

Maryland's Nutrient Trading Program

How Trading Works

John Rhoderick

Maryland Department of Agriculture

Maryland's Trading Program Background

- 2001 EPA Chesapeake Bay Program Workgroup developed "Nutrient Trading Fundamental Principles and Guidelines"
- 2003 EPA Final Water Quality Trading Policy
- 2010 EPA Region III Review of Bay States Trading Programs
- 2011 World Resources Institute "Comparison of State Nutrient Trading Programs in the Chesapeake Bay Watershed"

Maryland's Trading Program Background

- 2011 EPA Chesapeake Bay Program Trading and Offsets Workgroup
- 2012 Chesapeake Bay Commission Report "Nutrient Trading for the Chesapeake Bay Economic Outlook"
- 2013-2014 EPA Mid Atlantic Region III Trading and Offsets Workplan – 12 separate "Technical Memoranda"
- USDA Environmental Markets for the Chesapeake Bay

Maryland's Nutrient Trading Program Status

Maryland's Nutrient Trading Program Status

Demand

Offset
Requirements

Onsite Offset
Mitigation
Calculation Tool

Maryland's Nutrient Trading Program Status

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Credit Generation

Point Source
Credits

Septic Credits

Agricultural
Credits

Stormwater
Credits

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Exchange Tracking

Registry

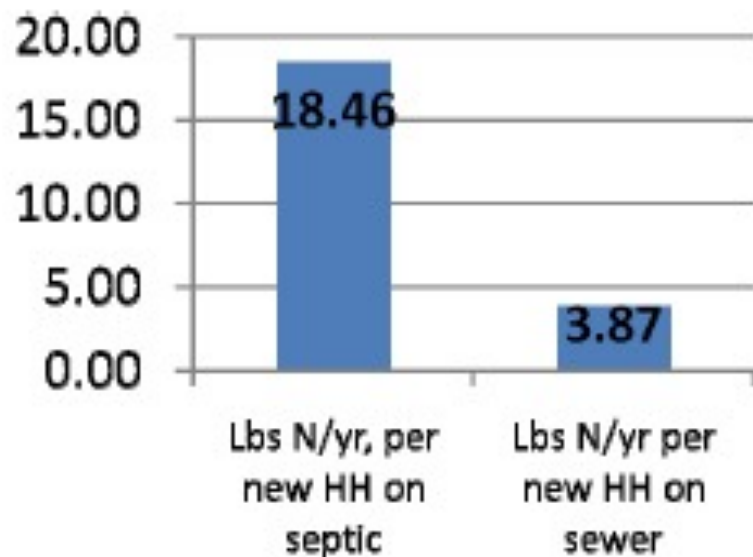
Market Place

Assessment Tools

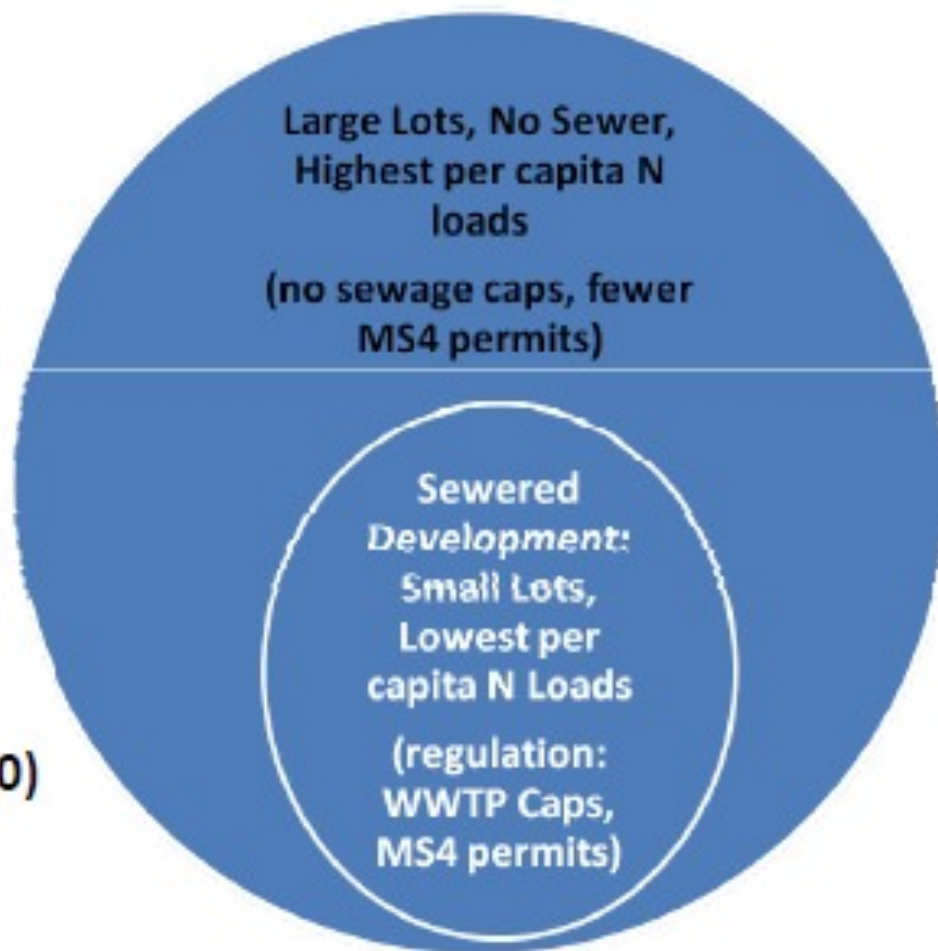
Credit Generation Program Overview

- Currently provides separate programs for PS-PS and PS-Agricultural NPS trading
 - Phase I addresses Point Source-Point Source and Septic Credit Generation & Trading
 - Final issued March 2008 by MDE
 - Phase II addresses Point Source-Non Point Source trading
 - Agricultural Credit Generation & Trading Program June 1, 2010 by MDA

Current Trading Programs Developed to Address New and Expanded Wastewater and Development Loads



**263,225 Additional Households
Forecasted in Maryland (2010 -2020)**
29% served by septic tanks
71% served by ENR WWTP



Maryland's Nutrient Trading Program

Phase I Policy
Point Source-Point Source
Trading
MDE

Purpose of Point Source Trading

- To offset new or increased discharges
- To establish economic incentives for reductions from all sources within a watershed
- To achieve greater environmental benefits than through the existing regulatory programs. Program requires a 5% retirement for Bay TMDL

Key Principles

- All new and expanded point source nutrient loads must be fully offset
- Trades must be consistent with County Water and Sewerage Plans
- Trading will not be available in lieu of required Enhanced Nutrient Removal upgrades
- Point source trades will be implemented and enforced via NPDES permits

Key Principles

- Trades must be consistent with TMDLs
- Trades must protect local water quality
- Adequate public outreach/stakeholder participation

Generating Credits

- ENR facilities may generate point source discharge credits by:
 - Reducing effluent concentration
 - Maintaining flow at less than the design flow basis of wasteload allocation
- Land application of wastewater with pretreatment and nutrient management controls

Generating Credits

- Upgrading an existing minor WWTP to BNR or ENR
- Retiring an existing minor WWTP and sending its flow to a BNR or ENR facility
- Retiring an existing Onsite Sewage Disposal System by connection to public sewer or cluster treatment

