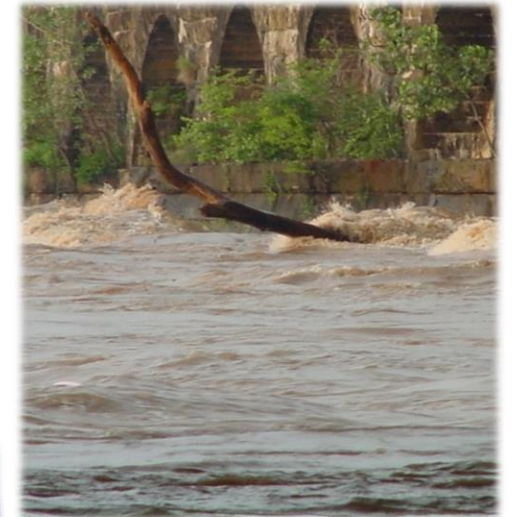


Delaware River Basin Commission

DRBC Climate Water Resources Program and Work Plans

Advisory Committee on Climate Change
December 20, 2023

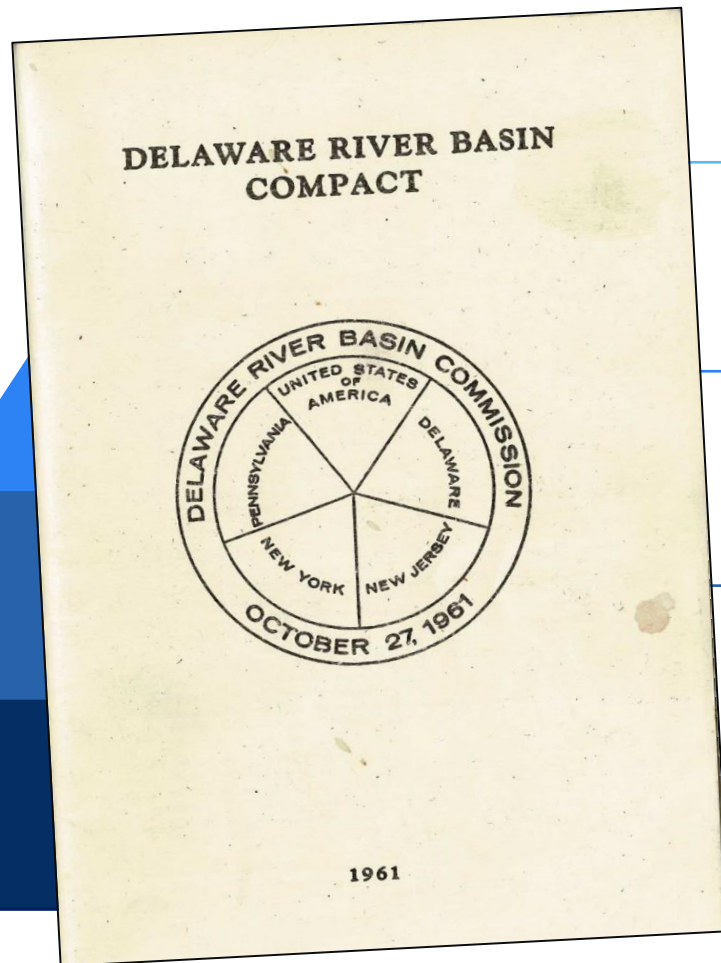
Kristen Bowman Kavanagh, DRBC Deputy Executive Director



Objectives

1. DRBC work plan development process
2. Key climate change risks to Basin water resources
3. Highlights of climate change work plan activities
4. Input/Questions

DRBC Work Plan Development



Individual Work Plans/Budget (§13.3) – 1 yr plan

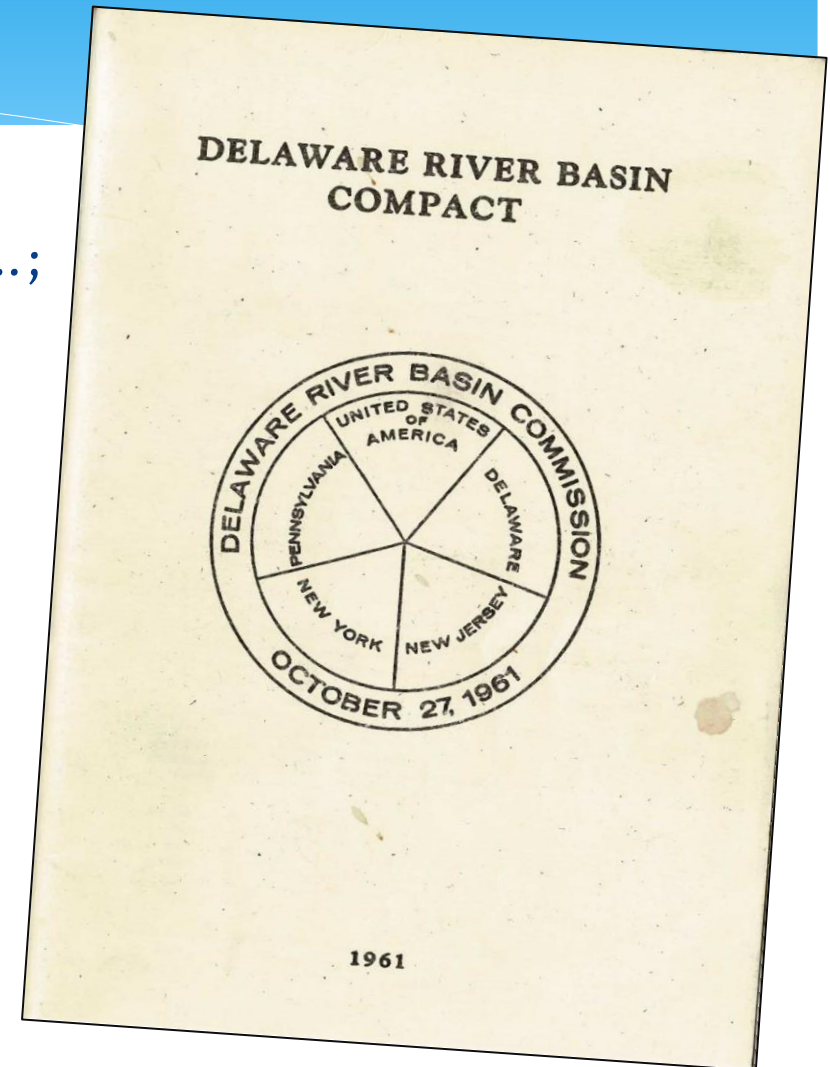
Water Resources Program (§13.2) – 3 yr plan

Comprehensive Plan (§13.1)

