriculture
 - ▣ Department of Environmental Protection
 - ▣ Department of Economic Development
 - ▣ Department of Conservation and Natural Resources
 - ▣ Infrastructure Investment Authority (PennVest)
 - ▣ Chester County Conservation District
 - ▣ Water Resources Authority
 - ▣ Department of Open Space Preservation
 - ▣ Agricultural Land Preservation Board
- ▣ Chester County Solid Waste Authority
- ▣ Honey Brook Township
- ▣ Honey Brook Borough (pending)
- ▣ Academy Of Natural Sciences of Drexel University
- ▣ Brandywine Conservancy (and other private foundations)
- ▣ Mt Cuba Center
- ▣ National Fish & Wildlife Foundation
- ▣ Open Space Institute
- ▣ William Penn Foundation
- ▣ Preservation Partnership Program
- ▣ Brandywine Headwaters Easement Program

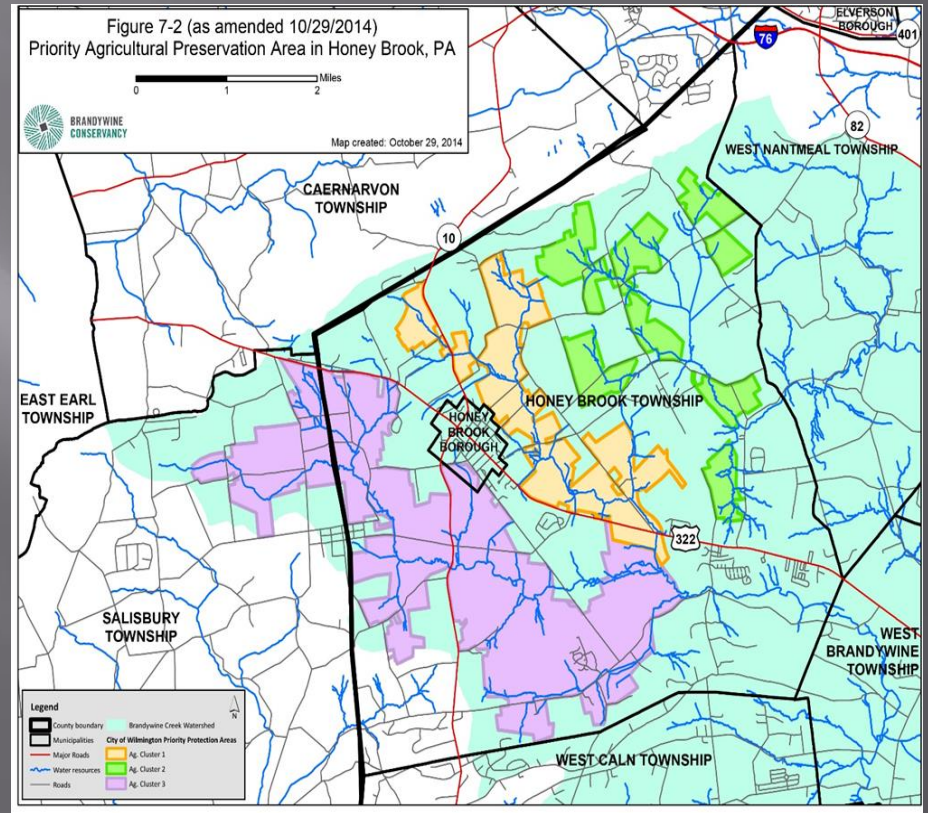
SWPP – Priority Agricultural Clusters

- ▣ From 2010-2014, the city's SWPP resulted in the preservation of over 1,000 acres on 15 farms in the agricultural priority areas of the Brandywine Creek.
- ▣ The SWPP ranked the Upper West and East Branches of the Brandywine Creek the highest priorities overall for agricultural protection and mitigation.
- ▣ As a result of the collaborative work we had to reexamine priority areas to include properties directly adjacent to the East and West Branches of the Brandywine Creek.

SWPP – Priority Agricultural Clusters



2010



Amended 2014

Moving Ahead

- ▣ Budget line for Source Water Protection
- ▣ Present plan to other groups to produce support
- ▣ Educate customers and young people in watershed
- ▣ Regulations aimed at source
 - LT2 Regulations-Crypto
 - DBPs
- ▣ The City continues to be actively involved in pursuing its goals and objectives through partnerships and support