Surface water availability analysis for the Delaware River Basin

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Michael Thompson, PE

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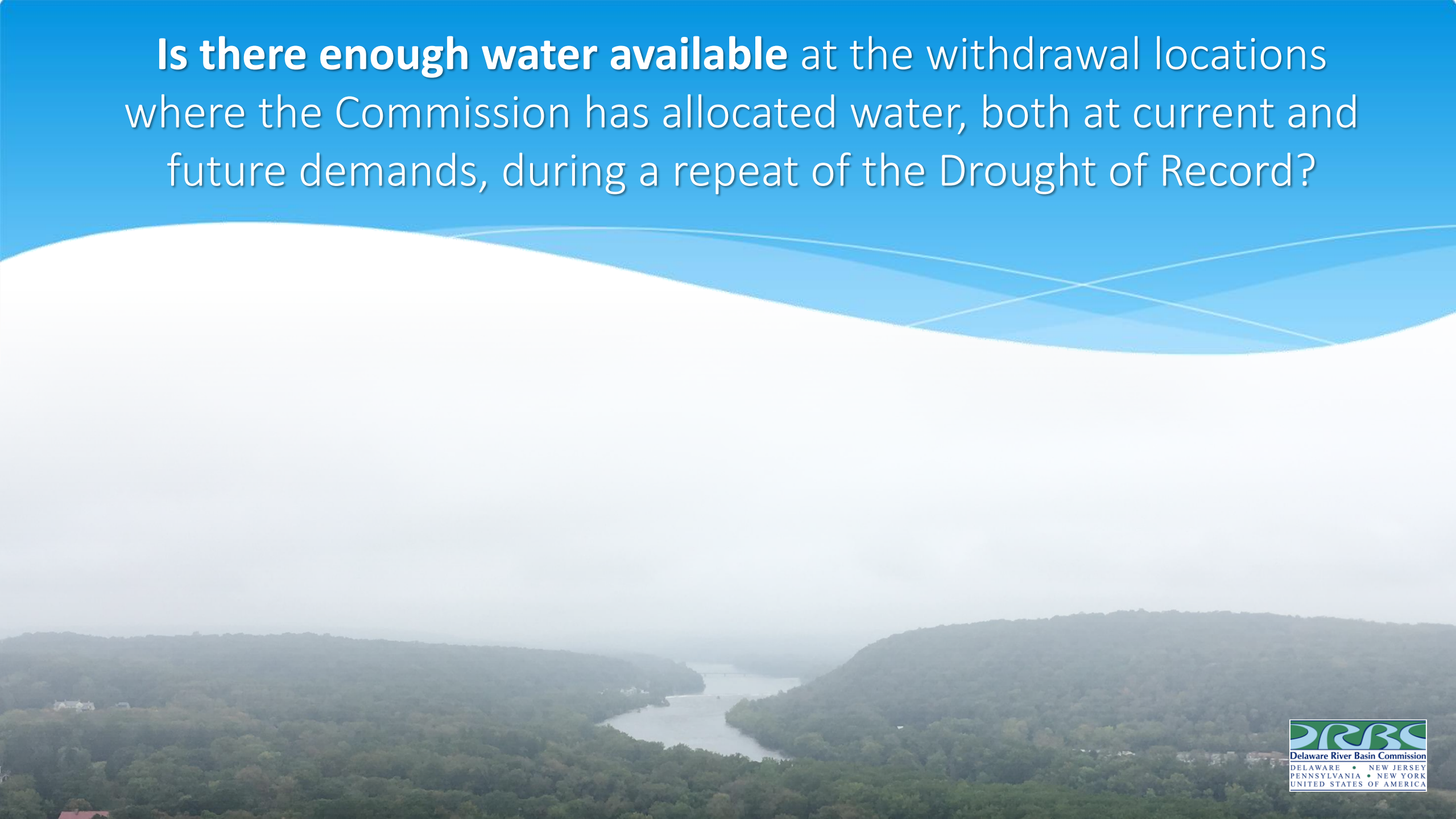
February 8, 2023

Water Management Advisory Committee

Is there enough water available at the withdrawal locations where the Commission has allocated water, both at current and future demands, during a repeat of the Drought of Record?



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With a planning horizon of 2060:

1. Current and projected future water demand: published Oct. 2021

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3. **Current and future surface water availability: in progress**

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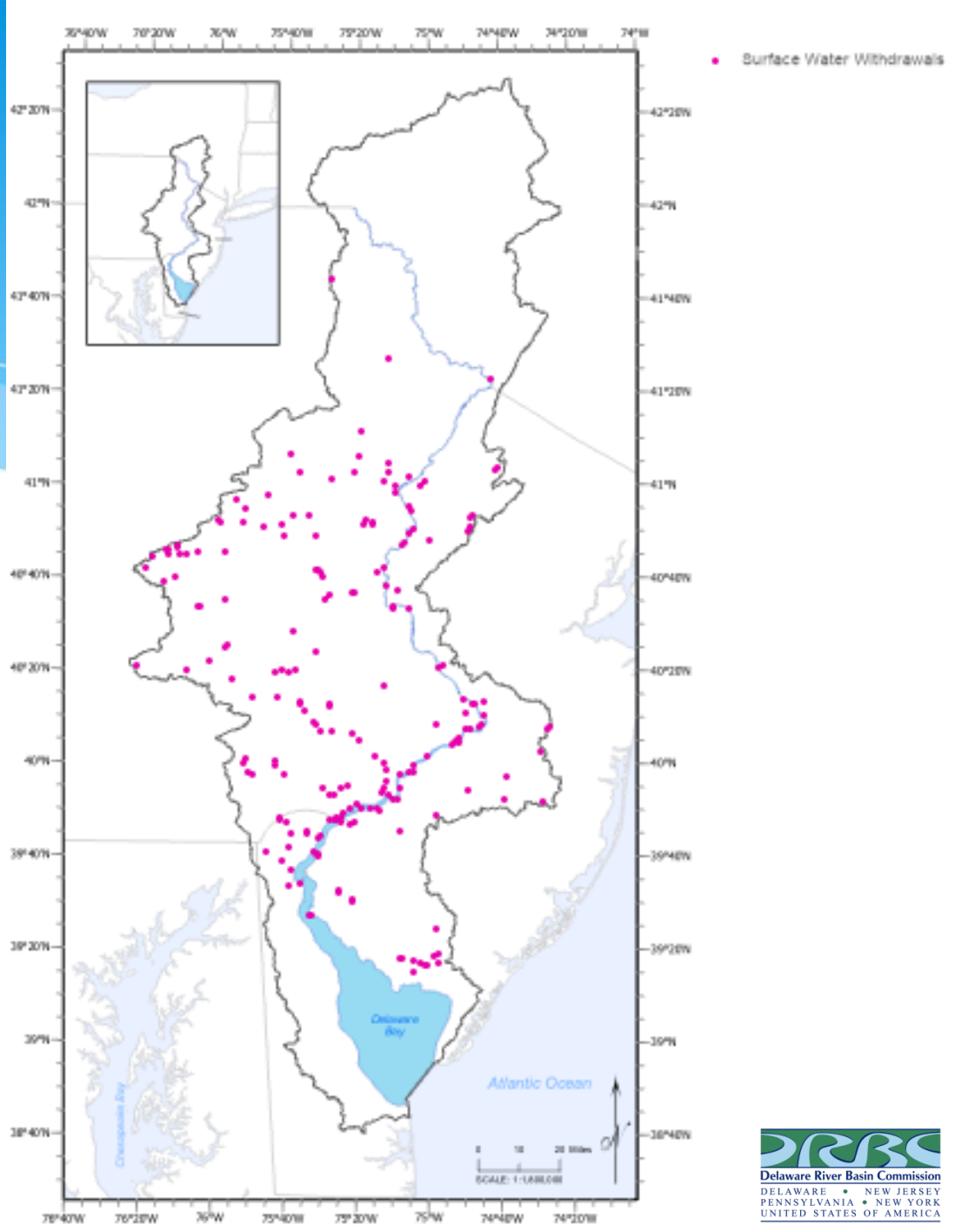
Surface water meets >90% of demand in the DRB