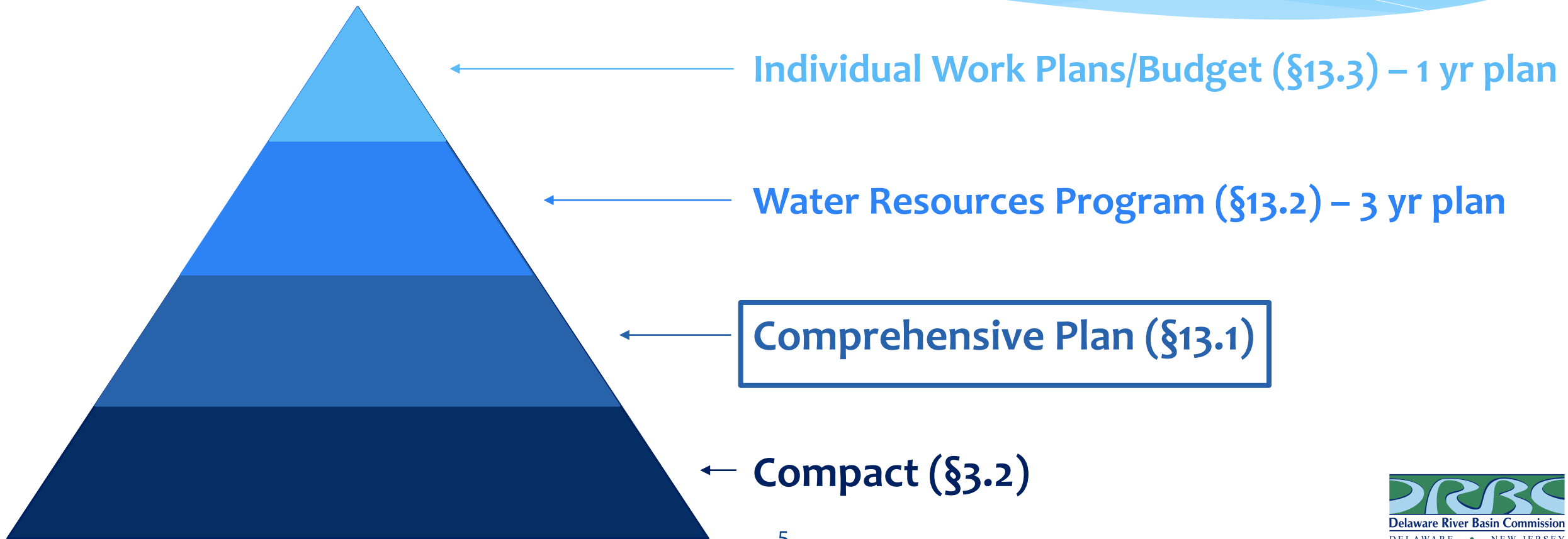
← Compact (§3.2)

Diverse Range of Water Resource Issues

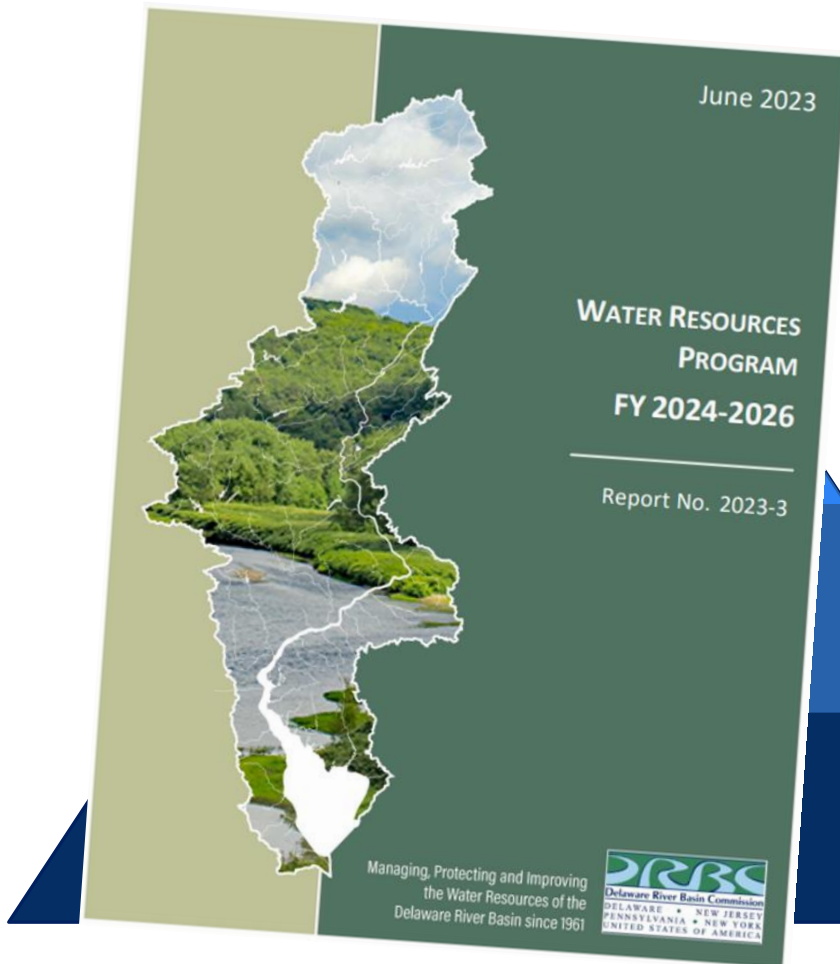
- **flood damage** reduction;
- conservation and **development** of ground and surface water supply...;
- development of **recreational facilities**;
- **propagation** of fish and game;
- promotion of related... **watershed projects**;
- **protection** to fisheries...;
- development of **hydroelectric power**;
- improved **navigation**;
- **control** of the movement salt water;
- **abatement** and control of stream pollution;
- And **regulation** of stream flows towards the attainment of these goals.