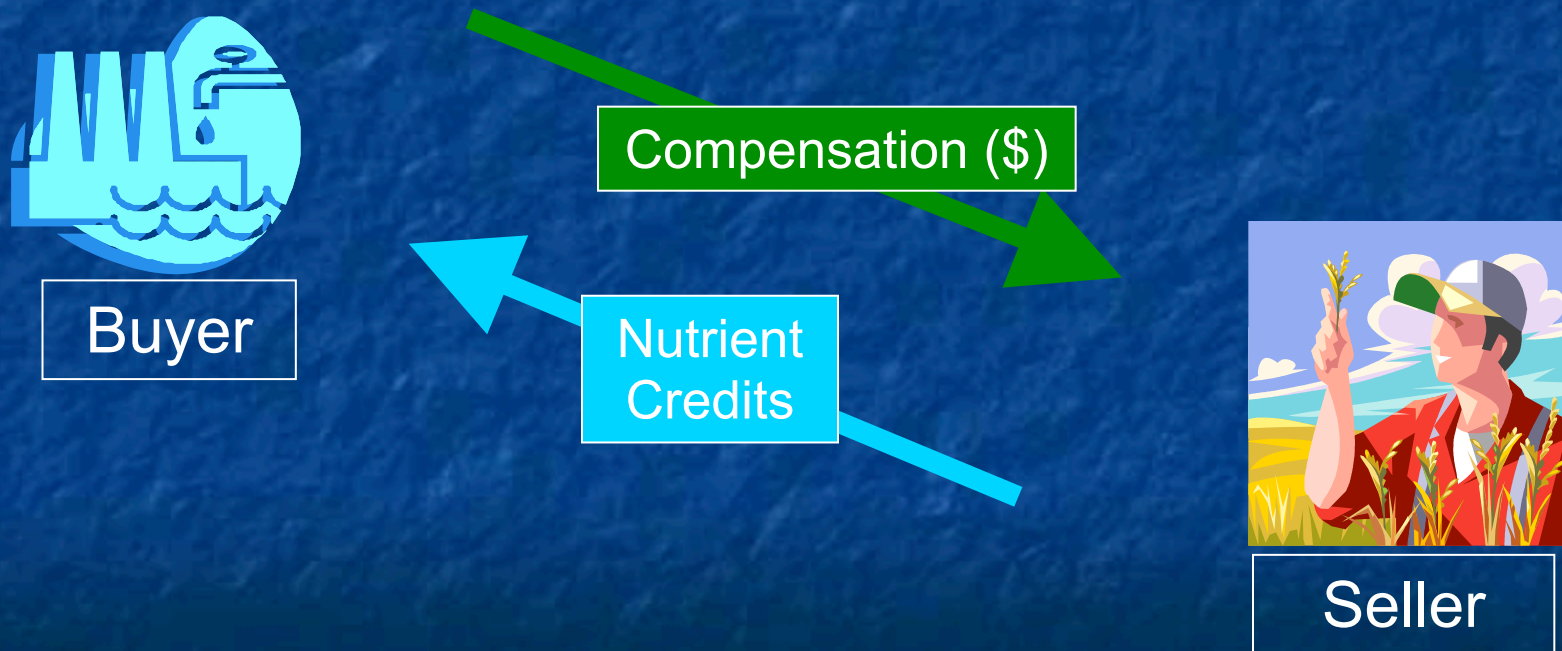


Onsite Sewage Disposal System

- Credit depends on location
 - 12.2 lbs/yr in Critical Area
 - 7.5 lbs/yr within 1,000 feet of any perennial surface water
 - 4.6 lbs/yr everywhere else

Maryland's Water Quality Trading Program

Phase II – Agricultural Nutrient Trading in Maryland



Article – Agriculture

Subtitle 9. Voluntary Agricultural Nutrient AND SEDIMENT Credit Certification Program.

8-901.

The General Assembly finds and declares that: it is the intent of the General Assembly that the authority of the State Department of Agriculture to establish requirements for the voluntary certification and registration of nutrient OR SEDIMENT credits on agricultural land, as provided by this Act, be retained by the State Department of Agriculture.

(2) The Agricultural Nutrient AND SEDIMENT Credit Certification Program established under this subtitle authorizes the Department to verify, certify, and register agricultural nutrient OR SEDIMENT credits in support of private and public nutrient OR SEDIMENT trading activities between the buyer of nutrient OR SEDIMENT credits and the farm owner or operator that agrees to be paid and implement best management practices to reduce agricultural nutrient AND SEDIMENT runoff and NUTRIENT emissions.

8-902.

(a) The Department may establish requirements for the voluntary certification and registration of nutrient **OR SEDIMENT** credits on agricultural land, as defined by the Department of Assessments and Taxation.

(b) Certification and registration requirements established under subsection (a) of this section shall include:

- (1) Application and eligibility requirements for certification;
 - (2) Standards for quantifying nutrient **OR SEDIMENT** credits resulting from any existing or proposed agronomic, land use, and structural practice;
 - (3) Requirements governing the duration and maintenance of credits;
- and
- (4) Establishment of a credit registry accessible to the public.

8-903.

On notice and opportunity to be heard, the Secretary may suspend or revoke the approval or certification of credits applicable for the Program for a violation of this subtitle or for a violation of any regulation adopted by the Secretary under this subtitle.

Maryland Agricultural Nonpoint Trading Advisory Committee

Mr. Bill Angstadt, Delaware-Maryland Agribusiness Association

Mr. Dan Baldwin, Maryland Department of Planning

Dr. Kevin DeBell, EPA Chesapeake Bay Program

Mr. Jason Dubow, Maryland Department of Planning

Ms. Patty Engler, USDA-Natural Resources Conservation Service

Mr. James George, Maryland Department of the Environment

Ms. Patricia Gleason, US Environmental Protection Agency

Ms. Lynne Hoot, Maryland Association of Soil Conservation Districts

Mr. Cy Jones, World Resources Institute

Mr. George Kelly, Environmental Banc & Exchange

The Honorable Stephen Lafferty, Maryland House of Delegates

Ms. Marya Levelev, Maryland Department of the Environment

Dr. Loretta Lynch, University of Maryland

Mr. Lee McDaniel, Maryland Association of Soil Conservation Districts

Ms. Beth McGee, Chesapeake Bay Foundation

The Honorable Thomas Middleton, Maryland State Senate

Mr. Daniel Nees, University of Maryland

Ms. Susan Payne, Maryland Department of Agriculture

Mr. Jerry Raynor, USDA-Natural Resources Conservation Service

Mr. John Rhoderick, Maryland Department of Agriculture

Ms. Mindy Selman, World Resources Institute

Ms. Catherine Shanks, Maryland Department of Natural Resources

Ms. Kelly Shenk, EPA Chesapeake Bay Program

Mr. Ed Stone, Maryland Department of the Environment

Mr. Bruce Yerkes, State Soil Conservation Committee

Dr. Mark M. Bundy, Facilitator

Agricultural Nutrient Trading

A program to provide to Maryland farmers a payment for conservation practices.

- A. The practices provide offsets to address new or increased loads associated with a growing population.

WWTP, Development, Industrial Facilities

- B. Private purchase of nutrient reduction projects and practices (retirement credits)

Chesapeake Bay Foundation

Maryland's Fundamental Trading Principles

- A. Key Program Principles
- B. How to Generate Agricultural Credits
 - Eligibility to participate
 - Baseline requirements
 - What is tradeable
 - Verification and certification requirements
- C. How to Exchange Agricultural Credits
 - Finding trading partners

Key Principles

Establish the foundation of any trading program. They are essential for an equitable, environmentally protectable, yet viable, trading program.

Key Principle #1

- Any generator of agricultural non-point source credits must first demonstrate they have met the baseline water quality requirements for nitrogen and phosphorus levels in their watershed. These include the minimum level of nutrient reductions outlined in the Bay TMDL or applicable local TMDL requirements. Baselines provide assurance that participants are at a minimum level of conservation stewardship and are not currently impacting local water quality.

Key Principles (cont.)

Key Principle #2

- Agricultural generators must be in compliance with all local, state, federal laws, regulations, and programs. The credit purchaser and generator cannot cause or contribute to water quality effects locally, downstream, or bay wide.

