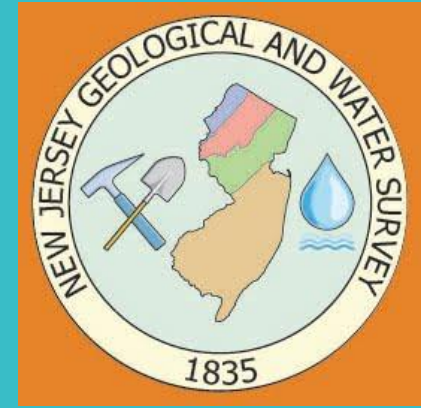


# New Jersey's Water Use Data:



## The NJWaTr Database, Estimated Water Use Data, and Data Sharing

August 17<sup>th</sup>, 2022

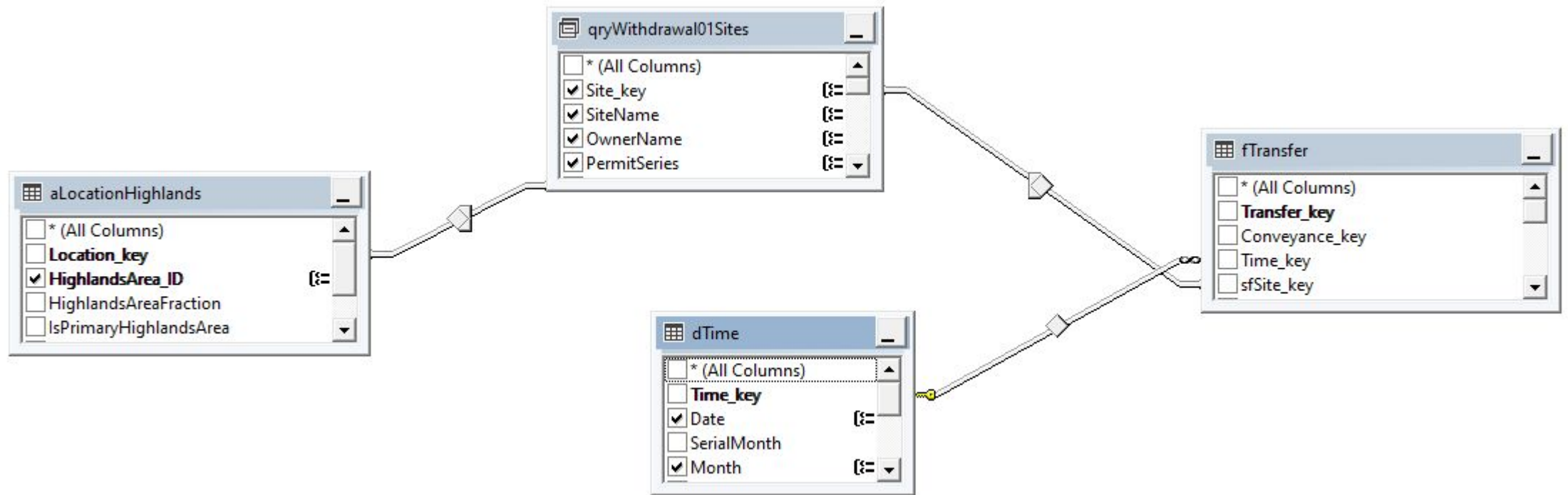
2022 National Water Use Workshop – Utah

Kent Barr, Research Scientist, NJDEP

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# New Jersey's Water Use Database: NJWaTr



# What is NJWaTr...

- **New Jersey Water Transfers Database - developed by the U.S. Geological Survey and maintained by the N.J. Department of Environmental Protection.**
- **A conveyance-based model that represents any water exchange activity between two sites.**
- **Pairs of Sites are joined through unidirectional Conveyances for which water Transactions are recorded.**
- **Sites and conveyances form a water network.**
- **Attributes such as owner, permit, water resource, location are linked with each component of the network.**
- **MS Access as primary data management tool.**
- **MS SQL is used as the primary tool for storage, processing and distribution internally.**

# What NJWaTr helps you know...

Where does our water come from?

Where does it go?

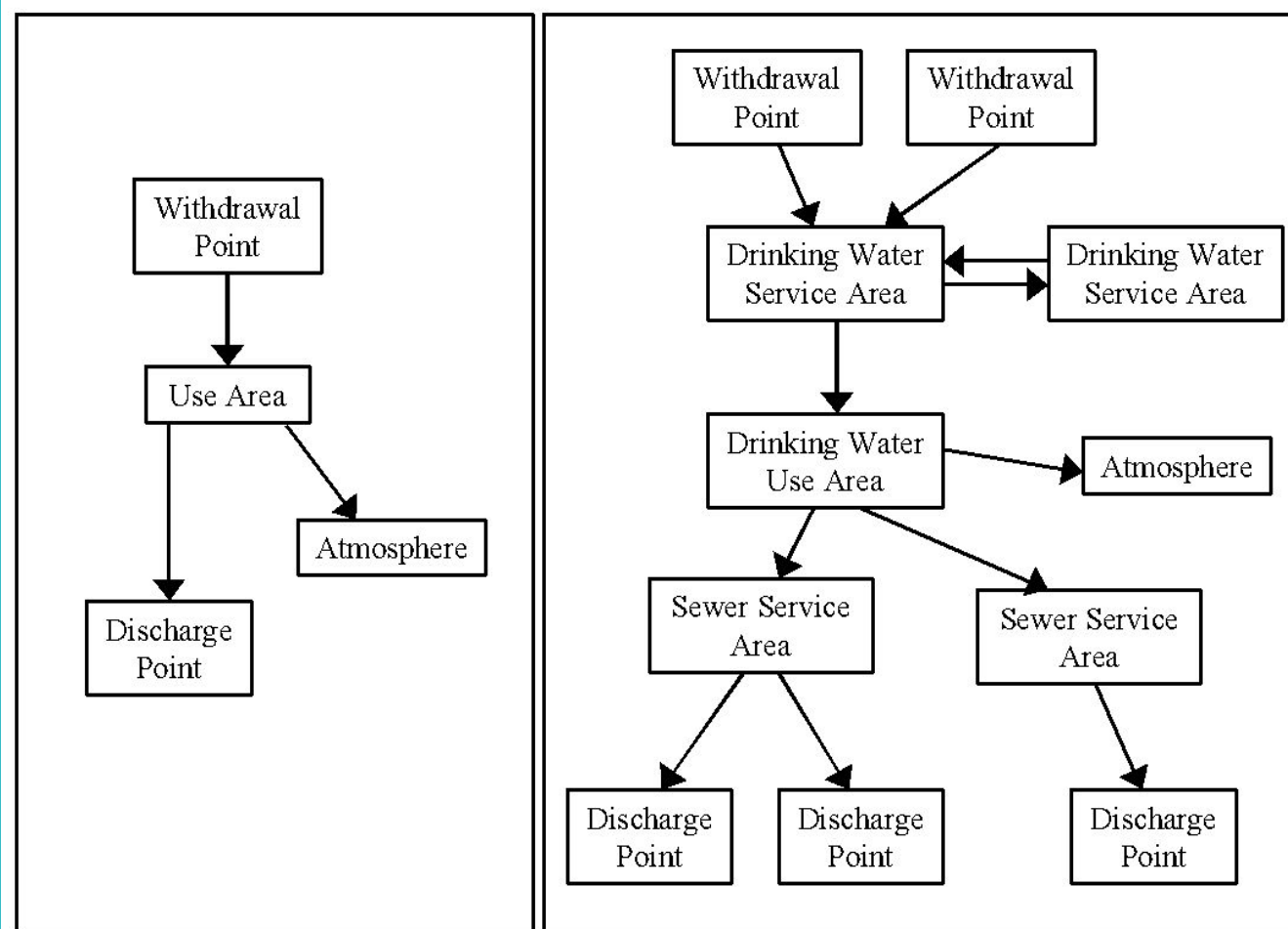
What is the water used for?

