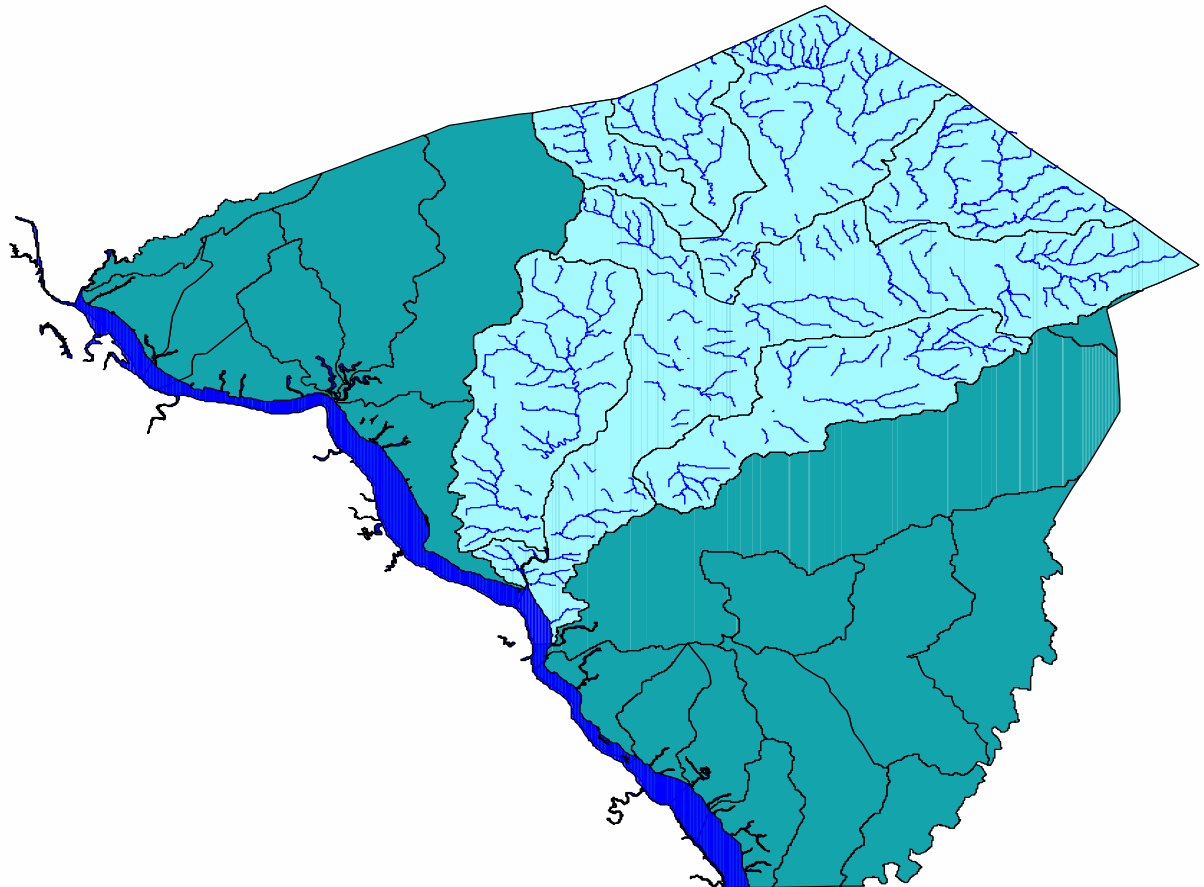


Nutrient Trading in Pennsylvania



Who Is Looking at Water Quality Trading?

16 “active” programs
Few trades



What is Nutrient Trading?

- ◆ Exchange of pollution reduction credits between sources to meet regulatory objectives or water quality goals
- ◆ Market driven approach to environmental management that can enhance options available to reduce pollutant loadings

Why Nutrient Trading?

- ◆ **To achieve early reductions & progress towards meeting water quality standards.**
- ◆ **Establish economic incentives for voluntary reductions from all sources.**
- ◆ **Reduce cost of compliance with water quality-based requirements.**
- ◆ **Offset new or increased discharges resulting from growth in order to maintain levels of water quality.**
- ◆ **Achieving greater environmental benefits than those under existing regulatory programs.**

Why Nutrient Trading? (con't)

- ◆ **Combing ecological services to achieve multiple environmental & economic benefits, such as stormwater management, wetland restoration, or the implementation of management practices that improve water quality, habitat, & community infrastructure.**
- ◆ **Reducing the cost of implementing tributary strategies, TMDL's, or other activities resulting from agreements such as the Chesapeake Bay 2000 Agreement.**

What May be Traded?

- ◆ **Total phosphorous reduction credits (lbs/yr)**
- ◆ **Total nitrogen reduction credits (lbs/yr)**
- ◆ **Sediment reduction credits (lbs/yr)**

Who May Trade?

- ◆ **Point sources, nonpoint sources or third parties can participate in trading. Any entity may create, purchase, retire or otherwise use credits for the purpose of securing long-term improvements in water quality.**
- ◆ **As a buyer, you pay or otherwise arrange for someone else to meet or exceed your environmental obligation**
- ◆ **As a seller, you exceed your own environmental obligation and benefit from it**

Steps for Conducting a Trade

1. Determine if the Baseline & Threshold of eligibility has been reached.
2. Determine if there is a need/generation of credits.
3. Find a trading partner.
4. Enter into a trade for credits.
5. Register credits on DEP website.
(Nutrient Net Trading Tool)

Baseline Requirements (Agriculture Example)

- ◆ **Compliance with Act 38 Nutrient Management Regulations, Chapter 102 E&S Regulations, Chapter 91.36 (Ag. Operations), & chapter 92 (CAFOs) as applicable.**
- ◆ **Compliance can be determined through a site visit OR verification of the development & implementation of a Nutrient Management Plan, E&S Plan, Conservation Plan, as well as a Manure Management Plan, as applicable.**
- ◆ **Compliance must be verified by DEP, Conservation District, or other agent approved by DEP.**

Threshold Requirements (Agriculture Example)

- ◆ 100 Foot setback or equivalent; this is achieved when **ONE of the following** is met:
 1. Manure is not applied within 100 ft of surface water
 2. There are no surface waters on or within 100 ft of farm
 3. Farm uses no manure application & applies commercial fertilizer at or below the recommended agronomic rates

OR

Threshold Requirements (Agriculture Example) (con't)

- ◆ 35 foot buffer or equivalent; this is achieved when **ALL of the following** are met:
 1. A minimum of 35 ft of permanent vegetation is established & maintained between the field & surface water
 2. Area can be grazed or cropped under a specific management plan, & permanent vegetation must be maintained at all times

OR

Threshold Requirements (Agriculture Example) (con't)

◆ 20% Reduction Option

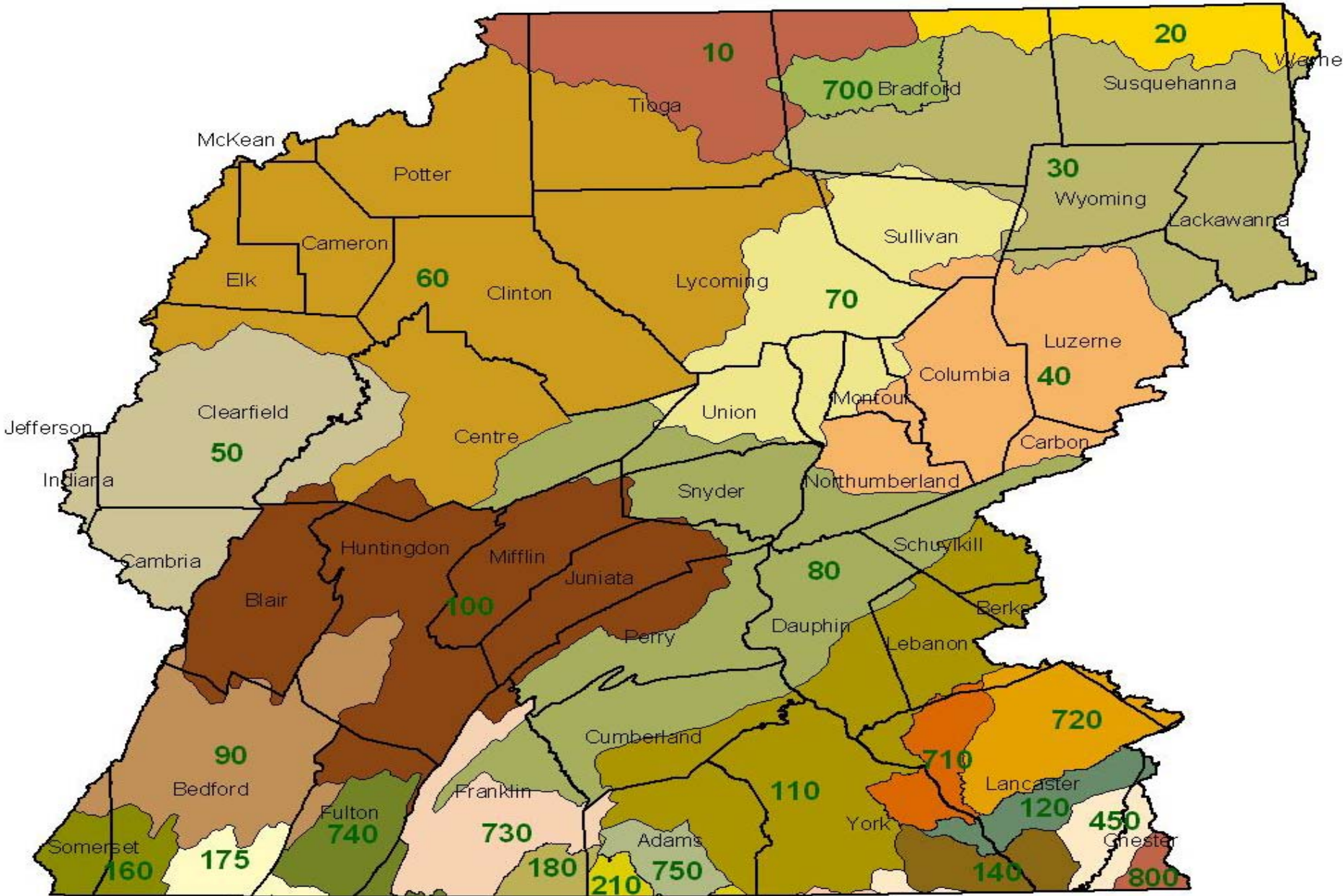
1. A reduction of 20% in the farm's overall nutrient reduction balance beyond baseline compliance