- In 2017, ~6.8 BGD surface water withdrawn
  - **94%** of total withdrawals in 2017
  - **92%** of projected withdrawals in 2060
  - **300+** surface water withdrawal locations



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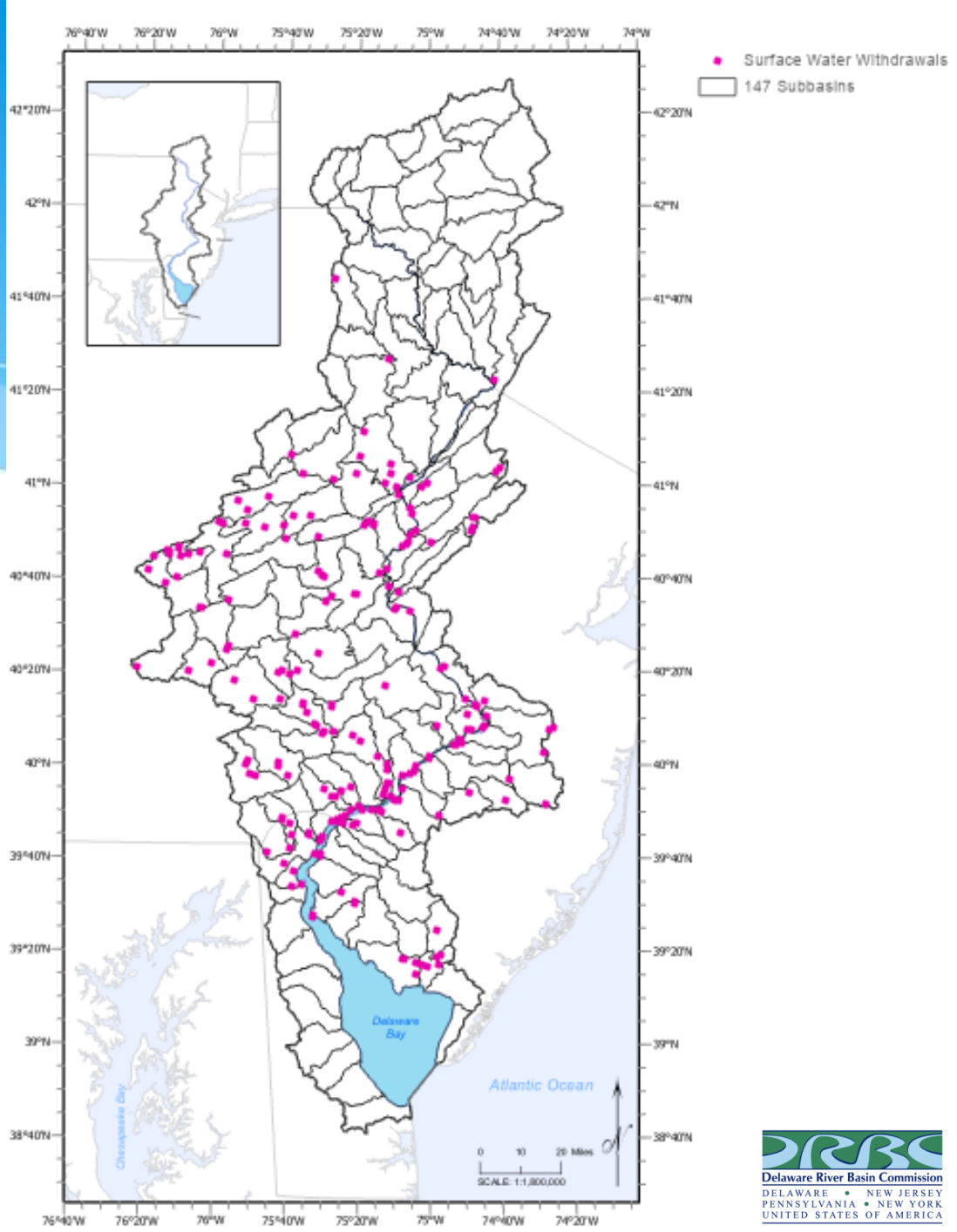
  - **300+** surface water withdrawal locations
- Evaluate using **147 subbasins**
  - Same scale as projection & groundwater reports
  - Average subbasin area = 87 mi^2
  - Between HUC12 (40mi^2) and HUC10 (227 mi^2)
  - Based on a 2006 USGS/DRBC publication



