

# NJ Water Supply Plan, 2017-2022, DRAFT



# 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

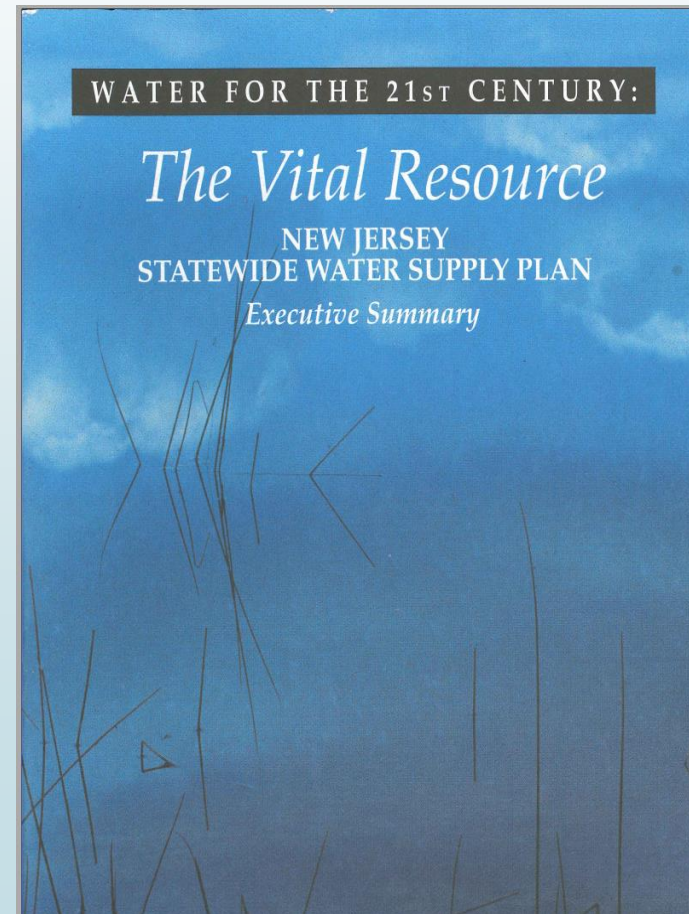
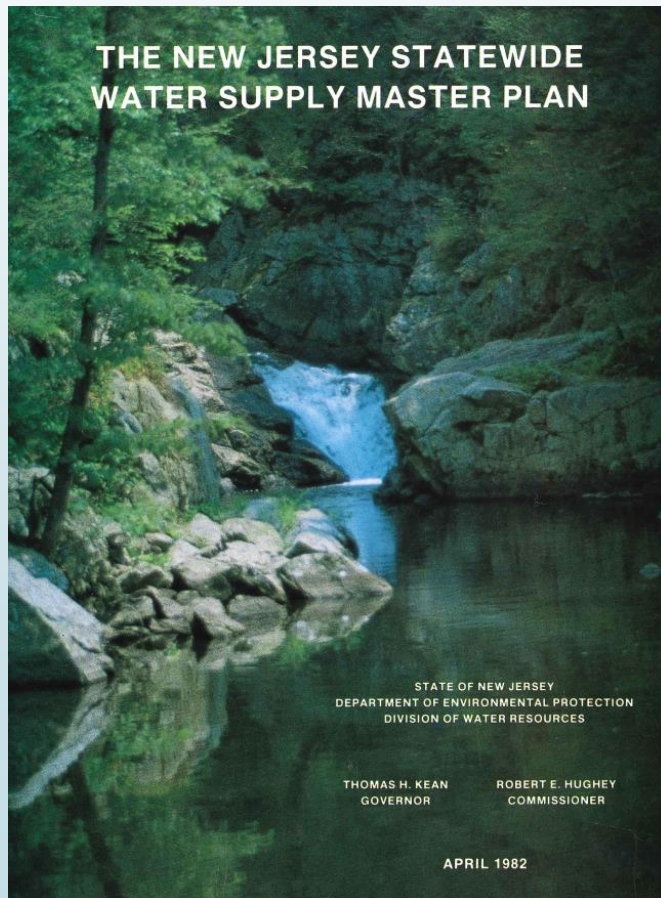
1983

1985

1987

1991

1993



1996

2003

# Requirements

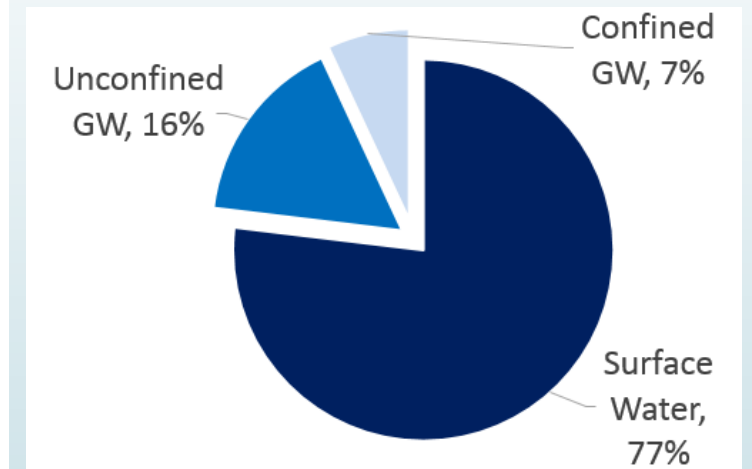
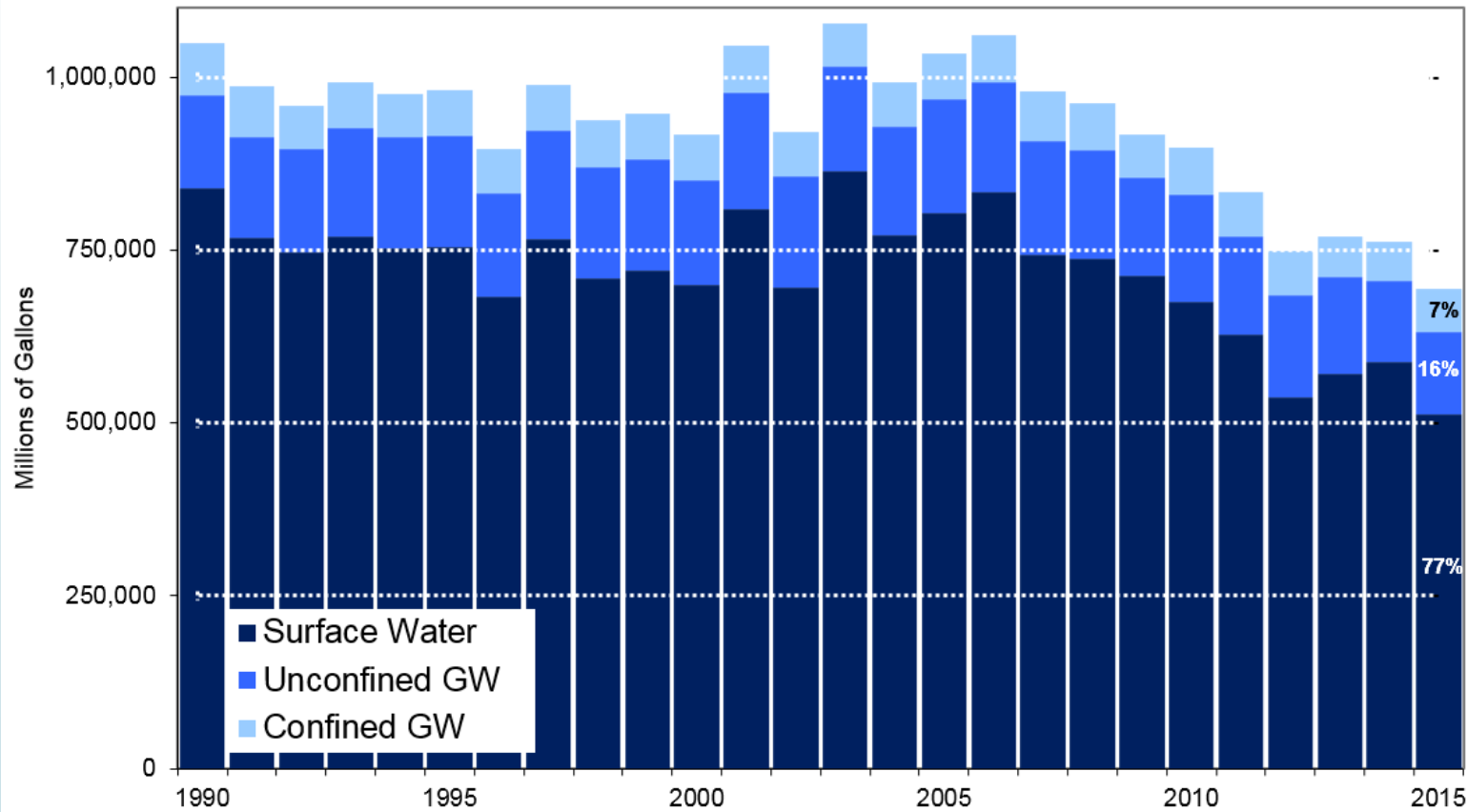
- Identify surface and ground water sources, current demands
- Make demand projections for duration of the plan
- Identify land purchased for water supply facilities but not yet used
- Recommend:
  - Improvements, new construction, and interconnections
  - Diversions for aquaculture
  - Legislative and administrative actions to protect watershed areas
  - Identification and purchase of land for water supply facilities
  - Administrative actions to protect surface and ground water supplies