DRBC Work Plan Development



DRBC Work Plan Development



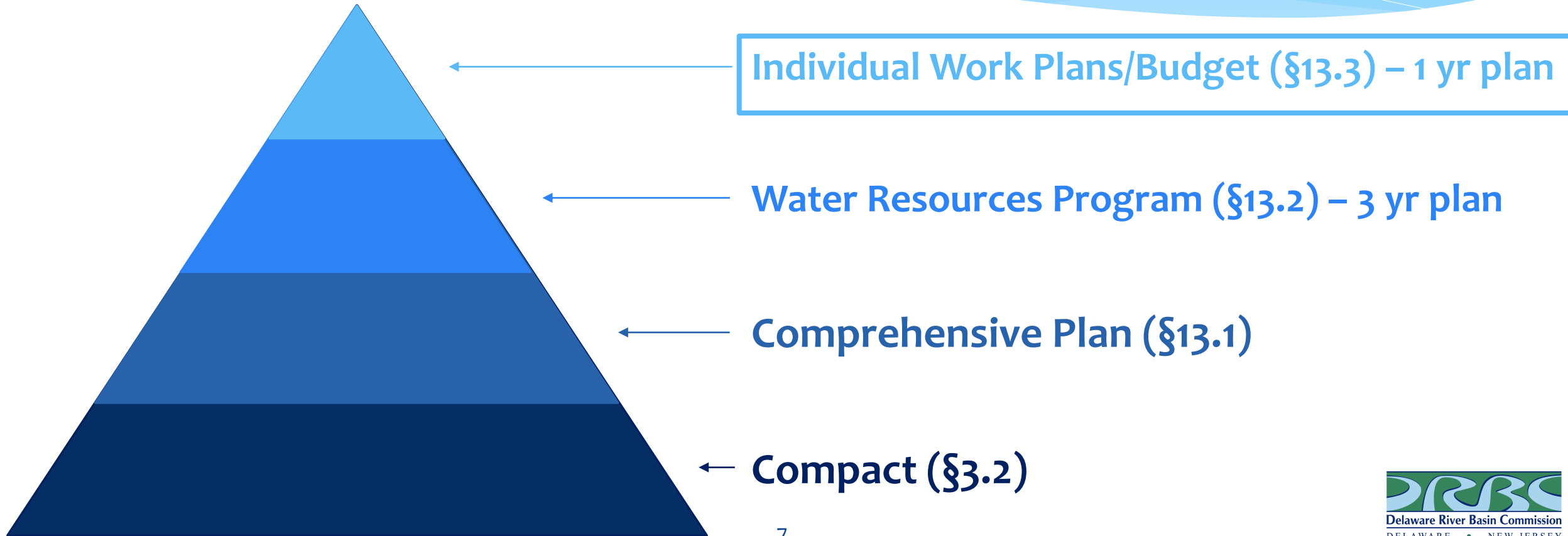
Individual Work Plans/Budget (§13.3) – 1 yr plan

Water Resources Program (§13.2) – 3 yr plan

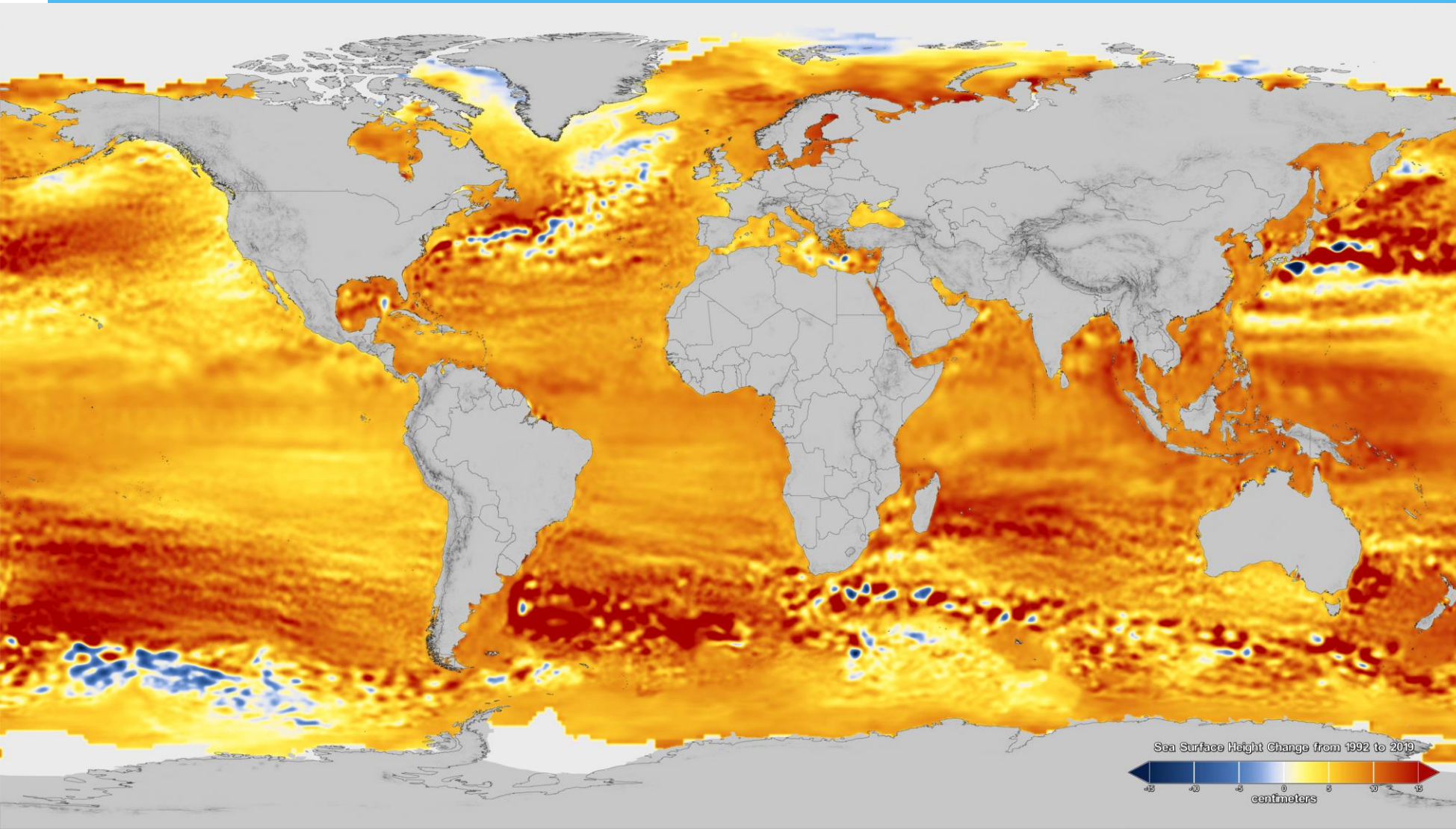
Comprehensive Plan (§13.1)

Compact (§3.2)

