REPORT OF THE

STATE WATER COMMISSION

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

REPORT DOCUMENT NO. 112

COMMONWEALTH OF VIRGINIA
RICHMOND
2011

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REPORT OF THE STATE WATER COMMISSION

EXECUTIVE SUMMARY

The State Water Commission is a 15-member legislative body established by statute that is charged with (i) studying all aspects of water supply and allocation problems in the Commonwealth, and (ii) coordinating the legislative recommendations of all state entities that have responsibilities with respect to water supply and allocation issues. During 2010, the Commission examined a number of significant issues, including the Chesapeake Bay clean-up plan, known as the Watershed Improvement Plan (WIP), the effects of endocrine disruptors, and the establishment of a program to facilitate nutrient trading, and received an update on water supply planning.

Background and Deliberations

1. Chesapeake Bay cleanup

The U.S. Environmental Agency (EPA) will be establishing a clean-up plan known as a Total Maximum Daily Load (TMDL) that establishes the maximum nitrogen, phosphorus, and sediment loads that can enter the Chesapeake Bay. Each state in the Bay watershed must develop a Watershed Improvement Plan (WIP) showing how Virginia will achieve the required reductions. Administration officials responsible for developing the draft plan indicated that their priorities in developing the WIP are to (i) allow flexibility in the implementation of the plan so as to ensure cost-effective practices are given priority, (ii) recognize current conditions, the economic impacts of the TMDL, and the need for federal support, and (iii) reserve the right to modify the plan and adapt the plan as necessary. The focus of the plan, according to officials, is to implement practices and programs that will result in actual environmental improvement. The TMDL model will be used as a management tool, but Virginia will tailor its actions within "real world" scientific, economic, and political frameworks.

Mr. Anthony Moore, Assistant Secretary for Chesapeake Bay Restoration, reviewed how the WIP was developed and the various stakeholder groups that were involved in its development. An essential component of the WIP is the broad expansion of the existing nutrient credit exchange to include credits for agriculture, stormwater, and on-site septic system projects for reducing nonpoint nutrient pollution. Mr. Moore noted that during the upcoming year a study will be undertaken to determine the most effective way to expand the nutrient credit exchange so as to enable Virginia to meet the various target loads. It is anticipated that a proposal for an expansion of the nutrient credit exchange will be introduced during the 2012 Session of the General Assembly. (Appendix A)

Mr. David Paylor, Director of the Department of Environmental Quality, and Mr. David Johnson, Director of the Department of Conservation and Recreation, discussed strategies that will be included in the WIP. (Appendix B) These strategies are aimed at reducing nutrient pollution generated from both point and nonpoint resources, including wastewater, on-site septic systems, agriculture/forestry, and urban/suburban stormwater. One significant initiative in the agricultural sector will be the voluntary implementation of conservation plans on agricultural

acreage. These conservation plans could include such elements as nutrient management plans, livestock exclusion from streams, 35-foot stream buffers, and soil conservation measures such as no-till practices, and cover crops.

Mr. Jeff Corbin, Senior Advisor to EPA's Regional Administrator, discussed his agency's response to Virginia's draft WIP. Virginia submitted a draft WIP to the EPA on September 3, 2010. A team of EPA experts conducted a three-day evaluation process of the WIP. The team sought to determine whether the draft plan would result in the following:

1. Achieving the load caps in all basins and impaired segments;
2. Providing a high level of reasonable assurance that nonpoint source controls will be achieved; and
3. Sufficient detail is provided in the draft plan for permit writers.

The EPA evaluators found a number of deficiencies in Virginia's draft WIP; among these were:

- No strategy for filling recognized program or resources gaps;
- Few enforceable or otherwise binding commitments;
- Discrepancies between the proposed implementation program and pollution reduction numbers contained in the WIP;
- Reliance on pollution trading programs with no commitment to adopt critical trading drivers such as new regulations; and
- Few dates for key actions and program-building milestones.

Mr. Corbin questioned whether the state WIP could achieve the projected reductions, noting that the "WIP didn't provide a high level of assurance that proposed strategies could be implemented." (Appendix C) This was particularly true with respect to the 60 percent reductions that are to be achieved by 2017. If the interim clean-up goals are not achieved, the federal government could institute "backstop" actions that may include the establishment of additional reductions from regulated point sources (i.e. wastewater treatment plants, concentrated annual feeding operations, municipal separate storm sewers, etc.), increase in permit oversight, or increase in federal enforcement. The EPA is providing the states within the Bay watershed an opportunity to enhance their WIPs by November 29, 2010.

As noted previously, one of the fundamental strategies for meeting Virginia's nutrient reduction loading is the expansion of the current nutrient exchange for point sources of pollution. While the EPA has expressed its concern regarding the extent of reliance on pollution trading, absent trading incentives such as a new regulations program, a new initiative has been undertaken to develop an expanded exchange for the Rappahannock Watershed. According to Mr. Eldon James representing the Rappahannock River Basin Commission, The Trust for a Clean Water Economy (The Trust), which is a watershed-based, not-for-profit organization, will provide government and corporations with environmentally efficient pollution prevention/reduction solutions, in the form of essentially a watershed bank. It will use "market-like mechanisms" to facilitate the implementation of cost-effective pollution reduction solutions. The Trust will be "incentivized" through the pollution reductions that local governments and

corporations achieve. It will also conduct local government pollution accounting and auditing, and will certify the pollution reductions achieved by the various projects. (Appendix D)

2. Endocrine disruptors and emerging contaminants

At the request of officials of the Fairfax County Water Authority (the Authority), the Commission received testimony regarding the potential threat posed by the presence of emerging contaminants (referred to as trace compounds) in the water samples collected at surface water intakes that have undergone the treatment process in Northern Virginia, and in finished water. The Authority is the largest water utility in Virginia, serving 1.7 million customers. Ms. Melissa Billman, Manager of Water Quality Laboratory and Compliance for the Fairfax County Water Authority, spoke of her agency's concerns regarding the potential threats to human health and the environment from such emerging contaminants as endocrine disrupting compounds (EDCs), and pharmaceuticals and personal care products (PPCPs). She noted that the Authority is involved in various national, regional, and local studies regarding the impacts of these contaminants on water quality. At the national level, the Authority closely monitors research undertaken by the Water Research Foundation, which is the nation's largest and most well established research foundation devoted solely to drinking water. The Authority is particularly interested in several of its research findings regarding the removal of EDCs and PPCPs in drinking water and reuse treatment processes. One of the findings indicated that conventional treatment processes such as coagulation, flocculation, and sedimentation are ineffective in removing the majority of targeted EDCs and PPCPs.

In response to the national studies, the regional water utilities, including the Fairfax County Water Authority, the Washington Aqueduct, and the Washington Suburban Sanitary Commission, are testing for 19 compounds in the source and treated waters. Water samples were sent to a certified laboratory and out of the 19 compounds tested, very small amounts of a total of four compounds were found in water samples taken from the Potomac, Patuxent, and Occoquan Rivers and in some of the treated water; however, research to date shows that there is no indication of human health concerns at the levels found in the sampled waters. While further research is needed at the regional level, water treatment officials have concluded that ozone and deep bed filtration are effective in removing the source water EDCs/PPCPs. (Appendix E)

Concerns regarding the effects of emerging contaminants such as EDCs and PPCPs are not limited to human health and the environment but also have an impact on certain fish species. Dr. Vicki Blazer of the U.S. Geological Survey's National Fish Health Research Laboratory has been studying the possible connections between fish health issues and emerging contaminants in the Chesapeake Bay Watershed. Her analysis suggests that the health of the various fisheries present in the watershed is indicative of environmental stress. The fish species are experiencing a number of different effects such as (i) skin lesions and kills of bass, sunfish and suckers, (ii) a high prevalence of intersex in bass, (iii) poor recruitment of yellow perch in certain tributaries, and (iv) skin and liver tumors in brown bullhead in certain tributaries. The fish kills specifically occurring in the Potomac River suggest that there are stressed populations of sensitive species and at some point the "perfect storm" of conditions have overwhelmed the fish and mortalities have occurred. Dr. Blazer stated that no one infectious agent is responsible for the kills but rather a variety of "opportunistic" infections are responsible for such kills. As the scientists were

examining those areas where fish kills occurred, they were finding the presence of the intersex phenomenon.

What Dr. Blazer characterized as chemicals of "emerging concern" are not commonly monitored in the environment, and are not generally regulated, but have the potential to enter the environment and cause adverse effects. The sources of the chemicals are wastewater treatment plants, industrial effluent, stormwater runoff, agriculture, and landfill leachate. Discharges from wastewater treatment plants contain human and animal pharmaceuticals and personal care products. Agricultural sources of contaminants include animal manure, litter, natural and synthetic hormones from animals, feed additives, pesticides, herbicides, and human biosolids. Dr. Blazer concluded her remarks by noting that one of the major concerns of the scientific community is that detection of these contaminants is often difficult using current water sampling methods. So in an effort to better detect such contaminants, biologists gave begun to work with chemists to develop protocols that would enable scientists to be able to measure the amounts of these contaminants in water samples taken over time. (Appendix F)

3. Update on State Water Supply Plan Advisory Committee

During the 2010 Session, legislation was enacted establishing the State Water Supply Plan Advisory Committee. The members of the advisory committee were to be appointed by the Director of the Department of Environmental Quality (DEQ). The 25-member advisory committee held its first meeting on August 31, 2010. The advisory committee (i) reviewed unresolved issues associated with the development of the water supply planning regulation, (ii) reviewed the history of water supply planning in the Commonwealth, (iii) identified the causes for failure of prior planning efforts and the lessons learned, and (iv) reviewed DEQ modeling tools that are to be used to create the State Plan. At its second meeting, held on December 2, 2010, the advisory committee developed its work plan, which included (a) analyzing the data needs and associated issues, and whether there is sufficient funding for the essential data collection efforts, (b) assisting in the state water plan development process, including developing the content of the plan and determining the role of the State Water Control Board in the process, and (c) determining how to best use state and local plans in managing Virginia's water resources in order to minimize conflicts and promote effective regionalization.

There are approximately 42 localities or groups of localities, encompassing all of the jurisdictions, that are currently engaged in the planning process at the local or regional level. Of these, 12 local/regional plans have been through the local plan adoption process and have been formally submitted to DEQ. More localities than expected have developed a regional approach in their water supply planning. (Appendix G)

Findings and Recommendations

Last year, the Commission received testimony regarding DEQ's limited ability to effectively manage Virginia's water resources, due in large measure to the lack of committed funding and reduction in staffing. The Commission recommended several pieces of legislation for consideration by the 2010 Session of the General Assembly. Two of those measures were rejected by the General Assembly, but the Commission believes they are worthy of further

consideration. As was noted in its 2010 report (Report Document No. 120), the Commission received extensive testimony that there are significant gaps in water-related data that are crucial to DEQ's ability to effectively manage Virginia's groundwater and surface water resources. One initiative recommended last year was to impose a civil penalty on those water withdrawers who are required to report the amount of their withdrawals or be subject to a civil penalty of up to $1,000. After the rejection of this bill by the legislature, Delegate David Bulova, patron of the 2010 legislation, met with various stakeholder groups including the representatives of the agricultural community, to develop legislation that would address the concerns of the various parties. Their discussions centered around three issues:

1. The bill should limit the number of civil penalties that could be imposed for not submitting a report to one violation per month; rather than the conventional approach of imposing a separate civil penalty of up to $1,000 for each day the report fails to be submitted.

2. There should be a schedule of penalties that would be developed by the State Water Control Board that would contain specific criteria for calculating the appropriate penalty for each violation based upon (i) the severity of the violation, (ii) the extent of any potential or actual environmental harm, (iii) compliance history of facility or person, and (iv) the ability to pay. Prior to these criteria being finalized the board would hold a hearing and receive public comments.

3. Adequate notification procedures of a violation of the reporting requirements would be instituted. The potential violator would initially be notified of his failure to report the amount of his withdrawals. If a person fails to submit the report within 30 days of the initial notice, the Board would be required to issue a second notice by certified mail. If the person fails to report within 60 days after receipt of the certified notice, the Board may then take the appropriate action which may include the imposition of a civil penalty.

Thus, the Commission recommends:

Recommendation 1: That legislation be introduced that imposes a civil penalty on those persons withdrawing surface and groundwater who are required by law to annually report the amount of water they withdraw. (Appendix H)

As noted in last year's annual report, water supply planning is a state and local responsibility with funding solely dependent upon state general fund moneys and local government allocations. According to figures provided by DEQ last year staffing costs for the state's current groundwater program are nearly $1.3 million. Of this total, approximately $889,890 is allocated for personnel costs and $227,500 is used for contracted program support. Groundwater withdrawal permit fees pay for approximately 12.3 percent of the program's costs, which funds two out of the 12 persons staffing the program. In light of the continued reduction in staffing levels, a modest increase in the fees for groundwater permits will be helpful in maintaining the effectiveness of the programs. Thus, the Commission recommends:

Recommendation 2: That legislation be introduced increasing the fee for a permit to withdraw groundwater from $6,000 to $12,000, and that the permit holder be given the option of paying a pro rate share annually over the 10-year term of the permit. (Appendix I).

Respectfully submitted,
Delegate Harvey B. Morgan, Chair
Senator John C. Miller, Vice-chair
Senator R. Creigh Deeds
Senator Frank M. Ruff, Jr.
Senator Richard H. Stuart
Senator Patricia Ticer
Delegate Watkins M. Abbitt, Jr.
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Mr. James O. Icenhour, Jr.
Mr. Michael T. McEvoy

Appendix A

Commonwealth of Virginia
Draft Chesapeake Bay TMDL Watershed Implementation Plan

Anthony Moore
Assistant Secretary for Chesapeake Bay Restoration
October 2010

Chesapeake Bay Program History

- 1980 Chesapeake Bay Commission
- 1983 Chesapeake Bay Agreement
- 1987 Chesapeake Bay Agreement
- 1992 Amended to develop Tributary strategies
- 2000 Chesapeake 2000 (C2K)
- 2005 New Tributary strategies were released
- 2010 TMDL <<<<<<< WIP

Virginia's Priorities

- Allow flexibility in implementation to ensure cost-effective practices are given priority.
- Recognize current economic conditions, the economic impacts of the TMDL and the need for federal support.
- Reserve the right to modify the plan and adapt as necessary.

Water Quality Improvements

- Ensure the plan works in the real world, not just in the "model world".
- "The TMDL is developed using the Chesapeake Bay model which allows for evaluation of implemented and proposed actions. While meeting the requirements of the model are important in order to meet the technical elements of the TMDL, our focus is on implementing practices and programs that result in real environmental improvement. We will use the model as a management tool, but we will tailor our actions within real scientific, economic, social and political frameworks."
- Known deficiencies in the model
- Working with EPA on Input deck

Virginia's Watershed Implementation Plan: Overview

- Meets 2017 target loads for all basins through management actions, plus use of existing nutrient credits achieve those target loads.
- Proposes a broad expansion of the existing nutrient credit exchange.
- Includes plan for the James River for additional study of the current chlorophyll standard.
- Proposed 2025 allocations for some sectors based on the so-called E3 level with the understanding that such levels of reduction by any sector could be accomplished with the ability to use an expanded credit and offset program.
- Expected Revisions to the 2025 allocations in 2017.

Expand Nutrient Credit Exchange

Legislative Findings and Purpose – [§62.1-44.19:12]

- Meeting cap allocations cost-effectively and as soon as possible
- Accommodating continued growth and economic development
- Providing foundation for establishing market-based incentives to help achieve non-point source reduction goals

Next Steps:

- Major programmatic undertaking for Commonwealth
- Will require General Assembly action
- Pursuing legislature-sanctioned study during 2011
- Proposal for consideration during 2012 session of General Assembly

- “This strategy has been constructed within the parameters set by the Chesapeake Bay Program model, and over the preceding months considerable time has been spent “crunching the numbers” so that our plans could be evaluated by the model. While these arithmetic calculations are important to define the suite of management actions we must take in the future, they are only a first step in the implementation process. The model is a tool to assist us in directing our actions. The implementation of our strategies will take place on the ground as we work treatment plant by treatment plant, farm by farm, parking lot by parking lot, and locality by locality. These strategies must have the flexibility to address real world issues, not just the issues raised by the Chesapeake Bay Program model.”

Development of the Plan

2009: Agency review of programs

2009 – 2010: Convened Stakeholder Advisory Group (SAG): 40 members from all affected interests.

2010: Convened "Expert Panels" to advise staff on feasible levels of treatment.

2010: July: Sector Workgroups – SAG members with additional participants

2010: August: SAG Steering Committee – Representatives from each sector workgroup and several at-large members.

