Water Quality Programs and Regulating Point Source Pollution

Presentation to the
State Water Commission
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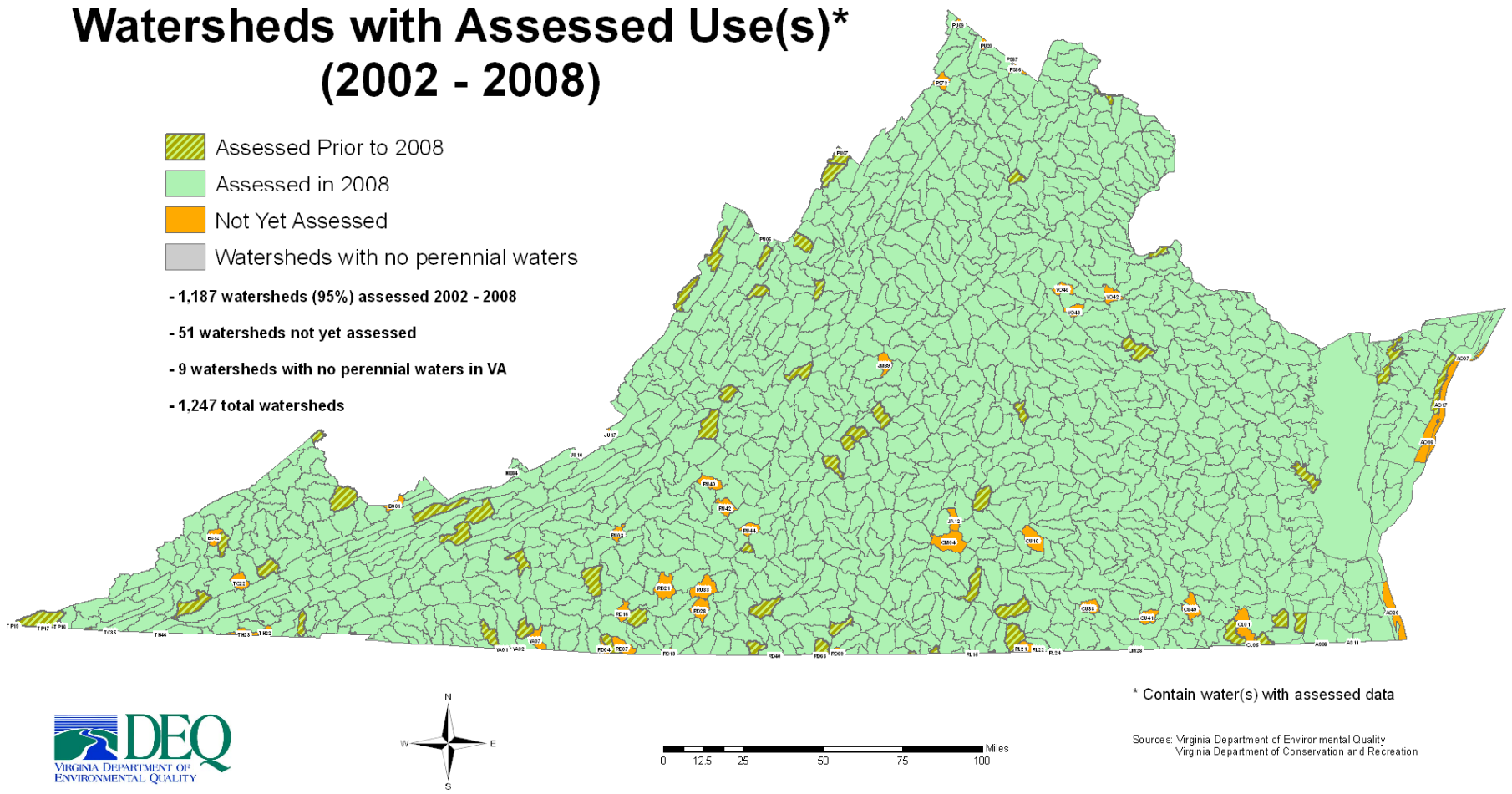
Presentation Outline

- Steps In Water Quality Management
- Water Quality Assessment
- Total Maximum Daily Loads – TMDLs
- Permits for Point Source Discharges
- Reducing Nutrient Loads to the Chesapeake Bay
  - Trading and the Watershed General Permit
  - Funding
  - Progress

