Updating the NJ Statewide Water Supply Plan: Regional Water Issues

Preliminary Results and Findings

WSAC and WSP Stakeholder Meeting March 17, 2023

What We'll Cover Today…

- Regional planning overview and process
- Unique regional initiatives and issues
- Areas of Concern
- Issues of Concern
- Stream Low Flow Margin HUC11s
- Detailed WMA example planning

Note: The finding contained in this presentation are still being refined and may change based upon input from other Department programs or stakeholders.

WSP Chapter Headings (tentative)

1. Introduction
2. Overview of New Jersey Water Resources and Infrastructure
3. Climate Change Driven Water Availability Impacts
4. Statewide Water Availability
5. Statewide Demands and Balances
6. Safe Drinking Water Issues
7. Statewide Water Resource Protection and Planning Efforts
8. **Regional Planning for Deficit Mitigation and Avoidance**
9. Planning for an Uncertain Future
10. Water Supply Action Plan
11. Summary, Conclusions, and Recommendations

Regional Water Resource Management

- Addressing regional issues is a long-standing water supply planning topic and driver of action
- All water resources are regional/local
  - Unconfined aquifers (watershed focus and baseflow in streams)
  - Reservoir systems (watershed and infrastructure focus)
  - Confined aquifers (hydrologic budget areas)
  - Even within these resource types major differences or site-specific conditions can occur
- Tailored approaches to address specific issues or concerns:
  - Solutions reflect complex nature of water resources and ability to move water
- Management decisions have direct and indirect effects on the region
  - E.g., economic sustainability, societal resilience (e.g., drought restrictions), etc.
- Significant amount of implementation actions in past plans and likely for the 2023 plan

Responding to Potential Regional Deficits

- The 1981, 1996 and 2017 Water Supply Plans responded to deficit assessments in various ways
- 2023 WSP is building toward a standardized approach based on past cases and experiences
- Establishing a framework – to help the public understand what to expect when regional deficits are identified (existing or forecast)
- Links to concept of Certainty and Severity
- Previously identified regions of concern may be at any step in the framework; important to know current status

Certainty vs Severity Approach

Certainty of Stress	Minimal Severity	Moderate Severity	High Severity
High (fully validated)	• Reservoir System Safe Yield Models with current demands	• Cape May Saltwater Intrusion (conditions stable)	• WS Critical Area 1 & 2 (conditions stable)
Moderate (modeled or trend results)	• 2050 Climate change impacts to water availability	• HUC11s with Negative LFM Water Availability • Climate change stressed reservoir system model	
Low (preliminary results)		• 2100 climate change impacts to water availability	• Drinking water quality impacts (HABs, PFAS, emerging contams)

Example

Regional Planning Steps

- Public/agency engagement across all steps; helps develop understanding, involvement, data gathering, and trust in process
- Regional Assessment Process:
  - Step 1: Data Verification
  - Step 2: Model Reanalysis
  - Step 3: Regional Evaluation
  - Step 4: Enhance Monitoring, Modeling and Analysis
  - Step 5: Planning, Management and Regulatory Responses
  - Step 6: Progress Evaluation- repeat steps as needed

Unique Regional Initiatives and Issues

- Regional Agencies:
  - Actions tailored to address specific management issues/legislation/regulation regardless of whether deficits exist
  - Delaware River Basin Commission
    - Comprehensive plan, dockets, and Water Code
  - Highlands Council
    - Regional Master Plan
  - Pinelands Commission
    - Comprehensive Plan
- Interstate Issues:
  - Passaic Hackensack River Basin- Rockland/Orange Counties NY upstream, ongoing issues
  - Wallkill River Basin- NJ upstream, less developed in both states
- Critical Areas 1 and 2:
  - Well established regulatory criteria and permitting process to manage regions

Areas of Concern

- The next set of slides identify areas that the Bureau of Water Allocation and Well Permitting have identified as having special considerations, in addition to the ‘standard’ ones required for all applications
- Examples shown are not final, but details are provided to allow for input from stakeholders

Buried Valley Aquifer

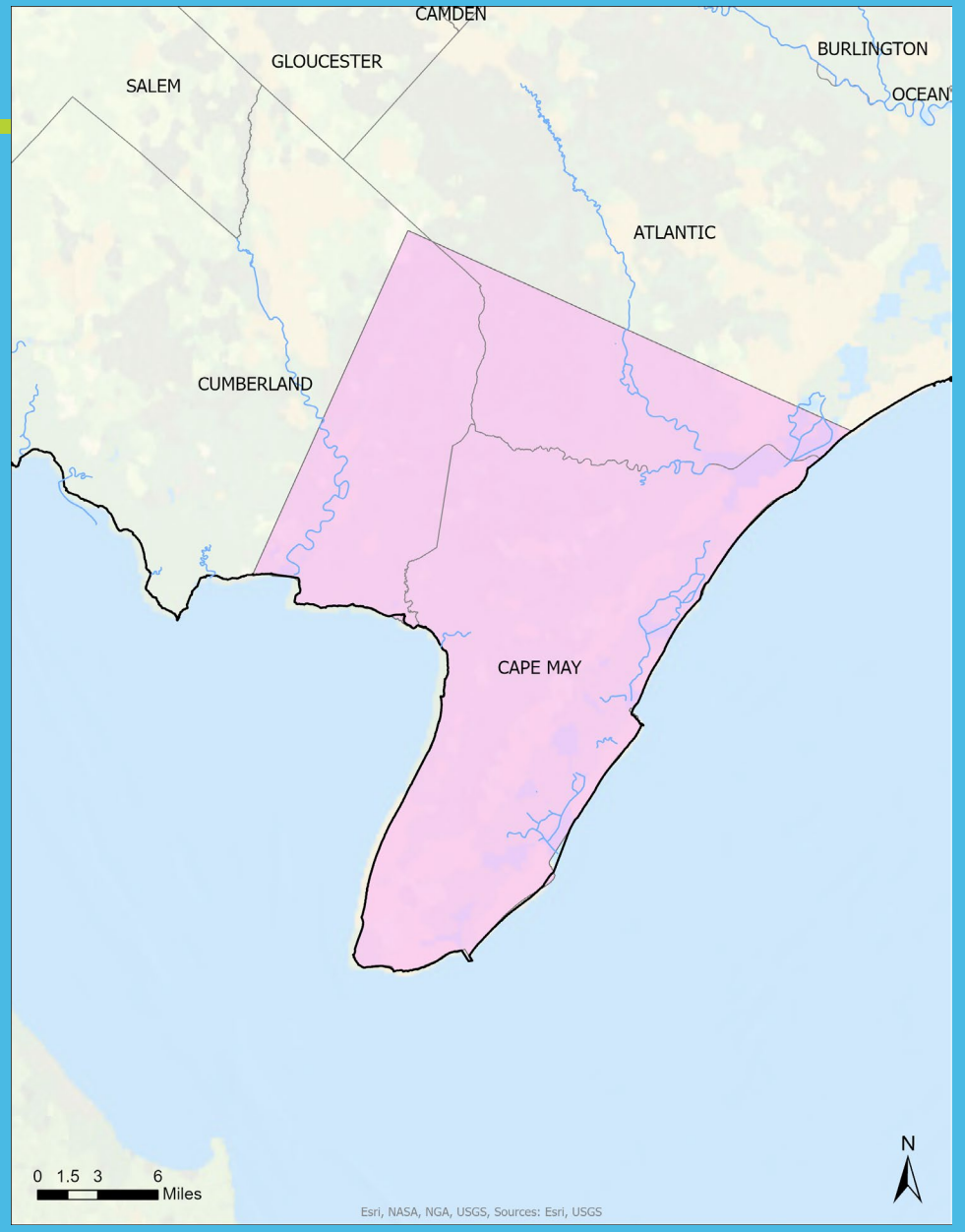
Area has been fully allocated since the 1980s, downstream reservoirs & intakes

