**"MIAMI RIVER BASIN WATER QUALITY IMPROVEMENT REPORT"**
**Action Item Matrix Quarterly Progress Report**

Fourth Quarterly Report, 2021
(October-December 2021)

**Action Item:**

4. Monitoring and Research
   a. Continue monthly monitoring for water quality of Wagner Creek, Miami River, and adjoining Biscayne Bay


| | |
|---|---|
| **Lead Agency:** | Miami-Dade County Regulatory and Economic Resources, Division of Environmental Resources Management (DERM) |
| **Contact Name** | Pamela Sweeney or Omar Abdelrahman, DERM |
| **Address** | 701 NW 1st Court<br>Miami, FL 33136 |
| **Telephone** | (305) 372-6594 or (305) 372-6872 |
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**Action Item Status:**

Miami-Dade DERM has continued to collect monthly water quality samples in the Miami River and its tributaries (including Tamiami Canal, Comfort Canal and Wagner Creek). During the Fourth Quarter of 2021 samples were collected at each of the eight (8) stations in the River and tributaries on First Tuesday of the first full week in October and November and December. Costs for sampling (including salaries and fringe and analysis) have been calculated at approximately $394 per station per month. No sewage spills were reported on or around the Miami River or its tributaries during the quarter.

The Florida Department of Environmental Protection (FDEP) revised the human health-based surface water quality criteria in Chapter 62-302, F.A.C that are designed to ensure that Floridians can safely eat Florida fish and drink local tap water. Figures **1 -3** below depict where monthly results for stations in the Miami River and the vicinity exceed the single sample standard of 130 cfu/100ml for Enterococcus—the applicable indicator for saline locations. Figure 4 is a quarterly composite of Enterococci results from station locations on the Miami River and its tributaries showing how frequently the results at each station exceeded the standard during the Third Quarter of the year. Table 1 lists the observed Enterococcus values, as well as E. Coli levels, in Wagner Creek and its confluence with the Miami River (MR03) for October-December.

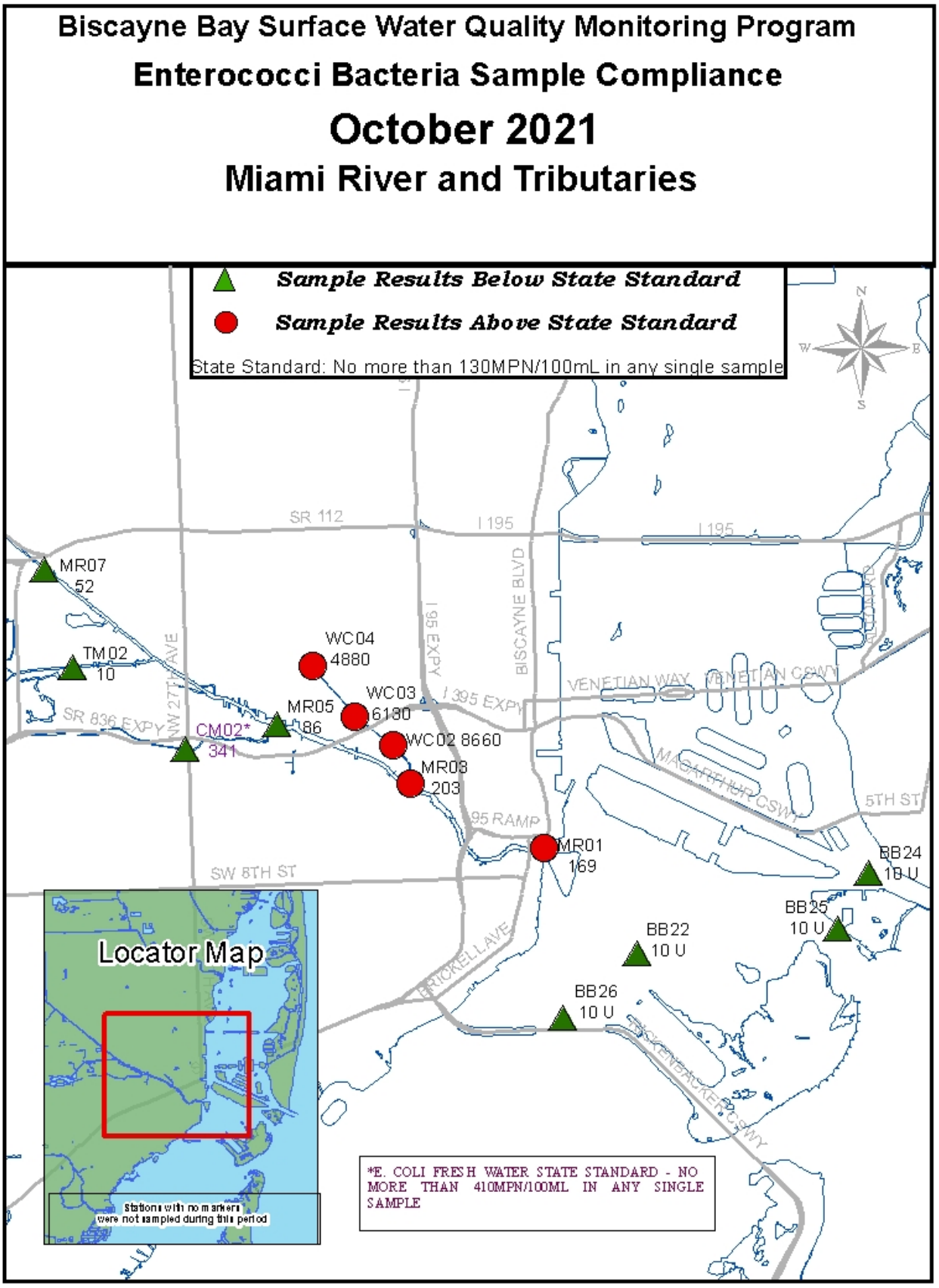
Biscayne Bay Surface Water Quality Monitoring Program
Enterococci Bacteria Sample Compliance
October 2021
Miami River and Tributaries
Sample Results Below State Standard
Sample Results Above State Standard
State Standard: No more than 130MPN/100mL in any single sample
MR07 52
TM02 10
WC04 4880
WC03 6180
MR05 186
CM02* 341
WC02 8660
MR03 203
MR01 169
BB24 10 U
BB25 10 U
BB22 10 U
BB26 10 U
SR 112
I 195
I 95 EXPY
BISCAYNE BLVD
NW 27TH AVE
SR 836 EXPY
I 395 EXPY
VENETIAN WAY
VENETIAN CSWY
MACARTHUR CSWY
5TH ST
95 RAMP
SW 8TH ST
BRICKELL AVE
BROKENBACKER CSWY
Locator Map
Stations with no markers were not sampled during this period
*E. COLI FRESH WATER STATE STANDARD - NO MORE THAN 410MPN/100ML IN ANY SINGLE SAMPLE

Figure 1.

