

**4. Article Two, B.5- Water Quality Monitoring (“WQM”) Plan – Report on whether any of the semi-annual (or annual) WQM required under Article Two, B.5, was conducted during the quarter, and if so, in which sewer basins, and report the results of that monitoring (both BST and fecal coliform) for each such sewer basin.**

The 2014 annual round of water quality monitoring was conducted on April 2, 2014. All 26 of the sewer basins were sampled (semi-annual and annual). Human source fecal bacteria were identified by library-based Polymerase Chain Reaction (PCR) testing in one or more samples from sixteen sewer basins. Using an independent verification test, discussed below, human sources were confirmed in nine of these basins.

As part of continuing re-evaluation of the Water Quality Monitoring Plan and of the methodologies used, the Virginia Tech laboratory that provides the bacterial source tracking (BST) testing services now conducts a verification test for human bacterial sources using a library-independent analytical method (Human Bacteroides HF183) on all samples. These results are presented below.

The 2014 semi-annual round of water quality sampling is planned for September, and results will be reported in the Fourth Quarter of 2014.

**Basins Subject to Semi-Annual Monitoring and Reporting Requirements:**

a.	Broad Creek-	BST Results:	Fecal Bacteria Results: ( <i>Enterococcus</i> CFU/100ml)
BRC001 – downstream (Henson Creek)	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 33% Canine – 10% Deer – 9% Horse – 0% Misc. Wildlife – 23% Non-human Unknown – 25%	50	
BRC002 – upstream (Henson Creek)	Human Bacteroides HF183: <b>Negative</b> (Too few bacteria for HF183) BOX-PCR Source Determination: <b>Human – 0 (NA)%</b> Avian – 34 (NA)% Canine – 12 (NA)% Deer – 11 (NA)% Horse – 0 (NA)% Misc. Wildlife – 19 (NA)% Non-human Unknown – 24 (NA)%	32 (<10)	

Note: Values in parentheses for station BRC002 are for field duplicate sample.  
NA: Too few bacteria for BOX-PCR source determination in duplicate sample.

**b. Cabin John- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

CBJ001 – downstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 7%</b> Avian – 29% Canine – 5% Deer – 10% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 25%	118
CBJ002 – upstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 15%</b> Avian – 27% Canine – 6% Deer – 17% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 14%	164

**c. Horsepen- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

HSP001 – downstream	Human Bacteroides HF183: <b>Negative (Negative)</b> BOX-PCR Source Determination: <b>Human – 6 (6)%</b> Avian – 29 (27)% Canine – 10 (10)% Deer – 8 (9)% Horse – 15 (15)% Misc. Wildlife – 20 (19)% Non-human Unknown – 12 (14)%	73 (87)
HSP002 – upstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 11%</b> Avian – 31% Canine – 6% Deer – 7% Horse – 17% Misc. Wildlife – 17% Non-human Unknown – 11%	141

Note: Values in parentheses for station HSP001 are for field duplicate sample.

**d. Indian Creek- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

INC001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 9%</b> Avian – 33% Canine – 7% Deer – 6% Horse – 11% Misc. Wildlife – 19% Non-human Unknown – 15%	111
INC002 – upstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 5%</b> Avian – 29% Canine – 8% Deer – 4% Horse – 13% Misc. Wildlife – 23% Non-human Unknown – 18%	83

**e. Little Falls- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

LFS001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 3%</b> Avian – 35% Canine – 4% Deer – 11% Horse – 0% Misc. Wildlife – 27% Non-human Unknown – 20%	18
LFS002 – upstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 37%</b> Avian – 21% Canine – 9% Deer – 6% Horse – 0% Misc. Wildlife – 15% Non-human Unknown – 12%	1,028

**f. Lower Anacostia- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

ANA001 – downstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 12%</b> Avian – 35% Canine – 15% Deer – 4% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 13%	336
ANA002 – upstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 4%</b> Avian – 39% Canine – 17% Deer – 4% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 14%	94