Steps in Water Quality Management Process

- Establish Water Quality Standards to protect uses
- Monitor waters and assess data
- Place Impaired Waters on 303(d) List if Standards not attained
- Develop TMDL - Total Maximum Daily Load - for Impaired Waters
- Develop TMDL Implementation Plan
- Implement TMDL Plan
- Remove Waters from 303(d) List when monitoring shows Water Quality Standards attained

Assessments within 95% of Watersheds in 2002 – 2008 305(b) Reports



2008 Assessed Area

Waterbody Type	Total	Assessed	Attained Use	Impaired
Rivers (miles)	51,016	15,951[1]	5,408	10,543
Lakes (acres)	115,835	112,310	18,266	94,044[2]
Estuaries (sq. miles)	2,305	2,305	123	2,182

[1] River/stream miles assessed increased to a record 31%

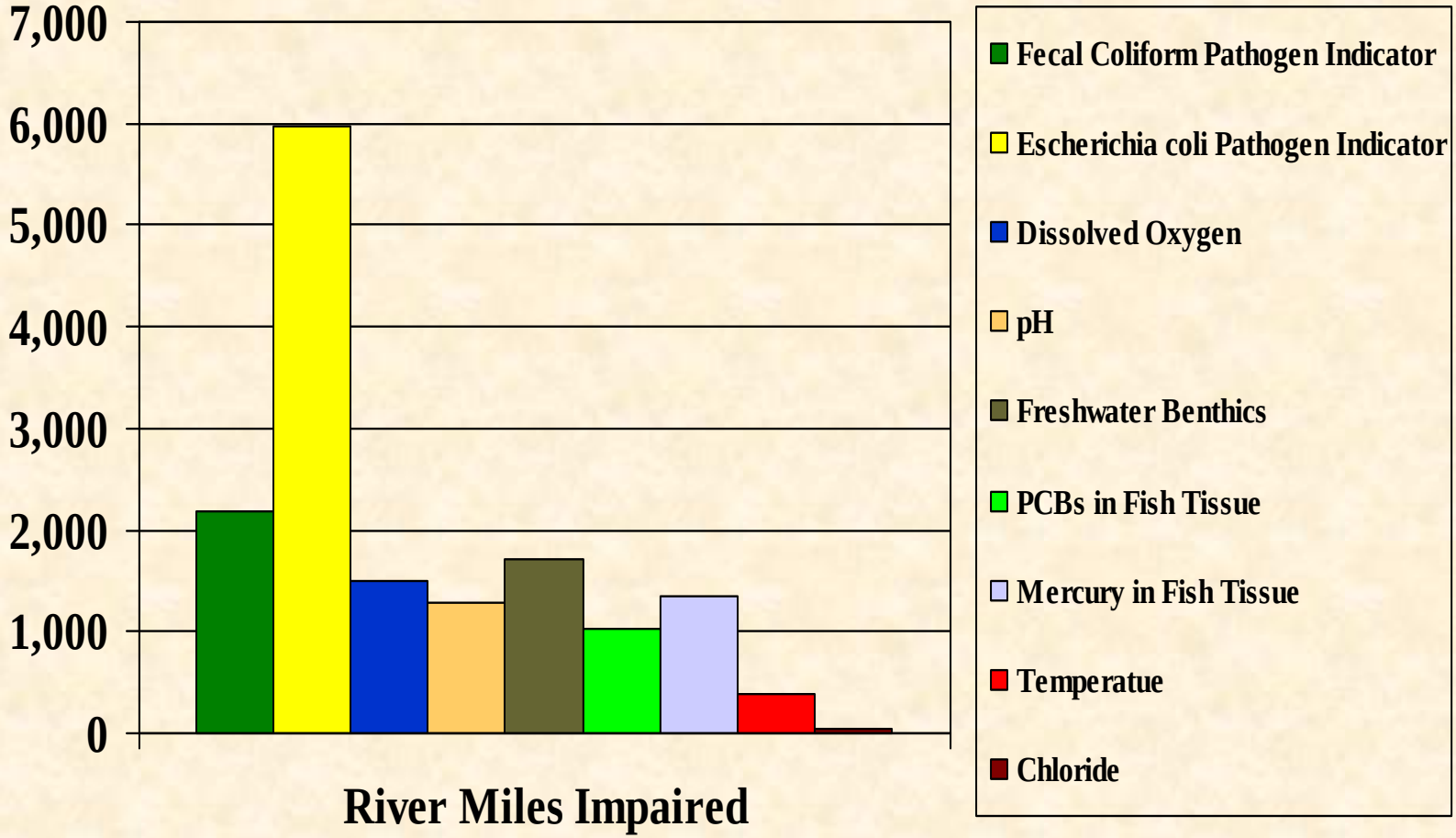
[2] Lakes no longer monitored for DO on the bottom

