NJ Water Supply Plan, 2017-2022

DRBC WMAC
October 24, 2017

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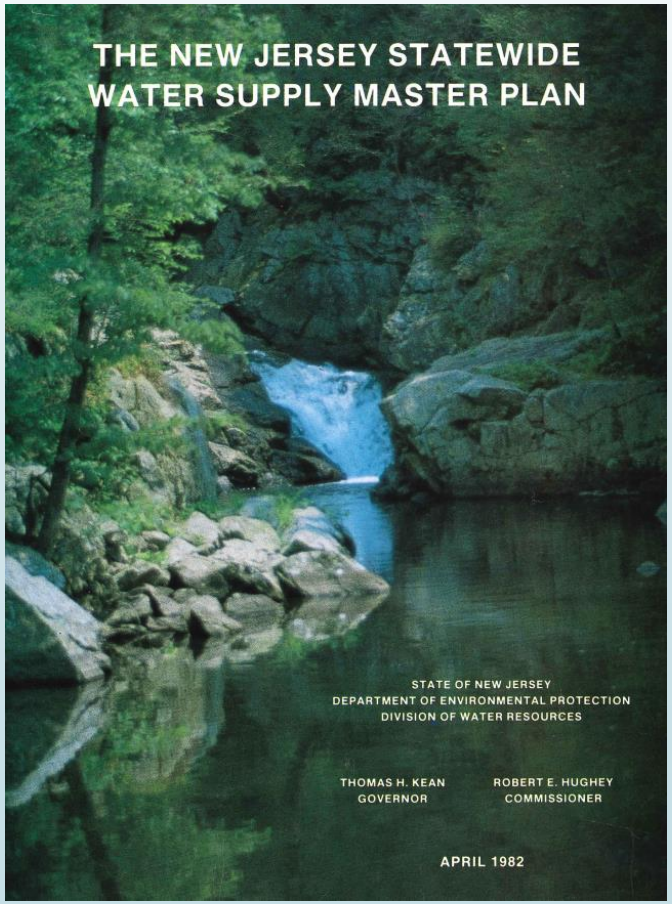
NJ Department of Environmental Protection

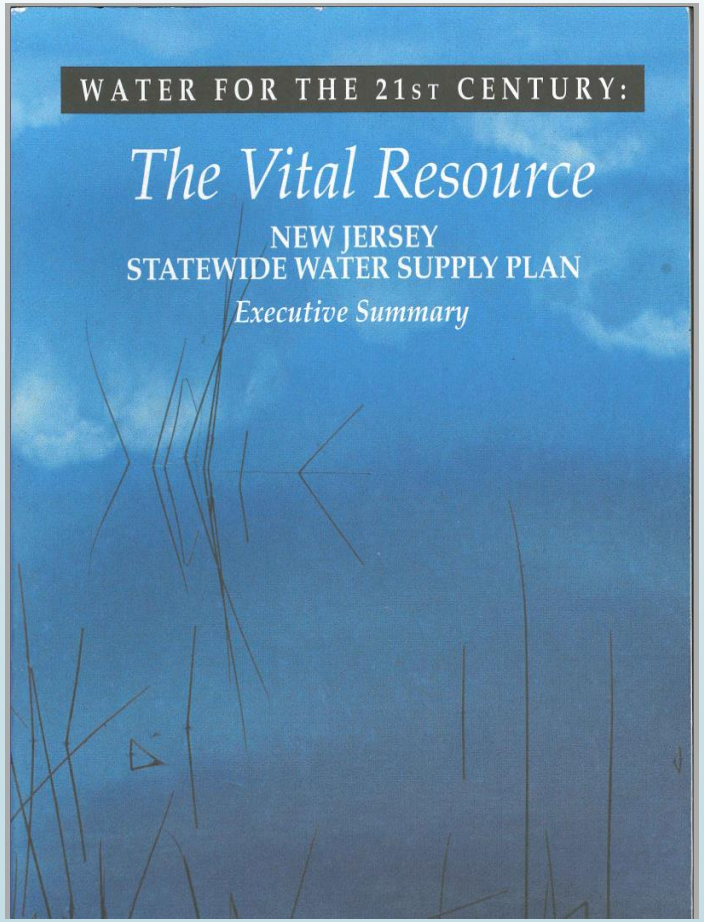
Authority

The 1981 **New Jersey Water Supply Management Act** (N.J.S.A. 58:1A-1 et. seq.) directs the NJDEP to develop and periodically revise the New Jersey Statewide Water Supply Plan (NJSWSP or Plan) in order to improve the management and protection of the State's water supplies.

