



# Water Quality Trading in the Chesapeake Bay

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United States Department of Agriculture - Office of Environmental Markets



# What is Water Quality Trading

- Regulated source purchases credits in lieu of upgrades
- New or expanding source purchases an allocation
- Credits generated by other regulated sources or from unregulated sources like agriculture.



# Benefits of WQT

- Reduces cost of compliance
- Accelerates pace of compliance
- Allows for growth under a pollution cap
- Provide incentive for nonregulated sources to meet TMDL allocation



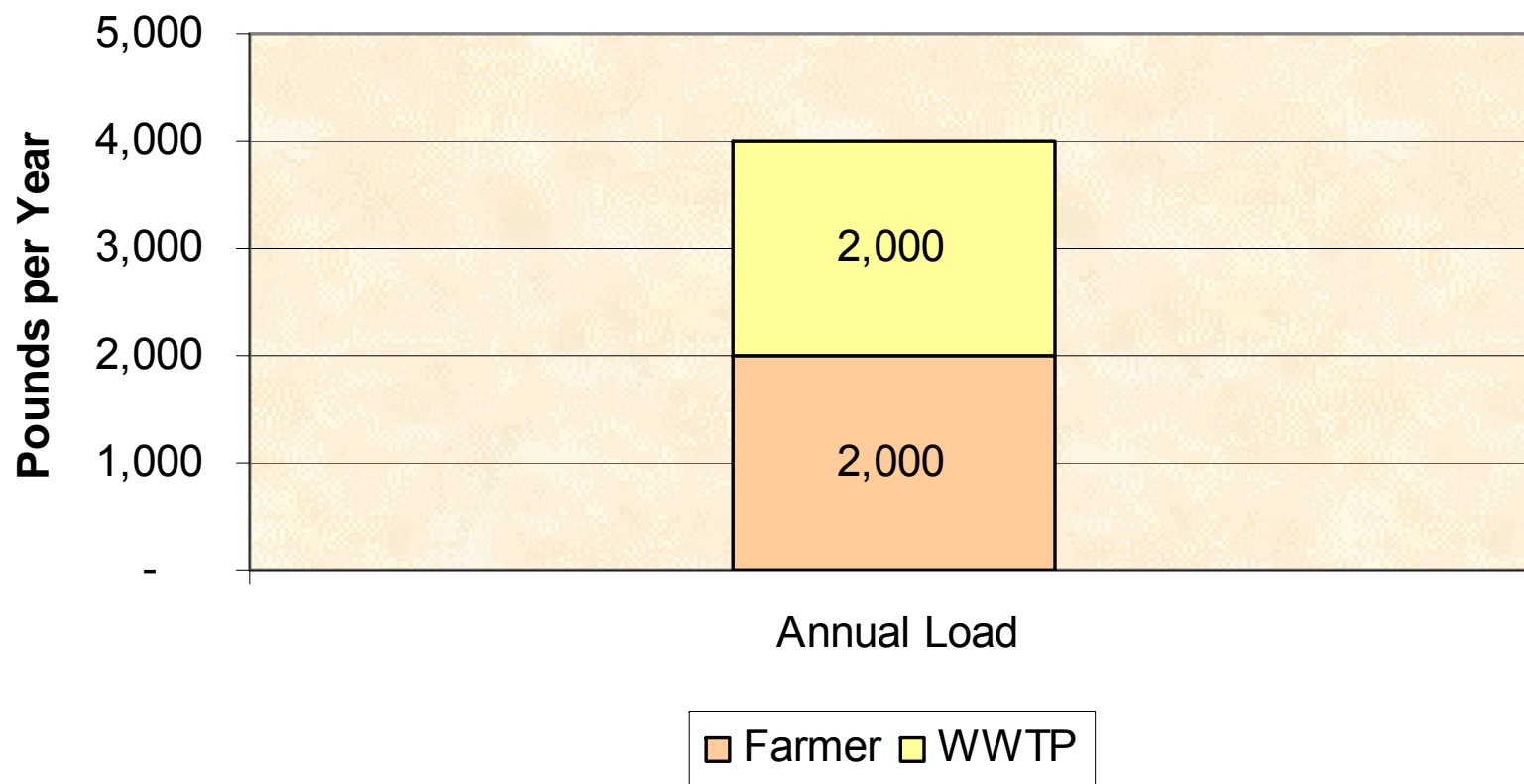
# Drivers for WQT in the Chesapeake Bay

- Chesapeake Bay 2000 Agreement
- Chesapeake Bay TMDL
- State-level policies/permits
  - NPDES permits
  - Post-construction Stormwater
  - MS4 permits