Impaired Area Identified Per Assessment Cycle by Waterbody Type

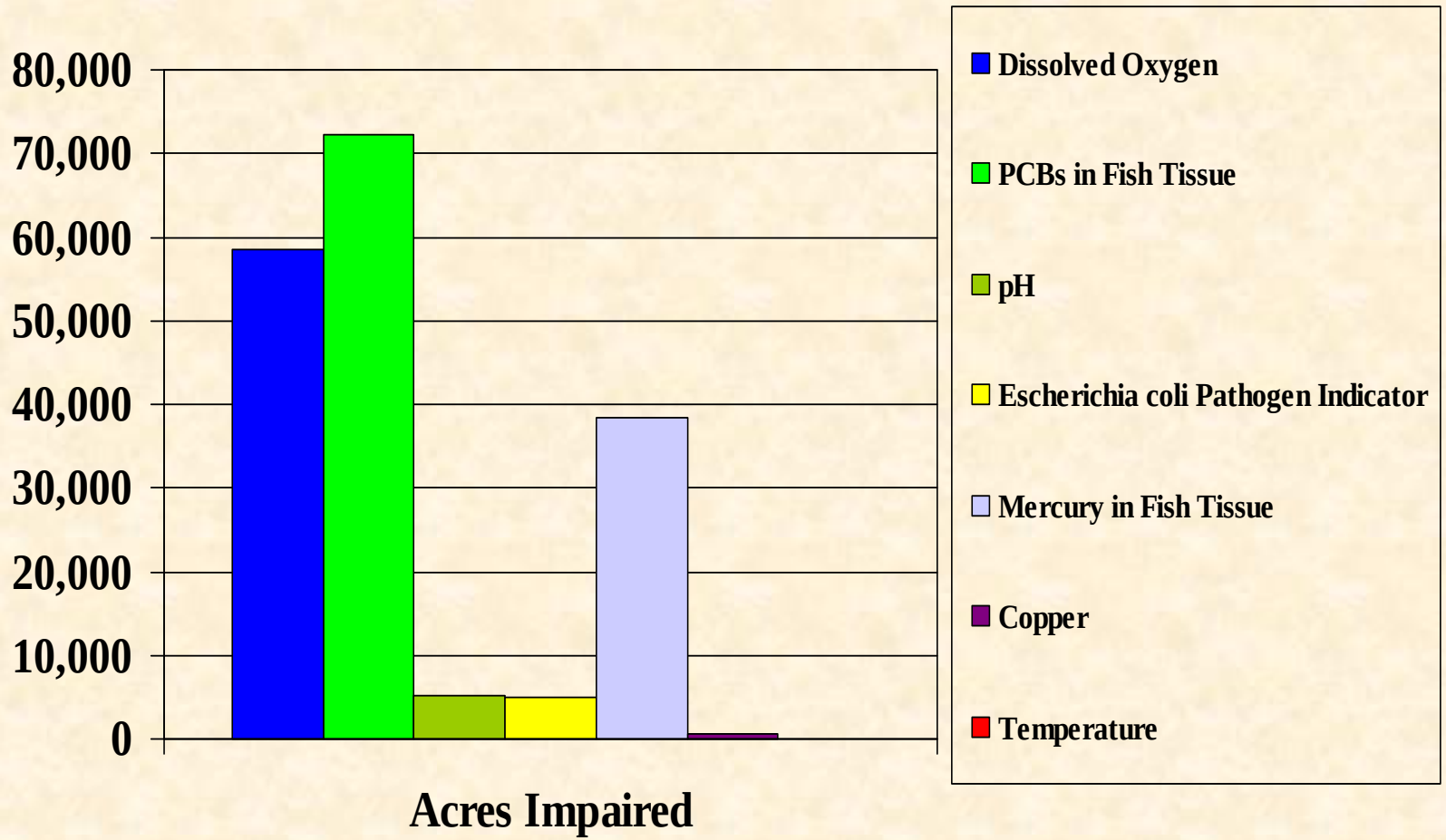
Waterbody Type	1998	2002	2004	2006	2008
Rivers 51,016 (miles)	2,611	4,838	6,931	9,002	10,543
Lakes 115,835 (acres)	0	115,558[1]	89,834	109,201	94,044
Estuaries 2,305 (sq. miles)	437	1,689	1,907	2,212	2,182

[1] Area included lakes shared by Virginia and North Carolina. 25,724 acres determined to be in North Carolina and removed from Virginia's 2004 total impaired acreage.