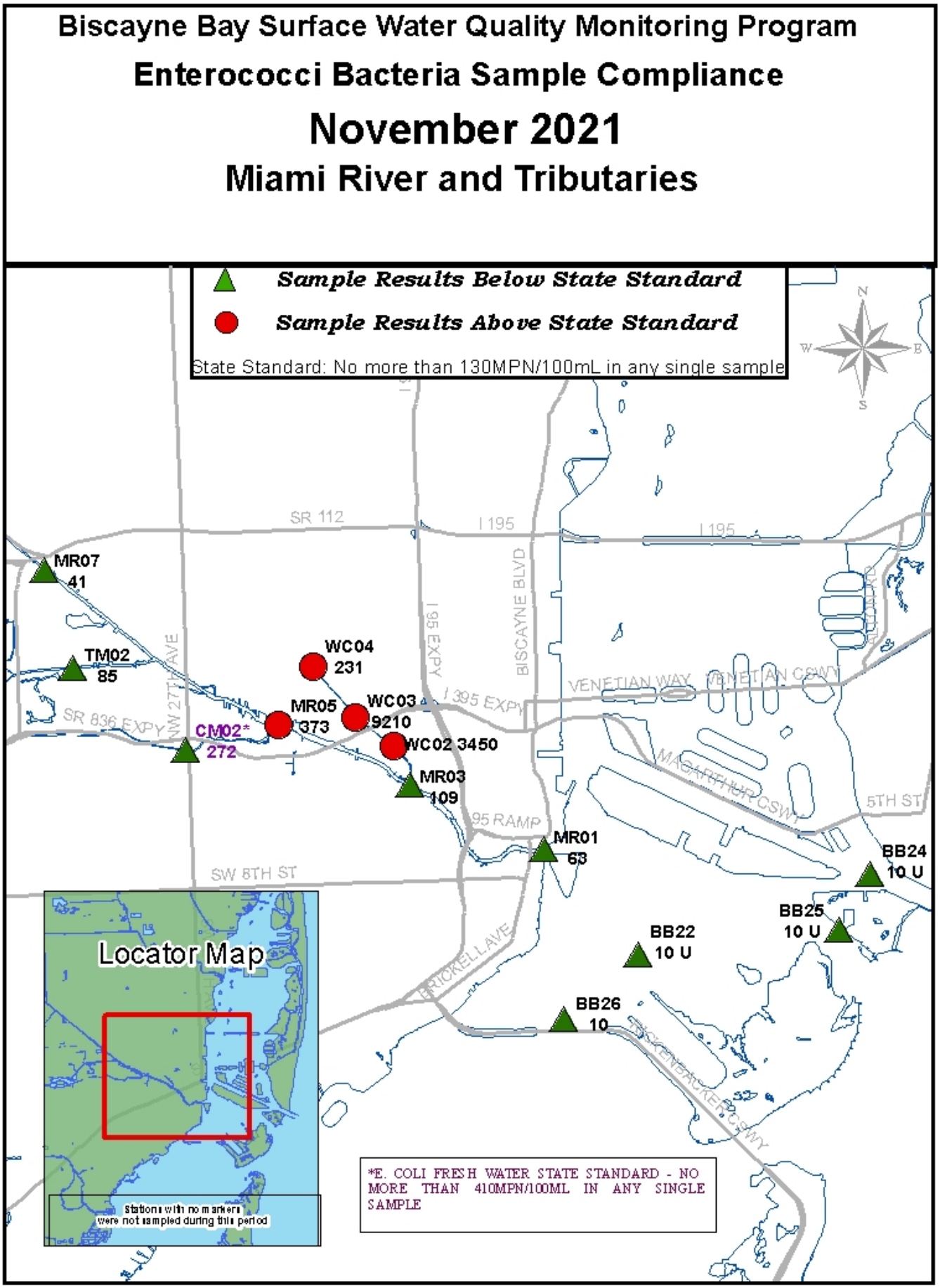
Biscayne Bay Surface Water Quality Monitoring Program
Enterococci Bacteria Sample Compliance
November 2021
Miami River and Tributaries
Sample Results Below State Standard
Sample Results Above State Standard
State Standard: No more than 130MPN/100mL in any single sample
MR07 41
TM02 85
WC04 231
MR05 373
WC03 9210
WC02 3450
CM02* 272
MR03 109
MR01 63
BB24 10 U
BB25 10 U
BB22 10 U
BB26 10
SR 112
I 195
I 95 EXPY
BISCAYNE BLVD
NW 27TH AVE
SR 836 EXPY
I 395 EXPY
VENETIAN WAY
VENETIAN CSWY
MACARTHUR CSWY
5TH ST
95 RAMP
SW 8TH ST
BRICKELL AVE
RICKENBACKER CSWY
Locator Map
Stations with no markers were not sampled during this period
*E. COLI FRESH WATER STATE STANDARD - NO MORE THAN 410MPN/100ML IN ANY SINGLE SAMPLE

Figure 2.

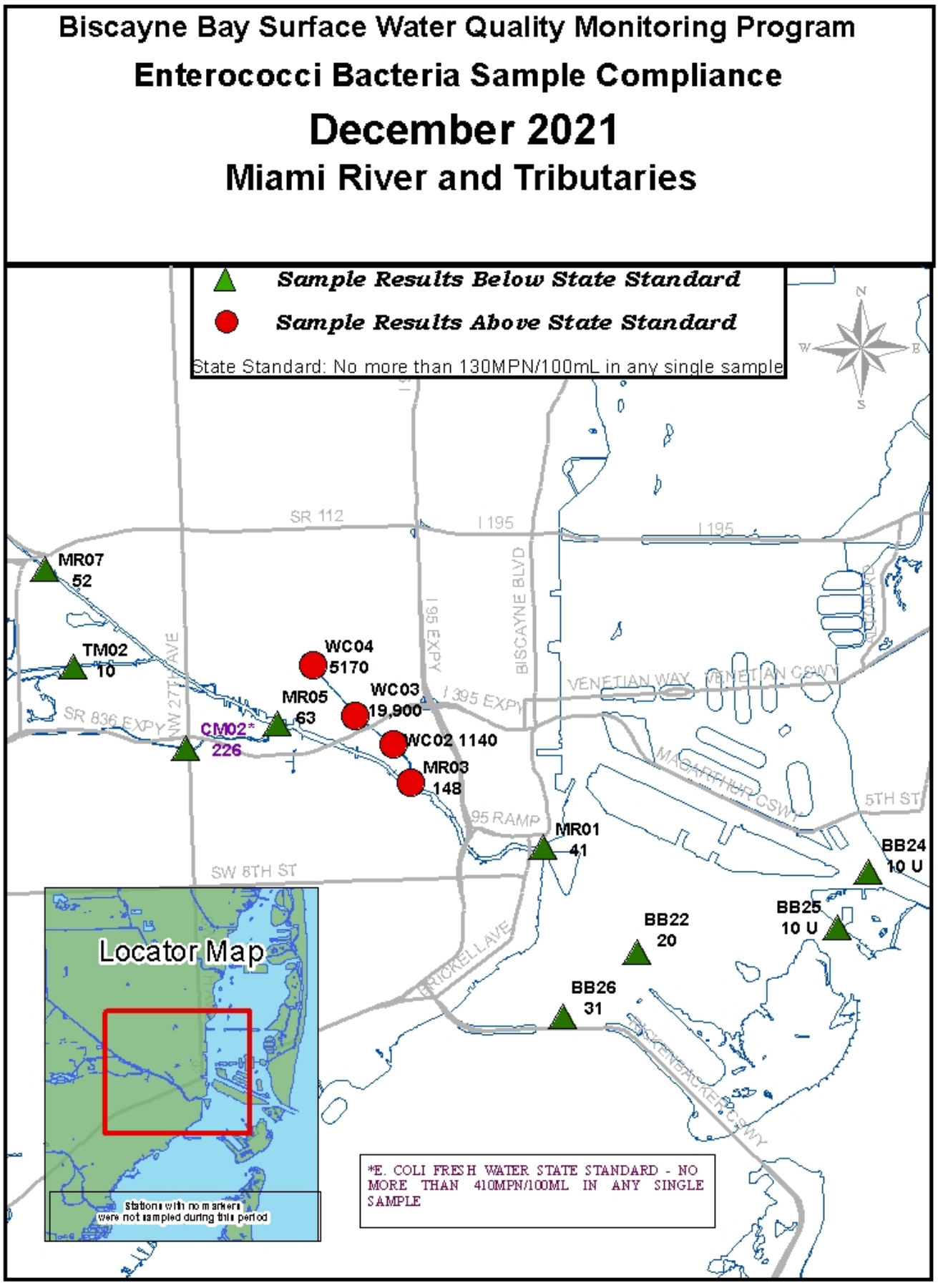
Biscayne Bay Surface Water Quality Monitoring Program
Enterococci Bacteria Sample Compliance
December 2021
Miami River and Tributaries
Sample Results Below State Standard
Sample Results Above State Standard
State Standard: No more than 130MPN/100mL in any single sample
MR07 52
TM02 10
WC04 5170
WC03 19,900
MR05 63
CM02* 226
WC02 1140
MR03 148
MR01 41
BB24 10 U
BB25 10 U
BB22 20
BB26 31
SR 112
I 195
I 95 EXPY
BISCAYNE BLVD
NW 27TH AVE
SR 836 EXPY
I 395 EXPY
VENETIAN WAY
VENETIAN CSWY
MACARTHUR CSWY
5TH ST
95 RAMP
SW 8TH ST
BRICKELL AVE
RICKENBACKER CSWY
Locator Map
Stations with no markers were not sampled during this period
*E. COLI FRESH WATER STATE STANDARD - NO MORE THAN 410MPN/100ML IN ANY SINGLE SAMPLE

Figure 3.