- **Certainty:** Validated (NJWGS 1989 model)
- **Severity:** Moderate (historically declining water levels and pollution)
- **Actions:** No new or increased annual water allocations, augment with surface water supplies
- **Next Steps**: Maintain policy, consider updating models (Steps 2 and 4) and regional evaluation (Step 3)

Cape May Study Area

No new or increased annual water allocations that would accelerate saltwater intrusion, reduce stream flow, or harm natural resources:

- **Certainty:** Validated (USGS models, latest 2009)
- **Severity:** Confirmed saltwater intrusion at southern tip and southwestern coast
- **Actions:** New/increased water allocation requests must be sustainable based on USGS recommendations
- **Next Steps:** Maintain policy, consider updating models, incorporate current sea level rise forecasts (Steps 2 and 4), regional evaluation (Step 3), regional planning with local interests (Step 5)



Gloucester-Salem Study Area

In Salem & Gloucester Counties south of Critical Area 2 there are concerns that new or increased diversions from the PRM Aquifer System could expand the -30 static water level contour that could expand the critical area:

- **Certainty:** Validated (USGS report and model 2011)
- **Severity:** Moderate
- **Actions:** New or increased annual allocations to be evaluated on a case-by-case basis.
- **Next Steps:** Maintain policy, consider updating USGS models and including SLR impacts (Steps 2 and 4)

Great Egg-Mullica Study Area

Increasing water demands, much of area in Pinelands National Reserve:

- **Certainty:** Validated (USGS 2012 report and model)
- **Severity:** Potential future concerns (both potable and agricultural demands).
- **Actions:** New or increased annual allocations from confined and unconfined aquifers to be evaluated on a case-by-case basis. Seasonal conjunctive use (confined and unconfined aquifers) and Reclaimed Water for Beneficial Reuse (RWBR) must be evaluated. Follow Pinelands Commission requirements.
- **Next Steps:** Continue policy, data verification, especially agricultural water use (Step 1); evaluate potable water demands to 2050, SLR effects on wells near coast

Salem River Drainage Basin

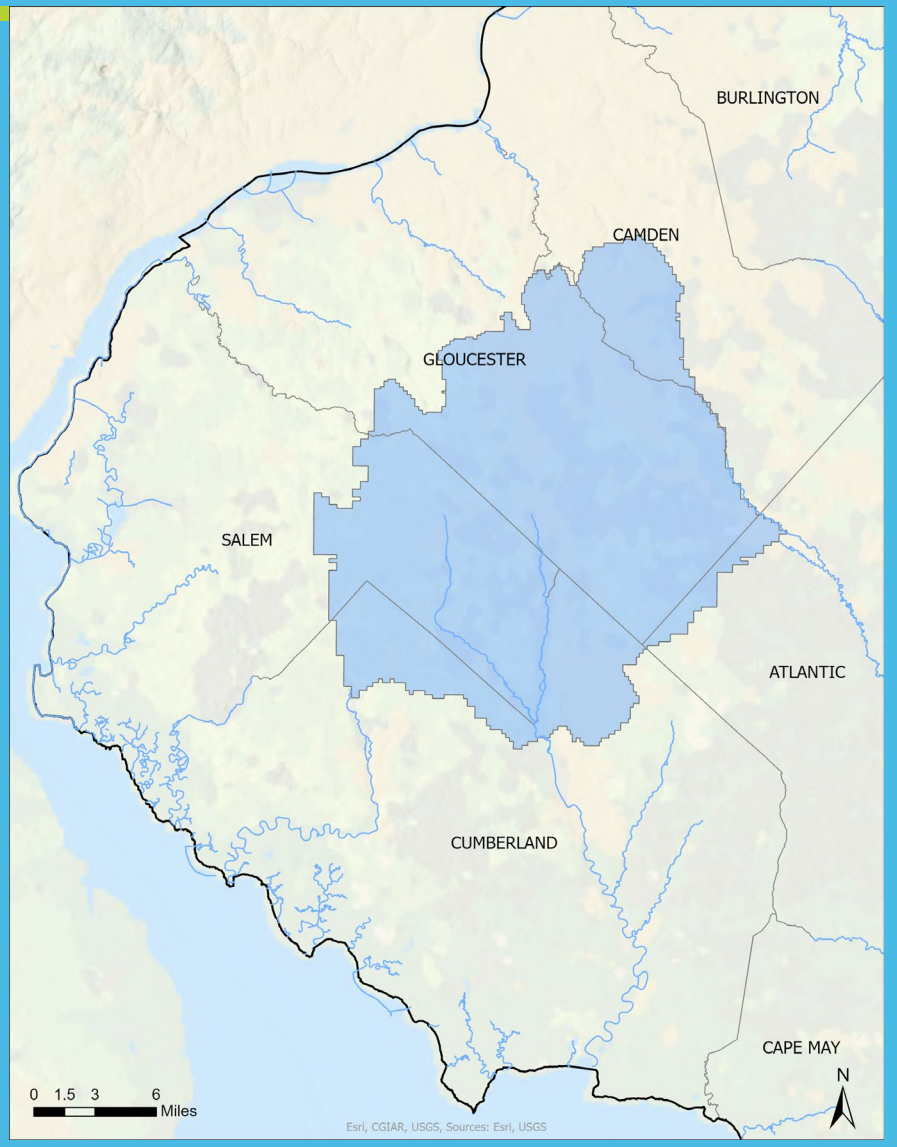
Fully allocated upstream of Salem Canal:

- **Certainty:** Validated (USGS model and report 1997)
- **Severity:** Moderate
- **Actions:** No new or increased annual surface water allocations from the Salem River or surficial aquifer
- **Next Steps:** Continue policy, consider updating USGS models, including SLR impacts in lower basin (Steps 2 and 4); regional evaluation (Step 3)

Upper Maurice River Drainage Basin

Ground water diversions from the K-C water-table aquifer system in the study area can reduce base flow in the Maurice River and reduce the size of wetland area near or adjacent to the river, especially during extended periods of little or no precipitation:

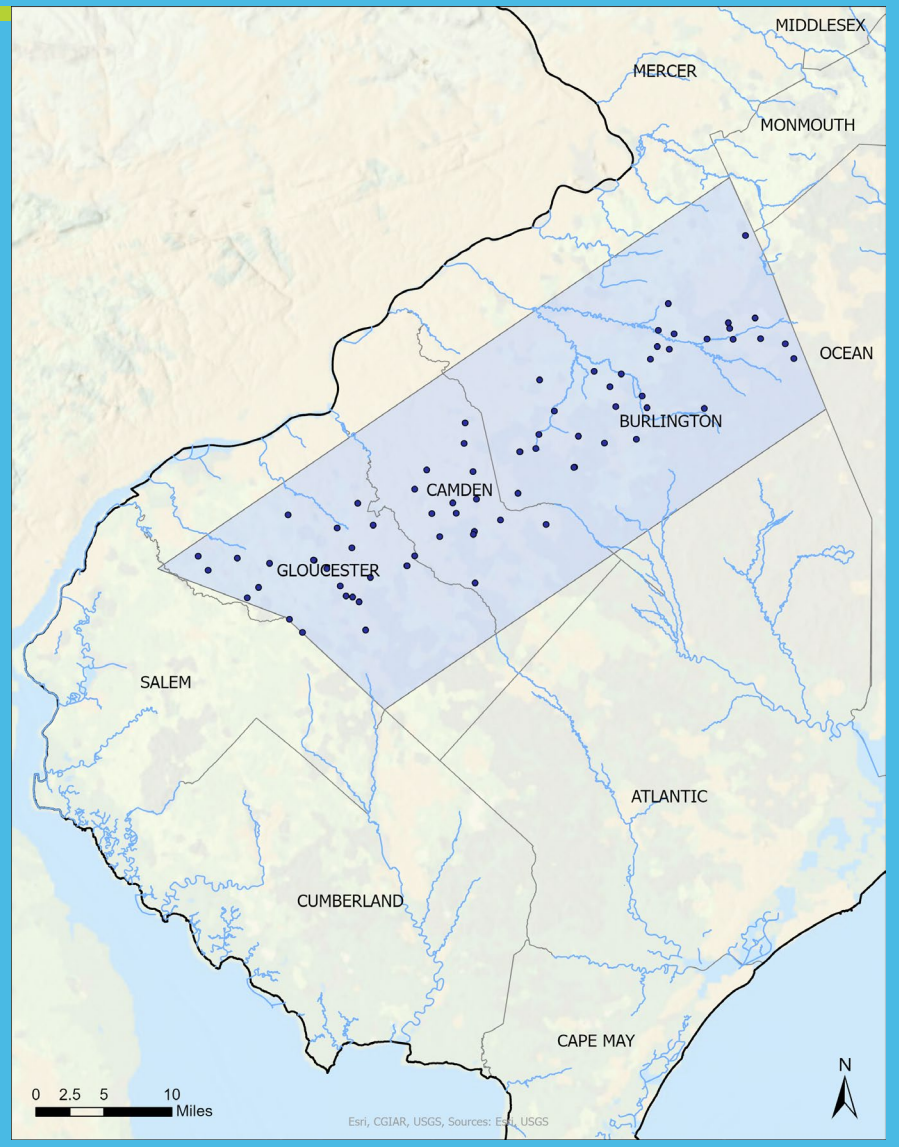
- **Certainty:** Validated (USGS model and report 2005)
- **Severity:** Moderate
- **Actions:** No new or increased annual Kirkwood-Cohansey Aquifer System or surface water allocations upstream of Union Lake
- **Next Steps:** Continue policy, consider updating USGS models, regional evaluation (Step 3)



Wenonah-Mt Laurel Confined Aquifer

Concerns regarding declining water levels and the sustainability of the water resource:

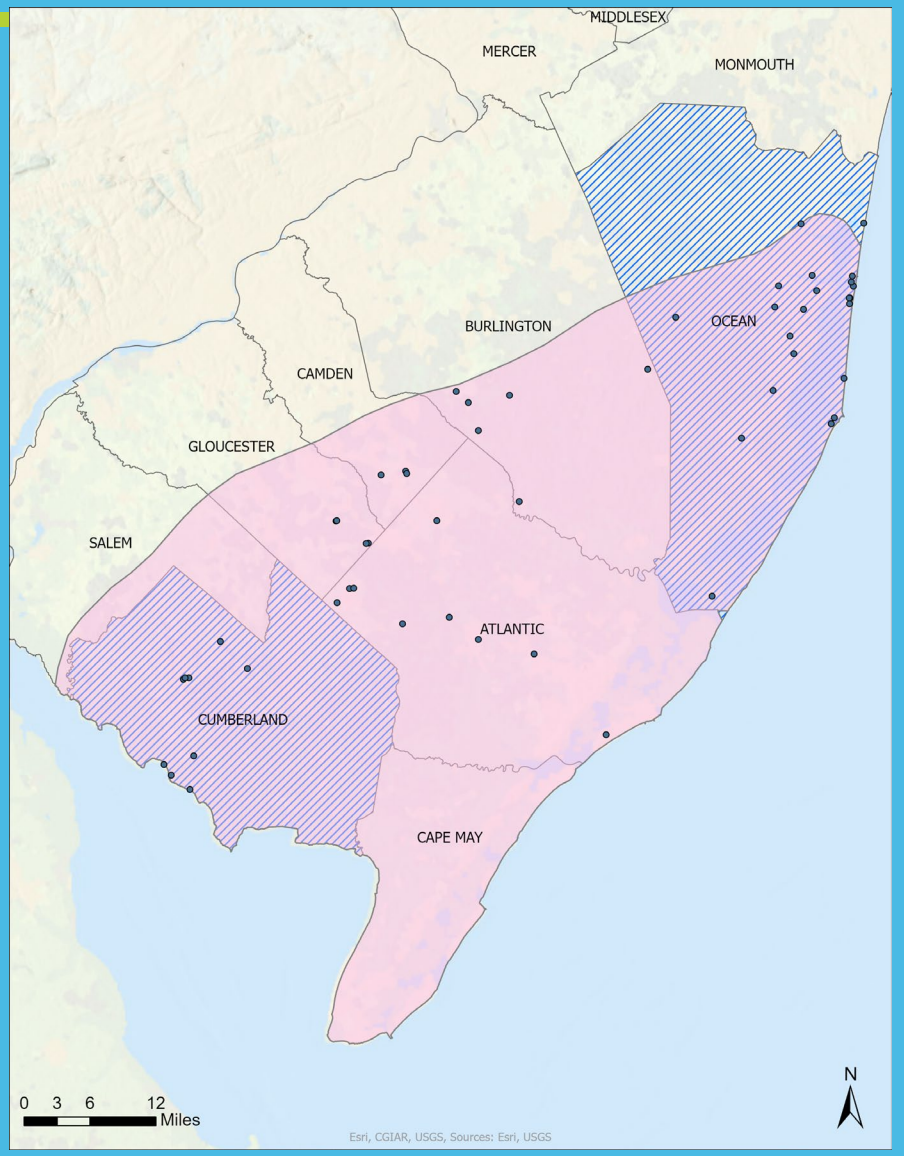
- **Certainty**: Validated (USGS models, 1994 and 2005)
- **Severity**: Moderate (declining static water levels in some areas)
- **Actions**: New and increased annual water allocations restricted
- **Next Steps**: Maintain policy, consider updating models with current and projected demands



Piney Point Confined Aquifer

Concerns regarding declining water levels, poor aquifer productivity and the sustainability of the water resource:

- **Certainty**: validated through aquifer tests and observed data
- **Severity**: Moderate
- **Actions**: New or increased allocations evaluated on a case-by-case basis and with special concerns in Cumberland and Ocean where aquifer may be fully allocated.
- **Next Steps**: Maintain policy, consider updating models with revised hydrogeology and current and projected demands