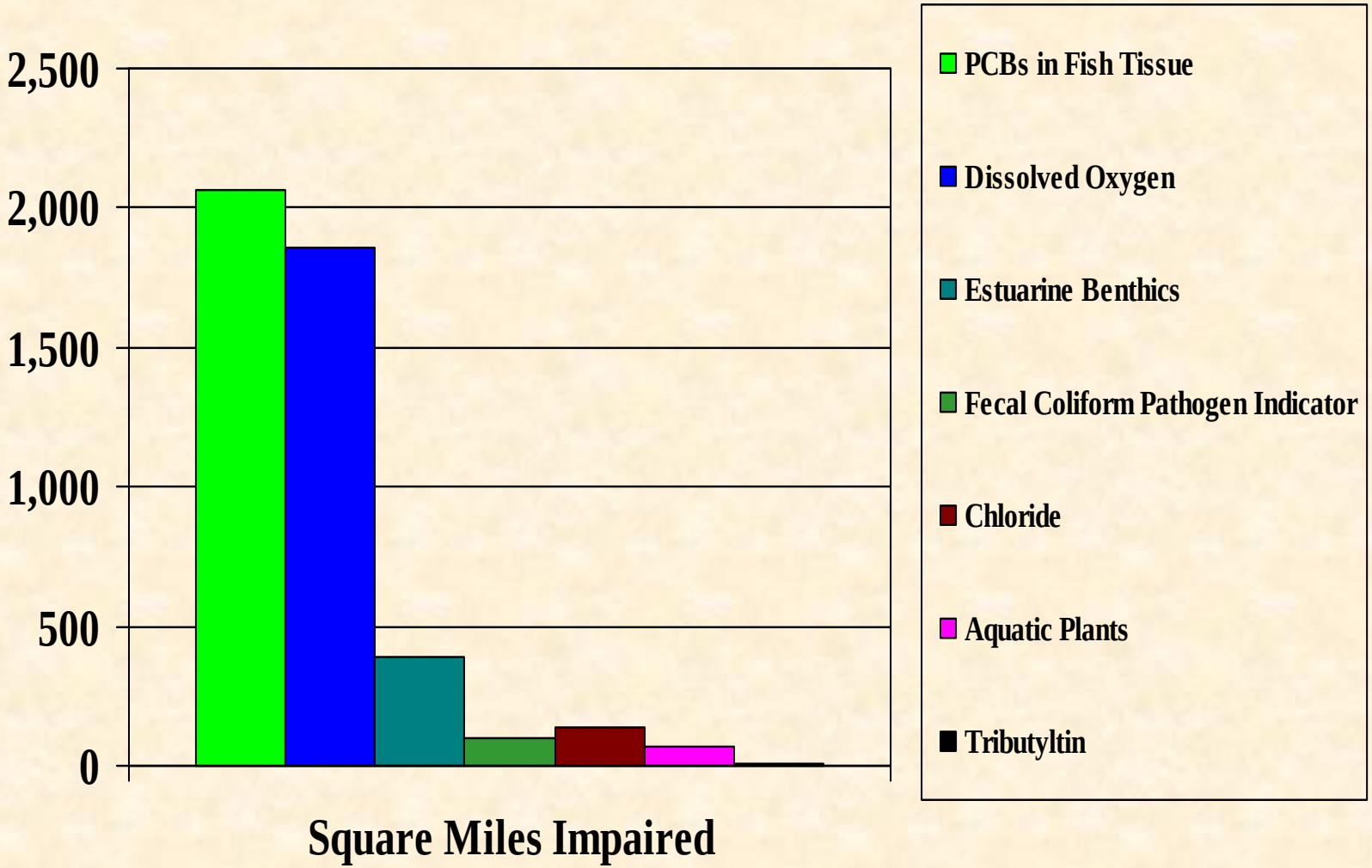
2008
Impairment Causes for Rivers



2008
Impairment Causes for Lakes



2008
Impairment Causes for Estuaries



Total Maximum Daily Loads

- TMDLs set a loading cap for a specific pollutant
- TMDL must be developed for each impaired water
- Watershed approach to restoring impaired waters
- TMDLs are expressed in terms of:
  - Daily and annual mass loading or other appropriate units
- Annual load is allocated among sources of pollutants within contributing watershed:
  - point sources – Waste Load Allocation (WLA)
  - non-point sources – Load Allocation (LA)
  - margin of safety (MOS)
  - TMDL = WLA + LA + MOS