## 2017 – 2022 Plan

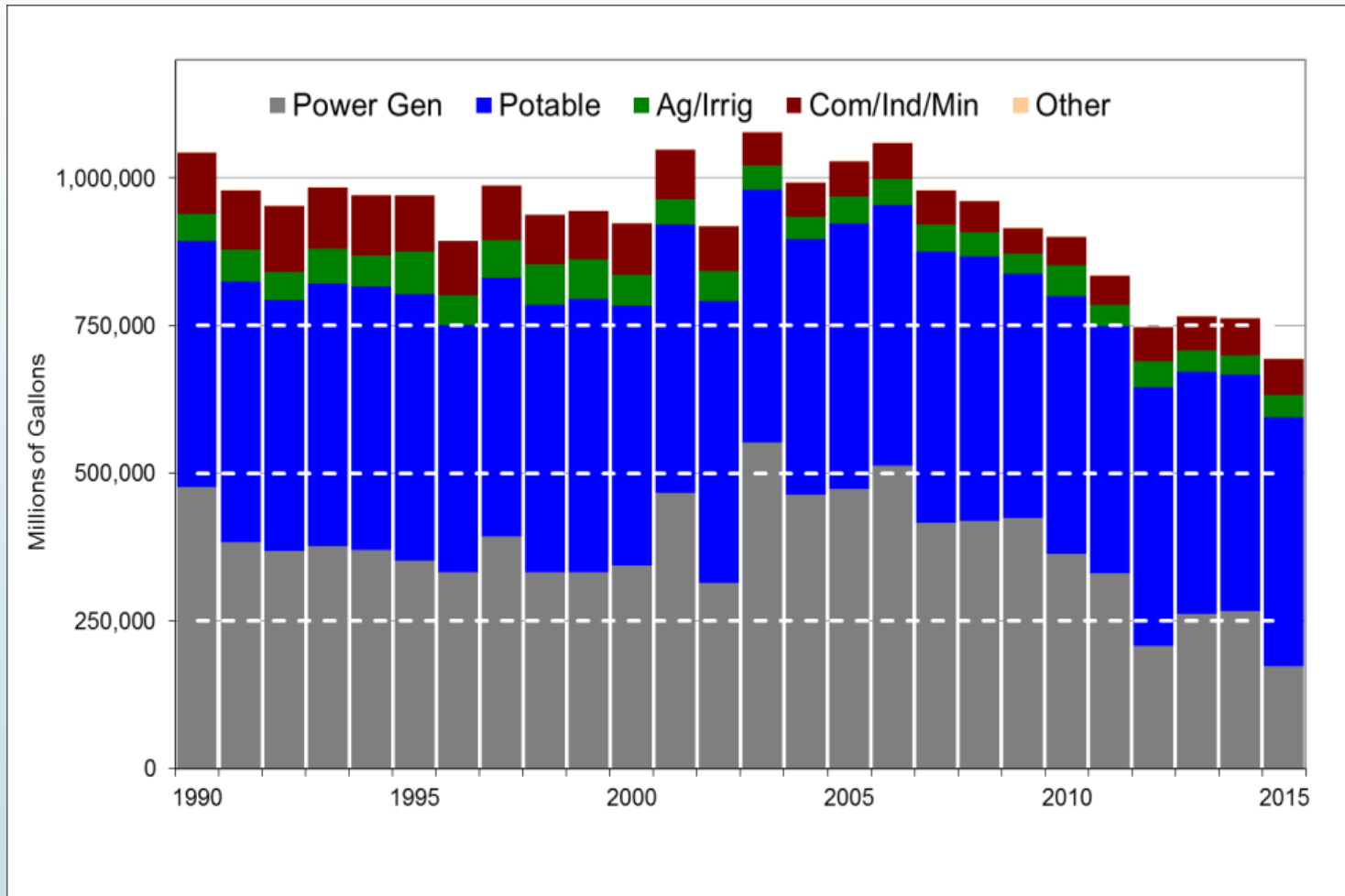
- Emphasizes the need to **balance** traditional **water use** with water **resource protection**, and outlines a range of policy options to achieve that balance amid an array of **competing interests** and issues.
- Differs from preceding plans as it is designed to allow for **continuous technical and policy updates**, as ongoing water resource evaluations, water use data, and more refined water demand projections become available. “Living Plan”
- The intention is for these, and future **releases** of the NJSWSP updates to be made available through the DEP’s **web site**.
- Serves as a **tool** to guide the **management, regulation, conservation, and development** of the State’s water resources for the foreseeable future.

# Water Use Trends: Key Findings

## Withdrawals by Source



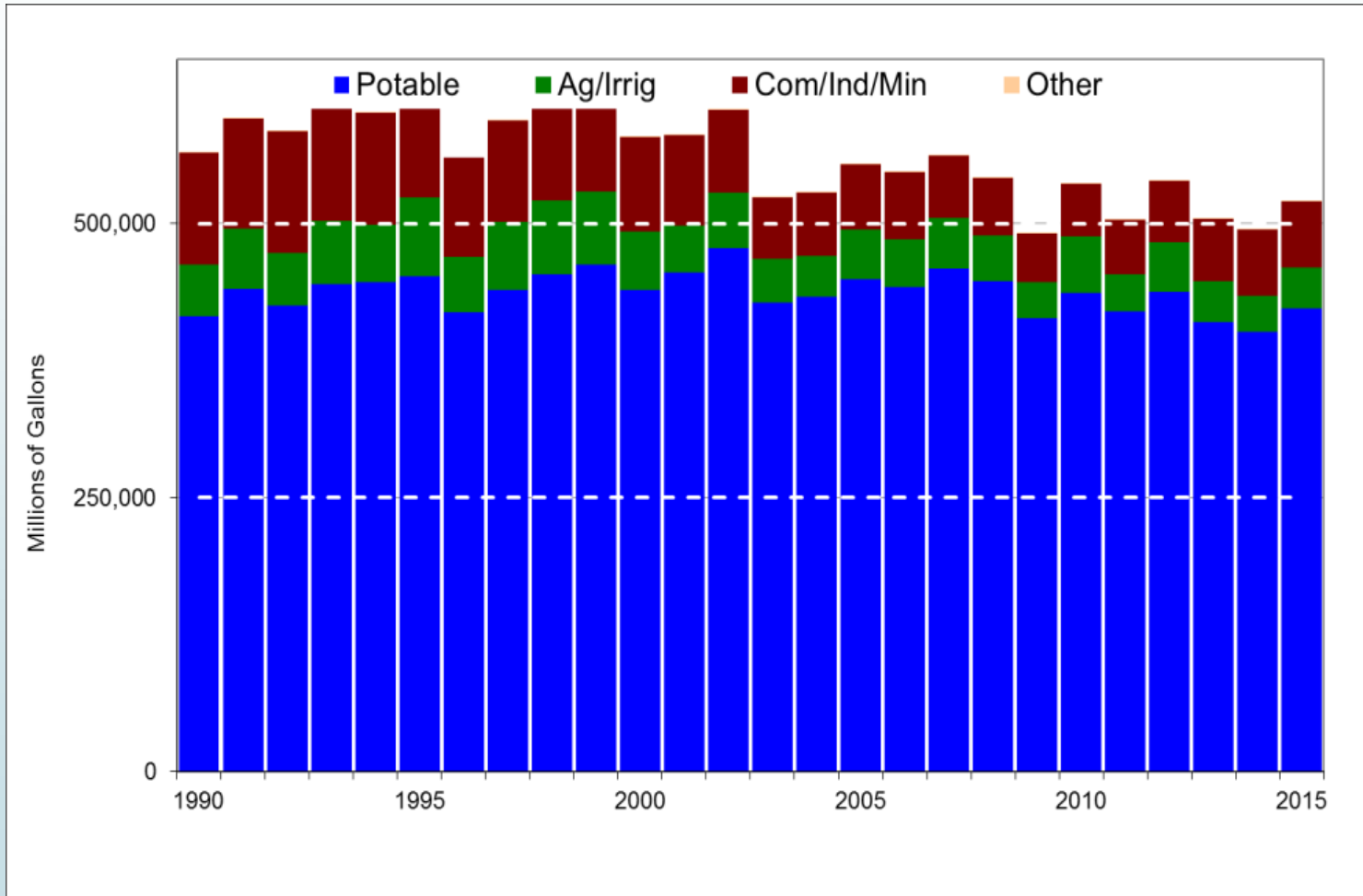
# Water Use Trends: Key Findings: Withdrawals by Use Group



- Total freshwater withdrawals 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: Key Findings

## Withdrawals by Use Group

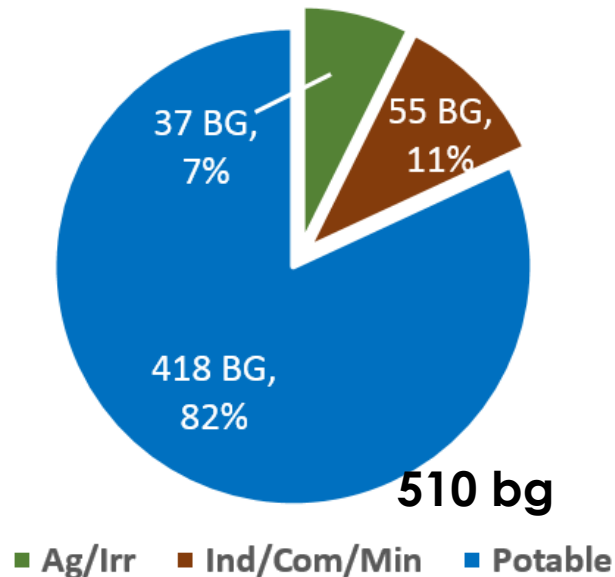


- Annual withdrawals for all other uses peaked about 650 bgy in late 1990's.
- Now around 500 bgy.

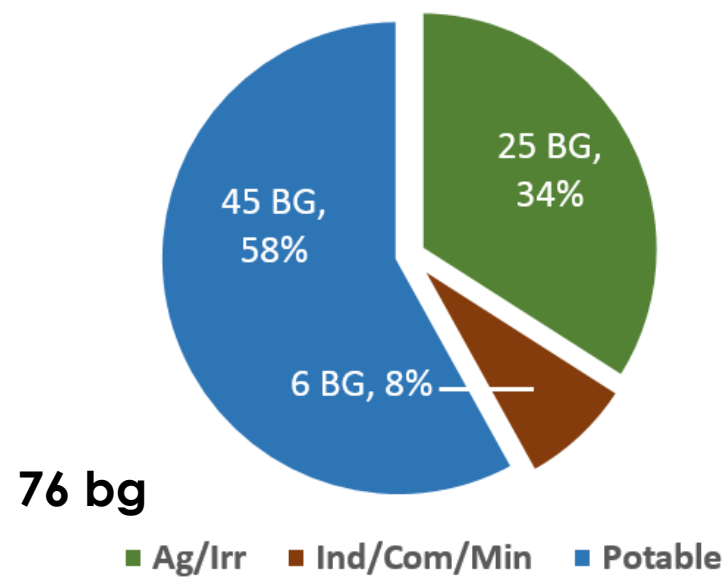
# Water Use Trends: Key Findings

## Total Withdrawals and Consumptive Losses

2011-2015 Average Total Water Use,  
by Sector  
(billions of gallons and % of total)



2011-2015 Average Consumptive  
Losses, by Sector  
(billions of gallons and % of total)