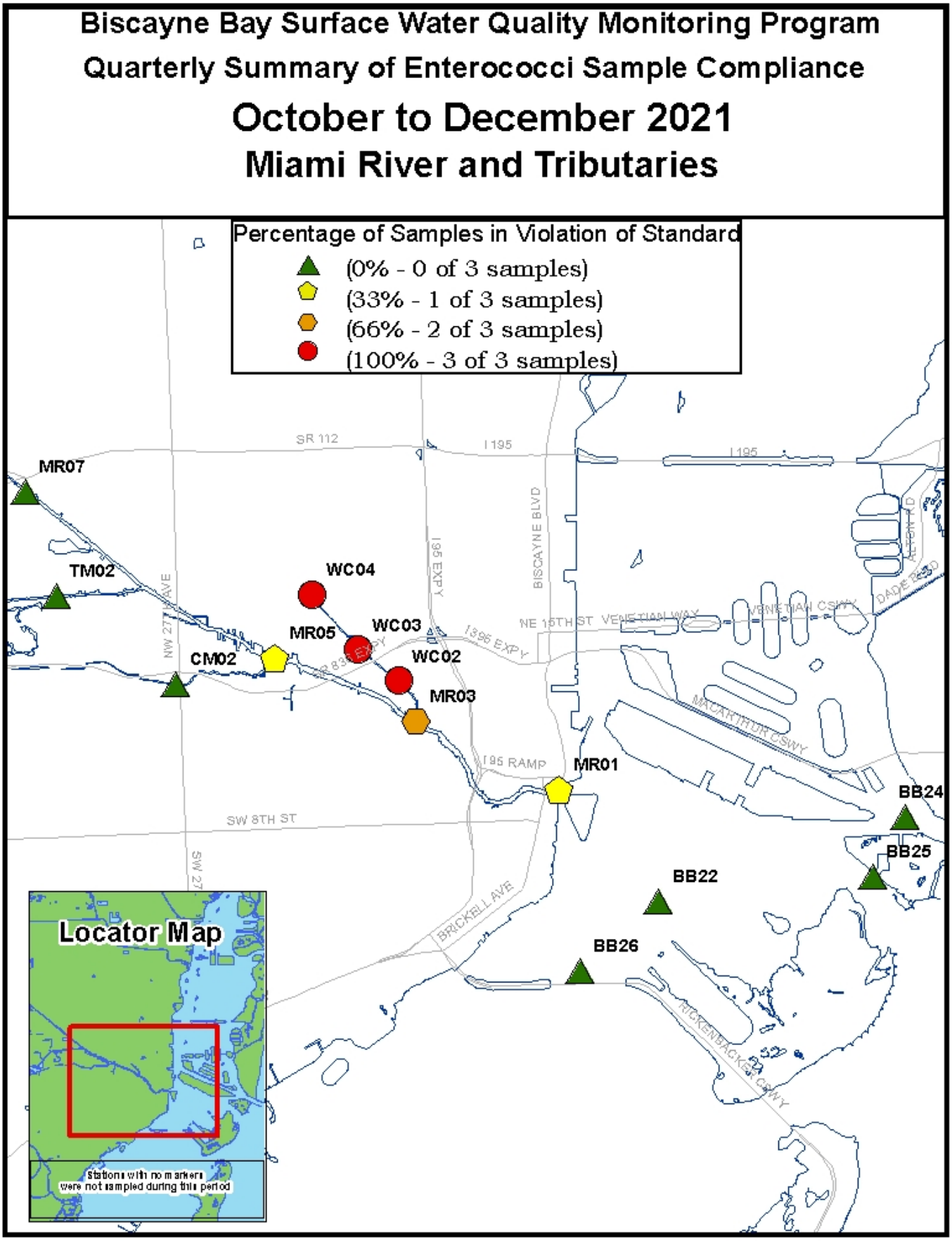
Biscayne Bay Surface Water Quality Monitoring Program
Quarterly Summary of Enterococci Sample Compliance
October to December 2021
Miami River and Tributaries
Percentage of Samples in Violation of Standard
(0% - 0 of 3 samples)
(33% - 1 of 3 samples)
(66% - 2 of 3 samples)
(100% - 3 of 3 samples)
MR07
TM02
WC04
WC03
MR05
CM02
WC02
MR03
MR01
BB24
BB25
BB22
BB26
SR 112
I 195
BISCAYNE BLVD
NW 27 AVE
SW 8TH ST
BRICKELL AVE
I 95 RAMP
NE 15TH ST
VENETIAN WAY
MACARTHUR CSWY
DADE BLVD
RICKENBACKER CSWY
Locator Map
Stations with no markers were not sampled during this period

Figure 4.

**Table 1.**

| MONTHLY INDICATOR BACTERIA LEVELS (cfu's/100 ml) IN WAGNER CREEK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **MR03** | | **WC02** | | **WC03** | | **WC04** | |
| **Parameter** | **Entero** | **E.Coli** | **Entero** | **E.Coli** | **Entero** | **E.Coli** | **Entero** | **E.Coli** |
| **October** | **203*** | 218 | **8660*** | **8160*** | **6130*** | **2600*** | **4880*** | **8660*** |
| **November** | 109 | 262 | **3450*** | **2310*** | **9210*** | **8160*** | **231*** | **443*** |
| **December** | **148*** | 209 | **1140*** | **594*** | **19900*** | **24196*** | **5170*** | **24196*** |

A "*" indicates results that exceed the State's E. Coli Standard (410 cfu/100ml) or Enterococci (130 cfu/100ml); a "0" indicates that the true value was below the method detection limit.

**Fourth Quarterly Report, 2021**
(October-December 2021)

**Action Item:**

5. Management
d. Establish standardized water quality tracking for key characteristics


| | |
|---|---|
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| **e-mail** | abdelo@miamidade.gov |


**Action Item Status:**

This report presents selected results of the water quality monitoring that occurred in the Fourth Quarter (October-December) of 2021for Bacteriological parameters, Ammonia, Total Phosphorus, and Turbidity. Due to the extensive nature of the database, it is not feasible to track each parameter collected at each station for the period of record. Therefore, representative parameters have been selected to achieve the objective of this Action Item. Current water quality trends will be tracked by plotting the actual sample results of several key parameters (see Charts 1-14 for graphs of Ammonia Nitrogen, Total Phosphorus, Bacteriological Indicator species, and Turbidity data) throughout the river.

All currently monitored stations in the river were included with each parameter plotted on 3 separate graphs each representing the lower river, upper river, and Wagner Creek (See maps presented under action item 4.a for station locations). Data are plotted in time series from the previous ten-year (2011-2021) period, except for Enterococcus and Escherichia Coli which only have 4 years of data available. For further comparison, the target values developed under Action Item 4.f are plotted, and where applicable, the existing state or county standard for each parameter is shown.