DRBC Work Plan Development



Climate Change Risks – Sea Level Rise

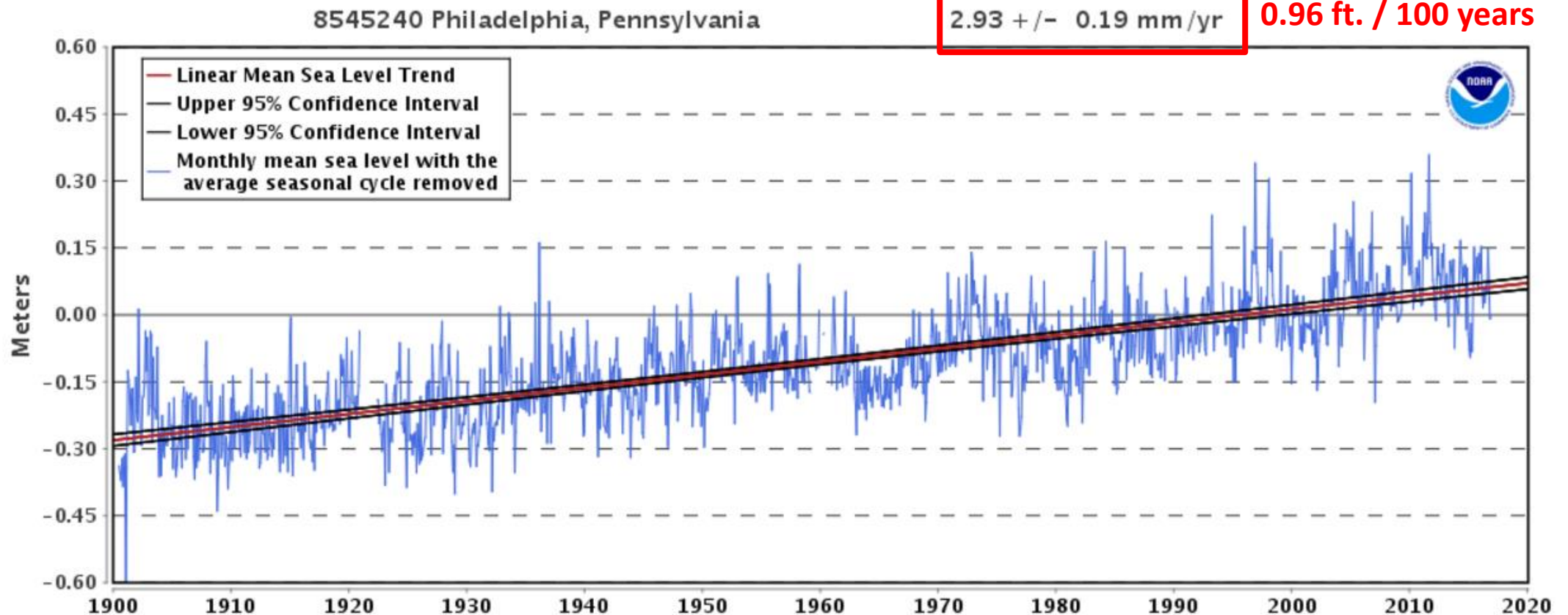


Regional sea-level change between 1992 and 2019, based on data collected from the TOPEX/Poseidon, Jason-1, Jason-2, and Jason-3 satellite altimeters.
Credit: NASA

Climate Change Risks – Sea Level Rise



Mean Sea Level Trend
8545240 Philadelphia, Pennsylvania



Climate Change Risks – Hydrologic Cycle

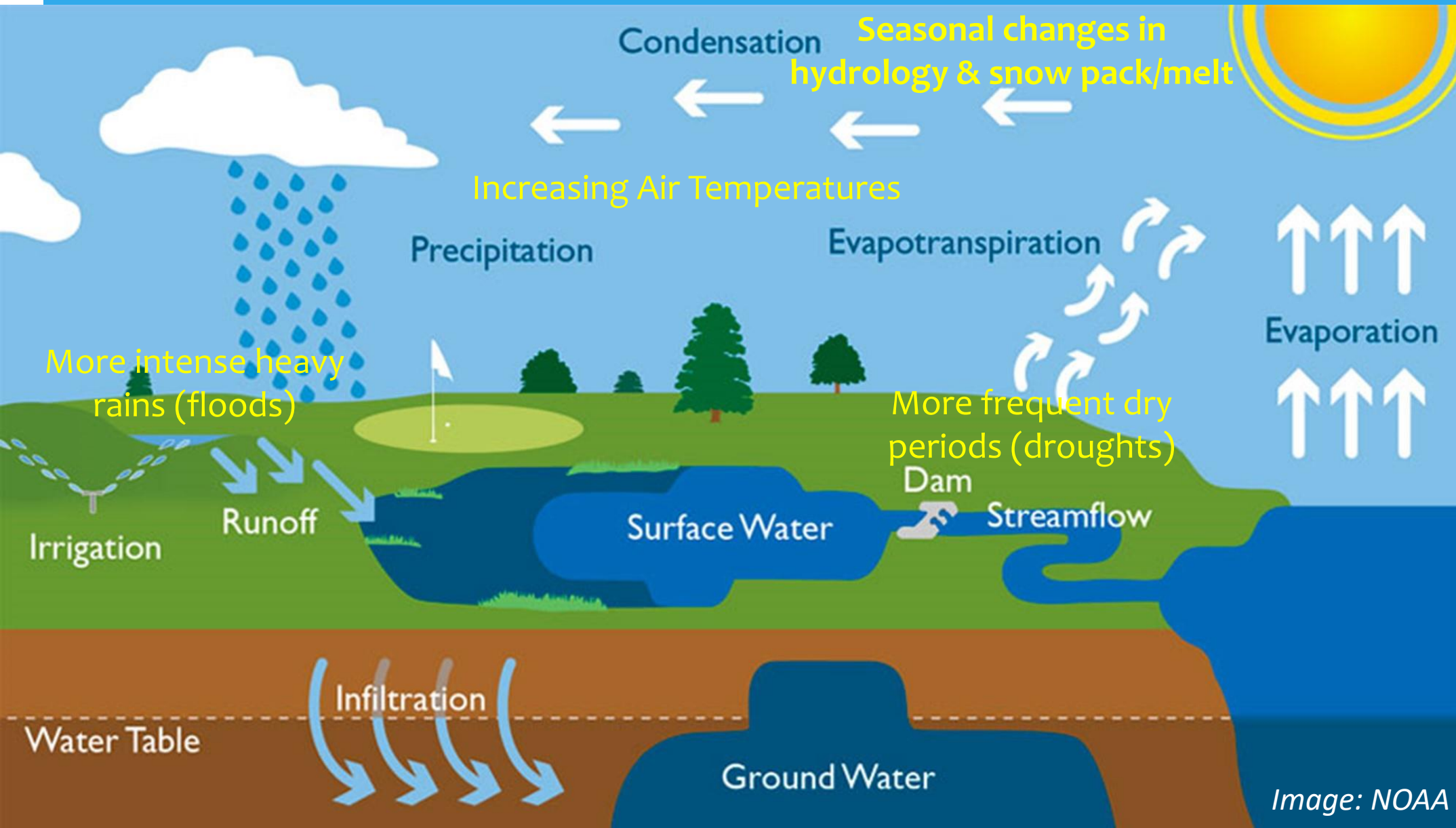


Image: NOAA

Highlights of Climate Change Work Plan Activities

- *Climate Action Plan*
- Outreach & Education
- Equity & Environmental Justice
- Flood Loss Reduction
- Water Availability
- Flow Management/
Drought
- Water Quality



Right to Left, Top to Bottom: AGU.org; NOAA, Phila.gov, Sea Grant Delaware, S. Mullholland, NOAA SLR Viewer, USGS, NYCDEP

Outreach & Education: *ACCC Climate Change Forum*

- Held January 31, 2023
- Part of the Partnership for the Delaware Estuary (PDE) biennial Science Summit
- Over 300 Science Summit attendees
- ACCC members and DRBC staff as moderators and speakers
- Program (see online [proceedings](#))
 - Keynote: Dr. Philippe Hensel of NOAA on relative sea level rise
 - High level panel including EPA R3 Administrator
 - Two technical sessions