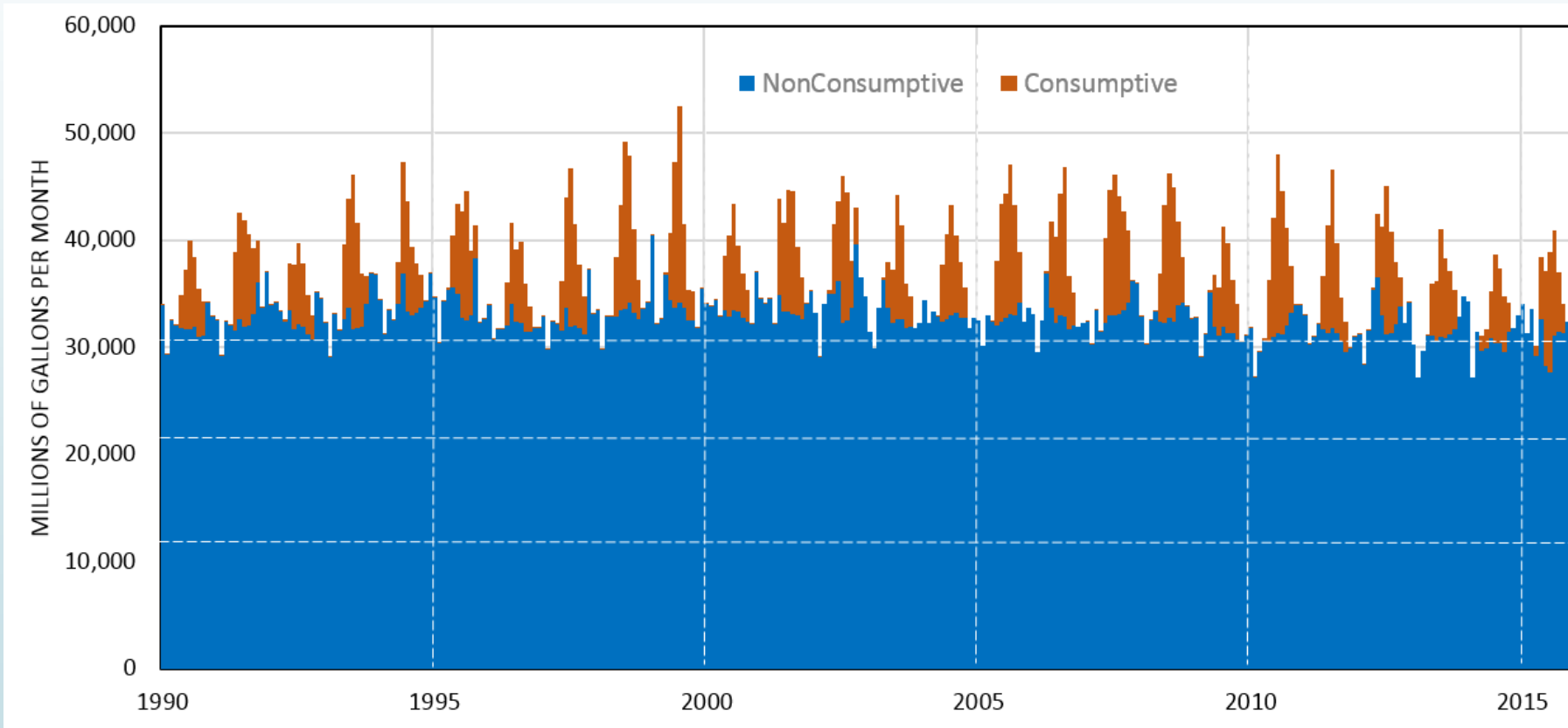
“Consumptive loss” is the portion of the water used which is lost to evaporation, transpiration or incorporation in a product. This water is not discharged to any location and is not available for a downstream use.



# Water Use Trends: Key Findings

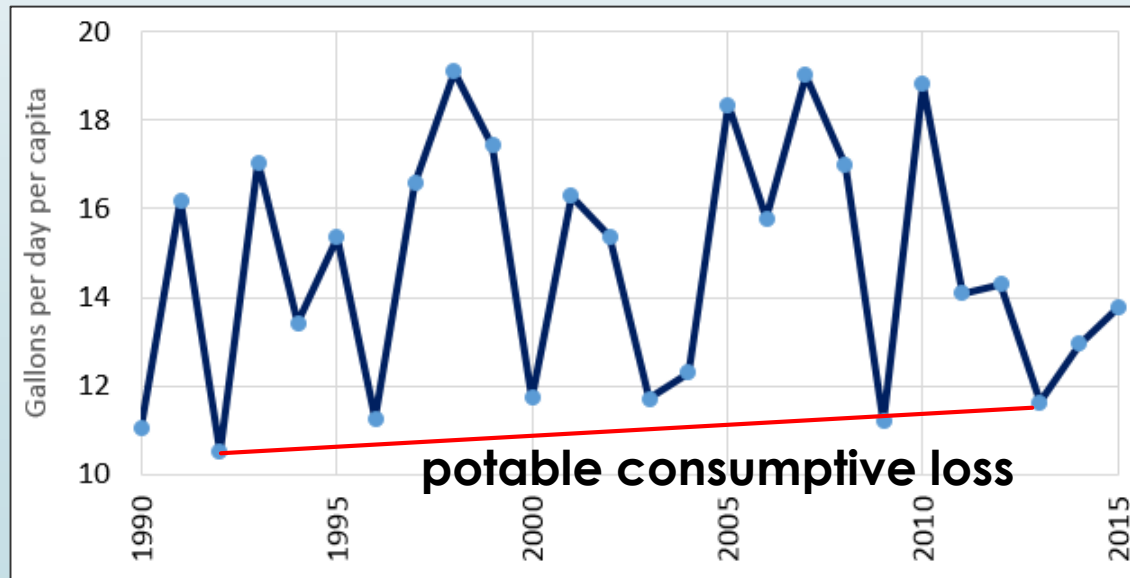
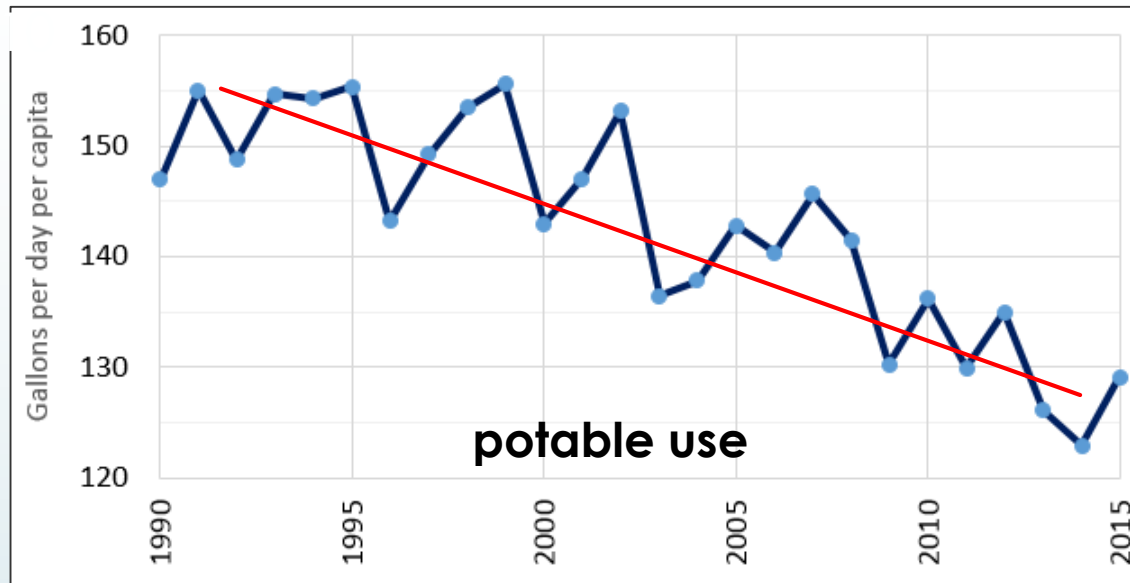
## Monthly Consumptive Losses

Monthly Potable consumptive and non-consumptive use 1990-2015



- 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: Key Findings



- **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: Key Objectives

## ➤ Calculate: (chapter 3)

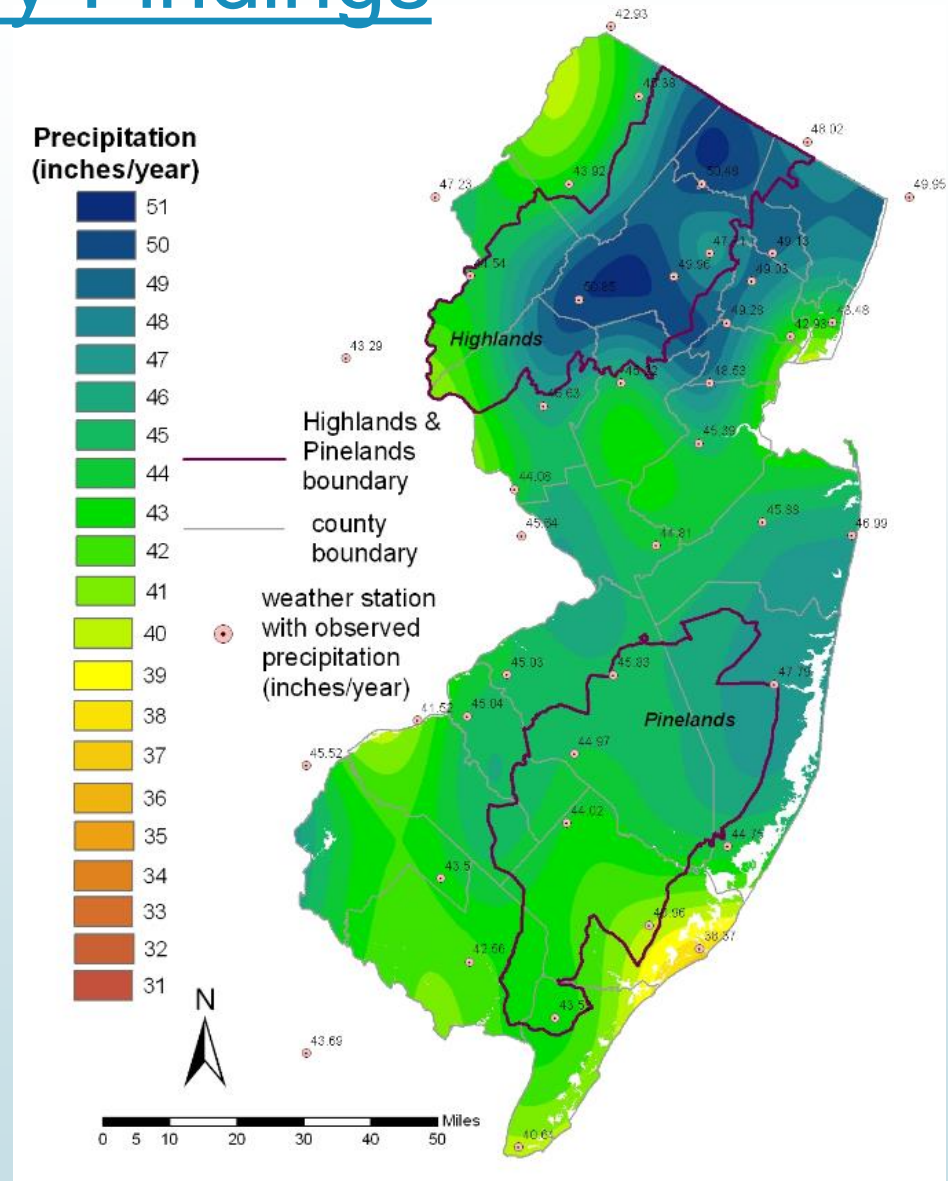
- consumptive losses (*evapo-transpiration*)
- depletive losses (*water or wastewater transfers out of the watershed*)
- accretive gains (*water transferred in*)
- net losses and gains