How Much is a Credit Worth?

- ◆ **Depends on Many Factors:**

- 1. Delivery ratio (closer to Bay higher the Ratio)**
- 2. Size of BMP (larger area higher the reduction)**
- 3. Efficiency Rate of Best Management Practice**

Delivery Ratio



Delivery Ratio (con't)

(Examples)

<u>Segment #</u>	<u>Nitrogen Delivery Ratio</u>	<u>Phosphorous Delivery Ratio</u>
120 (Pequea/Mill Cr. Watersheds)	0.980	0.436
140 (Conowingo Watershed)	0.990	0.436
450 (Octoraro Watershed)	1.000	1.000
710 (Chiques Watershed)	0.970	0.436
720 (Conestoga Watershed)	0.891	0.436

Example BMP Efficiencies

(January 2006)

<u>BMP</u>	<u>Total Nitrogen Reduction Efficiency</u>	<u>Total Phosphorous Reduction Efficiency</u>	<u>Sediment Reduction Efficiency</u>
Wetlands	30%	50%	80%
Riparian Forest Buffer (land use conversion + efficiency)	25%	50%	50%
Stream Restoration (load reduction converted to efficiency)	0.02 lbs/ft	0.0035 lbs/ft	2.55 lbs/ft

Example BMP Efficiencies

(January 2006)

<u>BMP</u>	<u>Total Nitrogen Reduction Efficiency</u>	<u>Total Phosphorous Reduction Efficiency</u>	<u>Sediment Reduction Efficiency</u>
Dry Detention Ponds & Hydrodynamic Structures	5%	10%	10%
Dry Extended Detention Ponds	30%	20%	60%
Infiltration Practices	50%	70%	90%
Filtering Practices	40%	60%	85%

Use of Credits in NPDES Permits

- ◆ **Because credits will be used to meet a permit effluent limit, permittees will only be authorized to use credits through the provisions of their NPDES permit. The permit terms & conditions for trades will require appropriate terms such as record keeping, monitoring, & tracking, which will be documented through reporting in the monthly Discharge Monitoring Reports.**
- ◆ **DEP will also ensure the effectiveness & validity of the credits used in NPDES permits. This will include the use of (1) methodologies to calculate credits before approval, (2) verifications processes & requirements, & (3) the credit reserve, all of which are discussed elsewhere in the Policy.**

How Long is a Credit Good For?

- ◆ Credits cannot be banked for future years. For example, if a BMP generates 100 credits each year and has a life span of 5 years, 500 credits cannot be applied to a permit in year five. Credits must be applied in the year that they are generated.
- ◆ A year is considered a “water year” October 1 through September 30.
- ◆ Finally, credits must be verified each year according to a plan created by the buyers and sellers involved in the trade.

Point Source Perspective on Trading

- ◆ **184 Significant sewage treatment plants in the basin**
 - 63 are in the 1st phase
 - 48 are in the 2nd phase
 - 72 are in the 3rd phase

- ◆ **The implementation schedule is as follows:**
 - Oct 1, 2010 - 1st phase
 - Permits extended when renewed - 2nd and 3rd phases

Lancaster County Point Sources

◆ First Phase

- Lancaster City
- Lancaster Area Sewer Authority (LASA)
- Lititz Sewer Authority
- Manheim Borough Sewer Authority
- Ephrata Borough Authority #2
- Ephrata Borough Authority
- Mount Joy Borough Authority
- New Holland Borough
- Elizabethtown Borough

Lancaster County Point Sources

◆ Second Phase

- Columbia Municipal Authority
- Marietta-Donnegal Joint Authority
- Northwestern Lancaster County Authority
- Salisbury Township
- Adamstown Borough Authority

Lancaster County Point Sources

◆ Third Phase

- Quarryville
- Northern Lancaster County Authority
- West Earl Sewer Authority
- Millersville Borough

Lancaster County Point Sources

◆ First Phase

- Combined Average 2010 Flow of 50 MGD
- Combined Design Flow 65 MGD

◆ Second Phase

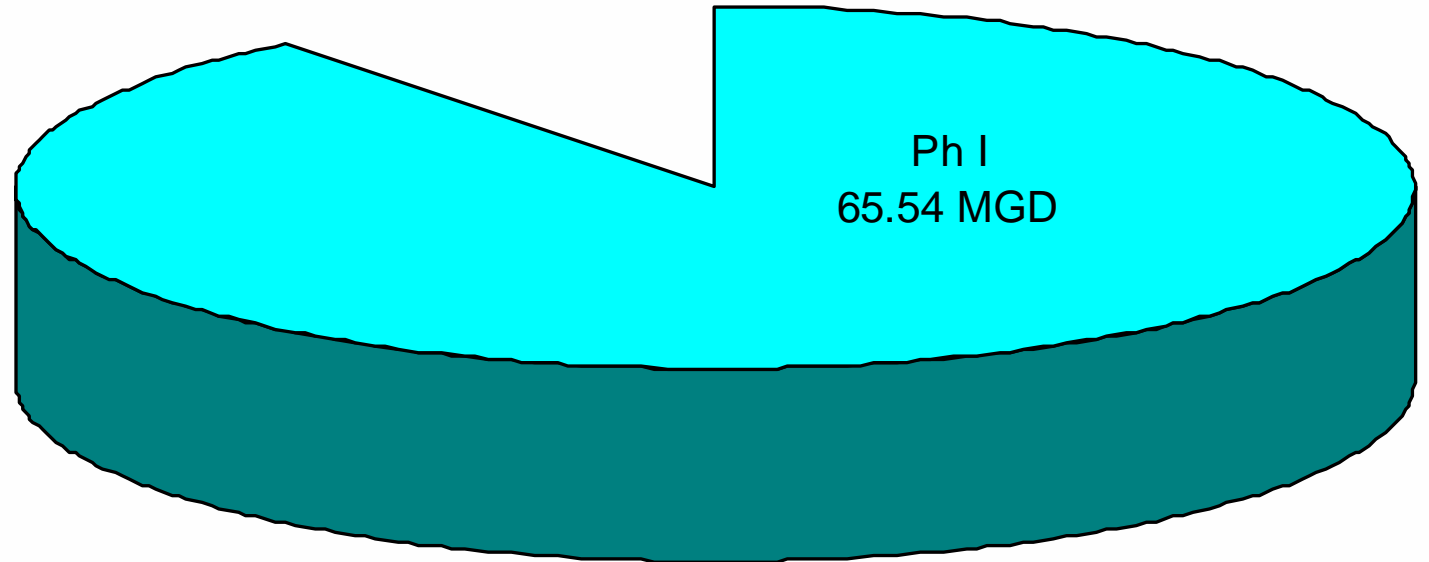
- Combined Average 2010 Flow of 3 MGD
- Combined Design Flow 4.5 MGD