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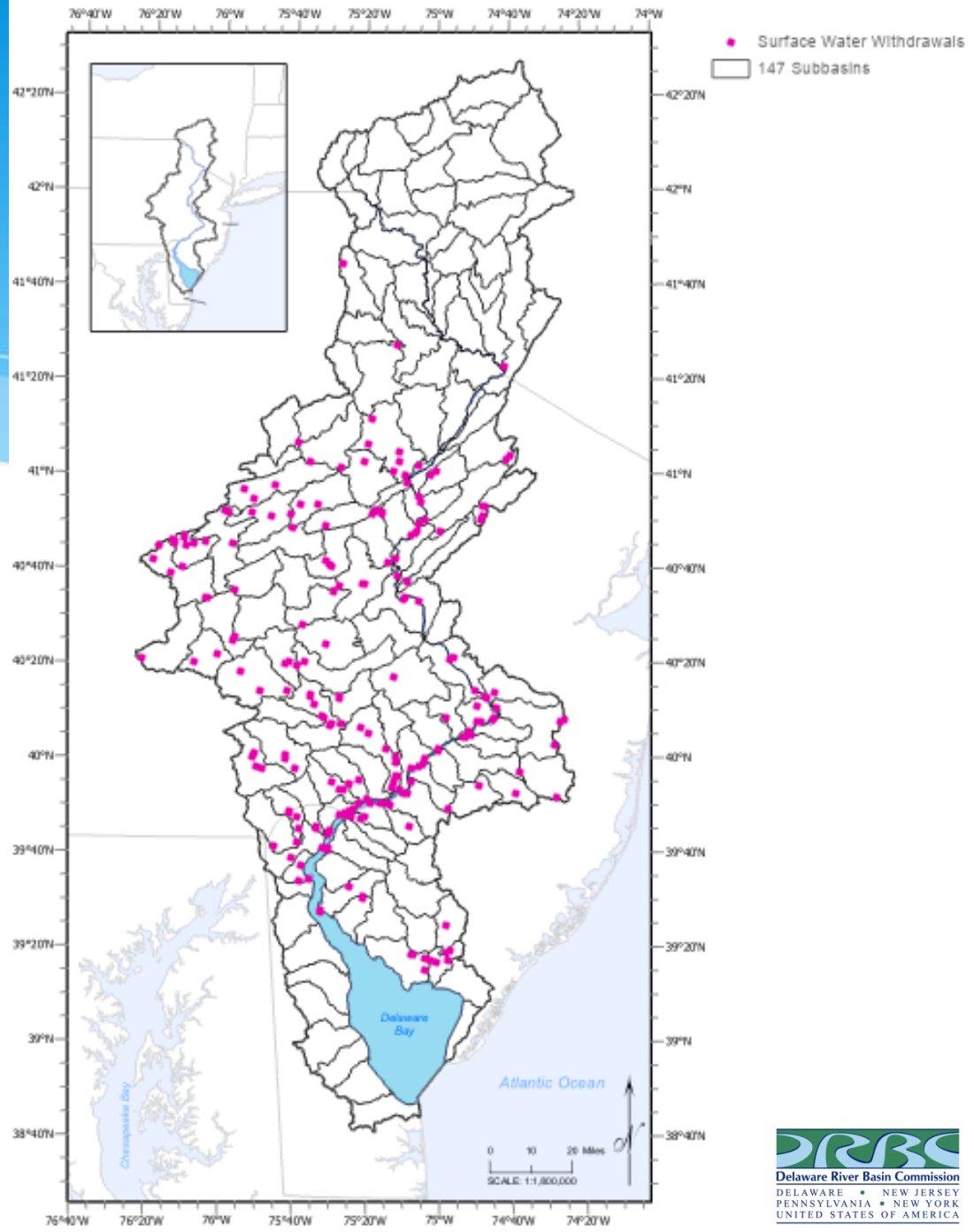
- **In each subbasin, under what conditions do allocations exceed available surface water?**



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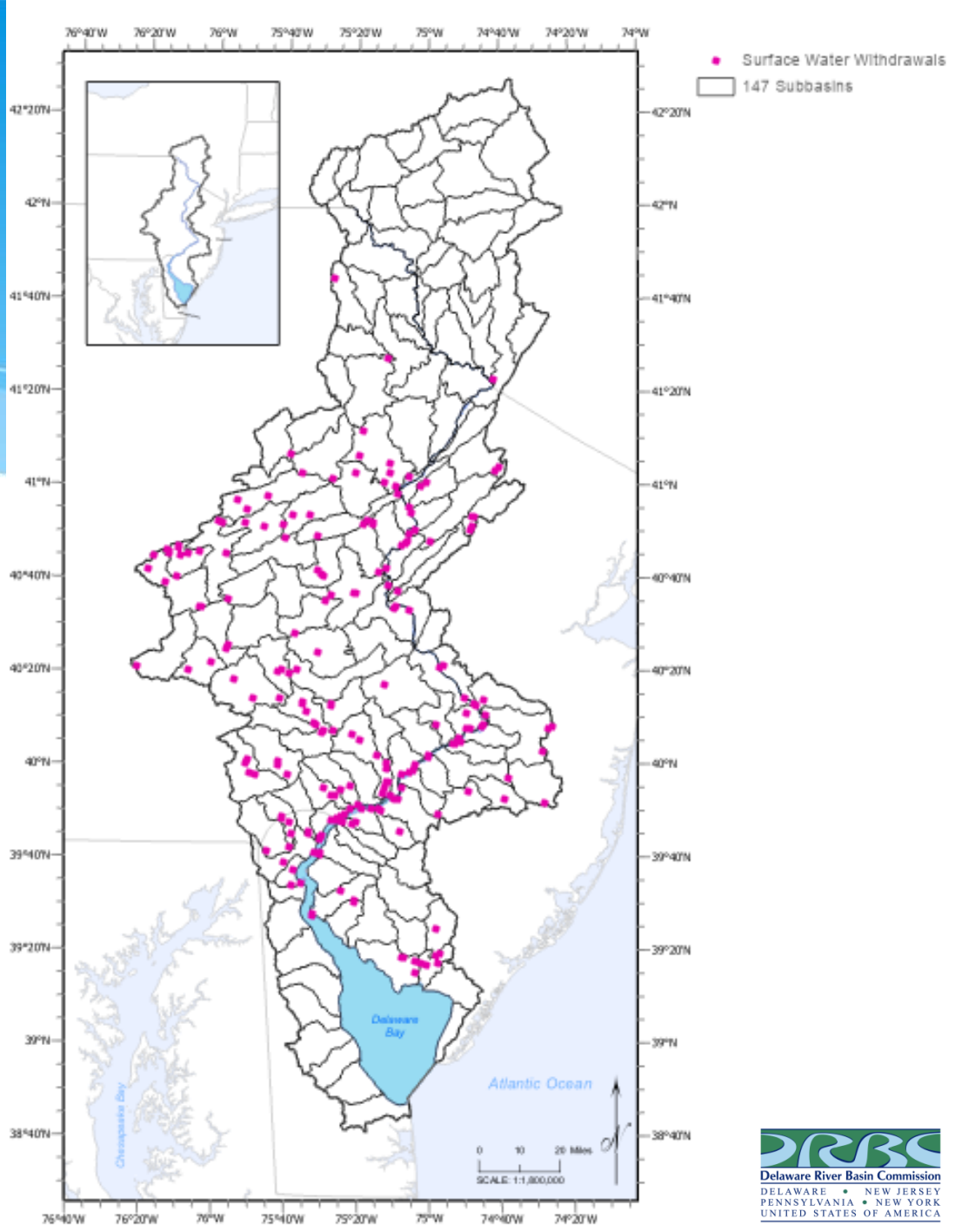
SWEET

(Surface Water Evaluation & Estimation Tool)

- **In each subbasin, under what conditions do allocations exceed available surface water?**
- DRBC tool to evaluate surface water availability
  - Originally in Excel/VBA
  - Currently streamlining into R code