## ➤ Develop: (chapter 3)

- 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

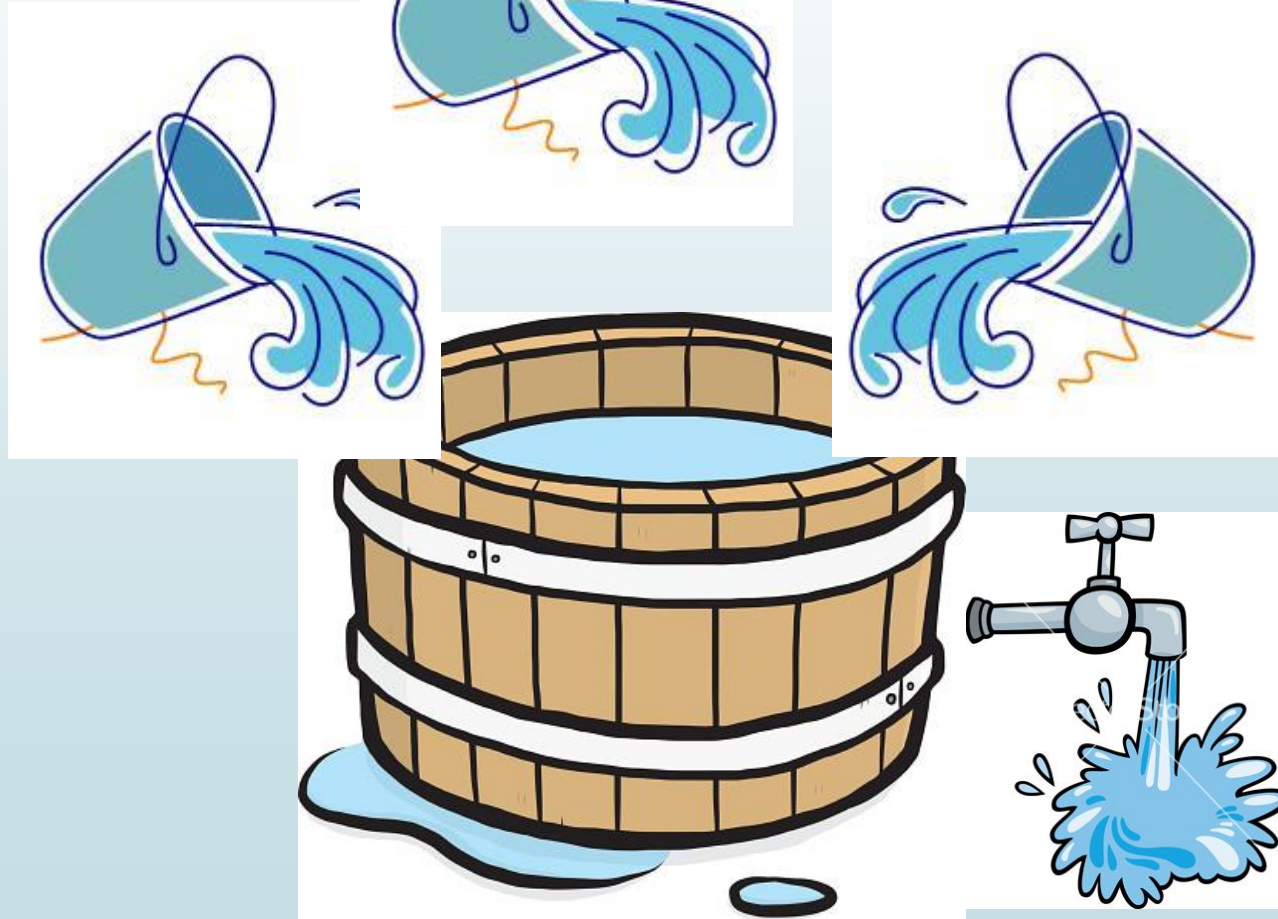
# Water Availability: Key Findings

- 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'

Reservoirs



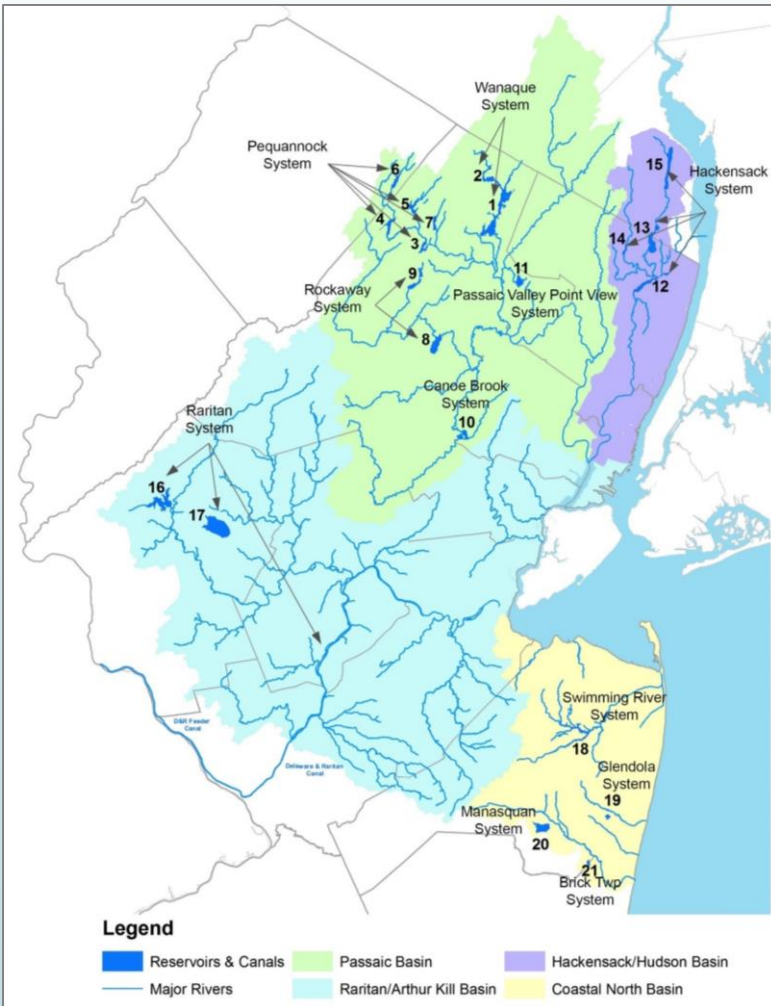
Confined  
Aquifers

Surface  
Water &  
Unconfined  
Aquifers

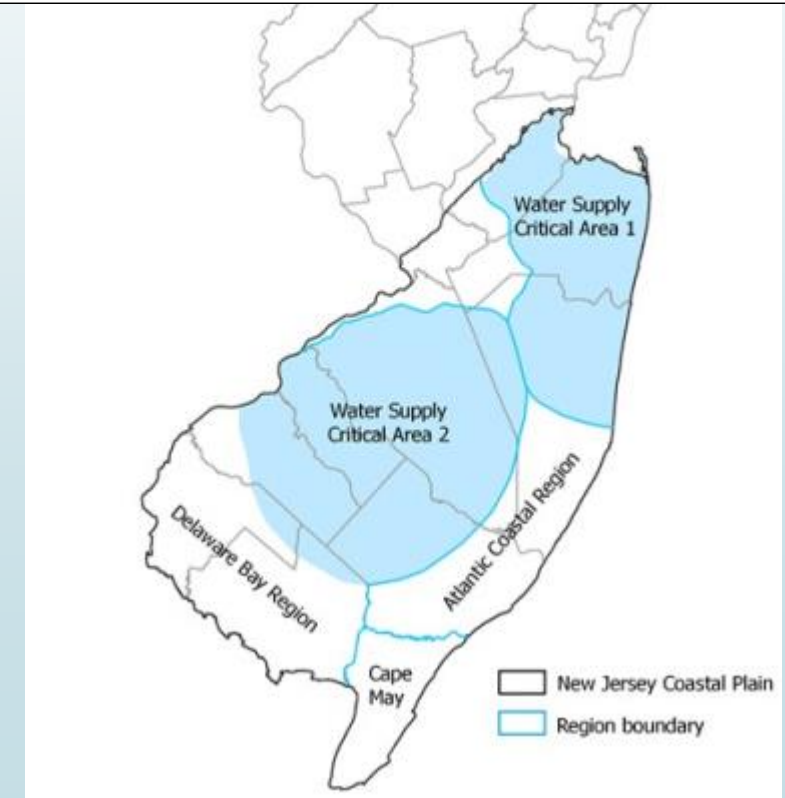
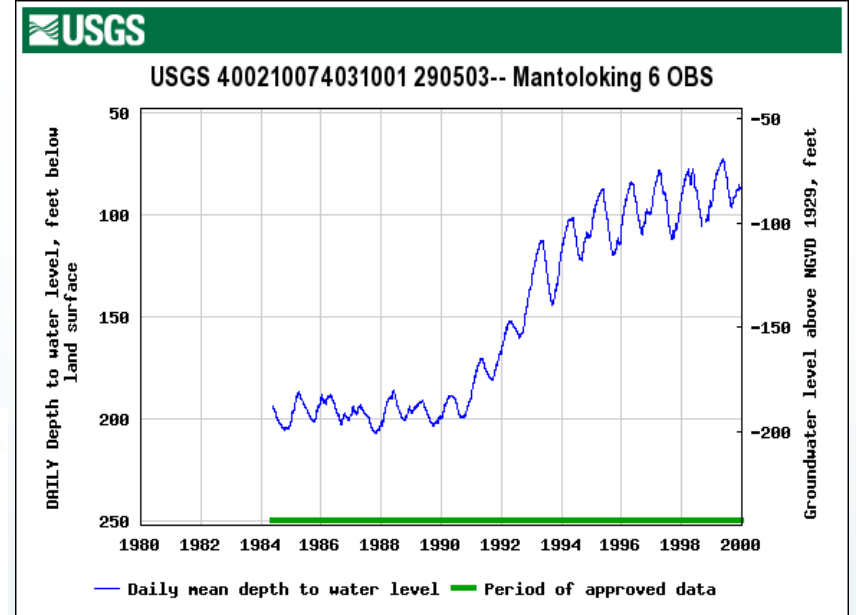
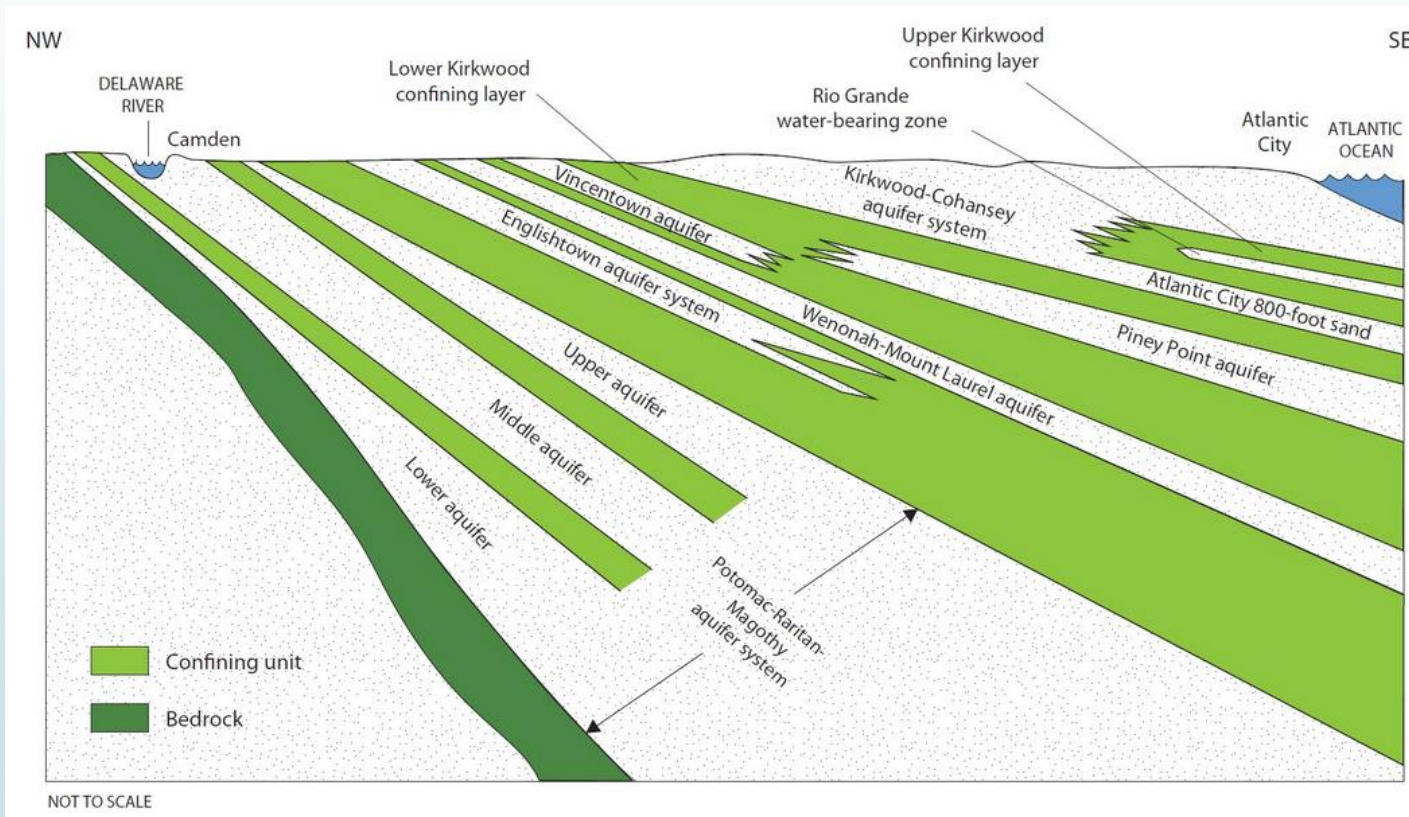
# Bucket #1: Reservoirs