2010: September: Reviewed by Governor and sent to EPA

James River Strategy

Step 1: Begin Pollution Reduction Actions During Stage 1 of TMDL Implementation to achieve the 60% Reduction Target by 2017

Step 2: Conduct Scientific Study to Determine the Most Appropriate Chlorophyll Criteria for the Tidal James River; and Initiate Rulemaking under the Virginia Administrative Process Act to Amend Water Quality Standards, as Needed [concurrent with Step 1]

Step 3: Amend TMDL Allocations for the James River Basin, as needed, in response to revised Water Quality Standards

Step 4: Virginia Implements Necessary Management Actions during Stage 2 to Achieve TMDL Allocations Prior to 2025

Aggregated Sector Allocations

- Draft WIP presents 2025 allocations for some sectors based on the so-called E3 level based on understanding that such levels of reduction by any sector could be accomplished through use of an expanded credit and offset program

- Aggregated sectors include: wastewater, storm water and on-site systems

- Provides VA the greatest flexibility to work out the most cost-effective and equitable long term program to meet the 2025 allocations among all sectors

Adaptive Management

- Draft WIP expects revisions to the 2025 allocations will be made in 2017
- Based on:
  - James River Strategy
  - Results of process to expand Nutrient Credit Exchange Program
- WIP ≠ Programs

Future Dates and Expected Actions

- Comment Period ends 8 Nov
- Review and Modify WIP/TMDL
- Submit Revised WIP to EPA 29 Nov
- EPA submits final TMDL 31 Dec

Future Dates and Expected Actions

Expected in 2011:

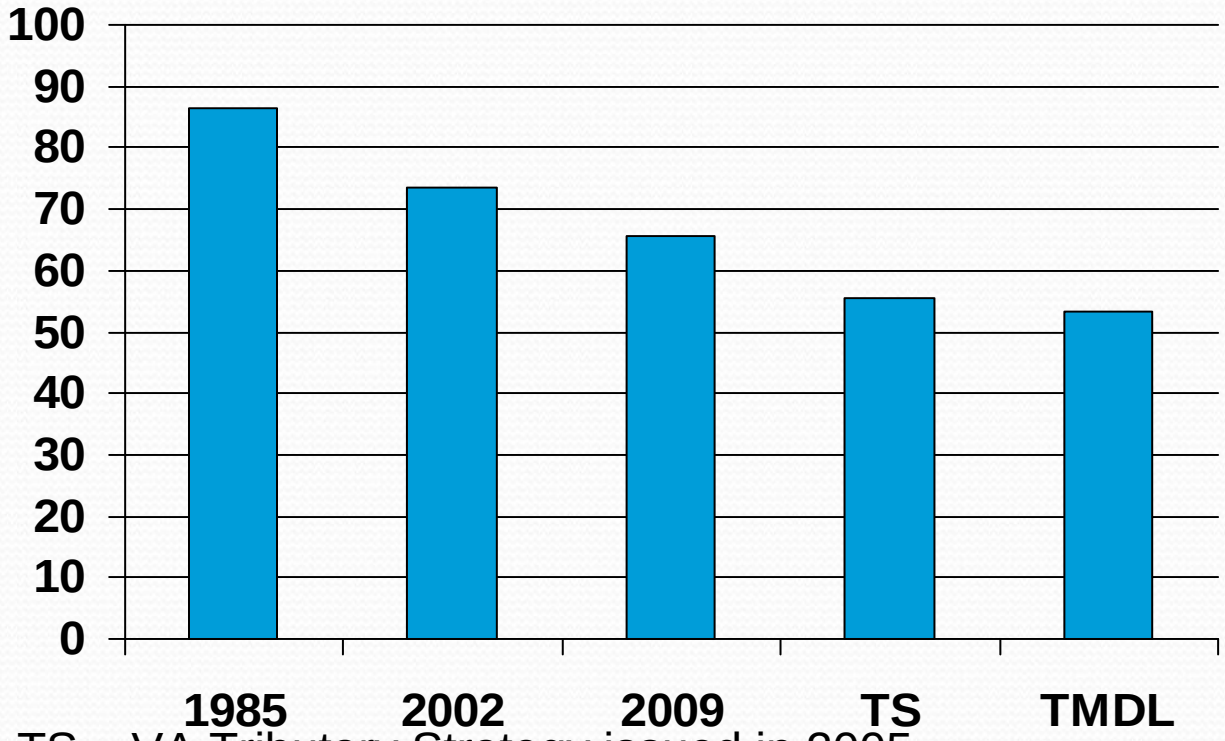
- Submittal of "Phase II" WIPS by the states. Phase II plans are expected to be developed with actions proposed at a smaller, local scale.
- Revisions to the Chesapeake Bay Model to correct currently known deficiencies.
- Modifications of the TMDL allocations by EPA by 15 Dec 2011

Expected in 2017:

- Submittal of Phase III WIPS by the states.
- Modifications of the TMDL allocations by Dec 2017

Virginia Nitrogen Loads

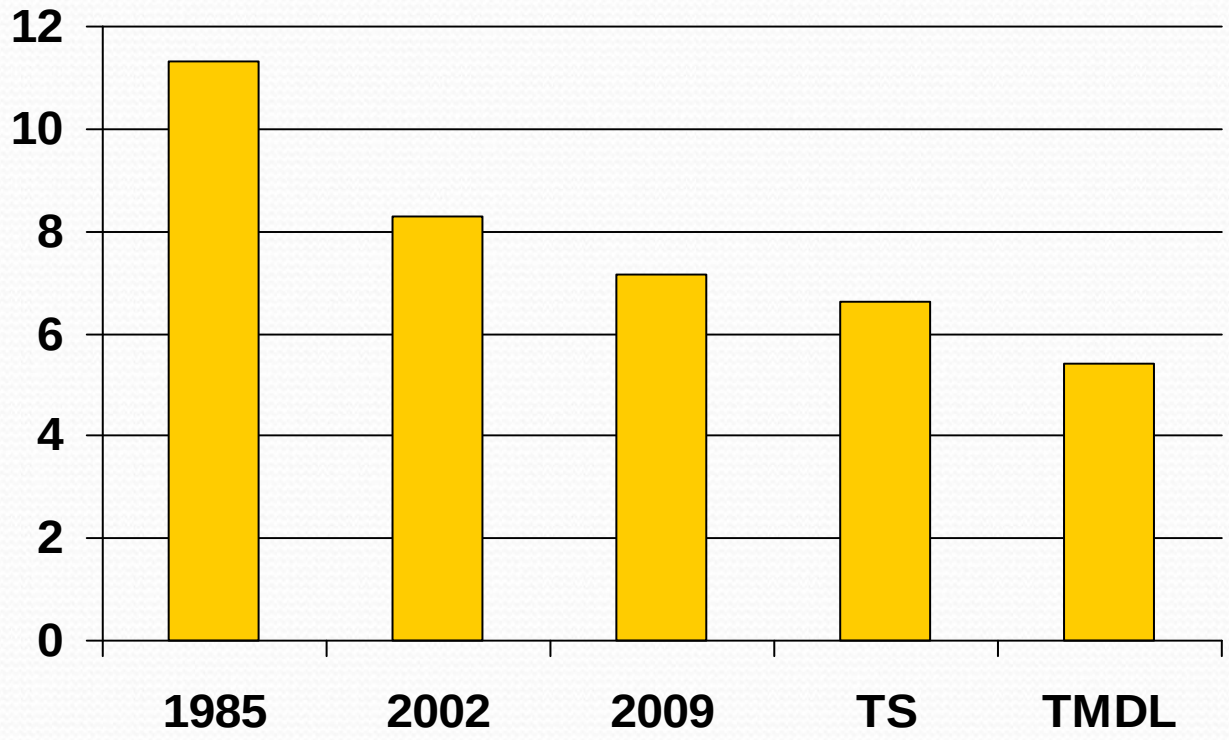
[million lbs/yr]



TS – VA Tributary Strategy issued in 2005

Virginia Phosphorus Loads

[million lbs/yr]



TS – VA Tributary Strategy issued in 2005

Commenting on the WIP

Comments or questions can be sent to

- VABAYTMDL@dcr.virginia.gov

Copies of the Virginia WIP and other TMDL related materials can be found at:

- www.deq.virginia.gov/tmdl/chesapeakebay.htm
- www.dcr.virginia.gov/sw/baytmdl.shtml

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

DEQ
Virginia Department of Environmental Quality

Appendix B

Virginia WIP: Wastewater

- WIP uses adjusted current nutrient allocations for significant wastewater facilities under the State Water Control Board issued Chesapeake Bay Watershed General Permit that establishes nutrient caps for all significant discharges and ability to trade through the Nutrient Credit Exchange.
- WIP proposals:
  - New facilities under 1,000 gpd must offset entire nutrient load (component of Nutrient Credit Exchange expansion).
  - Requirements for offsets for nutrient loads from small dischargers expanding to less than 40,000 gallons per day

DEQ
Virginia Department of Environmental Quality

EPA "Backstops": Wastewater

- Met or exceeded in the Shenandoah, Potomac, Rappahannock, and Eastern Shore basins.

- James River allocations:
  - Tied to chlorophyll standard; WIP proposes for review
  - Working with EPA on "time-bridge" to allow standard review prior to any additional upgrades
  - Some near term upgrades in the James likely
  - Longer term allocations will be established and met during the term of the TMDL following standard review.

- York River backstops more stringent than WIP due to EPA's concerns over lack of "reasonable assurance."

DEQ
Virginia Department of Environmental Quality

TMDL Issues: Wastewater

- EPA's total suspended solids ["TSS"] allocations are not feasible for manufacturing facilities and could disrupt our successful nutrient credit exchange program
- EPA's "across the board" backstops do not reflect real wastewater treatment issues at certain facilities:
  - UOSA – Allocation set by SWCB to protect drinking water supply [Occoquan Reservoir].
  - Hopewell – 80% of flow is from industrial sources, yet allocation set as if plant treats conventional sewage
  - CSO Communities – EPA TMDL nutrient allocations will serve as a disincentive to capture and treat combined sewage overflows.

DEQ
Virginia Department of Environmental Quality

Virginia WIP: Onsite/Septic

- Onsite/Septic is small load. WIP seeks to reduce rate of growth and offset additional loads above current levels through expansion of nutrient credit exchange.
- Septic/Onsite regulations are currently overseen by Virginia Department of Health; DEQ staff coordinating with VDH staff on septic/onsite issues.
- Current Septic 5-year pump-out requirements overseen by DCR in Chesapeake Bay Preservation Act designated areas.

DEQ
Virginia Department of Environmental Quality

Virginia WIP: Onsite/Septic

- WIP presumes implementation of new regulations for alternative systems that require nutrient controls (currently under executive review).
- WIP proposes new or replacement systems in the Chesapeake Bay watershed utilize nitrogen reducing technology.
- WIP proposes establishing a tax credit or other financial incentive for the upgrade or replacement of existing conventional systems with systems that have nitrogen removal technologies.
- WIP proposes requiring septic pump-outs in areas outside those governed by the Chesapeake Bay Preservation Act which currently requires pump-outs every 5 years.

DEQ
Virginia Department of Environmental Quality

VA WIP: Agriculture/Forestry

- Implementation of conservation plans on agricultural acres which could result in significant implementation of these practices:
  - Nutrient management plans
  - livestock exclusion from streams
  - 35’ stream buffers
  - soil conservation; such as no-till and cover crops
- Need 95% coverage of the above practices by 2025
- Vastly improved accounting of voluntary practices (SB346).
- Improved implementation of forestry water quality BMP requirements.

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VA WIP: Agriculture/Forestry

- Significant increase in acres of winter cover crops
- Animal waste management systems covering 95% of livestock
- Poultry manure transport
  - 5,000 tons per year shipped outside Bay watershed
  - 75,000 tons per year moved from concentrated production counties to other areas of Bay watershed
- Precision agriculture on 50,000 acres
- Consider future container nursery and greenhouse runoff / leachate collection and reuse requirement

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VA WIP: Urban/Suburban Stormwater

- Consider requiring all municipal / county owned lands implement NMPs if nutrients are applied (State lands already required)
- Voluntary reporting of acreage and rates by lawn service companies
- Consider requiring NMPs on all public and private golf courses
- Sales restrictions or controls on do-it-yourself fertilizers
  - Phosphorus ban, time of year restrictions, slow release nitrogen, labeling
  - Scotts Miracle-Gro Company has agreed to eliminate phosphorus from all lawn products by 2012
- Consider prohibiting use of nitrogen based de-icers
- Consider requiring proper storage and disposal of non-ag fertilizers by retailers

VA WIP: Urban/Suburban Stormwater

- The plan proposes a 20% phosphorus reduction standard for areas being redeveloped
- The draft plan proposes stormwater retrofits on existing developed lands to reduce nitrogen, phosphorus and sediment
- Potential greater use of stormwater utilities or service districts to generate funding for BMP retrofits
- For new development, post development loads cannot exceed allowed loads of previous land uses

DCR
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CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Commenting on the WIP

Comments or questions can be sent to

- VABAYTMDL@dcr.virginia.gov

Copies of the Virginia WIP and other TMDL related materials can be found at:

- www.deq.virginia.gov/tmdl/chesapeakebay.htm
- www.dcr.virginia.gov/sw/baytmdl.shtml

DEQ
Virginia Department of Environmental Quality

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Appendix C

EPA's Response to Virginia's Watershed Implementation Plan (WIP)

Jeff Corbin
EPA
October 28, 2010

Bay TMDL and WIP Schedule: 2009-2017

Oct 2009

Major basin jurisdiction loading targets

November-December 2009

Bay TMDL Public Meetings

Phase 1 Watershed Implementation Plans: November 2009 – Sept.1 2010

Local Program Capacity/Gap Evaluation

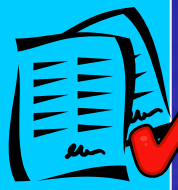
July 1 and August 13 Allocations

Draft TMDL

Sept. 24, 2010

(45 days)

Public Review And Comment



Nov 29, 2010 Final WIPs

December 2010

Final TMDL Established

Phase 2 Watershed Implementation Plans: Jun/Nov 2011

Divide Target Loads among Watersheds, Counties, Sources

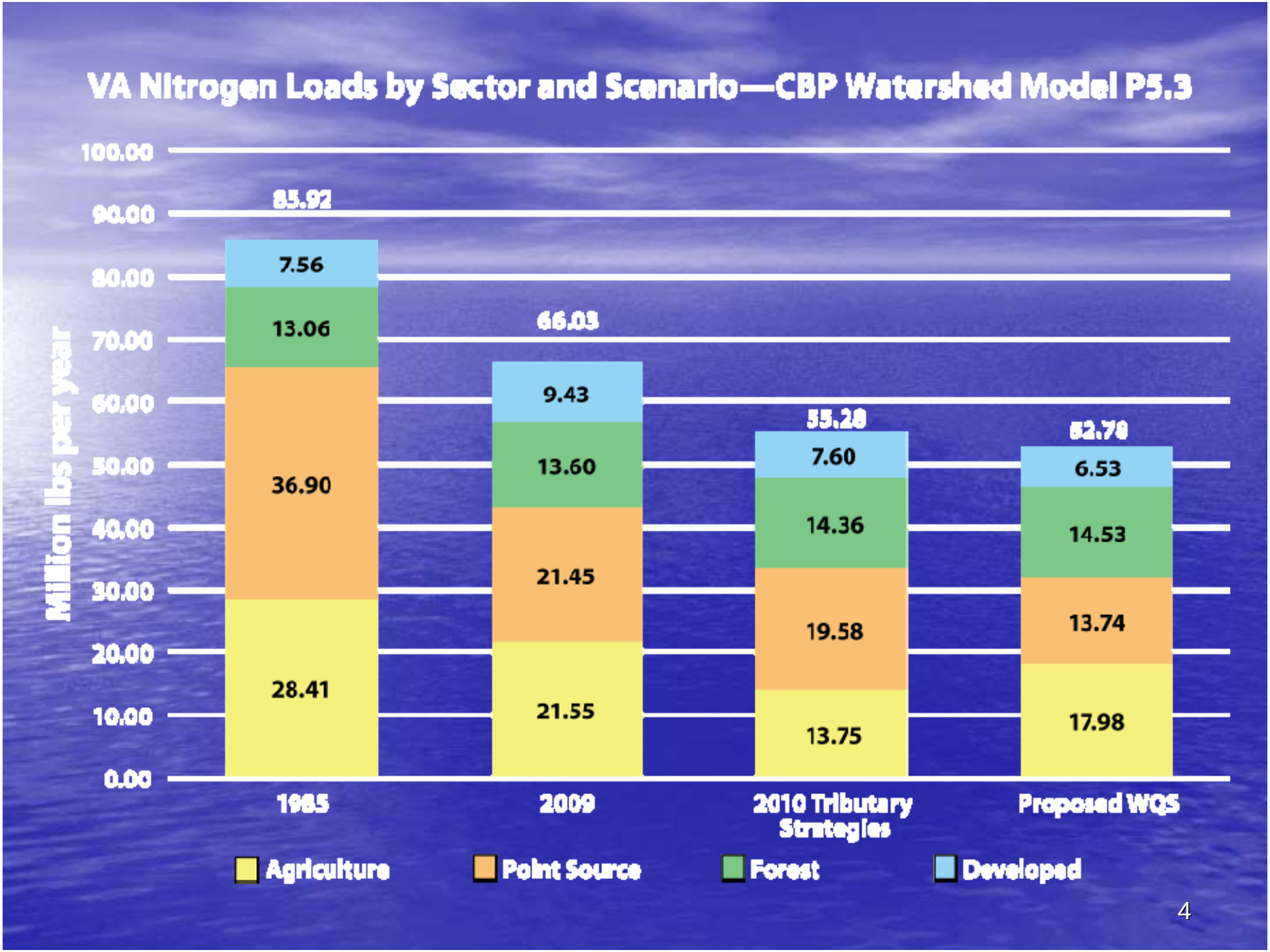
Starting 2011

2-year milestones, reporting, modeling, monitoring

2017 60% of Practices in Place - Phase III WIPs to meet 2025 Goal

TMDL/WIP Outreach

- Draft TMDL Issued on Sept 24: 45 Day public comment period until November 8th
- Four Public Meetings in Virginia: October 4 – 7, 2010
  - EPA and VA Participation
  - Webinar
- Stakeholder Outreach: Environmental Organizations, State Legislators, Local Governments, Agricultural Community, Homebuilders/Developers, and Wastewater Associations


VA Nitrogen Loads by Sector and Scenario—CBP Watershed Model P5.3
Million lbs per year
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
85.92
7.56
13.06
36.90
28.41
66.03
9.43
13.60
21.45
21.55
55.28
7.60
14.36
19.58
13.75
62.78
6.53
14.53
13.74
17.98
1985
2009
2010 Tributary Strategies
Proposed WQS
Agriculture
Point Source
Forest
Developed

CHAPTER 519

An Act to amend the Code of Virginia by adding in Chapter 3.1 of Title 62.1 an article numbered 4.1, consisting of sections numbered 62.1-44.19:4 through 62.1-44.19:8, relating to the Water Quality Monitoring, Information and Restoration Act. [S 1122]

Approved March 18, 1997

§ 62.1-44.19:7. Plans to address impaired waters.

A. The Board shall develop and implement a plan to achieve fully supporting status for impaired waters, except when the impairment is established as naturally occurring. The plan shall include the date of expected achievement of water quality objectives, measurable goals, the corrective actions necessary, and the associated costs, benefits, and environmental impact of addressing impairment and the expeditious development and implementation of total maximum daily loads when appropriate and as required pursuant to subsection C.

C. ...The Board shall develop and implement pursuant to a schedule total maximum daily loads of pollutants that may enter the water for each impaired water body as required by the Clean Water Act.

CHAPTER 3.7.
CHESAPEAKE BAY AND VIRGINIA WATERS CLEAN-UP AND OVERSIGHT ACT

§ 62.1-44.117. Development of an impaired waters clean-up plan; strategies; objectives.

A. The Secretary of Natural Resources shall develop a plan for the cleanup of the Chesapeake Bay and Virginia's waters designated as impaired by the U.S. Environmental Protection Agency. The plan shall be revised and amended as needed to reflect changes in strategies, timetables, and milestones.

CHESAPEAKE BAY AND VIRGINIA WATERS CLEAN-UP AND OVERSIGHT ACT

Continued…

B. The plan shall address both point and nonpoint sources of pollution and shall include, but not be limited to the following:

1. ***Measurable and attainable objectives;***
2. ***A description of the strategies to be implemented;***
3. ***Time frames or phasing to accomplish plan objectives and the expected dates of completion;***
4. ***A clearly defined, prioritized, and sufficiently funded program of work within the plan both for point and nonpoint source clean-up projects;***
5. ***A disbursement projection plan;***
6. ***Potential problem areas where delays in the implementation of the plan may occur;***
7. ***A risk mitigation strategy;***
8. ***A description of the extent of coordination between state and local governments;***
9. ***Assessments of alternative funding mechanisms***

Watershed Implementation Plans

~Expectations~

Similar to Existing Statutory Requirements

1. Interim and Final Nutrient and Sediment Target Loads
2. Current Loading Baseline and Program Capacity
3. Gap Analysis
4. Commitment and Strategy to Fill Gaps
5. Account for growth
6. Tracking and Reporting Protocols
7. Contingencies for Slow/Incomplete Implementation
8. Appendix with Detailed Targets and Schedule

60% by 2017!!

