DELAWARE AND THE CHESAPEAKE

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Nonpoint Source Pollution Course
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WHAT IS A WATERSHED?

- The land area that drains to a body of water
- We all live in a watershed!
- What we do on the land affects the quality of the water
DELAWARE'S WATERSHEDS

- Four major basins
- Forty-five watersheds
Facility with a National Pollutant Discharge Elimination System (NPDES) permit.
What we do on the land affects the quality of the water.
States must prepare and submit to the EPA every other year:

- Watershed Assessment Report (305(b) Report)
- List waters not meeting standards (303(d) List)
WATER QUALITY STANDARDS

- **Designated uses**
  - Industrial Water Supply
  - Agricultural Water Supply
  - Secondary Contact
  - Primary Contact
  - Public Water Supply
  - Aquatic Life and Wildlife
  - Cold Water Fish
  - Harvestable Shellfish
  - Exceptional Recreational and Ecological Significance

- **Water quality criteria**
  - Concentrations, parameter levels, or narrative statements

- It is assumed that if criteria are met, designated uses will be protected.
More than 130 monitoring sites

Monitoring frequency:
- Monthly at 22 sites
- Monthly or bi-monthly at 111 sites based on 5-year rotating basin schedule
  - 2 Years monthly
  - 3 years bi-monthly

Methodologies developed and recommended by the US EPA
More than 90% of Delaware's waterways are considered impaired.
Excess nutrients (nitrogen and phosphorous) fuel the growth of dense algae blooms.

The nutrients and sediment block sunlight that underwater grasses need to grow. Grasses provide food for waterfowl and shelter for crabs and fish.

The pollutants also rob the water of oxygen that crabs, oysters, and other bottom-dwelling species need to survive.
The maximum amount of a pollutant that can enter surface waters and still meet water quality standards

\[ \text{TMDL} = \text{WLA} + \text{LA} + \text{MOS} \]

- **WLA** = waste load allocation (point sources)
- **LA** = load allocation (nonpoint sources)
- **MOS** = margin of safety
TMDLS IN DE

- Law suit and consent decree schedule to establish TMDLs for all impaired waters on 1996 303d List within 10 years
  - 1st set of TMDLs established in 1998
  - DNREC met the CD schedule December 2006
- Wide range of reductions required for point and nonpoint sources across the state
TMDL NONPOINT SOURCE REDUCTIONS

Total Nitrogen Percent Load Reductions as Required by Total Maximum Daily Loads

-  Not listed
-  Capped
-  20%
-  30%
-  31%
-  35% below Route 13; 0% above Route 13
-  40%
-  45%
-  55%
-  57%; 88% in Kings Causeway Branch
-  60%
-  85%
-  Variable by Location (0-62%)
-  To be determined by 2011

Total Phosphorus Percent Load Reductions as Required by Total Maximum Daily Loads

-  Not listed
-  Capped
-  19%
-  25%
-  35% below Route 13; 0% above Route 13
-  40%
-  45%
-  50%
-  55%
-  57%; 88% in Kings Causeway Branch
-  60%
-  65%
-  Variable by Location (0-77%)
-  To be determined by 2011

Nitrogen

Phosphorus
TMDL NONPOINT SOURCE REDUCTIONS

Enterococcus Bacteria Percent Reductions as Required by Total Maximum Daily Loads

- Not listed
- 8% Fresh; 71% Marine
- 32% Fresh; 65% Marine
- 40% Fresh; 17% Marine
- <20%
- 20-29%
- 30-39%
- 70-79%
- 80-99%
- >90%
- Variable by Location (29-95%)
CHESAPEAKE BAY WATERSHED

- Six-state, 64,000 sq. mile watershed
- 10,000 miles of shoreline
- Over 3,600 species of plants, fish, and other animals
- $750 million to local economies
- Home to 18 million people
LEGISLATIVE HISTORY

- **Clean Water Act of 1972**
  - Requires TMDLs for impaired waters
  - Authorized the formation of the Chesapeake Bay Program in 1987 (a watershed partnership coordinated by EPA)

- **Bay States Agreements**
  - 1983-MD, VA, PA, DC, EPA, Chesapeake Bay Commission
  - 1987-goal to reduce nutrients by 40% by 2000
  - 2000-comprehensive plans with 2010 goal for restoration
    - NY and DE committed to these goals by signing a Memorandum of Understanding (WV signed in '02)

- **2014 (Pending!)**
Executive Order 13508

- May 2009
- Recognizes the Chesapeake Bay as a national treasure
- Mandates Federal Agencies to lead a renewed effort to restore and protect the nation’s largest estuary and its watershed (work on TMDL’s and implementation plans)
- Directs Feds to work with States
THE CHESAPEAKE TMDL