**Chart 1.**

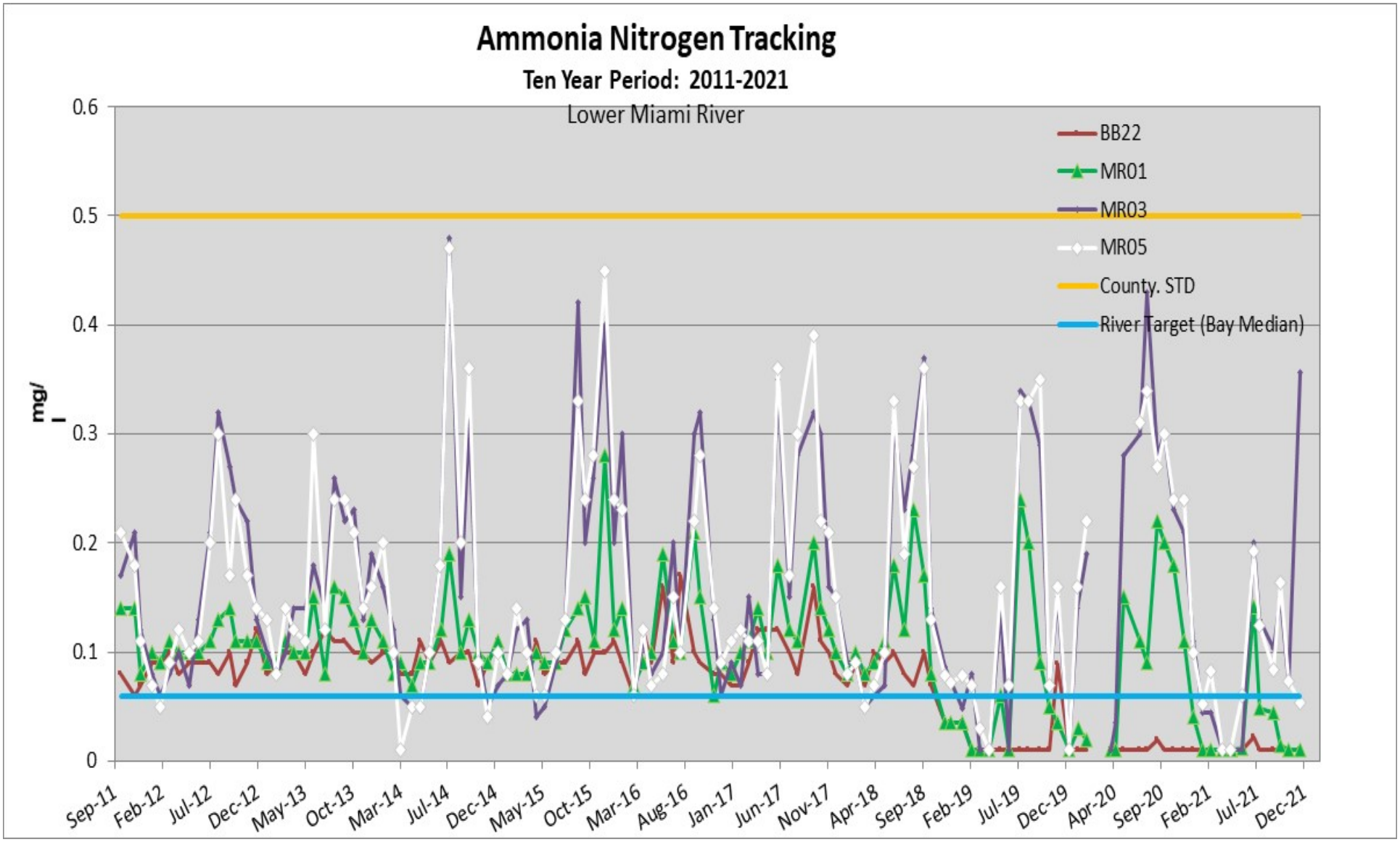

Ammonia Nitrogen Tracking
Ten Year Period: 2011-2021
Lower Miami River
BB22
MR01
MR03
MR05
County. STD
River Target (Bay Median)
mg/l
0.6
0.5
0.4
0.3
0.2
0.1
0
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 2.**

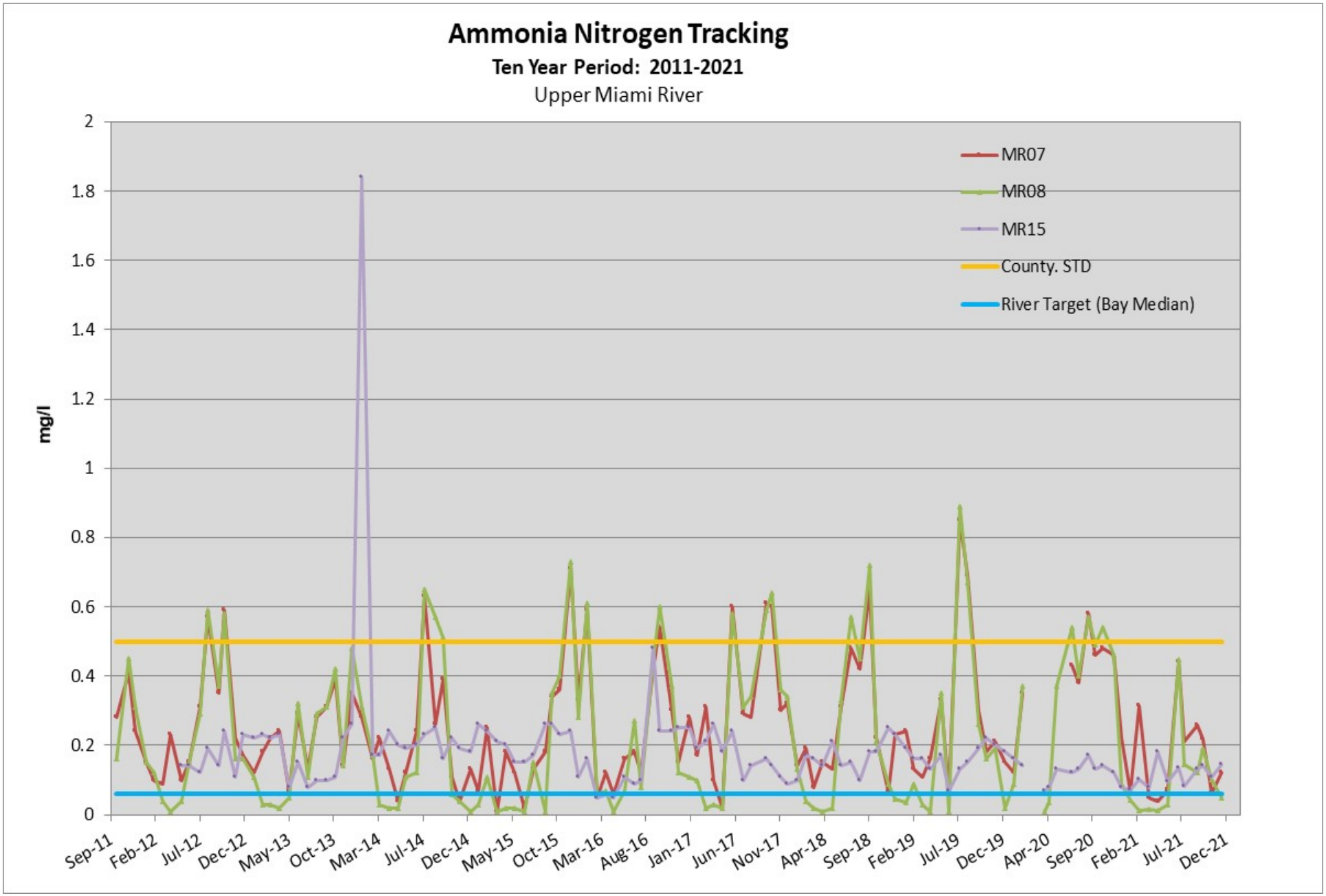

Ammonia Nitrogen Tracking
Ten Year Period: 2011-2021
Upper Miami River
mg/l
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
MR07
MR08
MR15
County. STD
River Target (Bay Median)
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 3**