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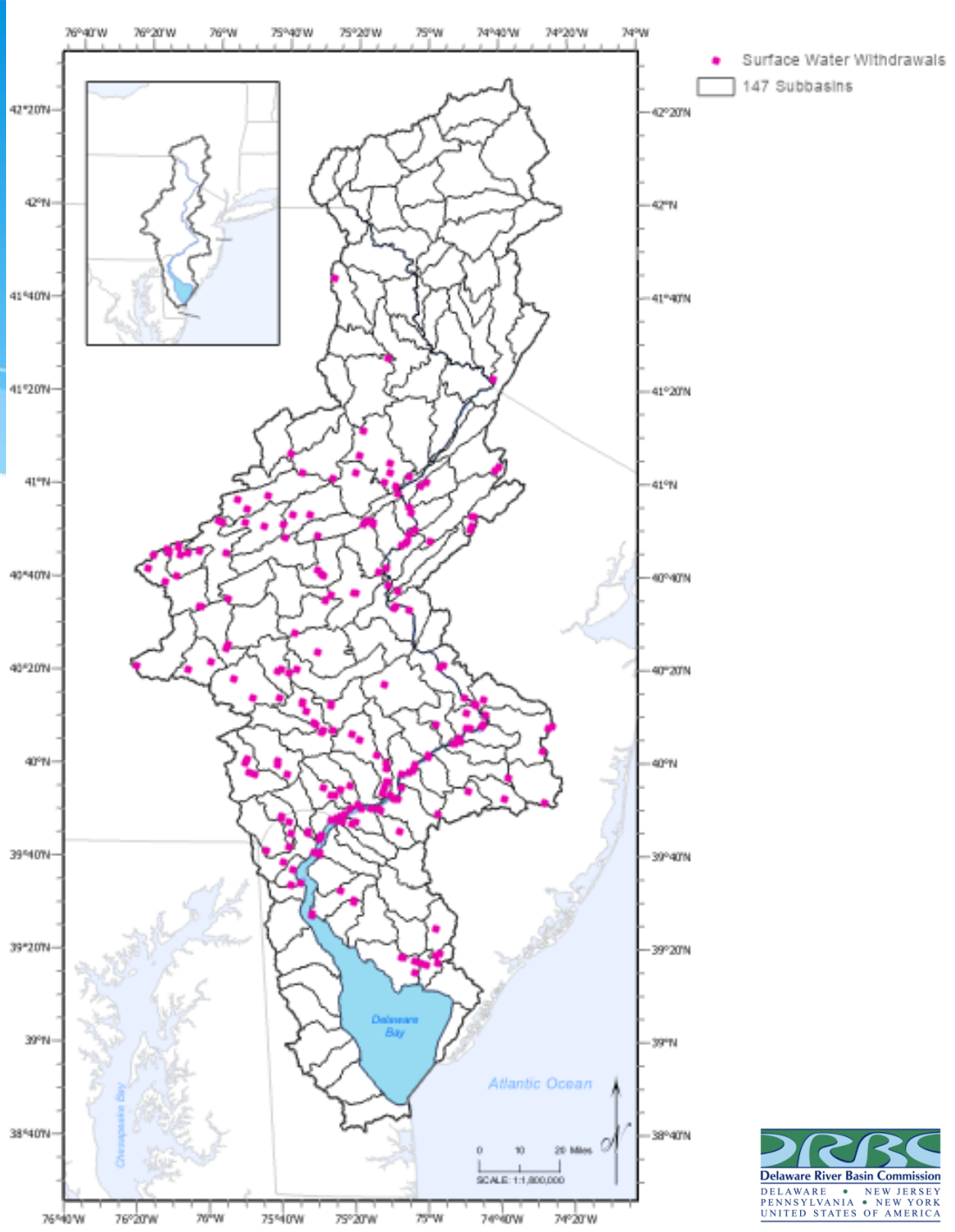
- Data needed for each subbasin:
  - Surface water allocations
    - Withdrawals & consumptive use: Projection report
  - Available surface water
    - Streamflow (unaltered): DRB-SET
    - Reservoir releases: DRB-PST



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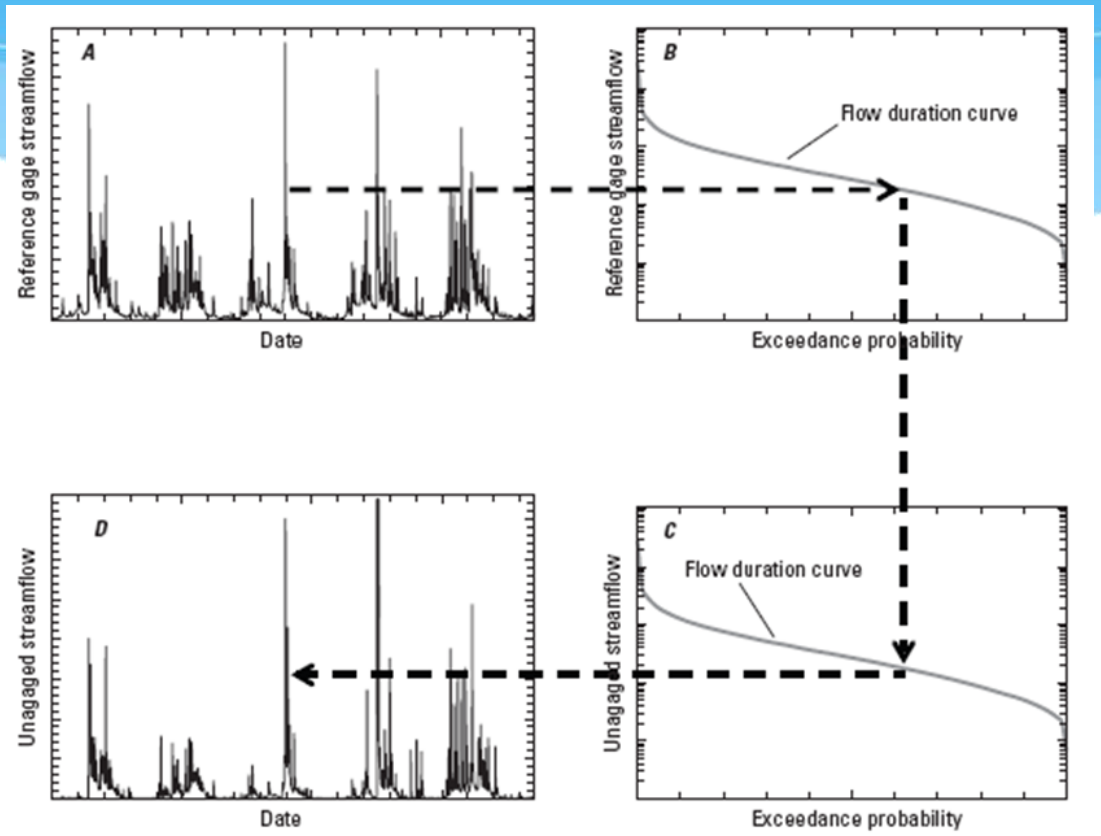
DRB-SET from USGS
(Streamflow Estimation Tool)