◆ Third Phase

- Combined Average 2010 Flow of 2 MGD
- Combined Design Flow 3 MGD

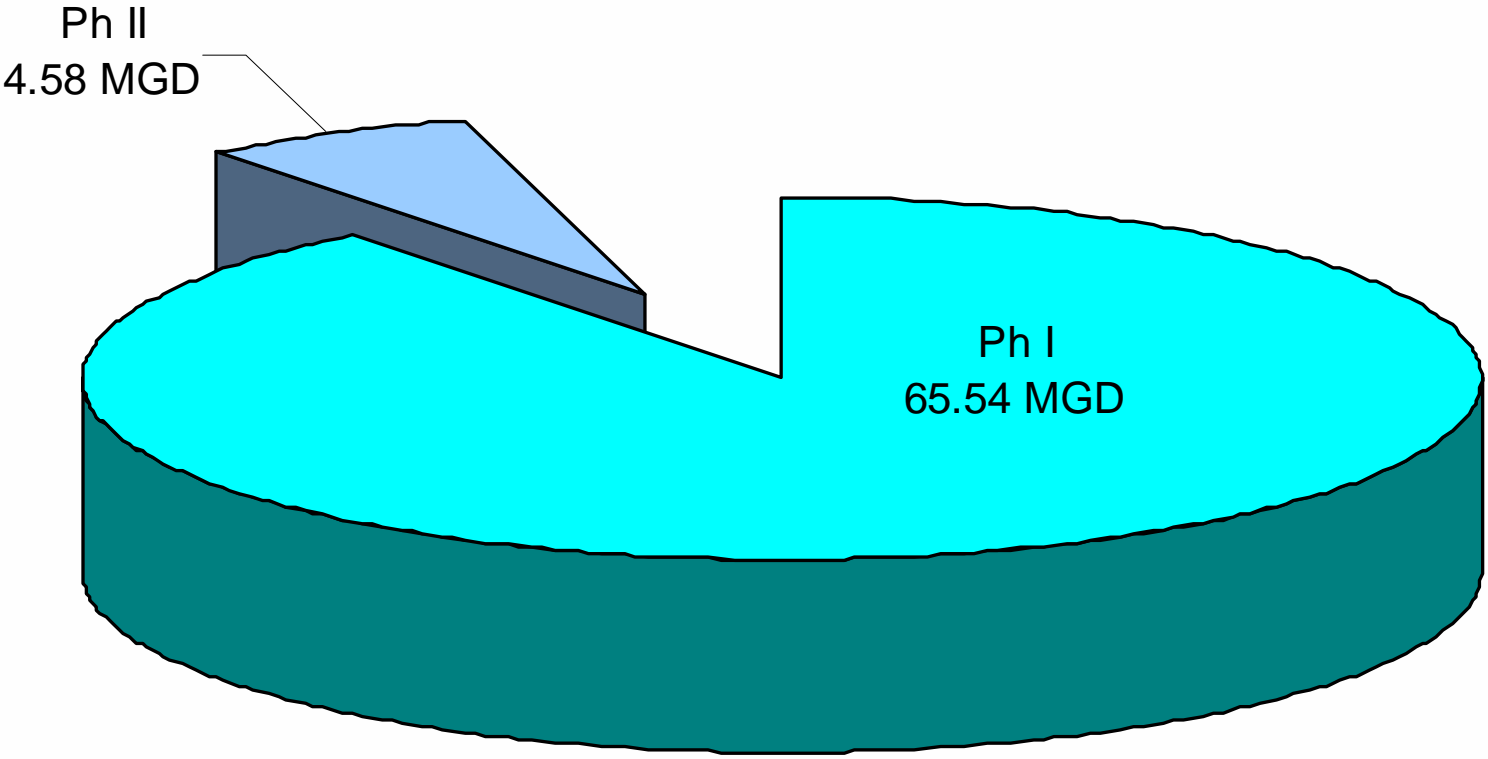
Lancaster County Point Sources

Lancaster County Plants - Design Flow by Phase



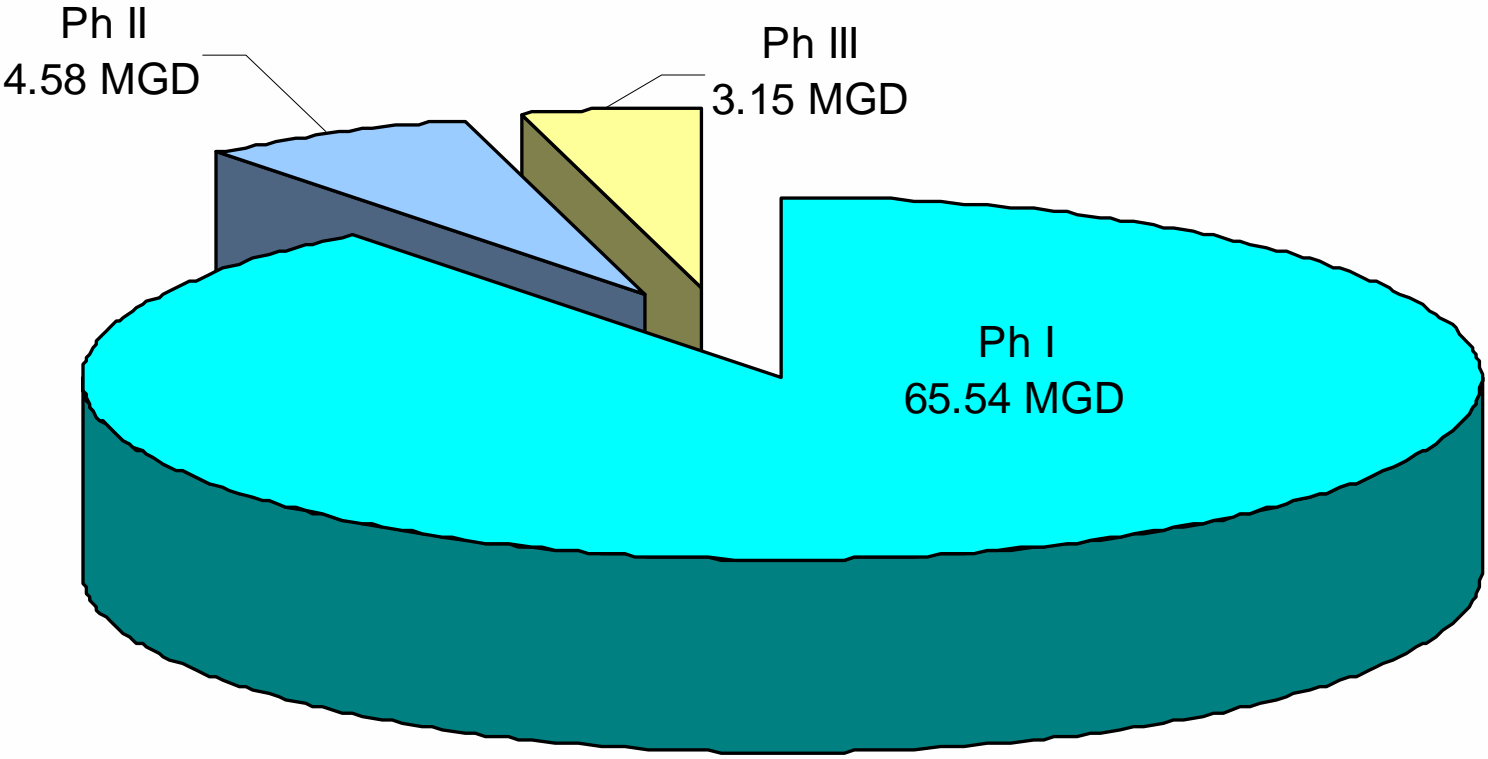
Lancaster County Point Sources

Lancaster County Plants - Design Flow by Phase



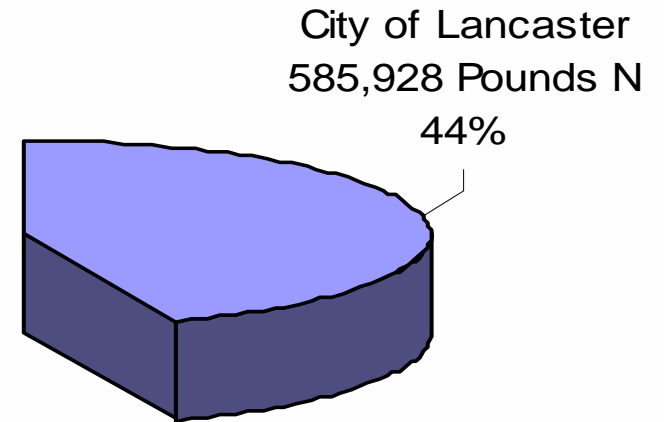
Lancaster County Point Sources

Lancaster County Plants - Design Flow by Phase



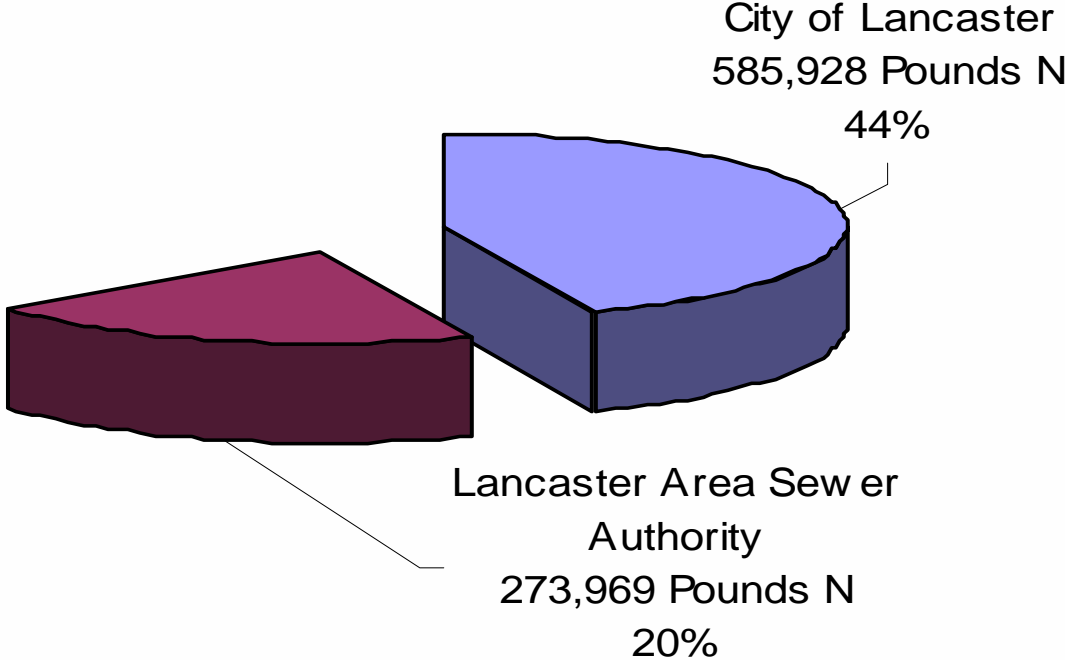
Lancaster County Point Sources

Two largest plants compared to rest of County



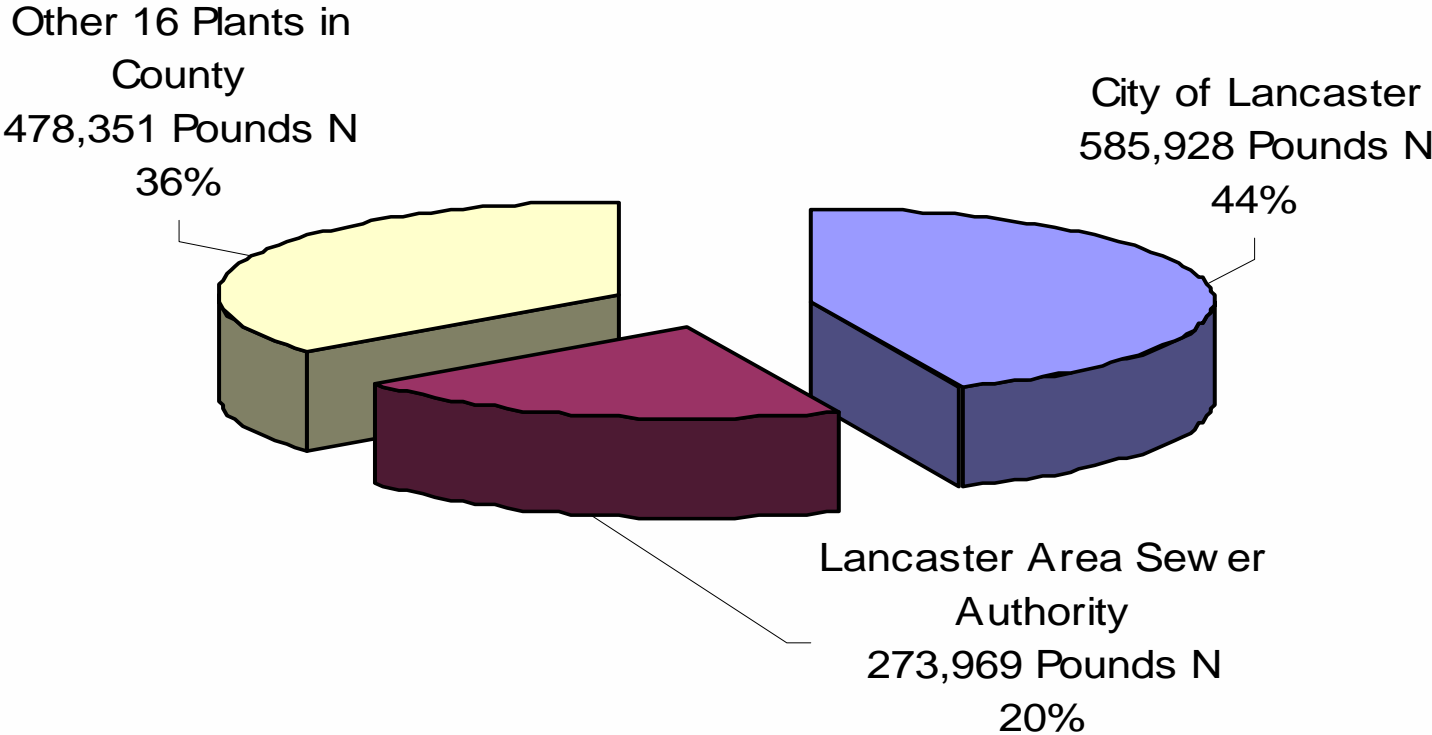
Lancaster County Point Sources

Two largest plants compared to rest of County



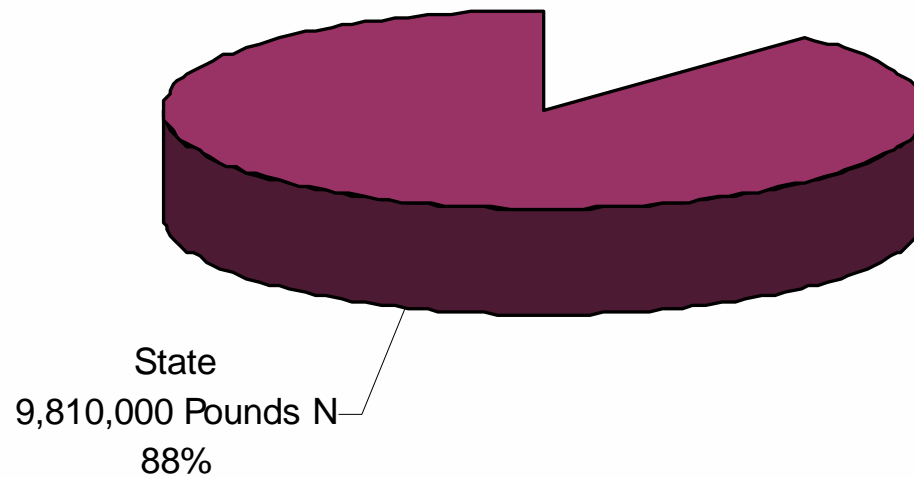
Lancaster County Point Sources

Two largest plants compared to rest of County



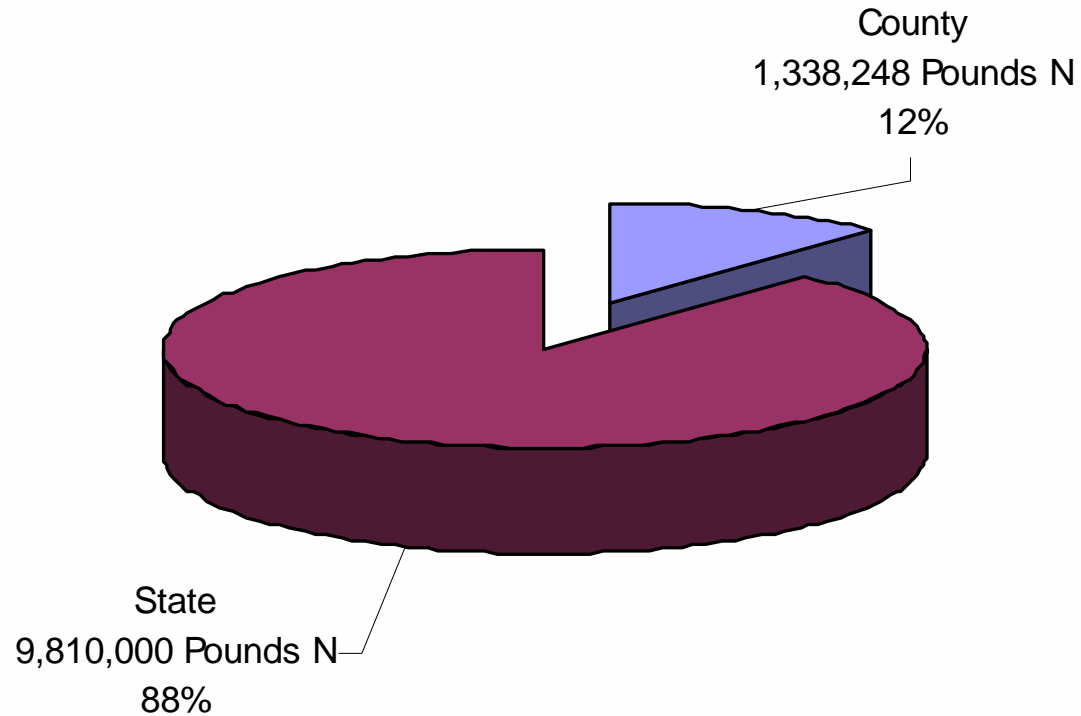
Lancaster County Point Sources

Lancaster County Plants - Share of Statewide N Loading



Lancaster County Point Sources

Lancaster County Plants - Share of Statewide N Loading



Point Source Perspective on Trading

- ◆ **In the short-term point sources will generate credits**
 - Basically no demand until 2010
 - Little demand for credits prior to and immediately after this period, except for new point sources
- ◆ **In the long term point sources may look for credits**
 - Variable demand depending on facility performance and growth

Point Source Perspective on Trading

◆ Pitfalls

