Non-Tidal Passaic River Basin Water Quality Trading Project

NJWEA 92nd Annual Conference

Atlantic City, NJ

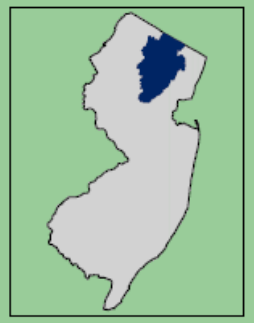
May 3, 2007

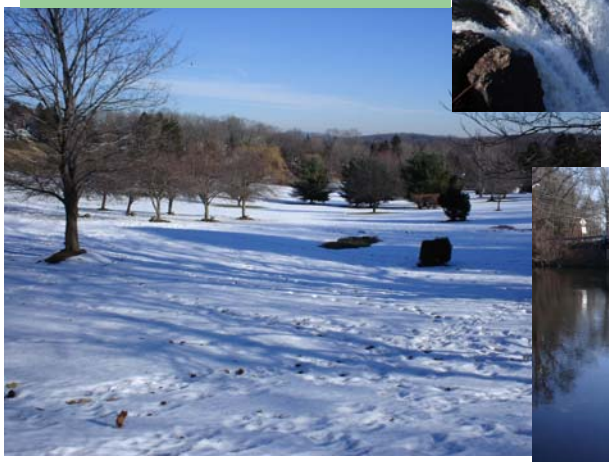
USEPA Targeted Watershed Grant Program

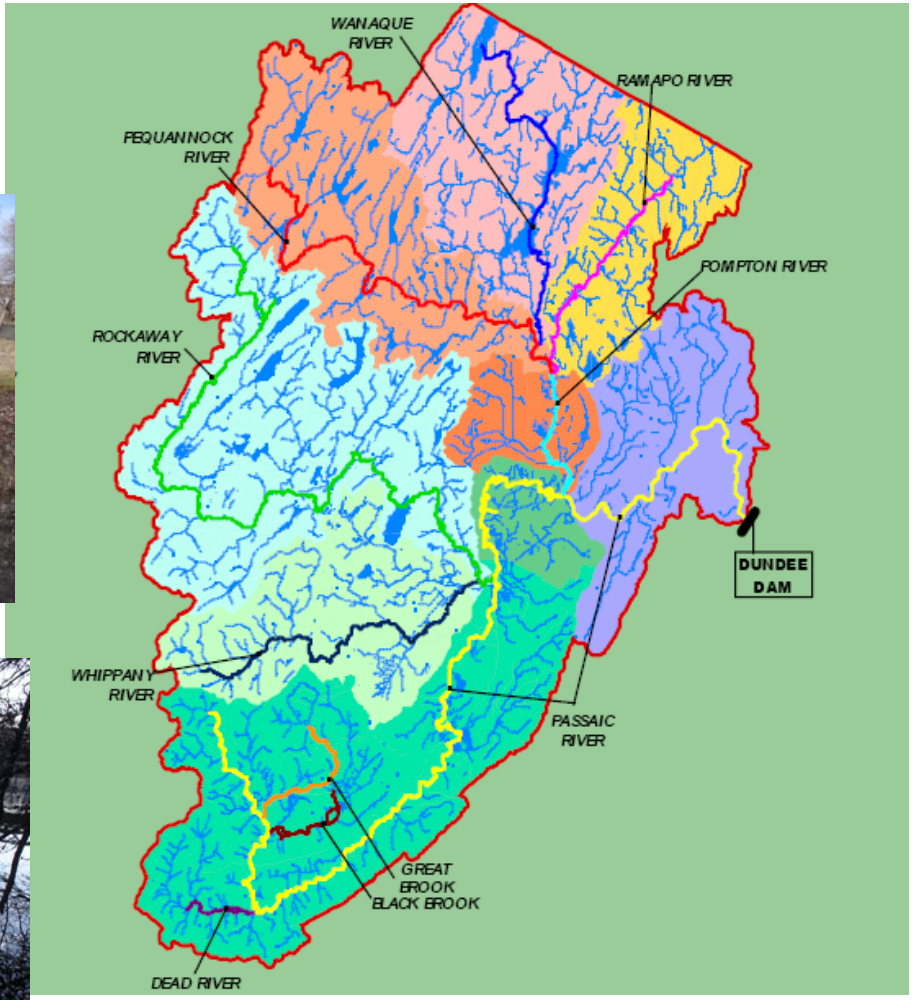
Passaic Trading Project