Communicating Expectations

- November 4, 2009, expectations letter
  - Expectations for content and timing of WIPS
  - Two-year milestones
- December 29, 2009, consequence letter
  - Potential Federal actions and consequences
- Final guide issued to States on April 2, 2010
  - Draft guide issued to states on March 18, 2010 for review
  - Provided a common framework for the review of the Phase I WIPs
  - Includes eight elements with level of detail needed
  - Expansion of November 4, 2009 “expectations” letter

EPA-VA Communication

- Aug. 24 – VA Summary of Proposed WIP Elements (SAG)
- Sept. 3 – Draft WIP submitted
- Sept. 23 – EPA Conference call with VA Senior Management - summary of EPA WIP review
- Sept. 24 – Letter from R3 Administrator explaining review process and brief summary of EPA WIP review findings
- Oct. 4 – Detailed WIP evaluation letter sent to VA

EPA WIP Review Process

- A Team of EPA experts conducted a 3-day rigorous evaluation process
  - Common review criteria
  - Tiered the State submissions in 4 categories of quality and Reasonable Assurance
- Three goals were paramount:
  - Achieving the load caps in all basins and impaired segments
  - Providing a high level of reasonable assurance that nonpoint source controls will be achieved
  - Sufficient detail for permit writers

Overview - Draft WIP Deficiencies

- No strategy for filling recognized program or resources gaps
- Few enforceable or otherwise binding commitments
- Discrepancies between proposed implementation programs and pollution reduction #s contained in a WIP
- Reliance on pollution trading programs--no commitment to adopt critical trading drivers such as new regulations
- Few dates for key actions and program-building milestones

Initial VA Findings: Stormwater

- Contingency actions lacking in the event that Virginia's new regulations are not promulgated on schedule
- Lacked strong performance standards for development and new development
- Lacked strong detailed retrofit program with aggressive performance standards; reductions from existing stormwater loads not possible without retrofits
- Overall concern with proposed expansion of Nutrient Credit Exchange Program
- Discrepancies between the WIP strategies and input deck (E3 issue)
- Insufficient implementation schedules

Initial VA Findings: Wastewater

- Lacked commitment to retrofit and optimize WWTPs in the James River Basin
- Lacked detail regarding permitting of non-significant WWTPs
- Additional clarity needed regarding tracking, verifying and reporting nutrient loads and upgrade/compliance schedules to EPA
- Insufficient detail for strategies to achieve nitrogen reductions from onsite treatment systems

Initial VA Findings: Agriculture

- Lacked assurance for increased implementation of “priority practices”
  - Proposed regulatory and legislative were removed
  - Detailed strategy outlining timing and process for large increases in implementation rates
  - Sources of funding
- EPA recommendation to develop a detailed Manure Management Strategy with innovative approaches
- Insufficient detail ensuring compliance with current regulatory programs
  - Compliance/Enforcement procedures
  - Needed staffing levels
  - Frequency of inspections/verification
- Additional need to address impacts of small dairies on water quality
- Limited commitment to improving phosphorus (P) management to address high P in soils and related excess manure
- Insufficient efforts to improve horse pasture management

Do WIPs meet the allocations?

Jurisdiction	Nitrogen	Phosphorus	Sediment
DC	✓	✓	
DE			✓
MD	✓	✓	✓
NY			✓
PA	✓		
VA			✓
WV		✓	

(Proposed) Federal Backstop Allocations

(modify state WIP allocations)

- All jurisdictions require some level of Backstop allocation or adjustment because:
  - Didn't achieve basin-jurisdiction allocations (N, P, Sediment)
  - Didn't provide a high level of assurance that proposed strategies could be implemented (particular emphasis on 60% by 2017)

Federal Backstop Actions Could Include…

- Establish additional reductions from regulated point sources (e.g., wastewater treatment plants, CAFO, MS4s)
- Establish finer scale allocations for headwater states (TMDL)
- Expand NPDES permit coverage to unregulated sources
- Increase permit oversight/object to permits
- Require net improvement offsets
- Increased federal enforcement
- Condition or redirect federal grants
- Promulgation of local nutrient standards

(proposed) Federal Backstops

3 Levels of Allocation Adjustments

- Minor - adjust load allocations to equal targets
- Moderate
  - Stronger CAFO/MS4 requirements
  - Significant WWTPs: N @ 4 mg/l, P @ 0.3 mg/l
- High Backstop
  - Stronger CAFO/MS4 requirements
  - Significant WWTPs: N @ 3 mg/l, P @ 0.1 mg/l

Draft VA WIP Evaluation

For Virginia: moderate backstop

- Wastewater facilities: 4 mg/L TN and .3 mg/L TP and design flow
- MS4s: 50% of urban MS4 lands meet aggressive performance standard through retrofit/redevelopment; 50% of unregulated land treated as regulated
- Construction: Erosion and sediment control on all lands subject to Construction General Permit
- CAFO production areas: Waste management, barnyard runoff control, mortality composting, precision feed management for all animals. Same standards apply to AFOs not subject to CAFO permits EXCEPT no feed management on dairies

Opportunities for Improvement

- EPA is providing the States with opportunities to **enhance** their WIPs by November 29
  - Potential to remove/adjust EPA backstop allocations
  - 2011 Phase II WIPs – opportunity to enhance levels of commitment
- EPA is extensively engaging the jurisdictions to share information, guidance, examples from other states, etc.
- Two-Year Milestones
- 2017 – Phase III

EPA-VA Interaction

- Weekly Conference Calls
- Available Technical Experts
- Sit-Down Meeting – Oct. 29
- Early Nov. “Closure Meeting”
- Share Revised Data
- Shared Revised Strategies

“There are no mistakes...only opportunities.”

- Anonymous

Image courtesy Guy Stephens

Appendix D

Trust for a Clean Water Economy
Rappahannock Watershed

A Systems Approach to Bay Restoration
2011-2020
Presentation to the
Virginia Water Commission
January 10, 2011

Rappahannock River Basin Commission
in partnership with
Conserv

Presentation

- System Introduction
- System Architecture
- System Process
- System Revenue
- System Testing
- Timeline

System Introduction

The Problem

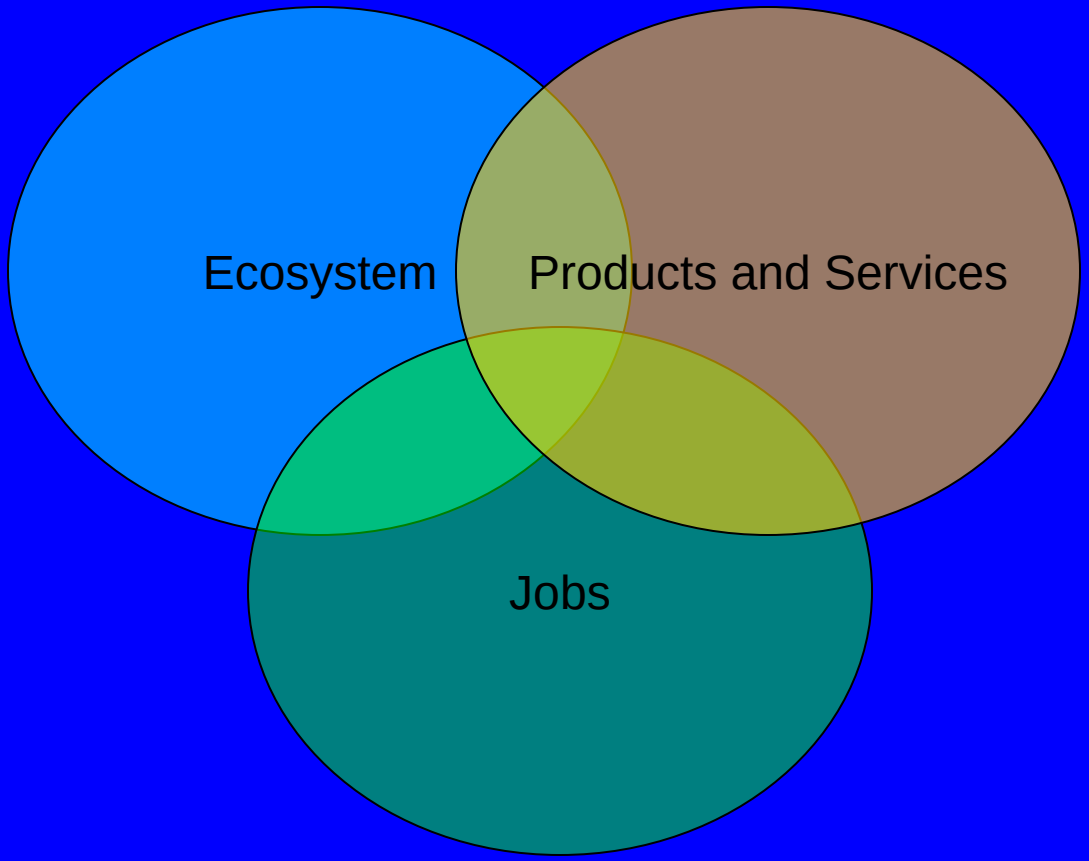
Bay degradation is caused by institutional disconnect between our human economy and nature.

The Solution

A re-coupling between the human and natural economies.

A proper coupling Enterprise is needed.

What does the Enterprise Couple?



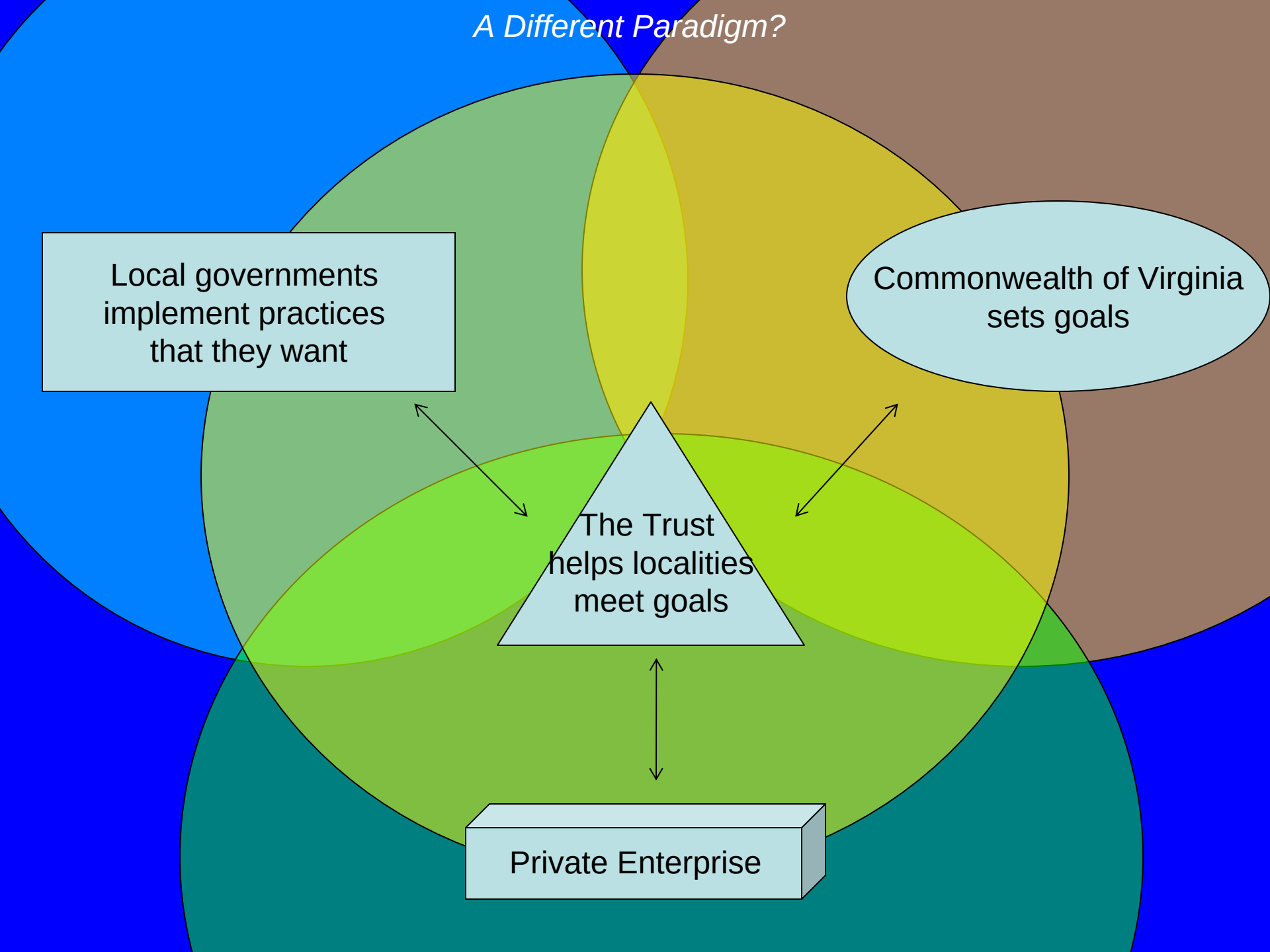
Current Paradigm

In response to federal mandate

State of Virginia implements practices through others including local governments

Local government has little discretion

A Different Paradigm?



Enterprise Mission

The Trust for a Clean Water Economy (The Trust) provides government and corporations environmentally efficient pollution prevention/reduction solutions, essentially a...

Watershed Bank.

The Trust is incentivized through the reductions that local governments and corporations achieve.

It is a contractor whose contract can be revoked if there is failure to perform.

Trust Organizational Structure

A watershed-based not-for-profit organization.

The Trust Objective

The Trust creates a market for cost-effective pollution reduction solutions.

The Trust Methodology

The Trust uses “market-like mechanisms” to facilitate the implementation of cost-effective pollution reduction solutions.

System Architecture

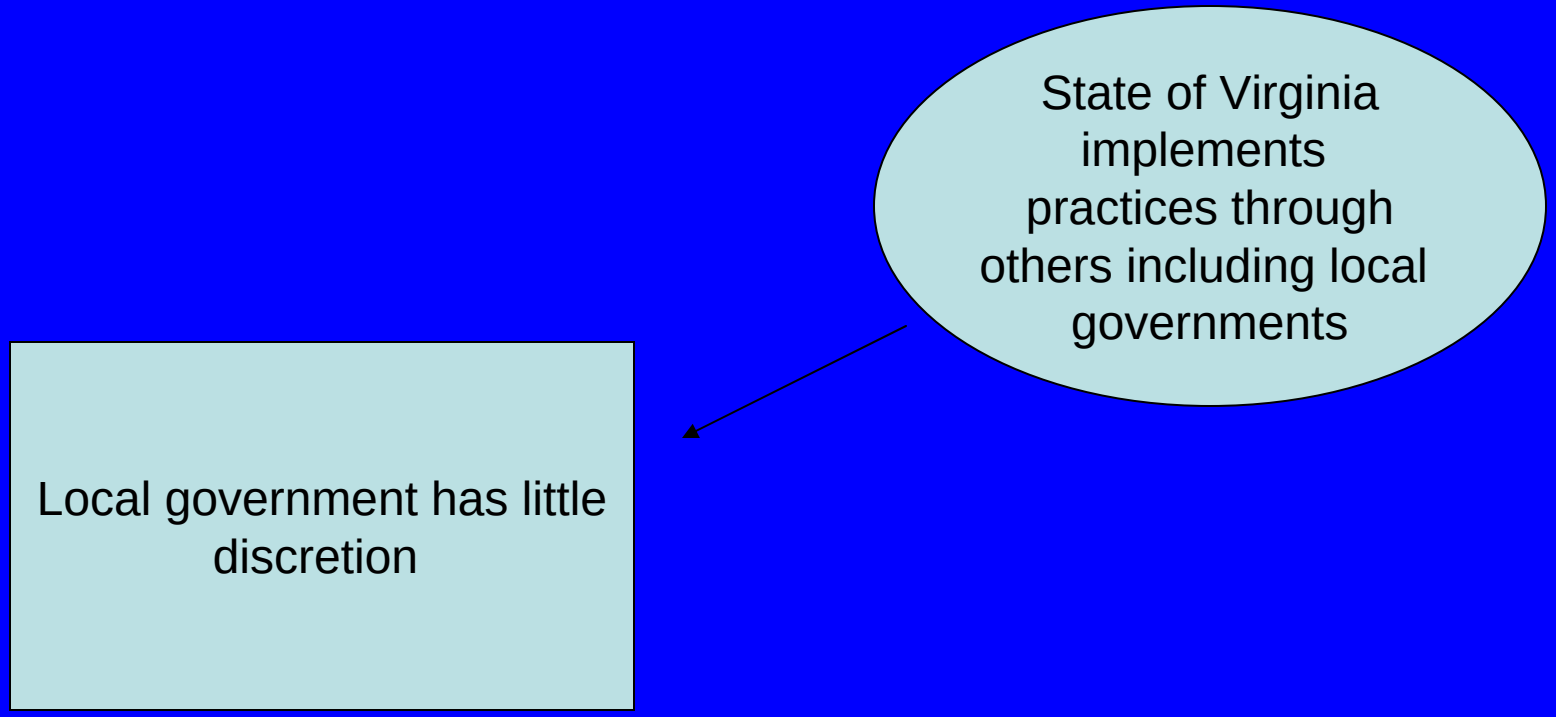
Elements

1. Market-friendly Baselines
2. Fully Capped Bubble Market
3. Capped at Local Government Scale
4. Source sector Cooperatives
5. Pollution banking
6. Natural Capital Brokers
7. Watershed Friendly Certifications
8. Monitoring
9. NPDES group based compliance
10. Market-friendly state and federal enabling legislation

System Process

Current Pollution Reduction Process

In response to federal mandate



#1
Trust conducts Local Government Pollution Accounting and Auditing

- Budgeting and performance evaluation
- Certification of pollution reduction
- Advising on tax impacts (conservation easement)

#2

Trust Markets *Rappahannock Friendly* Certifications

#3

Rappahannock Friendly projects are certified by the Trust (through modeling and/or monitoring) to provide specific pollution reduction performances

#4

Trust develops variable length pollution reduction credit contracts with watershed friendly providers of products and services

#5

Local Governments (and others) purchase cost effective and politically-acceptable pollution reduction projects…

some of which are provided by The Trust.

#6

Trust tracks purchases of *Rappahannock Friendly* products and services made by local governments and others

#7
Commonwealth audits Trust

#8
Commonwealth enforces reductions when failure to meet pollution reduction goals

System Revenue
(Market Prototypes and Testing)

Market 1: Federal Highways

- Project: Fredericksburg Area Metropolitan Planning Organization New Toll Road
- Hypothesis: Commuters should pay for the pollution impacts they create.
- Revenue Flow: From commuter to rural landowners.

Market 2: Urban Areas

- Project: City of Fredericksburg-Caroline County Stormwater Offset Trading
- Hypothesis: Purchase of nutrient reductions through conservation is more cost effective than on-site stormwater retrofit
- Revenue Flow: From city residents to rural landowners.