- Uncertainty
 - DEP rejected subsection b of point source strategy
 - Annual cash payments in lieu of trading
- Jail - Illegal to purchase under procurement laws for public sector
- Annual “truing” period – effect on market price and demands for credits
- 1-year shelf life of credits vs. 20-year life of capital assets

Point Source Perspective on Trading

◆ Pitfalls

- Liability (“Permittees have some limited responsibility to enforce terms of trade agreement”)
- Act 537 and Planning – how can we allow developers to provide credits without long-term guarantees?
- Point-point trades still subject to 10% reserve
 - DEP will not enforce against non-point generators for weather events, but will for point sources

Point Source Perspective on Trading

◆ Pitfalls

- Sediment credits – no interest from point dischargers - look to REAP or something similar
- Difficulty in dealing with multiple farmers under multiple contracts
- Uncertainty
 - Supply
 - Cost

Point Source Perspective on Trading

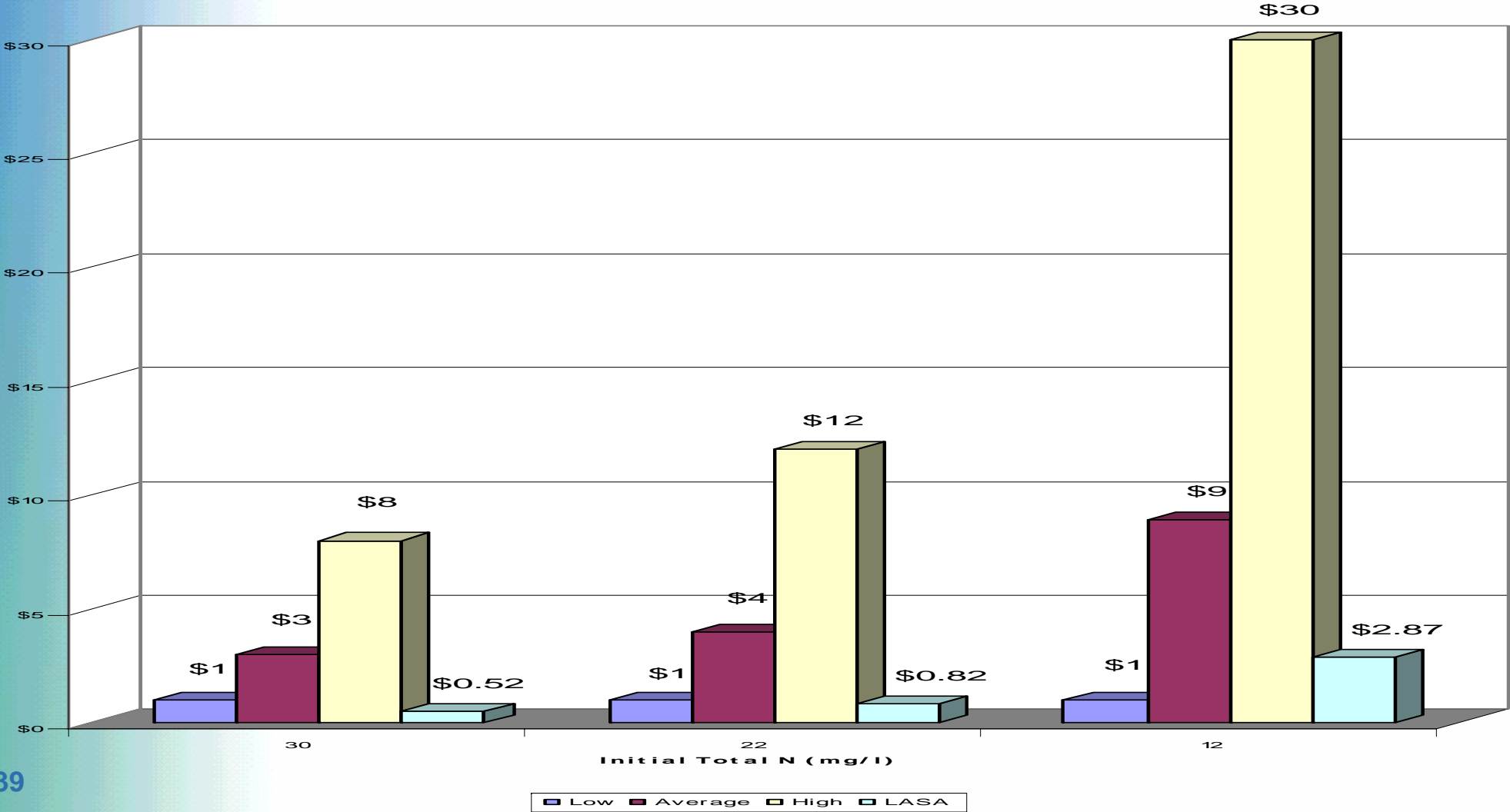
- ◆ **Reality check – potential demand (need) vs. supply**
 - Pfizer project in Lititz generated 5,400 lb/year
 - Assuming no additional treatment, the total need in Lancaster County alone is 2,700,000 lb/year (nearly 500 times)
 - LASA would need 450,000 lbs (85 times)
 - Assuming everyone treats to 8 mg/l, the demand would still be 445,000 lb/year
- ◆ **Either way, the supply may not match the demand**