- Estimates minimally-altered or “baseline” **daily mean flow for ungaged streams**



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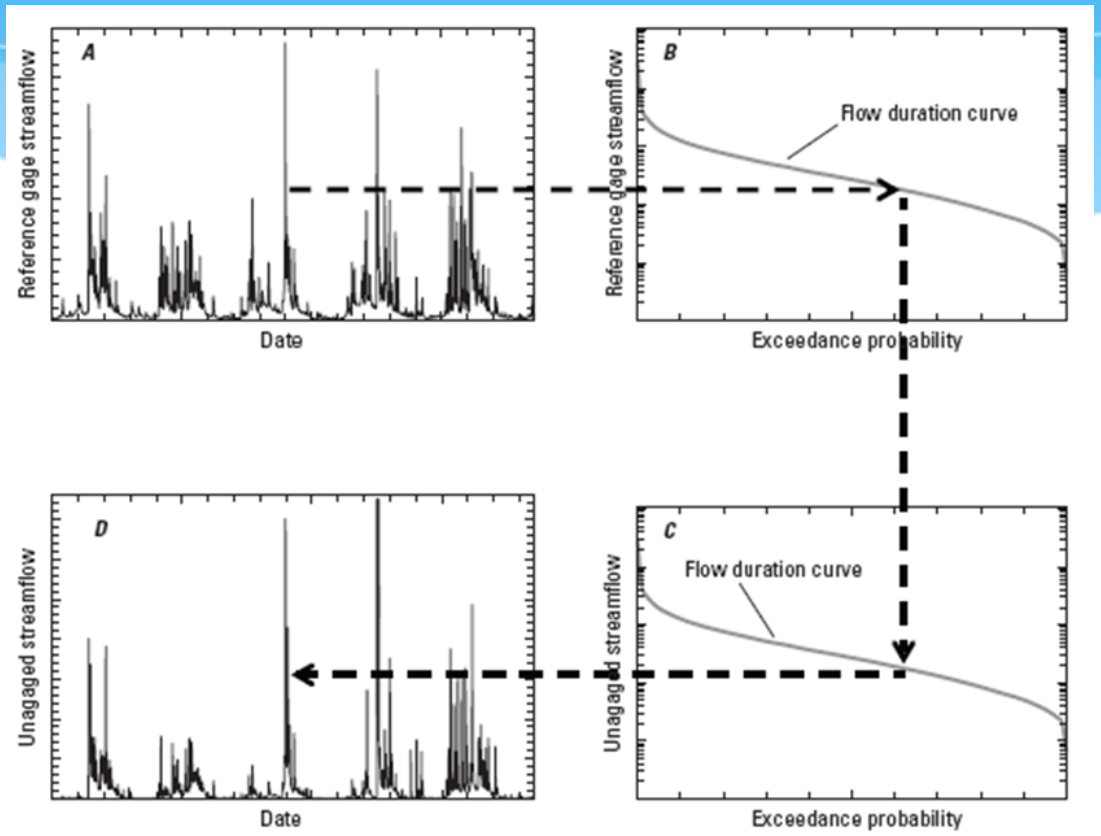

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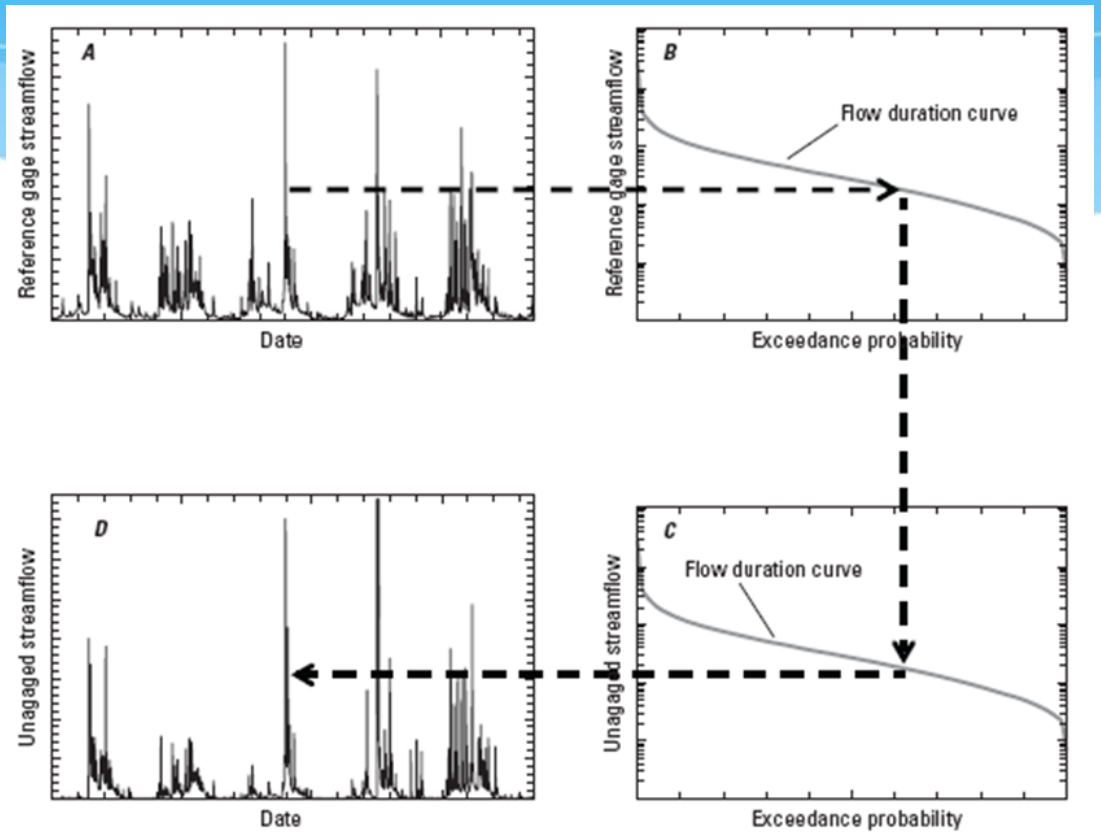