Market 3: Water Supply Watersheds

- Project: South Fork Rivanna River Forests to Faucets (F2F)
- Hypothesis: Natural infrastructure is more cost effective method to reduce sediment and nutrients than built infrastructure
- Revenue Flow: Urban water consumers to rural landowners

Market 4: Suburbs

- Project: Rappahannock – Friendly Lawn Design and Certification
- Hypothesis: Lawn nutrient reductions are more cost effectively achieved than stormwater retrofit reductions
- Revenue Flow: State Tax Credits for Design, Implementation, and Testing of Rappahannock – Friendly Yards

Emerging Projects

- Federal Lands – Military Installations (in partnership with Public Policy of Virginia)
- Other Innovative Corporate/Personal Responsibility

System Testing

2011

- Conduct simulations of Trust architecture
- Determine optimum architecture
- Develop Implementation Plan for 2012

Timeline

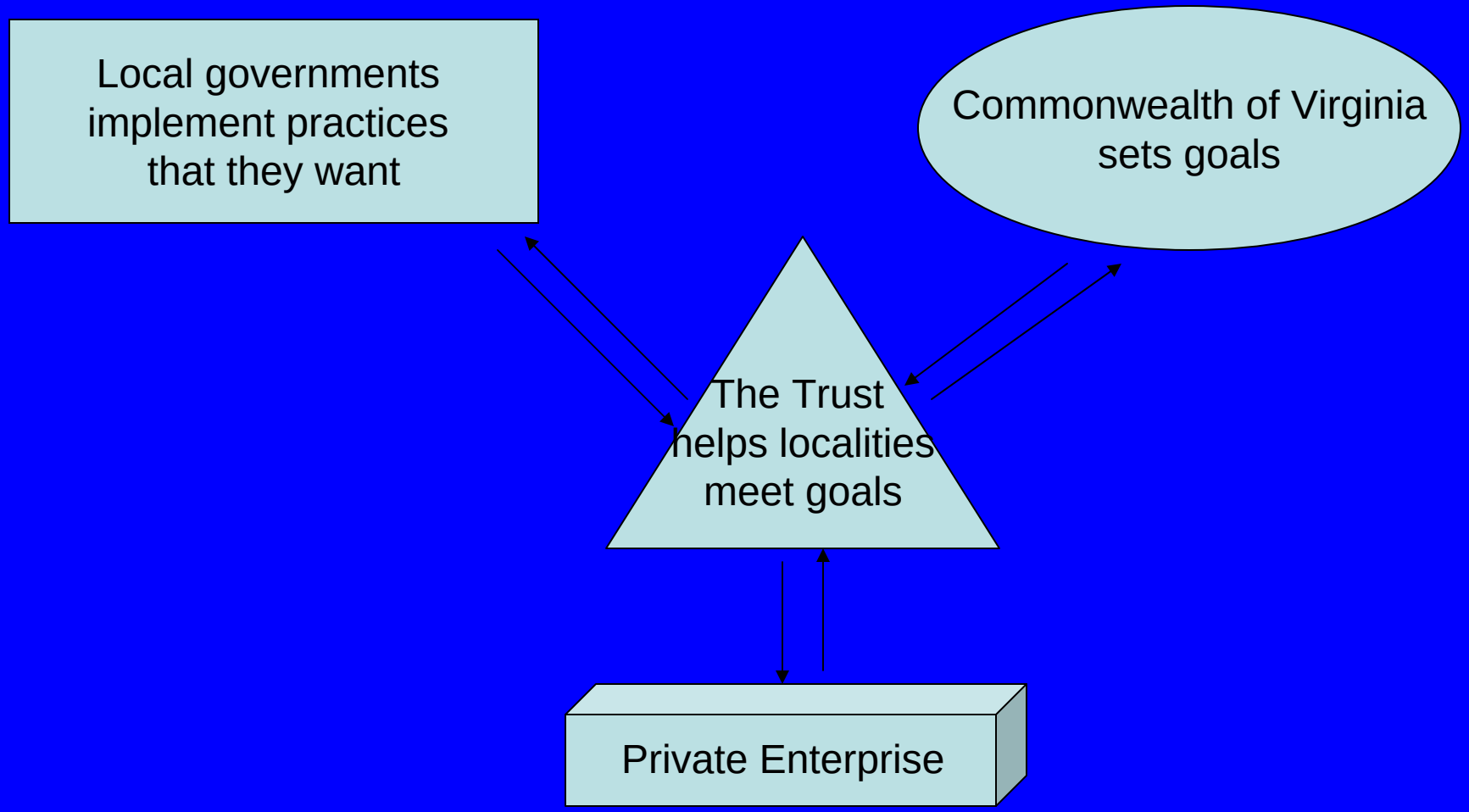
Phase 1 (2011) - Proof of Concept

Phase 2 (2012-2013) - Trust Demonstration

Phase 3 (2014-2017) - Trust Commercial Operations I

Phase 4 (2017-2020) - Trust Commercial Operations II

Proposed Pollution Reduction Process



Appendix E

Fairfax Water's Current Perspective on EDC and PPCP's

(Endocrine Disrupting Compounds and Pharmaceuticals and Personal Care Products)

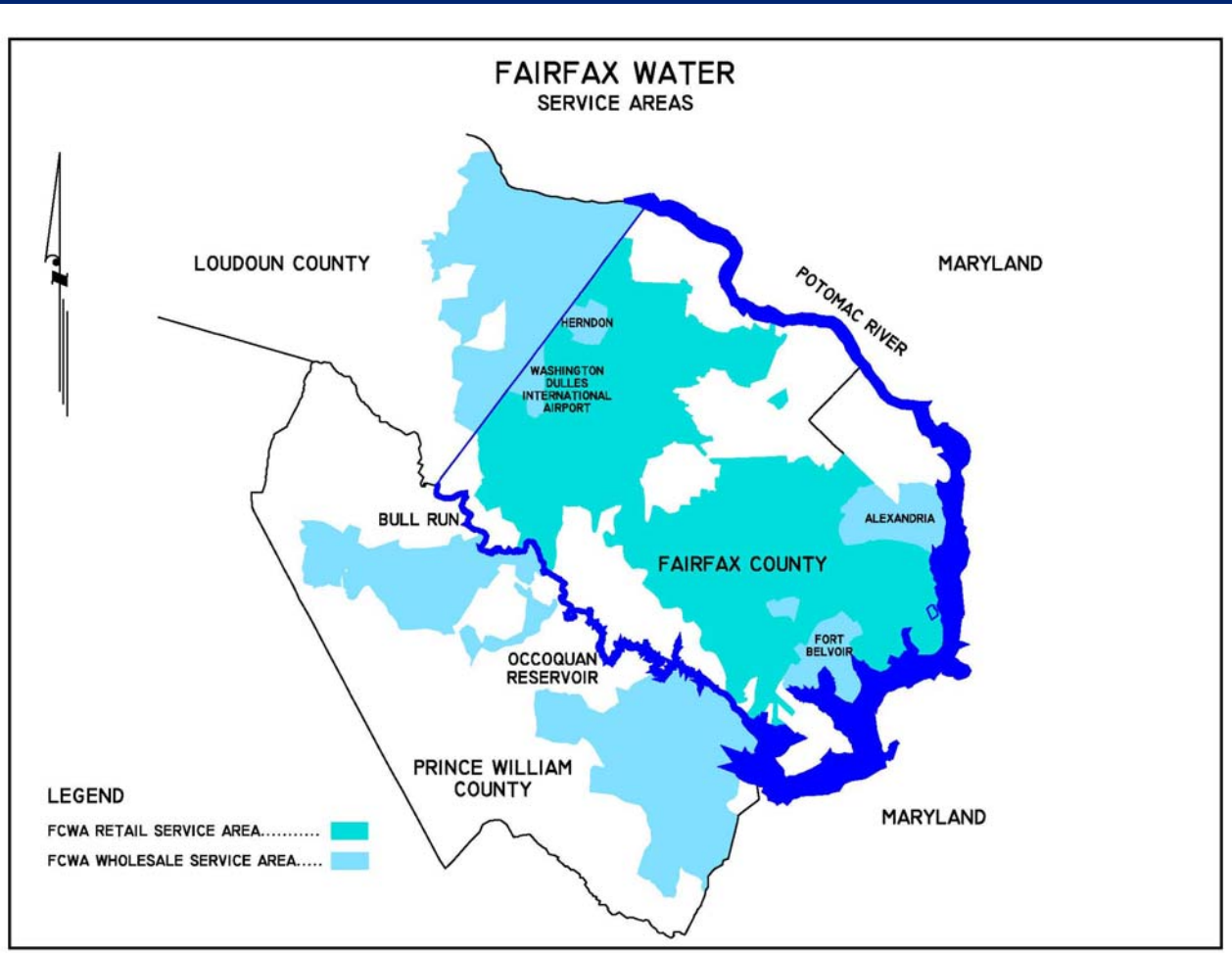
October 28, 2010

State Water Commission Meeting

Fairfax Water

Who is Fairfax Water ? – the Basics

- Drinking water only utility
- ~50-50 split retail/wholesale

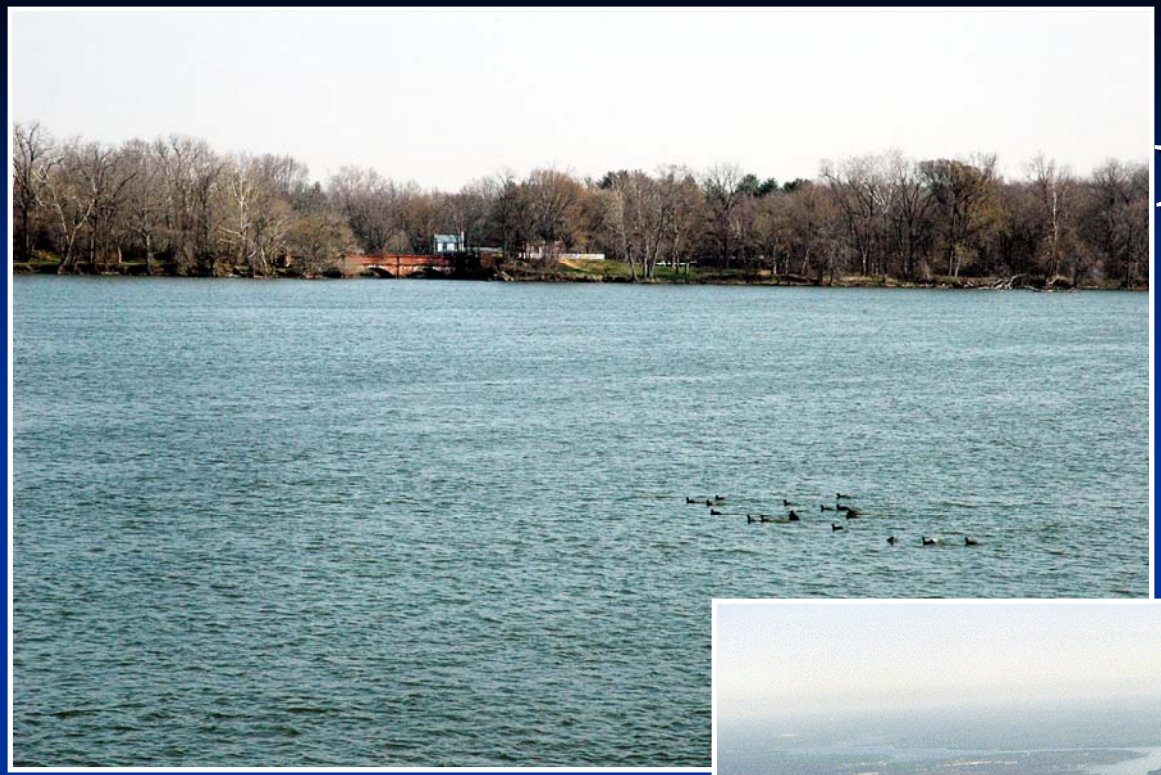


Fairfax Water

Who is Fairfax Water?

- Largest water utility in Virginia
- One of the 25 largest in the United States
- Serve 1.7 million customers
- Serve one out of every five Virginian's using public water
- Average Daily Production = 167 MGD (million gallons per day)

Fairfax Water



Potomac River source water

Occoquan Reservoir source water

Fairfax Water

James J. Corbalis, Jr. Water Treatment Plant

Frederick P. Griffith Jr. Water Treatment Plant

7. Low Southwest view of Griffith WTP 10-21-06 Patrick J. Hendrickson / Highcamera.com

Fairfax Water

Five Steps of Conventional Water Treatment

1. Coagulation
2. Flocculation
3. Sedimentation
4. Filtration (deep bed GAC)
5. Disinfection

…with an additional treatment…

Ozonation

Fairfax Water

Emerging Contaminant Definitions

- **Endocrine Disrupting Compounds (EDCs)/**
  - Chemicals that interfere with the action of natural hormones responsible for reproduction, development, and/or behavior of an organism.
    - Examples – pesticides; and natural & synthetic hormones
- **Pharmaceuticals (P)**
  - Simply put - Medications
    - Encompasses some of the hormone-based compounds already noted as EDCs
    - Examples – antibiotics; heart, cancer, and anti-epileptic medications; livestock food additives
- **Personal Care Products (PCPs)**
  - Common anthropogenic compounds
    - Examples – shampoos, bug spray, OTC meds

Fairfax Water

Emerging Contaminants-EDC/PPCP's
What is FW doing? Nationally, Regionally, Locally

- Fairfax Water involvement
  - **Nationally**
    - Water Research Foundation (WRF)
  - Regionally
    - MWCOG (Metropolitan Washington Council of Governments)
    - Potomac River DWSPP (Drinking Water Source Protection Partnership)
    - Public access to data via website www.mwcog.org/environment/water/watersupply/tracecompounds.asp
  - Locally
    - Research studies (2007 and 2010) performed to determine what specific compounds to monitor
    - Monitoring the source and finished waters
    - Public access to data via website www.fairfaxwater.org

Fairfax Water

A Closer Look at the National level – Water Research Foundation, WRF

- The WRF is the nation's largest and most well established research foundations devoted solely to drinking water.

- Strategic Initiative: *Provide research into understanding the sources, occurrence, nature, fate, possible health effects, and treatment options for EDCs, PhACs, and PCPs.*

Fairfax Water

A Closer Look at the National level – Water Research Foundation

- 47 funded projects since 1999 to address emerging contaminant issues
  - Total budget amount of $16,485,402 (funded and in-kind)
- 21 reports have been finalized and published
- Current funding for 26 on-going projects
  - (info updated Oct '10)

Fairfax Water

WATER RESEARCH FOUNDATION
ADVANCING THE SCIENCE OF WATER

Relevant research findings for FW

- Project: #2758 "Removal of EDCs and Pharmaceuticals in Drinking and Reuse Treatment Processes"
  - Conclusions
    - 5. Conventional coagulation, flocculation, and sedimentation are ineffective for removing the majority of target EDCs and PPCPs
    - 8. Ozone is much more effective than chlorine and is able to significantly remove the majority of target analytes.
    - 11. Activated carbon is highly effective for removal of target analytes…

Fairfax Water

WATER RESEARCH FOUNDATION
ADVANCING THE SCIENCE OF WATER

Relevant research findings for FW

- Project # 3085: Toxicological Relevance of Endocrine Disruptors and Pharmaceuticals in Drinking Water
  - Conclusions
    - Although some EDC's and PPCPs were detected…there is no evidence of human health risks from consumption of these waters.
    - Exposure to estrogenic chemicals in diet is far greater than in drinking water

Fairfax Water

WATER RESEARCH FOUNDATION
ADVANCING THE SCIENCE OF WATER

Quote to note from Water Research Foundation's State of Knowledge of EDC and Pharms in Drinking Water, 2008

- "Screening-level risk assessments conducted to date have not indicated that the trace concentrations of Pharms detected in drinking water pose a risk to consumers, and likewise, there is no convincing evidence that EDCs at levels occurring in drinking water have caused adverse effects in humans."

Fairfax Water

WATER RESEARCH FOUNDATION
ADVANCING THE SCIENCE OF WATER

Emerging Contaminants-EDC/PPCP's
What is FW doing? Nationally, Regionally, Locally

- Fairfax Water involvement
  - Nationally
    - Water Research Foundation
  - **Regionally**
    - Potomac River DWSPP (Drinking Water Source Protection Partnership)
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    - Public access to data via website www.mwcog.org/environment/water/watersupply/tracecompounds.asp
  - Locally
    - Research studies (2007 and 2010) performed to determine what specific compounds to monitor
    - Monitoring the source and finished waters
    - Public access to data via website www.fairfaxwater.org

Fairfax Water

A Closer Look at Regional level

- Regional = National Capitol Region
  - Fairfax Water
  - Washington Aqueduct
  - Washington Suburban Sanitary Commission

Fairfax Water

www.mwcog.org/environment/water/watersupply/tracecompounds.asp

Metropolitan Washington Council of Governments

Serving the National Capital Region

Environment

Trace Compounds Research

Overview

Fairfax Water, the Washington Aqueduct, and the Washington Suburban Sanitary Commission, suppliers of over 90 percent of the COG region's drinking water, have taken regional efforts to monitor for the presence of trace compounds (often referred to as emerging contaminants) in source water (stream water collected at a surface-water intake) and finished water (water that has gone through the treatment process, but has not been distributed). Working with national partners, these three major drinking water suppliers tested the Potomac, Patuxent, and Occoquan source waters for emerging contaminants. Emerging contaminants, such as endocrine disrupting compounds (EDCs), pharmaceuticals, and personal care products (PPCPs), are commonly described as chemicals or materials that have a real or perceived threat to human health or the environment.

The utilities tested for nineteen (19) compounds in the source and treated waters. Water samples were sent to a laboratory certified for this type of analysis.

Out of nineteen compounds tested for, the results showed the presence of very, very small amounts of a total of four compounds—Atrazine, Carbamazepine, estrone and Sulfamethoxazole—in the three rivers and in some of the treated drinking water, confirming the results of earlier monitoring studies. The compounds detected were found at the part per billion and part per trillion levels. A part per billion is equal to one gallon of water in 1,514 Olympic-size swimming pools. A part per trillion is equal to one gallon of water in 1,514,570 Olympic-size swimming pools. Research to date shows that there is no indication of human health concern at these levels.

The regional drinking water utilities, along with other water utilities nationally, are working to advance the science in the area of understanding and treating these emerging contaminants in water. The Potomac Drinking Water Source Partnership, founded by Fairfax Water, the Washington Suburban Sanitary Commission and the

WATER USE IT WISELY

Emerging Contaminants-EDC/PPCP's
What is FW doing? Nationally, Regionally, Locally

- Fairfax Water involvement
  - Nationally
    - Water Research Foundation
  - Regionally
    - MWCOG (Metropolitan Washington Council of Governments)
    - Potomac River DWSPP (Drinking Water Source Protection Partnership)
    - Public access to data via website
  - **Locally**
    - Research studies (2007 and 2010) performed to determine what specific compounds to monitor
    - Monitoring the source and finished waters
    - Public access to data via website www.fairfaxwater.org

Fairfax Water

www.fairfaxwater.org

Fairfax Water- Monitoring Program - Windows Internet Explorer provided by Fairfax Water

http://www.fairfaxwater.org/current/monitoring_program.htm

File Edit View Favorites Tools Help

Fairfax Water- Monitoring Program

Fairfax Water — Our Quality is Clear

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Emerging Water Quality Issues

Fairfax Water's Monitoring Program

While Fairfax Water does not have all of the answers about how and why certain compounds are in the source waters (the Potomac River and Occoquan Reservoir), we do try to answer some of the questions about what we have found, what we have not found, and what we are doing about it. Working with regional and national partners, Fairfax Water has developed a testing plan for emerging contaminants such as Endocrine Disrupting Compounds (EDCs), Pharmaceuticals, and Personal Care Products (PPCPs) in source and treated waters. We hope you find the discussion below helpful.

