

Delaware River Basin Perspective: Ecosystem-based Management

NOAA Stakeholder Forum: Strategic
Outlook and Program Priorities
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Presentation Overview

- Basin Facts
- DRBC General Powers
- High Level Themes and Principles
- Case Studies in the Delaware River Basin
- Opportunities for Improving Effectiveness



Basin Facts

- Largest un-dammed river east of the Mississippi – 330 miles
- 13,539 square mile drainage
- 17 million water users
- Largest freshwater port in the world
- Three reaches included in National Wild and Scenic River System
- World class trout fishery in the tailwaters of the NYC reservoirs
- Tremendous economic significance for the region.

New York

Pennsylvania

New Jersey

MD.

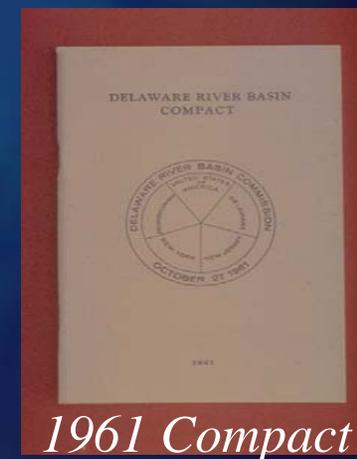
United States



Delaware

Delaware River Basin Commission General Powers:

- * Coordination
- * Planning
- * Regulation
- * Management
- * Development



Management Themes and Principles

- Integrated Management
- Adaptive Management
- Results Based Management
- Regional Collaboration

Why a regional approach in the Delaware River Basin?

- Manageable environmental problem
- Shared Resource/Shared Sense of Regions
- Management Issues transcend political and jurisdictional boundaries and require vertical and horizontal coordination
- Governmental expertise applied within a matrix of local participation & initiative
- “Toolbox” of technical and financial assistance
- Partnering/Need to leverage talents and resources of multiple partners, including private sector corporations

Case Study

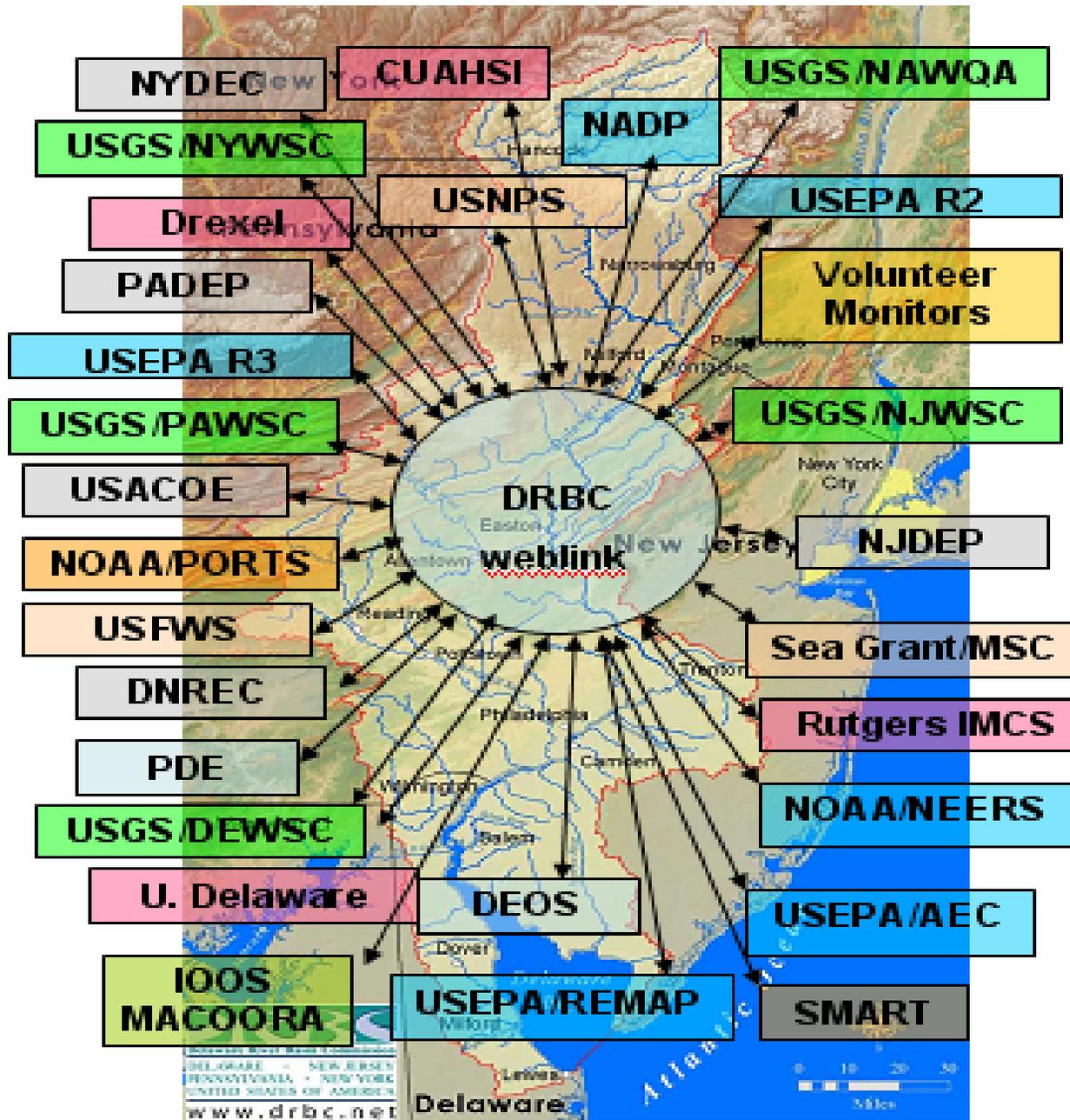
- National Water Quality Monitoring Network Pilot
- Delaware Estuary Conceptual Model
- DuPont Risk Assessment Process
- Delaware Bay Oyster Revitalization Project
- Mid-Atlantic Coastal and Ocean Observing System

