Delaware River Basin Commission

DRBC Climate Water Resources Program and Work Plans

Advisory Committee on Climate Change
December 20, 2023

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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

- Compact (§3.2)
- Comprehensive Plan (§13.1)
- Water Resources Program (§13.2) – 3 yr plan
- Individual Work Plans/Budget (§13.3) – 1 yr plan
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.
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- **Comprehensive Plan (§13.1)**
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- **Individual Work Plans/Budget (§13.3) – 1 yr plan**
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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

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

0.96 ft. / 100 years

Mean Sea Level Trend
8545240 Philadelphia, Pennsylvania

8545240 Philadelphia, Pennsylvania

2.93 +/− 0.19 mm/yr
Climate Change Risks – Hydrologic Cycle

- Increasing Air Temperatures
- More frequent dry periods (droughts)
- More intense heavy rains (floods)
- Seasonal changes in hydrology & snow pack/melt

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
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
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 to 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.
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?
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  - Climate change impacts on hydrology
- Water efficiency
- Water audits
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Water Availability:
Planning Studies

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Coming 2024
Water Availability: Planning Studies

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  - Future groundwater availability
  - Future surface water availability
  - Climate change impacts on hydrology

- Water efficiency
- Water audits
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
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)
Managing, Protecting, and Improving
Our Shared Water Resources since 1961