Key Principle #3

- BMPs funded by federal or state cost-share, or county mitigation banking programs, cannot be used to generate credits during their contract life. However, these BMPs can count toward baseline, or after the funded lifespan has expired, you can use the BMP to generate credits.

Key Principles (cont.)

Key Principle #4

- The Agricultural Trading Program is not intended to accelerate the loss of productive farmland. Therefore, credits will not be generated under this policy for the purchase and idling of whole or substantial portions of farms to provide nutrient credits.

Key Principle #5

- Trades must result in a net decrease in loads. A portion of the agricultural credits generated in a trade will be retired 10% and used to achieve Bay or Local TMDLs, the other portion becomes tradable credit.

Key Principle #6

- An Agricultural practice can only generate credits once it is installed and verified, or placed in operation.

Generation of Agricultural Credits

- Eligibility to participate
- Baseline requirements
- What is tradable
- Verification and Certification requirements



Eligibility

Who May Sell Agricultural Credits?

- Any generator of agricultural non-point source loads:
- Farm owners, landowners
- Renter or lessee that can demonstrate permission by the owner to sell credits
- Aggregators
- Maryland state entities
- Parties who remove agricultural nutrients from the environment

Eligibility of Generators to Sell

In order to sell nutrient credits as part of this program, credit generators must meet the following requirements:

- Agricultural operations generating credits must be in compliance with Nutrient Management Regulations, have a current Nutrient Management Plan, have an updated Soil and Water Conservation Plan, and include, if applicable, a Waste Management System Plan for the entire farm operation.

Eligibility of Generators to Sell (cont.)

- Any entity wanting to acquire and resell credits, such as aggregator:
 - Must be in compliance with all applicable federal, state and local requirements.
 - Must demonstrate an intent and ability to acquire and deliver sufficient offset from multiple projects or sites.
 - Must be able to demonstrate permission by the credit generator to sell credits.
 - Must be able to demonstrate that the credit owners meet all compliance and eligibility requirements.

“Baseline” Requirements for Agricultural Non-Point Sources

Maryland’s agricultural non-point nutrient trading program requires that operators of agricultural operations or other landowners wishing to generate credits must have achieved a level of nutrient reduction known as baseline.

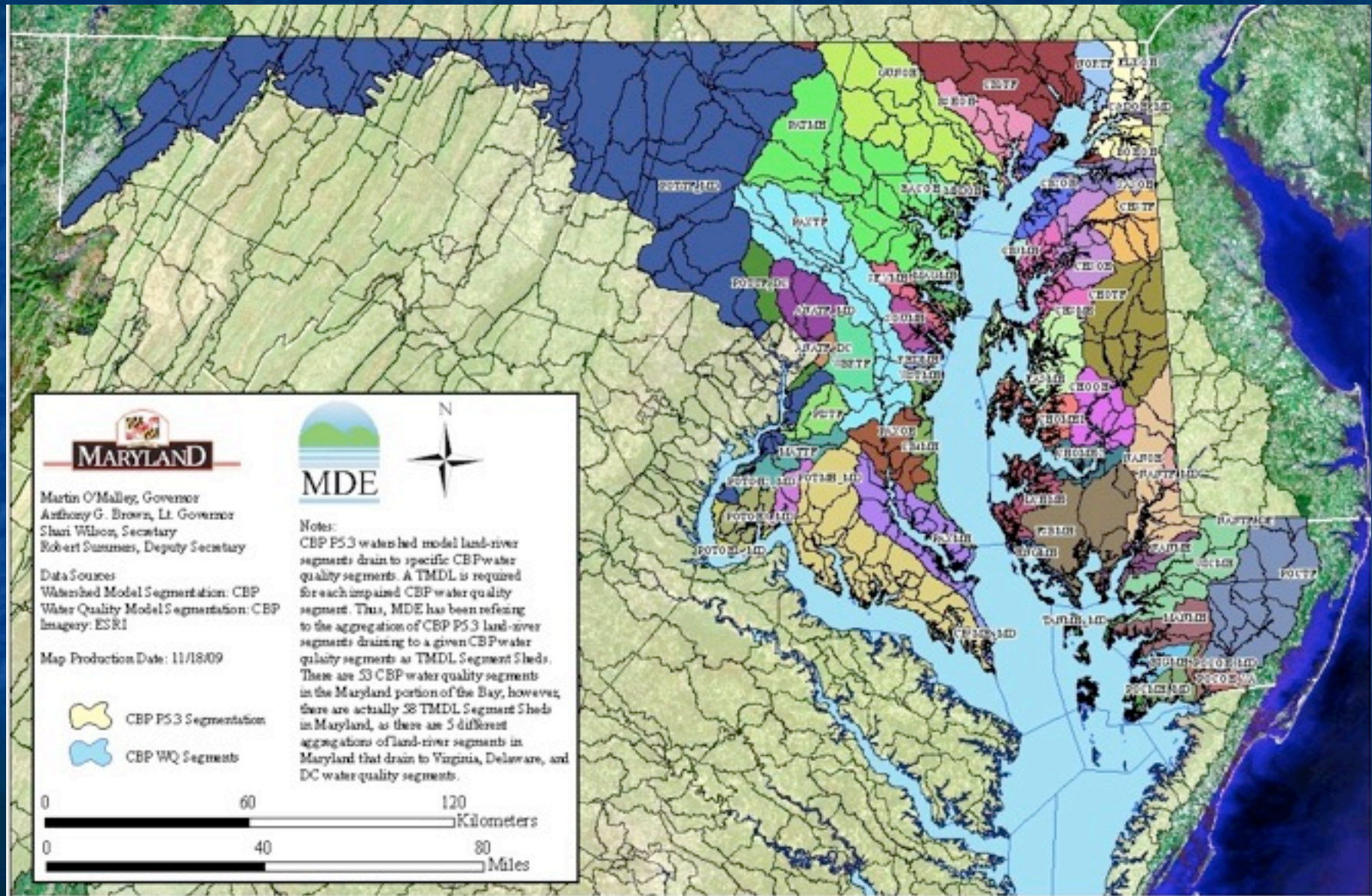
Baselines are applied to all the pasture/field/animal areas within a tract that is being used to generate credits and must first achieve the stricter of:

- a) the level of nutrient reduction called for in the Bay TMDL for that segment;
- or
- b) the level of nutrient reduction called for in an applicable TMDL for the watershed where the credits are generated from.

The entire tract must meet the baseline to be eligible to generate credits.

Current agronomic and structural practices at the field level are analyzed to determine baseline.

58 Sub-Allocation (TMDL) Segmentsheds



Bay TMDL

New Ag Baseline Based on Model Version 5.32

	PTX	POT	SUS	WS	ES
N =	10.3	24.9	17.6	15.9	11.7
P =	1.34	1.78	0.9	1.1	1.0
Sediment	51.35	552.56	48.58	89.25	117.50
—					
	Statewide N =		16.7		
	Statewide P =		1.3		
	Statewide		859.24		

Setting the Baseline

- Baseline is the maximum load of nutrients that can be lost from agricultural land while still achieving the Bay TMDL/WIP goals or local TMDL requirements.
- For the Bay TMDL the baseline was determined by calculating the basinwide average load per land use acre that needs to be achieved in order to achieve TMDL/WIP goals.