Point Source Perspective on Trading

- ◆ **How to plan for the future**
 - Infrastructure costs
 - Costs for credits

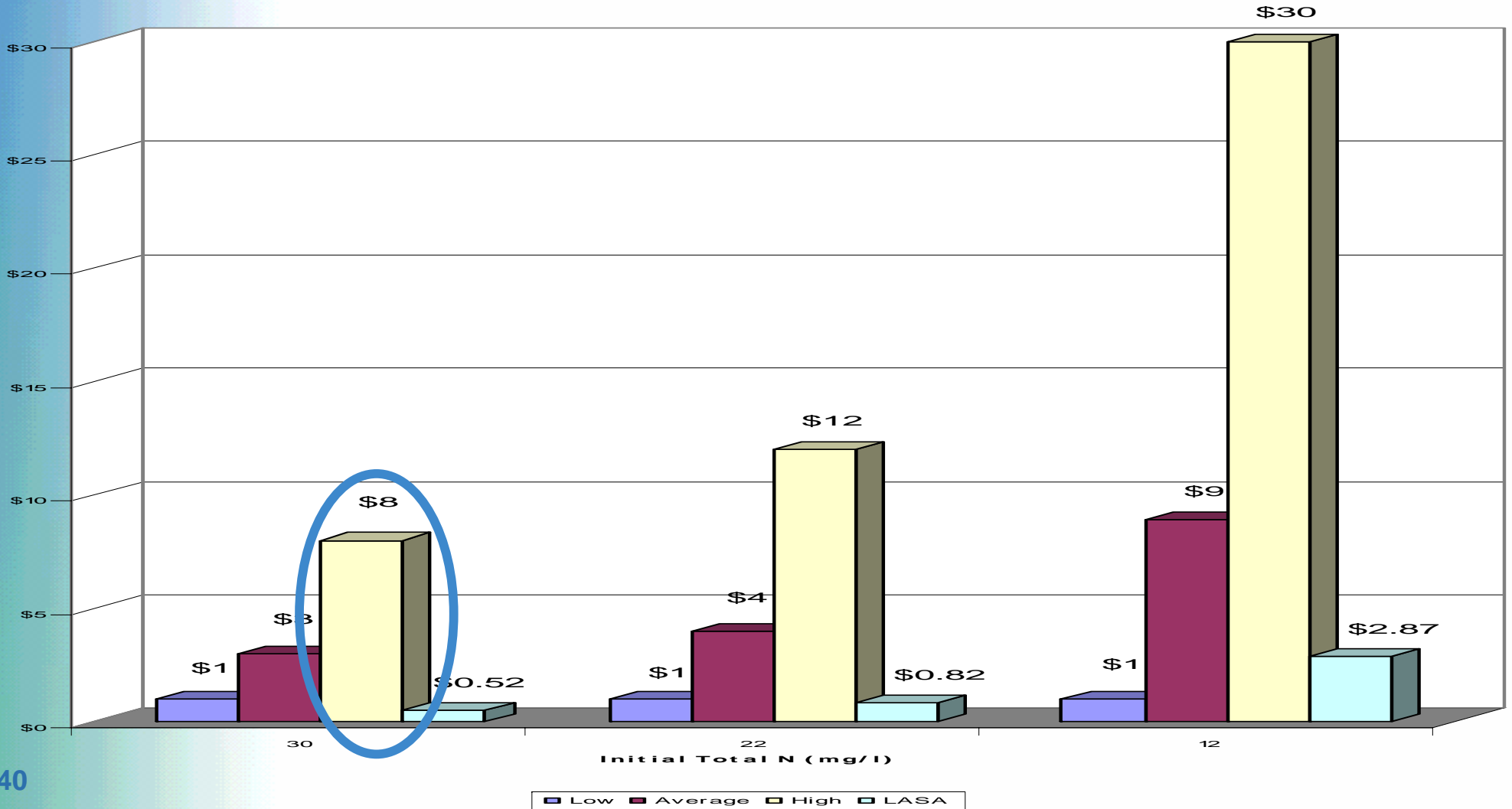
Point Source Perspective on Trading

Annualized Costs to Remove One Pound N



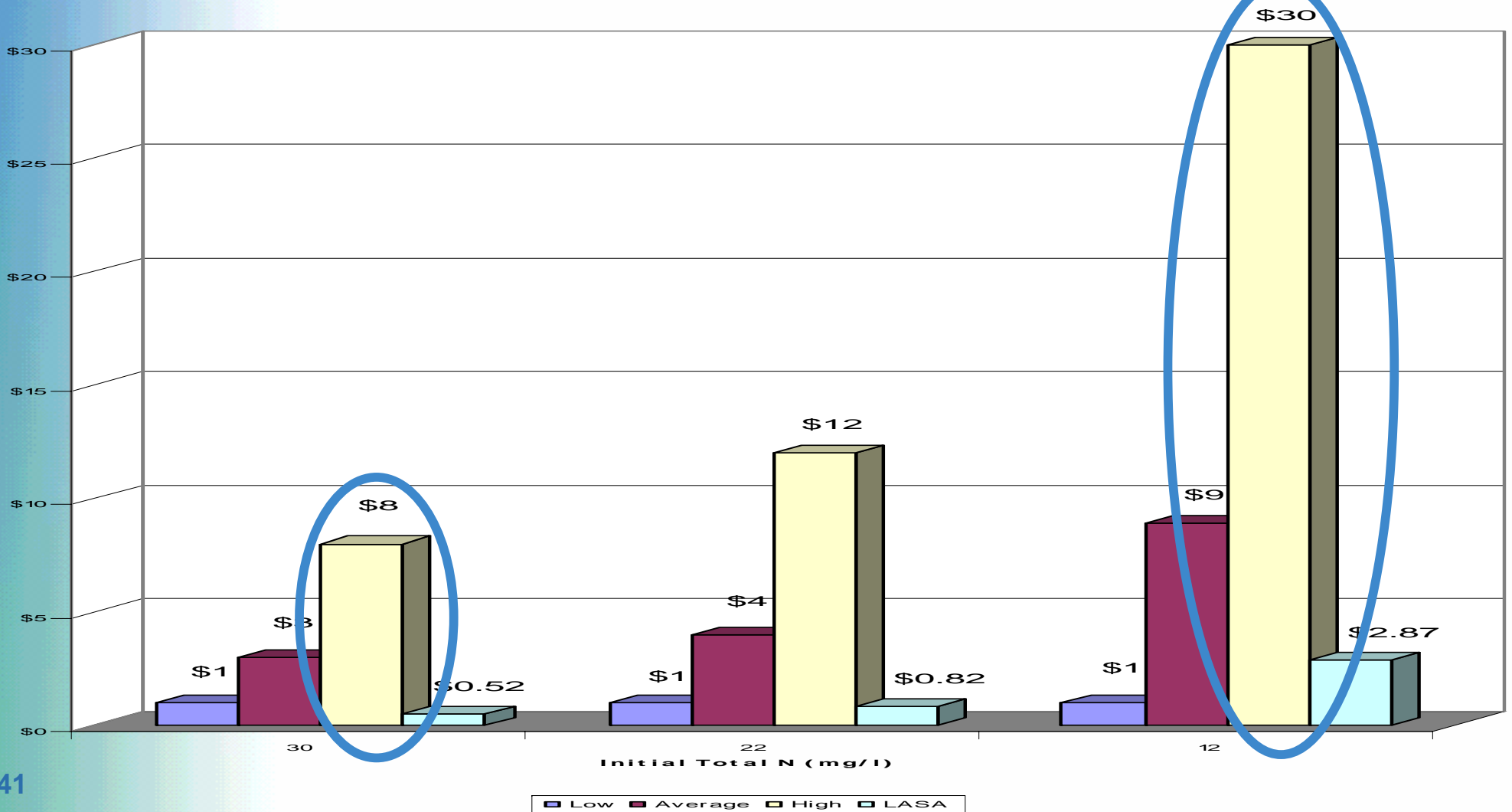
Point Source Perspective on Trading

Annualized Costs to Remove One Pound N



Point Source Perspective on Trading

Annualized Costs to Remove One Pound N



Point Source Perspective on Trading

- ◆ **Cost and long term availability of credits?**
 - Public sector is generally conservative and low tolerance for risk
 - Given two options of varying cost, will generally pick the low risk option despite cost
 - Permit compliance
 - Job security
- ◆ **Results of straw poll**