Who's using it?

How much is used?

How do these facts change over time?

# Two Primary Conveyance Networks



self-supplied commercial and industrial, agricultural, power generation, irrigation and mining uses

Potable supply and wastewater

# NJWaTr Contains

- **Sites**
  - Over 53,000 withdrawal points, use areas, collection areas and discharge points
- **Conveyances**
  - 32,000 one-way conveyances between sites
- **Transfer Volumes**
  - 1990 to 2020 monthly data
  - Over 5.5 million monthly transfers: includes resource withdrawals, bulk transfers, and sewer discharges
- **Data is available from 1990 through 2020\***
- **Flexible design allows easy addition of new data/attributes and meet needs of multiple users**
- **Majority of the data is metered, but there are exceptions....**

# Estimated Data: Ag Water Use



# Agricultural Water Use Reporting in New Jersey

- In New Jersey, the Agriculture, Aquaculture, and Horticulture Water Usage Certification (Ag Cert) rules (N.J.A.C. 7:20A) govern water usage for the agricultural community. Under these rules, certification holders are required to submit an annual record of the amount of water withdrawn each month.
- Meters on irrigation sources are not required.
- Typically, a pump capacity and run time method is used to estimate water use.
- Use for agricultural irrigation is small generally <10% of total.
- When examined regionally (Municipality, HUC, etc.) it can be the dominant use.



# NJ Water Supply Plan

- **POLICY ITEM #8: COORDINATE WITH THE AGRICULTURE COMMUNITY TO ACCURATELY ASSESS AGRICULTURAL WATER USE AND ANTICIPATED FUTURE DEMANDS.**



State of New Jersey  
Department of Environmental Protection

## **NEW JERSEY WATER SUPPLY PLAN 2017-2022**

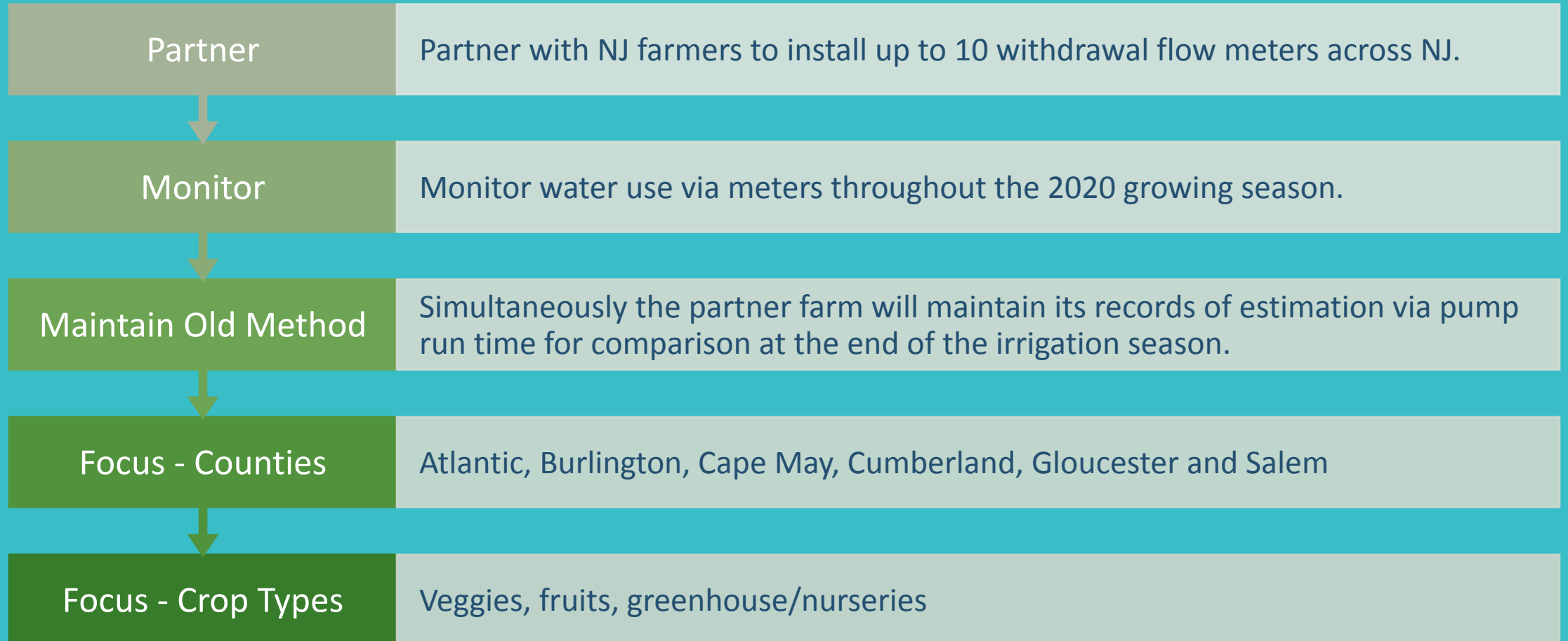


# WUDR Grant 2019

- Obtained WUDR Grant in 2019.
- 2-year time horizon to allow for field work throughout an entire irrigation season ~May-Nov.
- Plan was for the 2020 growing season – Covid delayed until 2021