What are EDCs and PPCPs?

Endocrine Disrupting Compounds (EDCs) are chemicals that interfere with the action of natural hormones responsible for reproduction, development, and/or behavior of an organism.

- Examples – pesticides; and natural and synthetic hormones

Pharmaceuticals (P), simply put, are medications.

- Examples – antibiotics; heart, cancer, and anti-epileptic medications; livestock food additives

Personal Care Products (PCPs) are common household compounds.

RELATED LINKS

Winter Water Tips

Internet 100%

Start X1 - Email Inbox - Microsoft Outlook StateWaterCommision10_... Fairfax Water- Monit... 11:58 AM Monday

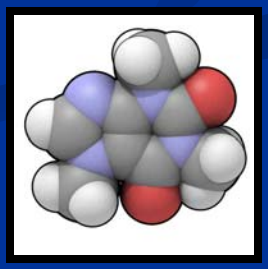
Fairfax Water on-going actions

- Research
- Assess
- Monitor
- Report
- Repeat
  - To date, as of October 2010, FW has compiled 10 quarterly sets of EDC/PPCP data through it's Emerging Compound Periodic Testing Efforts

Fairfax Water

FW List of Compounds for Analysis

- Atrazine
- Bisphenol A
- Butylbenzyl phthalate
- DEHP [di(2-ethylhexyl)phthalate]
- Dibutyl phthalate
- 17b-estradiol
- Estrone
- Caffeine
- Carbamazepine
- Ethynyl estradiol
- Lindane (BHC-gamma)
- Linuron
- Methoxychlor
- Nonylphenol
- Octylphenol
- Monensin
- Naproxen
- Sulfamethoxazole
- Ibuprofen
- Progesterone



Fairfax Water

FW List of Compounds with detectable levels in Source Waters

- Atrazine (Occoquan and Potomac)
- Bisphenol A (Occoquan)
- Butylbenzyl phthalate
- DEHP [di(2-ethylhexyl)phthalate]
- Dibutyl phthalate
- 17b-estradiol
- Estrone (Potomac)
- Caffeine (Potomac)
- Carbamazepine (Occ and Potomac)
- Ethynyl estradiol
- Lindane (BHC-gamma)
- Linuron
- Methoxychlor
- Nonylphenol
- Octylphenol
- Monensin
- Naproxen (Potomac)
- Sulfamethoxazole (Occ and Potomac)
- Ibuprofen
- Progesterone (Occ and Potomac)

Fairfax Water

Atrazine

- <0.1 - 0.9 ppb detected in both source waters (7 detects out of 18)
- Lowest level of detection = 0.1 ppb
- EPA Maximum Contaminant Level (MCL) of 3.0 ppb in Finished waters
- Seasonally detected in FW source waters
- Limited detections in FW finished waters (historical data)
- Commonly used herbicide for maize crops
- Watersheds contain agricultural uses
- Adequately removed by GAC and Ozone

Fairfax Water

Atrazine

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

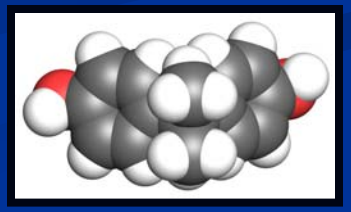
25 8oz. glasses of water per Day*

*water which contained 1.0 ppb Atrazine
(FW project data reflects non-detect for drinking waters)

Fairfax Water

Bisphenol A

- <0.010 - 0.027 ppb detected in Occoquan source (one detected occurrence out of 18)
  - Lowest level of detection = 0.010 ppb
- No EPA MCL
- Intermediate used in production of epoxy and polycarbonate resins and plastics
- Commonly found in food and various consumer products
- **Effectively removed by GAC and Ozone**



Fairfax Water

Bisphenol A

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

60,000 8oz. glasses of water per Day*

*water which contained 0.025 ppb Bisphenol A

Fairfax Water

Carbamazepine

- Antiepileptic drug use
- 0.001 to 0.012 ppb detected in both source waters (18/18)
  - Lowest level of detection = 0.001 ppb
- No EPA MCL
- WWTP are potential point source contributors
- One of the most commonly found pharms in WWTP's
- Watersheds contain WWTPs
- **Excellent removal capability by GAC and Ozone**

Fairfax Water

Carbamazepine

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

5,600 8oz. glasses of water per Day*

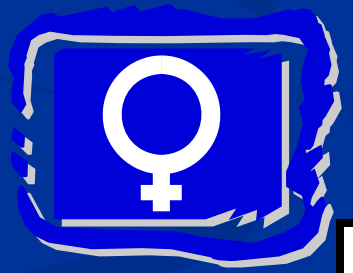
*water which contained 0.018 ppb Carbamazepine

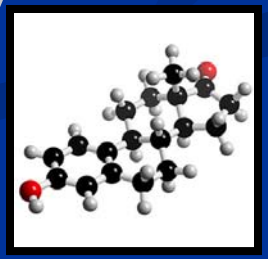
(FW project data reflects non-detect for drinking waters)

Fairfax Water

Estrone

- Natural hormone
- <0.5 to 0.9 ppt detected in Potomac source water only (2/18)
  - Lowest level of detection = 0.5 ppt
- No EPA MCL
- WWTP are potential point source contributors
- Watersheds contain WWTPs
- **Excellent removal capability by GAC and Ozone**





Fairfax Water

Estrone

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

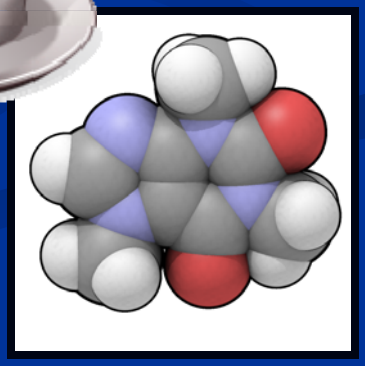
4,300 8oz. glasses of water per Day*

*water which contained 0.9 ppt Estrone
(FW project data reflects non-detect for drinking waters)

Fairfax Water

Caffeine

- Stimulant
- <0.05 to 0.07 ppb detected in Potomac source water only (2/18)
  - Lowest level of detection = 0.05 ppb
- WWTP are potential point source contributors
- Watersheds contain WWTPs
- No EPA MCL
- **Excellent removal capability by GAC and Ozone**



Fairfax Water

Caffeine

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

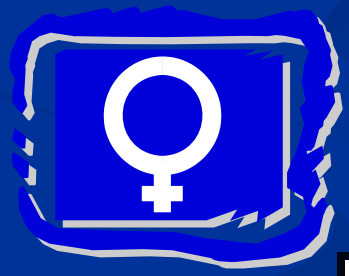
740,000 8oz. glasses of water per Day*

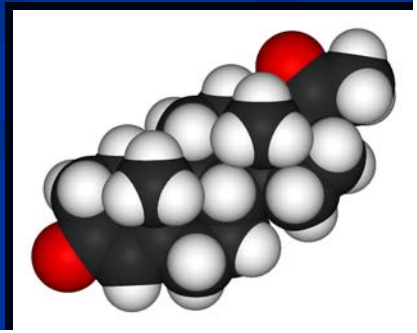
*water which contained 1.0 ppb Caffeine
(FW project data reflects non-detect for drinking waters)

Fairfax Water

Progesterone

- Natural hormone
- <0.1 to 0.3 ppt detected in both source waters (8/18)
  - Lowest level of detection = 0.1 ppt
- No EPA MCL
- WWTP are potential point source contributors
- Watersheds contain WWTPs
- **Excellent removal capability by GAC and Ozone**





Fairfax Water

Progesterone

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

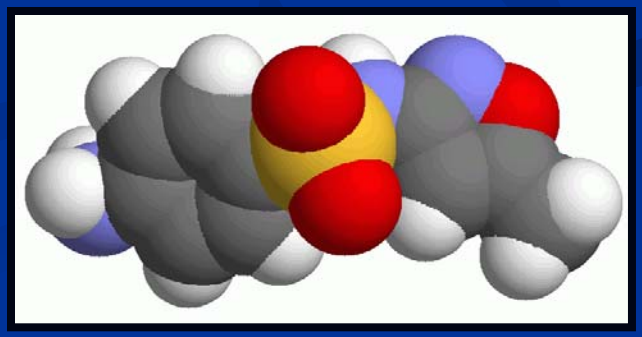
1,500 8oz. glasses of water per Day*

*water which contained 199 ppt Progesterone
(FW project data reflects non-detect for drinking waters)

Fairfax Water

Sulfamethoxazole

- Antibacterial antibiotic
- <0.002 to 0.027 ppt detected in both source waters (7/18)
  - Lowest level of detection = 0.002 ppb
- No EPA MCL
- **Excellent removal capability by GAC and Ozone**



Fairfax Water

Sulfamethoxazole

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

51,000,000 8oz. glasses of water per Day*

*water which contained 0.003 ppb Sulfamethoxazole
(FW project data reflects non-detect for drinking waters)

Fairfax Water

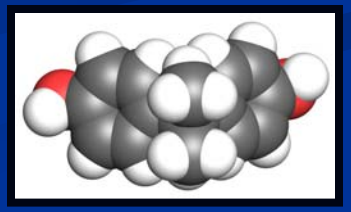
FW List of Compounds with detectable levels in Finished Waters

- Atrazine
- Bisphenol A (Griffith)
- Butylbenzyl phthalate
- DEHP [di(2-ethylhexyl)phthalate]
- Dibutyl phthalate
- 17b-estradiol
- Estrone
- Caffeine
- Carbamazepine
- Ethynyl estradiol
- Lindane (BHC-gamma)
- Linuron
- Methoxychlor
- Nonylphenol
- Octylphenol
- Monensin
- Naproxen
- Sulfamethoxazole
- Ibuprofen
- Progesterone

Fairfax Water

Bisphenol A

- <0.010 - 0.025 ppb detected in Griffith finished (1 detected occurrence out of 18)
  - Lowest level of detection = 0.010 ppb
- No EPA MCL
- Intermediate used in production of epoxy and polycarbonate resins and plastics
- Commonly found in food and various consumer products
- **Effectively removed by GAC and Ozone**



Fairfax Water

Bisphenol A

- To exceed the Acceptable Daily Intake levels as established through toxicity calculations….you would have to drink…

60,000 8oz. glasses of water per Day*

*water which contained 0.025 ppb Bisphenol A

Fairfax Water

Bisphenol A - BPA

- Recent hit near detection level in Griffith Finished water - 1 out of 9 quarters
- Low level detection limit for this analyte depicts a lesser degree of confidence in quantitative results
- Extremely low detection level required for FW project based on the current science at the time (2007)
- New research since FW project inception shows that the current lower detection level is not needed to predict concentrations of health concerns
- The future detection level suggested by toxicological consultant is higher than recent hits….but will still give the needed health related information and produce a greater confidence in quantitative results

Fairfax Water

The BPA Facts

- Extremely low level and very infrequent detects of BPA at FW
- Infrequent and/or low level detects provide analytical uncertainty
- GAC and Ozone are proven to be effective in removing BPA
- Conservative view of consumption
  - 60,000 8oz. glasses water/day to exceed the Acceptable Daily Intake at 0.025 ppb or 25 ppt

Fairfax Water

Current Overall Conclusions

- Ozone and GAC are effective in removing the source water EDC/PPCP's as evidenced in the finished water results
- Very few detects, and if found at extremely low concentrations
- Further research needed

Fairfax Water

Next steps, FW will continue…

- monitoring on a periodic basis for a more robust data set
- working with Regional and National organizations to bring more information to the drinking water industry and stakeholders
- researching the topic…..in order to keep current on new technology and findings

Fairfax Water

Contact information:

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Fairfax Water
Manager, WQ Laboratory and Compliance
703 289 6561
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Fairfax Water

Appendix F

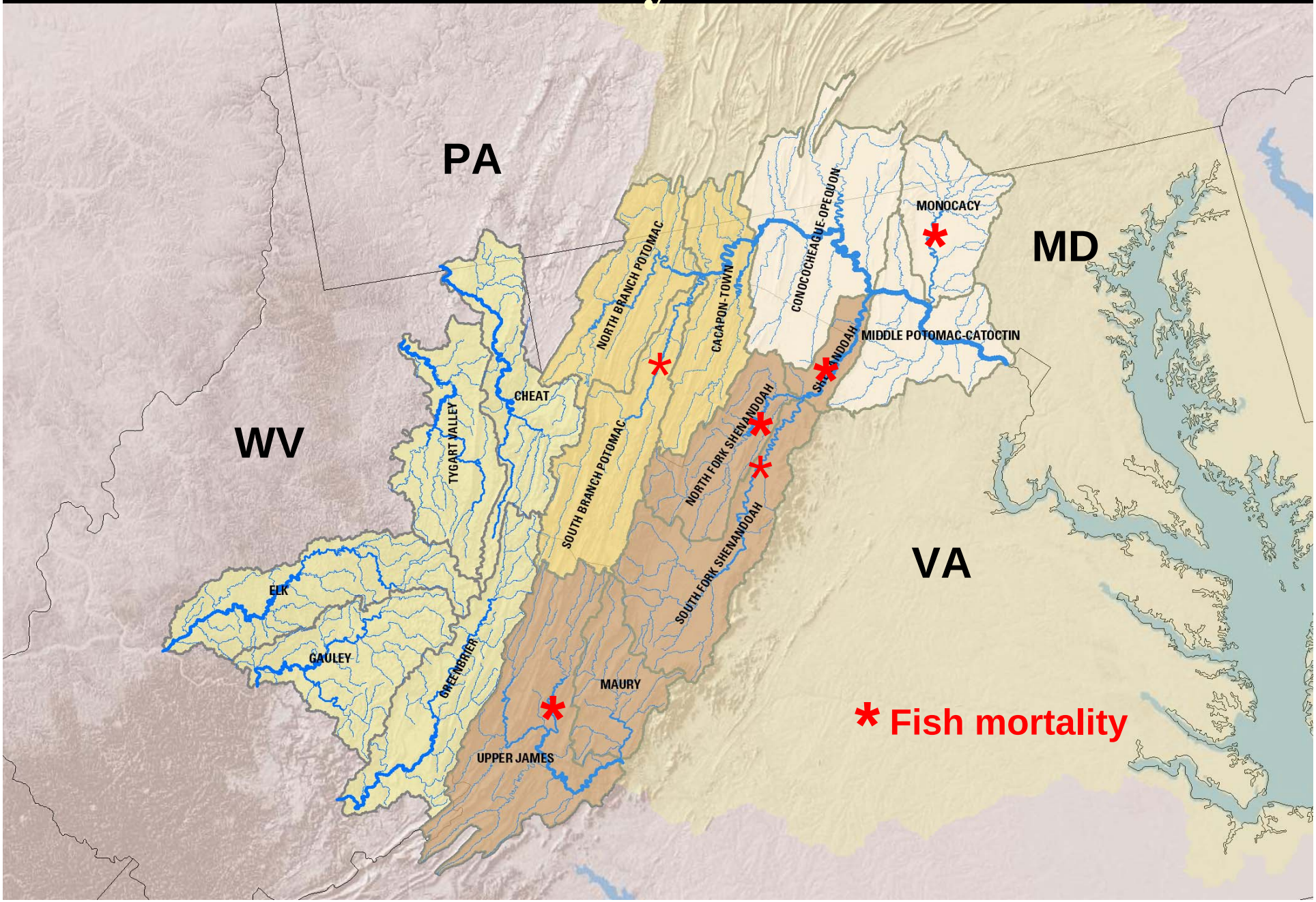
Contaminants of Emerging Concern

Vicki Blazer
U.S. Geological Survey
National Fish Health Research Laboratory
Kearneysville, WV

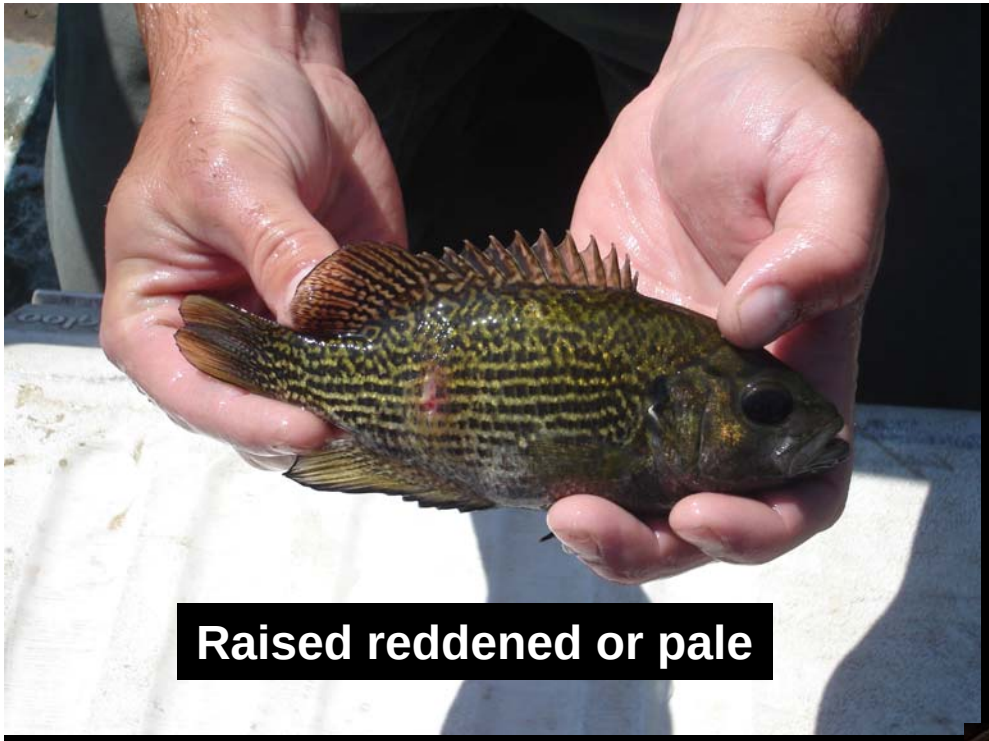
Fish Health Issues
Chesapeake Bay Watershed

- Indicative of environmental stress
  - Skin lesions and kills of bass, sunfish and suckers
  - High prevalence of intersex in bass
  - Poor recruitment of yellow perch in certain tributaries
  - Skin and liver tumors in brown bullhead in certain tributaries

Study Areas


PA
MD
WV
VA
MONOCACY
CONOCOCHEAGUE-OPEQUON
NORTH BRANCH POTOMAC
CACAPON-TOWN
MIDDLE POTOMAC-CATOCTIN
SHENANDOAH
CHEAT
TYGART VALLEY
SOUTH BRANCH POTOMAC
NORTH FORK SHENANDOAH
SOUTH FORK SHENANDOAH
ELK
GAULEY
GREENBRIER
MAURY
UPPER JAMES
* Fish mortality