# Trading Example

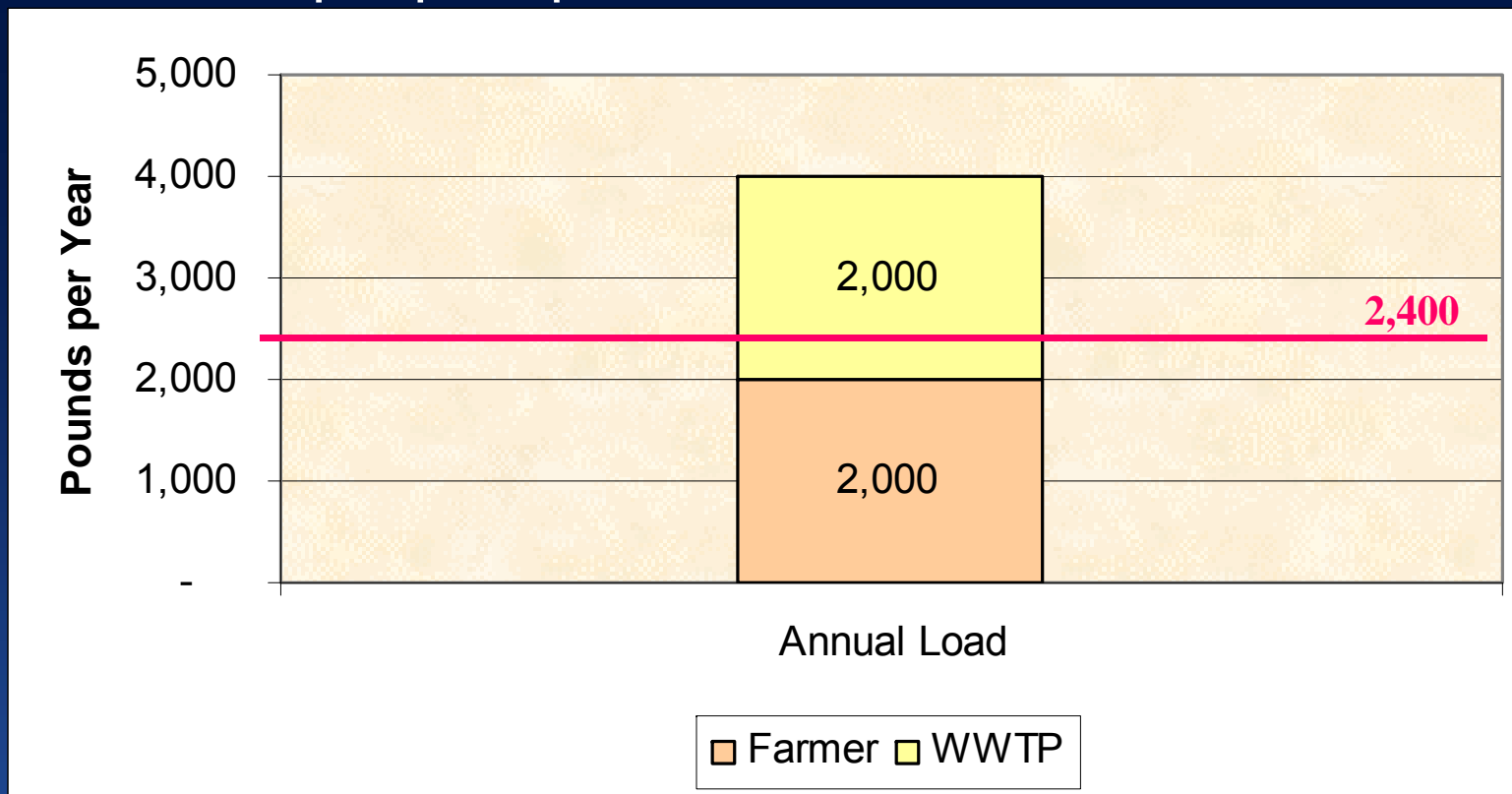
Annual discharges into a local stream





# Trading Example

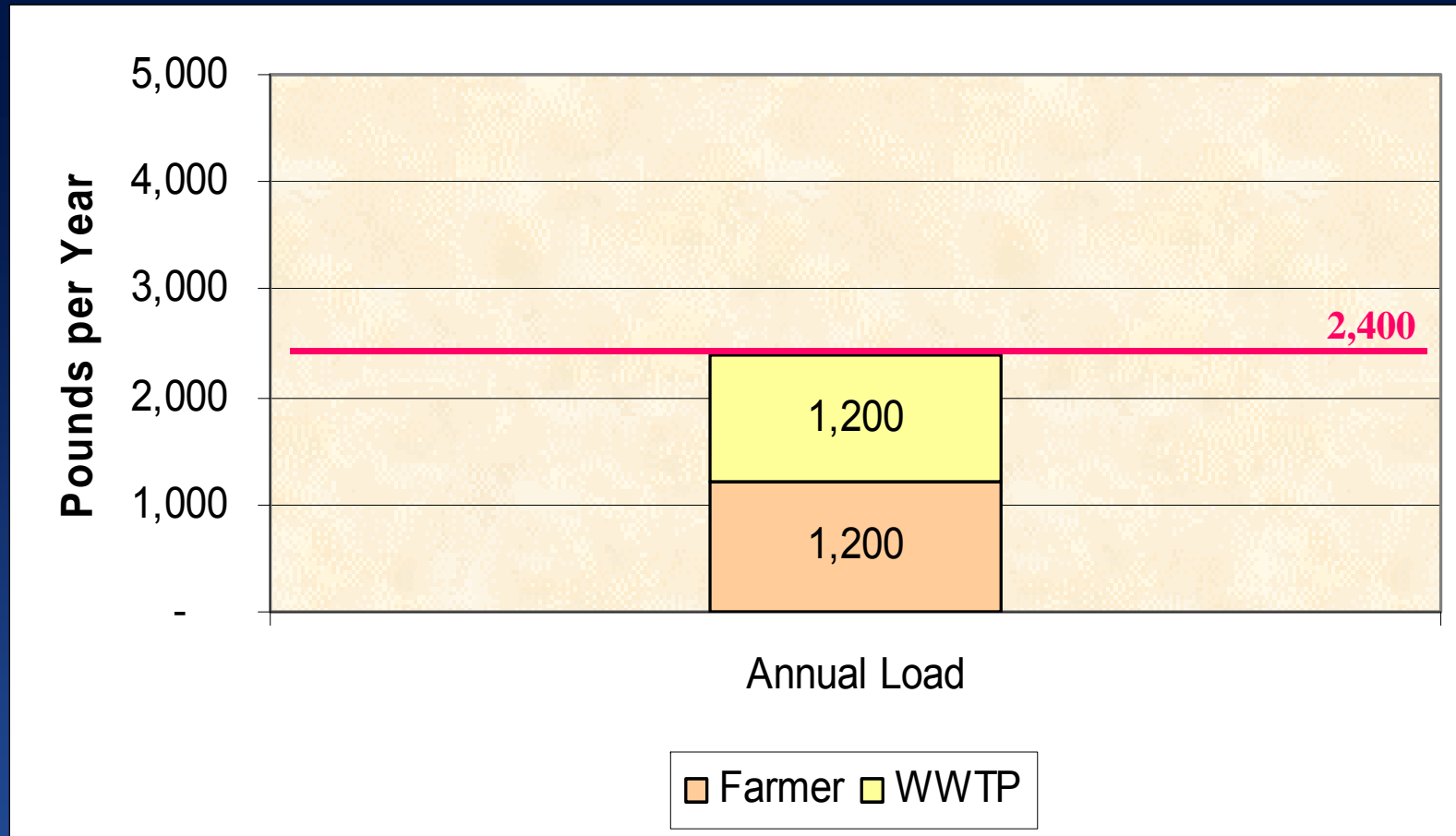
State adopts phosphorus TMDL





# Trading Example

Load is allocated among the sources of phosphorus