A watershed diverse in physical and socioeconomic features

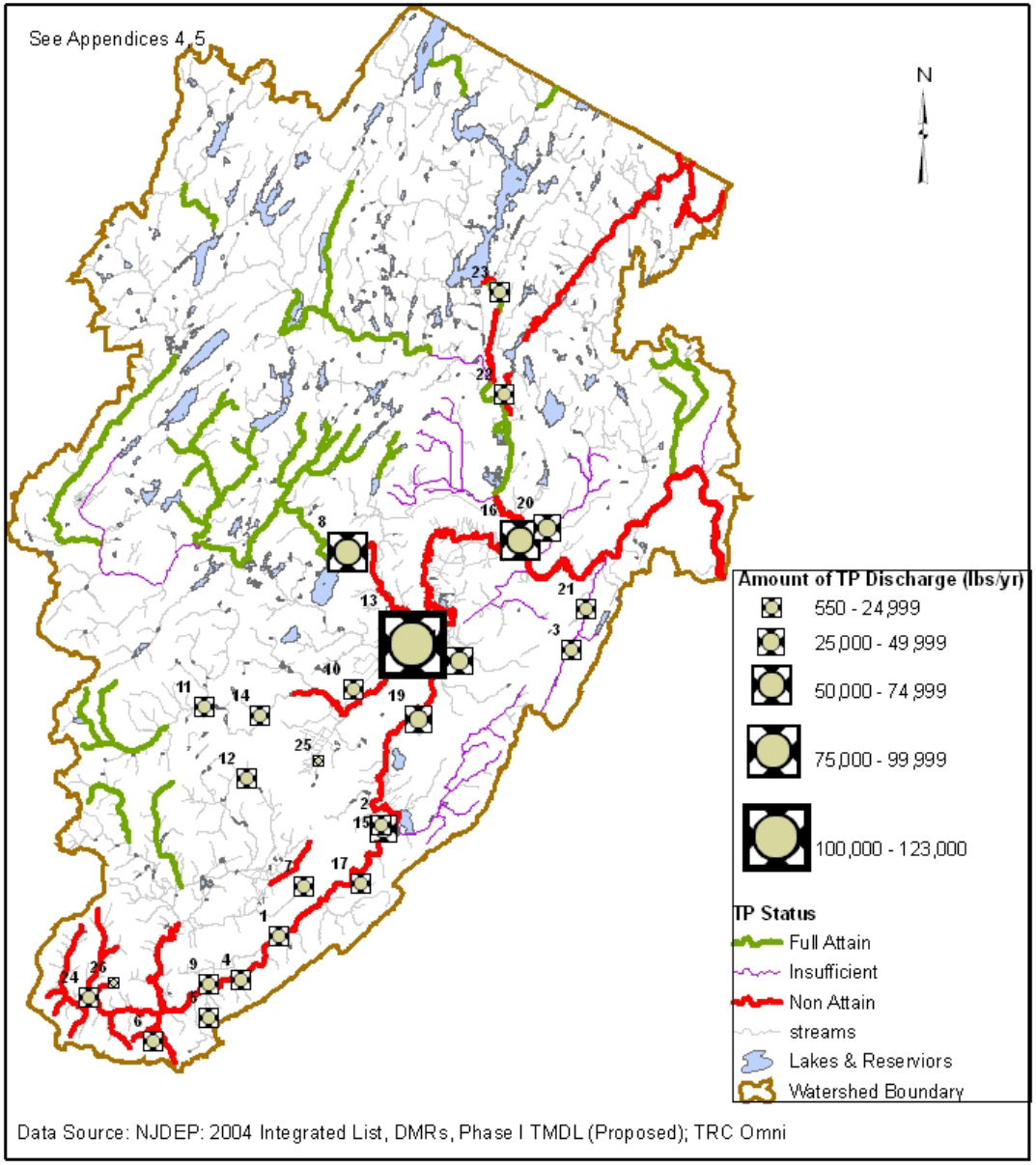
Non-Tidal Passaic River Basin

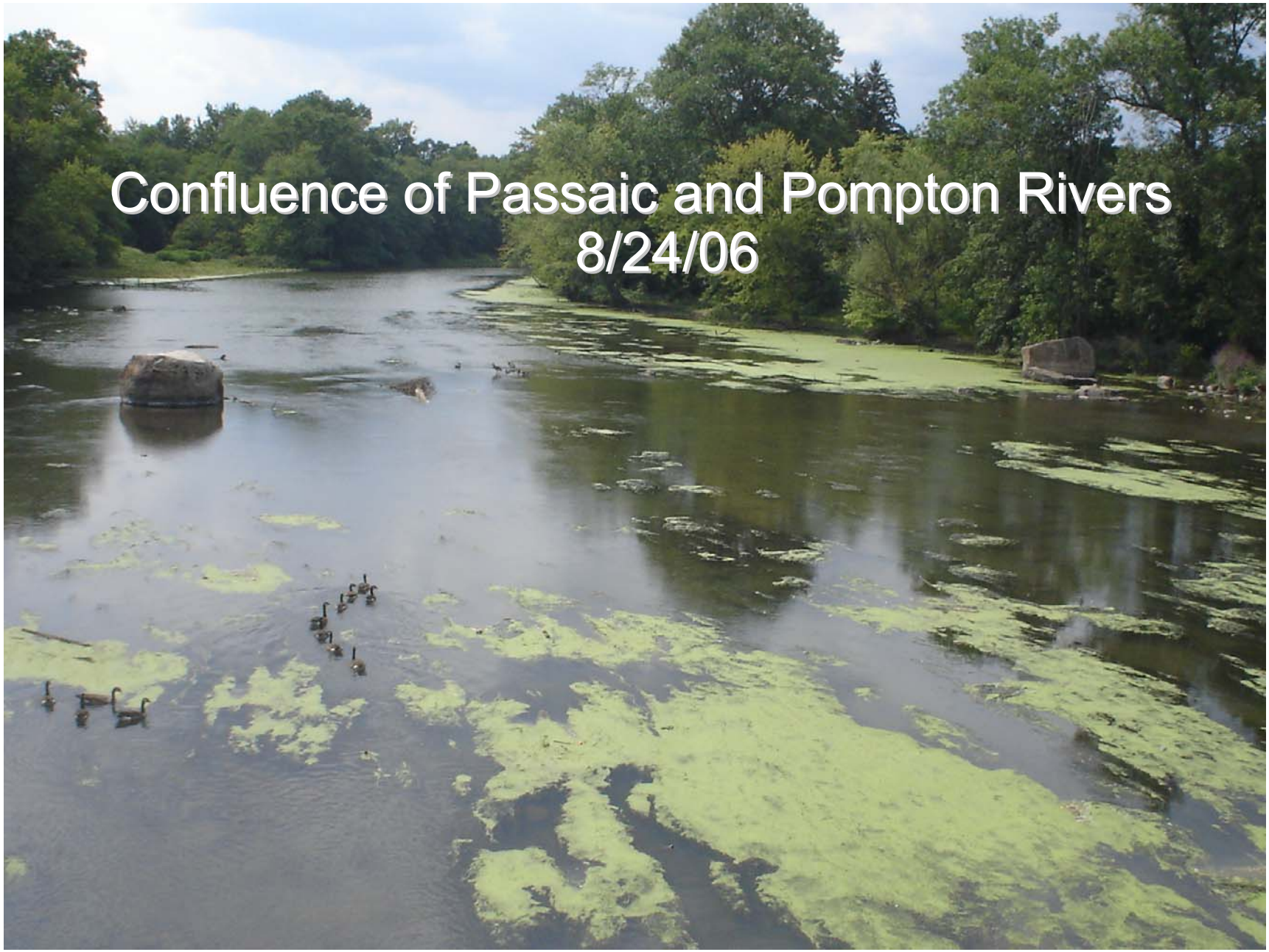






Phosphorus Impaired Streams & WWTP Loads




Confluence of Passaic and Pompton Rivers
8/24/06

Project Goal

- Develop, implement, and evaluate a Water Quality Trading program for Non-tidal Passaic River Watershed that:
  - *Adheres to USEPA policy on Water Quality Trading*
  - *Meets NJDEP requirements*
  - *Implements TMDL*
  - *Reduces cost of compliance with Clean Water Act*
  - *Establishes incentives for voluntary reductions that could also achieve ancillary environmental benefits such as expedited load reductions*