TMDL Implementation Authorities

- State law directs DEQ to:
  1. develop TMDLs for impaired waters
  2. develop plans to implement TMDLs
  3. implement TMDLs
- WLAs - implemented through VPDES permits (DEQ, DMME, & DCR)
- LAs – develop implementation plans for non-point sources (DCR)
  - implement through cost share & other non-regulatory incentives
  - WLAs not included in TMDL IPs
- Under federal and state law, no additional regulatory authority created under a TMDL to implement non-point source actions

Status of TMDL Process

[through May 2008]

- TMDLs Developed for Impaired Waters
  - Covering 546 impairments
- TMDL Implementation Plans Developed
  - 88 completed; 29 more in progress
- Implementation underway
  - 40 received funds; 28 soon will
  - Seen water quality improvements, but standards not yet attained

Future of TMDL Development

- Virginia's TMDL program completes Consent Decree (CD) schedule in 2010
- Demand for TMDL development does not decrease after 2010
  - about 1,500 TMDLs statewide remaining to be developed by 2018 - based in 2006 listing
- EPA plans to replace the CD with a MOU containing a TMDL development schedule
  - plan to start MOU discussions in late 2008
- DEQ prefers some shift in resources towards implementation, not just further TMDL development

Need To Develop Chesapeake Bay TMDL

- Bay will not achieve water quality standards by 2010 so TMDL is needed
- VA working with EPA and five other Bay watershed states [and DC]
- TMDL is opportunity to assess progress and make adjustments in implementation
- Goal is for EPA to issue TMDL by end of 2010; under federal court schedule must be done by May 1, 2011
- Expect initial public meetings later this year to inform citizens of the process; draft TMDL should be noticed for public comment during summer of 2010

Permitting Point Sources Discharges

Virginia Pollutant Discharge Elimination System Permits

VPDES Permits

- Required when there is a point source discharge of pollutants to surface waters
- Permit includes:
  - Effluent limitations
  - Self monitoring and self reporting requirements
- Agencies involved:
  - DEQ – wastewater
  - DMME – mining
  - DCR – municipal storm water

Point Sources: Wastewater Treatment Plants

Point Source Discharges

- Focus DEQ resources through:
  - General Permit coverage (3,700 facilities)
  - Individual Permit issuance (1,100 facilities)
- Establish Priority Permits to be reissued each year - majors and discharges to impaired waters (TMDL)

Municipal & Industrial Discharge Permits

- **Effluent Limitations** in compliance with Water Quality Standards and Federal Effluent guidelines.
- **Antidegradation** – maintain existing high quality waters.
- **Antibacksliding** - no less stringent than previous permit.
- **Toxicity Testing** required where reasonable potential for standard violation.
- **Pretreatment** requirements for industrial discharges to municipal treatment plants.

Progress Report on Nutrient Trading in the Chesapeake Bay Watershed of Virginia

Chesapeake Bay Watershed Nutrient Credit Exchange Program adopted by VA General Assembly in 2005

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chesapeake Bay Watershed Point Source Regulations

- **Water Quality Management Planning Regulation** (9 VAC 25-720): effective 1/11/06
  - Sets nutrient waste load allocations for 125 significant discharges
- **Regulation for Nutrient Enriched Waters and Dischargers Within the Chesapeake Bay Watershed** (9 VAC 25-40): effective 11/16/05
  - Sets technology-based nutrient concentration limits for dischargers
- **General VPDES Watershed Permit Regulation** (9 VAC 25-820-10): effective 11/01/06
  - Implements the Chesapeake Bay Watershed Nutrient Credit Exchange Program
  - Will aid in meeting PS nutrient load caps cost-effectively and as soon as possible; and, will provide foundation for market-based incentives to achieve NPS nutrient load goals

Why Trading?