# Trading Example

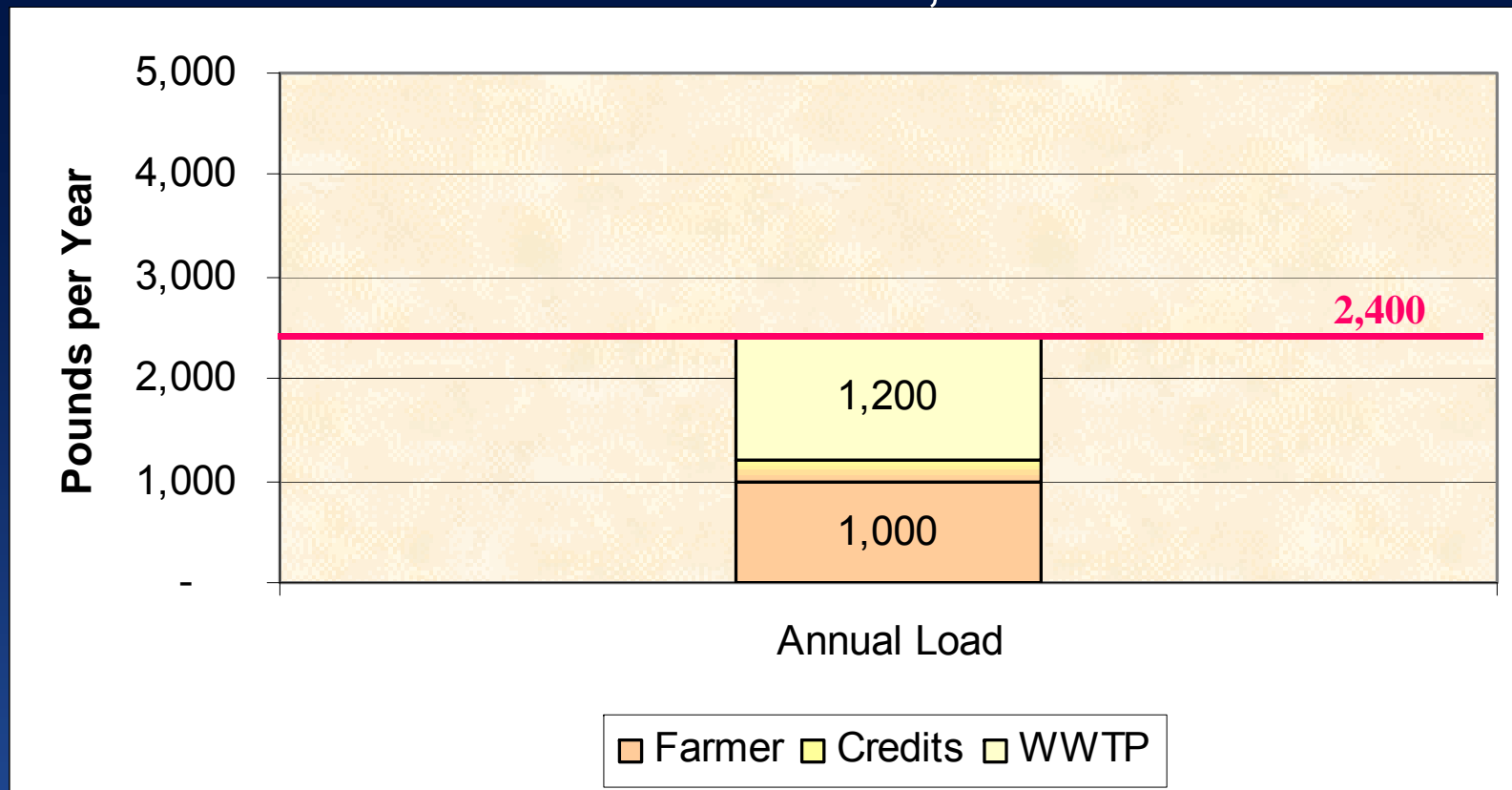
- WWTP can reduce to 1400 lbs at relatively low cost
- Next 200 lbs would be very expensive for WWTP.
- Farmer can get cost-share to reduce to 1,200 lbs.
- Farmer can use private dollars to reduce an additional 200 lbs to sell as credits.