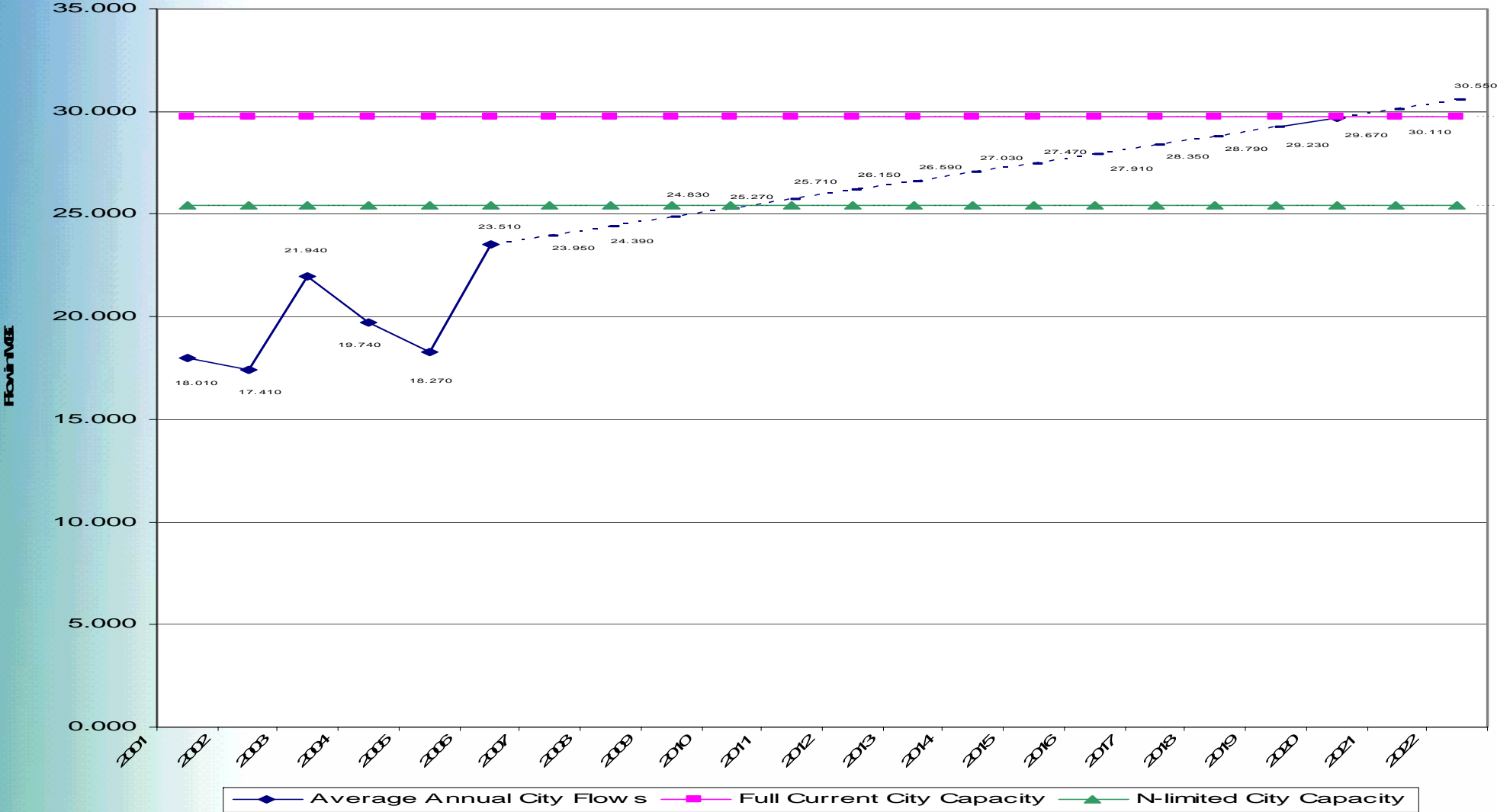
Nutrient Trading in Pennsylvania

Thank you
Questions?