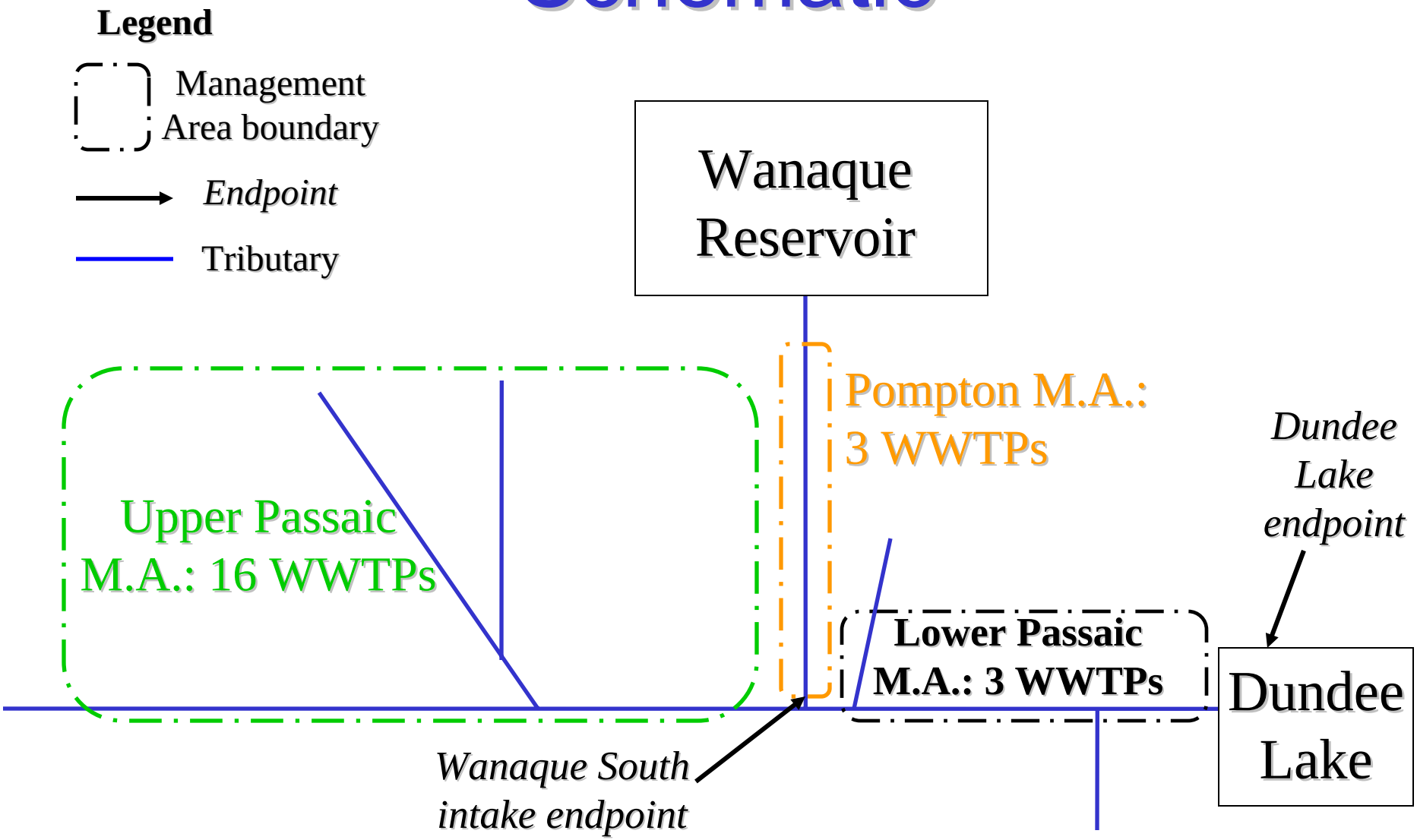
Trading Framework

- What are the restrictions on trading necessary to protect and improve water quality?
- Framework must:
  - Ensure hot spot avoidance
  - Address watershed-specific features (i.e., diversions, potential TMDL endpoints)
  - Minimize transaction costs
  - Maximize cost-effectiveness