1982

1983
1985
1987
1991
1993

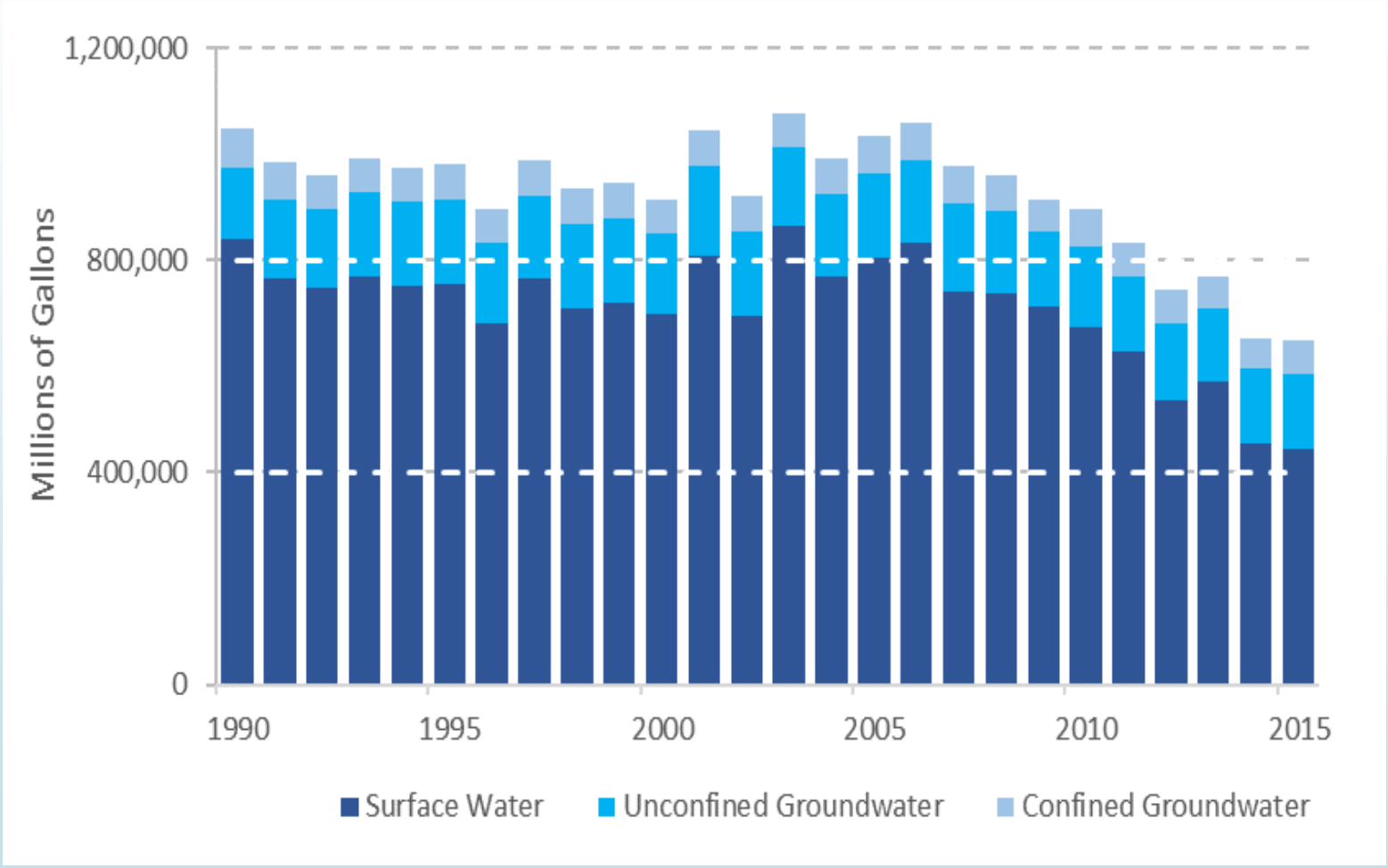


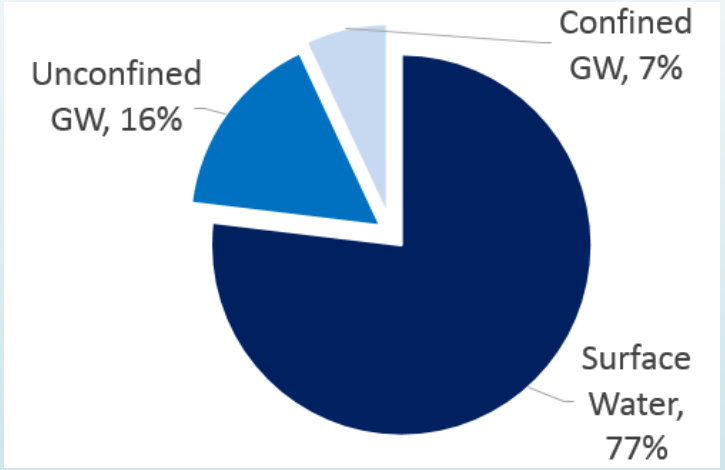


1996

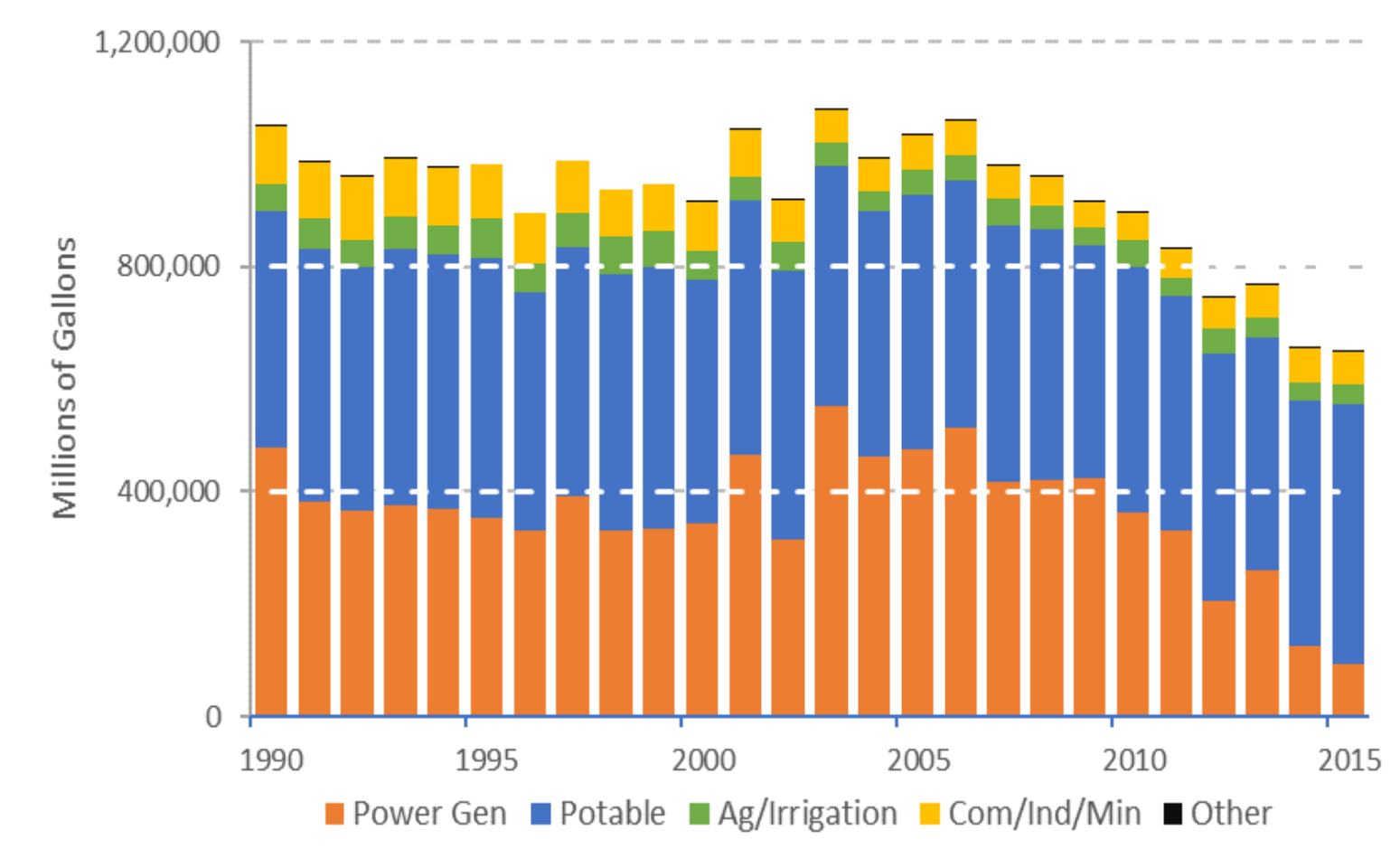
2003

Water Use Trends
Withdrawals by Source



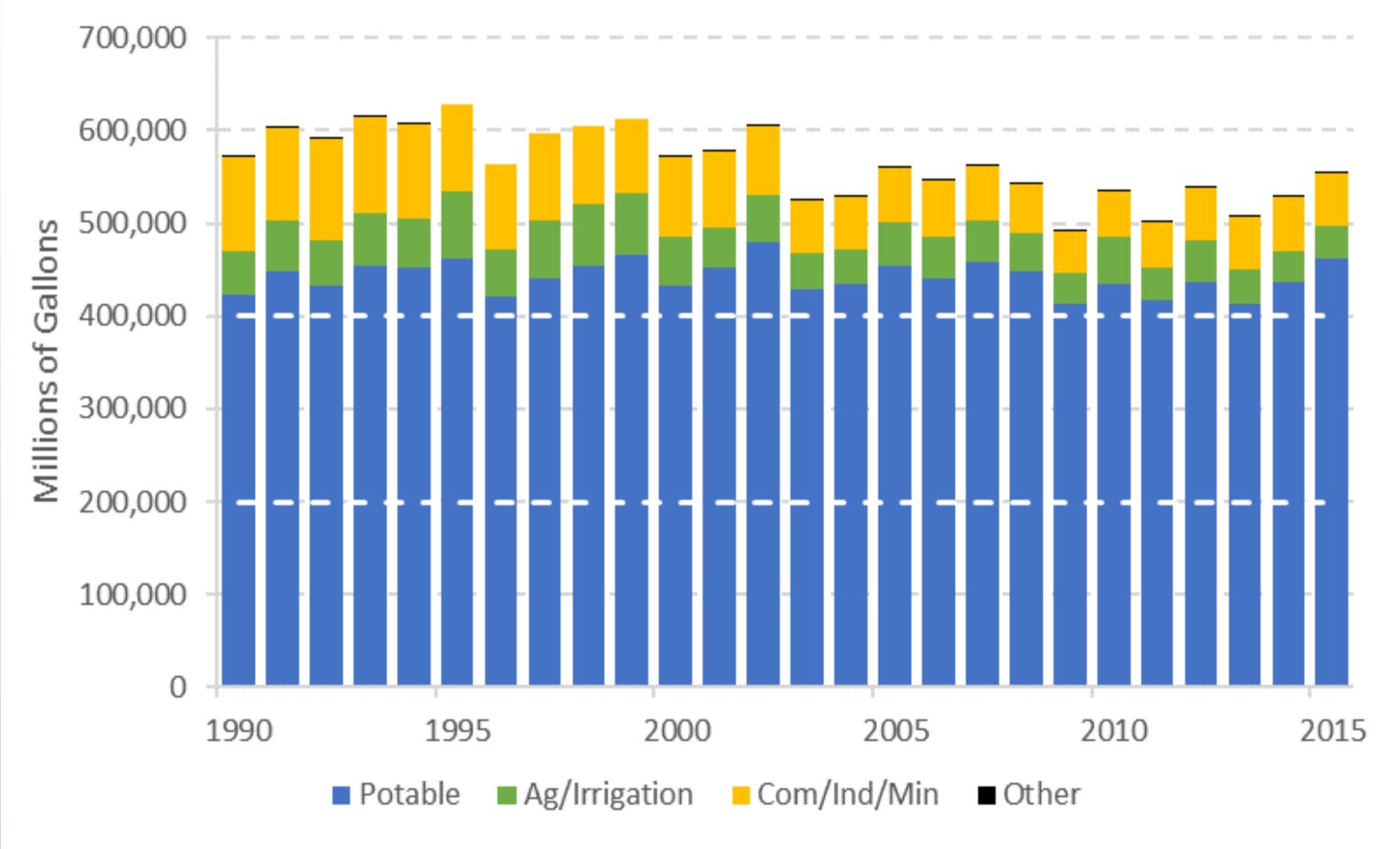


Water Use Trends
Withdrawals by Use Group



- Total freshwater with-drawals peaked about 1.1 trillion gallons in early 2000's.
- Excludes saline diversions
- Major fluctuations in power generation.
  - There are approximately 10 large power generation sources in NJ using ~200-400 bgy:
  - Highly non-consumptive water use
  - Hides trends in other water use sectors

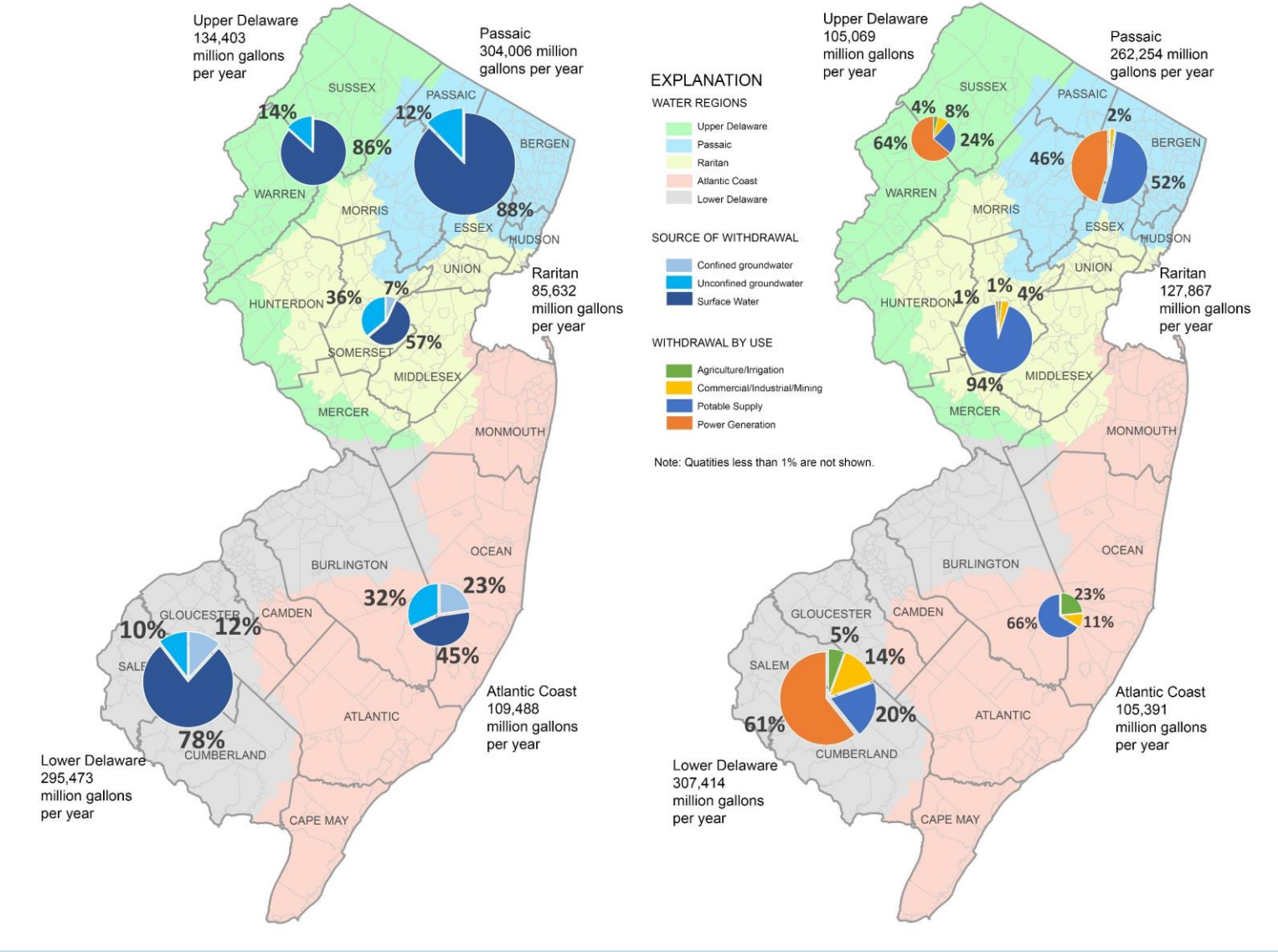
Water Use Trends
Withdrawals by Use Group



- Annual withdrawals for all other uses peaked about 630 bgy in late 1990's.
- Now around 550 bgy.

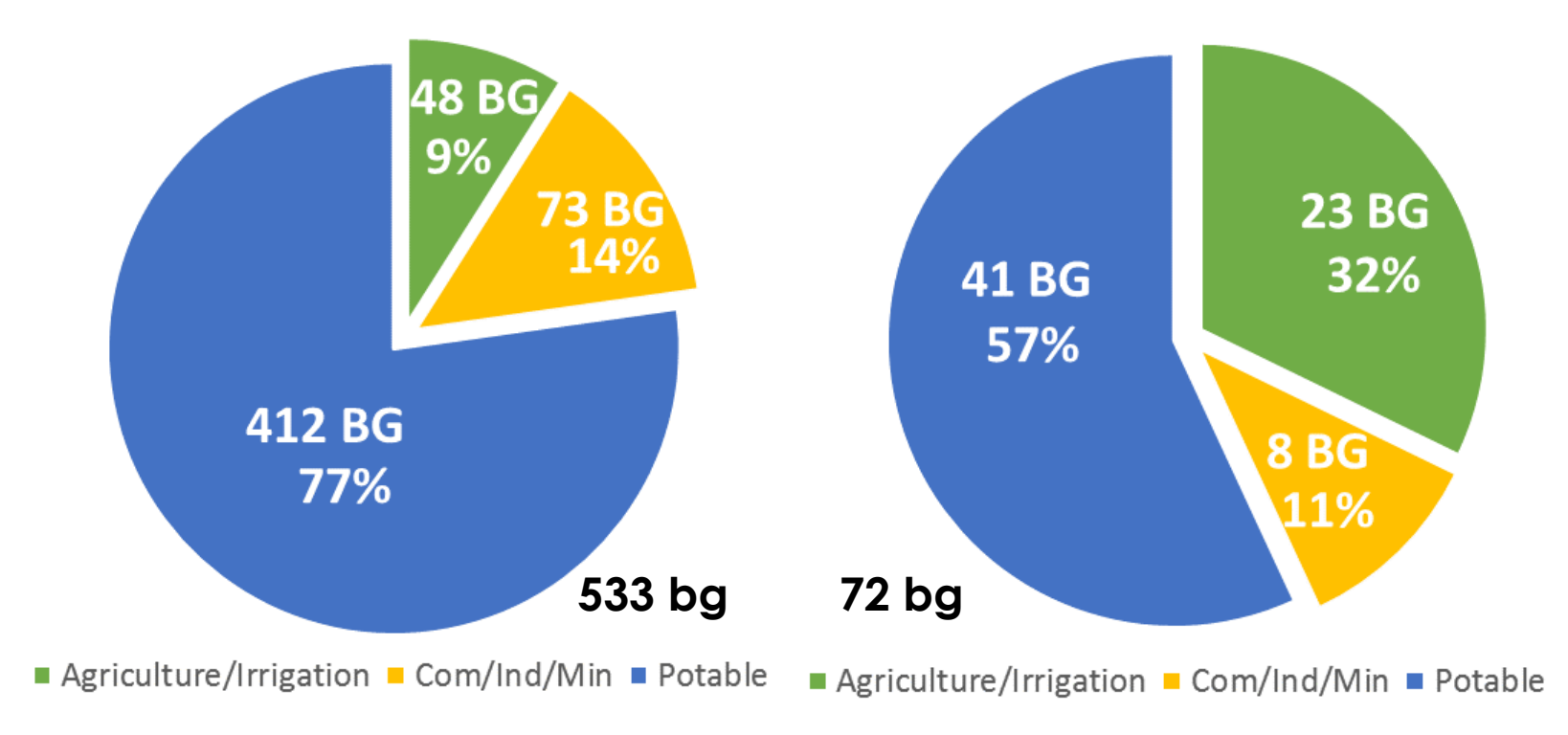
Water Use Trends

Withdrawals and Uses by Water Region (1990-2015)