Western Shore	Pre TN (lbs/ac)	TMDL TN (lbs/ac)
Crop	26.86	22.04
Pasture	9.56	9.93
Hay	7.51	5.52
Average Ag Load	25.50	15.90

Addressing Local Water Quality Impairments vs Chesapeake Bay TMDL

- MDE has developed 42 local nutrient TMDLs and 26 sediment TMDLs
- 26 of the local nutrient TMDLs require Ag load reduction lower than the Bay TMDL for nitrogen, phosphorus and sediments

Local TMDL vs Bay TMDL Examples

Western Shore Bay TMDL		Pretty boy Reservoir Local TMDL
Nitrogen		Nitrogen
Raw	26.86 mg/l	—
TMDL	15.90 mg/l	—
% Red	41%	—
Phosphorus		Phosphorus
Raw	2.01 mg/l	2.01 mg/l
TMDL	1.1 mg/l	0.56 mg/l
% Red	52%	83%

Local TMDL vs Bay TMDL Examples

Eastern Shore Bay TMDL		Chester River (Middle) Local TMDL
Nitrogen		Nitrogen
Raw	29.96 mg/l	29.96 mg/l
TMDL	11.7 mg/l	6.91 mg/l
% Red	61%	77%
Phosphorus		Phosphorus
Raw	2.01 mg/l	2.01 mg/l
TMDL	1.03 mg/l	0.49 mg/l
% Red	49%	73%

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	B	G	H	X	AE	AF	AG	AH	AI
		TMDL Name	Trading Basin	local TMDL lbs TN/ac baseline	local TMDL lbs TP/ac baseline	Bay TMDL lbs TN/ac baseline	Bay TMDL lbs TP/ac baseline	Final TN lbs/ac baseline	Final TP lbs/ac baseline
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2	21302030648	Adkins Pond	Eastern Shore of Chesapeake Bay	#VALUE!	0.27	11.70	1.03	11.70	0.27
3	21402050807	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
4	21402050808	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
5	21402050811	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
6	21402050814	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
7	21402050815	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
8	21402050816	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
9	21402050821	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
10	21402050822	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
11	21402050823	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
12	21402050824	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
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15	21402050827	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
16	21402050828	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
17	21402050829	Anacostia	Potomac River Basin	6.61	0.41	24.59	1.78	6.61	0.41
18	21309011038	Back River	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
19	21309011039	Back River	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
20	21309011040	Back River	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
21	21309011041	Back River	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
22	21309011042	Back River	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
23	21309031006	Baltimore Harbor	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
24	21309031007	Baltimore Harbor	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
25	21309031008	Baltimore Harbor	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04
26	21309031009	Baltimore Harbor	Western Shore of Chesapeake Bay	16.98	1.04	15.29	1.06	15.29	1.04

local vs Bay TMDL baseline comp

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2005 avg loads by basin

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28	21301060672	Big Millpond	Eastern Shore of Chesapeake Bay	#VALUE!	0.37	11.70	1.03	11.70	0.37
29	21306020363	Bohemia River	Eastern Shore of Chesapeake Bay	10.83	0.82	11.70	1.03	10.83	0.82
30	21306020364	Bohemia River	Eastern Shore of Chesapeake Bay	10.83	0.82	11.70	1.03	10.83	0.82
31	21306020365	Bohemia River	Eastern Shore of Chesapeake Bay	10.83	0.82	11.70	1.03	10.83	0.82
32	21306020366	Bohemia River	Eastern Shore of Chesapeake Bay	10.83	0.82	11.70	1.03	10.83	0.82
33	21401040720	Breton Bay	Potomac River Basin	22.04	1.42	24.59	1.78	22.04	1.42
34	21401040721	Breton Bay	Potomac River Basin	22.04	1.42	24.59	1.78	22.04	1.42
35	21401040722	Breton Bay	Potomac River Basin	22.04	1.42	24.59	1.78	22.04	1.42
36	21401040723	Breton Bay	Potomac River Basin	22.04	1.42	24.59	1.78	22.04	1.42
37	21401040724	Breton Bay	Potomac River Basin	22.04	1.42	24.59	1.78	22.04	1.42
38	21311050955	Centennial Lake	Patuxent River Basin	#VALUE!	0.69	10.16	1.34	10.16	0.69
39	21305090415	Chester River, Middle/Urieville Lake	Eastern Shore of Chesapeake Bay	6.91	0.49	11.70	1.03	6.91	0.49
40	21305100416	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
41	21305100417	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
42	21305100418	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
43	21305100419	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
44	21305100420	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
45	21305100421	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
46	21305100422	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
47	21305100423	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
48	21305100424	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
49	21305100425	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
50	21305100426	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60
51	21305100427	Chester River, Upper	Eastern Shore of Chesapeake Bay	7.22	0.60	11.70	1.03	7.22	0.60

local vs Bay TMDL baseline comp

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2005 avg loads by basin

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54	21303080592	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
55	21303080594	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
56	21303080595	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
57	21303080596	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
58	21303080597	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
59	21303080598	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
60	21303080599	Chicamacomico River	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
61	21402080857	Clopper Lake	Potomac River Basin	#VALUE!	1.12	24.59	1.78	24.59	1.12
62	21303040566	Johnson Pond	Eastern Shore of Chesapeake Bay	#VALUE!	0.72	11.70	1.03	11.70	0.72
63	21303040567	Johnson Pond	Eastern Shore of Chesapeake Bay	#VALUE!	0.72	11.70	1.03	11.70	0.72
64	21303040568	Johnson Pond	Eastern Shore of Chesapeake Bay	#VALUE!	0.72	11.70	1.03	11.70	0.72
65	21410020107	Lake Habeeb	Potomac River Basin	#VALUE!	1.55	24.59	1.78	24.59	1.55
66	21403020223	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
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70	21403020227	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
71	21403020228	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
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73	21403020230	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
74	21403020231	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
75	21403020232	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
76	21403020233	Lake Liganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
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		TMDL Name	Trading Basin	local TMDL lbs TN/ac baseline	local TMDL lbs TP/ac baseline	Bay TMDL lbs TN/ac baseline	Bay TMDL lbs TP/ac baseline	Final TN lbs/ac baseline	Final TP lbs/ac baseline
1	DNR-12DIG								
77	21403020234	Lake Linganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
78	21403020235	Lake Linganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
79	21403020236	Lake Linganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
80	21403020237	Lake Linganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
81	21403020238	Lake Linganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
82	21403020239	Lake Linganore	Potomac River Basin	#VALUE!	0.20	24.59	1.78	24.59	0.20
83	21308050300	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
84	21308050302	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
85	21308050303	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
86	21308050304	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
87	21308050305	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
88	21308050306	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
89	21308050307	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
90	21308050308	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
91	21308050309	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
92	21308050311	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
93	21308050312	Loch Raven Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.61	15.29	1.06	15.29	0.61
94	21303010558	Lower Wicomico River	Eastern Shore of Chesapeake Bay	9.42	0.71	11.70	1.03	9.42	0.71
95	21302080656	Manokin River	Eastern Shore of Chesapeake Bay	10.52	#VALUE!	11.70	1.03	10.52	1.03
96	21302080657	Manokin River	Eastern Shore of Chesapeake Bay	10.52	#VALUE!	11.70	1.03	10.52	1.03
97	21302080658	Manokin River	Eastern Shore of Chesapeake Bay	10.52	#VALUE!	11.70	1.03	10.52	1.03
98	21302080659	Manokin River	Eastern Shore of Chesapeake Bay	10.52	#VALUE!	11.70	1.03	10.52	1.03
99	21302080660	Manokin River	Eastern Shore of Chesapeake Bay	10.52	#VALUE!	11.70	1.03	10.52	1.03
100	21302080661	Manokin River	Eastern Shore of Chesapeake Bay	10.52	#VALUE!	11.70	1.03	10.52	1.03
101	21303060601	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71