Trading Framework

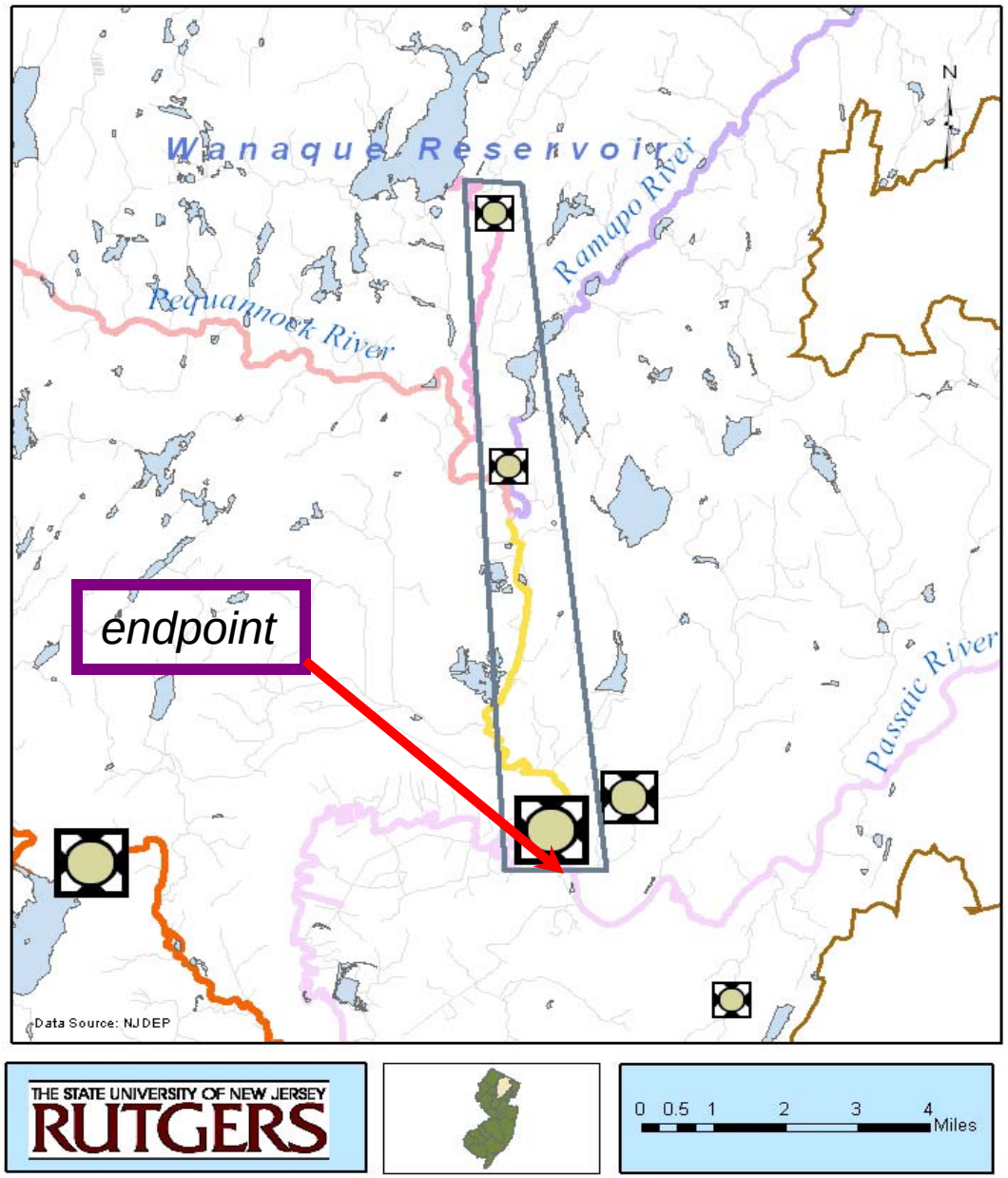
- Aims to protect TMDL endpoints; assumes excessive P is only a water quality concern at the TMDL endpoints
- Group WWTPs into “management areas”. A management area is bounded by a TMDL endpoint. **Management area is designed to protect TMDL endpoints**.
  - *Within the management area, buyers and sellers can trade bidirectionally. For trades between management areas, seller must be upstream.*
  - Apply trading ratio