## Safe Yield

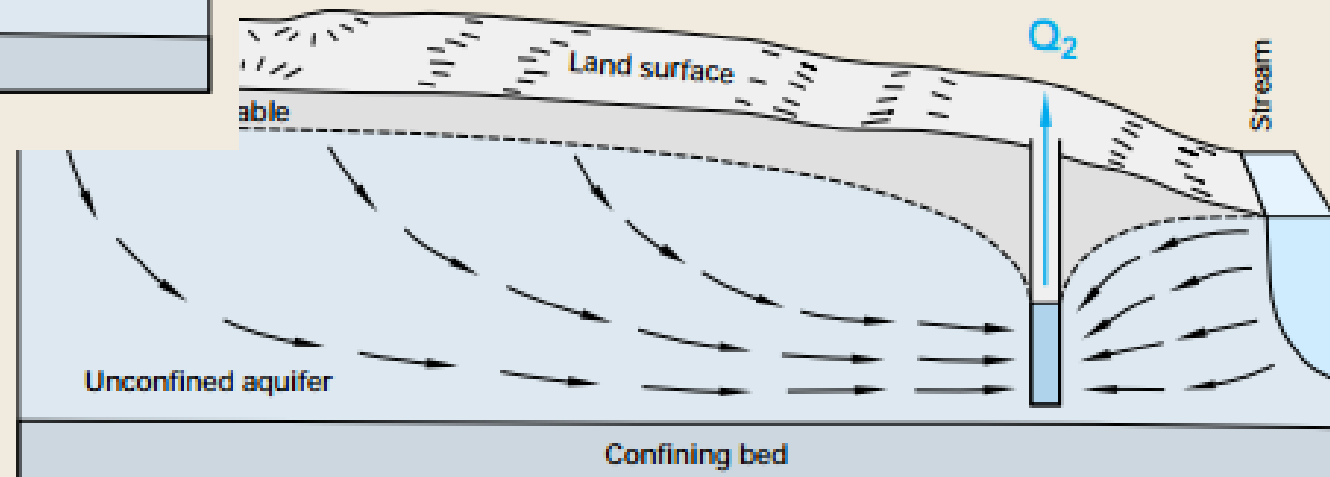
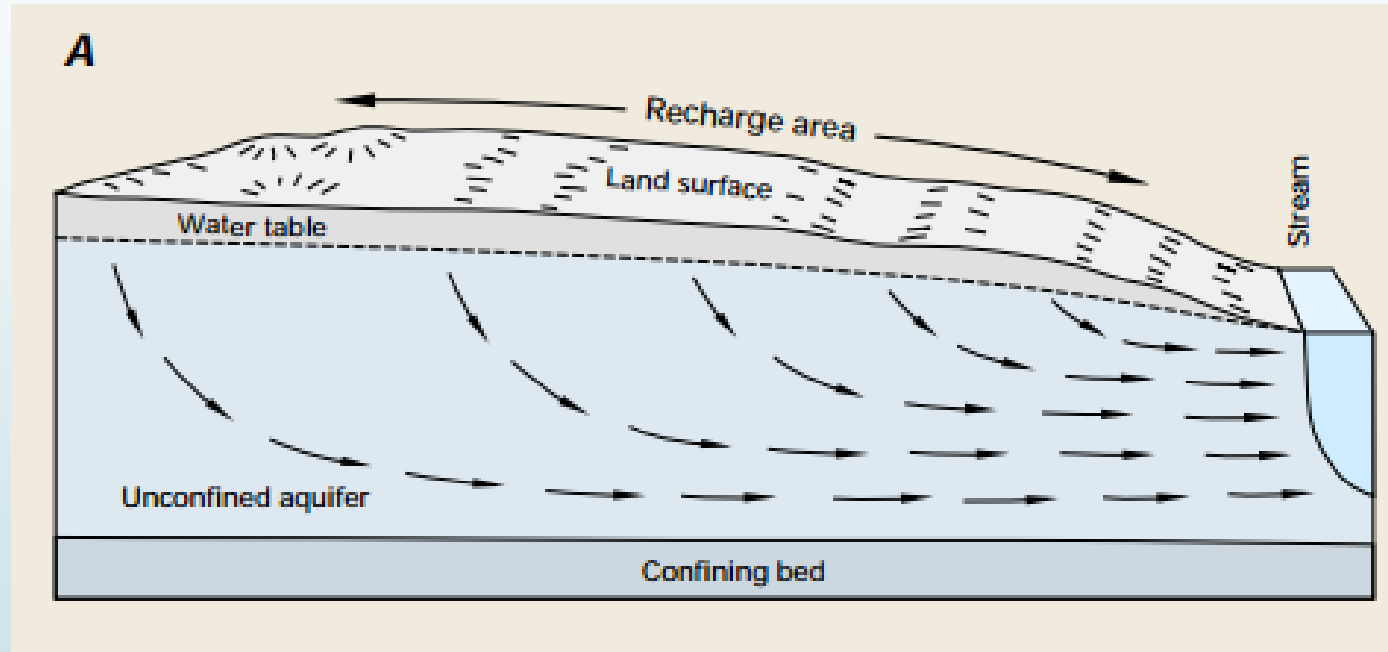
The amount of water the reservoir can supply in a repeat of the worst drought on record.



# Bucket #2. Confined aquifers



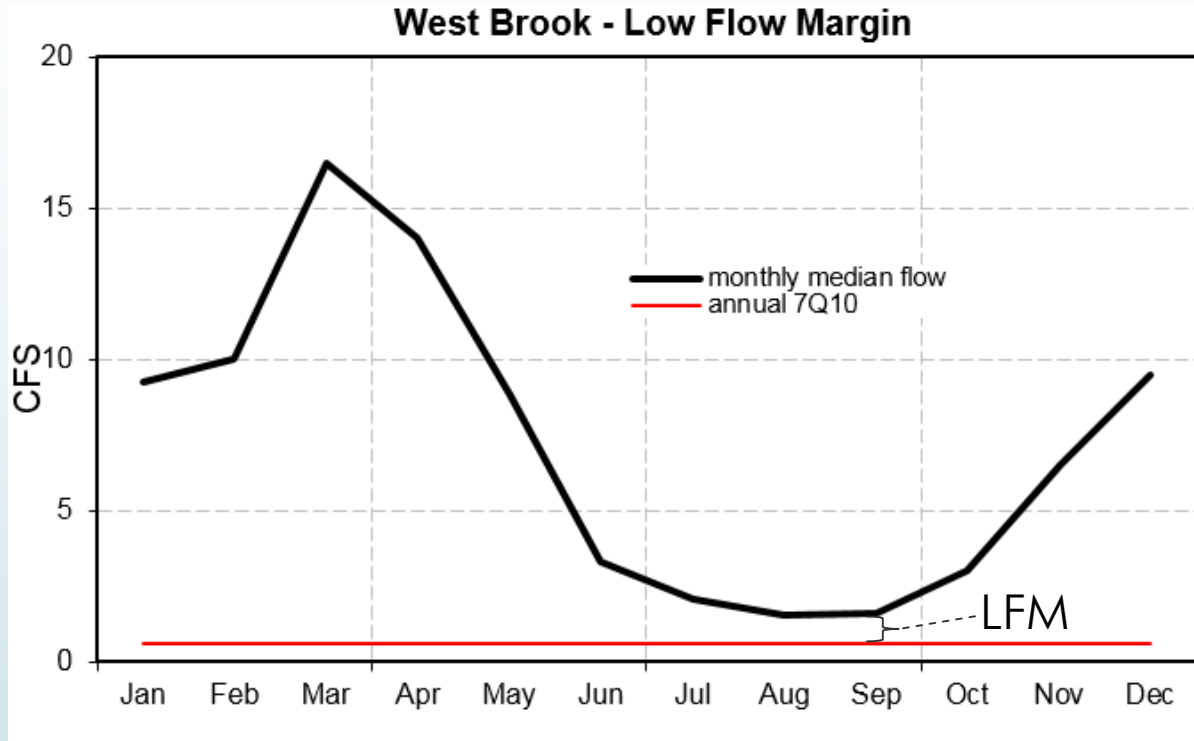
# Bucket #3. Surface water – unconfined aquifer system