**g. Lower Beaverdam Creek- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

LBD001 – downstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 18%</b> Avian – 27% Canine – 7% Deer – 12% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 12%	102
LBD002 – upstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 24%</b> Avian – 21% Canine – 4% Deer – 14% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 16%	295

**h. Muddy Branch- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

MDB001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 36% Canine – 5% Deer – 14% Horse – 0% Misc. Wildlife – 28% Non-human Unknown – 17%	16
MDB002 – upstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 33% Canine – 1% Deer – 13% Horse – 0% Misc. Wildlife – 35% Non-human Unknown – 18%	34

**i. Northeast Branch- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

NEB001 – upstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 12%</b> Avian – 37% Canine – 8% Deer – 14% Horse – 0% Misc. Wildlife – 19% Non-human Unknown – 10%	67
NEB002 – downstream	Human Bacteroides HF183: <b>Positive (Positive)</b> BOX-PCR Source Determination: <b>Human – 33 (33)%</b> Avian – 24 (22)% Canine – 4 (5)% Deer – 6 (6)% Horse – 0 (0)% Misc. Wildlife – 21 (21)% Non-human Unknown – 12 (13)%	566 (565)

Note: Values in parentheses for station NEB002 are for field duplicate sample.

j.	Northwest Branch-	BST Results:	Fecal Bacteria Results: ( <i>Enterococcus</i> CFU/100ml)
NWA001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 4%</b> Avian – 32% Canine – 15% Deer – 8% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 17%	48	
NWA002 – upstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 38% Canine – 6% Deer – 7% Horse – 0% Misc. Wildlife – 29% Non-human Unknown – 20%	19	

k.	Oxon Run-	BST Results:	Fecal Bacteria Results: ( <i>Enterococcus</i> CFU/100ml)
OXN001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 3%</b> Avian – 30% Canine – 9% Deer – 12% Horse – 0% Misc. Wildlife – 28% Non-human Unknown – 18%	24	
OXN002 – upstream (Watts Branch)	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 5%</b> Avian – 28% Canine – 7% Deer – 10% Horse – 0% Misc. Wildlife – 26% Non-human Unknown – 24%	27	

<b>I. Paint Branch-</b>	<b>BST Results:</b>	<b>Fecal Bacteria Results:</b> ( <i>Enterococcus</i> CFU/100ml)
PNT001 – downstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 11%</b> Avian – 31% Canine – 10% Deer – 11% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 16%	233
PNT002 – upstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 3%</b> Avian – 30% Canine – 11% Deer – 9% Horse – 0% Misc. Wildlife – 34% Non-human Unknown – 13%	25

<b>m. Parkway-</b>	<b>BST Results:</b>	<b>Fecal Bacteria Results:</b> ( <i>Enterococcus</i> CFU/100ml)
PKY001 – downstream (Bear Branch)	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 6%</b> Avian – 30% Canine – 13% Deer – 15% Horse – 0% Misc. Wildlife – 23% Non-human Unknown – 13%	93
PKY002 – upstream (Walker Branch)	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

<b>n. Piscataway-</b>	<b>BST Results:</b>	<b>Fecal Bacteria Results:</b> ( <i>Enterococcus</i> CFU/100ml)
PSW001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 29% Canine – 9% Deer – 14%	21

	Horse – 0% Misc. Wildlife – 23% Non-human Unknown – 25%	
PSW002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

**o. Rock Creek- Fecal Bacteria Results:**  
(*Enterococcus* CFU/100ml)

	<b>BST Results:</b> Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 22%</b> Avian – 25% Canine – 7% Deer – 8% Horse – 0% Misc. Wildlife – 19% Non-human Unknown – 19%	
RKC001 – downstream		188
	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 6%</b> Avian – 34% Canine – 3% Deer – 11% Horse – 0% Misc. Wildlife – 28% Non-human Unknown – 18%	
RKC002 – upstream		227

