TRIENNIAL REVIEW

WATER QUALITY STANDARDS

Commonwealth of Virginia

Department of Environmental Quality

Regulatory Advisory Panel Meeting

January 16, 2014

DEQ-PRO

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Agenda

- **Action Items From Dec. 13th Meeting**
- **Manganese: Concentrations, Fate, & Transport in Roanoke Basin** - Dr. Madeline Schreiber, VA Tech
- **Bacteria Criteria** - Discussion
- **Ammonia Criteria** - Discussion
- **Updating Selenium Criteria** - Se Recalculation Findings by GEI & Discussion
- **Special Standard for Winter-Only Trout Waters**
- **Public Water Supply Amendments**

Action Items From Dec. 13th Meeting

Does the copper BLM allocate all DOC metal binding capacity to copper only?

EPA Response:

The Cu BLM calculates all the binding capacity of DOC to Cu. The binding capacity of DOC to other metals is not taken into consideration since they all have different binding, equilibrium and saturation constants/rates.

Action Items From Dec. 13th Meeting

What is the status of the development of a BLM for Zinc?

EPA Response:

EPA is not currently working on developing new criteria for zinc; EPA is aware of work being done by industry to develop a BLM for zinc but it is not a priority at this time for EPA.

Action Items From Dec. 13th Meeting

What information does EPA have concerning toxicity of manganese? Human health and/or aquatic life.

EPA Response:

Some toxicity information can be found in IRIS.

EPA also provided Mn epidemiology study summaries for review.

Action Items From Dec. 13th Meeting

What is the status of EPAs national recommended criteria for selenium?

EPA Response:

In the process of updating freshwater ambient water quality criteria for Se to reflect the latest scientific information.

EPA intends to propose modifications to its national criteria for Se in the coming months. That proposal will be distributed for public comment and undergo external peer review. For more information visit:
http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium/

Action Items From Dec. 13th Meeting

Bacteria criteria. Any assurance that one datum within a 30 day period will not have to be considered to represent a mean and assessed against the criteria geometric mean; but should be assessed using the STV instead?

EPA Response: *The 2012 criteria have numerous changes from the 1986 criteria including: that the criteria consist of both a geometric mean and statistical threshold value.*

Number of samples collected is not an approvable element of a WQS package. States should not include a minimum sample size as part of their criteria submission.

EPA Response cont'd:

When identifying sampling frequency as part of a state's monitoring plan, a state may consider that, typically, a larger dataset will more accurately characterize water quality, which may result in more meaningful attainment determinations.

EPA is recommending that states conduct at least weekly sampling to evaluate the GM and STV over a 30-day period and encourages more frequent sampling at more densely populated beaches.

Action Items From Dec. 13th Meeting

EPA's national recommended criteria for the protection of human health updated to reflect the recent changes to the RfD and/or **Q1***contained in IRIS database?*

EPA Response:

EPA is using the updated IRIS toxicity values for chemicals VA is considering for human health updates.

Human Health Criteria Updates

Chemical	Old Criteria (µg/L) Public Water Supply	Updated Criteria (µg/L) Public Water Supply	Old Criteria (µg/L) All Non-PWS Waters	Updated Criteria (µg/L) All Non-PWS Waters
Carbon Tetrachloride	2.3	4.3	16	30
Cyanide , free	140	4.2	16,000	480
Hexachloroethane	14	5.0	33	12
Methylene Chloride	46	170	5,900	22,000
Nitrobenzene	17	68	690	2,800
Pentachlorophenol	2.7	0.80	30	9.1
Tetrachloroethylene	6.9	130	33	620
Trichloroethylene	25	7.0	300	82

Action Items From Dec. 13th Meeting

EPA information or recommendations for limiting bromide (Br) in surface water to protect public water supplies?

EPA Response:

- *Internal workgroup to scope out the issues. Still in an early stage.*
- *EPA background documents relating to the Br issue.*
  - *Region III States/ORSANCO Criteria/WQS Staff*
  - *USGS Article*
  - *Pittsburgh Water & Sewer article (Journal AWWA)*
  - *Overall Conclusions Based on Summaries of Manganese Papers*

Action Items From Dec. 13th Meeting

What is the scope of carbaryl use in VA?

Response From VDACS: *VA does not currently collect pesticide use data nor any type of data related to the distribution or sale of pesticides in the Commonwealth.*

VA Dept. Agriculture & Consumer Services data base search indicates ~ 90 carbaryl-containing products.