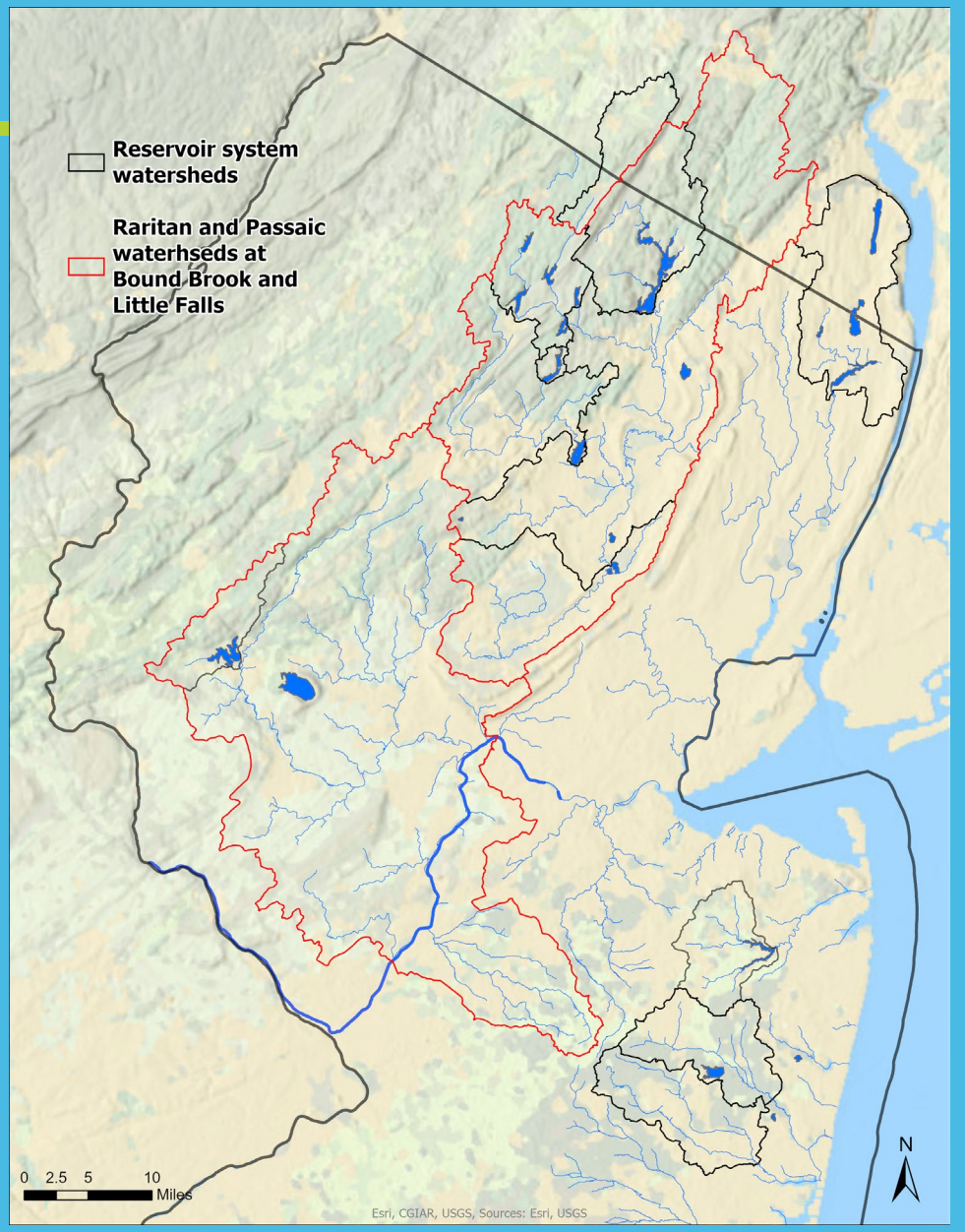
Watershed Specific Areas

Concerns for basins at or near their full allocation, Kettle, Lockatong, and Blacks Creek:

- **Certainty**: Low
- **Severity**: Moderate
- **Actions**: New or increased annual allocations to be evaluated on a case-by-case basis, baseflow impacts must be evaluated
- **Next Steps**: Maintain policy, consider developing models to validate findings