# Project Objectives



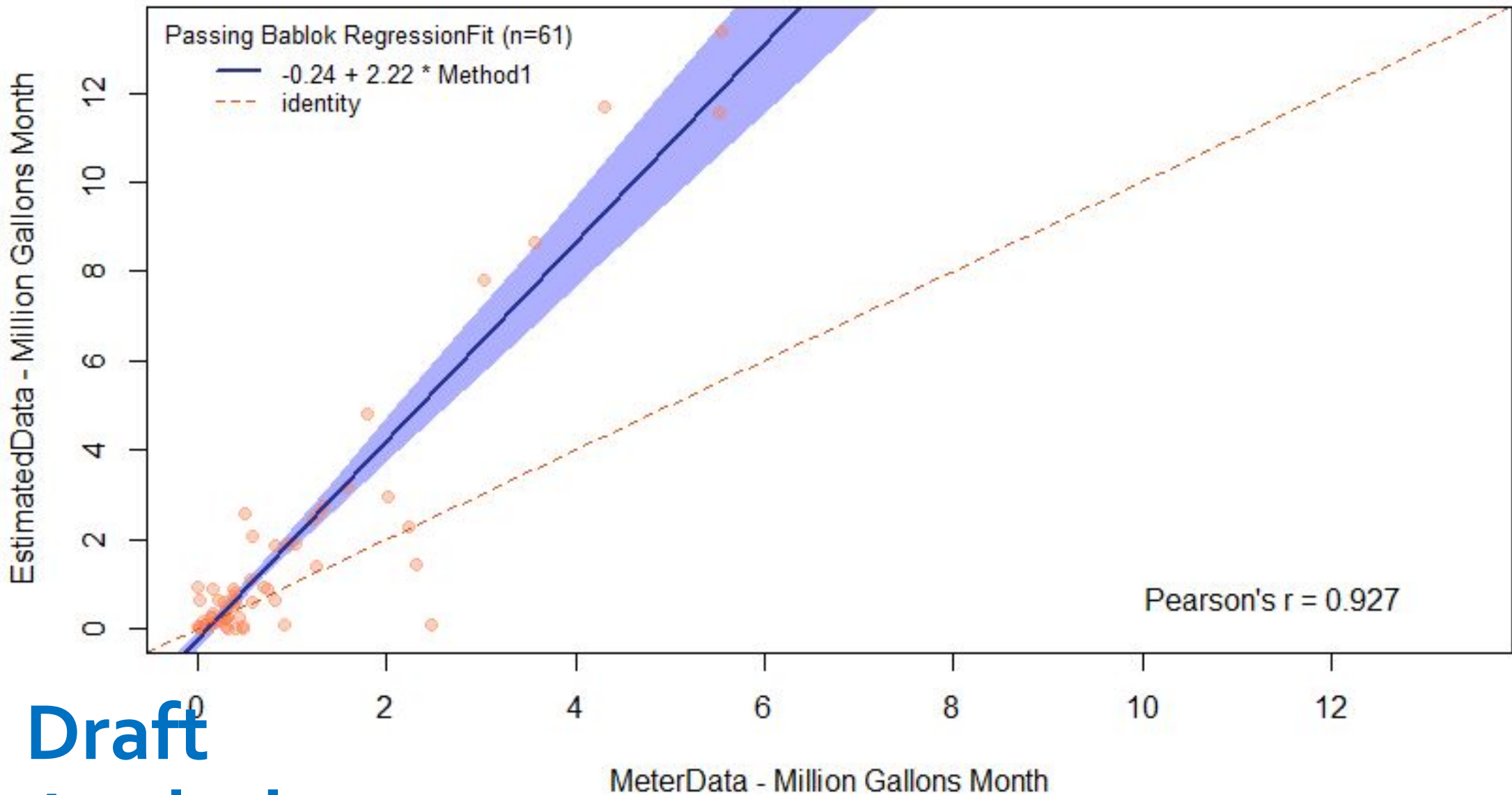


**Propeller**



**Electromagnetic**

# Passing Bablok Regression Comparing Monthly Meter Readings to Estimated Readings



Draft  
Analysis

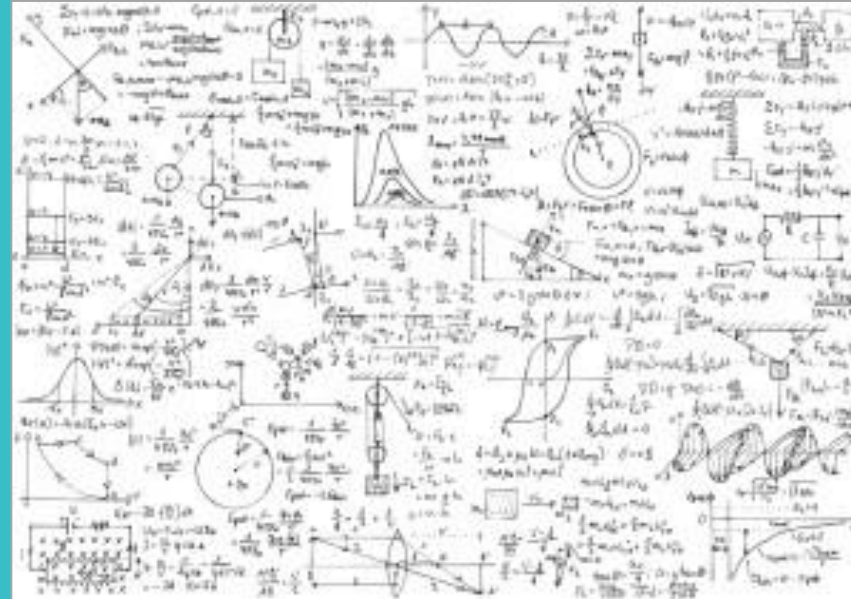
# Estimated Data: Domestic Water Use



# Domestic Water Withdrawals

- **Private domestic wells used by homeowners in NJ that are not served by a water purveyor.**
- **Domestic water use comprises a small percentage of NJ's overall State-wide water use. Roughly 5% on average for the last ten years of available data.**
- **When examined regionally (Municipality, HUC, etc.) it can be the dominant use.**

