

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 2016 annual round of water quality monitoring was conducted on March 23, 2016. 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 eleven sewer basins. Using an independent verification test, discussed below, human sources were confirmed in two 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 of that verification are presented below.

The 2016 semi-annual round of water quality sampling is planned for September, and results will be reported in the Fourth Quarter of 2016.

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: Negative BOX-PCR Source Determination: Human – 0% Avian – 39% Canine – 7% Deer – 7% Horse – 0%	18

	Misc. Wildlife – 26% Non-human Unknown – 21%	
BRC002 – upstream (Henson Creek)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 38% Canine – 9% Deer – 6% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 23%	27

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

CBJ001 – downstream	Human Bacteroides HF183: Too few bacteria for HF183 (Too few bacteria for HF183) BOX-PCR Source Determination: Too few bacteria for BOX-PCR (Too few bacteria for BOX-PCR)	<10 (<10)
CBJ002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

Note: Values in parentheses for station CBJ001 are for field duplicate sample.

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

HSP001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 5% Avian – 30% Canine – 5% Deer – 10% Horse – 9% Misc. Wildlife – 18% Non-human Unknown – 23%	72
HSP002 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 32% Canine – 7% Deer – 8% Horse – 11% Misc. Wildlife – 21%	17

	Non-human Unknown – 21%	
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d. Indian Creek- **Fecal Bacteria Results:**
(*Enterococcus* CFU/100ml)

	BST Results:	
INC001 – downstream	Human Bacteroides HF183: Negative (Negative) BOX-PCR Source Determination: Human – 6 (6)% Avian – 28 (29)% Canine – 9 (9)% Deer – 7 (8)% Horse – 13 (13)% Misc. Wildlife – 17 (16)% Non-human Unknown – 20 (19)%	57 (55)
INC002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

Note: Values in parentheses for station INC001 are for field duplicate sample.

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

	BST Results:	
LFS001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 3% Avian – 38% Canine – 7% Deer – 6% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 24%	25
LFS002 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 5% Avian – 33% Canine – 8% Deer – 9% Horse – 0% Misc. Wildlife – 25% Non-human Unknown – 20%	33

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

ANA001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 3% Avian – 36% Canine – 11% Deer – 0% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 26%	32
ANA002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

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

LBD001 – downstream	Human Bacteroides HF183: Too few bacteria for HF183 (Too few bacteria for HF183) BOX-PCR Source Determination: Too few bacteria for BOX-PCR (Too few bacteria for BOX-PCR)	<10 (<10)
LBD002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

Note: Values in parentheses for station LBD001 are for field duplicate sample.

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

MDB001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 24% Canine – 7% Deer – 13% Horse – 0% Misc. Wildlife – 30% Non-human Unknown – 26%	36
MDB002 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 34%	17

	Canine – 4% Deer – 5% Horse – 0% Misc. Wildlife – 26% Non-human Unknown – 31%	
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i. Northeast Branch- Fecal Bacteria Results:
BST Results: (Enterococcus CFU/100ml)

NEB001 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 29% Canine – 6% Deer – 9% Horse – 0% Misc. Wildlife – 27% Non-human Unknown – 29%	40
NEB002 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 30% Canine – 7% Deer – 7% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 32%	17

j. Northwest Branch- Fecal Bacteria Results:
BST Results: (Enterococcus CFU/100ml)

NWA001 – downstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
NWA002 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 31% Canine – 6% Deer – 8% Horse – 0% Misc. Wildlife – 25% Non-human Unknown – 30%	42

k. Oxon Run-

Fecal Bacteria Results:
(Enterococcus CFU/100ml)

BST Results:

OXN001 – downstream (Oxon Run)	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
OXN002 – upstream (Watts Branch, tributary to Anacostia River)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 6% Avian – 36% Canine – 11% Deer – 9% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 17%	25

l. Paint Branch-

Fecal Bacteria Results:
(Enterococcus CFU/100ml)

BST Results:

PNT001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 30% Canine – 11% Deer – 9% Horse – 0% Misc. Wildlife – 23% Non-human Unknown – 27%	20
PNT002 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 4% Avian – 29% Canine – 10% Deer – 7% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 29%	27

m. Parkway-

Fecal Bacteria Results:
(Enterococcus CFU/100ml)

BST Results:

PKY001 – downstream (Bear Branch)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 2% Avian – 29% Canine – 9% Deer – 7%	36
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	Horse – 0% Misc. Wildlife – 28% Non-human Unknown – 25%	
PKY002 – upstream (Walker Branch)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 31% Canine – 7% Deer – 10% Horse – 0% Misc. Wildlife – 29% Non-human Unknown – 23%	25

n. Piscataway-

Fecal Bacteria Results:

BST Results:

(*Enterococcus* CFU/100ml)

PSW001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 34% Canine – 11% Deer – 8% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 25%	20
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:

BST Results:

(*Enterococcus* CFU/100ml)

RKC001 – downstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
RKC002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

p. Seneca Creek-		Fecal Bacteria Results: (<i>Enterococcus</i> CFU/100ml)
BST Results:		
SNC001 – downstream (Seneca Creek)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 4% Avian – 28% Canine – 7% Deer – 6% Horse – 0% Misc. Wildlife – 25% Non-human Unknown – 30%	31
SNC002 – upstream (Dry Seneca Creek)	Human Bacteroides HF183: Negative (Negative) BOX-PCR Source Determination: Human – 13 (14)% Avian – 25 (25)% Canine – 8 (7)% Deer – 9 (10)% Horse – 0 (0)% Misc. Wildlife – 21 (22)% Non-human Unknown – 24 (22)%	60 (63)

Note: Values in parentheses for station SNC002 are for field duplicate sample.

q. Sligo Creek-		Fecal Bacteria Results: (<i>Enterococcus</i> CFU/100ml)
BST Results:		
SLC001 – downstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
SLC002 – upstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 2% Avian – 33% Canine – 8% Deer – 6% Horse – 0% Misc. Wildlife – 27% Non-human Unknown – 24%	16

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

UBD001 – downstream	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 6% Avian – 32% Canine – 5% Deer – 12% Horse – 0% Misc. Wildlife – 19% Non-human Unknown – 26%	55
UBD002 – upstream	Human Bacteroides HF183: Positive BOX-PCR Source Determination: Human – 14% Avian – 28% Canine – 4% Deer – 8% Horse – 0% Misc. Wildlife – 21% Non-human Unknown – 25%	145

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

WTB001 – downstream (Watts Branch)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 31% Canine – 8% Deer – 9% Horse – 0% Misc. Wildlife – 25% Non-human Unknown – 27%	20
WTB002 – upstream (Sandy Branch)	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 34% Canine – 6% Deer – 7% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 31%	27

t. Western Branch-	BST Results:	Fecal Bacteria Results: (<i>Enterococcus</i> CFU/100ml)
WNB001 – downstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10
WNB002 – upstream	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

Basins Subject to Annual Monitoring and Reporting Requirements-

a. Dulles Interceptor-	BST Results:	Fecal Bacteria Results: (<i>Enterococcus</i> CFU/100ml)
DSI001	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

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

Note: Values in parentheses for station MTW001 are for field duplicate sample.

c. Monocacy-	BST Results:	Fecal Bacteria Results: (<i>Enterococcus</i> CFU/100ml)
MCY001	Human Bacteroides HF183: Too few bacteria for HF183 BOX-PCR Source Determination: Too few bacteria for BOX-PCR	<10

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

e. Patuxent North-

Fecal Bacteria Results:
(Enterococcus CFU/100ml)

BST Results:

PTN001 (Hawlings River)	Human Bacteroides HF183: Positive BOX-PCR Source Determination: Human – 13% Avian – 28% Canine – 12% Deer – 10% Horse – 0% Misc. Wildlife – 19% Non-human Unknown – 18%	108
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f. Rock Run-

Fecal Bacteria Results:
(Enterococcus CFU/100ml)

BST Results:

RCM001	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 0% Avian – 31% Canine – 11% Deer – 6% Horse – 0% Misc. Wildlife – 24% Non-human Unknown – 28%	15
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