local vs Bay TMDL baseline comp

md_shed_lrs_union_areas

2005 avg loads by basin

Ready

Count: 5053

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MD local TMDLs and Bay baselines (2).xlsx - Microsoft Excel									
<div> <div>HomeInsertPage LayoutFormulasDataReviewViewAcrobat</div> <div> <div>Security Warning</div> <div>Automatic update of links has been disabled</div> <div>Options...</div> </div> </div>									
<div> <div>B1</div> <div>fx</div> <div>DNR-12DIG</div> </div>									
	B	G	H	X	AE	AF	AG	AH	AI
		TMDL Name	Trading Basin	local TMDL lbs TN/ac baseline	local TMDL lbs TP/ac baseline	Bay TMDL lbs TN/ac baseline	Bay TMDL lbs TP/ac baseline	Final TN lbs/ac baseline	Final TP lbs/ac baseline
102	21303060602	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
103	21303060603	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
104	21303060604	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
105	21303060605	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
106	21303060607	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
107	21303060608	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
108	21303060609	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
109	21303060610	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
110	21303060611	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
111	21303060612	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
112	21303060613	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
113	21303060614	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
114	21303060615	Marshyhope Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.71	11.70	1.03	11.70	0.71
115	21401110780	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
116	21401110781	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
117	21401110782	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
118	21401110783	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
119	21401110784	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
120	21401110785	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
121	21401110786	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
122	21401110787	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
123	21401110788	Mattawoman Creek	Potomac River Basin	18.89	1.22	24.59	1.78	18.89	1.22
124	21306080374	Northeast River	Eastern Shore of Chesapeake Bay	8.16	0.62	11.70	1.03	8.16	0.62
125	21306080375	Northeast River	Eastern Shore of Chesapeake Bay	8.16	0.62	11.70	1.03	8.16	0.62
126	21306080376	Northeast River	Eastern Shore of Chesapeake Bay	8.16	0.62	11.70	1.03	8.16	0.62
<div> <div>local vs Bay TMDL baseline comp</div> <div>md_shed_lrs_union_areas</div> <div>2005 avg loads by basin</div> </div>									
<div> <div>Ready</div> <div>Count: 5053</div> <div>100%</div> </div>									
<div> <div>start</div> <div>Inbox (2,205) - elz...</div> <div>PUBLIC (F:)</div> <div>Microsoft PowerPol...</div> <div>Microsoft Excel - M...</div> <div>basecht4.JPG - Paint</div> <div>basecht5.JPG - Paint</div> <div>12:26 PM</div> </div>									

Home

Insert

Page Layout

Formulas

Data

Review

View

Acrobat

MD local TMDLs and Bay baselines (2).xlsx - Microsoft Excel

Security Warning

Automatic update of links has been disabled

Options...

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fx

DNR-12DIG

	B	G	H	X	AE	AF	AG	AH	AI
		TMDL Name	Trading Basin	local TMDL lbs TN/ac baseline	local TMDL lbs TP/ac baseline	Bay TMDL lbs TN/ac baseline	Bay TMDL lbs TP/ac baseline	Final TN lbs/ac baseline	Final TP lbs/ac baseline
1	DNR-12DIG								
127	21306080377	Northeast River	Eastern Shore of Chesapeake Bay	8.16	0.62	11.70	1.03	8.16	0.62
128	21306080378	Northeast River	Eastern Shore of Chesapeake Bay	8.16	0.62	11.70	1.03	8.16	0.62
129	21306080379	Northeast River	Eastern Shore of Chesapeake Bay	8.16	0.62	11.70	1.03	8.16	0.62
130	21308060313	Prettyboy Reservoir	Western Shore of Chesapeake Bay	#VALUE!	0.56	15.29	1.06	15.29	0.56
131	21311070941	Rocky Gorge Reservoir	Patuxent River Basin	#VALUE!	0.73	10.16	1.34	10.16	0.73
132	21306100353	Sassafras River	Eastern Shore of Chesapeake Bay	#VALUE!	0.81	11.70	1.03	11.70	0.81
133	21306100354	Sassafras River	Eastern Shore of Chesapeake Bay	#VALUE!	0.81	11.70	1.03	11.70	0.81
134	21306100355	Sassafras River	Eastern Shore of Chesapeake Bay	#VALUE!	0.81	11.70	1.03	11.70	0.81
135	21306100356	Sassafras River	Eastern Shore of Chesapeake Bay	#VALUE!	0.81	11.70	1.03	11.70	0.81
136	21306100357	Sassafras River	Eastern Shore of Chesapeake Bay	#VALUE!	0.81	11.70	1.03	11.70	0.81
137	21305080399	Southeast Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.46	11.70	1.03	11.70	0.46
138	21305080400	Southeast Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.46	11.70	1.03	11.70	0.46
139	21305080401	Southeast Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.46	11.70	1.03	11.70	0.46
140	21305080403	Southeast Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.46	11.70	1.03	11.70	0.46
141	21305080404	Southeast Creek	Eastern Shore of Chesapeake Bay	#VALUE!	0.46	11.70	1.03	11.70	0.46
142	21306110349	Stillpond Creek/Worton Creek	Eastern Shore of Chesapeake Bay	9.42	0.71	11.70	1.03	9.42	0.71
143	21307061135	Swan Creek	Western Shore of Chesapeake Bay	7.99	0.49	15.29	1.06	7.99	0.49
144	21307061136	Swan Creek	Western Shore of Chesapeake Bay	7.99	0.49	15.29	1.06	7.99	0.49
145	21304030463	Town Creek/Unnamed Pond of La Tra	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
146	21311080966	Triadelphia Reservoir	Patuxent River Basin	#VALUE!	0.59	10.16	1.34	10.16	0.59
147	21303030563	Wicomico Creek	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
148	21303030564	Wicomico Creek	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
149	21303030565	Wicomico Creek	Eastern Shore of Chesapeake Bay	10.20	0.77	11.70	1.03	10.20	0.77
150									
151									