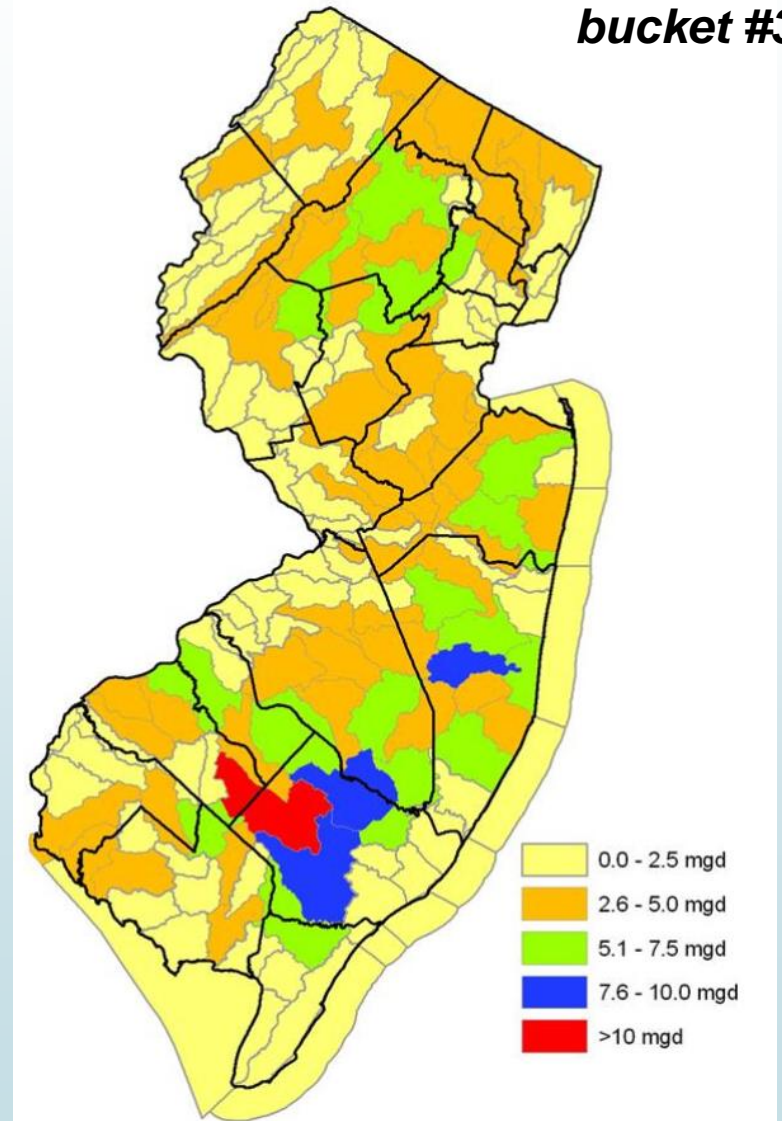


# Water Availability: Key Findings

*How much water in bucket #3?*

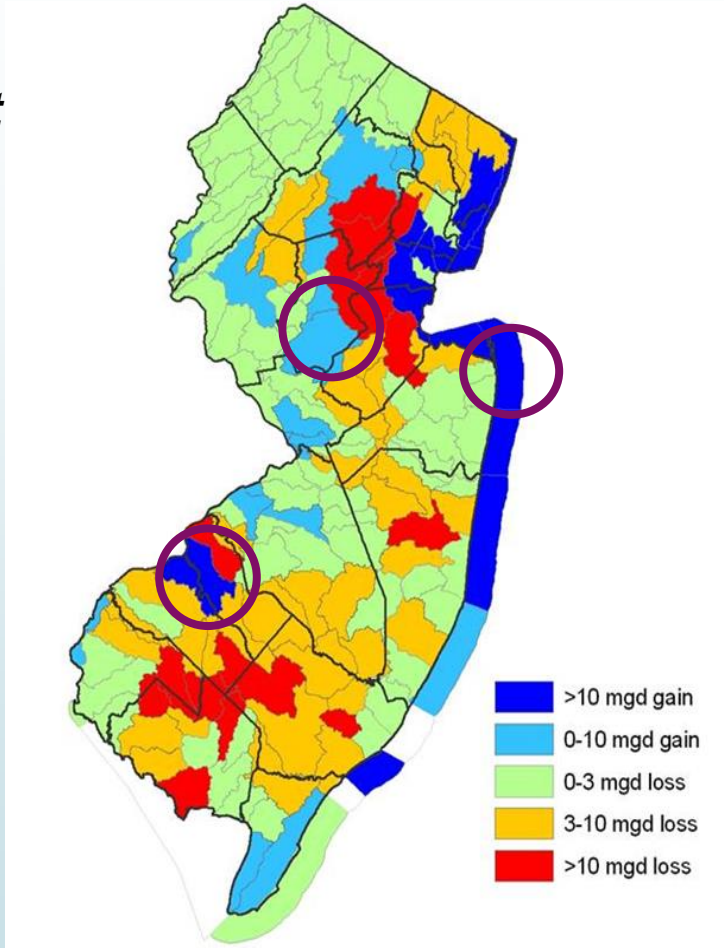


Total unconfined groundwater and surface water availability for depletive and consumptive use: 25% of low flow margin