# Calculation:



**Domestic Use Per Block Group =**

**Total # Wells \* Ave Household Size \* GPCD**

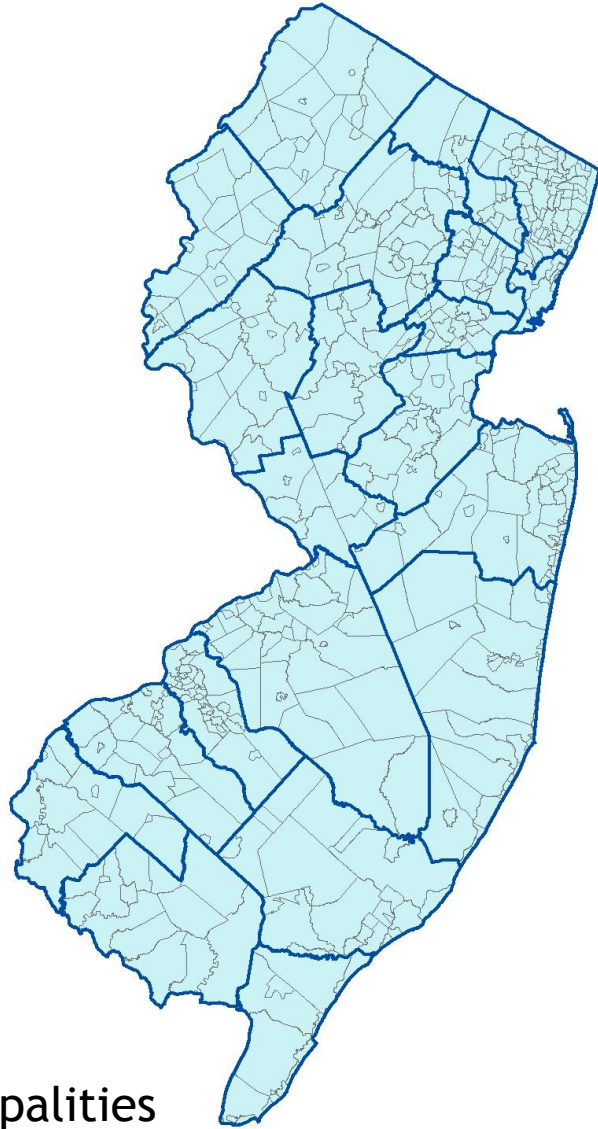
***(Determines an Annual Volume for each year 1990-2020)***



## New Jersey - Municipalities

### Legend

- NJCounties
- Municipalities

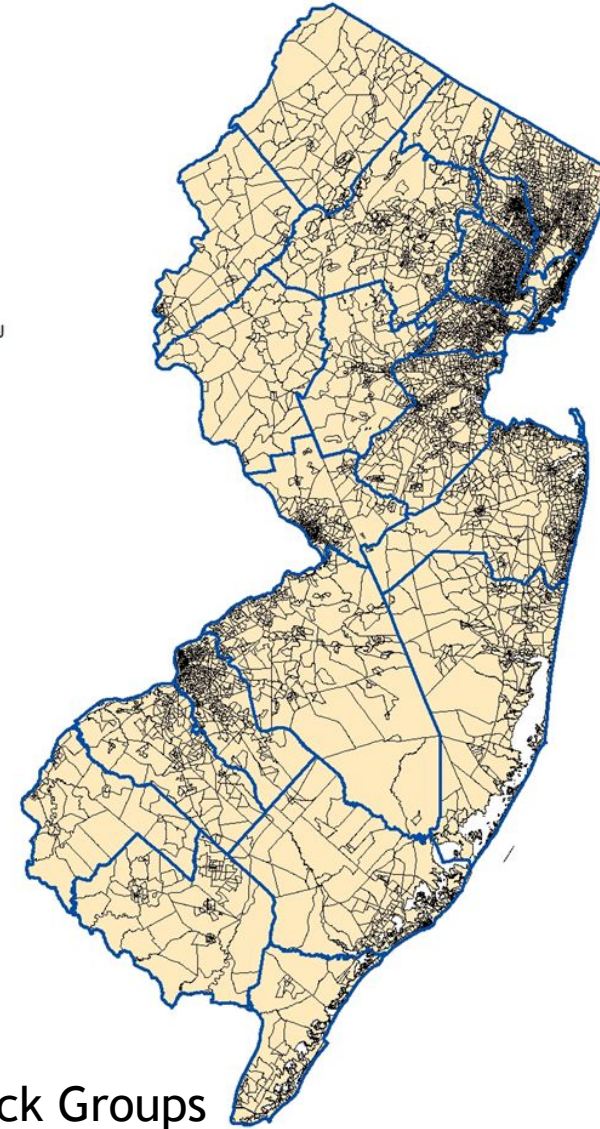


565 Municipalities

## 1990 Census - Block Groups

### Legend

- NJCounties
- 1990BlockGroupNJ



7,033 Block Groups

# GPCD Updates by Block Group



*Table 4-12. Selected Per Capita Residential Demands (gallons per day)*

Residential Density/Region	Coastal Plain (CP)	Piedmont (PM)	Highlands and Ridge & Valley (HL)
High Density (HD) Annual	47.92	58.46	42.04
Medium Density (MD) Annual	59.04	61.20	53.52
Low Density (LD) Annual	93.27	73.95	61.09
High Density (HD) Summer	53.49	62.61	42.47
Medium Density (MD) Summer	75.88	76.62	59.42
Low Density (LD) Summer	141.05	108.92	81.75
High Density (HD) Non-Summer	45.13	56.27	41.82
Medium Density (MD) Non-Summer	50.59	53.17	50.62
Low Density (LD) Non-Summer	69.36	56.61	50.84






*Van Abs, Daniel J., Jiayi Ding and Eric Pierson. 2018. Water Needs through 2040 for New Jersey Public Community Water Supply Systems. Rutgers University, New Brunswick, NJ.*