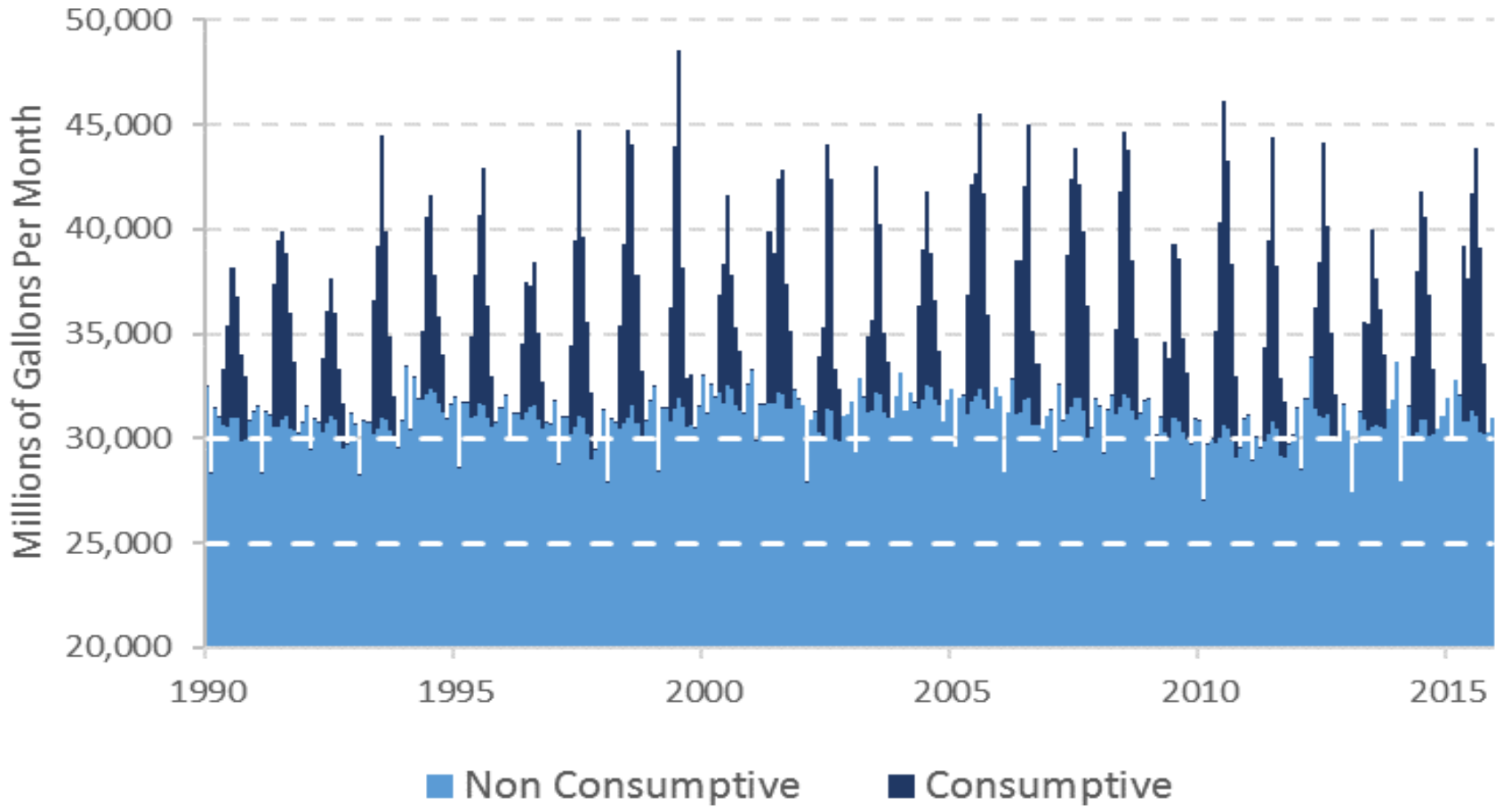
Water Use Trends

Total Withdrawals and Consumptive Losses (1990-2015)



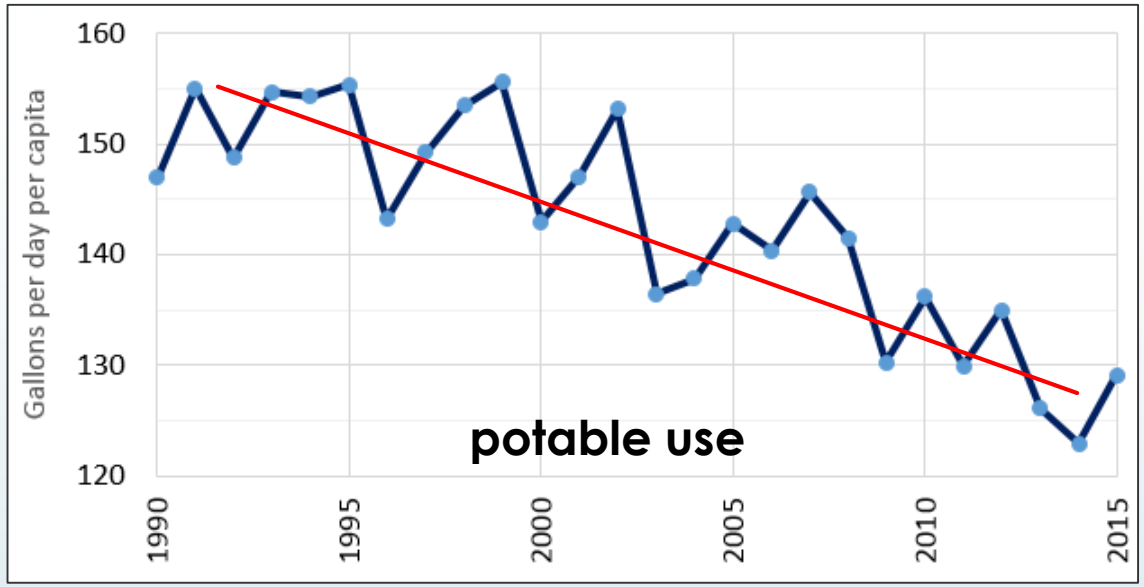
"Consumptive loss" is the portion of the water used which is lost to evaporation, transpiration or incorporation in a product. This water is not discharged to any location and is not available for a downstream use.

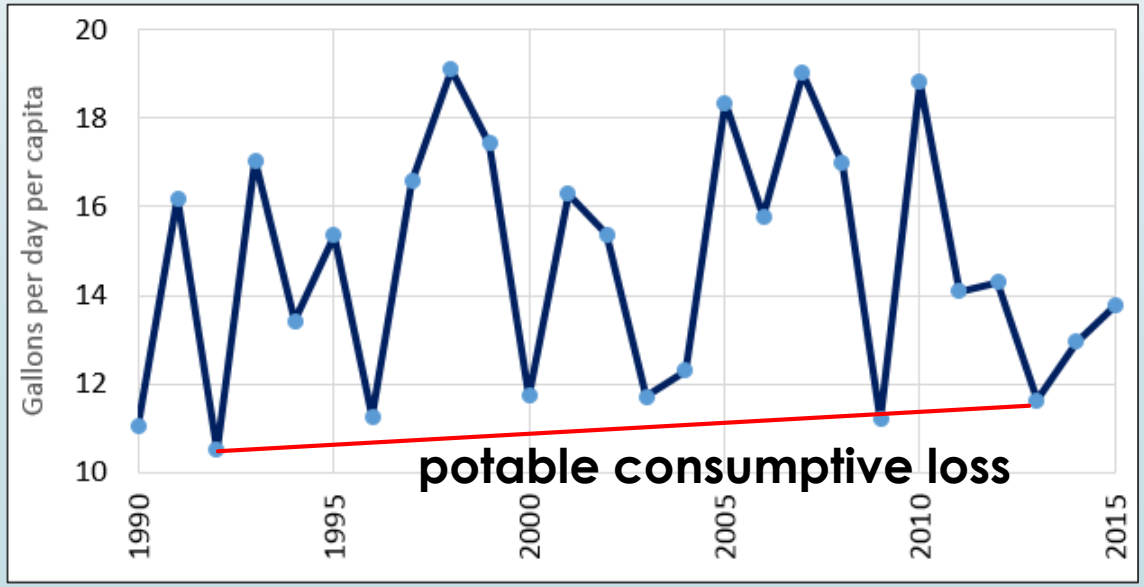
Water Use Trends
Monthly Consumptive Losses



- As much as one-third of all potable water is lost to evaporation to the water cycle in any given peak season month (with considerably higher losses during daily and weekly periods).
- Significantly strain on water availability when supplies are most scarce and the need for plentiful, high quality water is greatest.

Water Use Trends





- **Per capita potable water use** in NJ **decreased** from about 155 to 125 gpd between 1990 and 2015, due in part to diminished indoor usage associated with more efficient plumbing fixtures.
- **Consumptive water loss**, on average annual basis, is between 11 and 19 gpd per capita.
- Average annual basis, not seasonal.

Water Availability

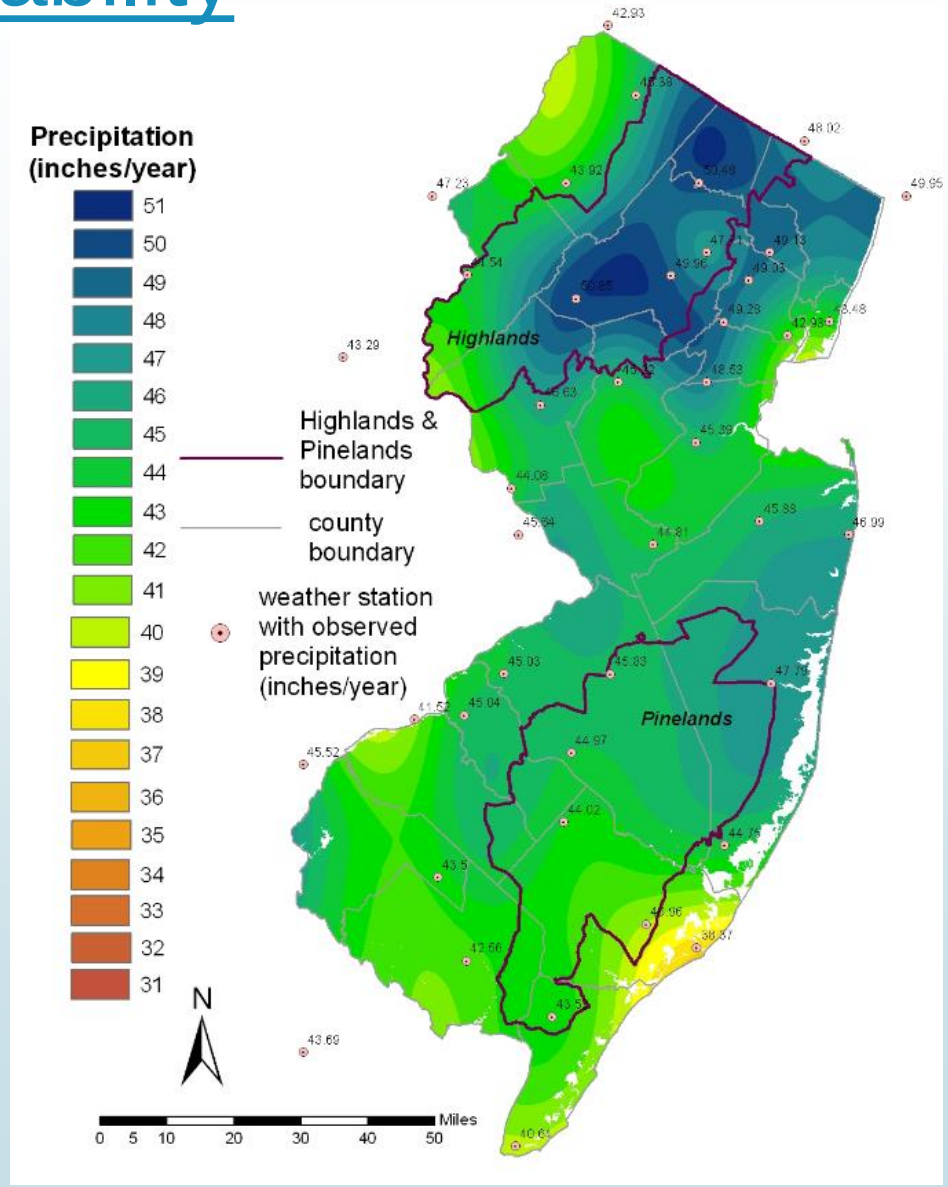
- Calculate:
  - consumptive losses (*evapo-transpiration*)
  - depletive losses (*water or wastewater transfers out of the watershed*)
  - accretive gains *(water transferred in)*
  - net losses and gains