**p. Seneca Creek- Fecal Bacteria Results:**  
(*Enterococcus* CFU/100ml)

	<b>BST Results:</b> Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 29% Canine – 8% Deer – 11% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 28%	
SNC001 – downstream		15
	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 31% Canine – 12%	
SNC002 – upstream		27



	Deer – 10% Horse – 0% Misc. Wildlife – 23% Non-human Unknown – 24%	
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**q. Sligo Creek- Fecal Bacteria Results:**  
(*Enterococcus* CFU/100ml)

	<b>BST Results:</b>	
SLC001 – downstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 21%</b> Avian – 25% Canine – 10% Deer – 11% Horse – 0% Misc. Wildlife – 17% Non-human Unknown – 16%	71
SLC002 – upstream	Human Bacteroides HF183: <b>Positive</b> BOX-PCR Source Determination: <b>Human – 9%</b> Avian – 23% Canine – 11% Deer – 12% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 21%	69

**r. Upper Beaverdam Creek- Fecal Bacteria Results:**  
(*Enterococcus* CFU/100ml)

UBD001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 36% Canine – 9% Deer – 13% Horse – 0% Misc. Wildlife – 25% Non-human Unknown – 17%	28
UBD002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 ( <b>Negative</b> ) BOX-PCR Source Determination: <b>Human – NA (0)%</b> Avian – NA (34)% Canine – NA (10)% Deer – NA (12)%	<10 (21)

	Horse – NA (0%) Misc. Wildlife – NA (25%) Non-human Unknown – NA (19%)	
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Note: Values in parentheses for station UBD002 are for field duplicate sample.  
NA: Too few bacteria for BOX-PCR source determination in sample.

**s. Watts Branch- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

WTB001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 36% Canine – 7% Deer – 8% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 25%	22
WTB002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

**t. Western Branch- Fecal Bacteria Results:**  
**BST Results:** (*Enterococcus* CFU/100ml)

WNB001 – downstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 8%</b> Avian – 27% Canine – 9% Deer – 10% Horse – 0% Misc. Wildlife – 28% Non-human Unknown – 18%	25
WNB002 – upstream	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 4%</b> Avian – 33% Canine – 6% Deer – 9% Horse – 0% Misc. Wildlife – 25% Non-human Unknown – 23%	15

**Basins Subject to Annual Monitoring and Reporting Requirements-**

**a. Dulles Interceptor- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

DSI001	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 3%</b> Avian – 36% Canine – 8% Deer – 14% Horse – 0% Misc. Wildlife – 23% Non-human Unknown – 16%	18
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**b. Mattawoman- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

MTW001	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
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**c. Monocacy- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

MCY001	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 0%</b> Avian – 28% Canine – 7% Deer – 15% Horse – 0% Misc. Wildlife – 27% Non-human Unknown – 23%	20
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**d. Patuxent Center- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

PTC001 (Mill Branch)	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
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**e. Patuxent North- Fecal Bacteria Results:**  
**BST Results:** (Enterococcus CFU/100ml)

PTN001 (Hawlings River)	Human Bacteroides HF183: <b>Negative</b> BOX-PCR Source Determination: <b>Human – 4%</b>	18
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	Avian – 33% Canine – 4% Deer – 10% Horse – 0% Misc. Wildlife – 28% Non-human Unknown – 21%	
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f.

**Rock Run-**

**Fecal Bacteria Results:**

**BST Results:**

*(Enterococcus CFU/100ml)*

RCM001	Human Bacteroides HF183: <b>Negative (Negative)</b> BOX-PCR Source Determination: <b>Human – 0 (0)%</b> Avian – 29 (30)% Canine – 12 (12)% Deer – 16 (17)% Horse – 0 (0)% Misc. Wildlife – 21 (20)% Non-human Unknown – 22 (21)%	31 (29)
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Note: Values in parentheses for station RCM001 are for field duplicate sample.