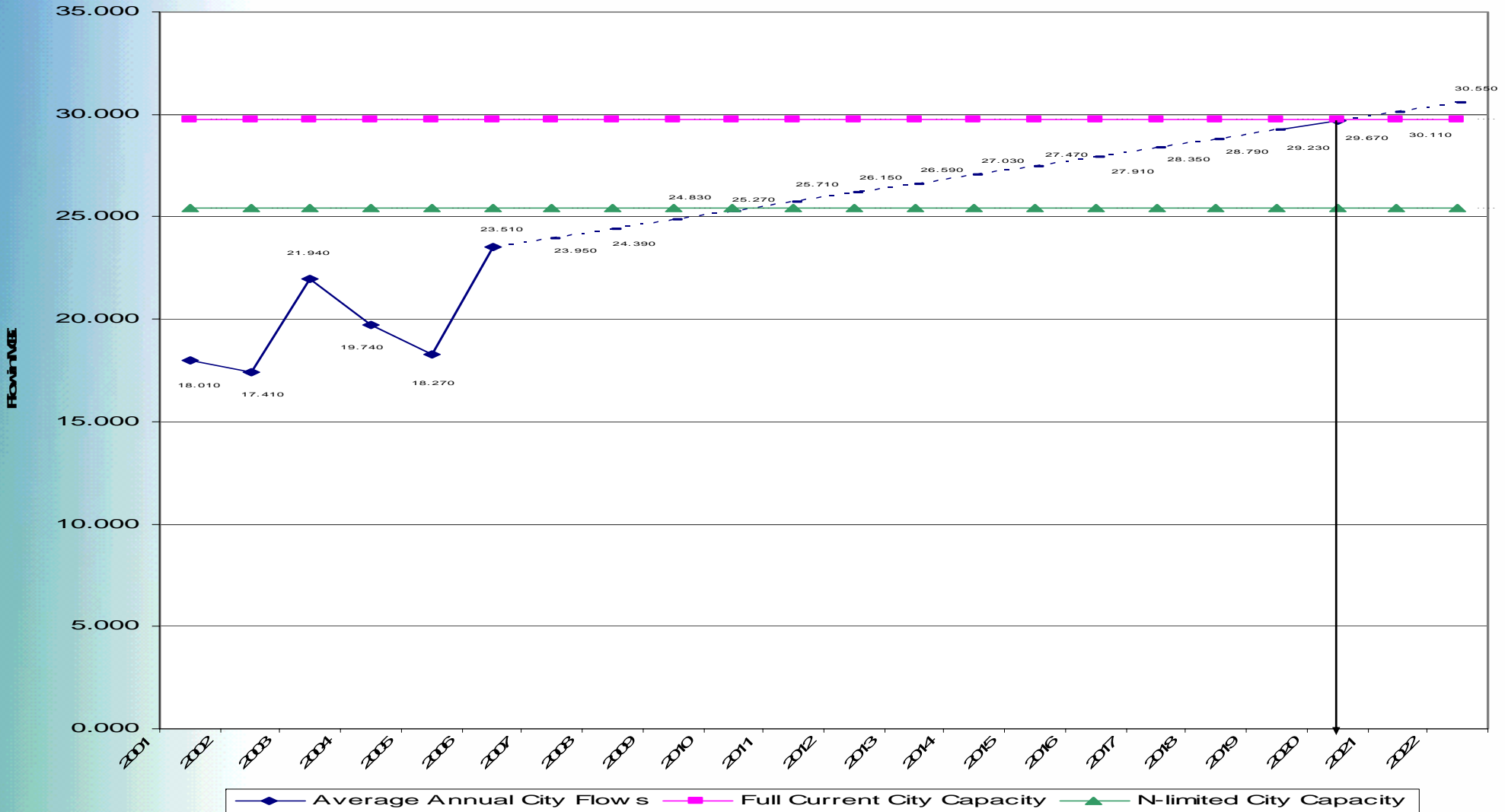
Point Source Perspective on Trading

City of Lancaster Plant Flows



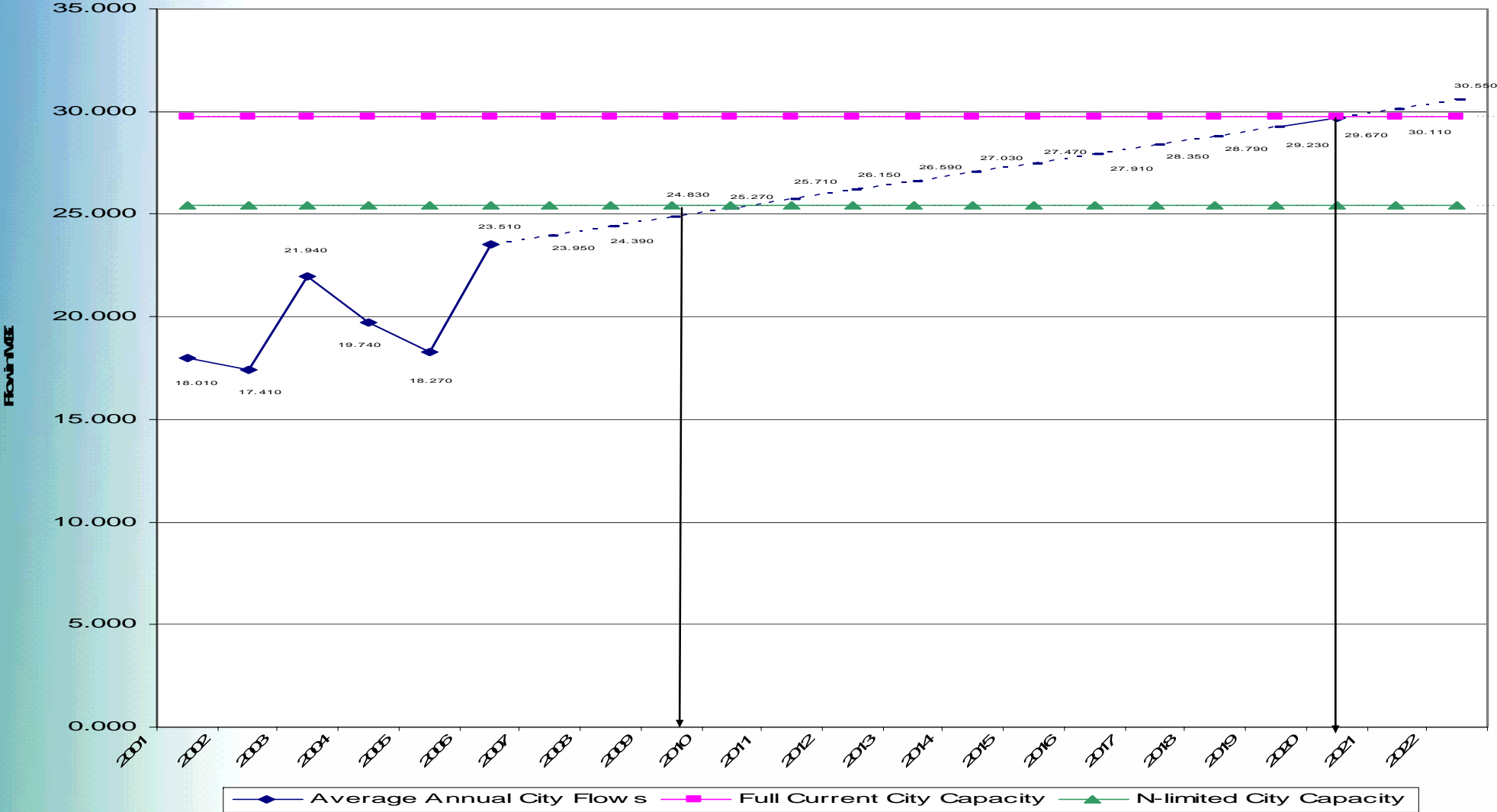
Point Source Perspective on Trading

City of Lancaster Plant Flows



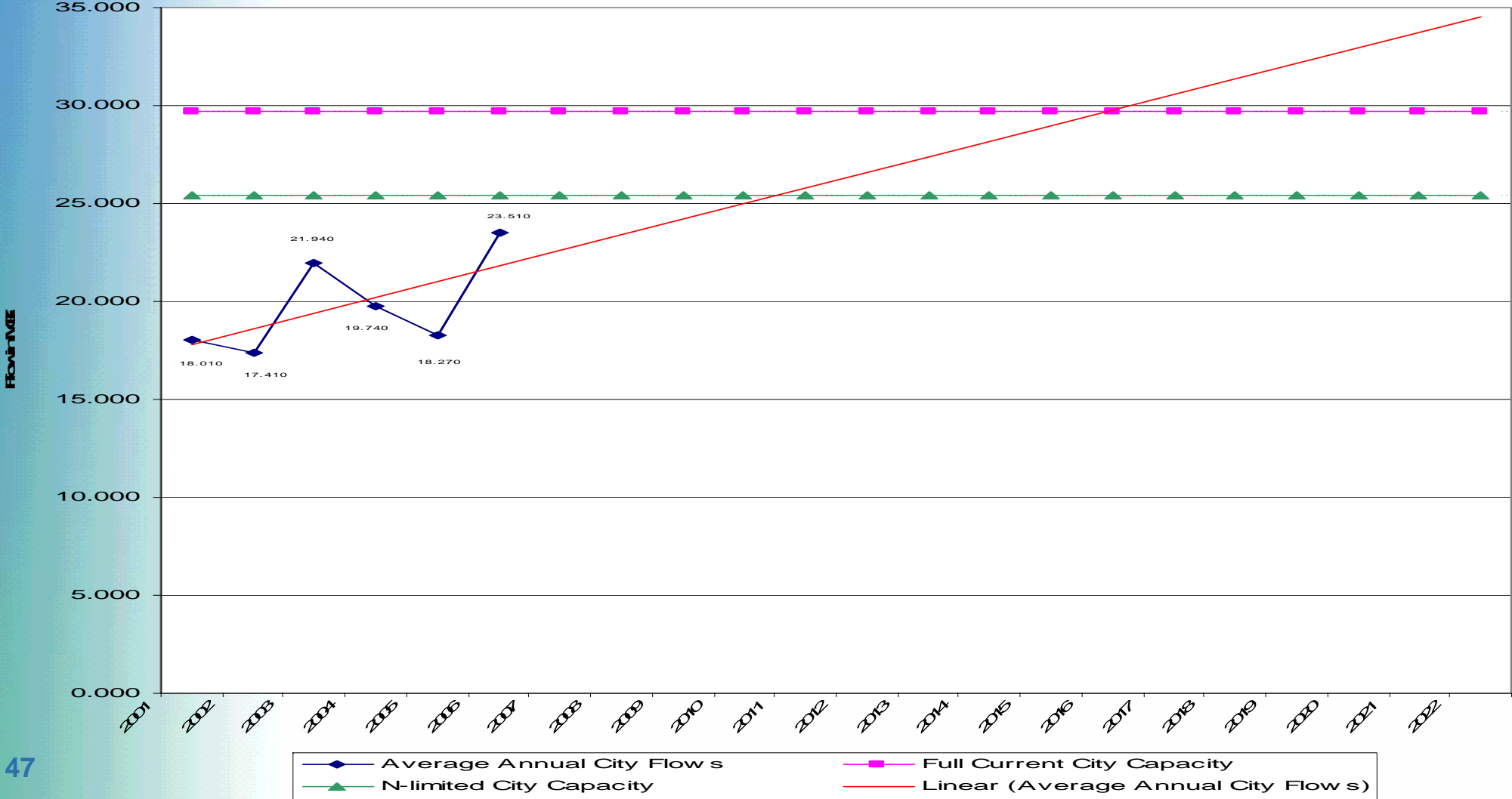
Point Source Perspective on Trading