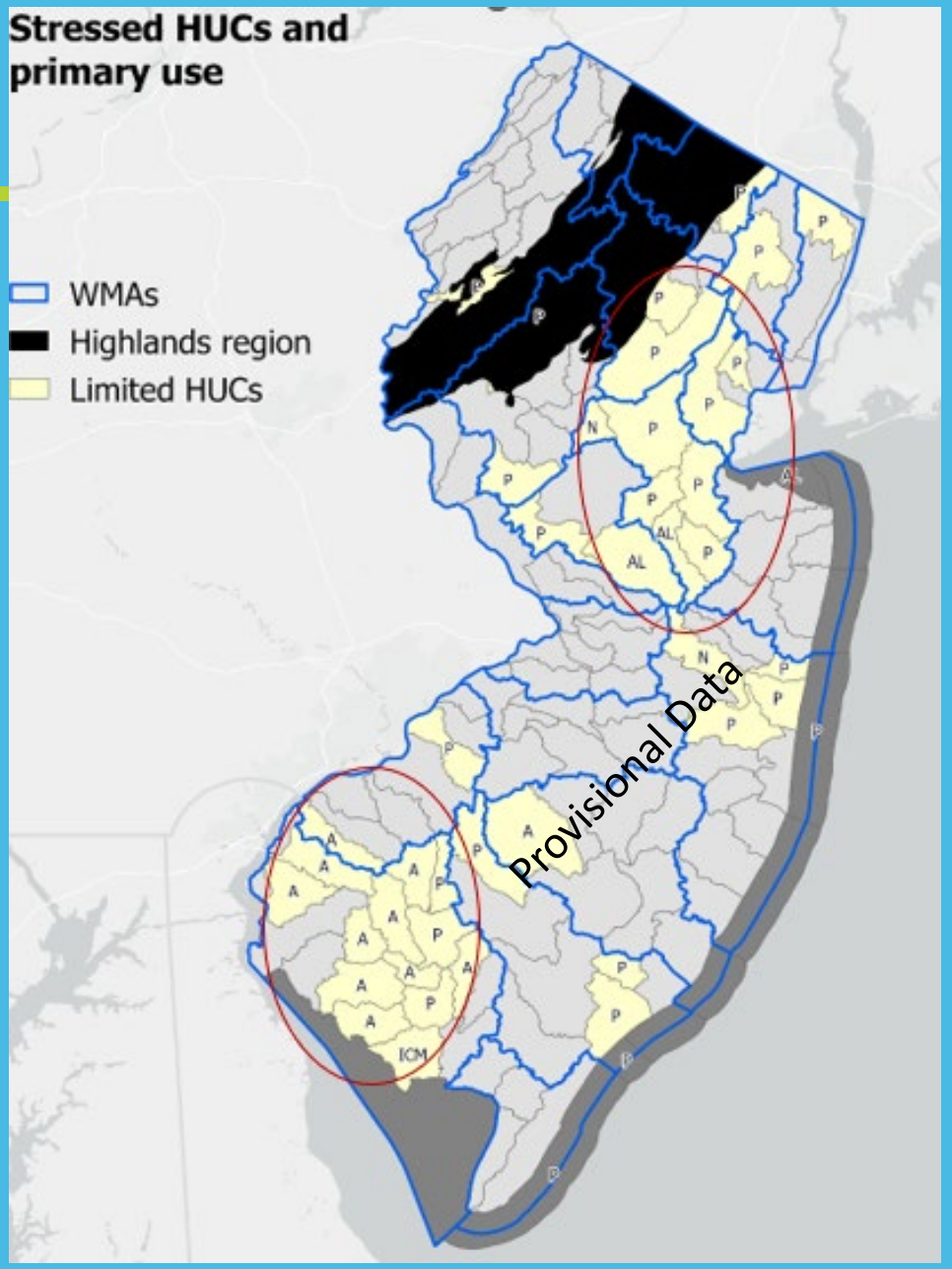
Issues of Concern

- Situations where specific issues need to be considered:
  - Local pollution issues: Classification Exception Areas (CEAs) and Currently Known Extent (CKEs)
  - In watershed above reservoir or potable intake (map)
  - Wetlands: emergent or forested



Low Flow Margin Limited Areas

- 2 Regional focus areas:
  - Lower Raritan-Passaic region-potable driven
  - Southwest region- ag driven
- Subregional areas:
  - Single or a few HUCs
- Approach:
  - Revise to HUC12 analysis unit
  - Data QA/QC
    - Ag water use estimate uncertainty
  - In-situ conditions, observed data, reports, etc.
  - Overlay with areas of concern
  - Consider climate change effects (wetter)
  - Develop water use analysis and recommendation action plan based upon refined analysis



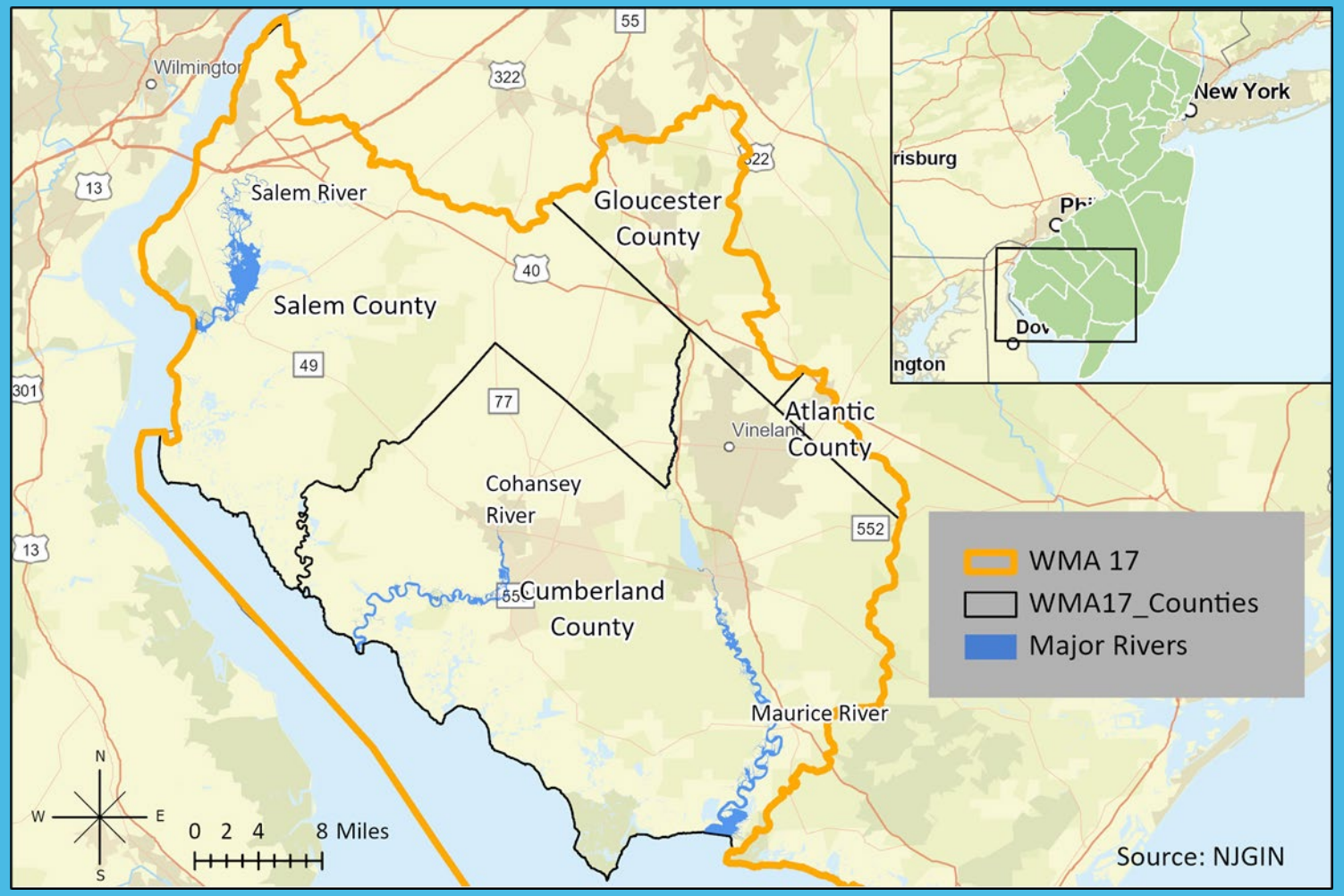
Watershed Management Area Focused Planning Examples

- More detailed planning approach that could be used to address regional issues identified in WSP, LFM or study area recommendations

WMA 17 Maurice, Salem & Cohansey Rivers

Region:

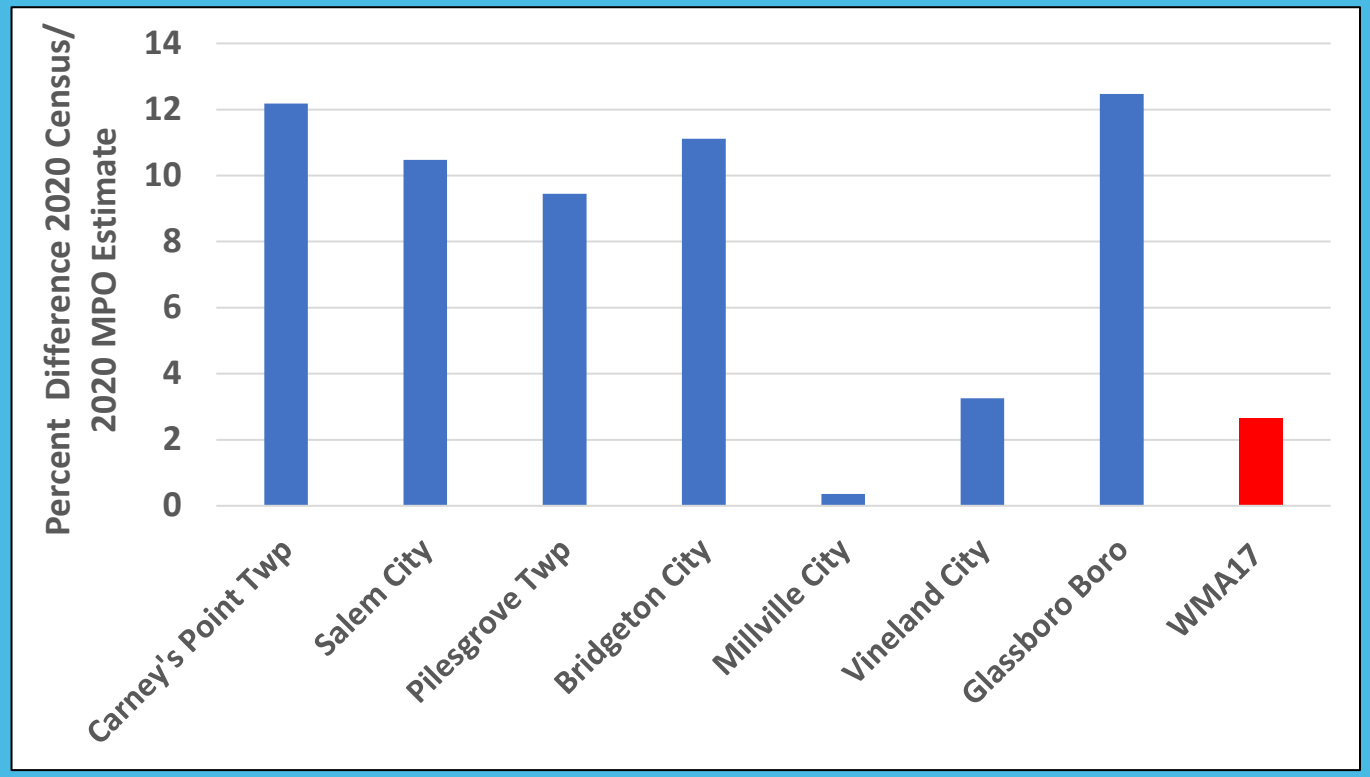
- Counties:
  - Salem, Cumberland, & Gloucester (7 municipalities)
  - Atlantic (2 municipalities)
- Major Rivers:
  - Maurice, Salem and Cohansey



WMA 17 Maurice, Salem & Cohansey Rivers

Demographics:

- Population
  - Current population and projected future growth (2020-2050)
  - County and municipality focus
- Land Use
  - Significant environmental land use; limited urban areas
  - Regional interest in rural/agricultural preservation and concentrated urban development
- Social Vulnerability
  - Complementary use of NJDEP's Overburdened Community metric and CDC's Social Vulnerability Index (SVI)
  - Cumberland County was found to have the highest social vulnerability

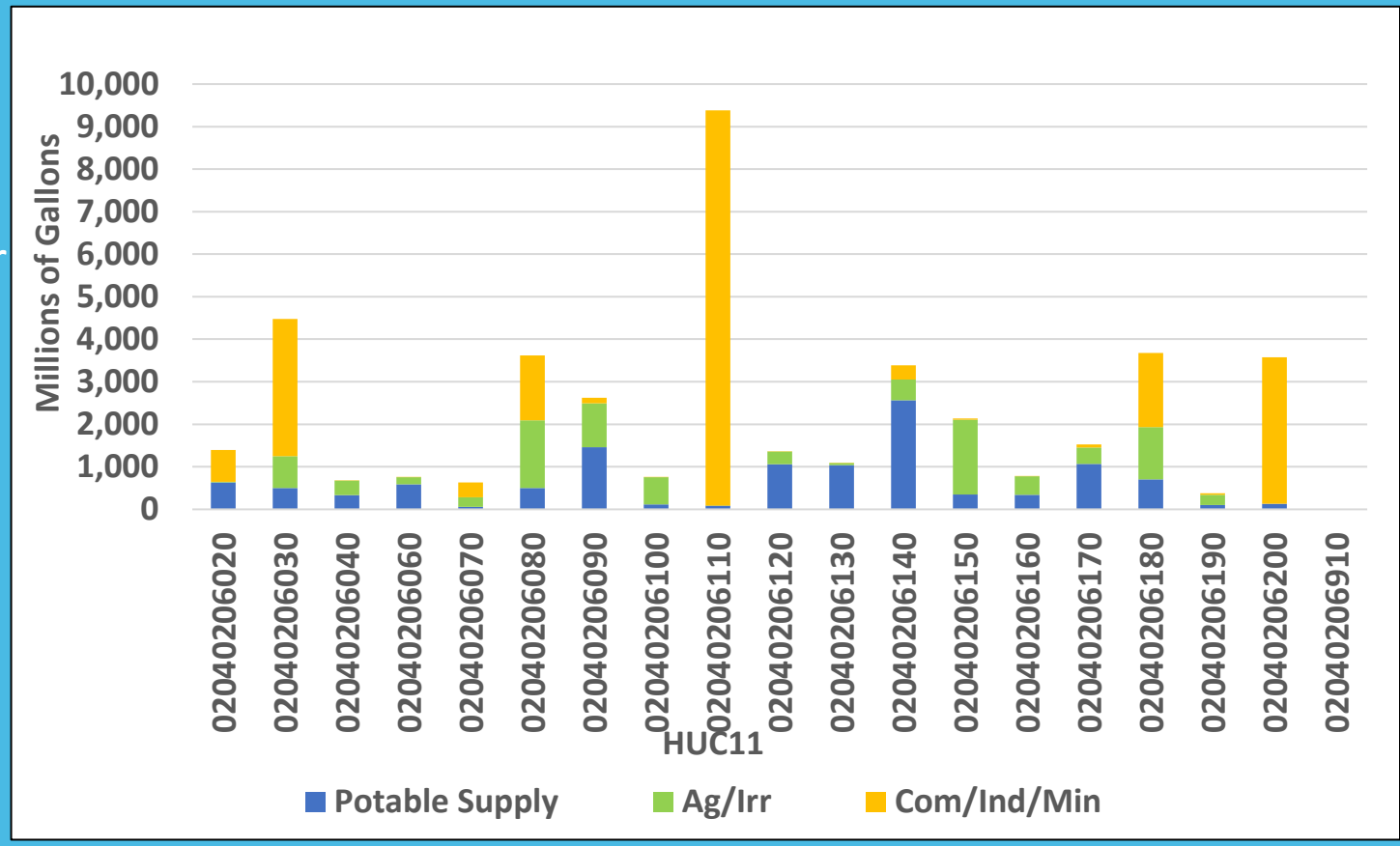


Percent Difference (2020 Census Population/MPO 2020 Population Estimate) among WMA17 Focus Municipalities (**Sources**: US Census Bureau, 2021; SJTPO, 2021; DVRPC, 2022)

WMA 17 Maurice, Salem & Cohansey Rivers

Availability and Demands:

- Water Withdrawals Analysis (1990-2020)
  - Examination by water source and water use category
- Low Flow Margin (LFM) Method
  - 13 of 19 WMA17 HUC11s found to be stressed during 3-year average peaks in consumptive/depletive loss (2011-2020)
- Water Utilities (Public Community Water Systems (PCWS))
  - Majority of major PCWS servicing WMA17 experienced a decline in potable water demand between 2011-2020, with localized exceptions