Equity & Environmental Justice:

NOAA Climate Resilience Regional Challenge

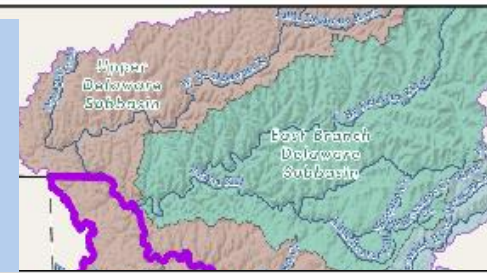
- [NOAA 2023 grant opportunity](#) to build a new collaborative to advance equitable climate resilience solutions
- Focused on urban communities of the coastal Delaware River
- Core team – DVRPC with DRBC, PDE, City of Philadelphia, and The Water Center at Penn
- Not selected but will continue to¹³ pursue



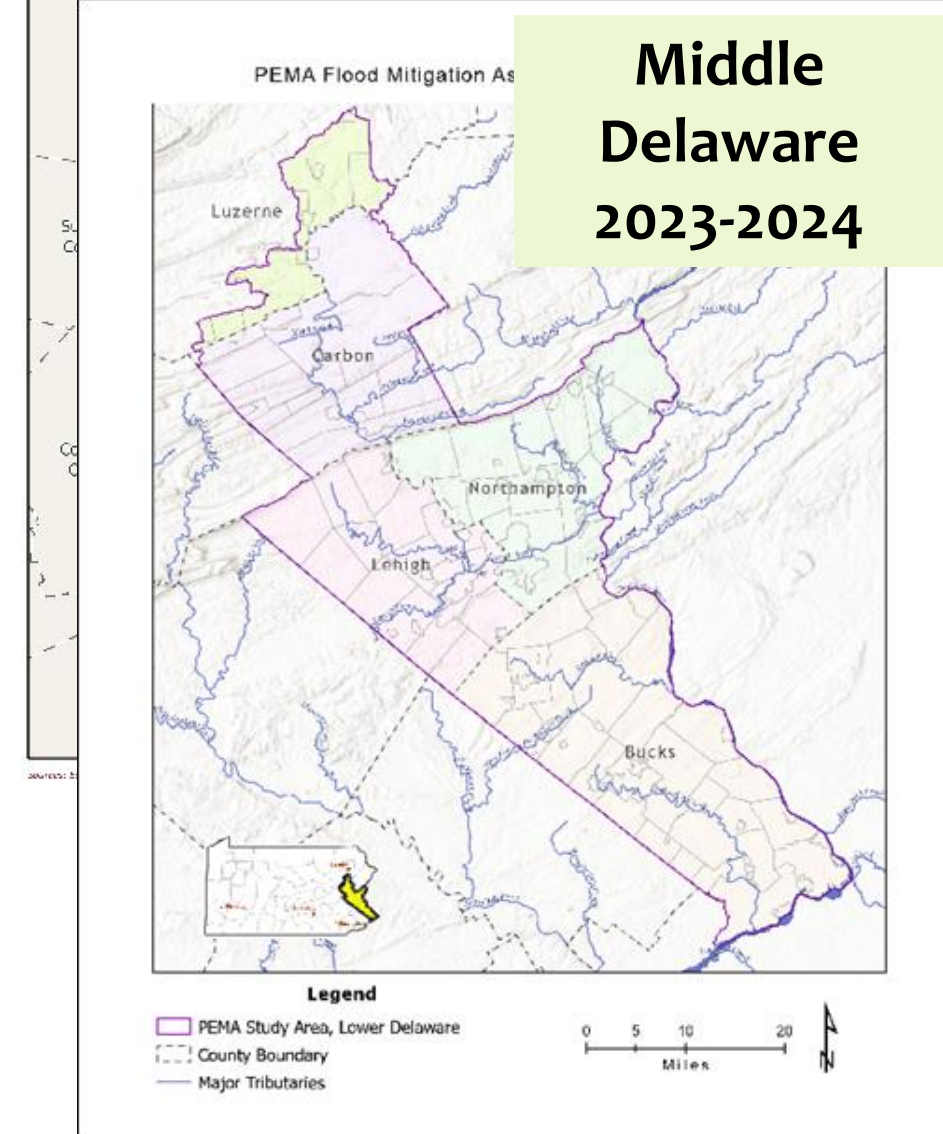
Flood Loss Reduction: *Hazard Mitigation Assistance Grants*

- Work with stakeholders in low-capacity communities to:
 - increase the capacity of local municipalities to apply for grants;
 - provide education and outreach on application process and timeline; and
 - advance Hazard Mitigation Plans to mitigation project development and actions
- New focus on climate change and equity.