- Achieve nutrient reductions more cost-effectively and sooner
  - Compliance dates of January 1, 2011 for each river basin
- Means to maintain loading cap in the future
  - Est. savings of 23 – 33% in capital costs

General Permit Registrations

Nutrient Trading General Permit Effective January 1, 2007

124	"Significant" facilities
8	Bubbled "non-significant" facilities
20	New or expanding facilities currently registered
152	Current registrants

10	Pending registrations for new or expanding facilities
15	New or expanding facilities that have not registered

VA Nutrient Credit Exchange Assoc.

- Established under VA Code to aid wastewater treatment plant owners
- The “Exchange” is striving to keep the price of credits low in order to encourage trading

Class A “promised” buyers

Price - $4/lb TP and $2/lb TN

Sales to Exchange participants to meet unexpected requirements

If available, Price = 1.5 x Class A = $6/lb TP and $3/lb TN

Non-participants

If available, beyond Exchange participant needs, Price = 2 x Class A = $8/lb TP and $4/lb TN

Compliance Plans

Initial Compliance Plans submitted August 1, 2007

104 Facilities included in NCEA submittal

Updated Compliance Plans submitted February 1, 2008

111 Facilities included in NCEA submittal

How Does a Facility Grow Under Nutrient Caps?

- Upgrade to more advanced treatment
- Purchase additional point source allocations
- Reclamation and Reuse
  - Irrigation and industrial uses
- Non-Point Source Offsets
  - Agricultural and urban storm water BMPs
- Other reductions as approved by DEQ on a case-by-case basis
  - Taking septic systems off line (?)
  - Aquaculture (?)
  - Algal production and harvesting (?)
  - Others (?)

Reclamation and Reuse

Single largest opportunity to accommodate growth!

Non-point Source Nutrient Offsets

Virginia's first non-point source nutrient bank approved in August 2008:

- Wildwood Farm – Appomattox Co.
- Chesapeake Bay Nutrient Land Trust, LLC

Next Steps for Point Sources in Chesapeake Bay watershed

- Maintaining the nutrient caps is the long term challenge
- Nutrient loads discharged from WWTPs are limited – Growth is not
- Lots of creative possibilities
- Growth will only be limited if we refuse to change the manner in which we have grown in the past

Deposits to VA Water Quality Improvement Fund – Point Sources

- WQIF established in 1997 to provide grants for nutrient removal and other water quality projects.
- DEQ - point sources
- DCR – non-point sources
- 2007 General Assembly authorized up to an additional $250 million in bonds for PS nutrient projects.

Period	WQIF Funds for Bay Point Source Projects (Million Dollars)
FY 1998	$10.00
FY 1999	$37.10
FY 2000	$25.24
FY 2001	$10.30
Interest earned (through FY04)	$11.71
FY 2005	$13.25
Interest earned (FY05)	$0.29
FY 2006	$67.21
Interest earned (FY06)	$1.57
FY 2007	$197.33
Interest earned (FY07)	$8.46
FY 2008	$5.00
TOTAL DEPOSIT =	**$387.46**

Water Quality Improvement Fund Status for Point Sources

- 80 grant applications received by DEQ for construction of nutrient facilities
  - About $815 million requested
  - 74 applications from significant dischargers for projects to reduce nutrients
  - 6 applications from smaller dischargers to hold the line on nutrient load

- Have signed grant agreements for 41 of these projects
    - $525 million commitment

- Another 17 applications under active processing
    - $128 million requested

- Remaining facilities to finalize applications or request $ later as upgrades are needed

Timeline For Use of Bond Proceeds

- WQIF balance as of 6/30/08 = $228.0 M
- Mandatory FY09 Deposit = +$ 0.5 M
- Expected FY09 expenditures = - $210.8 M
- Projected balance as of 6/30/09 ~ $ 17.7 M

- Expect current funds in WQIF for point source projects to be depleted by Sept. ’09

- For FY10, expect to need approx. $176 M in bond proceeds to meet WQIF obligations

- Entire Bond Authorization estimated to be expended before the end of FY2011; presently have an anticipated funding gap of $103 million.