local vs Bay TMDL baseline comp

md_shed_lrs_union_areas

2005 avg loads by basin

Ready

Count: 5053

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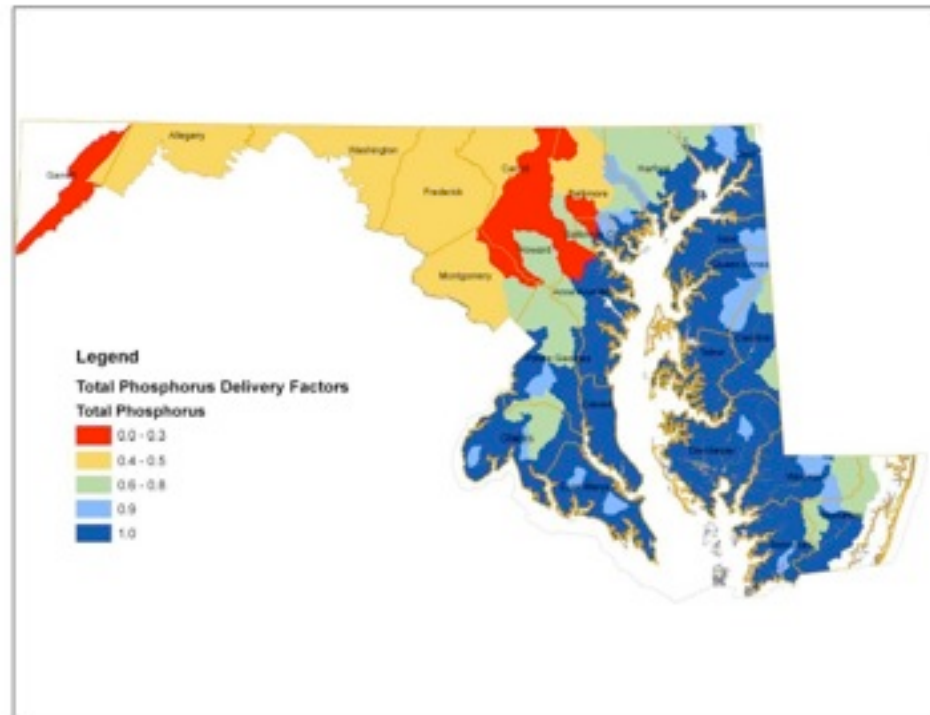
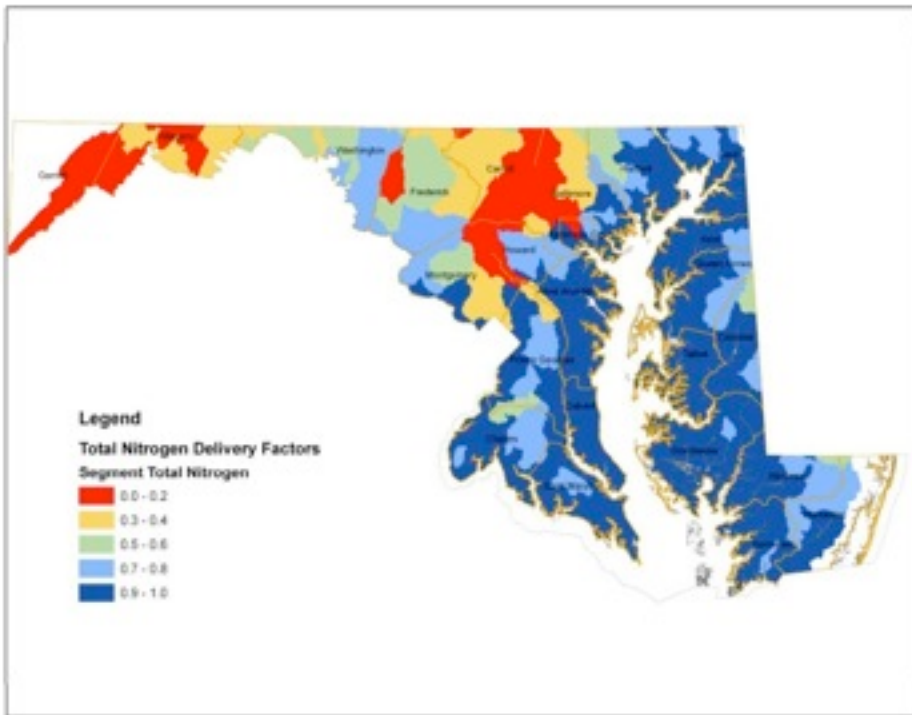
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Early Howard County MDNTT

Farm	Baseline Met?	N Red EOS	N Red to Bay	Bay N Credits Generated	P Red EOS								P Red Bay	P Credits Generated
Farmer 1	N Only	21.9	2.6	3	0								0	0
Farmer 2	Yes	42.6	35.8	36	7.5								5.4	5
Farmer 3	Yes	10.3	1.2	1	4.7								3.4	3
Farmer 4	Yes	48.1	5.8	6	10.3								7.4	7
Farmer 5	N Only	9.4	7.9	8	0								0	0
Farmer 6	Yes	443.1	367.8	368	16.4								15.6	16
Farmer 7	Yes	42.2	35.5	35	18.2								13.1	13
Farmer 8	N Only	76.3	9.2	9	0								0	0
Farmer 9	Yes	304.9	36.6	37	20.3								14.6	15
Farmer 10	Yes	217.1	26.1	26	2								1.4	1
Farmer 11	N Only	485	58.2	58	MDNTT Howard County Results*									
Farmer 12	Yes	173	20.8	21	7.5								5.4	5
SUBTOTAL		1873.9	607.5	608	86.9								66.3	65
*Version 2 MDNTT														

DELIVERY FACTOR IMPACT ON CREDIT GENERATION



What is Tradeable

How to Generate Credits

Once a landowner or operator has determined the tract has achieved the baseline requirements for the watershed additional implementation of water quality improvements can be considered as a tradable credit. No partial credits for BMPs utilized to meet baseline.

Tradeable credits can be generated from any planned agronomic, land conversion, or structural practice.

Agricultural Non-Point Source Credit Potential

- Three categories of credit-generating practices
 1. BMPs with “approved” load reductions
 - Bay Program peer review has been done
 - Stipulated BMP efficiencies built into watershed model
 - Uncertainty built into efficiency
 - No separate uncertainty ratio for the trade

Agricultural Non-Point Source Credit Potential (cont.)

- BMPs with Approved Load Reductions
 - Continuous No-Till
 - Riparian Forest Buffers
 - Riparian Grass Buffers
 - Wetland Restoration
 - Tree Planting
 - Cover Crops (Early – and Late – Planting)
 - Off Stream Watering w/ Fencing
 - Off Stream Watering w/o Fencing
 - Off Stream Watering, Fencing, and Rotation Grazing
 - Animal Waste Management Systems: Livestock
 - Animal Waste Management Systems: Poultry
 - Barnyard Runoff Control/Loafing Lot Management

Agricultural Non-Point Source Credit Potential (cont.)

- Three categories of credit-generating practices
 2. BMPs requiring technical review
 - Practices currently in use
 - Require review and establishment of efficiencies by technical workgroup, may have a Bay Program interim efficiency
 - Credits can be traded but will be assigned an uncertainty ratio

Agricultural Non-Point Source Credit Potential (cont.)

- BMPs Requiring Technical Review
 - Dairy Precision Feeding
 - Dairy Manure Incorporation
 - Nursery Water Capture and Reuse
 - Stream Restoration
 - Commodity Cover Crops
 - Ammonia Emission Reduction

Agricultural Non-Point Source Credit Potential (cont.)

- Three categories of credit-generating practices
 3. Other BMPs, practices, or innovative approaches
 - Innovative practices not currently in widespread use
 - Will be reviewed on case-by-case basis
 - Will establish specifications for
 - Installation
 - Operation
 - Maintenance
 - Monitoring
 - Will establish uncertainty ratio
 - Proposal will be reviewed by a technical workgroup

Agricultural Non-Point Source Credit Potential (cont.)

- Other BMPs, practices, or innovative approaches
 - Algal Turf Scrubber
 - Poultry Manure Incorporation
 - Phosphorus Sorbing Materials (PSMs)
 - Oyster Aquaculture
 - Floating Wetlands

Agricultural Non-Point Source Verification, Certification, and Approval

- Submit credit registration and certification form to MDA
- The program or representative will conduct field visit to verify that baseline condition and credit generation proposal is appropriate

The image shows a PDF document titled "MDA_CCR_Form.pdf - Adobe Acrobat Pro" open in a web browser. The document is the "State of Maryland Maryland Department of Agriculture Nutrient Credit Certification and Registration Form". It features the Maryland Department of Agriculture logo on the left and the state seal on the right. The form is divided into three main sections:

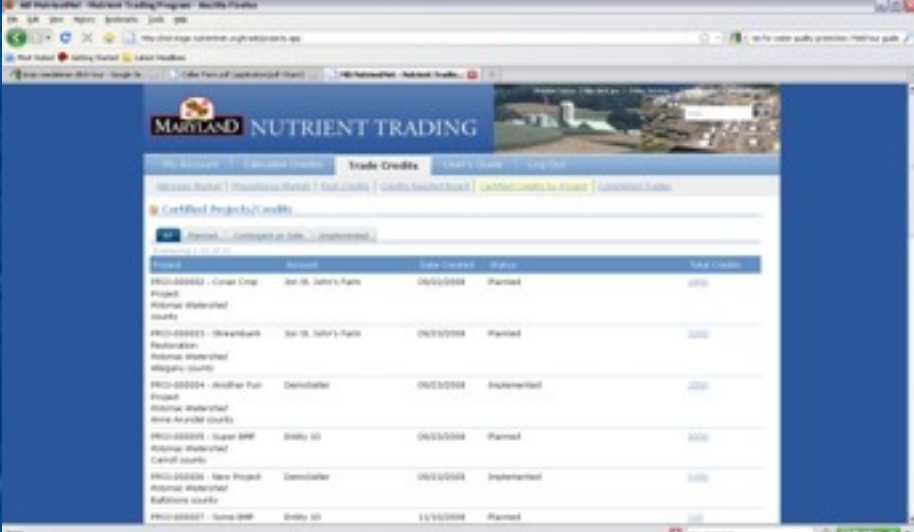
- 1. Applicant Information:**
 - First Name _____ MI _____ Last Name _____
 - Company Name (if applicable) _____ Title _____
- 2. Applicant Address:**
 - Number _____ Street _____
 - Town _____ State _____ Zip _____
- 3. Property Information:**

If the applicant is not the property owner or renter with control, enter the name of the owner or party in control of the property: _____

The bottom of the screenshot shows the Windows taskbar with the Start button and several open applications, including the PDF viewer and a web browser.