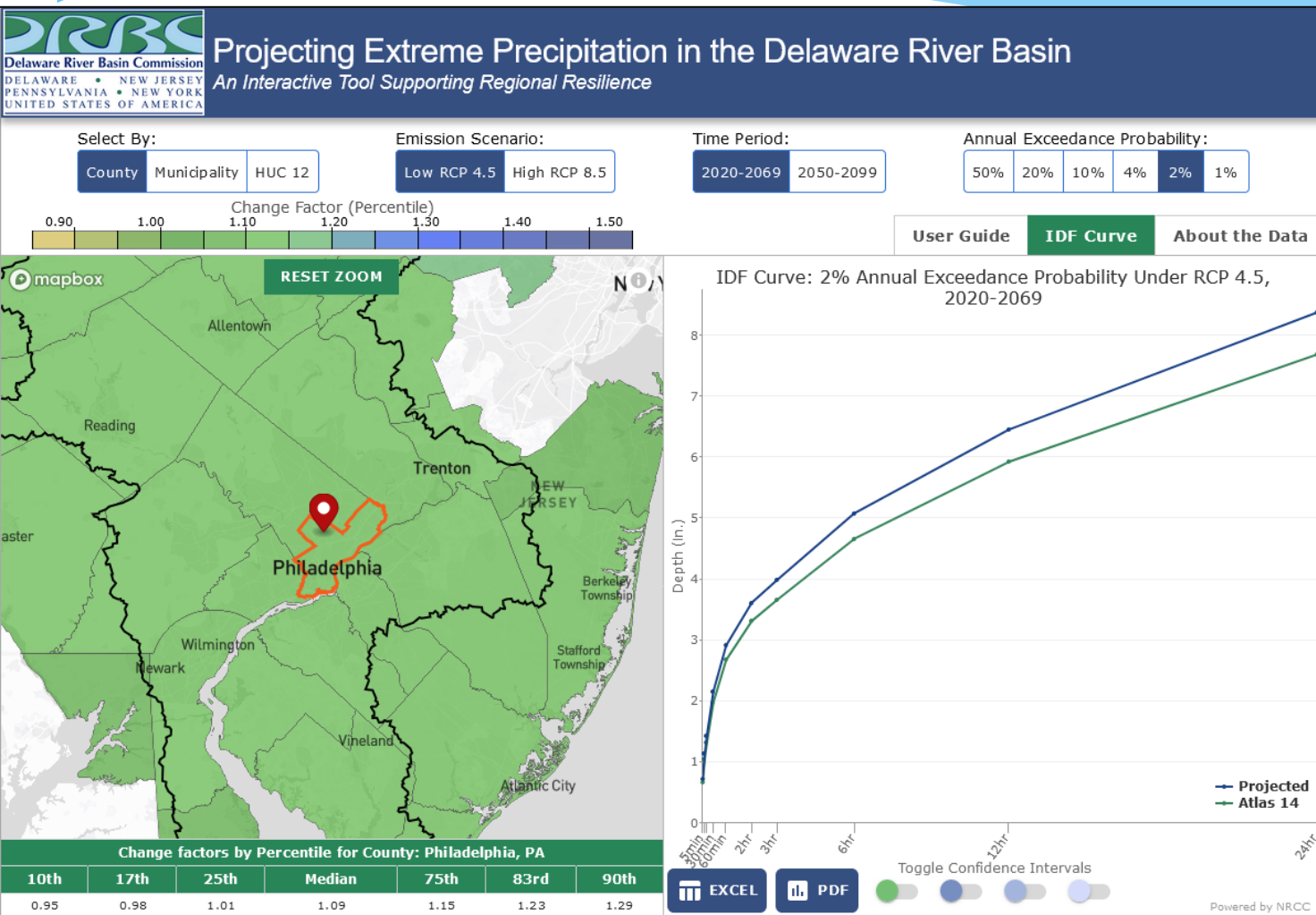
**Upper
Delaware
2021-2022**



**Middle
Delaware
2023-2024**



Flood Loss Reduction: *Extreme Precipitation Projection Tool*



- Projected changes in rainfall Intensity-Duration-Frequency (IDF) curves
- Developed by NRCC at Cornell University
- Live now at <https://drbc-idf.rcc-acis.org/>

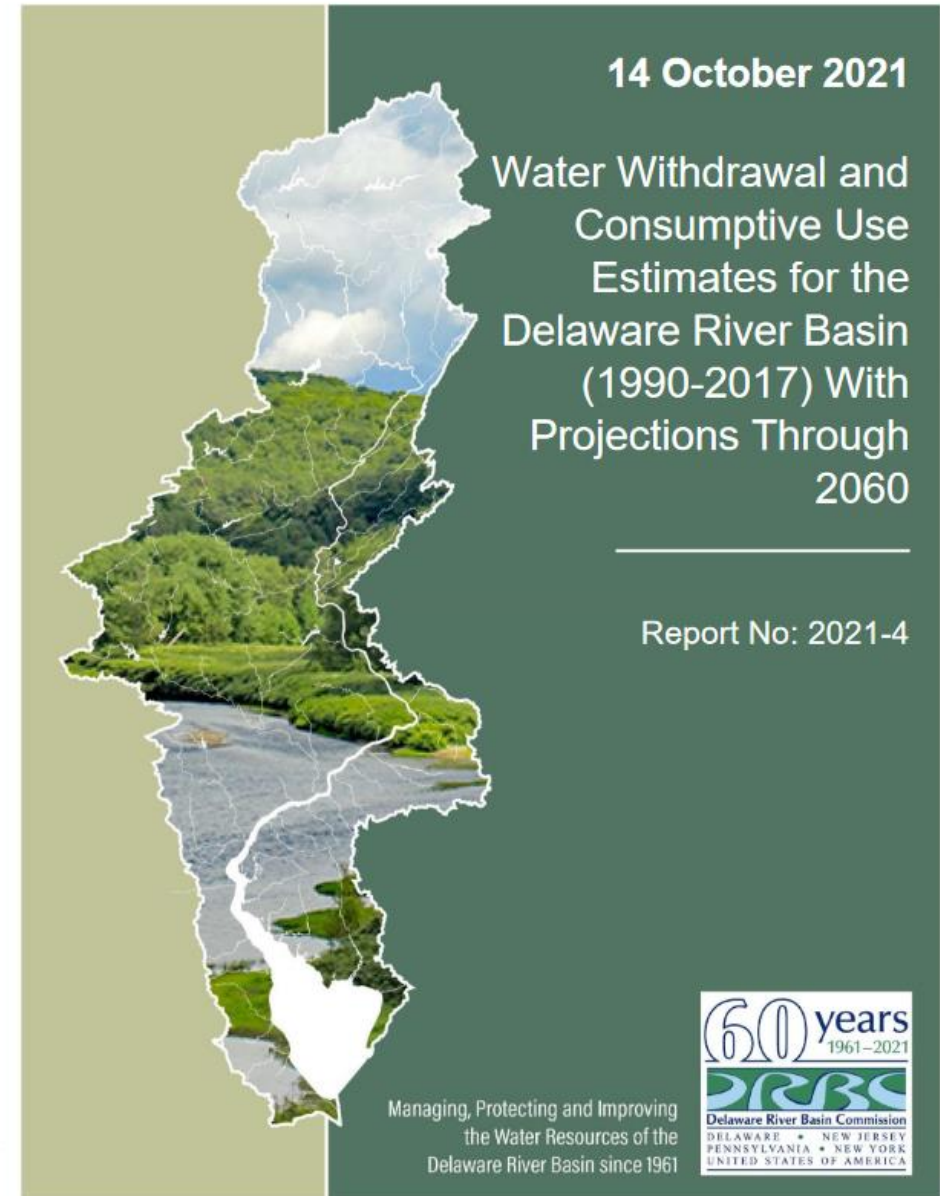
Water Availability: *Planning Studies*

- Sustainable water availability
 - Future water withdrawal and consumptive use projections
 - Future groundwater availability
 - Future surface water availability
 - Climate change
- Water efficiency
- Water audits

- Adequacy of available storage?
- Adequacy of emergency storage?
- Number of “drought days”?
- Adequacy of flow objectives?
- Water budget in major sub basins:
 - Will the available Water Supply meet the projected Water Demand?