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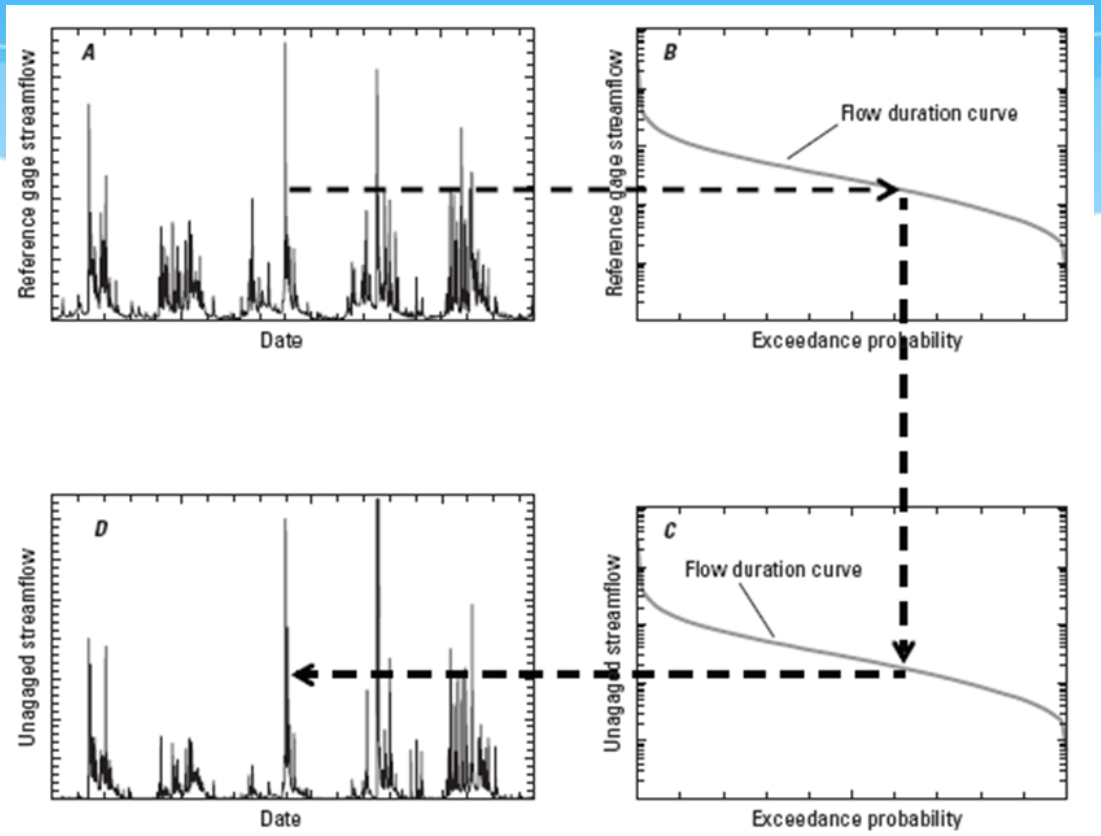
- **Next step: Exploring an update with data through 2022**



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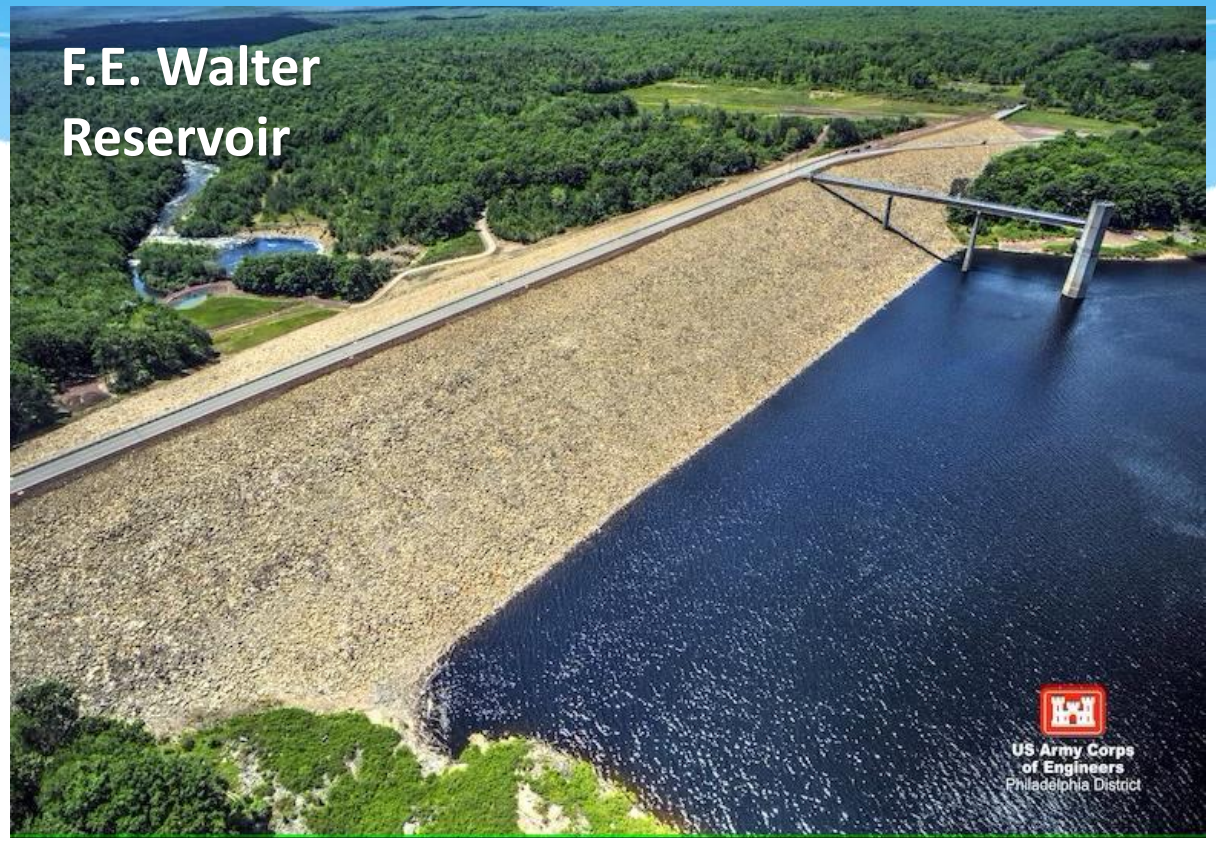
DRB-PST
(Planning Support Tool)

- Basin-wide flow routing and reservoir operations model
  - Reservoir storage, flow objectives, salinity repulsion
  - FFMP 2017