Pilot Study: NWQMN

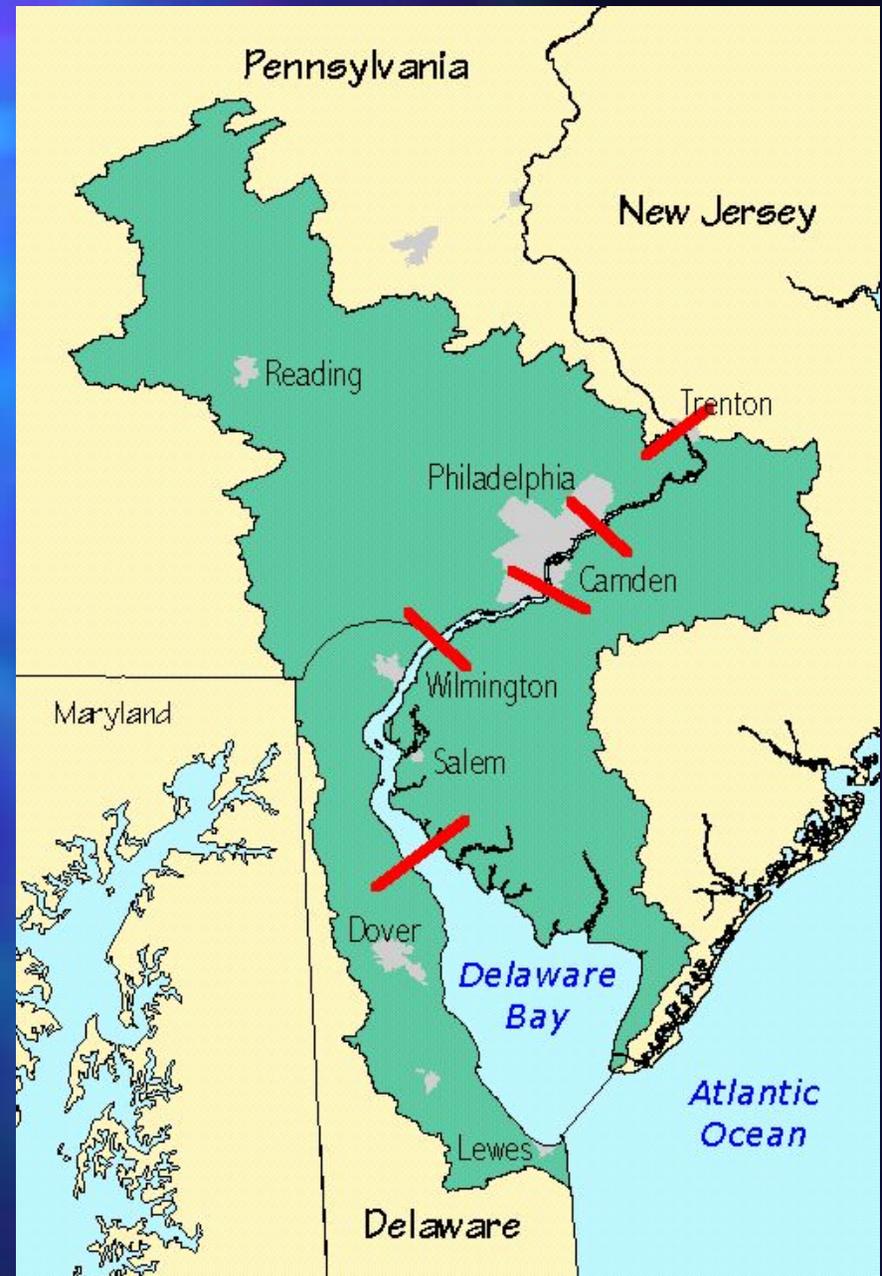
- Nine Resource compartments
- A Continuum of Observations
 - Estuaries
 - Nearshore
 - Offshore and EEZ
 - Great Lakes
 - Coastal Beaches
 - Wetlands