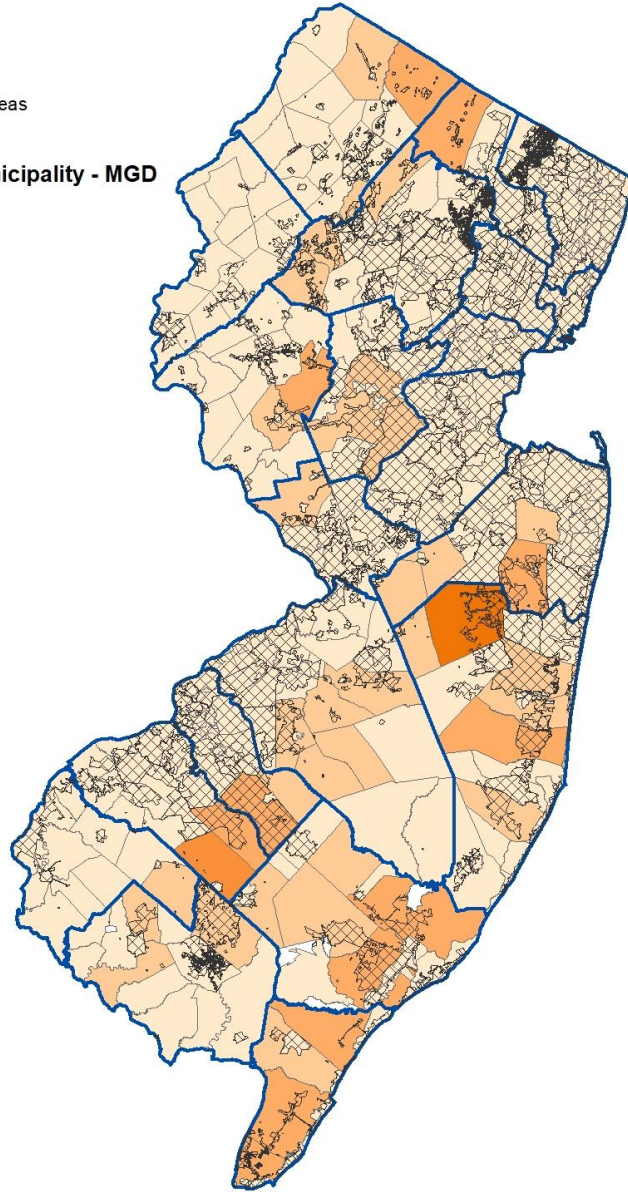
# 2018 Domestic Water Use

## Legend

-  Purveyor Service Areas
-  NJCounties



## Domestic Use by Municipality - MGD

-  0 - 0.5
-  0.5 - 1
-  1 - 1.5
-  1.5 - 2
-  2 - 2.5








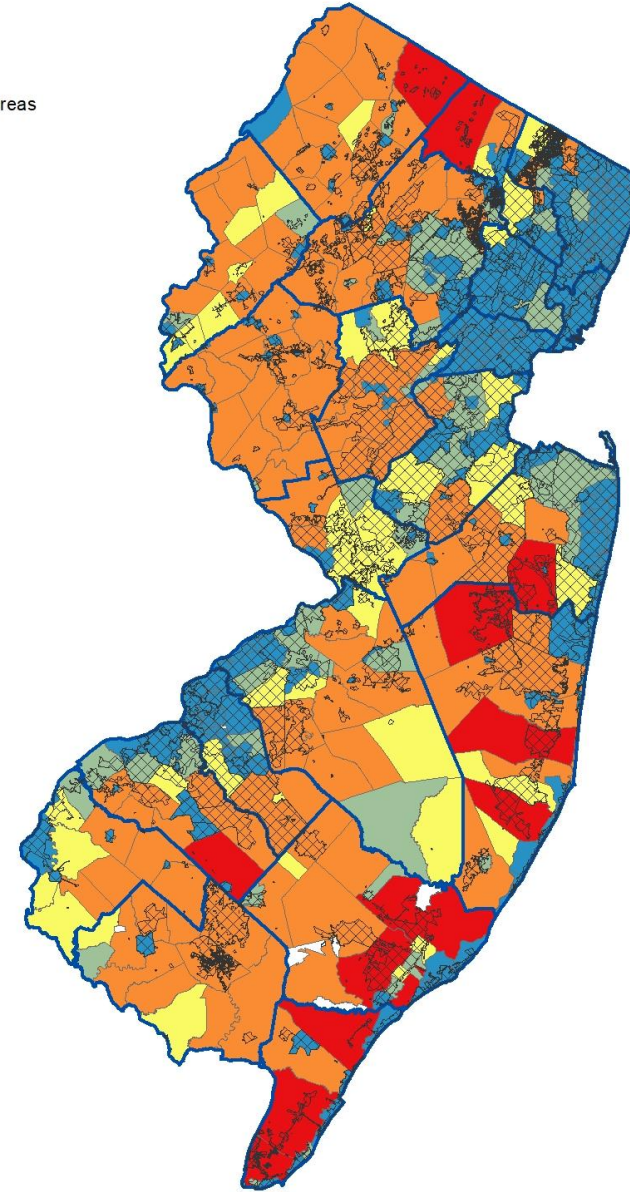
# 2018 Domestic Well Totals by Municipality