- EPA established December 2010
- Covers 6-state & DC watershed
- Whichever TMDL is more strict will supersede in DE
- Sediment in addition to N & P
- States given an “allocation”
- Jurisdictions sub-allocate
- 60% by 2017; 100% by 2025
- 3-phase Watershed Implementation Plan (WIP)

DE required reductions:
- 24% for Nitrogen
- 20% for Phosphorus
- 0% for Sediment
THE CHESAPEAKE BAY WATERSHED IN DELAWARE

Within all 3 counties

- Very rural character:
  - Developed: 10%
  - Agriculture: 48%
  - Rangeland: 3%
  - Forest: 16%
  - Water: 1%
  - Wetland: 21%
  - Other: 1%

Small, but growing, towns
WHERE DOES POLLUTION COME FROM?

Sources of Nitrogen from Delaware to Chesapeake Watershed

- Agriculture: 77%
- Urban runoff: 0%
- Septic: 9%
- Wastewater: 7%
- Forest: 3%
- Other: 4%

Source: EPA
CONVENED AN INTERAGENCY WORKGROUP – REPRESENTATIVES FROM NUMEROUS PARTNER AND STAKEHOLDER GROUPS

FORMED 9 SUBCOMMITTEES TO DRAFT TEXT AND PROPOSE ACTIONS TO MEET DELAWARE’S STATEWIDE ALLOCATIONS

SUBMITTED A DRAFT PLAN TO EPA ON SEPTEMBER 1, 2010, BUT IT DID NOT ACHIEVE POLLUTION REDUCTION GOALS!

REVISED THE PLAN BASED ON FEEDBACK FROM EPA AND THE PUBLIC
Submitted Final Phase I Watershed Implementation Plan to EPA on November 29, 2010

Showed that we can meet federal water quality goals by 2025 without requiring any drastic or punitive measures (“backstops”) in the short term

EPA used the Phase I WIPs to establish the Bay TMDL
PHASE II PLANS

- More specific and localized
- Who will do what when
- Resources, authorities, needs
- Clear and quantitative goals – local area N, P, S load targets, BMP implementation levels, and/or programmatic milestones
  - 2013 Milestones levels
  - 2017 60% levels
  - 2025 100% levels
- Draft submitted Dec. 15, 2011
- Final submitted March 30, 2012
HOW DO WE KNOW WE’RE MEETING OUR GOALS?

- The model determines if we meet our share of the Chesapeake’s “pollution diet.”
STRATEGIES FOR CLEANER WATER IN THE CHESAPEAKE

What's in Delaware's WIP?
Major treatment plants include Bridgeville, Laurel, Seaford, and Invista.

Permitted nutrient loads will be reduced.

Plants may be required to upgrade to higher levels of nutrient removal or find alternative disposal methods.
ONSITE WASTEWATER

- Statewide regulations revised – effective 1/11/14
  - Require new inspection requirements,
  - Performance standards, and
  - Advanced treatment for all new and replacement systems within 1,000 feet of Chesapeake tidal waters and wetlands
- Eliminate a minimum of 6,295 systems by 2025
STORMWATER

- Statewide regulations revised – effective 1/1/14
  - Emphasis on green technologies
  - In-lieu fee required to partially offset new development
- DelDOT/New Castle County Municipal Separate Stormwater Sewer (MS4) permit renewed 5/7/13
- Stormwater retrofits
AGRICULTURE

Farms must meet tougher state and federal requirements for management of nutrients such as manure and fertilizer and for feeding operations such as poultry houses and dairies.

The plan sets many specific implementation goals for ag related BMPs.

Such farming best practices are a very cost-effective way to meet our goals.
NRCS 590 STANDARD

- Federal standard revised to reflect USDA objectives, science, and technology
  - Impacts cost share applicants
- Places more emphasis on risk assessment
  - Nitrogen Leaching Tool
    - UD recommended practices may be required on high leaching soils
  - Phosphorus Risk Assessment (P-Index)
- State NRCS offices updated their standard in cooperation with State water authority and other stakeholders
DE committed in WIP to review current index and consider updating it
- DDA held a 1-day workshop February 2012 and has had subsequent discussions with agency and UD staff
- Maryland updated their tool (Phosphorus Management Tool – PMT)
- UD a partner on a Conservation Innovation Grant to do a Chesapeake Bay-wide assessment