WQIF Funds Needed To Meet and Maintain Nutrient Caps

- Projects operating by 2011 to meet cap
  - 44 projects - $458 M
- Projects operating 2012 or later to maintain cap
  - 36 projects - $351 M
  - 24 projects - $144 M [est. - not yet applied]

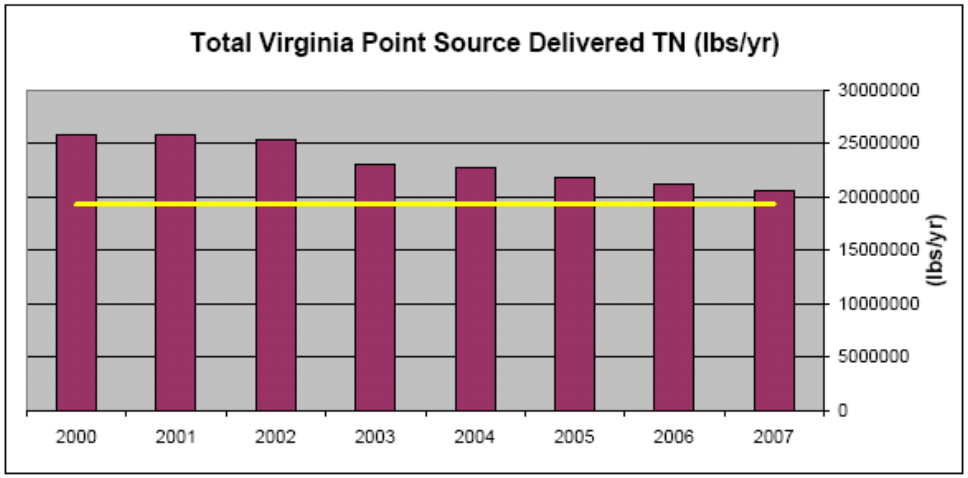
Revolving Loan Fund

Funds Provided from 2004-2009

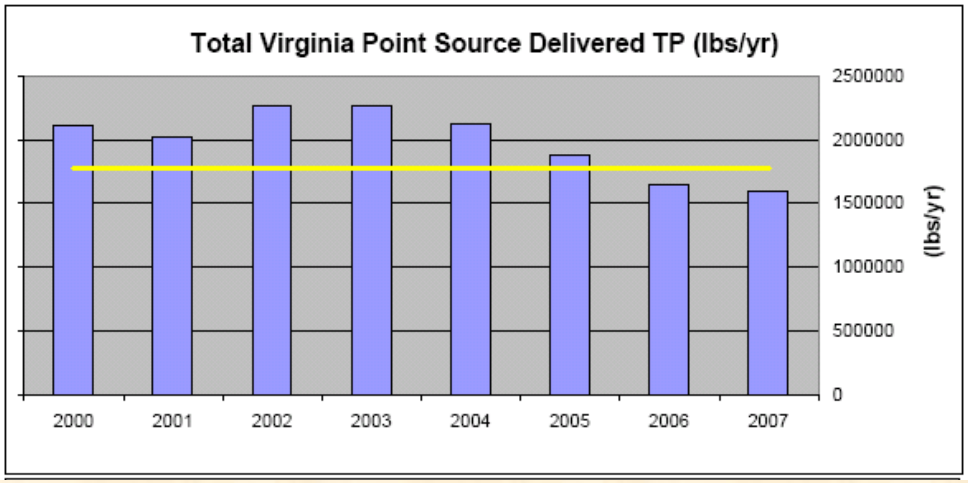
Year	Total Funds (million $)	Ches Bay Nutrients (million $)
2004	$195.29	$133.57
2005	$62.49	$13.75
2006	$103.79	$39.06
2007	$339.97	$298.79
2008	$247.57	$216.47
2009	$260.69	192.31
Totals	$1,209.82 (103 projects)	$893.95 (36 projects)

Progress in Nutrient Reduction Wastewater Point Sources - 2007

- Virginia PS nitrogen loads are less than 6% over loading cap
- All five river basins still over their caps
- Most of reduction to date in the Potomac basin



- Virginia PS phosphorus loads below total cap
- Two river basins have met their cap [York and James] and three still over



Point Source Nutrient Loads 2007 vs. Nutrient Load Caps

[Million Pounds/Year]

River Basin	Number of Significant Dischargers	**Total Nitrogen Delivered Load**		**Total Phosphorus Delivered Load**	
		2007	CAP	2007	CAP
Shenandoah-Potomac*	44	3.62	3.41	0.269	0.188
Rappahannock	25	0.52	0.50	0.057	0.042
York	11	1.41	0.96	0.140	0.162
James	39	14.13	13.90	1.115	1.352
Eastern Shore	5	0.18	0.03	0.004	0.002
TOTALS =	**124**	**19.87**	**18.80**	**1.585**	**1.745**

*Note: figures do not include VA Portion of Blue Plains