Agricultural Non Point Source Verification, Certification, and Approval

- Application review:
 - Base line requirement
 - Compliance met
 - Credit generation proposal is reasonable
 - Landowner/operator consent
 - Tract information correct
- Approved credits are given a unique registration number and entered in the online Trading Registry.



The screenshot displays the Maryland Nutrient Trading Program website. The header includes the Maryland state logo and the text "NUTRIENT TRADING". Below the header, there are navigation tabs: "Home", "About", "Credits", "Trading", "Compliance", and "Help". The main content area is titled "Certified Projects/Credits" and features a table with the following columns: "Project", "Tract", "Date Created", "Status", and "Total Credits". The table lists several projects, including "Project 000001 - Green Crop", "Project 000002 - Streambank", "Project 000003 - Streambank", "Project 000004 - Streambank", "Project 000005 - Streambank", "Project 000006 - Streambank", "Project 000007 - Streambank", and "Project 000008 - Streambank". Each project entry includes details about the tract, the date created, the status, and the total credits available.

Project	Tract	Date Created	Status	Total Credits
Project 000001 - Green Crop	See 16, John's Farm	06/01/2008	Planned	1000
Project 000002 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000
Project 000003 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000
Project 000004 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000
Project 000005 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000
Project 000006 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000
Project 000007 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000
Project 000008 - Streambank	See 16, John's Farm	06/01/2008	Planned	1000

Exchange of Agricultural Credits

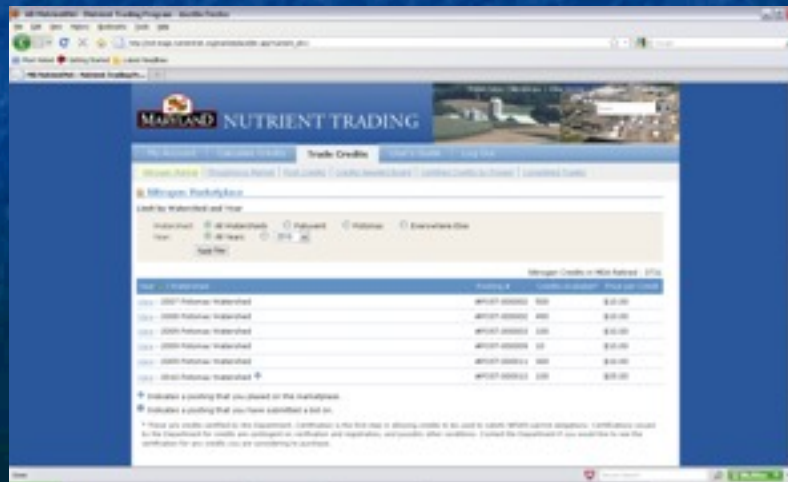
- Finding a trading partner
- How to sell credits
- Developing trade agreements
- Accountability/Verification/Administration



Exchange of Non-Point Credits

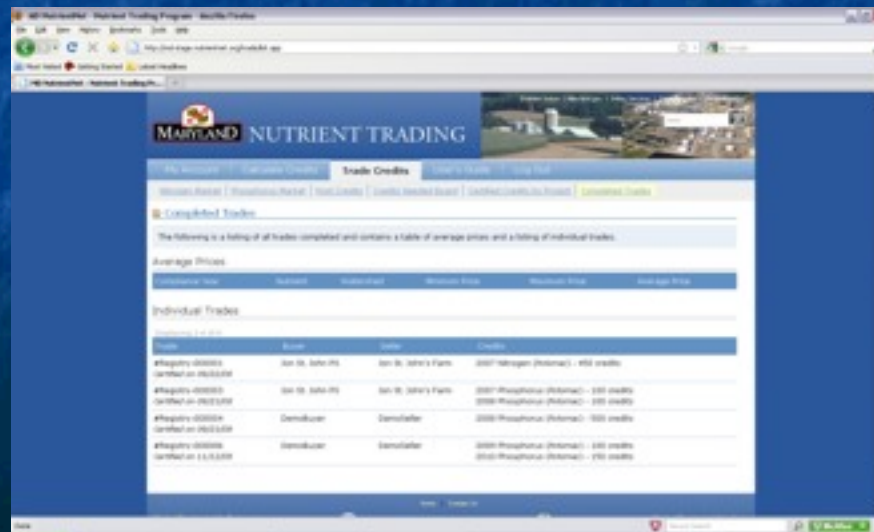
- Marketplace

- Program functions as a free market, buyers and sellers are free to negotiate the terms of a trade
- Trades are formalized through private agreements, a contractual arrangement
- Participants are free to utilize the web base marketplace as a mechanism to assist with credit purchase



Exchange of Non-Point Credits

- Credits may be sold directly to a regulated point source or to a conservation buyer (offset or retirement)
- Purchasing contracts between buyers and sellers
- May be brokers or aggregators
- Requirements for contract elements
- Contracts for sales to regulated buyers, approved by MDE
- Contracts for sales to non regulated buyers, approved by MDA
- A 10% retirement ration applies to all exchanges
- Upon approval trade is recorded in the Trade Registry



The screenshot shows the Maryland Nutrient Trading Program website. The main heading is "MARYLAND NUTRIENT TRADING". Below it, there are tabs for "Trade Credits", "Conservation Credits", and "Trade Registry". The "Trade Registry" tab is selected, displaying a table of completed trades. The table is titled "Completed Trades" and includes a sub-header "The following is a listing of all trades completed and contains a table of average prices and a listing of individual trades." Below this, there are two tables: "Average Prices" and "Individual Trades".

Trade ID	Buyer	Seller	Trade Type	Average Price
#Regist-000001	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000002	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000003	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000004	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000005	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000006	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000007	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000008	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000009	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits
#Regist-000010	San Jo, John's Farm	San Jo, John's Farm	2007 Phosphorus (Internal)	450 credits

Trade Agreements

- Required elements of a Nutrient Trading Contract
 - Identification and contact information of parties including signature
 - Location of credits
 - Duration of contract in years
 - Quantity of credits to be exchanged each year of the contract
 - Method of credit generation, certification and registry number

Trade Agreements (cont.)