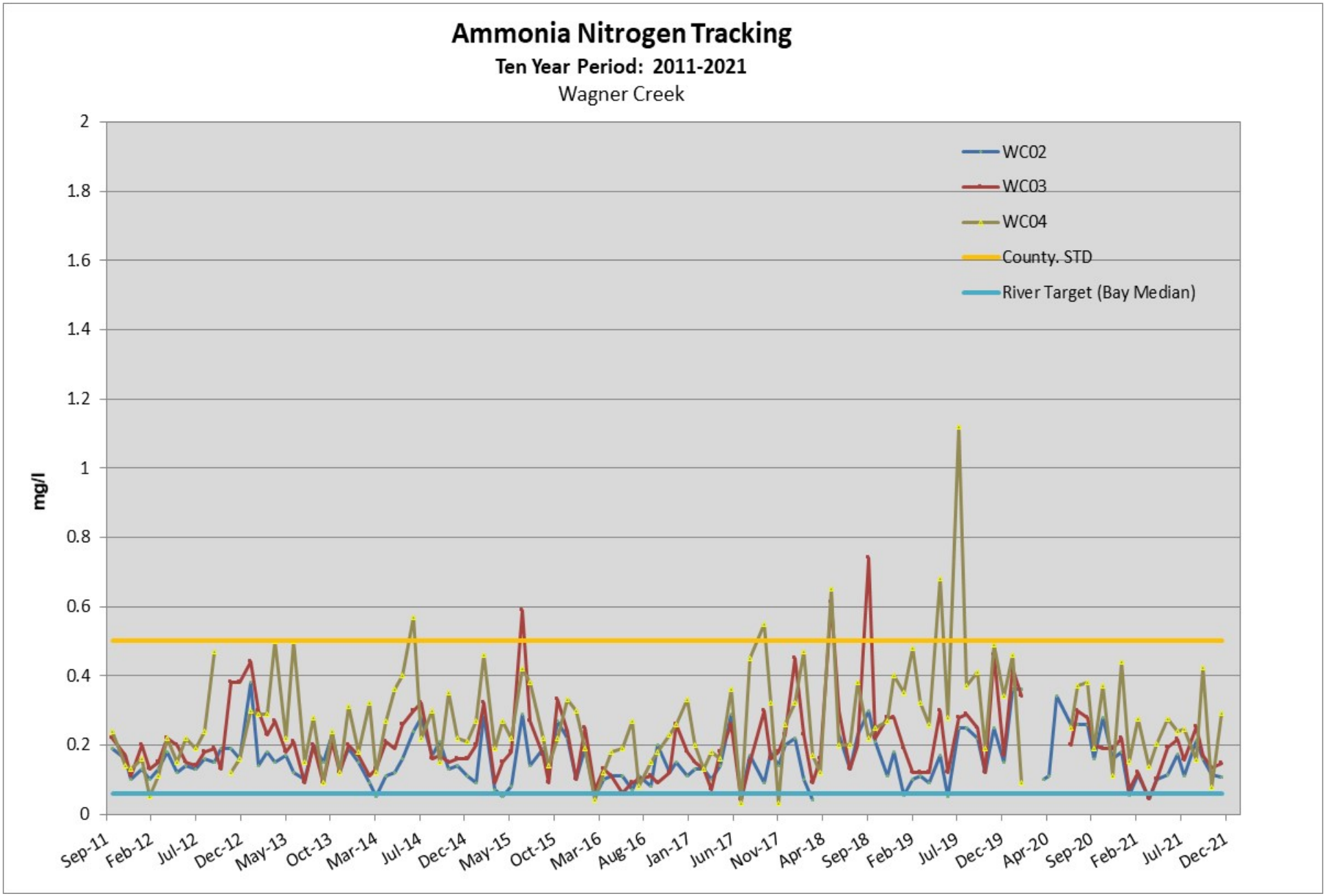

Ammonia Nitrogen Tracking
Ten Year Period: 2011-2021
Wagner Creek
mg/l
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
WC02
WC03
WC04
County. STD
River Target (Bay Median)
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 4.**

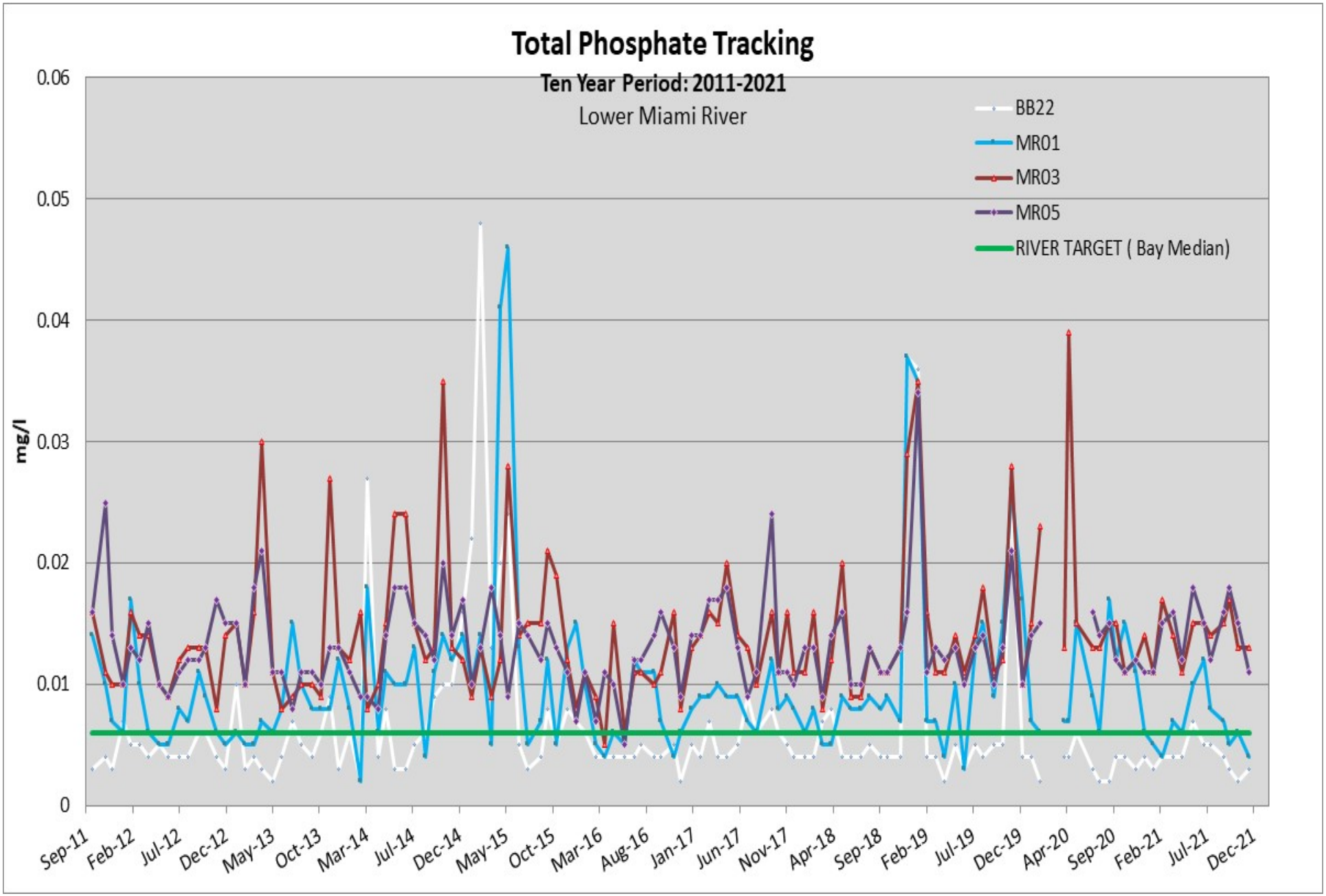

Total Phosphate Tracking
Ten Year Period: 2011-2021
Lower Miami River
BB22
MR01
MR03
MR05
RIVER TARGET ( Bay Median)
mg/l
0.06
0.05
0.04
0.03
0.02
0.01
0
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 5.**