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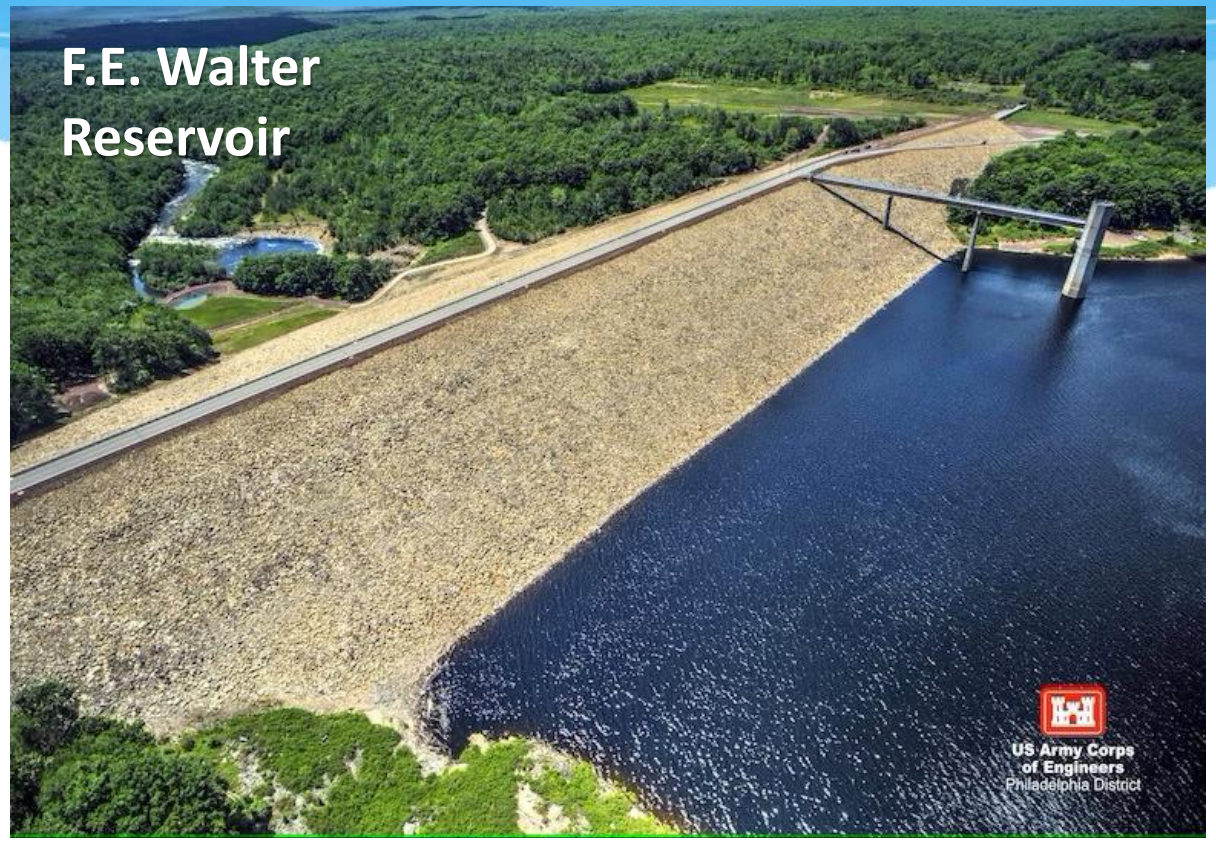

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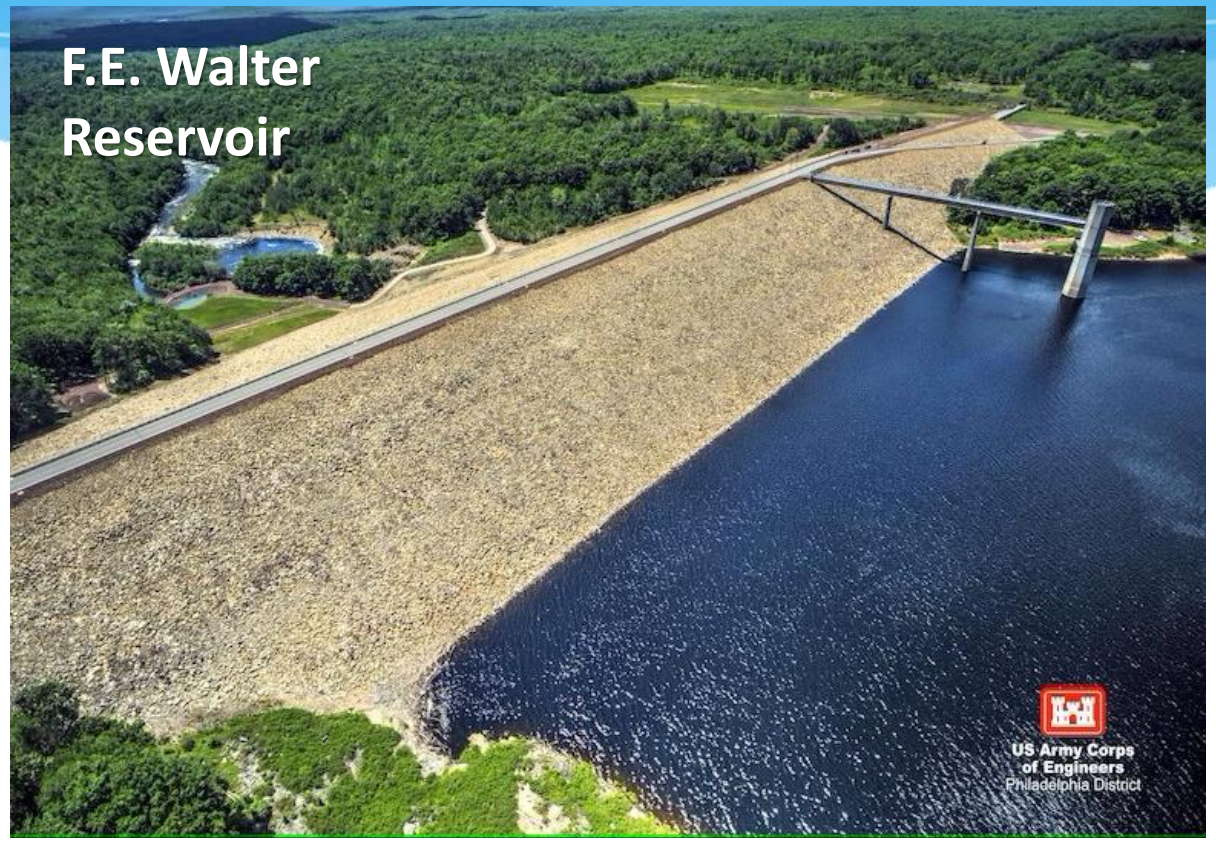
- **Next step: Refine PST model to be compatible with DRB-SET data**