Water Availability: *Planning Studies*

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 - Future surface water availability
 - Climate change impacts on hydrology
- Water efficiency
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Water Availability: *Planning Studies*

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Water Availability: *Planning Studies*

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- Water conservation/efficiency
- Water audits



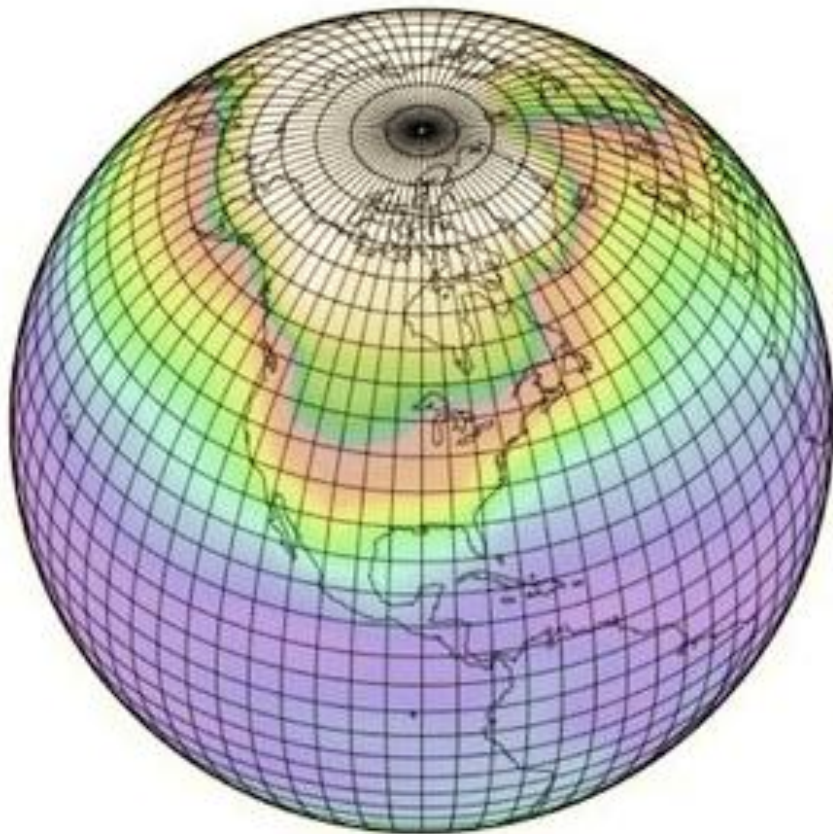
Water Availability: *Planning Studies*

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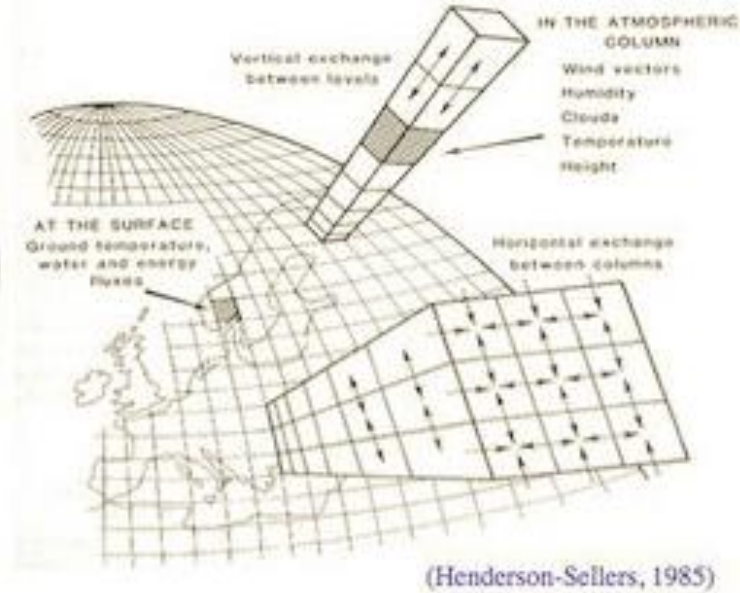


Water Availability:

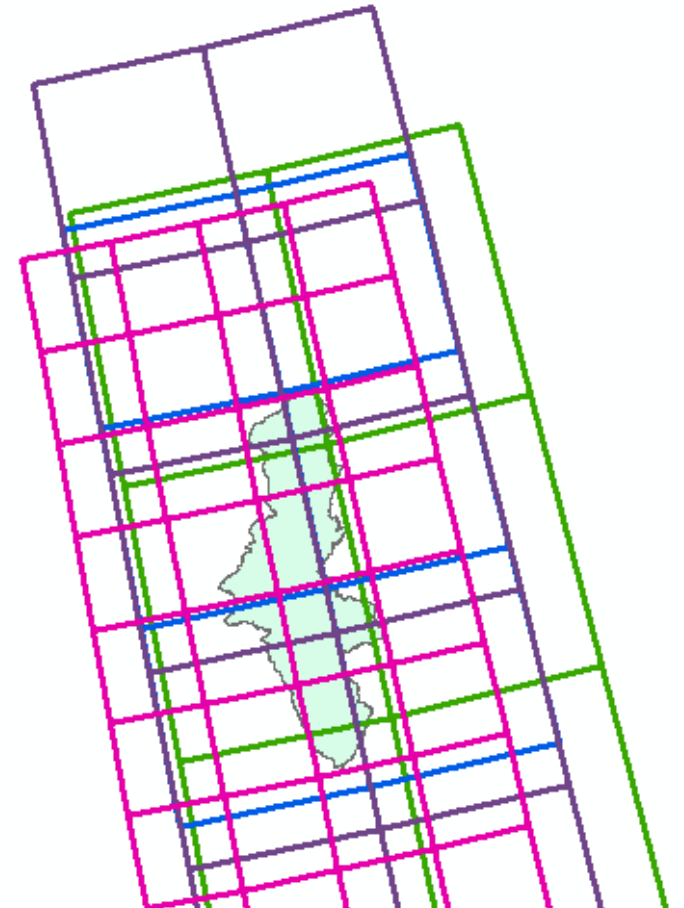
Climate Change Impacts on Hydrology



Global Circulation Model
(GCM) Tiles



Finite Element Grid of
Atmospheric Layers



Tiles that Cover the DRB

Water Availability: *Storage Feasibility Study*



- Explores the feasibility of additional freshwater storage to meet future water availability, climate adaptation, drought management and flow management needs
- Planning level inventory of potential options (no specific, immediate need for additional storage)
- Final study [report](#) (Apr 2023)
- Online [GIS tool](#)



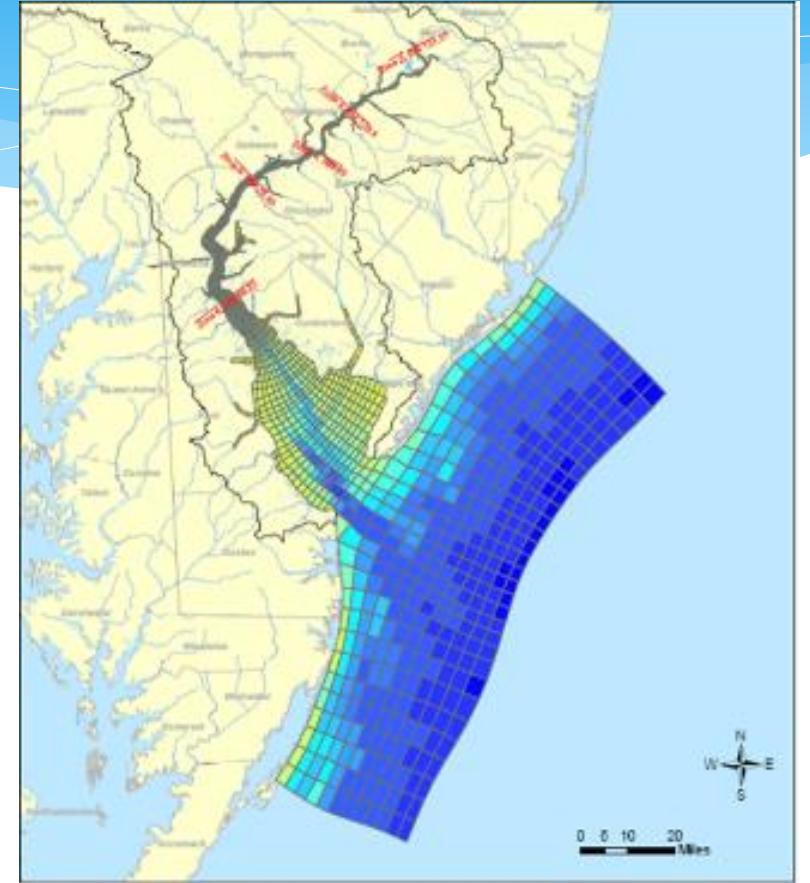
US Army Corps
of Engineers
Philadelphia District