# Trading Example

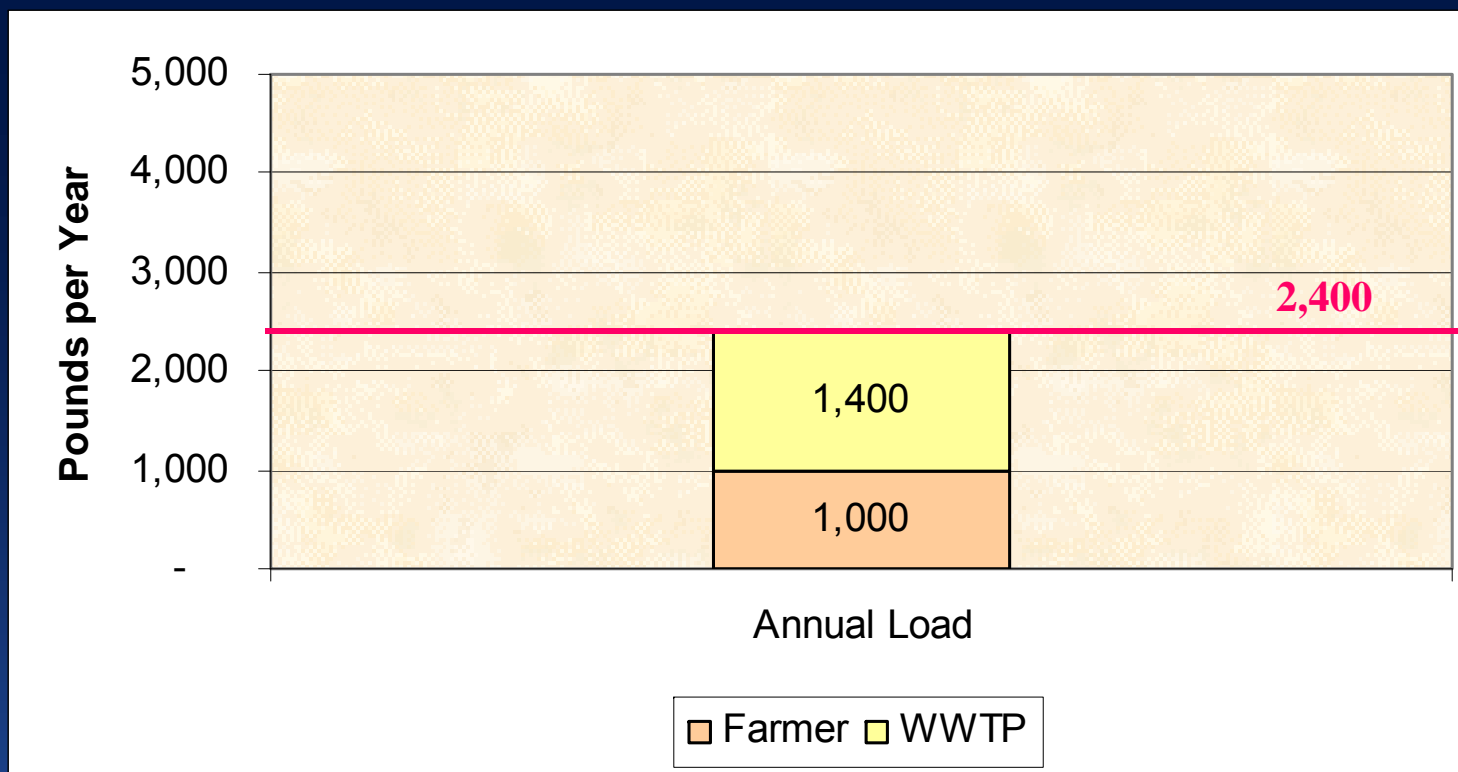
Farmer reduces load to 1000 lbs, has 200 credits to sell