- Develop:
  - water budgets for each of the 151 HUC11 watersheds and confined aquifer planning areas
  - determine which areas have exceeded or are in danger of exceeding planning thresholds
  - Total Resource Availability

Water Availability

- Average annual precipitation in range of 38 to 51 inches per year.

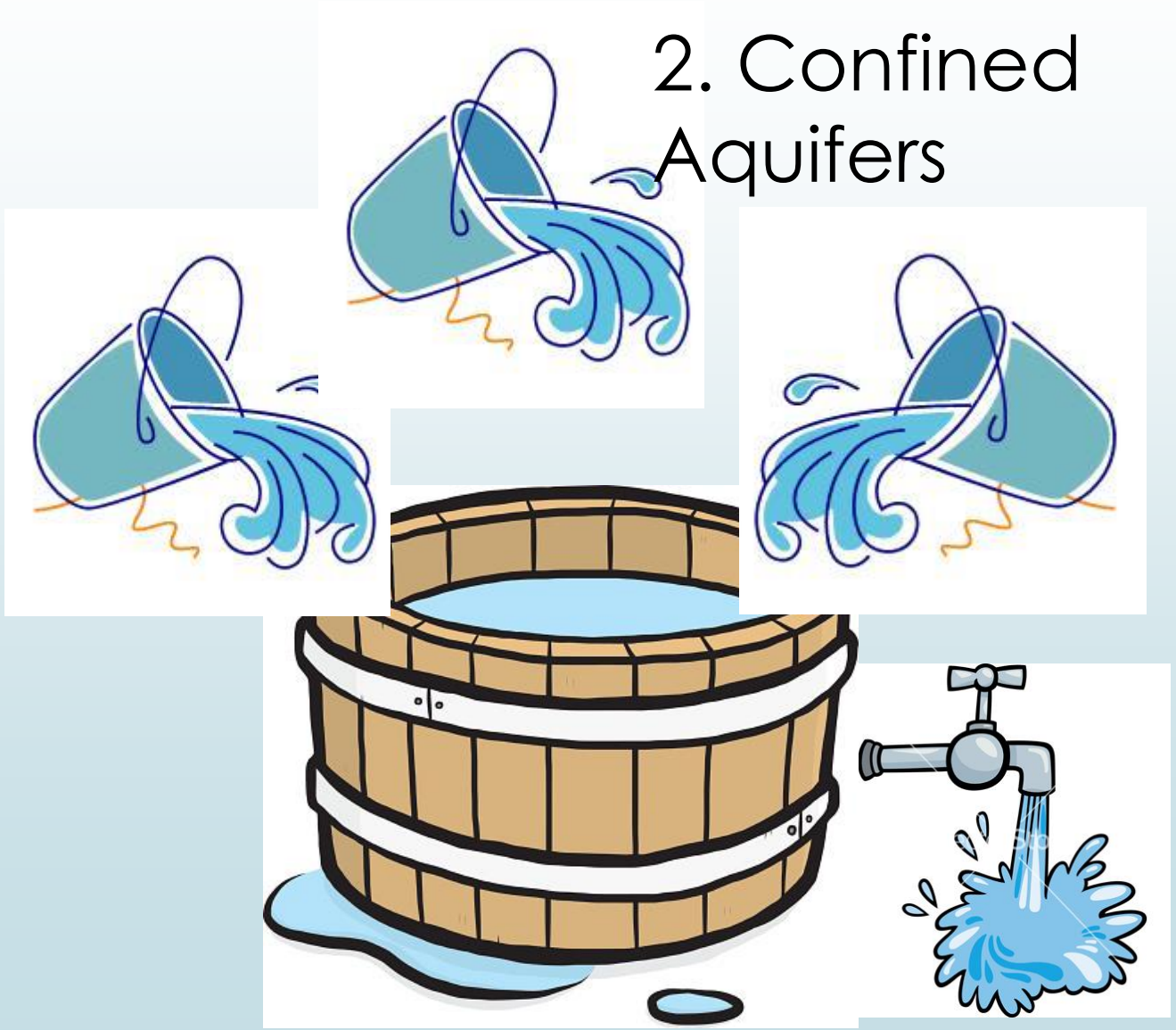
- NJ typically has ample average precipitation and the State's geology allows the storage of large quantities of groundwater and supports large reservoirs.



Water Supply: 3 ‘buckets’