City of Lancaster Plant Flows



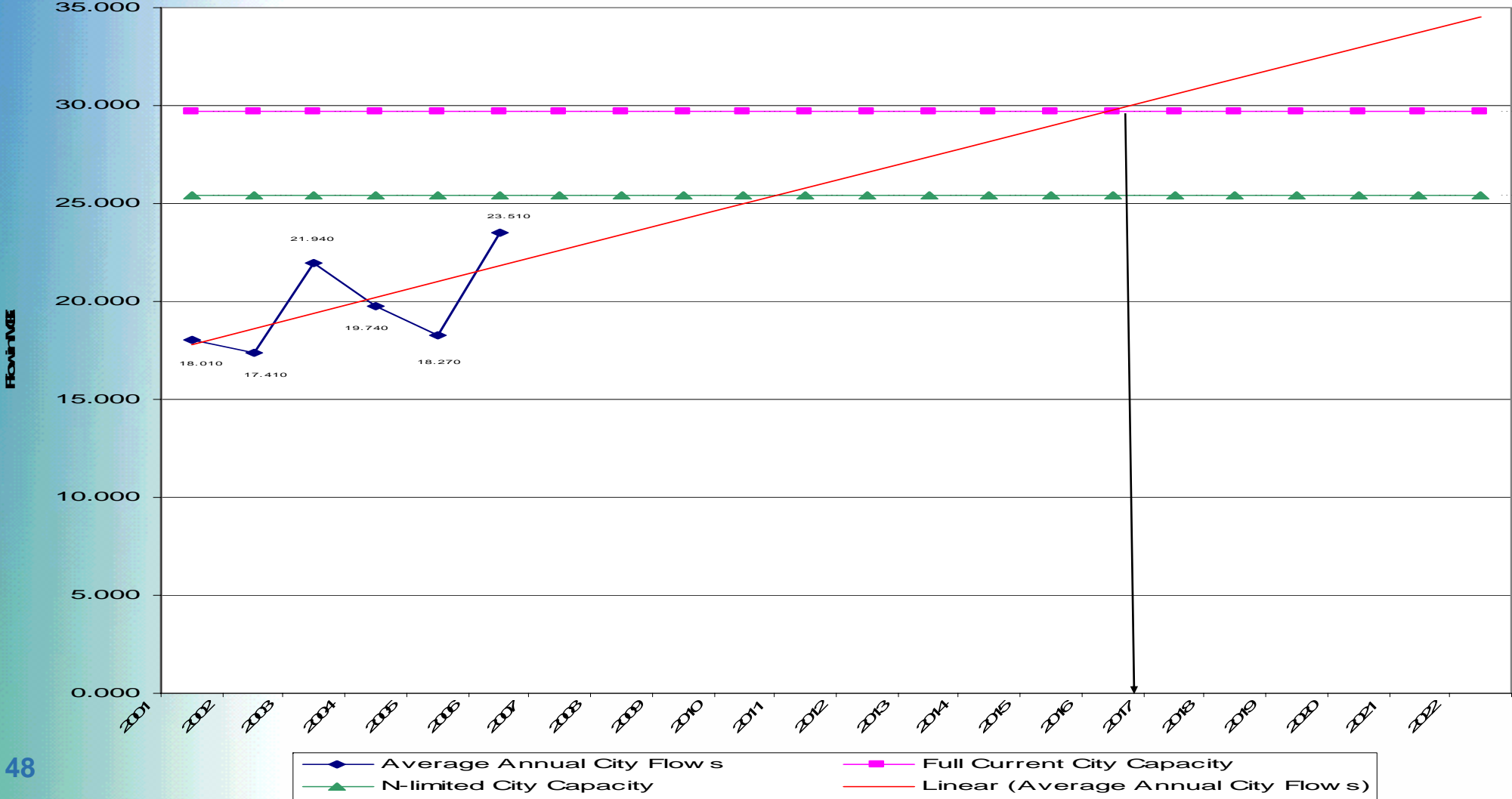
Point Source Perspective on Trading

City of Lancaster Plant Flows



Point Source Perspective on Trading

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Point Source Perspective on Trading

City of Lancaster Plant Flows