With Flow and Flux from:

- Rivers
- Atmosphere
- Groundwater



Delaware Estuary and Delaware Bay



Technical Needs

1. **Contaminants** (forms, sources, fates & effects for different classes)
2. **Tidal Wetlands** (status, trends and relative importance of different types)
3. **Ecologically Significant Species & Critical Habitats** (oysters, benthos, horseshoe crabs)
4. **Ecological Flows** (effects of flow changes on salt balance & biota)
5. **Physical-Chemical-Biological Linkages** (e.g., sediment budgets, toxics & biota)
6. **Food Web Dynamics** (key trophic connections among functional dominant biota)
7. **Nutrients** (forms, concentrations and balance of macro- and micronutrients)
8. **Ecosystem Functions** (assessment and economic valuation of ecosystem services)
9. **Habitat Restoration and Enhancement** (science & policy)
10. **Invasive Species** (monitoring, management & control)

Operational Needs

Top Six Operational Needs

1. Strengthen **Linkages Between Science and Management**
2. Develop a **Conceptual Framework** Describing the Ecosystem
3. Implement an **Ecosystem Management Approach**
4. Grow the **Monitoring Infrastructure** and Link to Improved **Indicators and Goals**
5. Improve **Data Coordination, Compatibility, Quality, Sharing, Access and Archiving**
6. **Educate Public and Build Identity** for Defining Traits and Issues

Conceptual Matrix for the Delaware Estuary Ecosystem

Number of Cells = 141			Nontidal Watershed					Tidal Estuary											
			Freshwater					Freshwater (<1 ppt)				Brackish (1-8 ppt)				Bay (>8 ppt)			
			Delaware River (above River Mile 133)		Other Rivers and Streams (below River Mile 133)			Approximately River Mile 82 to 133				Approximately River Mile 58 to 82				Approximately River Mile 0 to 58			
			Main Channel	Tributaries to Delaware River (e.g., Lehigh)	Schuylkill River & Its Tributaries	Christina River & Its Tributaries	Other Tributaries	Main Channel	Shallow Subtidal	Intertidal Edges, Shorelines	Wetlands	Main Channel	Shallow Subtidal	Intertidal Edges, Shorelines	Wetlands	Main Channel	Shallow Subtidal	Intertidal Edges, Shorelines	Wetlands
Aquatic	Pelagic	Physical	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a	17a
		Chemical	1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b	12b	13b	14b	15b	16b	17b
		Biological	1c	2c	3c	4c	5c	6c	7c	8c	9c	10c	11c	12c	13c	14c	15c	16c	17c
	Benthic	Physical	1d	2d	3d	4d	5d	6d	7d	8d	9d	10d	11d	12d	13d	14d	15d	16d	17d
		Chemical	1e	2e	3e	4e	5e	6e	7e	8e	9e	10e	11e	12e	13e	14e	15e	16e	17e
		Biological	1f	2f	3f	4f	5f	6f	7f	8f	9f	10f	11f	12f	13f	14f	15f	16f	17f
Terrestrial	Tidal Buffers*								8g	9g			12g	13g			16g	17g	
	Riparian Buffers**		1h	2h	3h	4h	5h												
	Watershed Uplands**		1i	2i	3i	4i	5i			8i	9i			12i	13i			16i	17i
Socioeconomic			1j	2j	3j	4j	5j	6j	7j	8j	9j	10j	11j	12j	13j	14j	15j	16j	17j

Suction boat seed reharvest



Measuring barges



Water cannons planting shell



Water cannons planting shell



Is it Working?



Summary of '05 & '06 Program:

- 2005 plantings enhanced recruitment 'bay-wide' by 10 percent, despite planting only 100 acres.
- Despite bay-wide low recruitment, the 2006 NJ plantings enhanced recruitment by a factor of 1.34.
- Shell plants provided 26 percent of the total 2006 recruitment on NJ's beds.
- Pilot scale NJDEP shell plant demonstrated a >\$50:1 cost-benefit.
- Current multiple year harvest projections, while often tenuous, have the potential to significantly increase future commercial harvests.

Final Thoughts

- Ocean Commission: Adopt a Regional Approach; Managing Coasts and their Watersheds
- Need to manage as system: connect land and water governance structures, resource management compartments, and link to existing decision-making systems (CZMPs; NEPs; RBCs; Fishery Commissions)
- Regional Collaboration/Partnerships/Leveraging
- Strengthen Linkages between Science and Management
- Grow the monitoring infrastructure and link to improved indicators and goals
- Visualization and Analysis Tools