1. Reservoirs

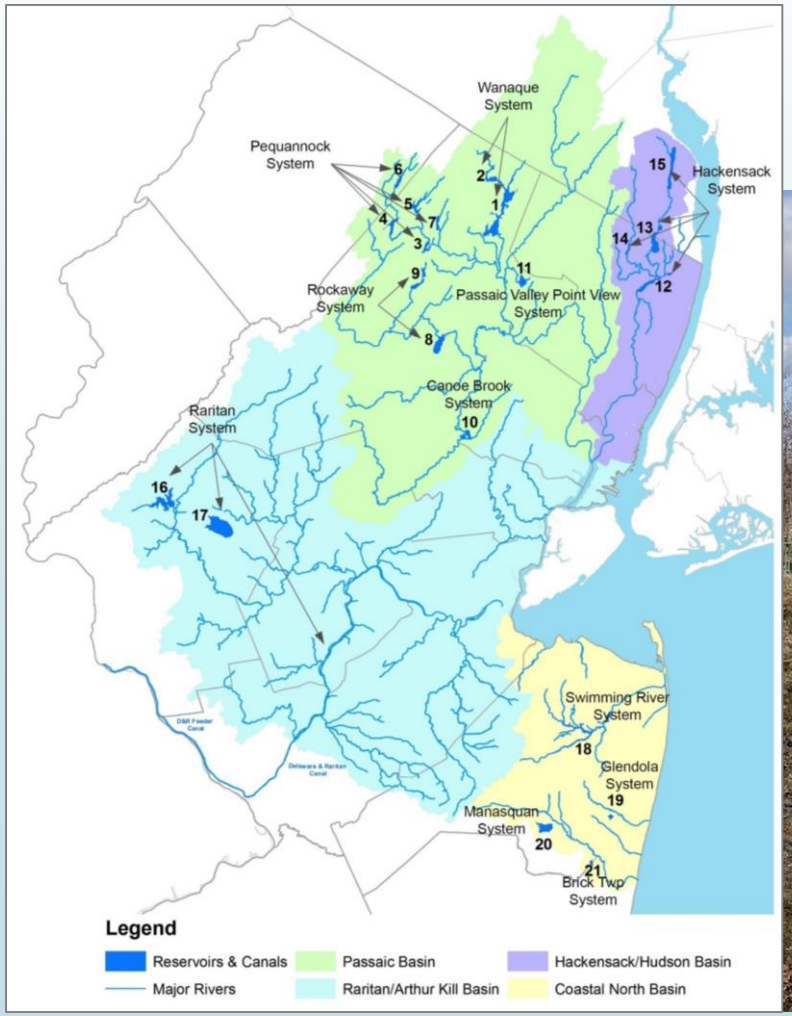
2. Confined Aquifers



3. Surface Water & Unconfined Aquifers

Image sources:
Cliparts Zone

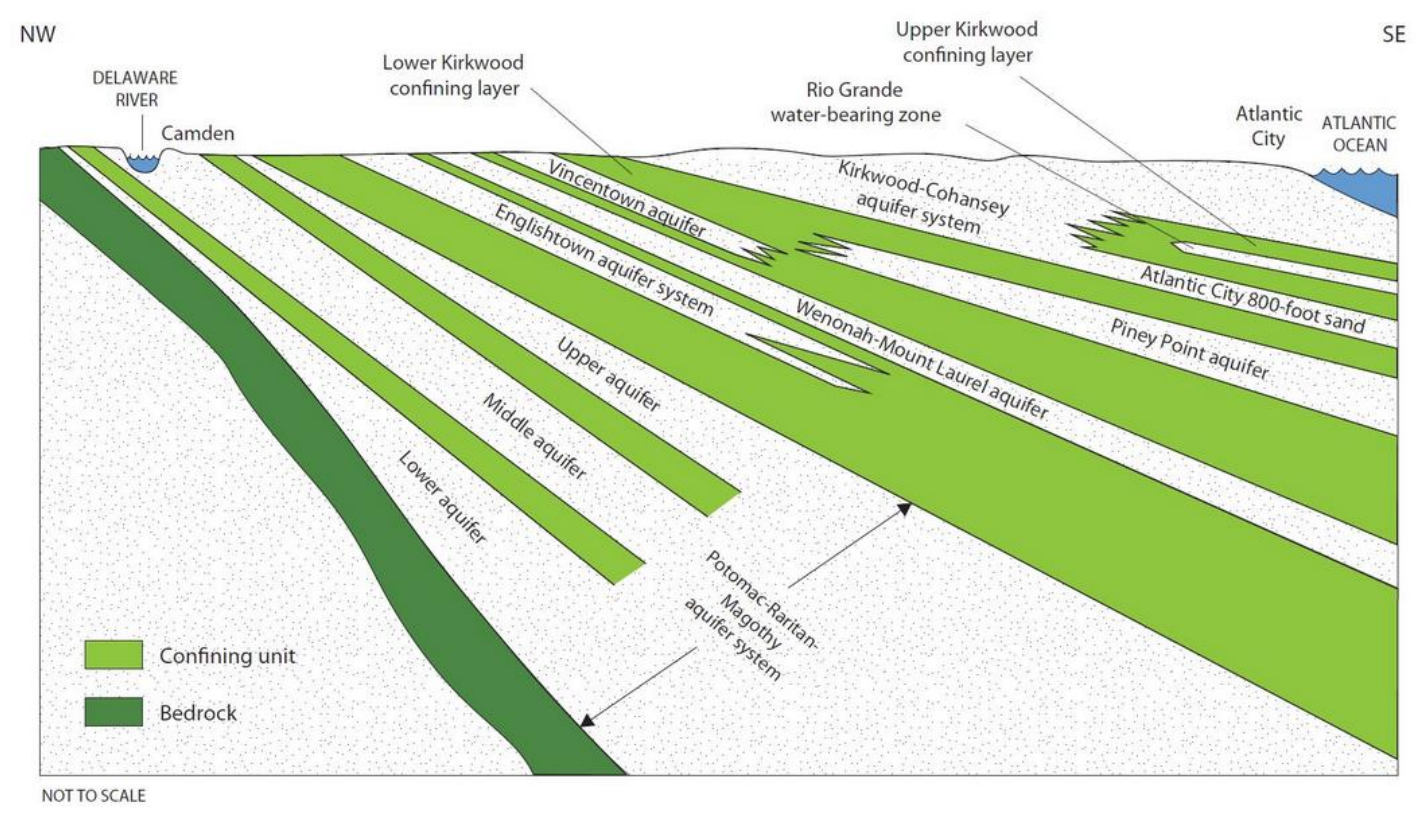
Bucket #1: Reservoirs

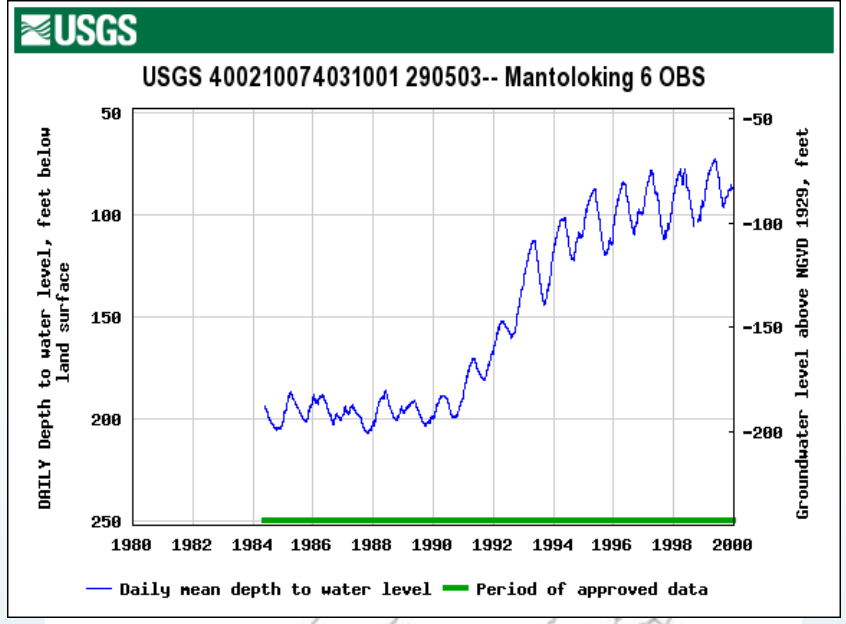


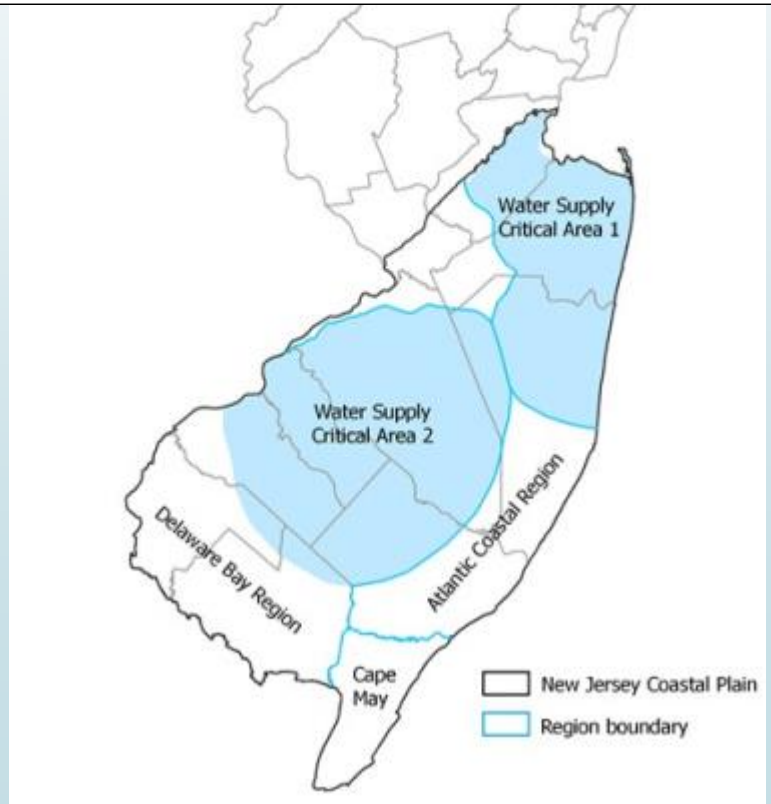
Safe Yield

The amount of water the reservoir can supply in a repeat of the worst drought on record.