Schematic


Legend
Management Area boundary
Endpoint
Tributary
Wanaque Reservoir
Pompton M.A.: 3 WWTPs
Upper Passaic M.A.: 16 WWTPs
Lower Passaic M.A.: 3 WWTPs
Dundee Lake endpoint
Dundee Lake
Wanaque South intake endpoint

Pompton Management Area

- Endpoint is Wanaque South Intake
- Endpoint is only hot spot concern in the Pompton Management Area
- 3 WWTPs with total 12.5 MGD capacity
- WWTP discharge is attenuated as it flows toward endpoint



Passaic Trading Table
3 Management Areas & 2 Endpoints

Buyer / Seller	Upper Passaic MA	Pompton MA	Lower Passaic MA
Upper Passaic MA	Yes	No	Yes
Pompton MA	Yes	Yes	Yes
Lower Passaic MA	No	No	Yes

Passaic Trading Table

- How was the trading table developed?
  - Analyzed 3 scenarios: No Diversion, Diversion, Extreme Diversion
  - Selected most conservative options from each scenario to create the final table
  - Trading table is protective of water quality under **all** scenarios

Passaic Trading Table
No Diversion Scenario

Buyer / Seller	Upper Passaic MA	Pompton MA	Lower Passaic MA
Upper Passaic MA	Yes	Yes	Yes
Pompton MA	Yes	Yes	Yes
Lower Passaic MA	Yes	Yes	Yes

Passaic Trading Table
Diversion Scenario

Buyer / Seller	Upper Passaic MA	Pompton MA	Lower Passaic MA
Upper Passaic MA	Yes	No	Yes
Pompton MA	Yes	Yes	Yes
Lower Passaic MA	Yes	No	Yes

Passaic Trading Table
Extreme Diversion Scenario

Buyer / Seller	Upper Passaic MA	Pompton MA	Lower Passaic MA
Upper Passaic MA	Yes	Yes	Yes
Pompton MA	Yes	Yes	Yes
Lower Passaic MA	No	No	Yes

Passaic Trading Table
3 Management Areas & 2 Endpoints

Buyer / Seller	Upper Passaic MA	Pompton MA	Lower Passaic MA
Upper Passaic MA	Yes	No	Yes
Pompton MA	Yes	Yes	Yes
Lower Passaic MA	No	No	Yes

Credits

- Transactions will be in terms of mass (lbs or kg)
- Calculating credits:
  - Credits = (0.4 mg/l **LTA** – Actual mg/l **LTA**)*(permitted flow)
  - Using LTA because TMDL allocations are based on LTA
- Recommend that trades occur based on credits accumulated *annually*
- No banking of credits
- Table of trading ratios will guide buyers and sellers in equalizing the amount of pounds traded
  - Ex. *A trading ratio of 0.5 means that the seller must generate 1 pound of credits for every half- pound the buyer needs.*

Example of trading ratio table

(Based on No Diversion and Diversion Scenarios)

Buyer / Seller	Bernards Twp (UP MA)	Caldwell (UP MA)	Wayne Twp (LP MA)
Rockaway Valley (UP MA)	0.84	0.82	0.66
Parsippany-Troy Hills (UP MA)	0.92	0.90	0.72
Wanaque Valley (PO MA)	0.82	0.74	0.59
Verona (LP MA)	0	0	0.98

Derivation of trading ratios

- Consultant (Omni Environmental) performed attenuation coefficient analysis using calibrated model
- Considered “no diversion” and “diversion” scenarios, WY2001 conditions
- Calculated attenuation of TP load from each WWTP as load moves downstream
- Result: “Zonal attenuation coefficient” or ZAC for each WWTP

Derivation of trading ratios (cont.)