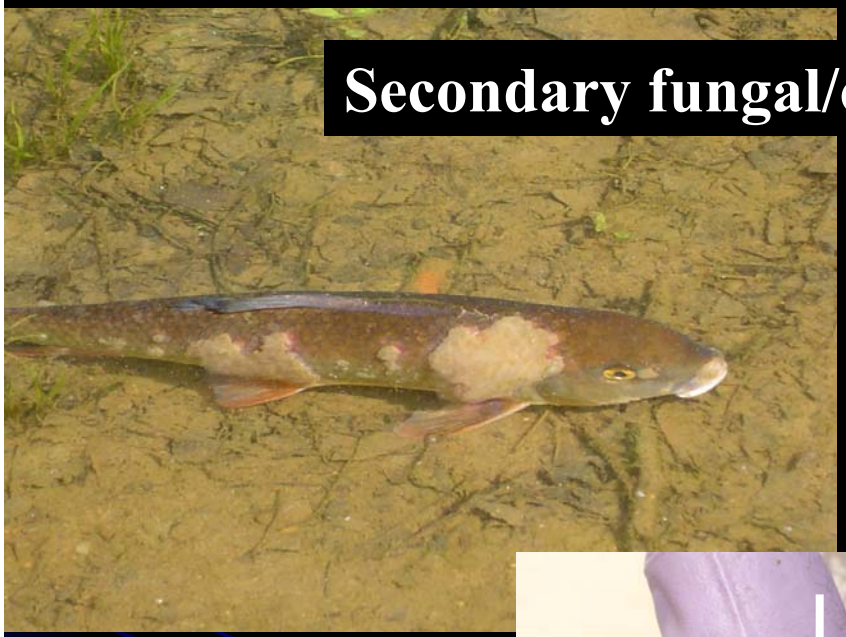
Variety of Lesions



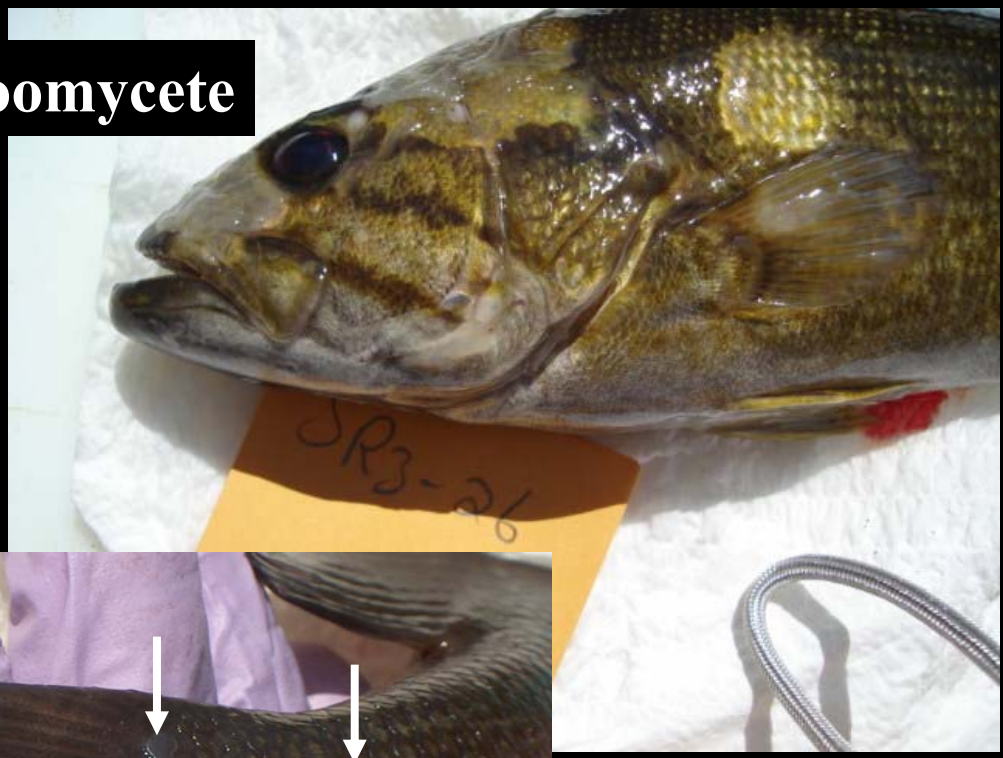
Raised reddened or pale

Erosion of epidermis and dermis

Variety of Skin Lesions



Secondary fungal/oomycete



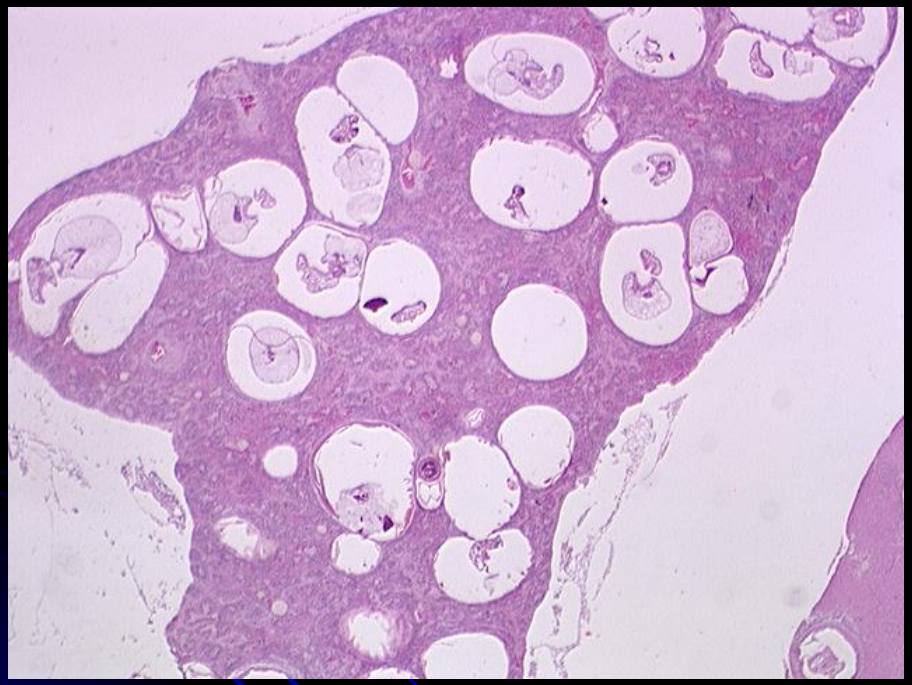
Raised clear, mucoid

Variety of Pathogens Cultured

- **Bacteria**
  - ***Flavobacterium columnare***
  - ***Aeromonas hydrophila* – and other motile Aeromonads**
  - ***Aeromonas salmonicida***
- **Virus**
  - **Largemouth Bass Virus**
- **Fungi**

No consistent findings

High Parasite Loads



Trematodes

Myxozoans

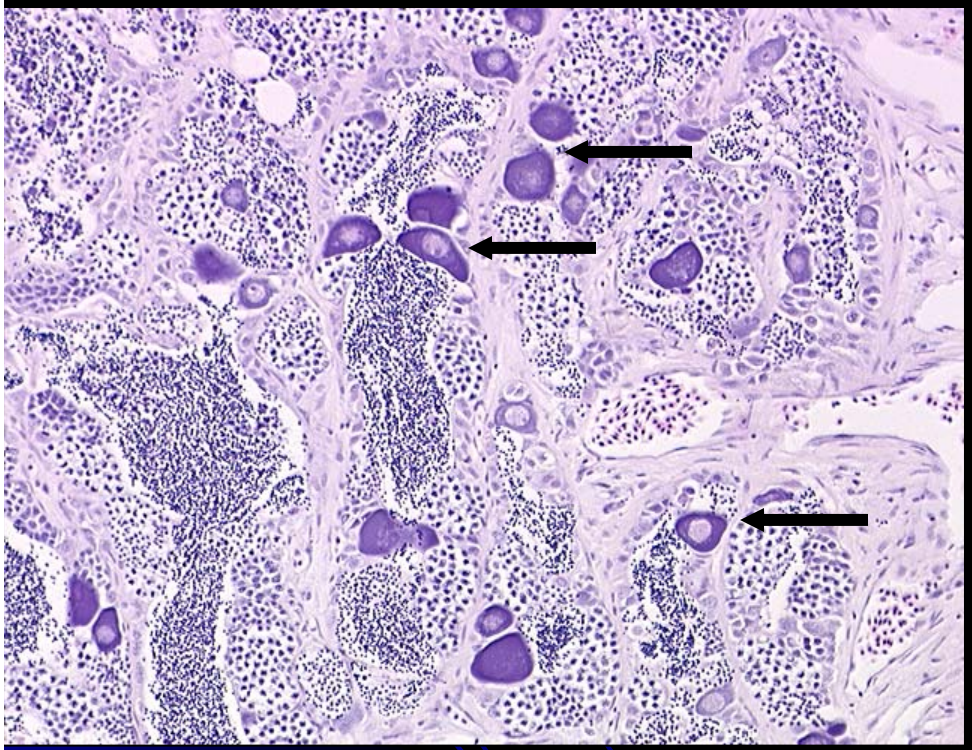
Both groups have complex life cycles that include benthic invertebrates – snails, bryozoans, worms – polycheates and oligocheates (*Tubifex*)

Potomac Fish Kills Findings Suggest:

- There are stressed populations of sensitive species and at some point the "perfect storm" of conditions overwhelm the fish and mortalities occur

- No one infectious agent responsible – variety of "opportunistic" infections
- Environmental stressors:
  - Water quality issues – high pH, ammonia, increased water temperatures, nutrients, low DO
  - Chemicals that cause immunosuppression leading to a variety of infections

Intersex in Normally Gonochorist Fishes



- Suggested as a marker of endocrine disruption
- Most often associated with exposure to estrogenic compounds
- Probably induced early in life, but may occur due to exposure later in life

Vitellogenin in Male/Immature Fish

- Vitellogenin is the serum/plasma phospholipoglycoprotein precursor to egg yolk
- Normally found in measurable amounts only in the blood of sexually mature egg-laying vertebrates (females)
- Estrogen stimulates the liver to produce vitellogenin which travels to the ovaries via bloodstream and is sequestered by developing oocytes
- Males have the gene to produce vitellogenin - usually not turned on, however exposure to estrogenic compounds turns on the gene

Fish Kill Issues Related to Intersex and Other Reproductive Findings?

- Estrogens and estrogenic chemicals are most often associated with intersex and vitellogenin production in male fishes
- Increasing evidence that estrogenic chemicals and other endocrine-disrupting substances modulate the immune response and disease resistance

Chemicals of "Emerging (Emerged) Concern"

- Defined as synthetic or naturally occurring chemicals that are not commonly monitored in the environment, are generally not regulated, but have the potential to enter the environment and cause adverse effects

Chemicals of Emerging Concern Sources

- Wastewater Treatment Plants
- Industrial effluent
- Stormwater runoff
- Agriculture
- Landfill leachate

“Emerging Contaminants” WWTP-Related

- Pharmaceuticals – Human and Animal
  - Synthetic Hormones – birth control, hormone replacement therapy
  - Antibiotics
  - Viagra to Prozac
- Personal care products
  - Antimicrobials – soap, detergent, toothpaste
  - Fragrances
  - Organic UV filters
  - DEET

“Emerging Contaminants”

- Current-use and legacy pesticides
- Brominated flame retardants
- Bisphenol A, other plastic-derived compounds
- Phytoestrogens

Agricultural Sources

- Animal manure and litter
  - Natural and synthetic hormones
  - Antibiotics/antimicrobials
  - Feed additives
- Pesticides and herbicides
- Human Biosolids

Effects
Chemical of Emerging Concern

- Endocrine disruption (EDC)

- Immune system/disease resistance
- Cancer/Neoplasia - promoters
- Numerous physiological and pathological effects – secondary sex characteristics, oxidative damage
- Behavior

Factors To Consider

- ***Many are chemicals that are produced to have a biological effect***
  - **May have biological effects on nontarget organisms at very low (ppb-ppt) levels**
  - **Endocrine/immune systems are regulated by soluble factors and feedback mechanisms – not classic dose responses**
- ***Interactive effects of the complex mixtures***
  - **In vitro and laboratory studies have shown many of these compounds are additive or even synergistic in estrogenicity, immunotoxicity and other effects**
- ***What ends up in the sediment?***
  - **Levels of estrogenic activity have been found to be much higher (532 to 748-fold) in sediments than in the overlying water, suggesting these chemicals accumulate in the bed sediment phase (Peck et al 2004).**

Questionable Statements

“No trace elements or pesticide contaminants have been found at concentrations sufficient to stress fish and thereby be factors in fish kills”

- **Most criteria are based on acute toxicity or gross effects such as growth**
- **In most cases there are no criteria for sublethal effects such as immune modulation or endocrine disruption**
- **Detection limits (MDL) for the methods used may be well above the concentrations known to cause effects**

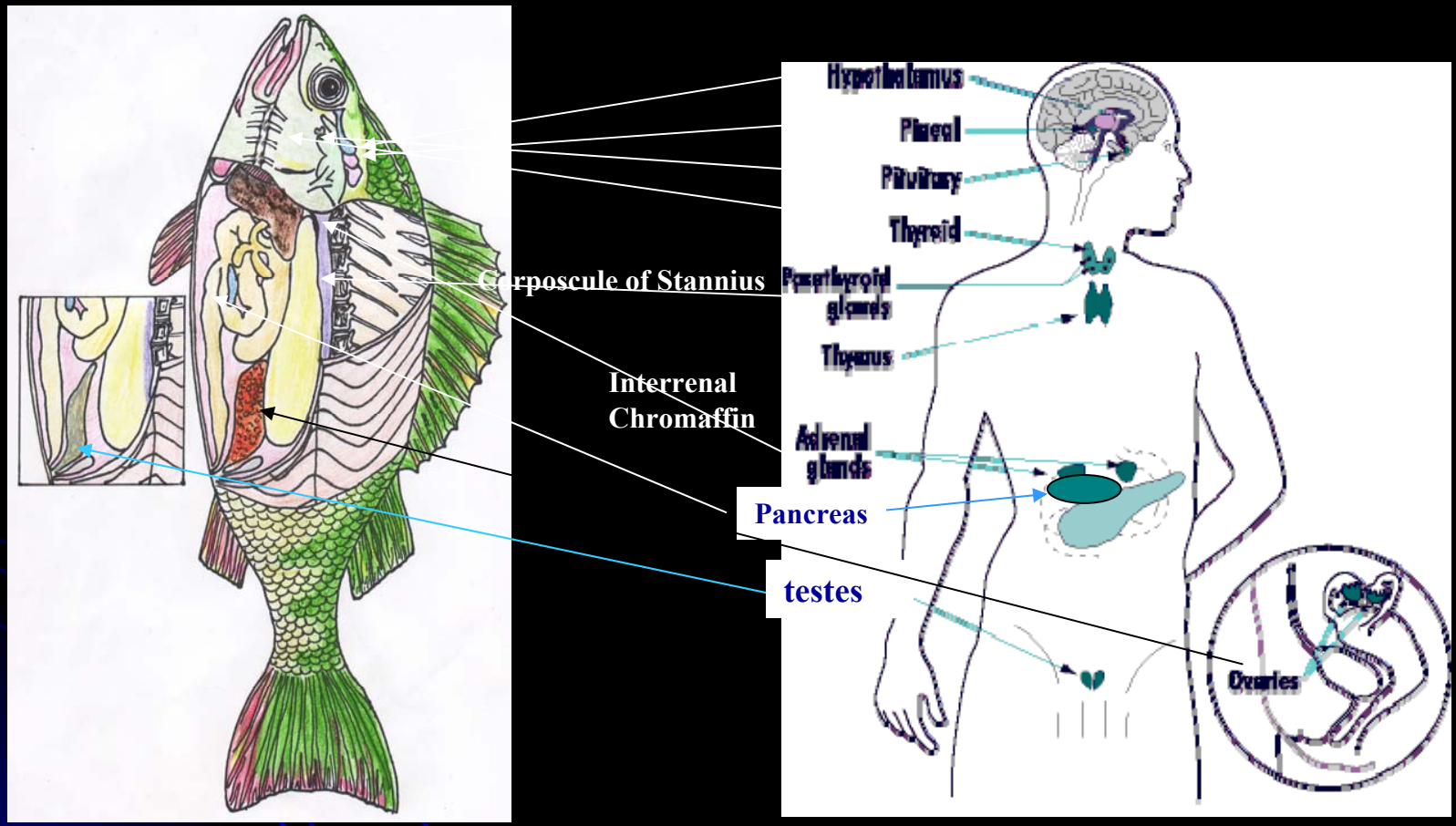
Estrogens and Intersex

- Natural estrogen
  - Based on studies in >25 fish species 1 ng/L has been suggested as the “no effects levels”
  - 1.3 ng/L MDL for the Potomac/Shenandoah passive sampler studies
- Ethynylestradiol
  - 0.3 ng/l exposure of roach embryo caused feminization
  - 0.35 ng/l recently set as the aquatic “no effects level”
  - 0.66 ng/L MDL for the Potomac/Shenandoah studies

Fish As Indicators of Environmental or Ecosystem Health

- Fish health is a good integrator of cumulative effects of environmental stressor
- Biological effects often occur when no one chemical indicator suggests “stress”

Endocrine Organs



Fish

Human

Suite of Fish Biological Indicators

- **Morphometric and necropsy-based**
  - Comparisons based on sex, age,
  - Identify visible abnormalities
  - Provides condition factor/relative weight
- **Plasma**
  - Hormones – estrogen, testosterone, cortisol, thyroid
  - Vitellogenin
- **Histopathological**
  - Diagnose causes of gross observations, identify emerging pathogens, identify specific effects of contaminants, with image analyses quantify parasites, macrophage aggregates etc.
- **Molecular**
  - mRNA for reproductively related genes (vitellogenin, estrogen receptors), immune system indicators (TGF-β, hepcidin), contaminant-related (CYP1A, oxidative stress), stress (glucocorticoid receptors)
  - Mechanisms
  - Identification of parasites/pathogens

Passive Samplers

- Semi permeable Membrane Devices (SPMDs)- accumulate hydrophobic compounds
- Polar Organic Compound Integrative Samplers (POCIS)—accumulate hydrophilic compounds