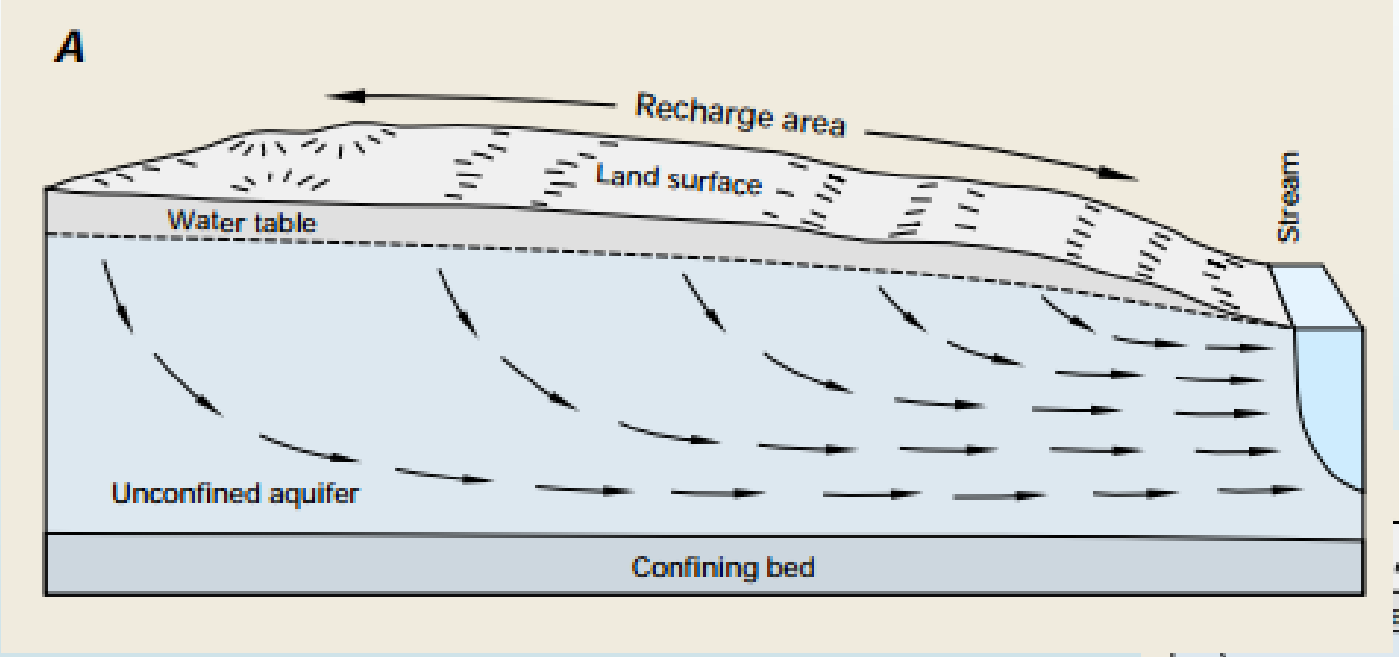
Bucket #2.
Confined aquifers

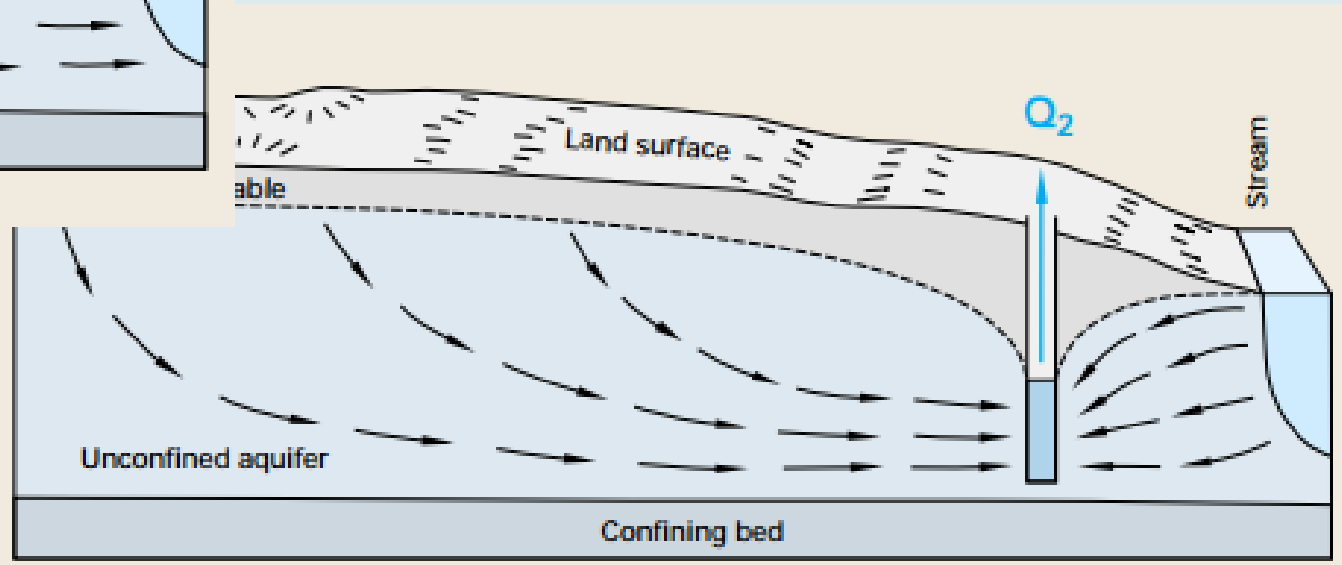




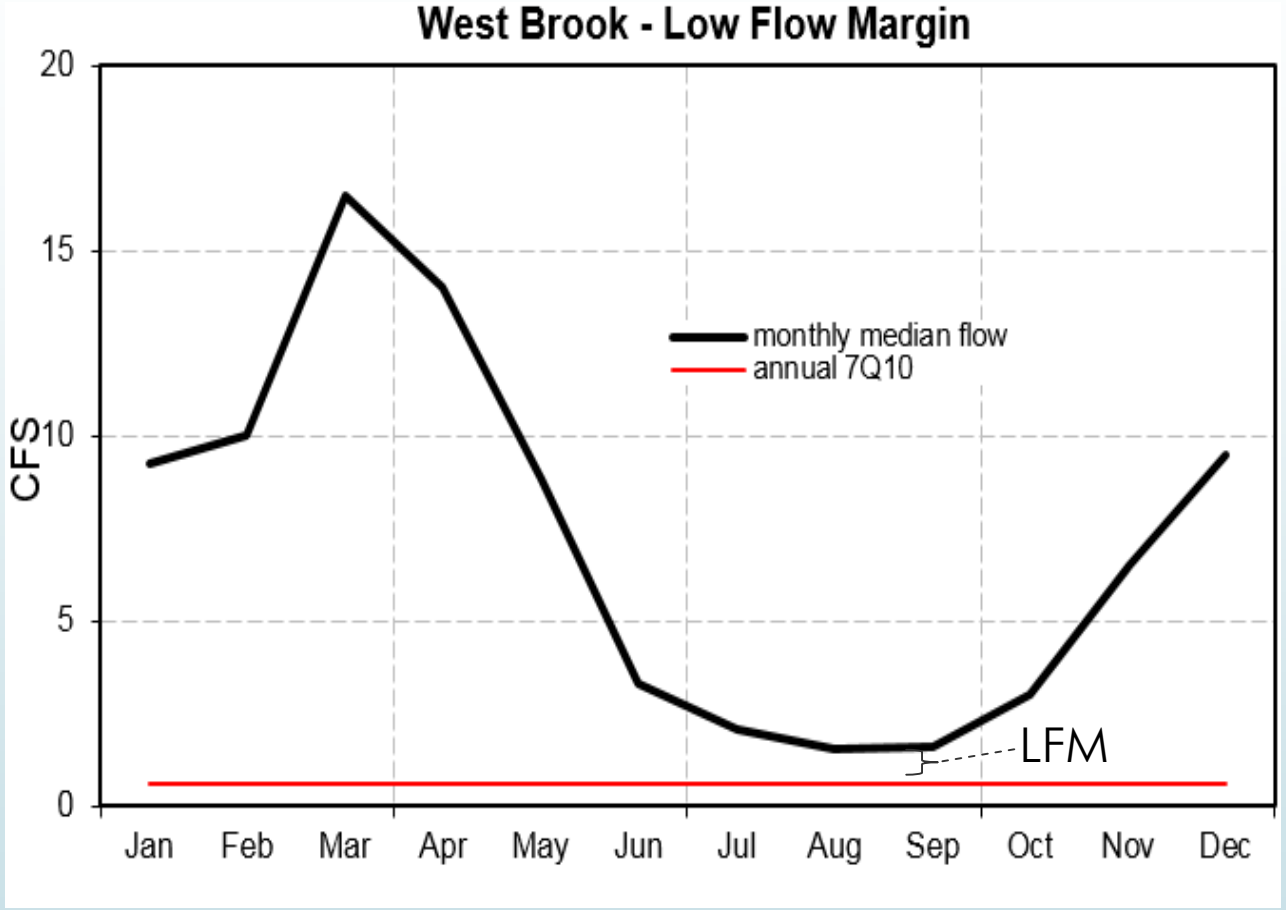


Bucket #3.
Surface water – unconfined aquifer system

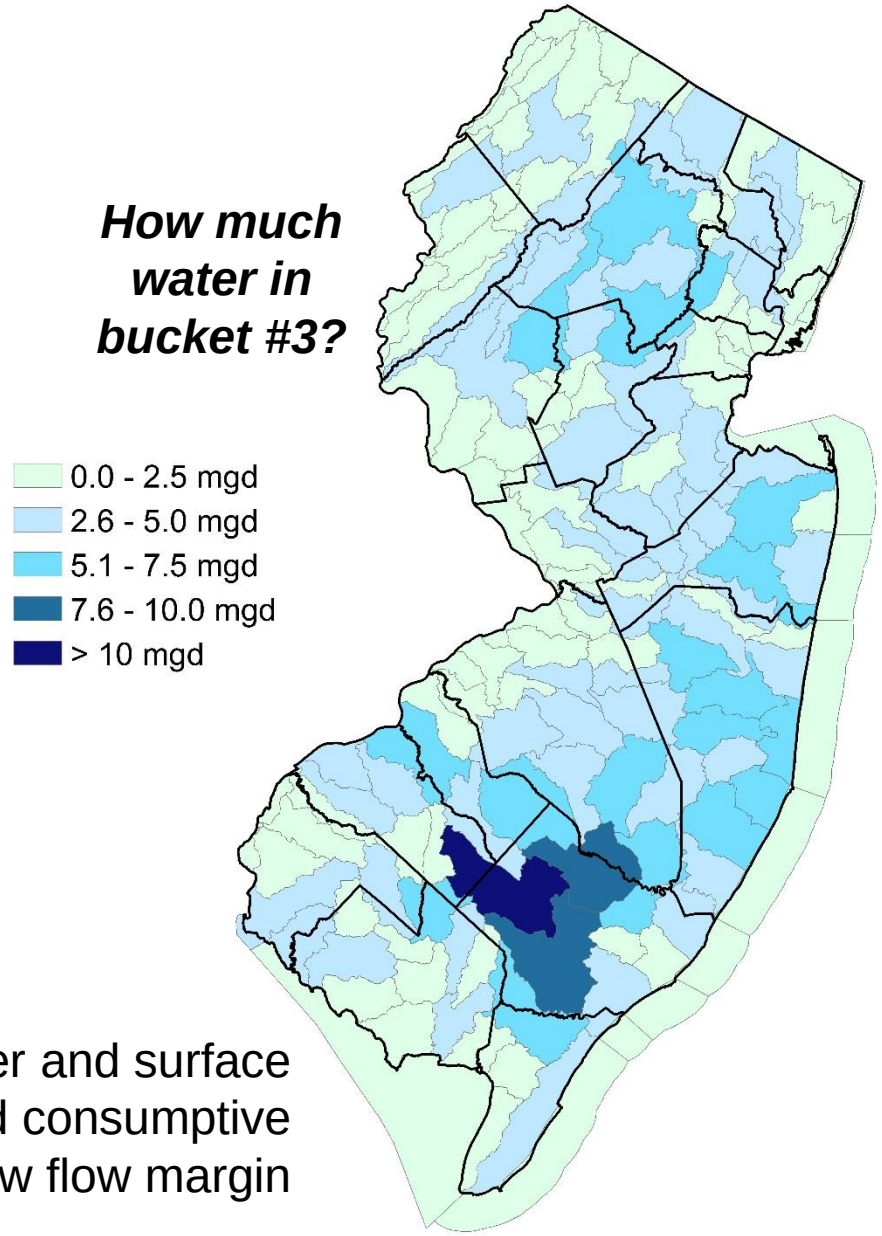




Water Availability



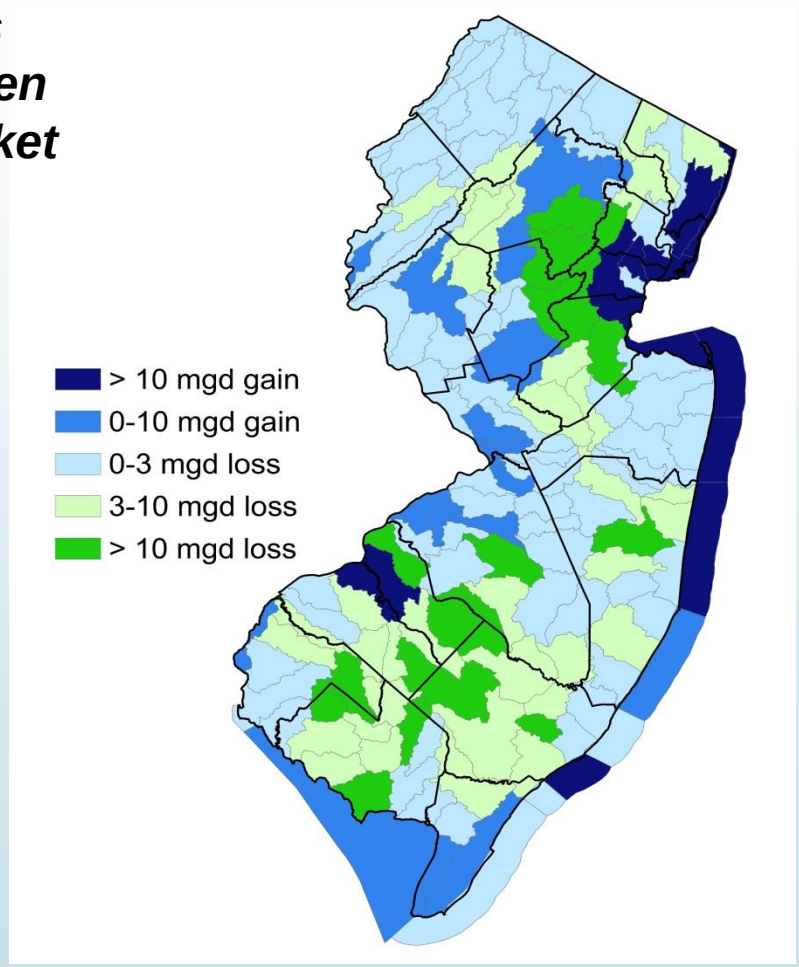
How much water in bucket #3?



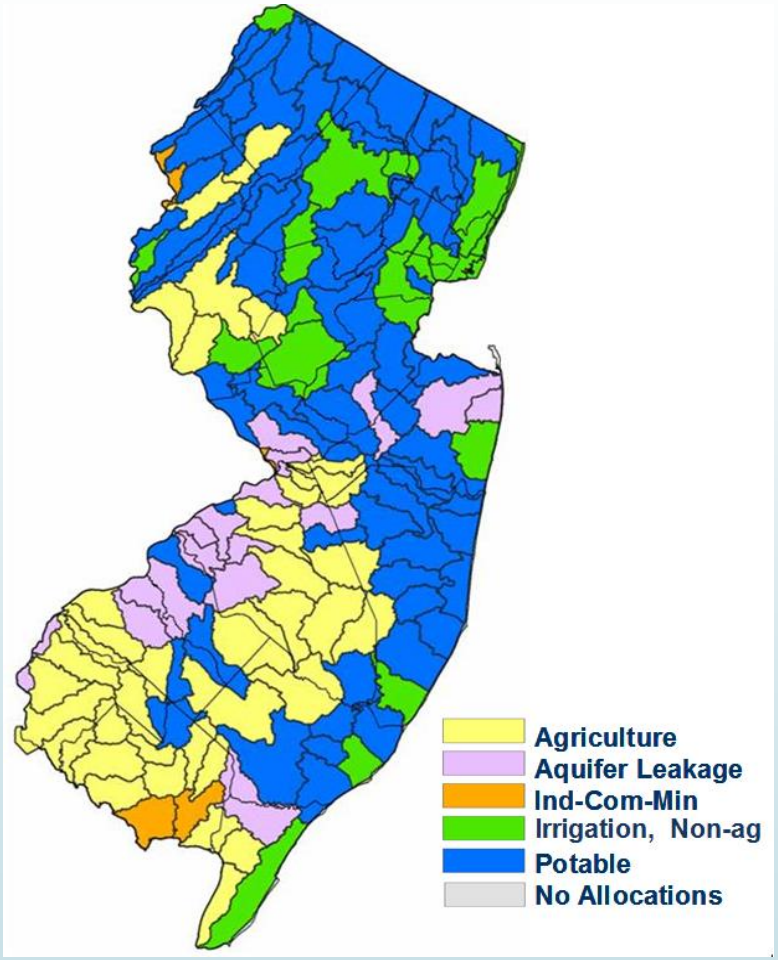
Total unconfined groundwater and surface water availability for depletive and consumptive use: 25% of low flow margin

Water Availability

How much water is being taken from bucket #3?



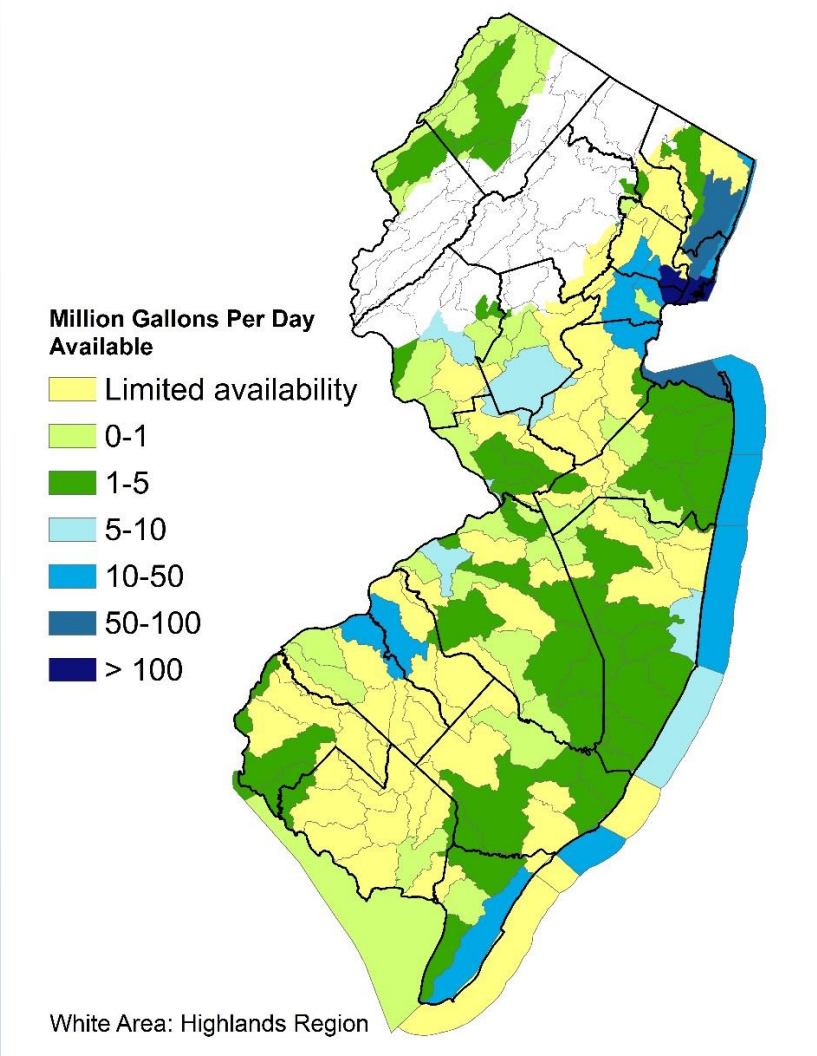
HUC11 unconfined aquifer and stream flow net loss or gain for peak use rates