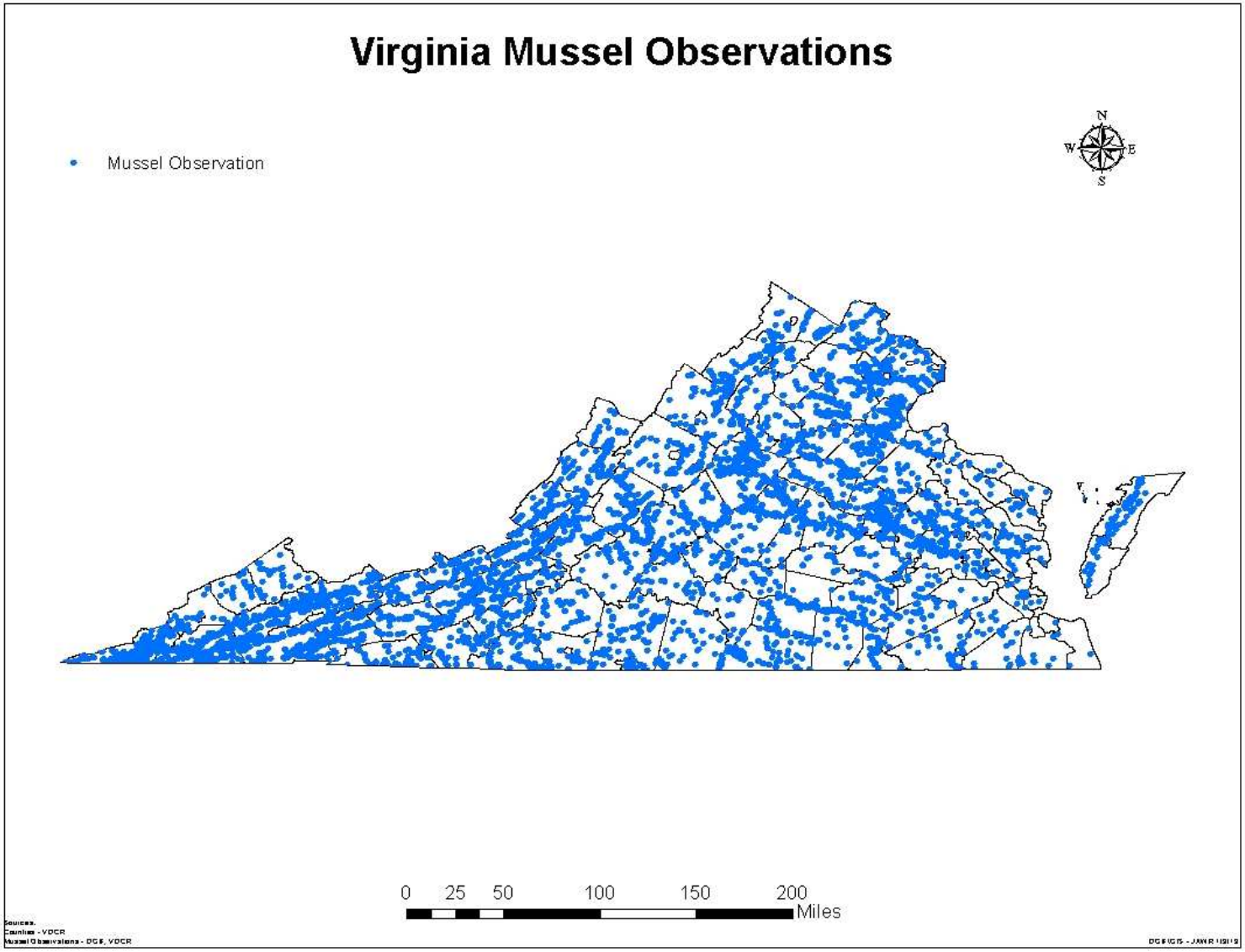
Source: http://www.kellysolutions.com/va/pesticideindex.htm

Action Items From Dec. 13th Meeting

Ammonia Criteria and Unionid FW Mussel Distribution in VA

- DEQ , DGIF, DCR, US FWS met January 9, 2014 to discuss this issue.
- Consensus is that Unionid mussels should be considered to be likely in any perennial stream in Virginia.
- Intermittent headwater streams potentially may not have resident mussels.
- Case by case study/determination would be needed.