WMA17 HUC11 5-Year Average Water Withdrawals by Water Use Category (2016-2020) (**Source**: NJDEP Division of Water Supply and Geoscience (DWSG), 2022)

WMA 17 Maurice, Salem & Cohansey Rivers

Climate Change & Sea-Level Rise Assessment:

- Largest projected precipitation increase: Atlantic County
- Sea Level Rise Analysis
  - WMA17 aquifers
  - NJDEP permit sites
  - PCWS purveyor service areas
  - Overburdened Communities

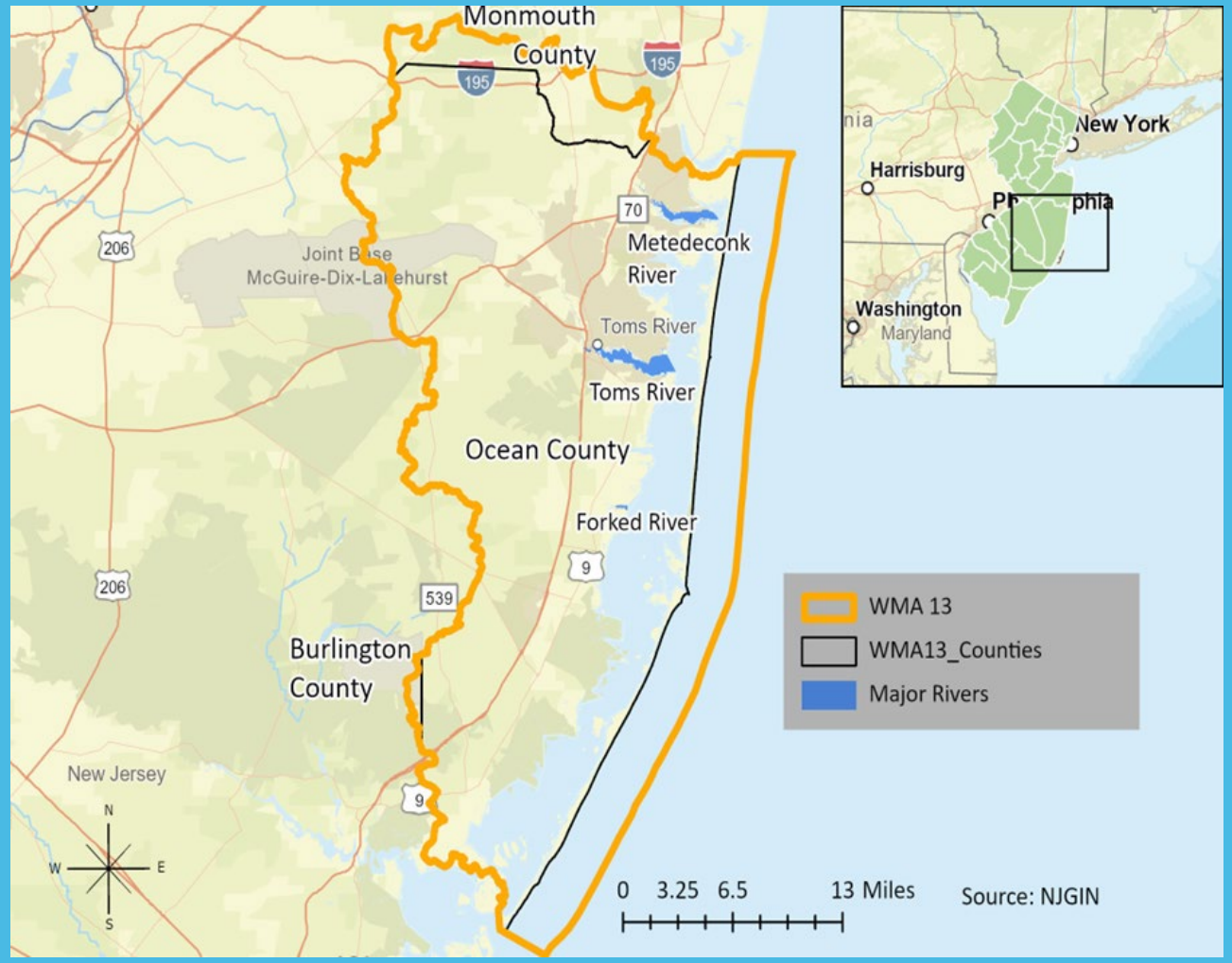
WMA17 County	2-Year Storm	5-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm	100-Year Storm
Atlantic	18%	17%	19%	23%	26%	30%
Cumberland	16%	16%	16%	19%	23%	28%
Gloucester	16%	16%	17%	19%	22%	26%
Salem	17%	18%	19%	21%	22%	24%

Projected Percent Increase in Precipitation among WMA17 Counties (Moderate RCP 4.5 Scenario for 2020-2069) (Data courtesy of the New Jersey Extreme Precipitation Projection Tool)

WMA 13 Toms and Metedeconk Rivers

Region:

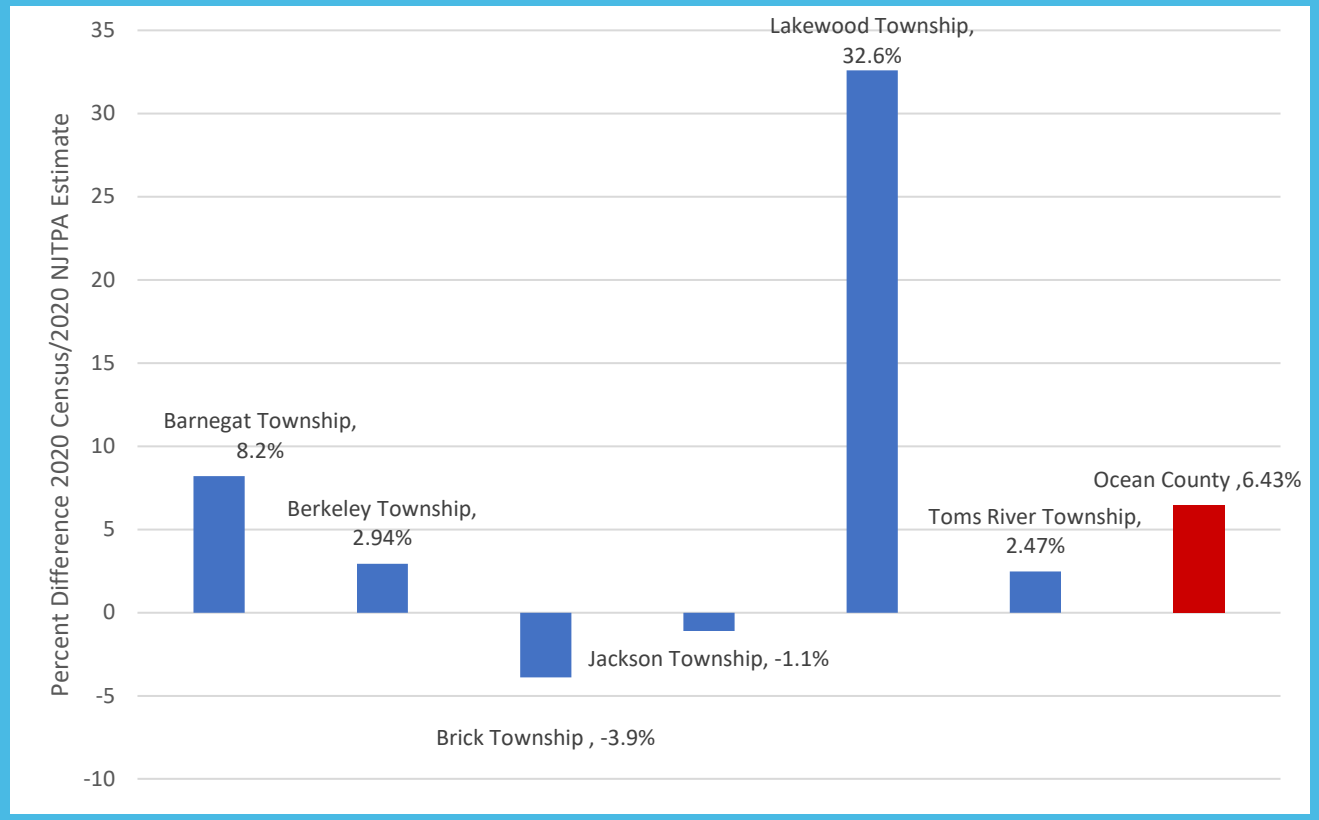
- Counties
  - Burlington
  - Monmouth
  - Ocean
- Major Rivers
  - Forked River
  - Metedeconk River
  - Toms River