Prompton Reservoir: Photo courtesy of U.S. Army Corps of Engineers



Flow Management / Drought: *Salinity Model & Sea Level Rise*

- 3D salinity model
- Evaluation of sea level rise on salinity intrusion and protection of salinity sensitive uses
- Evaluation of climate change on surface water flow management and reservoir management



Flow Management / Drought: *Water Resource System Model*

Primary Drivers

Tides/WSE



Climate

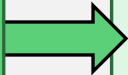


Flow



Sea Level Rise Impacts on Salinity

**3D Salinity
Model**



**MDR-H/SLR
Screening
Salinity Model**

Climate Change Impacts on Flow

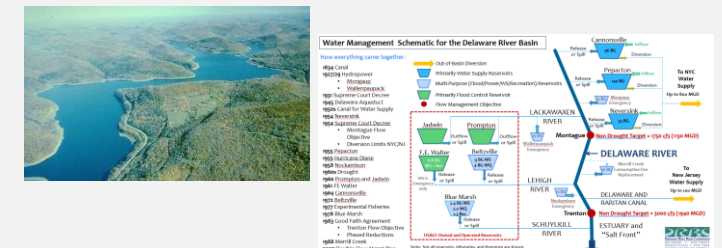
**GCM/RCM
Temperature
Precipitation**



**Hydrologic
Model**

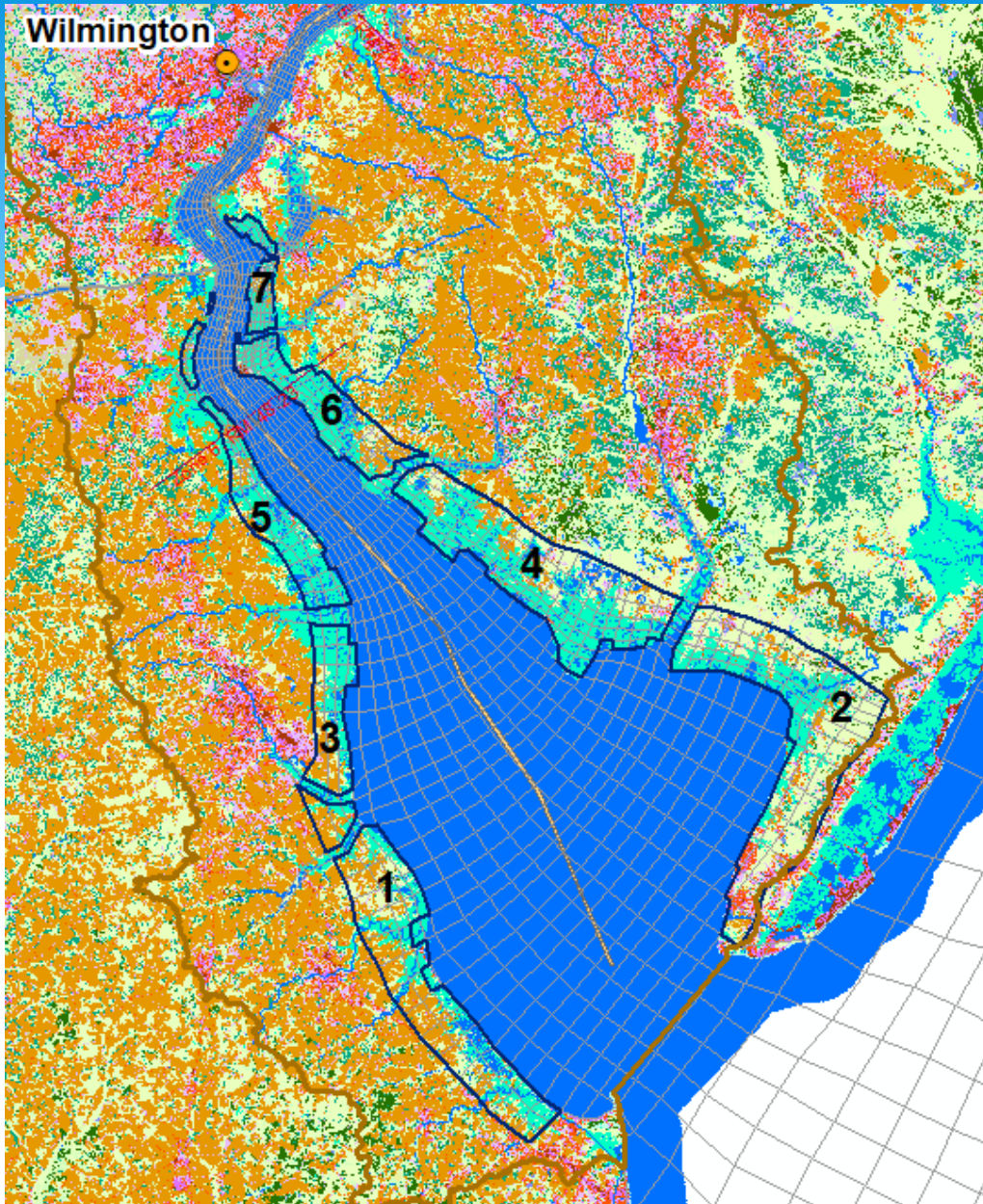
**Future
Withdrawals**

**Water Resource
System Model**



Storage
Opportunities

Consumptive Use
Projections



Water Quality:

Salinity Impacts on Habitat

- Sea level rise impacts on salinity:
 - Marshes
 - Oyster beds
- Climate change impacts (temperature and hydrology) on Estuary water quality (2024)

Kristen Bowman Kavanagh, P.E.

Deputy Executive Director

Kristen.B.Kavanagh@drbc.gov

www.drbc.gov



Delaware River Basin Commission

DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

*Managing, Protecting, and Improving
Our Shared Water Resources since 1961*