Ammonia Criteria



Action Items From Dec. 13th Meeting

Special Standard m.
Effluent limits in the Chickahominy watershed

- BOD_5 = 6mg/l monthly average; 5% samples >8 mg/l
- Settleable Solids = 0.1 ml/l
- Suspended Solids = 5.0 mg/l monthly average, 5% samples >7.5 mg/l
- Ammonia Nitrogen = 2.0 mg/l
- Total Phosphorus = 0.10 monthly average (exception for Tyson Foods)
- Other Physical & Chemical (as needed)

Special Standard m (continued)

- Public comment: Original intent and focus of this standard was wastewater treatment dischargers treating organic waste. The effluent limits are based on expectations for a well run wastewater treatment facility treating organic waste.
- Intent was to prevent eutrophication of Chickahominy watershed.

One current permittee is a mineral industry with no discharge of organic waste; BOD, ammonia and phosphorus are not in discharge.

- DEQ is considering appropriateness of these effluent limitations for non-organic discharges.
- One option; apply the same effluent limit as used in the Virginia General Permit of 30 mg/l suspended solids.

Manganese (Mn)

- Originated as Safe Drinking Water Act secondary maximum contaminant level for finished water
- Protect drinking water supplies from staining properties of Mn (50 ug/l)
- Expressed in WQS as total; most other metals expressed as dissolved

<u>The Issue</u>:

Soils & underlying geology of many regions of VA naturally high in Mn & Mn compounds

New Bacteria Criteria

EPA's 2012 RWQC recommendations to protect primary contact recreation consist of a magnitude, duration and frequency of exceedance.

- **Magnitude: GM and the STV (regardless of the sample size).**
- **Duration and Frequency: The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.**

Criteria Elements	EPA Recommendation 1	Theoretical Illness Rate (STV) (36/1000 illness rate)	Alternate EPA Recommendation 2	Theoretical Illness Rate (STV) (32/1000 illness rate) Slightly more stringent
Indicator (freshwater)	Geometric Mean (GM) cfu/100 ml	Statistical Threshold Value (STV) cfu/100 ml (10% exceedence)	GM (cfu/100 ml)	STV (cfu/100 ml) (10% exceedence)
Virginia criterion E. coli	126	235 Single sample maximum (SSM)		
EPA 2012 E. coli	126	410 (STV)	100	320 (STV)
Indicator (marine water)	Geometric Mean (GM) cfu/100 ml	Statistical Threshold Value (STV) cfu/100 ml (10% exceedence)	GM (cfu/100 ml)	STV (cfu/100 ml) (10% exceedence)
Virginia criterion Enterococci	35	104 Single sample maximum (SSM)		
EPA 2012 Enterococci	35	130 (STV)	30	110 (STV)

New EPA Recommendation Ammonia Criteria

Examples of current DEQ criteria compared to EPA (2013) criteria at pH 7 and 20°C.

	Acute (mg/L)	Chronic (mg/L)
EPA (2013)	17	1.9
DEQ (trout present)	24.1	
DEQ (trout absent)	36.1	
DEQ (early life stage present)*		4.15*
DEQ (early life stage absent)*		4.15*

*At temperatures 15° C and above, criterion same for ELS present or absent

Ammonia Criteria

Site Specific Options

EPA 2013 Site Specific Criteria Options at pH 7 and 20°C	Acute (mg/L)	Chronic (mg/L)
Unionid Mussels present Trout present or absent	17	
Unionid Mussels absent Trout present	24	
Unionid Mussels absent Trout absent	38	
Unionid Mussels present Fish ELS present or absent		1.9
Unionid Mussels absent Fish ELS present		6.5
Unionid Mussels absent Fish ELS absent		7.1

Implications: New Ammonia Criteria Should Apply Statewide

Site-specific determination of "mussels not present" is allowed.

Option 1. Treat every case as a site-specific criteria recalculation and adoption process.

Option 2. Adopt a second criteria based on all toxicity data except unionid mussels to be applied only where "mussels are absent". Determination of "mussels are absent" to be determined by site mussel survey study and approval of findings by DGIF-DEQ.