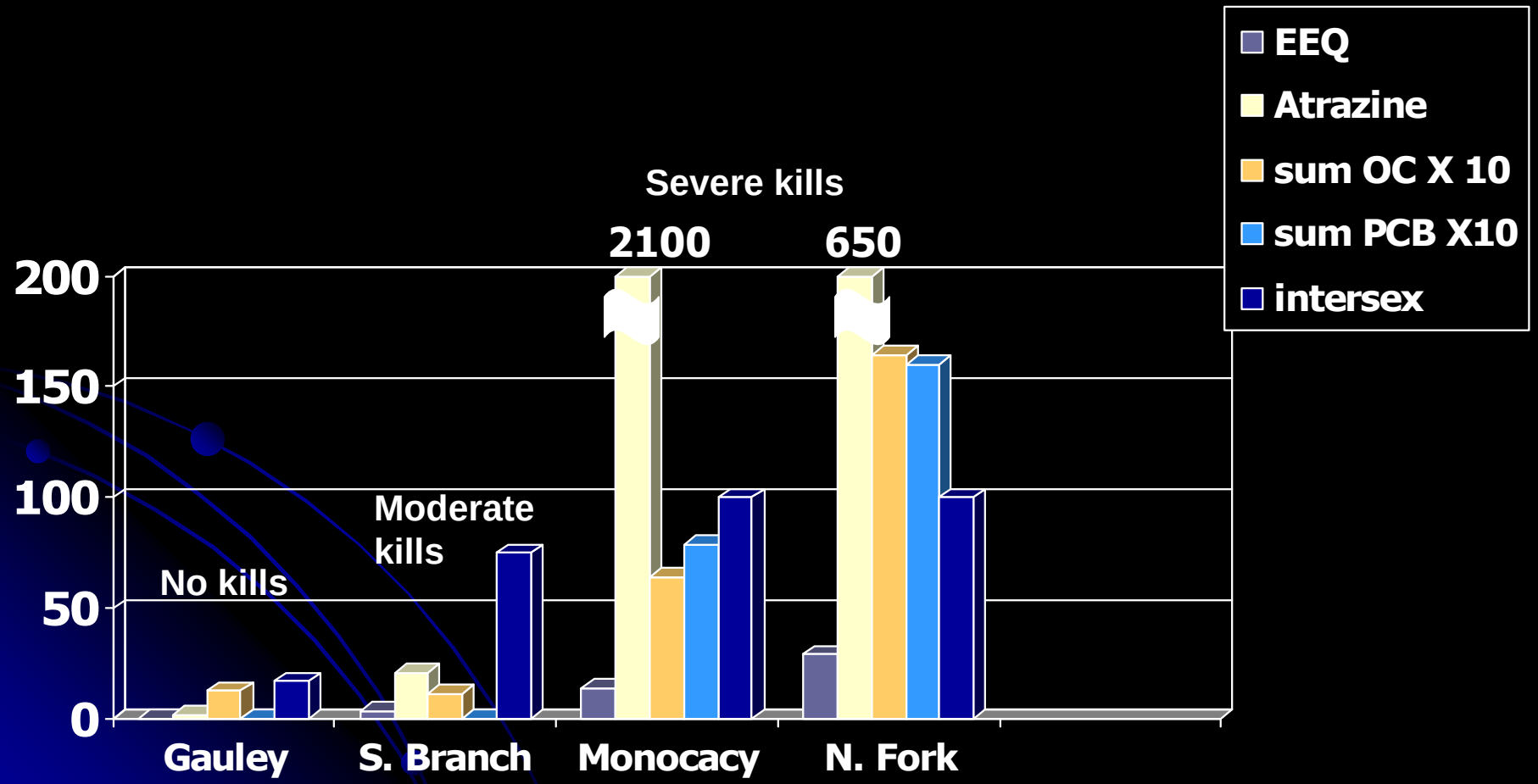
Dave Alvarez, Columbia Environmental Research Laboratory
WRD Chemists

Issue of Complex Mixtures

- Screening either grab water extracts or the extracts from the passive samplers using in vitro reporter cell assays
  - YES, BLYES, breast cancer cells – total estrogenicity – estrogen equivalents
  - Total androgenicity

- Passive sampler hormone results – no hormones above method quantification levels (N. Fork Shen)
  - 17β estradiol, 17α-ethynylestradiol, estrone, estriol
- Estrogen equivalents ranged from 14-79 ng estradiol/sample depending on the site

Gradient Spring 2006-2007 Passive Sampler Results/Intersex



WWTP Study
Smallmouth Bass

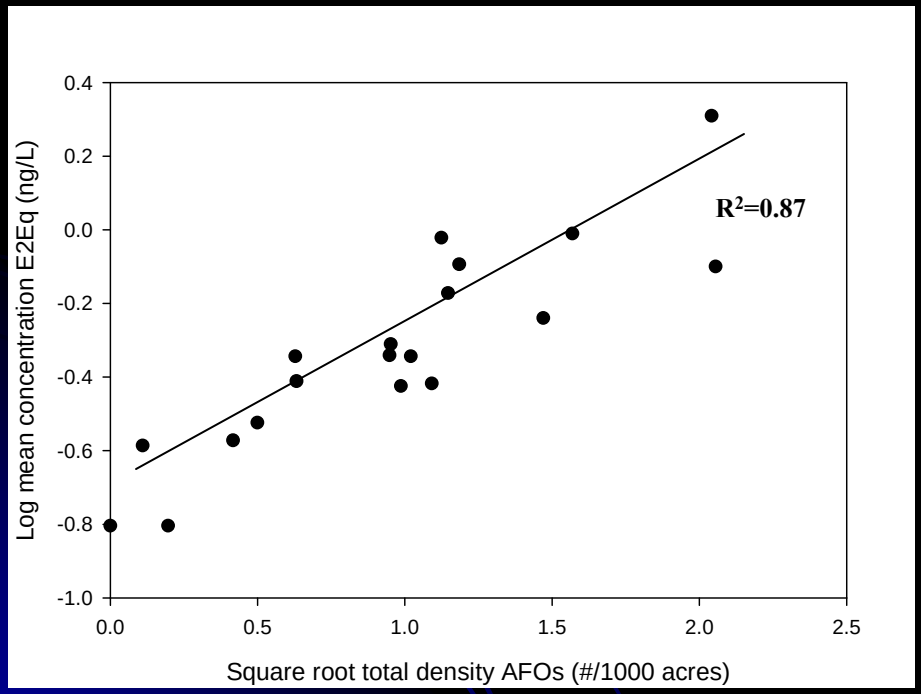
Site	Testicular Oocytes	Male Vitellogenin	Female Vitellogenin
Conococheague Upstream	100%	60%	80%
Conococheague Downstream	90%	90%	80%
Monocacy Upstream	82%	45%	45%
Monocacy Downstream	100%	33%	77%

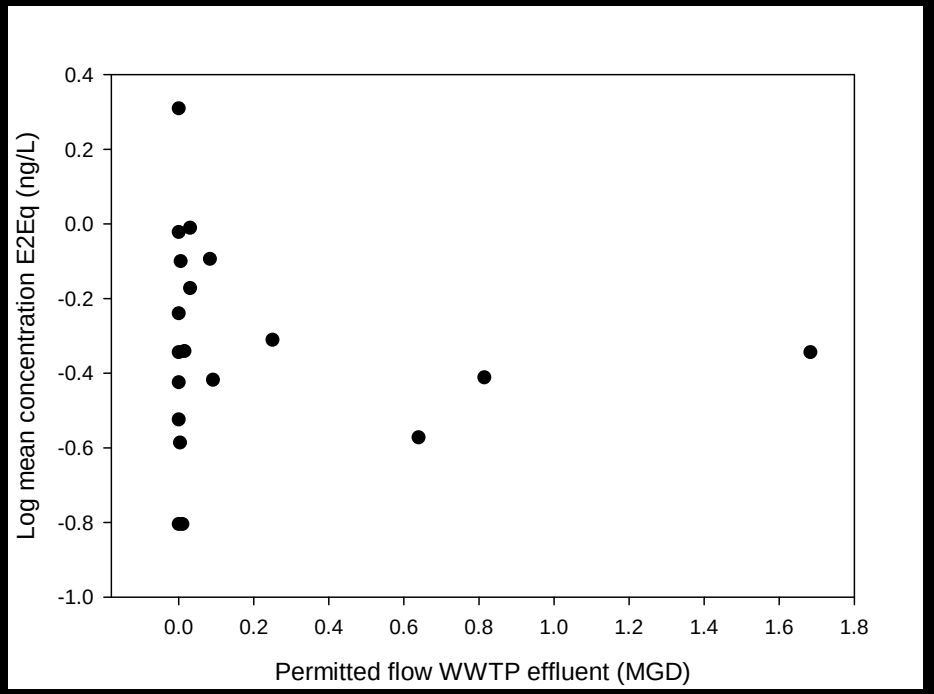
Agricultural Inputs

Cattle with free access to the river

Piles of manure along the river prior to a high water event

Total Estrogenic Equivalents of Water Extracts
Smaller Tribs of Shenandoah Drainage





Serena Ciparis, Reese Voshell – VT Tech

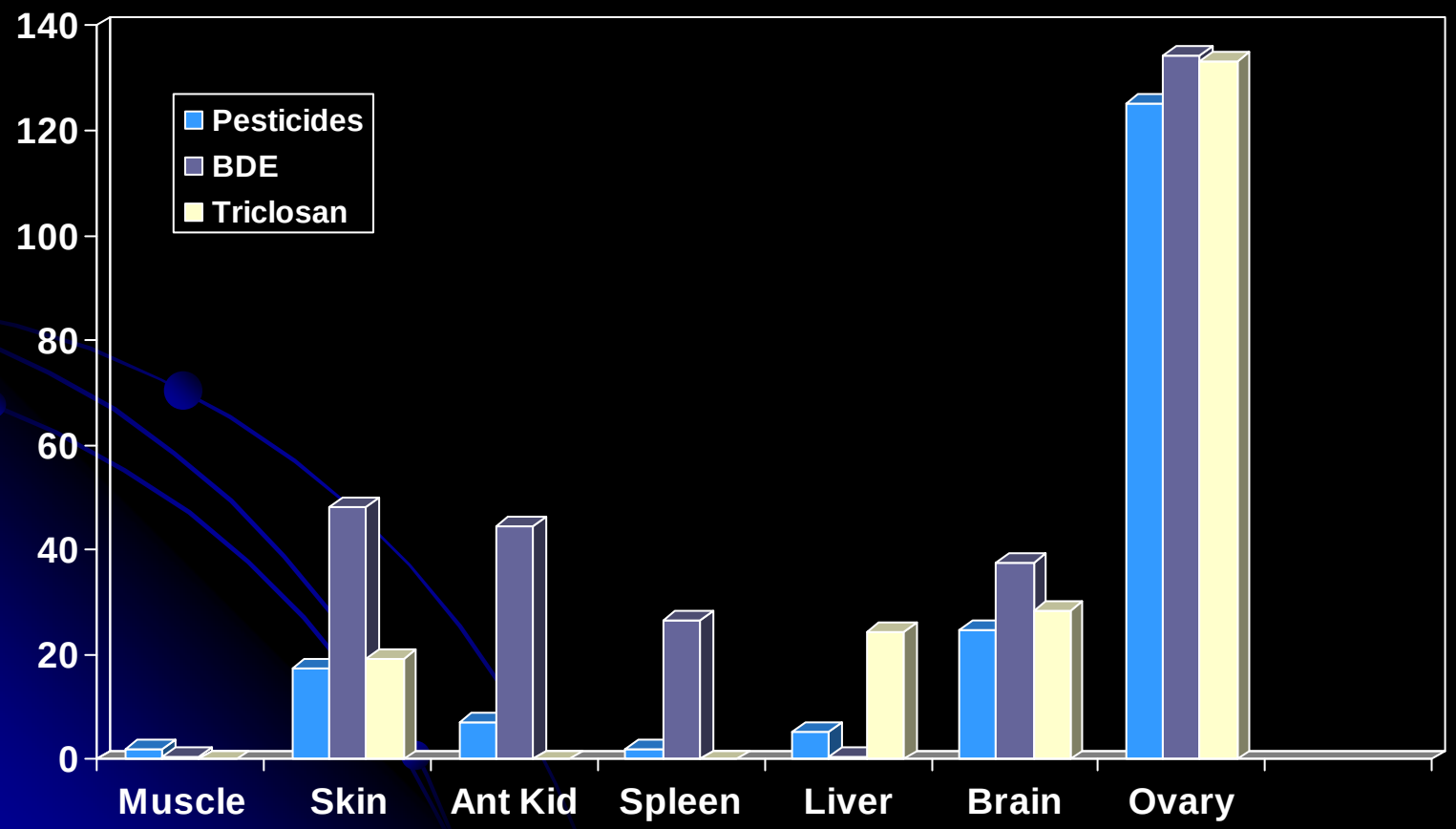
Agricultural Pesticides Fall 2005 (Spring 2006)

Chemical Estimated ng/L	Con Up	Con Down	Mon Up	Mon Down
Metolachlor	0.73 (7.5)	1.1 (9.0)	12.0	10.8 (97)
Atrazine	47 (380)	110 (430)	92	2 (2100)
Prometon	1.1 (1.2)	3.2 (1.4)	2.1	1.4 (1.8)

2.5 ppb recently shown to induce complete feminization and chemical castration in frogs - Hayes et al. (March 2010)

Earlier work found 0.1 ppb induced intersex in frogs

Comparison of Tissue Contaminant Concentrations Female Bass South Fork Shenandoah



Antidepressant Study Iowa and Colorado

- 7 different antidepressants upstream and downstream of WWTP
- Analyzed in water, sediment and fish brains
  - Were not present upstream, but were downstream
  - Levels decreased in water further downstream
  - Levels increased in sediment at downstream sites
  - Were measurable in fish brains
  - Different profile was observed in brain tissue than that observed in water

Schultz et al. 2010

Tissue Levels?

- Understanding what effects the individual compounds and complex mixtures have in the individual tissues in which they accumulate
  - Spleen, anterior kidney – influence disease resistance
  - Brain – effects on reproduction, behavior etc.
    - Oocyte maturation depends the pituitary gonadotropin, luteinizing hormone stimulating the production of maturation-inducing hormone.
  - Egg
    - Effect vitellogenin incorporation, final maturation etc.
    - Fish hatch as sac fry – for the first 2-3 weeks of life live by absorbing the yolk.
    - How do chemicals present in the egg (and water and sediment) affect the fish during this critical stage of sexual differentiation, immune system development etc.

Human Effects

- Cancer – particularly breast cancer, testicular cancer
- Infertility
- Disorders of sex development (intersex)
- Asthma and other immune related syndromes
- Autism, ADHD, Learning/behavioral disorders
- Diabetes
- Thyroid disorders

Critical Windows of Exposure – Fetal/Newborn Exposure

Testicular Dysgenesis Syndrome in Humans

- Increase in reproductive system problems
  - Declining sperm counts
  - Reduced semen quality
  - Genital abnormalities - cryptorchidism
  - Reduction in testicle size
  - Increased prevalence of testicular cancer

Suggested this syndrome is result of disruption of fetal programming and gonadal development during fetal life and is related to adverse environmental influences/contaminant exposures or other factors affecting hormone levels.

Human Testicular Cancer

- Rates of testicular cancer have increased sharply in the past three decades in many countries (US, Denmark, Norway, Canada)
- Particularly those affecting younger men - the seminomas
- Recent study compared EDCs in breast milk – dioxins, PCBs and some organochlorine pesticides correlated with high incidence

Testicular Tumors (Seminoma) Lake Michigan Yellow Perch

Sample Time	Prevalence
Winter	31%
Spring	27%
Fall	25%

Results for Male Perch

Testicular dysgenesis syndrome in Lake Michigan yellow perch?

Lake Michigan compared to Lake Mendota

- **Smaller testes – smaller GSI**
- **Presence of a variety of gonadal abnormalities including intersex**
- **High prevalence of testicular tumors**
- **Higher concentrations of PCBs, organochlorine pesticides**

Pharmaceutical Formulation Facilities

Compound	Class
Butalbital	Barbiturate
Carisoprodol	Muscle relaxant
Diazepam	Tranquilizer
Metaxalone	Muscle relaxant
Methadone	Opioid
Oxycodone	Opioid
Phendimetrazine	Amphetamine

Phillips et al. 2010 Environ. Sci. Technol.

Pharmaceutical Formulation Facilities

- National Survey of 23 municipal WWTP
  - 5 of 7 were detected in at least one
  - Butalbital (83%) and oxycodone (56%) most common
  - Concentrations up to 0.73 µg/L
- Effluent of 2 WWTP receiving flows from pharmaceutical formulation facilities
  - Concentrations of oxycodone and metaxalone up to 1700 and 3800 µg/L (1.7 and 3.8 mg/L)
  - Oxycodone human dosage ranges from 2.2 to 9.0 depending on strength – 2 liters of water would have an effective dose

Phillips et al. 2010 Environ. Sci. Technol.

Acknowledgements

- Virginia DGIF and DEQ
- PA F&B and DEP
- West Virginia DNR and DEP
- Maryland DNR
- Virginia Tech
- West Virginia University
- US EPA
- US Fish Wildlife Service
- NOAA
- USGS Water Resources Divisic
- Toxics Substance Hydrology
- Priority Ecosystem

Appendix G

State Water Supply Plan Advisory Committee

Scott Kudlas

DEQ, Office of Surface and Groundwater Supply Planning

Membership

- 62.1-44.38:2.A
  - Shall be appointed by DEQ Director
  - composed of nonlegislative citizen members representing industrial and municipal water users; public and private water providers; agricultural, conservation, and environmental organizations; state and federal agencies; and university faculty
- 25 members appointed to Committee

Who Are They?

- Mark Bennett, USGS, Virginia
- Tom Botkins, MeadWestvaco
- Kevin Byrd, New River Valley Planning District Commission
- John Carlock, Hampton Roads Planning District Commission
- Dr. William Cox, Virginia Tech
- Larry Dame, New Kent County
- Judy Dunscomb, The Nature Conservancy
- Katie Frazier, VA Agribusiness
- Dr. Greg Garman, Virginia Commonwealth University
- Denise Harris, Fauquier County
- John Kauffman, VA Department of Game and Inland Fisheries
- Dr. Wes Kleene, VA Department of Health
- Michael Lawless, Draper Aden Associates
- Rick Linker, Dominion Virginia Power
- Mark Mansfield, Norfolk District, USACE
- Rob McClintock, VA Economic Development Partnership
- Chuck Murray, Fairfax Water
- John O'Dell, Water Well Association
- Bill Pennell, Lancaster County
- Art Petrini, Henrico County
- Tom Roberts, Smurfit Stone
- John Staelin, Clark County Board of Supervisors
- Ed Tankard, Tankard Nurseries
- Bob White, Region 2000
- Beate Wright, VA AWWA

First Meeting

- Held first meeting August 31, 2010
  - Introductory meeting
  - Introduced concept for a mission statement and received comment on proposed revisions
  - Discussed member expectations for the work of the Committee
  - Reviewed unresolved issues from development of the Water Supply Planning regulation
  - Reviewed history of Water Supply Planning to date
  - Identified causes of failure and lessons learned from prior efforts
  - Review of DEQ modeling tools to be used to create the State Plan

Second Meeting

- Second meeting held December 2, 2010
- Discussed Committee Plan
  - Basic Data Collection Issues and Funding
    - Environmental flow data
    - Demand Projection methodologies
  - State Water Plan Development Process
    - Process and Content
    - Role of the Water Control Board
  - Using State and Local Plans in Resource Management
    - Minimizing conflicts
    - Effectiveness of regionalization
    - Impacts of consumptive use and reuse
    - Encourage use of alternative sources of supply
- Presentation on DEQ Modeling Tool

Second Meeting (cont)

- Majority of the meeting spent discussing expectations for State Plan content
  - Common themes include:
    - Compilation of local/regional plan information
    - Identify data gaps
    - Identify conflicts, alternatives, and opportunities
    - Identify means to resolve conflict – define DEQ role
    - Support permit process and applications for new projects
    - Identify funding or legislative needs

You Can Follow the Committee at:

http://www.deq.virginia.gov/watersupplyplanning/advisory_committee.html

Next Meeting in Late March (tbd)

Water Supply Plan Development Process to Date

Draft plan developed, with or without grant funds;

↓

Plan reviewed by DEQ staff;

↓

DEQ staff reviews to be sure each section of the regulation has been addressed and outlines any outstanding regulatory issues;

↓

DEQ staff meets with region/locality;

↓

Region/locality responds to comments that need to be addressed prior to formal submission;

↓

Public hearing(s) held, appropriate documentation and plan submitted for formal program submission to DEQ.