# Trading Example

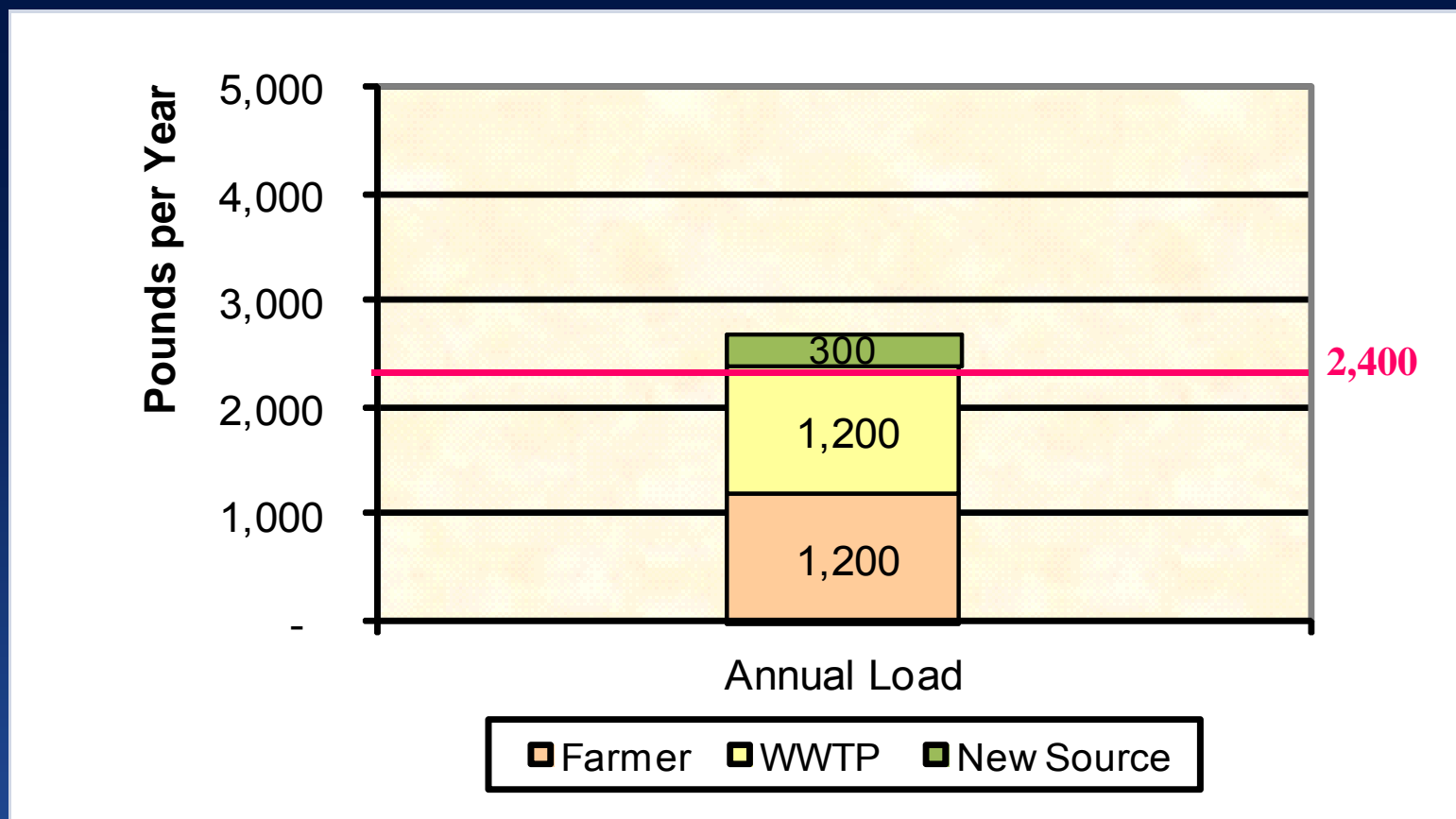
## Net Result





# Offsetting new growth

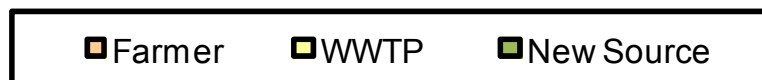
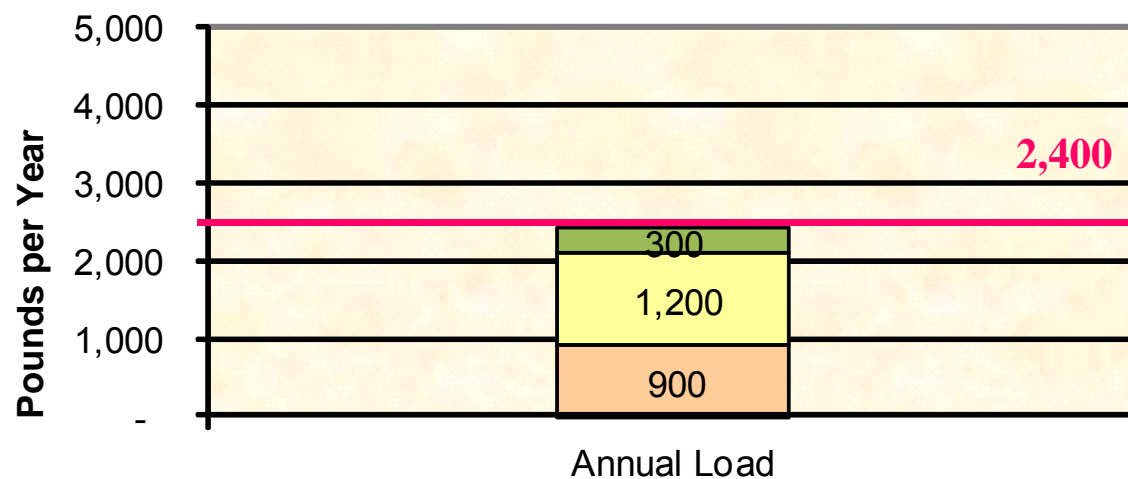
A proposed development in the watershed will discharge an estimated 300 lbs.