University recommendations would be considered by Nutrient Management Commission before being adopted as new policy.
Concentrated Animal Feeding Operations
Regulations were revised in 2010 to make state regulations consistent with federal requirements.
Updated again to address EPA concerns over definition and inspection protocols.
Became effective November 11, 2011.
State Technical Standards are policy documents that provide details about best management practices that may be appropriate on CAFOs.
New NRCS 590 Standard.
DE manure analysis data indicate that EPA CBP model assumptions should be updated (Dr. Glancey; Bill Brown). Improvements in poultry genetics, diets, and manure handling resulted in substantial decreases over time. UD, DNREC, DDA working with CBP to address this issue and modify the model accordingly. Implications for poultry manure BMP goals in WIP:
- Relocation
- Alternative uses
- Emerging technologies
THE FUTURE OF APPLYING POULTRY LITTER ON DELMARVA

- A resource in demand
- Alternative uses of litter
  - Anaerobic digesters
  - Composting
- Alternative to composting dead birds
BEST MANAGEMENT PRACTICES

- Cover Crops
- Model credit depends on:
  - Planting date
  - Planting method
  - Species planted
  - Harvested (traditional cover crop) or destroyed (commodity cover crop)
BEST MANAGEMENT PRACTICES

- Water Control Structures and Wetland Restoration
BEST MANAGEMENT PRACTICES

- The “b” word
- Filter strips/swales/riparian corridors
- Take land out of production, shade row crops, more opportunities for wildlife grazing
- Can existing cost share programs be modified to alleviate burdens and provide adequate compensation?
RESTORE CONSERVED LANDS

- ~40,000 acres of publicly owned lands in Delaware’s Chesapeake
  - 3,000 acres of leased farmland
- Many opportunities for restoration and improved stewardship practices
BEST MANAGEMENT PRACTICES

- Irrigation
  - Potential to reduce groundwater N and soil P reservoirs; credit as a BMP?
    - Dr. Shober leading research project on this now
  - Delaware Irrigation Management System on DEOS
  - Delaware Rural Irrigation Program (DRIP)
    - A Revolving Loan Fund program to help farmers add new irrigation
  - Potential to negatively impact wetlands?
WASTEWATER DISPOSAL

- Spray Irrigation of Wastewaters
  - Dedicated sites
  - Spray on-demand – Middletown pilot
  - Alternative to stream discharge for municipalities and local governments
  - Emerging contaminants?
“CERTAINTY”

- Voluntary approach to provide “assurances” to the ag community
- They can conduct business in a predictable regulatory setting
- In exchange for their implementation of additional BMPs to achieve enhanced environmental benefits
- DDA drafted legislation for consideration this session
- Draft regulations containing the program details will follow

The Hershberger Family of Michigan
LAND USE

- Capitalize on existing planning and infrastructure
- Provide technical assistance to local governments on ordinances, incentives, and funding mechanisms
- Urban Nutrient Management
  - Delaware non-farm fertilizer sales data shows a 92% decrease between 2005-2010
  - Delaware Livable Lawns Program
All new and increasing loads *must* be offset. Existing loads can be traded. Possibly by:

- Paying a fee,
- Doing a project nearby, or
- Buying credits from a “bank”
CONSEQUENCES OF MISSING GOALS

- Increased and direct regulation by EPA of:
  - Industrial and municipal wastewater plants
  - Municipal stormwater systems
  - Agricultural operations
- Redirection of federal funds
THE VALUE TO US*

Contributes $2 billion in annual economic activity from benefits!

Responsible for 47,000 jobs with $1.2 billion in annual salaries!

The total value of natural goods and services in the Delaware portion of the watershed is $3.4 billion annually!

*Socioeconomic Value of the Chesapeake Bay Watershed in Delaware – University of Delaware Water Resources Agency (March 2011)
SUMMARY

- We all live in a watershed!
- What we do on the land affects the quality of the water
- Much has already been done, but more work is still needed
- We are all part of the solution!
  - Huge strides have been made but the future still holds many challenges and opportunities too
RESOURCES

- Watershed Assessment Section Website: http://www.dnrec.delaware.gov/swc/wa/Pages/WatershedAssessment.aspx
  - Water Quality Standards
  - Monitoring Plans
  - Combined 305(b) Reports and 303(d) Lists
  - TMDL technical documents and links to regulations
  - Watershed Plans and Strategies
  - Tips for what you can do to protect our waterways
RESOURCES

- Delaware Watersheds Website!
  
  http://www.delawarewatersheds.org/
  
  - A dynamic online library resource on our watersheds
  - Data and details at Basin and Watershed scale
    - Vital statistics - size, population, land use, jurisdiction
    - Wildlife
    - Environmental Concerns
    - Recreational Opportunities
    - Publications
    - Partners
QUESTIONS
AND
DISCUSSION

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