## Legend

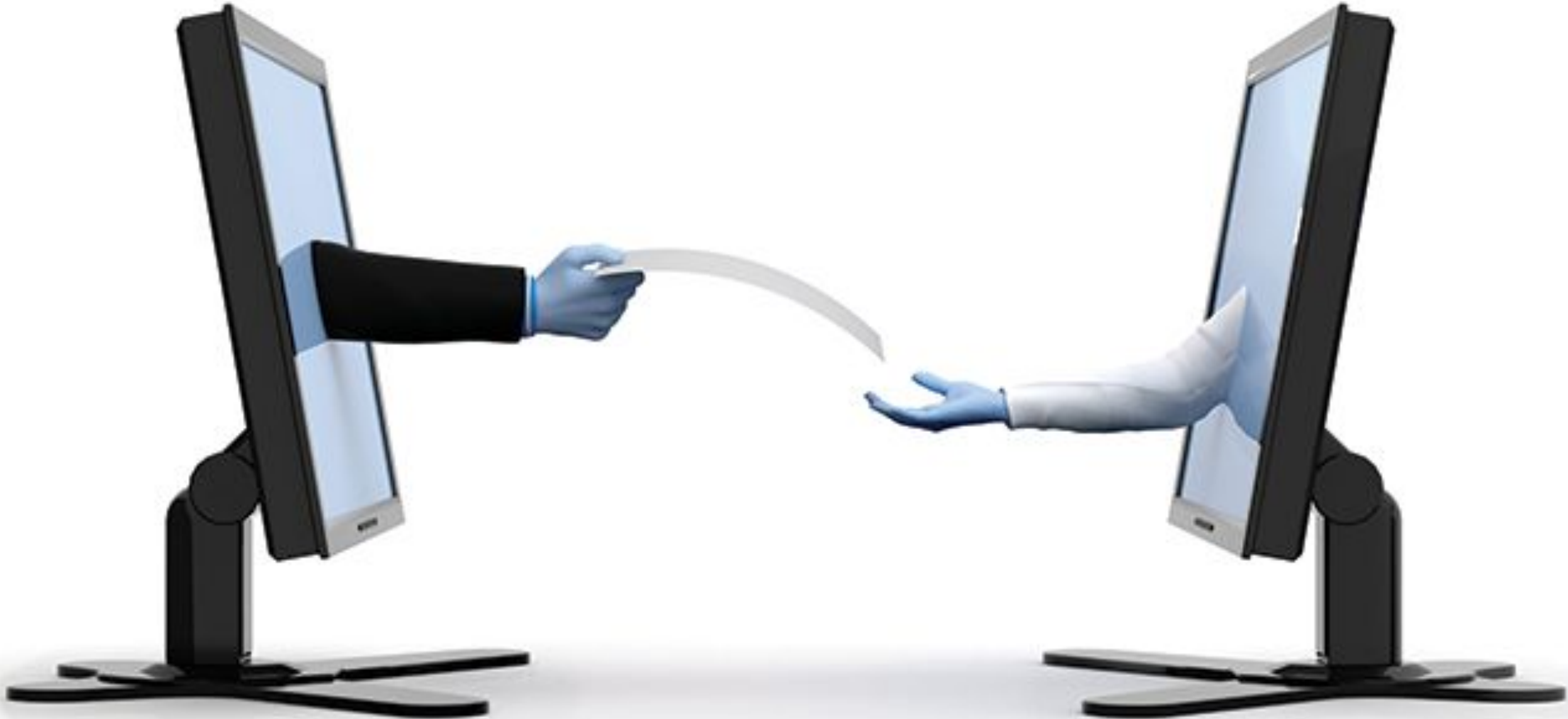
-  Purveyor Service Areas
-  NJCounties

## Total Wells

-  0 - 200
-  200 - 500
-  500 - 1000
-  1000 - 5000
-  5000 - 9000



# Data Sharing. Current and Future





## New Jersey Geological and Water Survey

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## Digital Geodata Series

## DGS10-3 New Jersey Water Transfer Model Withdrawal, Use, and Return Data Summaries

**DOWNLOAD** 85.6 MB UPDATED (1-26-2021)

## Abstract

This New Jersey Geological and Water Survey (NJGWS) Digital Geodata Series (DGS) publication is a set of five Microsoft Access™ databases that summarize information contained in the New Jersey Water Transfer Data Model (NJWaTr). The databases contain measured and estimated monthly withdrawal, use and return volumes by site. The five databases cover: 1) withdrawals by HUC14 drainage basin, 2) withdrawals by municipality, 3) use by site, 4) returns by HUC14 drainage basin, and 5) returns by municipality. Attribute data such as site owner, permit number, water use, water source, watershed name, and municipality are included with each database. Table and field description information is also included with each database. The databases do not contain site latitude and longitude locations.

The underlying data are available online from multiple New Jersey Department of Environmental Protection (NJDEP) programs through DataMiner ([www.nj.gov/dep/opra](http://www.nj.gov/dep/opra)). This data is collected from each program, quality assured, enhanced, and then reformatted by NJGS before it is loaded into NJWaTr. NJGS's QA/QC process determines the best estimate of actual water use for each individual site, and as a result these volumes may be different from other NJDEP sources which have different end uses and purposes. The NJWaTr data is simplified through a series of queries into the tables found in this publication.

The HUC14 drainage basin databases can be used for watershed modeling, planning, or similar analyses. The municipal level databases can be used for municipal and county level planning or summary exercises. The use by site database is included to account for the effects of storage (e.g. reservoir or pumped storage) and bulk water transfers that occur primarily with public water systems that can shift where and when withdrawals are used.

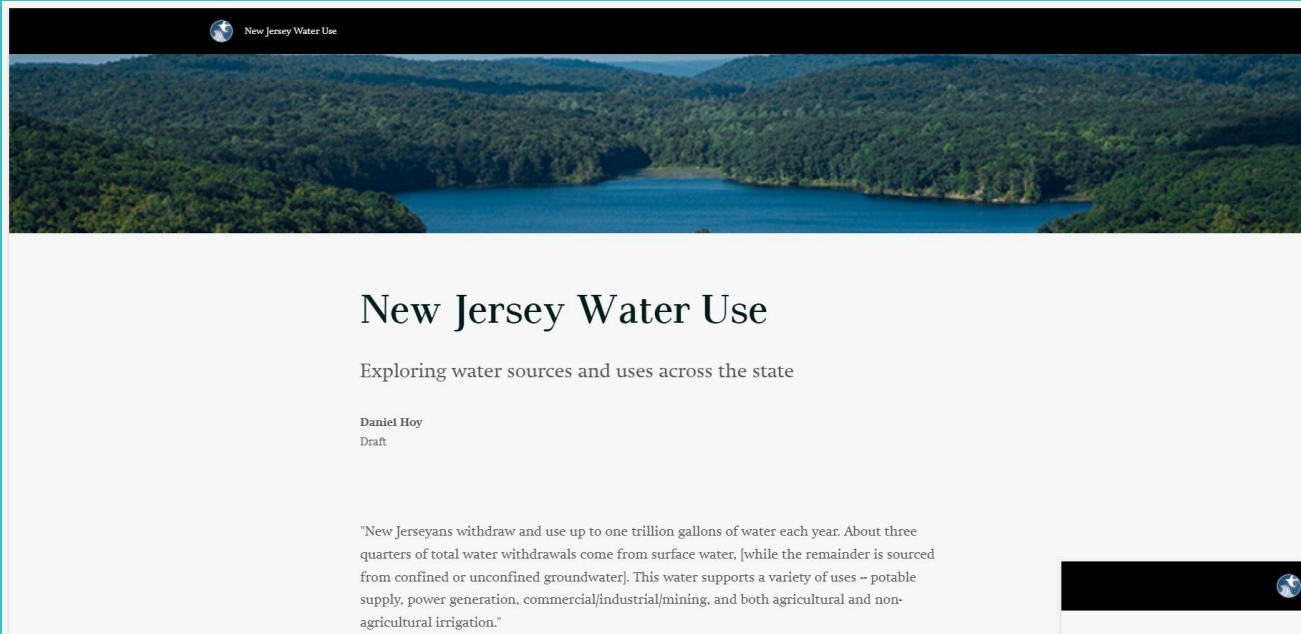
The databases contain 1990 through 2018 monthly data.