# Offsetting new growth

Agriculture generates 300 lbs of offsets below its TMDL obligation.  
The new development is granted a permit





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# State Trading Programs in the Chesapeake Bay

- Virginia
- Maryland
- Pennsylvania



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# Virginia

- Nutrient trading law signed in 2005
  - To provide flexibility for point sources to meet compliance schedules and cost-effectively meet upcoming loading caps
- Program expanded in 2012 to authorize MS4s, other sectors to trade
- Trading for P allowed to offset post-construction requirements





# Virginia

- PS-PS trades for compliance; PS-NPS trades for new/expanded growth.
- Virginia Nutrient Credit Exchange established for PS-PS trades
- Credits selling for under \$5/lb N
- No trades to offset new or expanded growth



# Virginia

- Post-construction stormwater offsets for P only
- Offsets must be permanent
- Credits generated through land conversion/easements
- Permanent P credits trading for up to \$18,000/lb





# Virginia

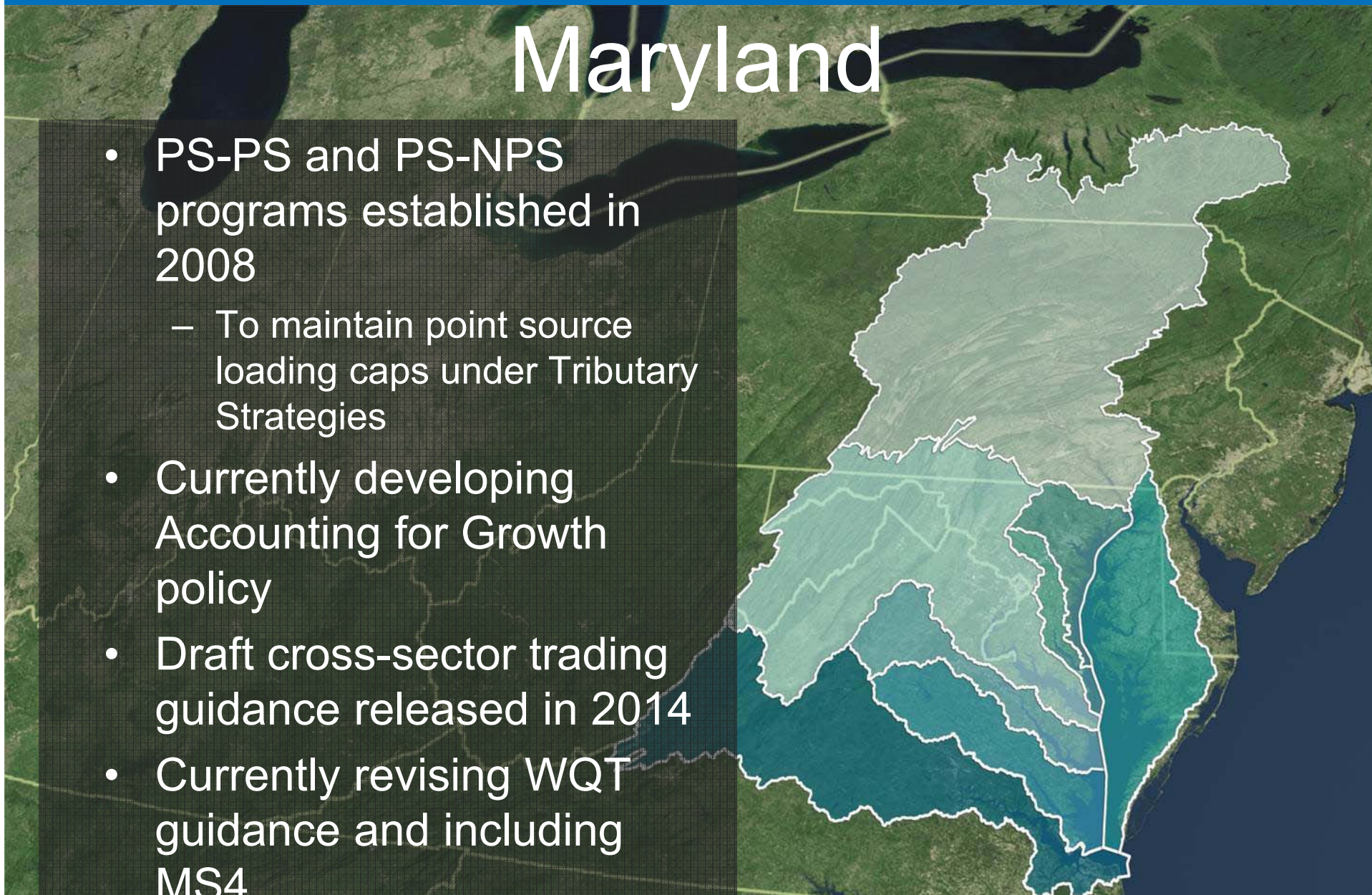
- Virginia only state to add numeric N and P goals to Phase I MS4 permits
- Arlington county currently exploring a trade with its WWTP to ensure compliance for next 5 year permit