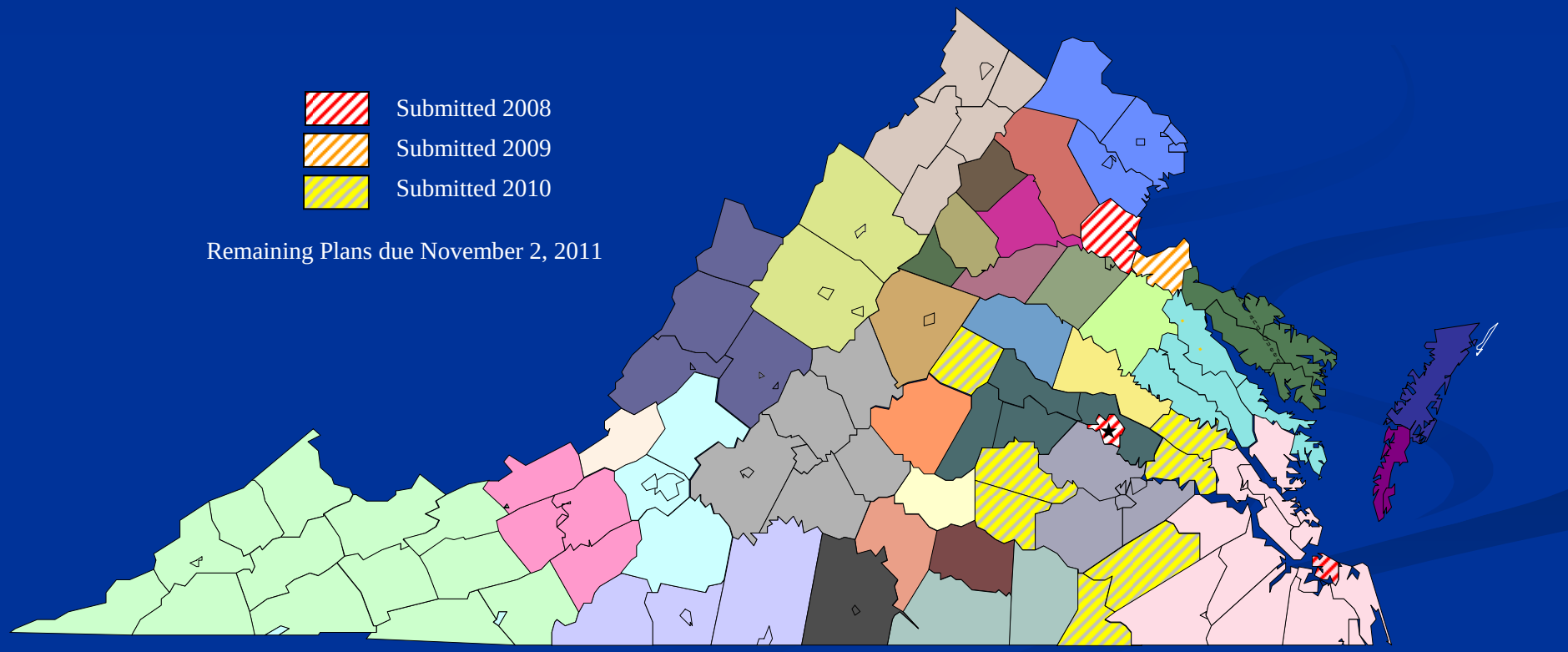
Status of Water Supply Plans

- As of January 11, 2011, twelve local and regional water supply plans have been formally submitted:
  - Amelia County
  - Charles City County
  - Chincoteague Town
  - Fluvanna County and Town
  - Greene/Sussex Counties and Towns, City of Emporia
  - Hillsboro Town
  - King George County
  - Norfolk City
  - Nottoway County and Towns
  - Port Royal Town
  - Richmond City
  - Warrenton Town

Status of Water Supply Plans

- Six localities/regions are responding to comments and moving toward program submission:
  - Louisa County
  - Middle Peninsula Planning District
  - New River Planning District (all localities except Blacksburg and Christiansburg, which are developing a regional plan with the two localities)
  - Northern Neck Planning District
  - Orange County and Towns
  - Region 2000
- Undergoing comment
  - Roanoke Valley
  - West Piedmont Planning District

Status of Water Supply Plans



Appendix H

11100552D

HOUSE BILL NO. 1738

Offered January 12, 2011

Prefiled January 10, 2011

A BILL to amend and reenact § 62.1-44.38 of the Code of Virginia, relating to requiring the reporting of water withdrawals from surface waters and groundwater; penalty.

Patrons—Bulova, Kory, Morgan and Scott, J.M.; Senator: Ticer

Referred to Committee on Agriculture, Chesapeake and Natural Resources

Be it enacted by the General Assembly of Virginia:

1. That § 62.1-44.38 of the Code of Virginia is amended and reenacted as follows:

§ 62.1-44.38. Plans and programs; registration of certain data by water users; advisory committees; committee membership for federal, state, and local agencies; water supply planning assistance; establishment of Fund.

A. The Board shall prepare plans and programs for the management of the water resources of this Commonwealth in such a manner as to encourage, promote and secure the maximum beneficial use and control thereof. These plans and programs shall be prepared for each major river basin of this Commonwealth, and appropriate subbasins therein, including specifically the Potomac-Shenandoah River Basin, the Rappahannock River Basin, the York River Basin, the James River Basin, the Chowan River Basin, the Roanoke River Basin, the New River Basin, the Tennessee-Big Sandy River Basin, and for those areas in the Tidewater and elsewhere in the Commonwealth not within these major river basins. Reports for each basin shall be published by the Board.

B. In preparing river basin plan and program reports enumerated in subsection A ~~of this section~~, the Board shall (i) estimate current water withdrawals and use for agriculture, industry, domestic use, and other significant categories of water users; (ii) project water withdrawals and use by agriculture, industry, domestic water use, and other significant categories of water users; (iii) estimate, for each major river and stream, the minimum instream flows necessary during drought conditions to maintain water quality and avoid permanent damage to aquatic life in streams, bays, and estuaries; (iv) evaluate, to the extent practicable, the ability of existing subsurface and surface waters to meet current and future water uses, including minimum instream flows, during drought conditions; (v) evaluate, in cooperation with the Virginia Department of Health and local water supply managers, the current and future capability of public water systems to provide adequate quantity and quality of water; (vi) identify water management problems and alternative water management plans to address such problems; and (vii) evaluate hydrologic, environmental, economic, social, legal, jurisdictional, and other aspects of each alternative management strategy identified.

C. The Board ~~may~~ *shall*, by regulation *and upon written notice*, require each water user withdrawing surface or subsurface water or both during each year to register *and report*, by a date to be established by the Board, water withdrawal and use data for the previous year including the estimated average daily withdrawal, maximum daily withdrawal, sources of water withdrawn, and volume of wastewater discharge, provided that the withdrawal exceeds one million gallons in any single month for use for crop irrigation, or that the daily average during any single month exceeds 10,000 gallons per day for all other users.

D. The Board shall establish advisory committees to assist it in the formulation of such plans or programs and in formulating recommendations called for in subsection E of this section. In this connection, the Board may include committee membership for branches or agencies of the federal government, branches or agencies of the Commonwealth, branches or agencies of the government of any state in a river basin located within that state and Virginia, the political subdivisions of the Commonwealth, and all persons and corporations interested in or directly affected by any proposed or existing plan or program.

E. The Board shall prepare plans or programs and shall include in reports prepared under subsection A ~~of this section~~ recommended actions to be considered by the General Assembly, the agencies of the Commonwealth and local political subdivisions, the agencies of the federal government, or any other persons that the Board may deem necessary or desirable for the accomplishment of plans or programs prepared under subsection B ~~of this section~~.

F. In addition to the preparation of plans called for in subsection A ~~of this section~~, the Board, upon written request of a political subdivision of the Commonwealth, shall provide water supply planning assistance to such political subdivision, to include assistance in preparing drought management strategies, water conservation programs, evaluation of alternative water sources, state enabling legislation to

facilitate a specific situation, applications for federal grants or permits, or other such planning activities to facilitate intergovernmental cooperation and coordination.

G. Subject to the completion of public comment requirements described in subsection H, the Board may enforce the provisions of this section utilizing all applicable due process procedures under §§ 10.1-1186, 62.1-44.15, and 62.1-44.24, and subsection (a) of § 62.1-44.32. If the Board finds that a person required to register and report water withdrawal data under subsection C and the regulations adopted pursuant to this subsection has failed to submit the required report by the date established by the Board, it shall notify such person in writing of his failure to report. If the person fails to report within 30 days after the date of such notice of failure to report, the Board shall issue a second notice by certified mail of the failure to report. If the person fails to report within 60 days after the date of the certified notice of a failure to report, such person shall be subject to a civil penalty not to exceed $1,000 for each violation. Each month of violation shall constitute a separate offense. Civil penalties may be assessed by a court in an action brought by the Board. With the consent of any person in violation of this subsection, the Board may provide in a special order issued by the Board against the person, the payment of civil charges and the performance of injunctive relief. All civil penalties and charges collected shall be deposited in the Water Supply Plan Fund established in subsection I.

H. The Board shall develop and provide an opportunity for public comment on guidelines and procedures that contain specific criteria for calculating the appropriate penalty for each violation based upon the severity of the violation, the extent of any potential or actual environmental harm, the compliance history of the facility or person, and the ability to pay.

I. There is hereby established in the state treasury a special nonreverting fund to be known as the Water Supply Plan Fund (the Fund). The Fund shall consist of the civil penalties and civil charges collected by the Board pursuant to subsection G. No part of the Fund, either principal or interest, shall revert to the general fund. The Fund shall be administered by the Director and shall be used solely for administration of the water supply planning responsibility of the Department of Environmental Quality.

Appendix I

11100755D

SENATE BILL NO. 1237

Offered January 12, 2011

Prefiled January 12, 2011

A BILL to amend and reenact § 62.1-44.15:6 of the Code of Virginia, relating to ground water withdrawal permit fee.

Patron—Ticer

Referred to Committee on Agriculture, Conservation and Natural Resources

Be it enacted by the General Assembly of Virginia:

1. That § 62.1-44.15:6 of the Code of Virginia is amended and reenacted as follows:

§ 62.1-44.15:6. Permit fee regulations.

A. The Board shall promulgate regulations establishing a fee assessment and collection system to recover a portion of the State Water Control Board's, the Department of Game and Inland Fisheries' and the Department of Conservation and Recreation's direct and indirect costs associated with the processing of an application to issue, reissue, amend or modify any permit or certificate, which the Board has authority to issue under this chapter and Chapters 24 (§ 62.1-242 et seq.) and 25 (§ 62.1-254 et seq.) of this title, from the applicant for such permit or certificate for the purpose of more efficiently and expeditiously processing permits. The fees shall be exempt from statewide indirect costs charged and collected by the Department of Accounts. The Board shall have no authority to charge such fees where the authority to issue such permits has been delegated to another agency that imposes permit fees.

B1. Permit fees charged an applicant for a Virginia Pollutant Discharge Elimination System permit or a Virginia Pollution Abatement permit shall reflect the average time and complexity of processing a permit in each of the various categories of permits and permit actions. However, notwithstanding any other provision of law, in no instance shall the Board charge a fee for a permit pertaining to a farming operation engaged in production for market or for a permit pertaining to maintenance dredging for federal navigation channels or other Corps of Engineers sponsored dredging projects or for the regularly scheduled renewal of an individual permit for an existing facility. Fees shall be charged for a major modification or reissuance of a permit initiated by the permittee that occurs between permit issuance and the stated expiration date. No fees shall be charged for a modification or amendment made at the Board's initiative. In no instance shall the Board exceed the following amounts for the processing of each type of permit/certificate category:

Type of Permit/Certificate Category	Maximum Amount
1. Virginia Pollutant Discharge Elimination System	
Major Industrial	$24,000
Major Municipal	$21,300
Minor Industrial with nonstandard limits	$10,300
Minor Industrial with standard limits	$ 6,600
Minor Municipal greater than 100,000 gallons per day	$7,500
Minor Municipal 10,001-100,000 gallons per day	$6,000
Minor Municipal 1,000-10,000 gallons per day	$5,400
Minor Municipal less than 1,000 gallons per day	$2,000
General-industrial stormwater management	$ 500
General-stormwater management-phase I land clearing	$ 500
General-stormwater management-phase II land clearing	$ 300
General-other	$ 600
2. Virginia Pollution Abatement	
Industrial/Wastewater 10 or more	$15,000

inches per year	
Industrial/Wastewater less than 10 inches per year	$10,500
Industrial/Sludge	$ 7,500
Municipal/Wastewater	$13,500
Municipal/Sludge	$ 7,500
General Permit	$ 600
Other	$ 750

The fee for the major modification of a permit or certificate that occurs between the permit issuance and expiration dates shall be 50 percent of the maximum amount established by this subsection. No fees shall be charged for minor modifications or minor amendments to such permits. For the purpose of this subdivision, "minor modifications" or "minor amendments" means specific types of changes defined by the Board that are made to keep the permit current with routine changes to the facility or its operation that do not require extensive review. A minor permit modification or amendment does not substantially alter permit conditions, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

B2. Each permitted facility shall pay a permit maintenance fee to the Board by October 1 of each year, not to exceed the following amounts:

Type of Permit/Certificate Category	Maximum Amount
1. Virginia Pollutant Discharge Elimination System	
Major Industrial	$4,800
Major Municipal greater than 10 million gallons per day	$4,750
Major Municipal 2-10 million gallons per day	$4,350
Major Municipal less than 2 million gallons per day	$3,850
Minor Industrial with nonstandard limits	$2,040
Minor Industrial with standard limits	$1,320
Minor Industrial water treatment system	$1,200
Minor Municipal greater than 100,000 gallons per day	$1,500
Minor Municipal 10,001-100,000 gallons per day	$1,200
Minor Municipal 1,000-10,000 gallons per day	$1,080
Minor Municipal less than 1,000 gallons per day	$ 400
2. Virginia Pollution Abatement	
Industrial/Wastewater 10 or more inches per year	$3,000
Industrial/Wastewater less than 10 inches per year	$2,100
Industrial/Sludge	$3,000
Municipal/Wastewater	$2,700
Municipal/Sludge	$1,500

An additional permit maintenance fee of $1,000 shall be collected from facilities in a toxics management program and an additional permit maintenance fee shall be collected from facilities that have more than five process wastewater discharge outfalls. Permit maintenance fees shall be collected annually and shall be remitted by October 1 of each year. For a local government or public service authority with permits for multiple facilities in a single jurisdiction, the permit maintenance fees for permits held as of April 1, 2004, shall not exceed $20,000 per year. No permit maintenance fee shall be assessed for facilities operating under a general permit or for permits pertaining to a farming operation engaged in production for market.

B3. Permit application fees charged for Virginia Water Protection Permits, ground water withdrawal permits, and surface water withdrawal permits shall reflect the average time and complexity of processing a permit in each of the various categories of permits and permit actions and the size of the

proposed impact. Only one permit fee shall be assessed for a water protection permit involving elements of more than one category of permit fees under this section. The fee shall be assessed based upon the primary purpose of the proposed activity. In no instance shall the Board charge a fee for a permit pertaining to maintenance dredging for federal navigation channels or other U.S. Army Corps of Engineers-sponsored dredging projects, and in no instance shall the Board exceed the following amounts for the processing of each type of permit/certificate category:

Type of Permit	Maximum Amount
1. Virginia Water Protection	
Individual-wetland impacts	$2,400 plus $220 per 1/10 acre of impact over two acres, not to exceed $60,000
Individual-minimum	$25,000
instream flow	$35,000
Individual-reservoir	$7,500
Individual-nonmetallic mineral mining	$0
General-less than 1/10 acre impact	$600
General-1/10 to 1/2 acre impact	$1,200
General-greater than 1/2 to one acre impact	$120 per 1/10 acre of impact
General-greater than one acre to two acres of impact	
2. Ground Water Withdrawal	~~$6,000~~*12,000*
3. Surface Water Withdrawal	$12,000

No fees shall be charged for minor modifications or minor amendments to such permits. For the purpose of this subdivision, "minor modifications" or "minor amendments" means specific types of changes defined by the Board that are made to keep the permit current with routine changes to the facility or its operation that do not require extensive review. A minor permit modification or amendment does not substantially alter permit conditions, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

B4. The Board may establish a schedule for annualizing the ground water withdrawal permit fee.

C. When promulgating regulations establishing permit fees, the Board shall take into account the permit fees charged in neighboring states and the importance of not placing existing or prospective industries in the Commonwealth at a competitive disadvantage.

D. Beginning January 1, 1998, and January 1 of every even-numbered year thereafter, the Board shall make a report on the implementation of the water permit program to the Senate Committee on Agriculture, Conservation and Natural Resources, the Senate Committee on Finance, the House Committee on Appropriations, the House Committee on Agriculture, Chesapeake and Natural Resources and the House Committee on Finance. The report shall include the following: (i) the total costs, both direct and indirect, including the costs of overhead, water quality planning, water quality assessment, operations coordination, and surface water and ground water investigations, (ii) the total fees collected by permit category, (iii) the amount of general funds allocated to the Board, (iv) the amount of federal funds received, (v) the Board's use of the fees, the general funds, and the federal funds, (vi) the number of permit applications received by category, (vii) the number of permits issued by category, (viii) the progress in eliminating permit backlogs, (ix) the timeliness of permit processing, and (x) the direct and indirect costs to neighboring states of administering their water permit programs, including what activities each state categorizes as direct and indirect costs, and the fees charged to the permit holders and applicants.

E. Fees collected pursuant to this section shall not supplant or reduce in any way the general fund appropriation to the Board.

F. Permit fee schedules shall apply to permit programs in existence on July 1, 1992, any additional permits that may be required by the federal government and administered by the Board, or any new permit required pursuant to any law of the Commonwealth.

G. The Board is authorized to promulgate regulations establishing a schedule of reduced permit fees for facilities that have established a record of compliance with the terms and requirements of their permits and shall establish criteria by regulation to provide for reductions in the annual fee amount

assessed for facilities accepted into the Department's programs to recognize excellent environmental performance.