Selenium Criteria Update Request

- **Current Se Criteria 25+ years old**
- **Current Criteria (expressed as total Se)**

Acute = 20 µg/L

Chronic = 5 µg/L

- **Updated Aquatic Life Criteria for Selenium report submitted by VA Mining Issues Group**

Selenium Criteria Update Request

EPA Approval Letter of Kentucky Se Criteria

http://appvoices.org/aww/11_15_2013%20Letter%20to%20Dr%20Peters.pdf

Complaint for Injunctive Relief Filed Against EPA

http://appvoices.org/aww/EPA_Se_suit/SeleniumComplaint.pdf

Special Standard for Winter-Only Trout Waters

- Adjust application of temperature criteria to winter-only stockable streams during summer
- Address USFWS concerns re: application of max. temp Class IV waters (Mountainous Zone) May-Oct. is protective of Roanoke logperch
- DEQ staff conferred w/ DGIF/DCR/USFWS 12/11

Special Standard for Winter-Only Trout Waters

- USFWS recommendations:

Roanoke R. sections maximum temperature of 28°C

Tinker Creek maximum temperature of 26°C

- Based on available data for these two waterbodies & are calculated as daily <u>medians</u>
- Most temperature monitoring data insufficient to assess against a median temperature criterion

Public Water Supply

9 VAC 25-260- 390 – 540

Suggested PWS deletions due to intake closures

James Basin

1o	II	~~*PWS*~~, bb	James River from City Point (Hopewell) to a point 5 miles above American Tobacco Company's raw water intake **VDH Response: May have been a raw water intake there in early days of the tobacco processing plant. Intake was most likely for industrial (process) water. No intake there for domestic water in the past 35 years. VDH could not find any records about a domestic water intake at that location in years prior to 1978 (VDH).**
12i	~~*IV*~~	~~*PWS*~~	~~*Dunlap Creek and its tributaries from the Covington Boys Home raw water intake to points 5 miles upstream.*~~ Reserved **Operations permit revoked August 2, 2002, as per the Boys' Home, Inc. request (VDH)**

Public Water Supply

Potomac Basin

7f III ~~*PWS*~~,g The Quantico Marine Base Camp Upshur and its tributaries' raw water intake on Cedar Run (located approximately 0.2 mile above its confluence with Lucky Run) to points 5 miles upstream.

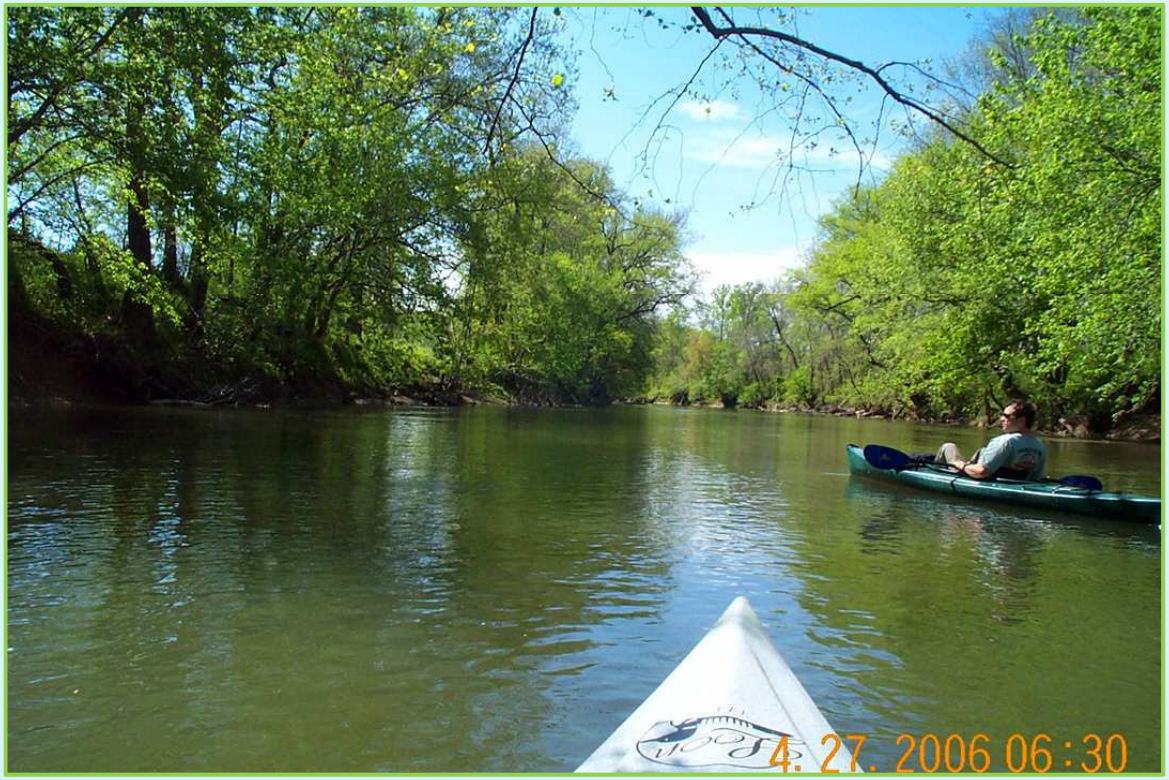
VDH Response: **Current operation permit lists only groundwater wells as the source for Camp Upshur. VDH is fairly confident that Quantico MCB has no plans or interest in returning to surface water withdrawal & treatment at this location (VDH).**