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# Maryland

- PS-PS and PS-NPS programs established in 2008
  - To maintain point source loading caps under Tributary Strategies
- Currently developing Accounting for Growth policy
- Draft cross-sector trading guidance released in 2014
- Currently revising WQT guidance and including MS4





# Maryland

- WWTPs cannot trade to comply only to offset new and expanding growth
- No trades conducted to date
- MD working on “Accounting for Growth” policy for post-construction stormwater
- MD released a policy in 2015 to allow non-phase I MS4s to trade



# Maryland

- MD currently redrafting trading guidance
- New guidance proposes Phase I MS4 trades.
- MS4 trades would require a translation between impervious acres and nutrient loads.



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# Pennsylvania

- Nutrient trading policies and guidance issued in 2006
  - To meet regulatory obligations and offset new loads from wastewater
- Trading regulations passed in 2010
- Trading program under revision
- Trading options for MS4s and development stormwater are under consideration





# Pennsylvania

- Trades for permit compliance
- 54 facilities purchased credits in 2015
- Credits traded through MARKIT registry using auctions to match buyers/sellers
- Prices vary between \$3 and \$0.50
- Credits generated from PS and NPS



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# Allowable Trading Scenarios

Source: Sara Walker, WRI

		Who can buy?				
		Wastewater	Municipal Stormwater	Post-construction Stormwater	CAFO	Septic
When can trading occur?	Who can sell?					
To Comply	Point sources	VA, PA	VA, MD*		VA	
	Nonpoint sources	PA	VA, MD*		VA	MD*
To Maintain/Offset	Point sources	MD, PA	VA, MD*	VA, MD*	VA	
	Nonpoint sources	VA, MD, PA	VA, MD*	VA, MD*	VA	



# Trading Ratios

	Maryland	Pennsylvania	Virginia
Delivery Ratio	Chesapeake Bay Watershed Model		
Reserve Ratio		10%	
Retirement Ratio	5% for PS 10% for NPS		5% for NPS*
Uncertainty Ratio	$\geq 10\%$ , in some cases		2:1 for NPS to PS

\* proposed





# Agricultural Baseline

- A level of environmental performance that must be achieved before being eligible to trade.
- Because agriculture is not regulated, baseline is used to determine trading eligibility



# Agricultural baseline

Maryland	Pennsylvania	Virginia
Meet a per-acre annual loading rate (e.g., lbs TN/acre) calculated from the Bay or local TMDL, whichever is more restrictive	(1) Implement a 100-foot manure setback, (2) implement a 35-foot vegetative buffer, or (3) reduce the farm's total nutrient balance by additional 20%	Implement, as applicable: 1) Soil conservation plan 2) Nutrient management plan 3) Cereal cover crops 4) Fencing 5) Riparian buffers
<b>Performance-based</b> <b>EPA: TMDL</b>	<b>Practice-based</b> <b>EPA: TMDL</b>	<b>Practice-based</b> <b>EPA: TMDL</b>



# Tools for estimating credits

- Chesapeake Bay Nutrient Tracking Tool (CBNTT)
- Maryland Urban Offset Calculator
- Lookup values based on the CBWM
- Spreadsheet tools
- BayFAST

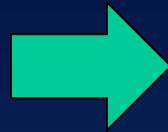


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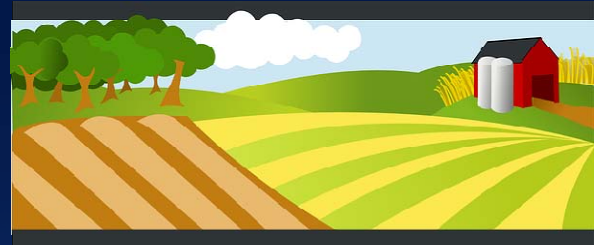
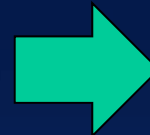
# Project review & certification



Submit project proposal



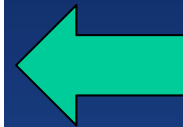
Administrative review



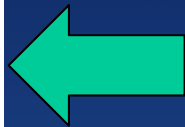
Project implementation



Onsite verification



Project certified & registered



Credits issued



# Registry

- Spreadsheet (VA)
- MARKIT (PA)
- Chesapeake Bay WQT Registry (MD + others?)