[contact us](#) | [privacy notice](#) | [legal statement](#) | [accessibility statement](#) 

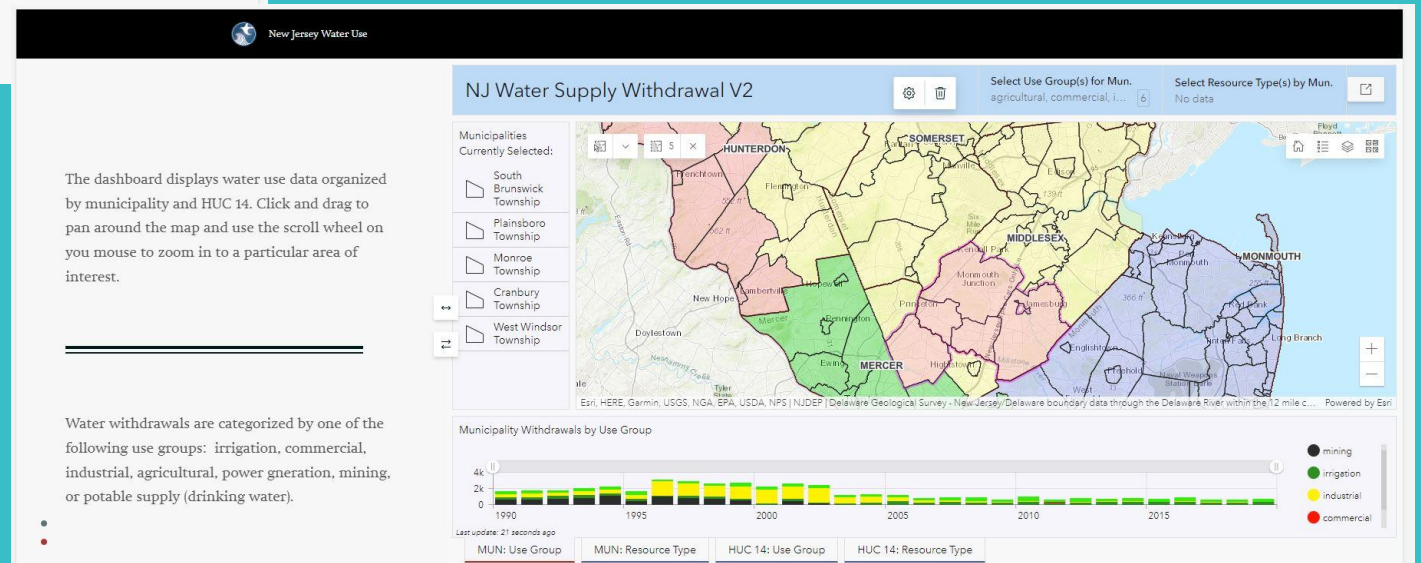
# Current: DGS10-3

- Currently we make data available via download in MS Access
- Site level information summarized by Municipality or HUC 14 (no coordinates included)
- Separate outputs for withdrawals, use and returns.

# Future: ArcGIS Online Storymap



- Data will be queryable in an interactive map environment.
- Users can still choose between 2 regional boundaries (Muni and HUC14) and 2 data types (Resource Type or Use Group).
- Queried result downloadable in .csv instantly.

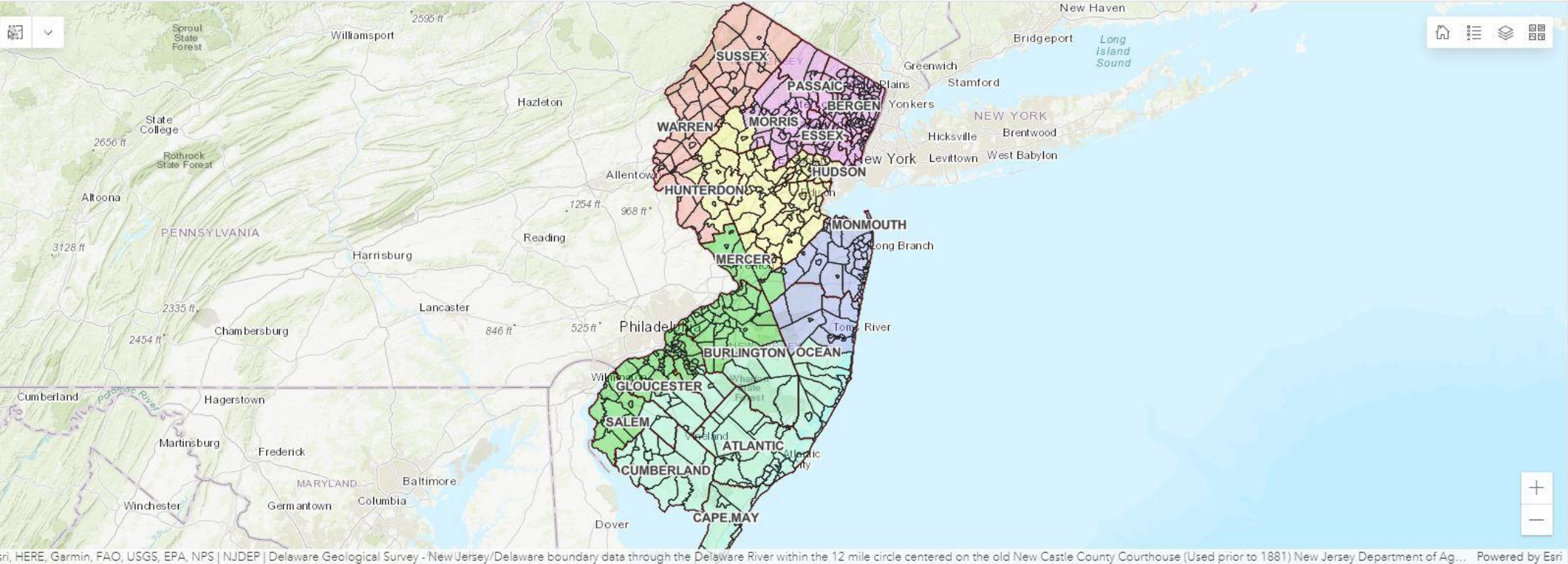


# NJ Water Supply Withdrawal V2

Select Use Group(s) for Mun.  
No data

Select Resource Type(s) by Mun.  
No data

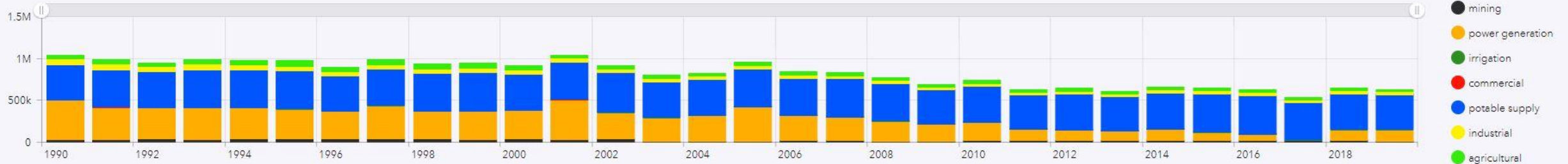
Municipalities Currently Selected:



No mun. selected

Esri, HERE, Garmin, FAO, USGS, EPA, NPS | NJDEP | Delaware Geological Survey - New Jersey/Delaware boundary data through the Delaware River within the 12 mile circle centered on the old New Castle County Courthouse (Used prior to 1881) New Jersey Department of Ag... Powered by Esri

Municipality Withdrawals by Use Group



Last update: 55 seconds ago

MUN: Use Group    MUN: Resource Type    HUC 14: Use Group    HUC 14: Resource Type

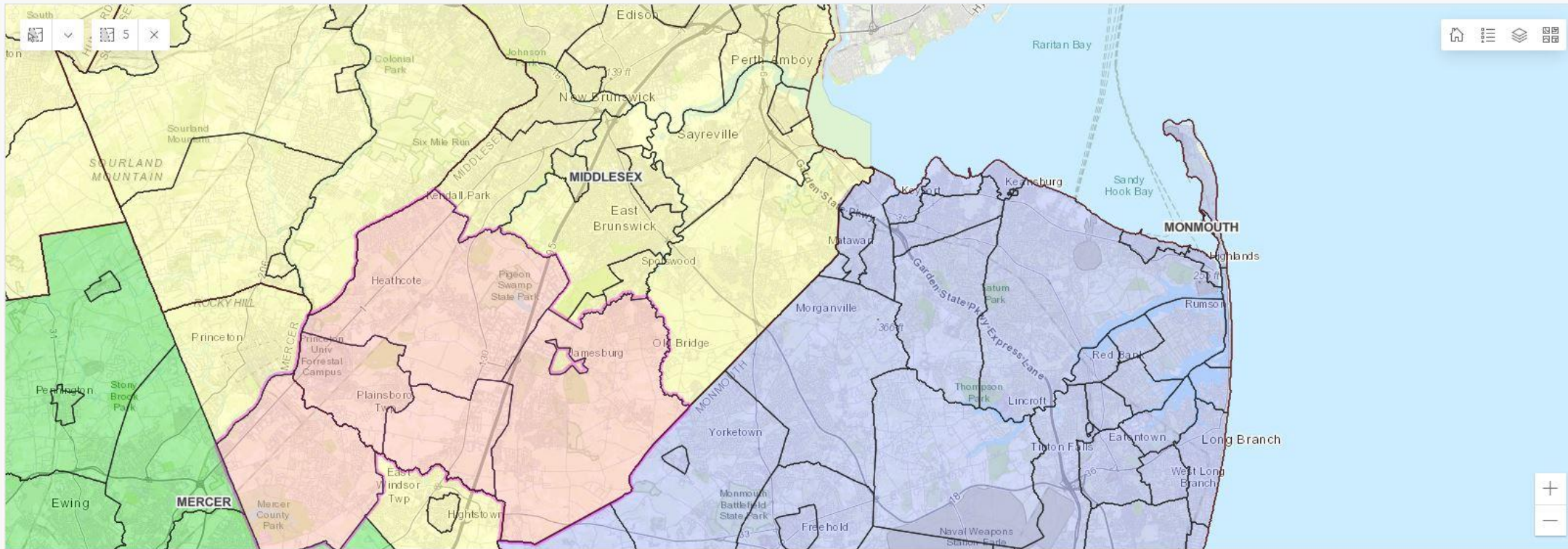
# NJ Water Supply Withdrawal V2

Select Use Group(s) for Mun.  
No data

Select Resource Type(s) by Mun.  
No data

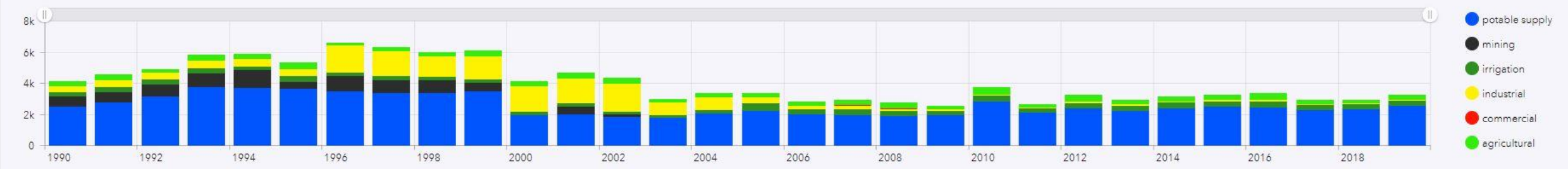
Municipalities Currently Selected:

- South Brunswick Township
- Plainsboro Township
- Monroe Township
- Cranbury Township
- West Windsor Township



State of New Jersey, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | NJDEP | Delaware Geological Survey - New Jersey/Delaware boundary data through the Delaware River within the 12 mile circle centered on the old New Castle County Courthouse (Used prior to 1881) N... Powered by Esri

Municipality Withdrawals by Use Group



Last update: 6 seconds ago

- MUN: Use Group
- MUN: Resource Type
- HUC 14: Use Group
- HUC 14: Resource Type



# Other Data Sharing

- **WADE**
- **Direct data exchange with our local partners**
  - **USGS – NJ WSC**
  - **Delaware River Basin Commission**
- **Lots of specific data requests – watershed groups, non-profits, Universities, etc.**

# Contact

## Kent Barr

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Research Scientist

Geological & Water Survey

Division of Water Supply &  
Geoscience

# Questions?



Kent.Barr@dep.nj.gov



<https://www.nj.gov/dep/watersupply/>

<https://www.njgeology.org>

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