- Trading ratio = (Seller ZAC/Buyer ZAC), relative to common endpoint.
  - For “no diversion” and “diversion” scenarios, Dundee Lake is common endpoint
  - For “extreme diversion” scenarios, Wanaque South intake is common endpoint for Upper Passaic MA and Pompton MA.
  - Maximum trading ratio = 1.0
- Calculate trading ratio for each scenario,and select lowest ratio; max protection for WQ

Derivation of trading ratios: example

- Seller: Rockaway Valley
  - ZAC at Dundee Lake = 0.56, diversion
  - ZAC at Dundee Lake = 0.64, no diversion
- Buyer: Wayne Twp
  - ZAC at Dundee Lake = 0.85, diversion
  - ZAC at Dundee Lake = 0.92, no diversion
- Trading ratio = (Seller ZAC/Buyer ZAC)
  - Diversion, trading ratio = **0.66** = 0.56/0.85
  - No diversion, trading ratio = **0.70** = 0.64/0.92
  - Select 0.66 as trading ratio

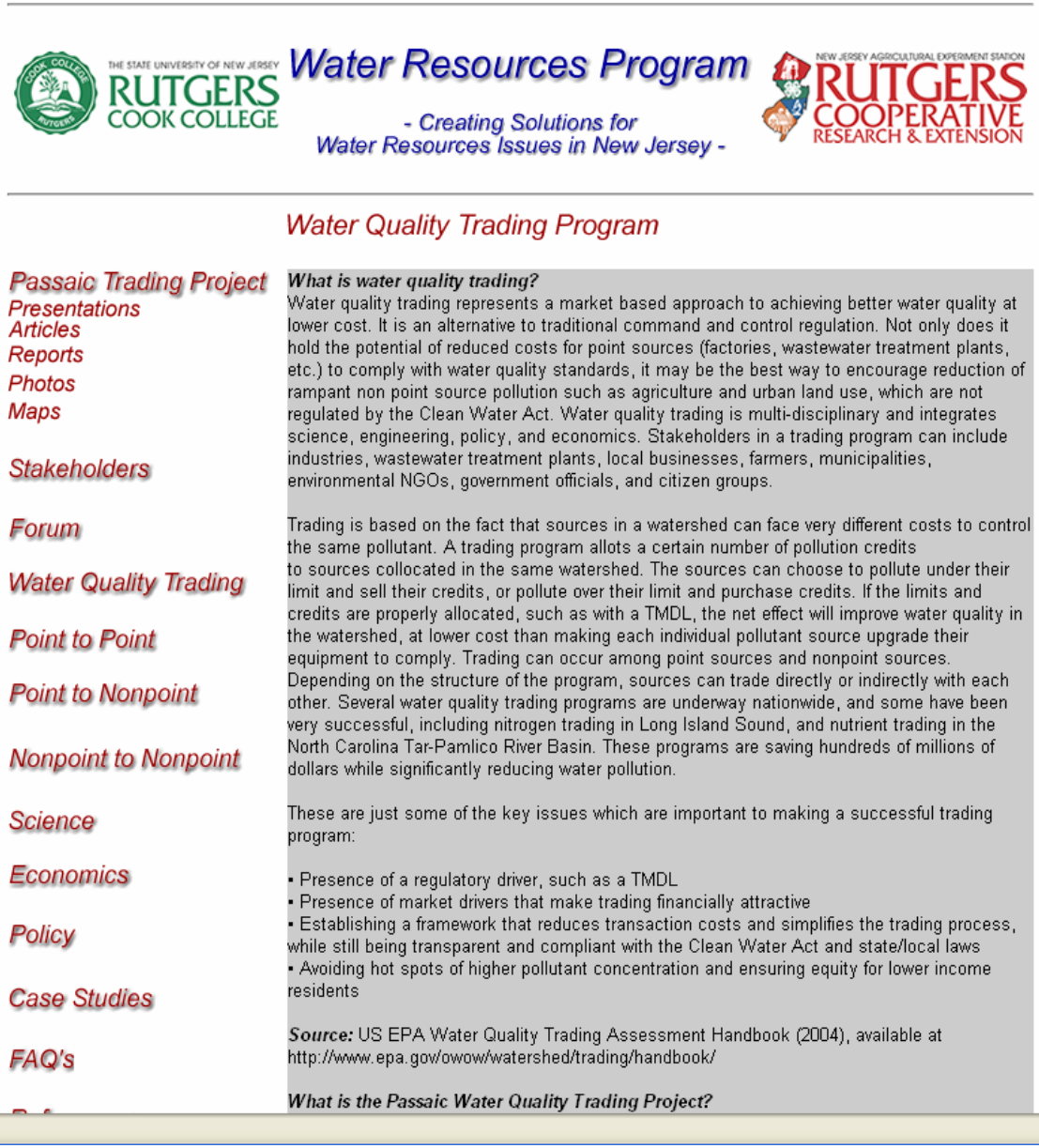
Example trade

- Buyer: Plant X
  - Permitted limit based on 0.4 mg/l **LTA**
  - Year 1: Actual LTA = 1.055 mg/l **LTA**
  - Permitted flow = 10 MGD
  - **Credits** = (0.4 mg/l LTA – 1.055 mg/l LTA) * 10 MGD * 365 days = **-9050 kg**
- Seller: Plant Z
  - Permitted limit based on 0.4 mg/l **LTA**
  - Actual LTA = 0.105 mg/l **LTA**
  - Permitted flow = 8 MGD
  - **Credits** = (0.4 mg/l LTA – 0.105 mg/l LTA) * 8 MGD * 365 days = **3260 kg**
- **Trading ratio = 0.66**
- **Plant X needs to buy 9050 kg**
- **Plant Z can sell 0.66 *3260 kg = 2150 kg**
- **Plant X would still need to buy 6900 kg from other plants to comply with its permit**

Schedule

Project Focus	Mar-May 2007	Jun-Aug 2007	Sep-Dec 2007	Jan-Aug 2008
Education/Outreach			Second Symposium	
Trading Program Development	Finalize trading ratios	Water quality modeling scenario analysis	Incorporate monitoring strategies and admin component into evaluation matrix	
	Report on various trading scenarios	Identify measurements of program success	Add trade tracking capability to website	
		Trading scenario evaluation matrix	Report of trading program for distr. to public	
			QAPP submittal to NJDEP and USEPA	
Implementation and Evaluation				Documentation of trades and resulting pounds of TP removed from trades
				Quarterly water quality report
				Final Report
				Closeout

http://www.water.rutgers.edu/Projects/trading/WQTrading.htm



THE STATE UNIVERSITY OF NEW JERSEY RUTGERS COOK COLLEGE

Water Resources Program

- Creating Solutions for Water Resources Issues in New Jersey -

NEW JERSEY AGRICULTURAL EXPERIMENT STATION RUTGERS COOPERATIVE RESEARCH & EXTENSION

Water Quality Trading Program

Passaic Trading Project
Presentations
Articles
Reports
Photos
Maps

Stakeholders

Forum

Water Quality Trading

Point to Point

Point to Nonpoint