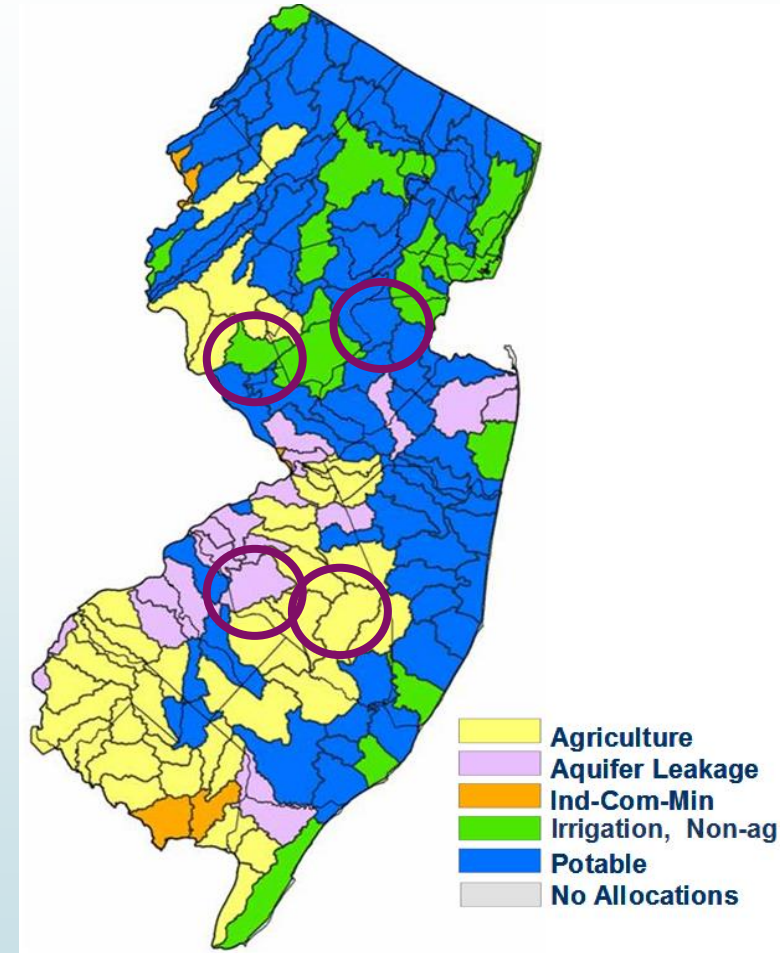


# Water Availability: Key Findings

*How much water is being taken from bucket #3?*



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

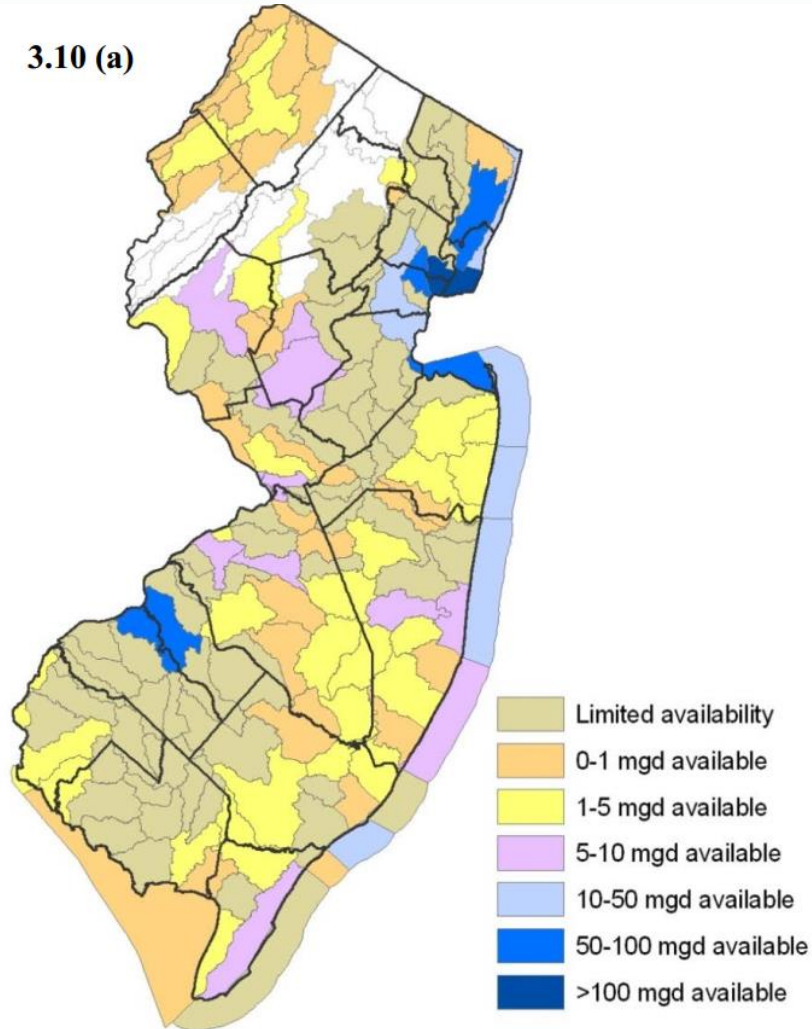


primary cause of peak loss

# Water Availability: Key Findings

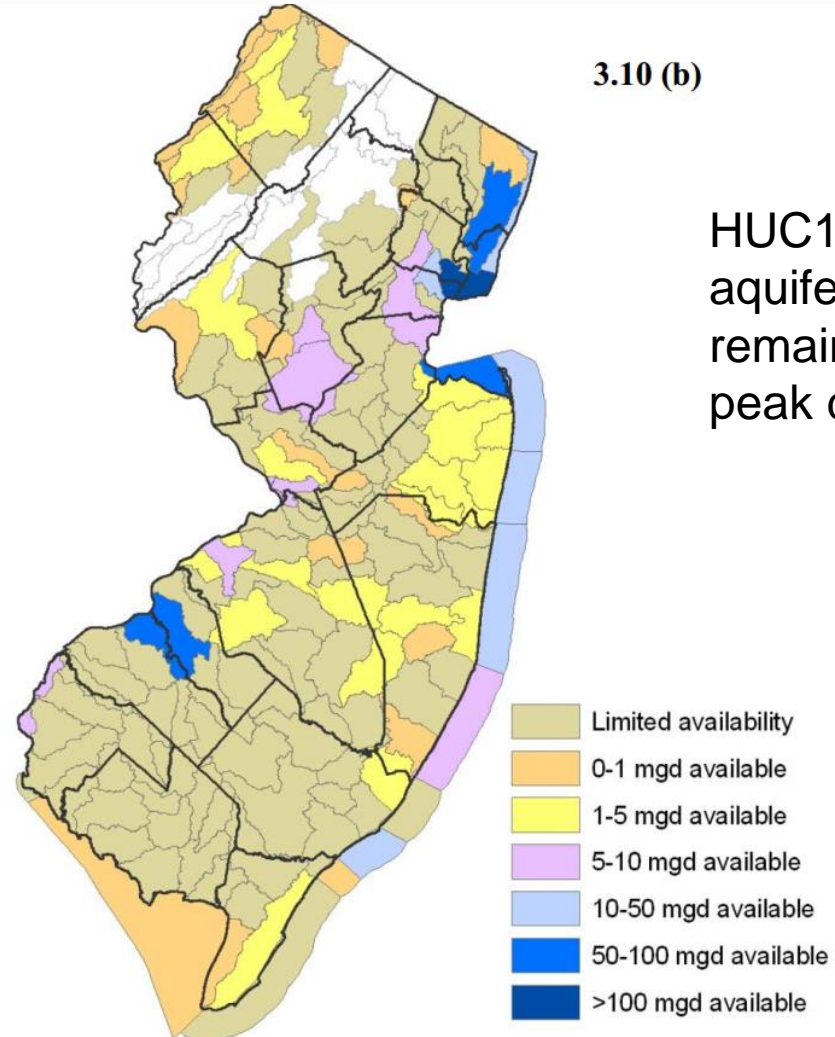
*How much water is left in bucket #3?*

3.10 (a)



Peak use rates,  
1997-2008

3.10 (b)



Full allocation

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

# Water Availability: Key Findings

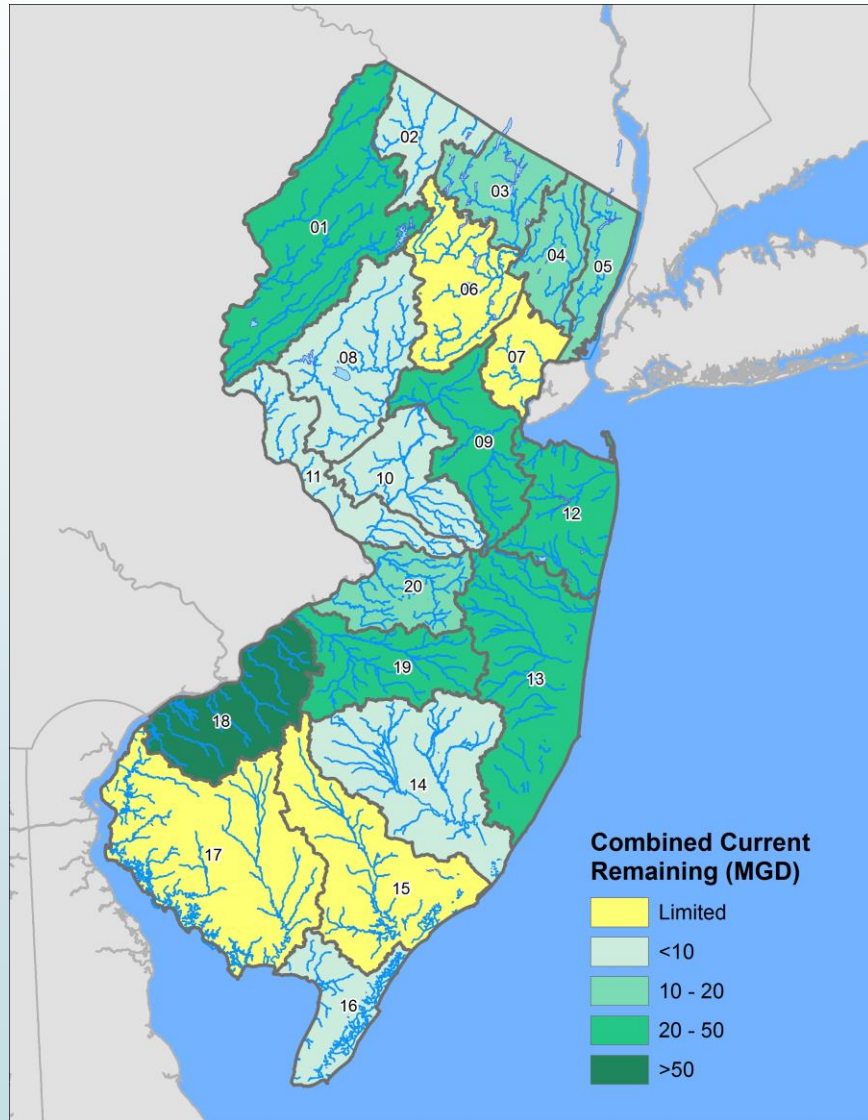
➤ **Total Resource Availability:** 3 ‘buckets of water’ vs current and future demands

➤ With this evaluation criteria, water availability in New Jersey is about 1,520 million gallons per day (mgd) while 211 mgd remains unused. (Tables 3.2 and 3.3)

**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 by 2020 (mgd)	Estimated remaining water availability in 2020 (mgd)
		Reservoirs	SW intakes/ Unconf GW	Conf GW	Combined	Reservoirs	SW intakes/ Unconf GW	Conf GW	Combined	Reservoirs	SW intakes/ Unconf GW	Conf GW	Combined		
1	Upper Delaware		30		30		6		6		23		23	4.2	19
2	Wallkill		8		8		4		4		4		4	1.7	2
3	Pompton, Pequannock, Wanaque, and Ramapo	187	12		199	168	13		181	19	-1		18	1.9	16
4	Lower Passaic and Saddle	75	10		85	50	16		67	25	-7		18	8.9	9
5	Hackensack, Hudson and Passaic	118	9		127	111	2		113	6	7		13	11.7	1
6	Upper and Middle Passaic, Whippany and Rockaway	72	15		87	65	24		89	7	-9		-2	3.1	-5
7	Arthur Kill		7		7		20		20		-13		-13	12.6	-25
8	North and South Branch Raritan		21		21		12		12		9		9	2.1	7
9	Lower Raritan, South, and Lawrence	241	13	29	283	187	36	17	240	54	-22	11	43	13.1	30
10	Millstone		8	9	16		5	6	11		3	2	5	5.5	-1
11	Central Delaware		8	3	11		2	2	4		6	1	7	2.3	5
12	Monmouth	63	21	29	113	59	10	18	87	3	11	11	26	5.4	20
13	Barnegat Bay	17	49	48	114	8	44	41	93	9	6	7	21	12.9	8
14	Mullica		37	3	40		31	2	33		6	1	7	3.2	4
15	Great Egg Harbor		33	23	56		59	23	82		-25	0	-25	6.1	-31
16	Cape May		6	15	21		-1	15	14		6	0	6	1.4	5
17	Maurice, Salem and Cohansey		47	16	63		120	13	132		-73	3	-70	4.0	-74
18	Lower Delaware		23	138	161		-20	103	83		43	35	78	3.7	74
19	Rancocas		18	27	46		0	23	23		18	5	23	4.5	18
20	Assisicunk, Crosswicks and Doctors		10	22	32		-6	19	13		16	4	20	3.5	16
	Total <sup>f</sup>	773	385	362	1,520	649	377	282	1,308					111.8	