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# Virginia registry

2014 Total Nitrogen Credit Transfers

	Facility	Individual VPDES Permit No.	General Permit Registration No.	Discharged TN Wasteload Allocation (lbs/yr)	TN Delivery Factor	Delivered TN Wasteload Allocation (lbs/yr)	2014 Discharged TN (lbs)	2014 Delivered TN (lbs)	2014 Delivered TN Exceedance (lbs)	2014 Delivered TN Credits Obtained (lbs)	Source of Credits
Potomac	Front Royal STP	VA0062812	VAN010010	48,729	0.67	32,648	114,154	76,483	43,835	43,835	VNCEA
Potomac	Strasburg STP	VA0020311	VAN010102	11,939	0.67	7,999	36,772	24,637	16,638	16,638	VNCEA
Potomac	Massanutten PSC STP	VA0024732	VAN010039	18,273	0.44	8,040	25,338	11,149	3,109	3,109	VNCEA
Potomac	Merck (Outfall 101) <sup>A</sup>	VA0002178	VAN010007	43,835	0.44	19,287	16,921	7,445	0	1,013	VNCEA
Rappahannock	Fredericksburg WWTF	VA0025127	VAN020095	54,820	1.00	54,820	62,088	62,088	7,268	7,268	VNCEA
Rappahannock	Urbanna WWTP	VA0026263	VAN020034	1,218	1.00	1,218	3,958	3,958	2,740	2,740	VNCEA
Rappahannock	Reedville S.D. WWTP	VA0060712	VAN020101	2,436	1.00	2,436	2,915	2,915	479	479	VNCEA
James	So. Central Wastewater Authority WWTF	VA0025437	VAN040087	350,239	1.00	350,239	402,675	402,675	52,436	52,436	VNCEA
James	Lake Monticello STP	VA0024945	VAN040074	18,182	0.61	11,091	61,420	37,466	26,410	26,410	VNCEA
James	Covington STP	VA0025542	VAN040065	54,820	0.30	16,446	73,300	21,990	5,544	5,544	VNCEA
James	Buena Vista STP	VA0020991	VAN040063	41,115	0.30	12,335	48,586	14,576	2,241	2,241	VNCEA
Eastern Shore	Tangier Island WWTP	VA0067423	VAN050004	1,218	1.00	1,218	2,397	2,397	1,179	1,179	VNCEA
Eastern Shore	Shore Memorial Hospital	VA0027537	VAN050003	1,218	1.00	1,218	2,042	2,042	824	824	VNCEA
Total									162,703	163,716	



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# Chesapeake Bay Nutrient Trading Registry

Home / Projects / New Project

## NEW PROJECT

### PROJECT INFO

Project Name*	<input type="text" value="My sample project"/>	State*	<input type="text" value="Pennsylvania"/>
Project Type*	<input type="text" value="Working Lands"/>	County*	<input type="text" value="Armstrong"/>
Applicant Role*	<input type="text" value="Working Lands"/>	Major Basin*	<input type="text" value="Susquehanna"/>
Property Owner Name	<input type="text" value="Land Use Conversion"/>	HUC 8*	<input type="text" value="UpperSusquehanna"/>
Property Owner Telephone	<input type="text" value="Urban Stormwater"/>	HUC 12*	<input type="text" value="Select huc12"/>
Property Address 1	<input type="text" value="Septic"/>	Credit Type*	<input type="text" value="Term"/>
	<input type="text" value="Wastewater"/>		
	<input type="text" value="Other"/>		

## CHESAPEAKE BAY NUTRIENT TRADING REGISTRY

Home / Credits / Issue Credits

## ISSUE CREDITS

Project	apple farm
Duration	<input type="text" value="Term"/>
Type	<input type="text" value="Ex-post (after project implementation)"/>
Start year	<input type="text" value="2013"/>
Number of years	<input type="text" value="10"/>
Nitrogen credits (Estimated: 100)	<input type="text" value="100"/>
Phosphorus credits (Estimated: 50)	<input type="text" value="20"/>
Sediment credits (Estimated: )	<input type="text"/>
Ratio	<input type="text" value="None"/>

Home / Verifications / Index

## MANAGE VERIFICATIONS

+ Add Verification

This is a listing of all verifications that have been submitted. To submit a verification for an existing project, click the "Add Verification" button.

Project	Project ID	Site Checked	Verifier	Notes	Status	Actions
test project	51179-00001	2015-01-15	Sara		Compliant	
test project	51179-00001	2015-04-21			Compliant	
maryland project	24003-00001	2014-09-09			Compliant	
maryland project	24003-00001	2014-12-02	Jill	approve	Pending	
maryland project	24003-00001				Compliant	
maryland project	24003-00001				Compliant	
Jill's farm	24021-00001	2014-12-02			Compliant	
apple farm	24009-00001	2015-01-07			Compliant	
Frozen farm	24031-00001				Compliant	
Happy valley	24033-00001		Zhou		Compliant	



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# Questions?

[http://www.usda.gov/oce/environmental\\_markets/](http://www.usda.gov/oce/environmental_markets/)

**e-mail: [mselman@oce.usda.gov](mailto:mselman@oce.usda.gov)**