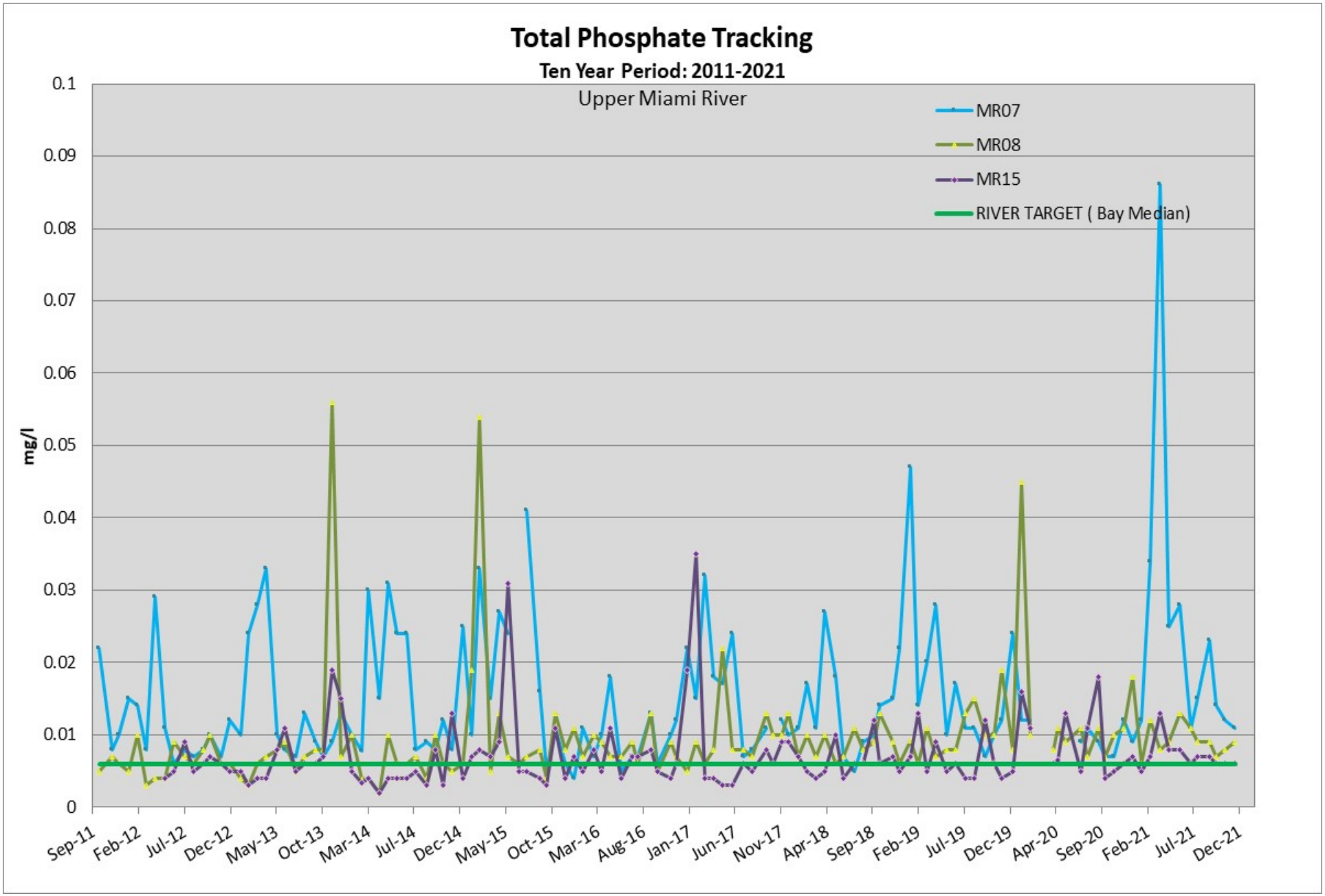
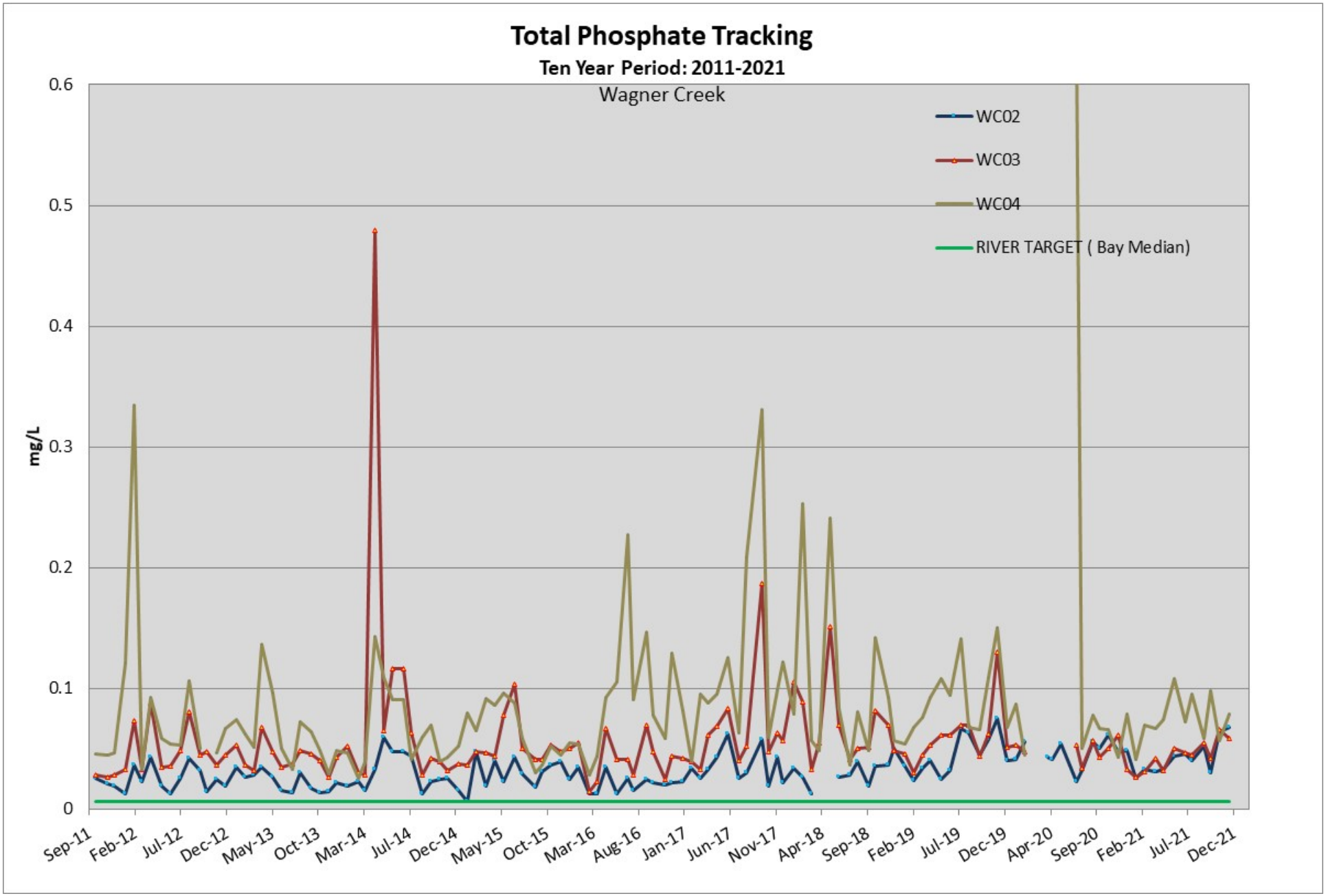

Total Phosphate Tracking
Ten Year Period: 2011-2021
Upper Miami River
MR07
MR08
MR15
RIVER TARGET ( Bay Median)
mg/l
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 6.**