- Required elements of a Nutrient Trading Contract
 - Obligation of the seller, including agreement to:
 - Property maintain BMP or other specified facilities
 - Allow regular inspections by independent third party and MDA
 - Maintain compliance with all applicable federal, state, and local requirements
 - Obligation of the buyer:
 - Provide independent third party inspection, minimal once yearly
 - Prompt payment for all services and specified yearly dates
 - Regulated buyer to provide provision for violation of contract terms

Accountability/Verification/Administration

- A practice can only generate credits once it is installed and functioning
- An inspection to certify standards and spec were met and the BMP is functional is required
- The full annual credit produced by the practice will not be certified until the year following the year of installation
- Credits are used in the year they are generated
- Credits can not be banked for sale and used in future years
- The Maryland Department of Agriculture (or its designee) will perform annual spot checks on a

Current Guidelines

- Practices verified at three different levels once they are part of a trade contract
 - A. Installation, meets standards and specs
 - B. Requirements for annual inspection and verification by buyer's representative and/or MDE
 - C. Random spot checks by MDA representative
- Report is issued and provided to all parties - farmer/landowner, MDA, MDE, buyer, aggregator
- Requires certification and verification by technically proficient, third party personnel with annual review of baseline practices and credit generating practices
- "Technical proficient" – Requires Nutrient Management Planner certification, and demonstrated knowledge and practical application of the NRCS Technical Guide/Practice Standards

Maintenance Actions

- Corrective action order issued by MDA
- Allow 30-day repair, back to specs
- Requires reinspection and signoff

Possible Reasons for Decertification

- Credits not sold over lifetime of certification
- Practice installed is substantially different
- Practice does not meet standards and specs
- Practice is not maintained
- Farm does not meet baseline

Decertification of Credits

- Notice issued by MDA to registered credit owner with effective date, and copies to all affected parties
- Allows for appeal to Secretary of Agriculture
- Notice of decertification published on program website and emailed to all parties
- Does not preclude any punitive action as covered in buyer's contract or as part of an NPDES permit

Summary of Non-Point Source Program Structure

- Utilizing a web based nutrient trading application with tools to calculate eligibility and credit potential
- Provides for nitrogen and phosphorus credit calculation from agricultural sources, sediment in 2013
- Provides a separate market place for buyers and sellers of approved credits to post and exchange information on credit quantity and price
- Provides a registry to track and register trades
- User's guide provides procedures to calculate credits and submit credit proposals with "non-approved" load reduction BMPs

Trading Program Activities Going Forward

- Turning on the sediment and carbon calculation tools in Version III
- Adding local sediment TMDL to baseline loading Version III
- CIG grant to utilize Maryland's Nutrient Trading Tool (Performance Assessment) for 100 farms in VA and PA as part of a uniform multi State Trading Platform
- Intergreation of the Nutrient Assessment Tool in all NRCS Conservation Planning software
- National Soybean Board grant to pay 36 farmers to go through to certification and assess trade offers

Trading Program Activities Going Forward (cont.)

- Developing mapping tools and calculation tools for urban offsite mitigation of offset needs
- Expanding Registry and Market for septic, stormwater and WWTP credits

Agricultural Nutrient Trading Credits Calculation Tool

NutrientNet Load Calculations



Management Info
Spatial Info



NTT Output
(Edge of Farm)

Structural
BMPs




EOS
Delivery

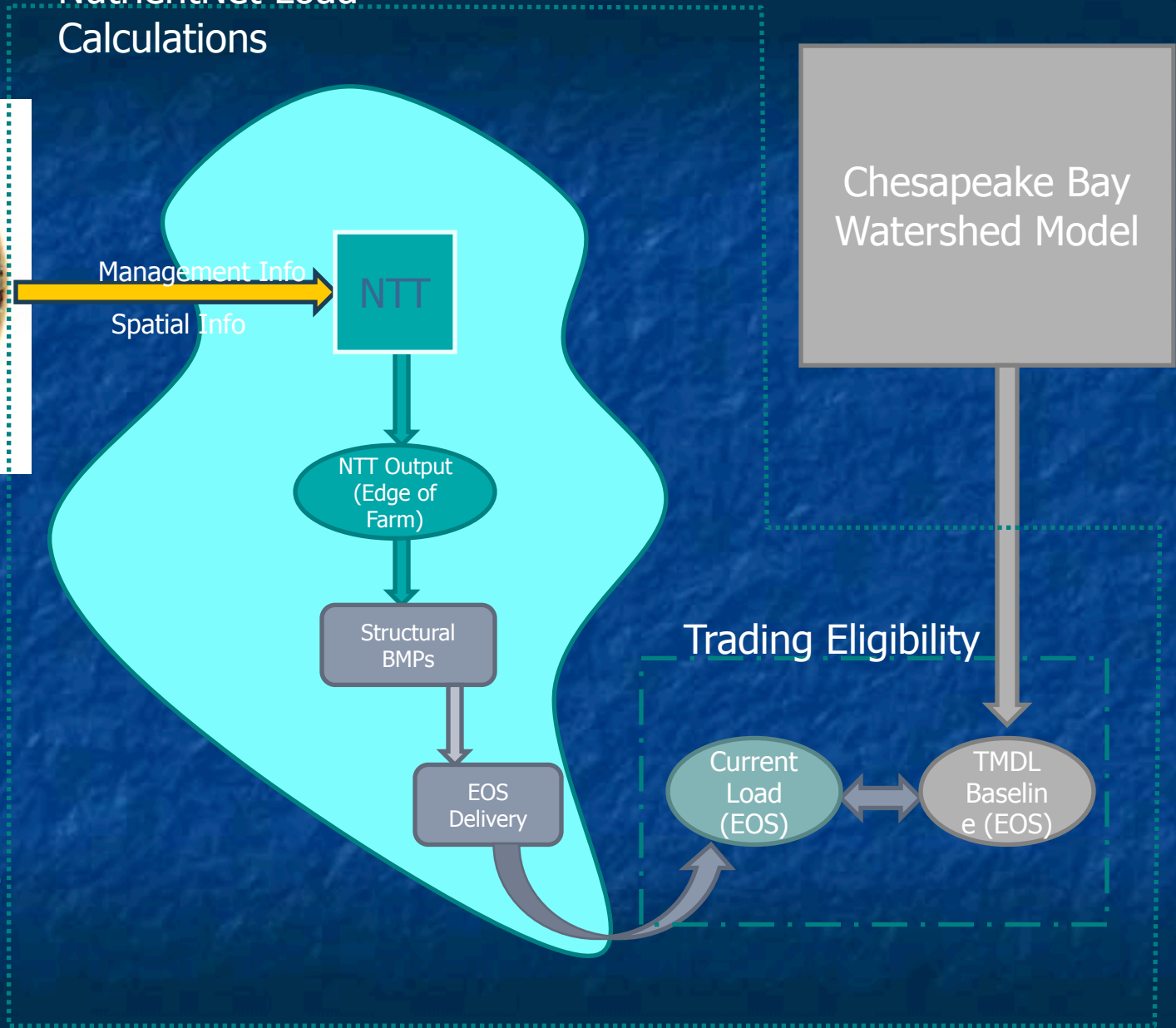
Chesapeake Bay
Watershed Model

Trading Eligibility

Current
Load
(EOS)

TMDL
Baselin
e (EOS)

-  Nutrient Tracking Tool
-  NutrientNet Operations
-  Chesapeake Bay Watershed Model



NTT - APEX

- The NTT application specifically arrays the output of the APEX model in terms of delta products or the difference between existing conditions and proposed conservation.

Existing
Condition

-

Proposed
Conservation

=

Nitrogen and
Phosphorus
Saved

Nutrient Tracking Tool

- Currently NTT is used in Maryland with the WRI Nutrient Net application
- In Oregon the Willamette Partnership uses the NTT
- EPRI evaluated NTT for use in the Ohio River Basin
- NTT functionality will be embedded in CDSI

Nutrient Tracking Tool – Ongoing CIG Projects

- State of Mississippi
- State of California
- State of Missouri
- Oregon, Washington, and Idaho
(EPA Region 10)
- Chesapeake Bay Foundation, WRI, Howard SCD, received a CIG grant to demonstrate the Maryland Trading Tool on 100 farms in VA and PA as part of a uniform multi-state trading platform.

Baseline and Credit Calculation Example