# Water Availability: Key Findings



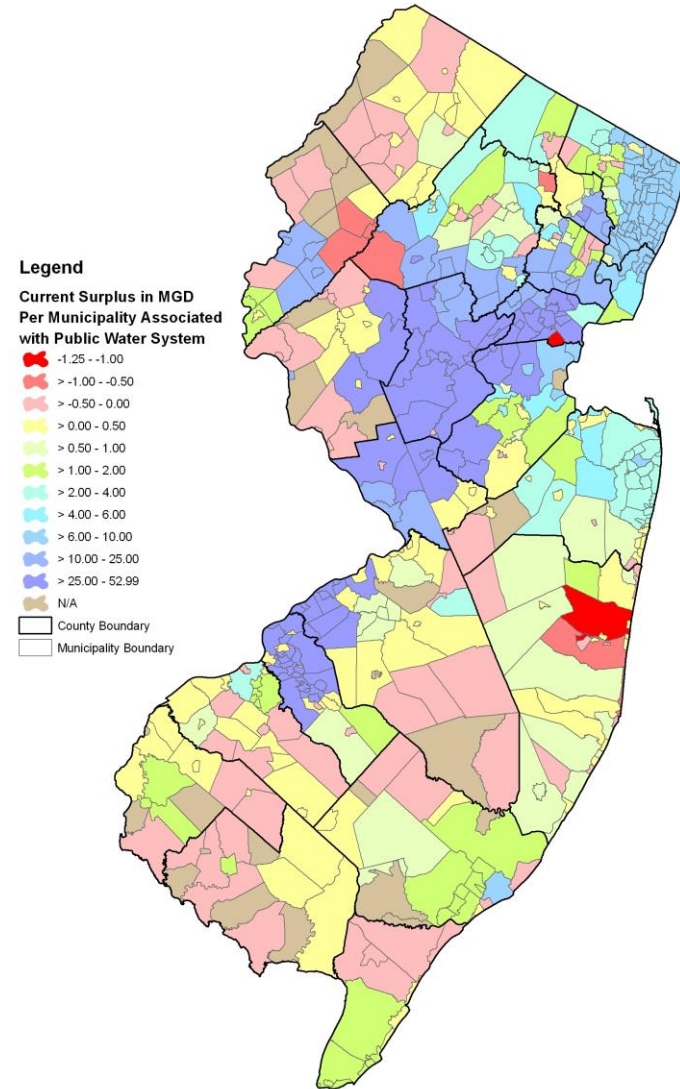
## **Total Resource Availability**

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

# Finished Water: Key Objectives & Findings

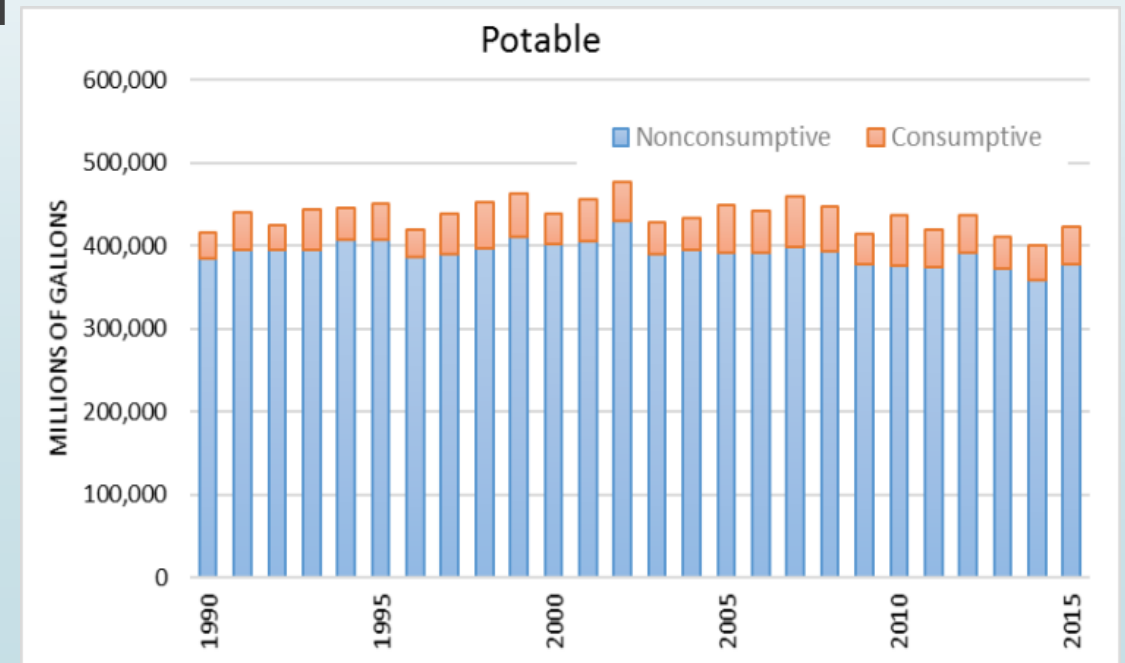
- Determine whether existing approved (allocated) resources and developed water supply infrastructure (firm capacity) can accommodate anticipated growth (Chapters 3 and 7);

Figure 3.11. Areas of NJ with surplus or deficit supplies in relation to currently approved potable supply



# Finished Water: Key Objectives & Findings

- Estimate future residential water demands based on population projections (Chapter 3; Appendix D);
  - 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: Key Objectives

- Identify and quantify the location of potential supplemental sources of supply, including future infrastructure needs, to ensure future demands are satisfied (Chapter 3, 7, 8 and Appendix A)
- Define overarching water supply policies (Chapters 6 and 7)
- Provide a support tool to inform and assist local, regional and State planning decisions. (Watershed Management Area (WMA) summaries are included as Appendix A)

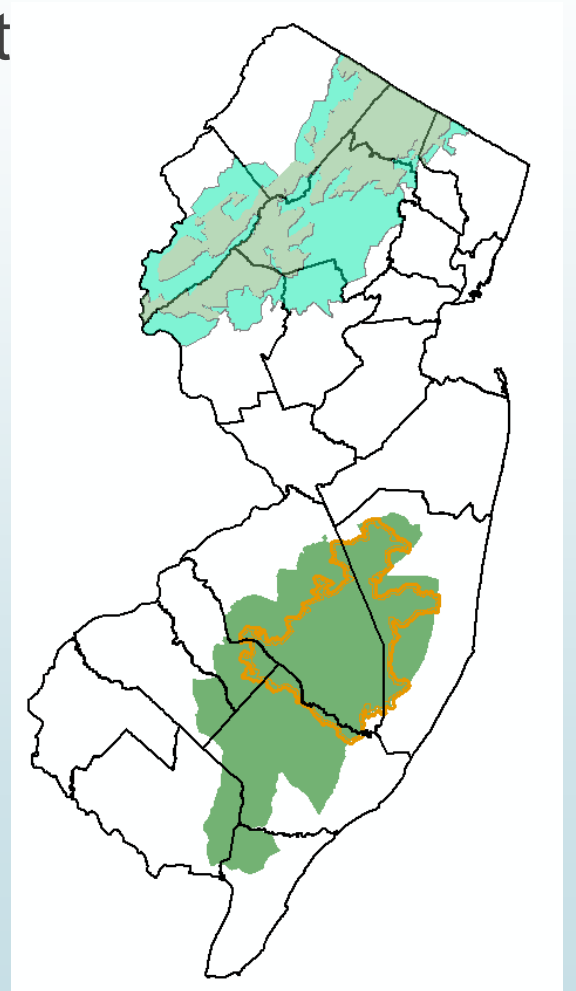


# Planning & Policy: Key Findings

- **Water availability** is a function of **all water resources available** to a specific area and of **site-specific** resource limitations.
- **Imports** of water may be a significant source.
- **Exports** of water may be a significant demand.
- **Seasonal consumptive water losses** are a **significant stressor** but provide an **opportunity for increased efficiency**.

# Planning & Policy: Key Findings

- 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



# Policies for Improving Water Supply

## 1. **Promote the efficient use** of the State's freshwater resource

- enhancing water conservation initiatives
- encouraging reductions in outdoor water use
- match highly consumptive non-potable uses with non-potable water sources.

## 2. **Improve** New Jersey's drought management capabilities and water system **resilience**.

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

- interconnections
- conjunctive use
- aquifer storage and recovery (ASR)

# Policies for Improving Water Supply

## 4. Encourage:

- new and expanded sources of supply
- innovative technologies

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

## 6. **Coordinate sustainable water supply policies** with

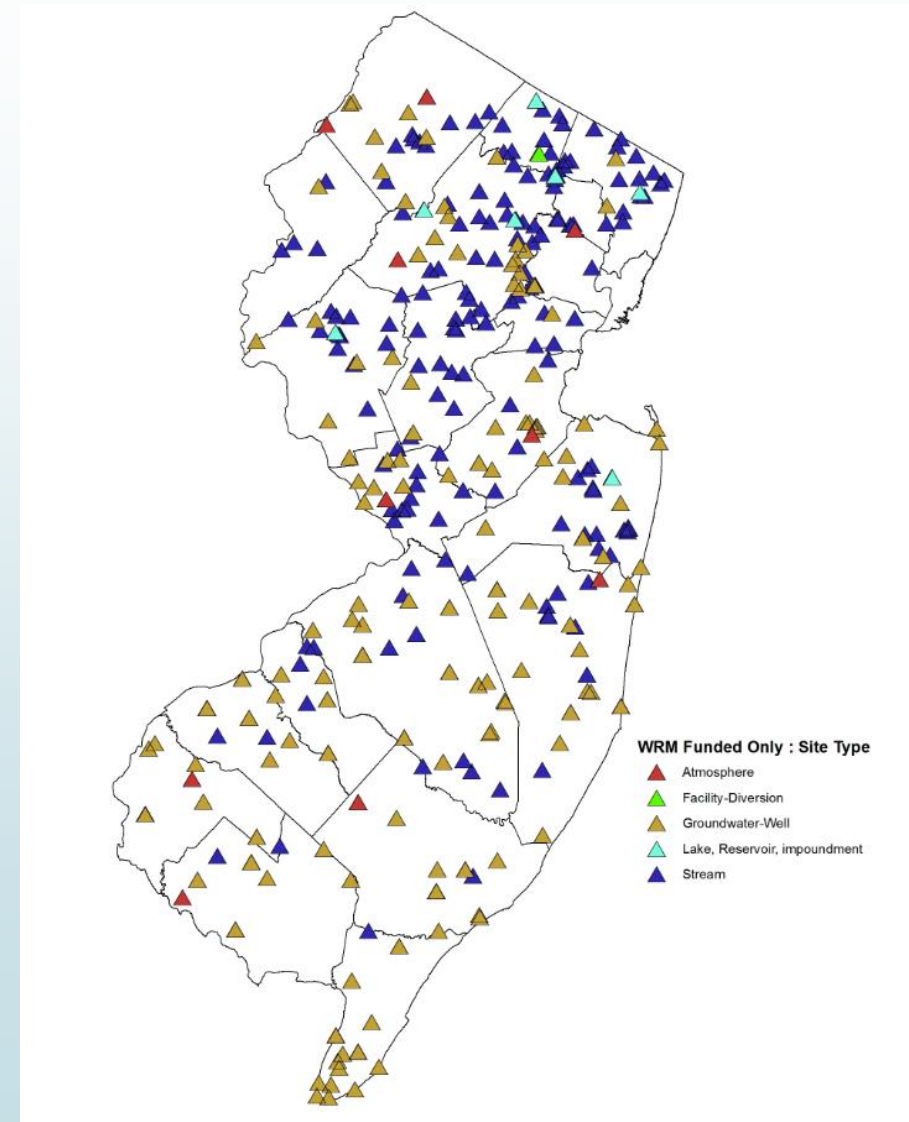
- Highlands Regional Master Plan
- Pinelands Comprehensive Management Plan

# Policies for Improving Water Supply

7. Support **detailed hydrologic regional assessments** to assess:
  - status and sustainability of the resource
  - feasible water supply alternatives
  
8. **Coordinate with the agricultural community** to more accurately assess future agricultural water demands
  
9. Continue to **assist water systems** in ensuring **adequate financial investment** to improve, repair, rehabilitate, replace and/ or update water supply infrastructure.

# Policies for Improving Water Supply

10. **Maintain NJ's extensive surface water, groundwater and drought monitoring systems and assessment tools.** Information obtained from these networks is critical to planning for our future.



# SUMMARY

**Use Water Wisely**

**Proper Asset Management**

**Sufficient Monitoring & Assessment**

# What's Next

- 2014 and 2015 water use data updates.
- Update water availability analysis.
  - Reservoirs
  - Confined aquifers
  - Unconfined aquifers and streams (HUC11)
- Incorporate updated data and availability results.
- Address comments.



# Online Resources -- [www.njgeology.org](http://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](#)

# Public Meetings

- Central – Tuesday, July 11, 2017
  - 401 East State St, Trenton, 1:00
  - USGS, Lawrenceville, 6:00
- North - Wednesday, July 12, 2017, 3:00
  - Millburn Public Library, Millburn,
- South - Thursday, July 13, 1:00
  - Stockton University, Board of Trustees Room,  
Campus Center
- Written comments submitted until July 21<sup>st</sup> at [watersupply@dep.nj.gov](mailto:watersupply@dep.nj.gov)
- Plan available at <http://www.nj.gov/dep/watersupply/wsp.html>

**Thank You.**

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**watersupply@dep.nj.gov**