Total Phosphate Tracking
Ten Year Period: 2011-2021
Wagner Creek
WC02
WC03
WC04
RIVER TARGET ( Bay Median)
mg/L
0.6
0.5
0.4
0.3
0.2
0.1
0
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
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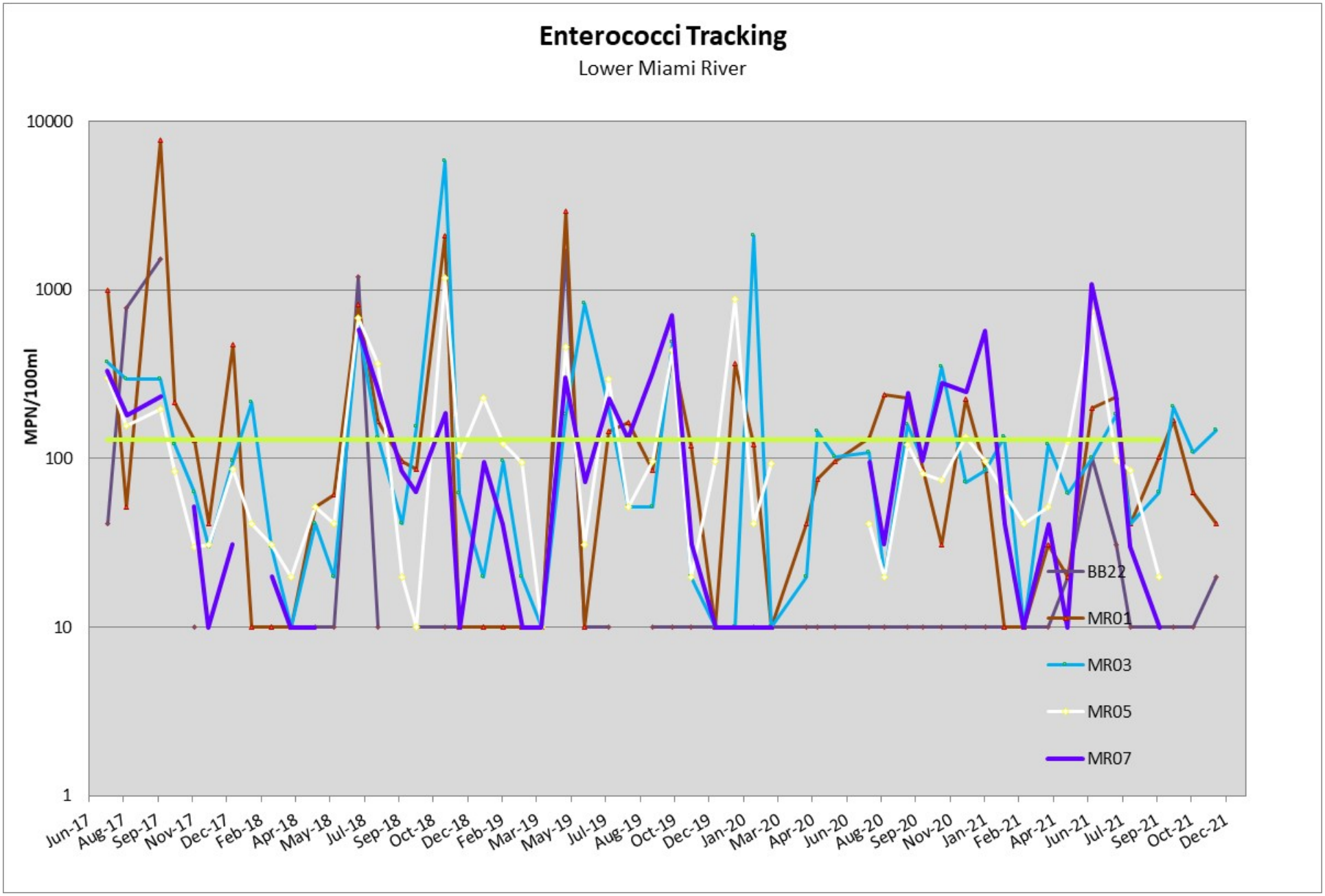
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 7.**


Enterococci Tracking
Lower Miami River
MPN/100ml
10000
1000
100
10
1
BB22
MR01
MR03
MR05
MR07
Jun-17
Aug-17
Sep-17
Nov-17
Dec-17
Feb-18
Apr-18
May-18
Jul-18
Sep-18
Oct-18
Dec-18
Feb-19
Mar-19
May-19
Jul-19
Aug-19
Oct-19
Dec-19
Jan-20
Mar-20
Apr-20
Jun-20
Aug-20
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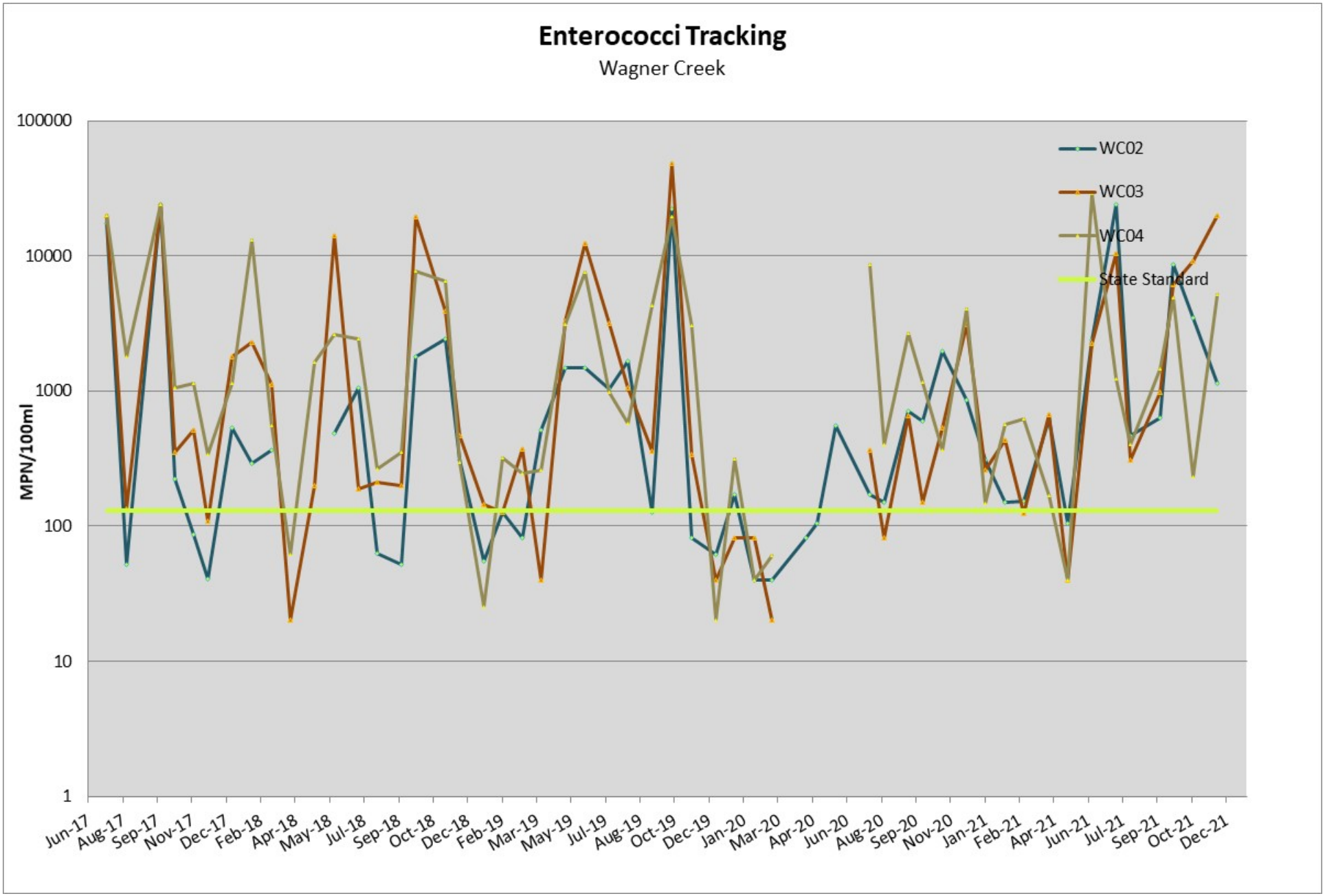
Jul-21
Sep-21
Oct-21
Dec-21