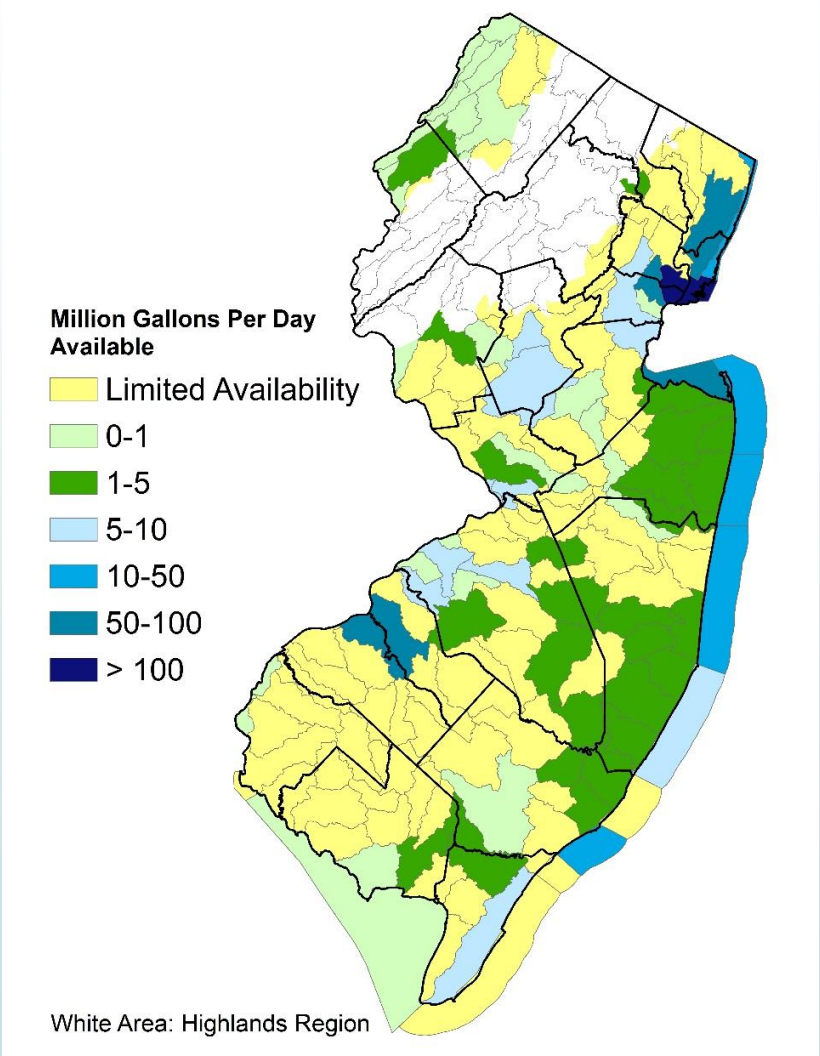
primary cause of peak loss

Water Availability

How much water is left in bucket #3?



Peak use rates, 2000-2015



Full allocation

HUC11 unconfined aquifer and stream flow remaining availability for peak demand period.

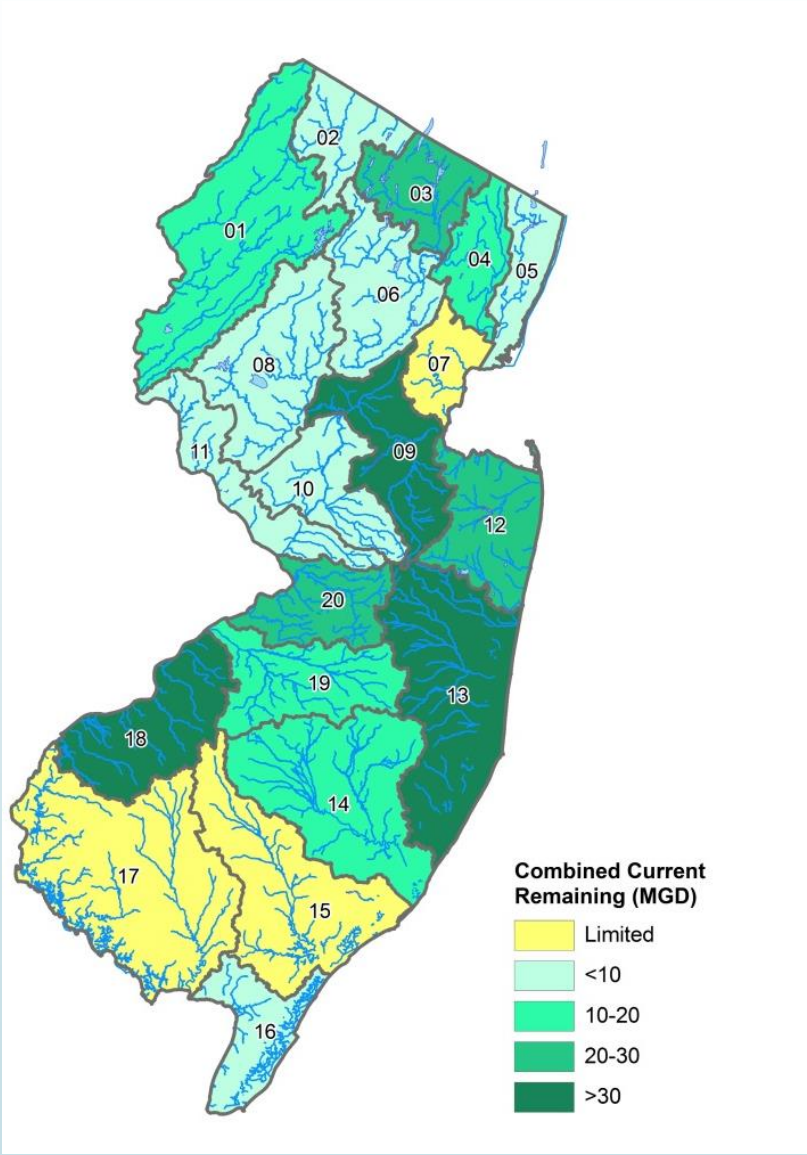
Water Availability

Table 3.2 Natural Resource Availability, net demand and remaining availability, and 2020 estimates of potable use.

WMA#	WMA Name	Natural Resource Availability (mgd)				Net Demand (mgd)				Remaining Availability (mgd)				Estimated increase in potable use 2015 to 2020 (mgd)	Estimated remaining water availability in 2020 (mgd)
		Reservoirs	SW Intakes/ Unconf GW	Conf GW (sub to revision)	Combined	Reservoirs	SW Intakes/ Unconf GW	Conf GW	Combined	Reservoirs	SW Intakes/ Unconf GW	Conf GW	Combined		
1	Upper Delaware		30		30		12		12		18		18	1.1	16.9
2	Wallkill		6		6		4		4		2		2	0.4	1.6
3	Pompton, Pequannock, Wanaque, and Ramapo	191.1	8		199.1	160	13		173	31.1	-5		26.1	0.7	25.4
4	Lower Passaic and Saddle	75	9		84	53	12		65	22	-3		19	4.3	14.7
5	Hackensack, Hudson and Pascack	126.5	6		132.5	122	3		125	4.5	3		7.5	3.7	3.8
6	Upper and Middle Passaic, Whippany and Rockaway	67.6	15		82.6	58	21		79	9.6	-6		3.6	1	2.6
7	Arthur Kill		6		6		21		21		-15		-15	4.9	-19.9
8	North and South Branch Raritan		21		21		12		12		9		9	0.5	8.5
9	Lower Raritan, South, and Lawrence	241	13	21.7	275.7	187	44	14	245	54	-31	7.7	30.7	3.9	26.8
10	Millstone		8	9.2	17.2		0	9	9		8	0.2	8.2	1	7.2
11	Central Delaware		8	3.5	11.5		1	2	3		7	1.5	8.5	0.3	8.2
12	Monmouth	62.6	21	21.3	104.9	55	7	17	79	7.6	14	4.3	25.9	1.4	24.5
13	Barnegat Bay	17	54	50.4	121.4	6	42	37	85	11	12	13.4	36.4	4.1	32.3
14	Mullica		39	10.4	49.4		30	7	37		9	3.4	12.4	0.5	11.9
15	Great Egg Harbor		36	27.2	63.2		59	22	81		-23	5.2	-17.8	1.2	-19
16	Cape May		7	13.6	20.6		1	12	13		6	1.6	7.6	-0.2	7.8
17	Maurice, Salem and Cohansey		47	28.2	75.2		122	11	133		-75	17.2	-57.8	0.7	-58.5
18	Lower Delaware		24	113.3	137.3		19	74	93		5	39.3	44.3	1.2	43.1
19	Rancocas		19	20.2	39.2		11	15	26		8	5.2	13.2	0.7	12.5
20	Assiscunk, Crosswicks and Doctors		10	22.2	32.2		-8	15	7		18	7.2	25.2	0.5	24.7
	TOTAL	**780.8**	**387**	**341.2**	**1,509**	**641**	**426**	**235**	**1,302**	--	--	--		**31.9**	--

- **Total Resource Availability**: 3 'buckets of water' vs current and future demands
- With this criteria, water availability in New Jersey is about 1,509 million gallons per day (mgd) while 207 mgd remains.