Public Water Supply

2a IV PWS,v New River from Radford Army Ammunition Plant's raw water intake (that intake which is the further ~~*downstream*~~ **upstream**), upstream to a point 5 miles above the Blacksburg-Christiansburg, V.P.I. Water Authority's raw water intake and including tributaries in this area to points 5 miles above the respective raw water intakes.

VDH Response: **Raw water intake (PWSID 1155645) taken off-line on January 6, 2011. Operations permit was revoked on February 11, 2011, as this waterworks was consolidated with PWSID 1121643. Possibility that the RAAP intake may be used in the future for non-drinking water purposes (VDH).**

7a	IV PWS pH-6.5-9.5	Roanoke River and its tributaries from Salem's ~~#1~~ raw water intake to ~~*points 5 miles upstream from Salem's #2 raw water intake*~~ **the Western Virginia Water Authority's Spring Hollow-Reservoir**. **VDH Response: Records indicate that the Salem Plant #2 and its raw water intake (PWSID 2775400) were closed effective on July 15, 2005. Operations permit was revoked on August 24, 2005, as per the City of Salem's request.**


4. 27. 2006 06:30

Supplemental Slides

Manganese & Human Health

National Research Counsel: safe and adequate daily dose is 2-5 mg per day (2000-5000 ug/day)

WHO: 2-3 mg/day is adequate and 8-9 mg/day (8,000-9,000 µg/day) "is perfectly safe"
WHO drinking water guidelines for manganese = 400 µg/L

One a day vitamin: 2 mg manganese (2,000 µg)

ATSDR: Tolerable Upper Intake level = 11 mg /day
& interim guidance Minimum Risk Level = 0.16 mg/kg/day

EPA: concluded that an appropriate reference dose for manganese is 10 mg/day (10,000 µg /day)

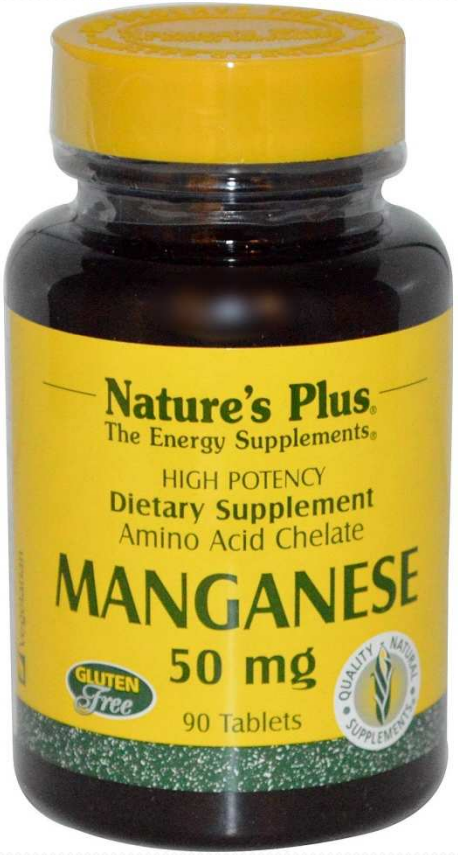
IRIS Reference dose = 0.14 mg/kg-day

Manganese in Virginia Streams

- 1990-2010 (1,655 manganese data points)

- Median 50 ppb
- Mean 127.6 ppb
- 95 % < 360 ppb
- 98 % < 840 ppb
- Maximum 7940 ppb

Dietary Supplements Range From 2 mg to 50 mg



Standard Calculation of WQC

- WQC in Drinking water supplies
- WQC = RfD x BW / water consumption + (fish consumption rate x BCF)
  - = 0.14 x 70 / 2 L +(0.0175 x 19.6) = 4.201 mg/L

    = **4,200 ppb**

  - Considering relative source contribution
  - 0.14 x 0.20 x 70 / 2 L +(0.0175 x 19.6) = 0.8401 mg/L

  = **840 ppb**