WMA 13 Toms and Metedeconk Rivers

Demographics:

- Population Analysis
  - 2020 U.S Census and MPO population forecasts
  - Focus on Ocean County and its municipalities
- Land Use
  - Significant urban land cover in focus municipalities
  - Development Strategies: Protect remaining available open space and improve water quality
- Social Vulnerability
  - Used NJDEP's Overburdened Community definition and CDC's Social Vulnerability Index
  - Lakewood Township has the highest number of social vulnerability census block groups in WMA 13

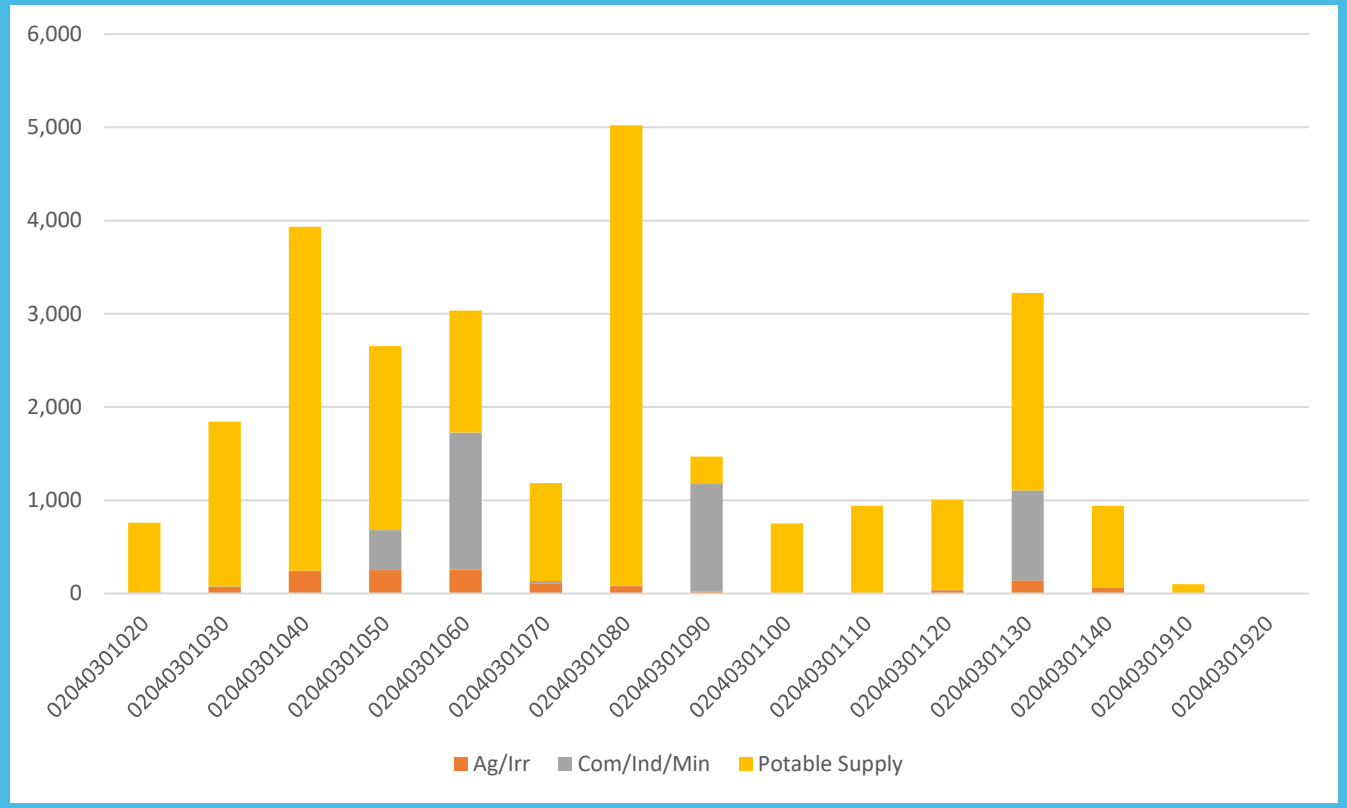


Percent Difference 2020 Census Population & NJTPA Population Estimate
(Source: NJTPA 2020, U.S Census Bureau,2020)

WMA 13 Toms and Metedeconk Rivers

Availability & Demands:

- Water Withdrawals Analysis(1990-2020)
  - Water source & Water use
- Low Flow Margin Method
  - 4 out of 15 HUC11s found to be stressed during peak years
- Water Utilities: Public Community Water Systems(PCWS)
  - Majority of PCWS's demand increased(2011-2020)



WMA 13 HUC11 5-Year Average Water Withdrawals by Water Use Category(2016-2020)
(Source: NJ DGS10-3, 2022)

WMA 13 Toms and Metedeconk Rivers

Climate Change & Sea-Level Rise Assessment:

- Projected Precipitation
  - Largest increase: Monmouth County
- Sea-Level Rise Assessment
  - Discharge/Withdrawal Permit Sites
  - PCWS Purveyor Service Areas
  - Overburdened Communities

County	2-Year Storm	5-Year Storm	10-Year Storm	25-Year Storm	50-Year storm	100-Year Storm
Burlington	15%	15%	16%	18%	21%	25%
Monmouth	17%	16%	17%	20%	23%	27%
Ocean	15%	15%	16%	17%	19%	23%

Projected Percent Increase for Precipitation among WMA 13 Counties(Moderate RCP 4.5 Scenario for 2020-2059
(Source: NJ Extreme Precipitation Projection Tool, 2023)

Thank You

Water Supply Plan Team

- Department Leads:
  - NJGWS Water Supply Modeling and Planning
  - DWSG Director's Office
  - AC WRM's Office
- Rutgers University Team:
  - Dr. Dan Van Abs, Professor of Professional Practice for Water, Society & Environment
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