Water Availability



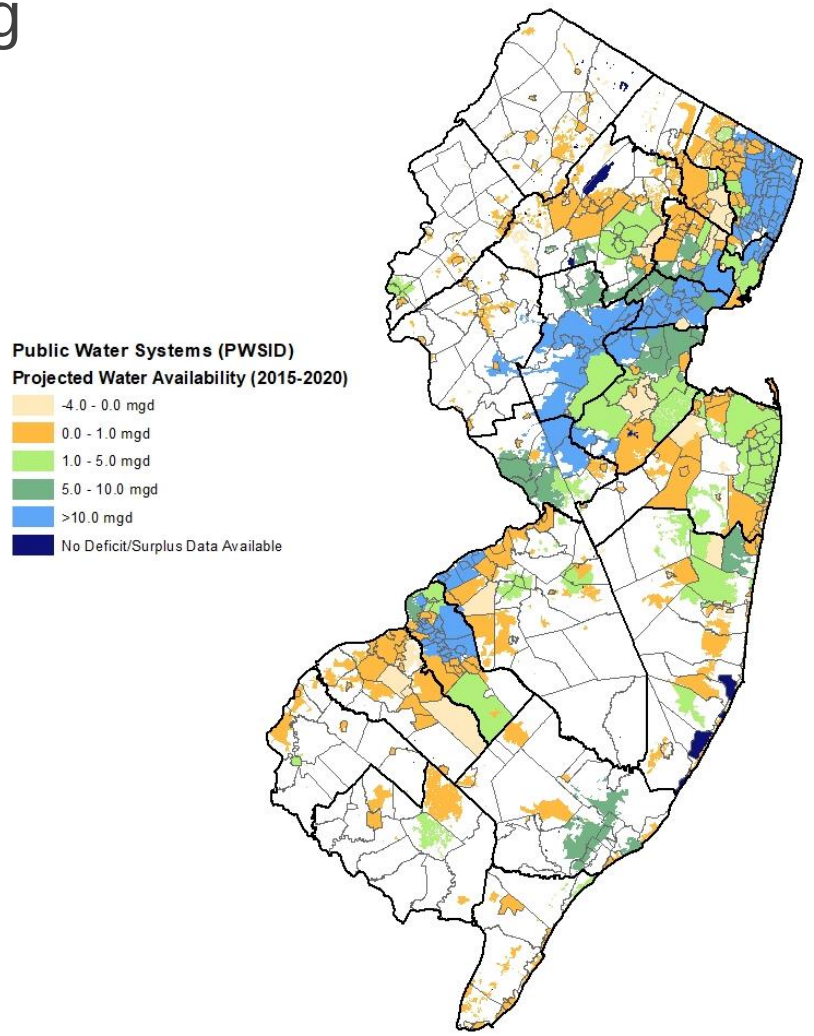
Total Resource Availability

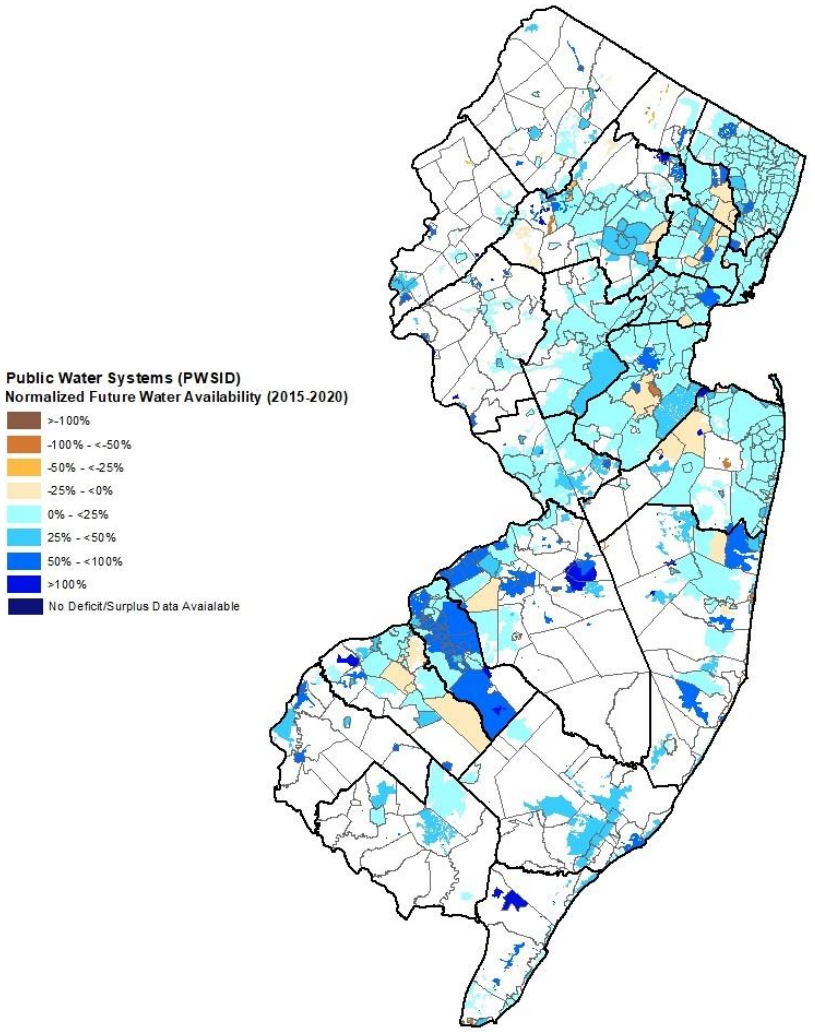
- A water-budget approach to withdrawals from reservoirs, confined aquifers, and the surface water/un-confined aquifer system.
- Balances human needs with ecological functions.
- Three of the State's 20 watershed management areas are currently stressed. Nine more would become stressed if pumped at volumes authorized under existing permits.
- New withdrawals in stressed water-sheds must be thoroughly evaluated.

Finished Water

Determine whether existing approved (allocated) resources and developed water supply infrastructure (firm capacity) can accommodate anticipated growth.

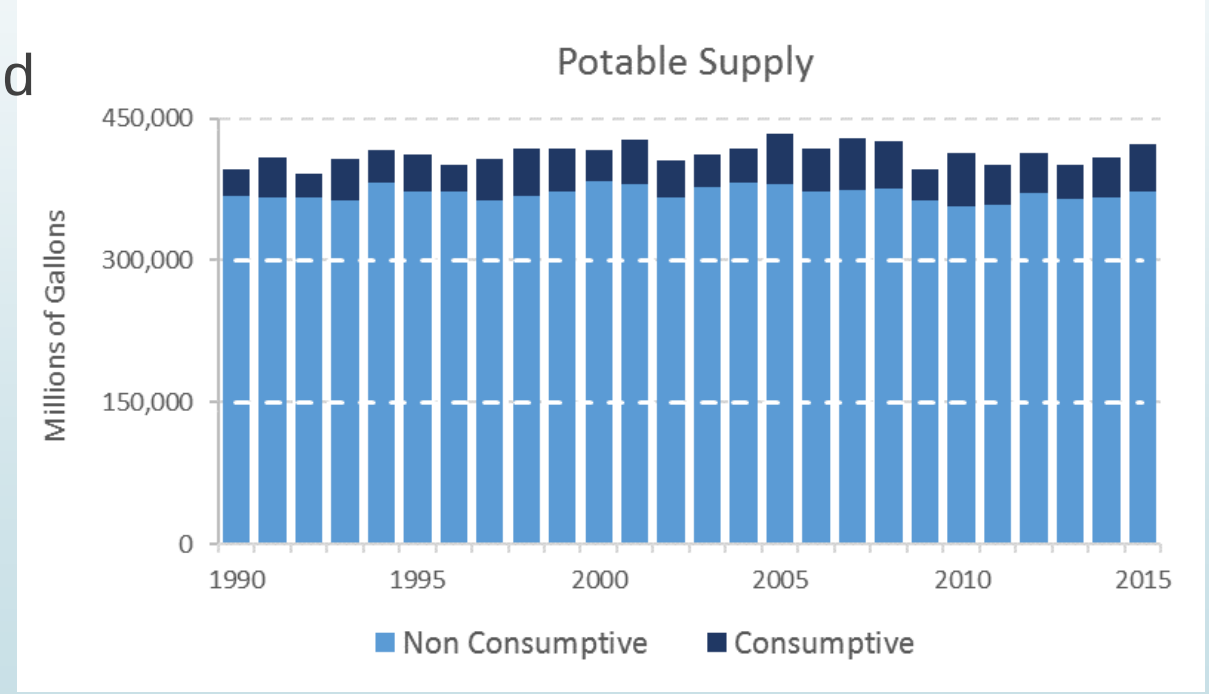
Areas with surplus or deficit supplies in 2020 in relation to currently approved potable supply.





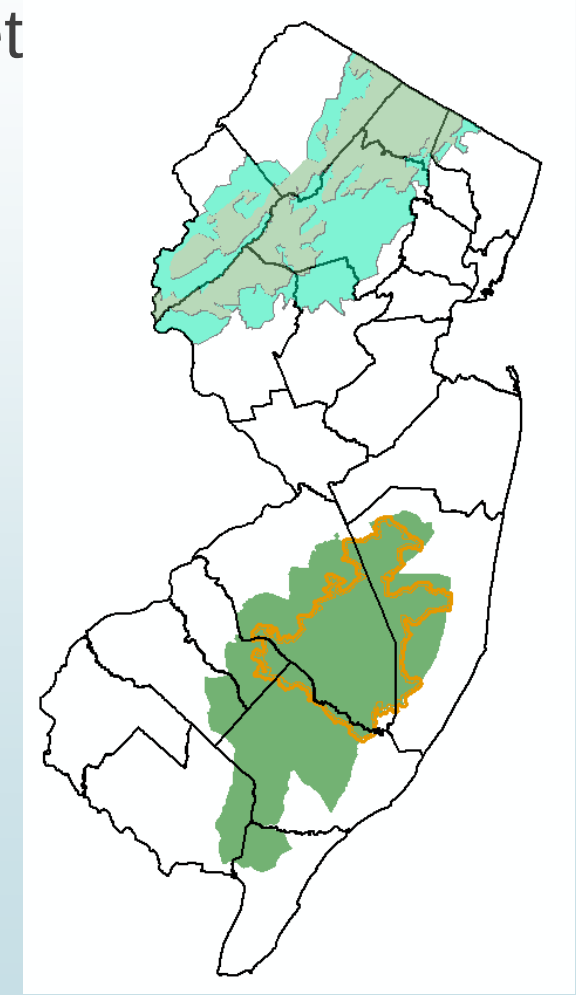
Finished Water

- Estimate future residential water demands based on population projections
  - Potable water trends flat despite increasing population
  - Much of new demand appears concentrated in lower per capita regions
  - Rutgers study underway to develop range of population projections to 2040 and a detailed analysis of per capita use rates due 2017



Planning & Policy

- Generally, NJ has **sufficient water available** to meet needs into the foreseeable future provided we **effectively manage** the state's water resources.
- **Region-specific sustainability thresholds** affects water availability:
  - Highlands & Pinelands
  - watershed-specific water quality and ecological concerns
- **10** specific recommendations



10 Policies for Improving Water Supply

1. **Promote efficient water use.**

2. Improve New Jersey's water system **resilience.**

3. Promote **optimized use** of existing water supplies.

4. Encourage **new water sources** and **innovative technologies**.

5. Evaluate the impact of new or increased allocations for **highly consumptive non-potable** uses.

10 Policies for Improving Water Supply

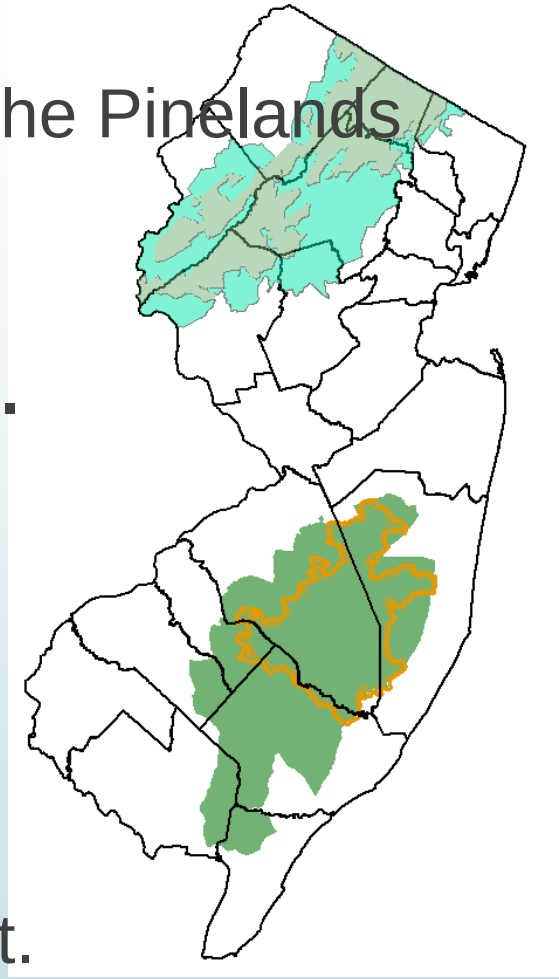
6. Coordinate **sustainable water supply policies** with the Pinelands and Highlands.

7. Support **detailed hydrologic regional assessments.**

8. Coordinate with the **agricultural community.**

9. Continue to **assist water systems** in ensuring **adequate financial investment** – asset management.

10. Maintain **monitoring networks.**



SUMMARY

Use Water Wisely

Proper Asset Management

Sufficient Monitoring & Assessment

Online Resources -- www.njgeology.org

Data

Digital Geodata Series
DGS10-3 New Jersey Water Transfer Model Withdrawal, Use, and Return Data Summaries

DOWNLOAD 85.6 MB UPDATED (6-25-2015)

Methods

TM 13-1 Using the Stream Low Flow Margin Method to Assess Water Availability in New Jersey's Water-Table-Aquifer Systems

Analysis

Digital Geodata Series
DGS14-1 Computer Workbook Investigating Water Availability in New Jersey on a Watershed Management Area Basis

DOWNLOAD

Web Page

http://www.nj.gov/dep/watersupply/wsp.html

Questions

watersupply@dep.nj.gov