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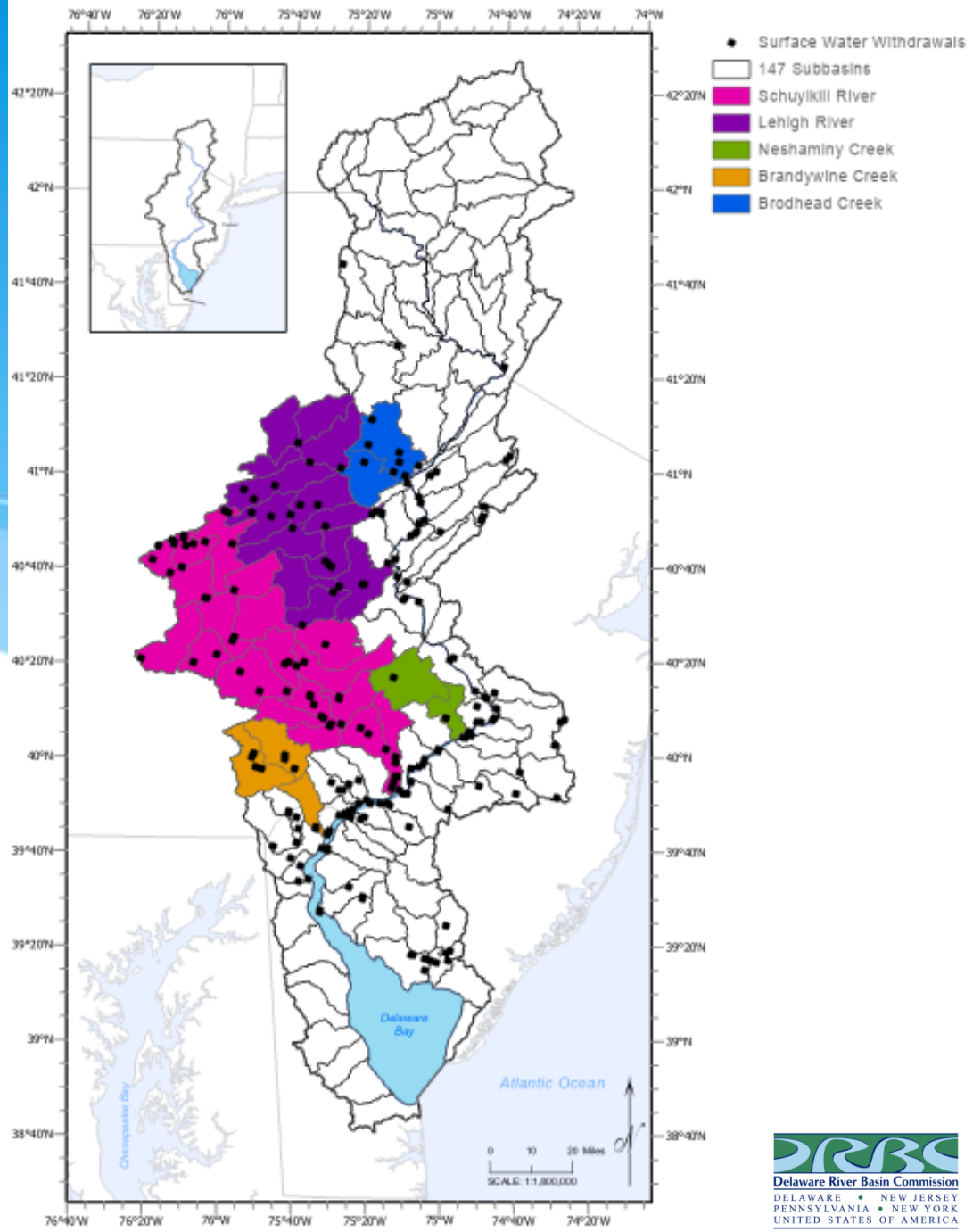
SWEET facilitates surface water availability analysis under current and future withdrawals

- Preliminary results expected ~Q3 2023
  - Identify when and where available surface water does not support allocated withdrawals
  - Start with 5 basins: **Lehigh**, **Schuylkill**, **Brodhead**, **Neshaminy**, **Brandywine**



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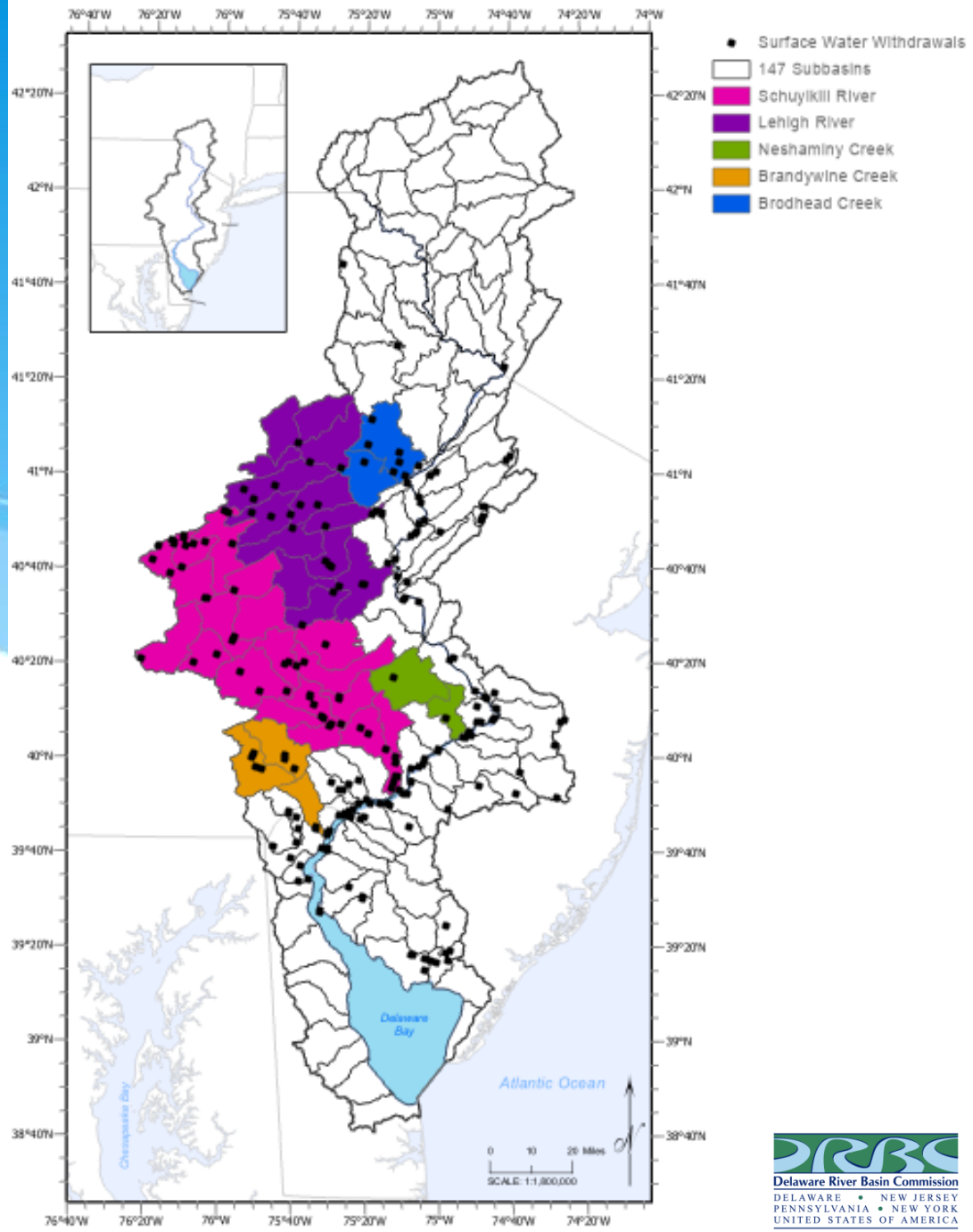
- Part of this work is funded through a 2021 NFWF grant



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