Nonpoint to Nonpoint

Science

Economics

Policy

Case Studies

FAQ's

What is water quality trading?

Water quality trading represents a market based approach to achieving better water quality at lower cost. It is an alternative to traditional command and control regulation. Not only does it hold the potential of reduced costs for point sources (factories, wastewater treatment plants, etc.) to comply with water quality standards, it may be the best way to encourage reduction of rampant non point source pollution such as agriculture and urban land use, which are not regulated by the Clean Water Act. Water quality trading is multi-disciplinary and integrates science, engineering, policy, and economics. Stakeholders in a trading program can include industries, wastewater treatment plants, local businesses, farmers, municipalities, environmental NGOs, government officials, and citizen groups.

Trading is based on the fact that sources in a watershed can face very different costs to control the same pollutant. A trading program allots a certain number of pollution credits to sources collocated in the same watershed. The sources can choose to pollute under their limit and sell their credits, or pollute over their limit and purchase credits. If the limits and credits are properly allocated, such as with a TMDL, the net effect will improve water quality in the watershed, at lower cost than making each individual pollutant source upgrade their equipment to comply. Trading can occur among point sources and nonpoint sources. Depending on the structure of the program, sources can trade directly or indirectly with each other. Several water quality trading programs are underway nationwide, and some have been very successful, including nitrogen trading in Long Island Sound, and nutrient trading in the North Carolina Tar-Pamlico River Basin. These programs are saving hundreds of millions of dollars while significantly reducing water pollution.

These are just some of the key issues which are important to making a successful trading program:

- Presence of a regulatory driver, such as a TMDL
- Presence of market drivers that make trading financially attractive
- Establishing a framework that reduces transaction costs and simplifies the trading process, while still being transparent and compliant with the Clean Water Act and state/local laws
- Avoiding hot spots of higher pollutant concentration and ensuring equity for lower income residents

Source: US EPA Water Quality Trading Assessment Handbook (2004), available at http://www.epa.gov/owow/watershed/trading/handbook/

What is the Passaic Water Quality Trading Project?

Done

Questions?