**Chart 8.**


Enterococci Tracking
Wagner Creek
MPN/100ml
100000
10000
1000
100
10
1
WC02
WC03
WC04
State Standard
Jun-17
Aug-17
Sep-17
Nov-17
Dec-17
Feb-18
Apr-18
May-18
Jul-18
Sep-18
Oct-18
Dec-18
Feb-19
Mar-19
May-19
Jul-19
Aug-19
Oct-19
Dec-19
Jan-20
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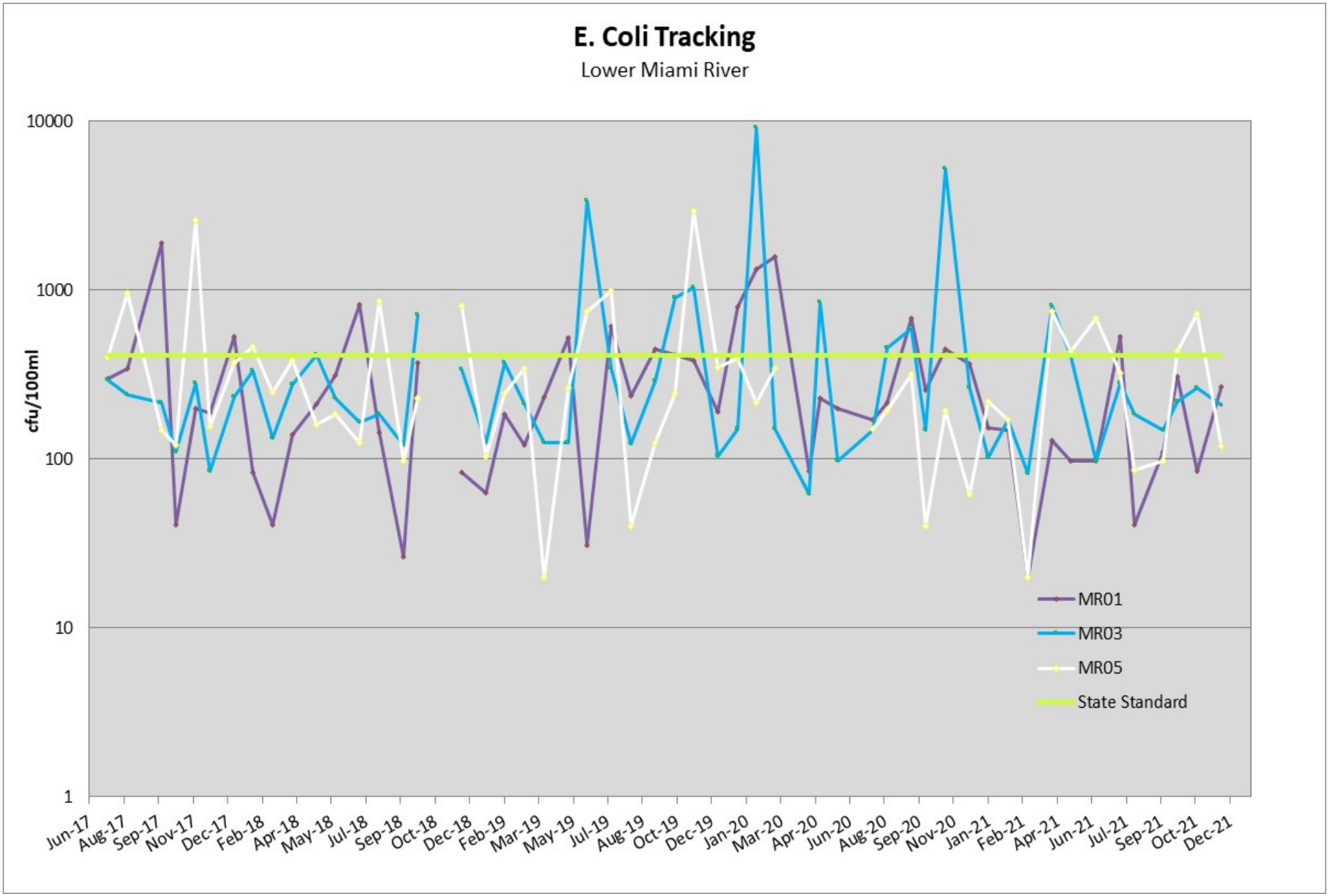
Oct-21
Dec-21

**Chart 9.**


E. Coli Tracking
Lower Miami River
10000
1000
100
10
1
cfu/100ml
MR01
MR03
MR05
State Standard
Jun-17
Aug-17
Sep-17
Nov-17
Dec-17
Feb-18
Apr-18
May-18
Jul-18
Sep-18
Oct-18
Dec-18
Feb-19
Mar-19
May-19
Jul-19
Aug-19
Oct-19
Dec-19
Jan-20
Mar-20
Apr-20
Jun-20
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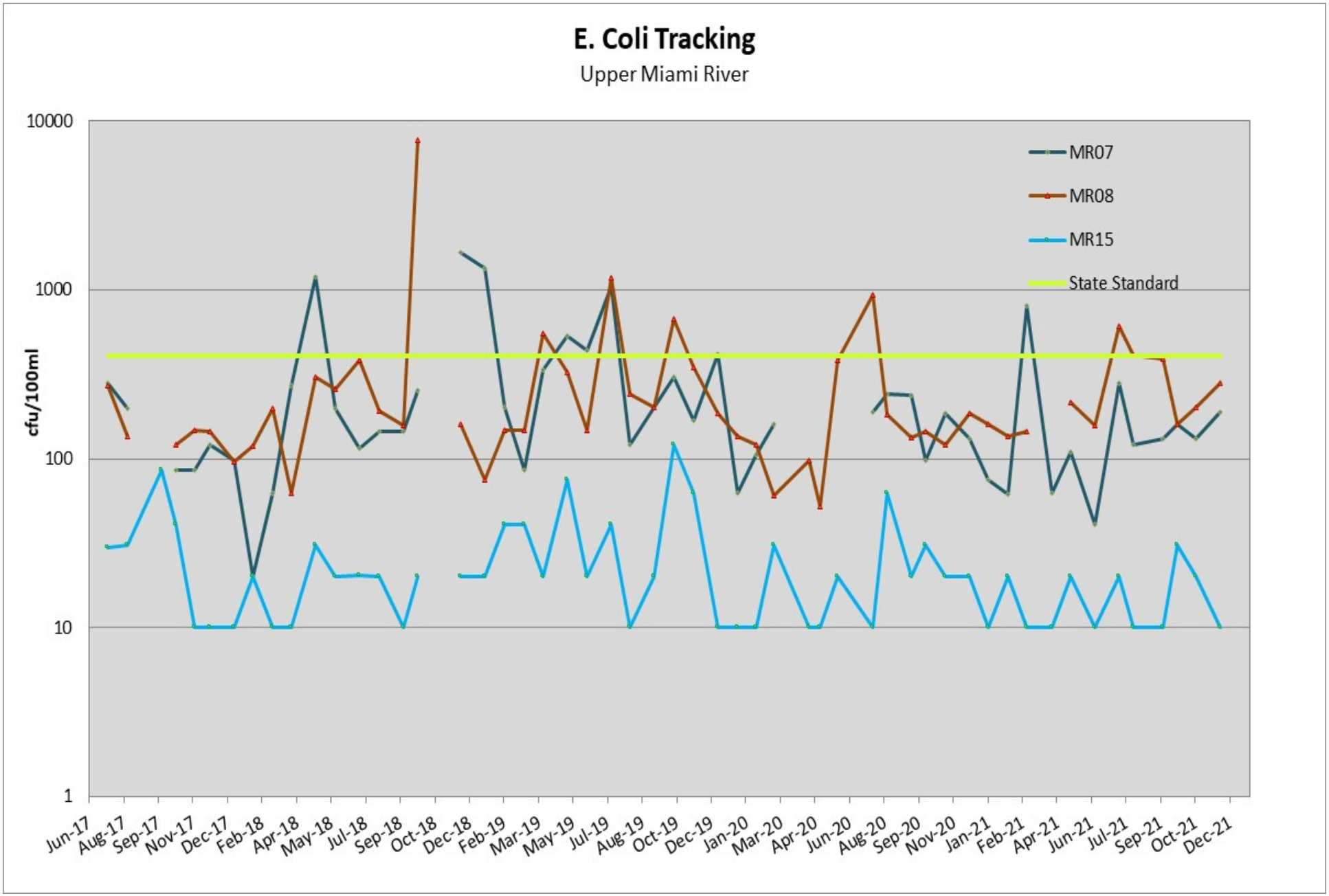
Sep-21
Oct-21
Dec-21

**Chart 10.**


E. Coli Tracking
Upper Miami River
cfu/100ml
10000
1000
100
10
1
MR07
MR08
MR15
State Standard
Jun-17
Aug-17
Sep-17
Nov-17
Dec-17
Feb-18
Apr-18
May-18
Jul-18
Sep-18
Oct-18
Dec-18
Feb-19
Mar-19
May-19
Jul-19
Aug-19
Oct-19
Dec-19
Jan-20
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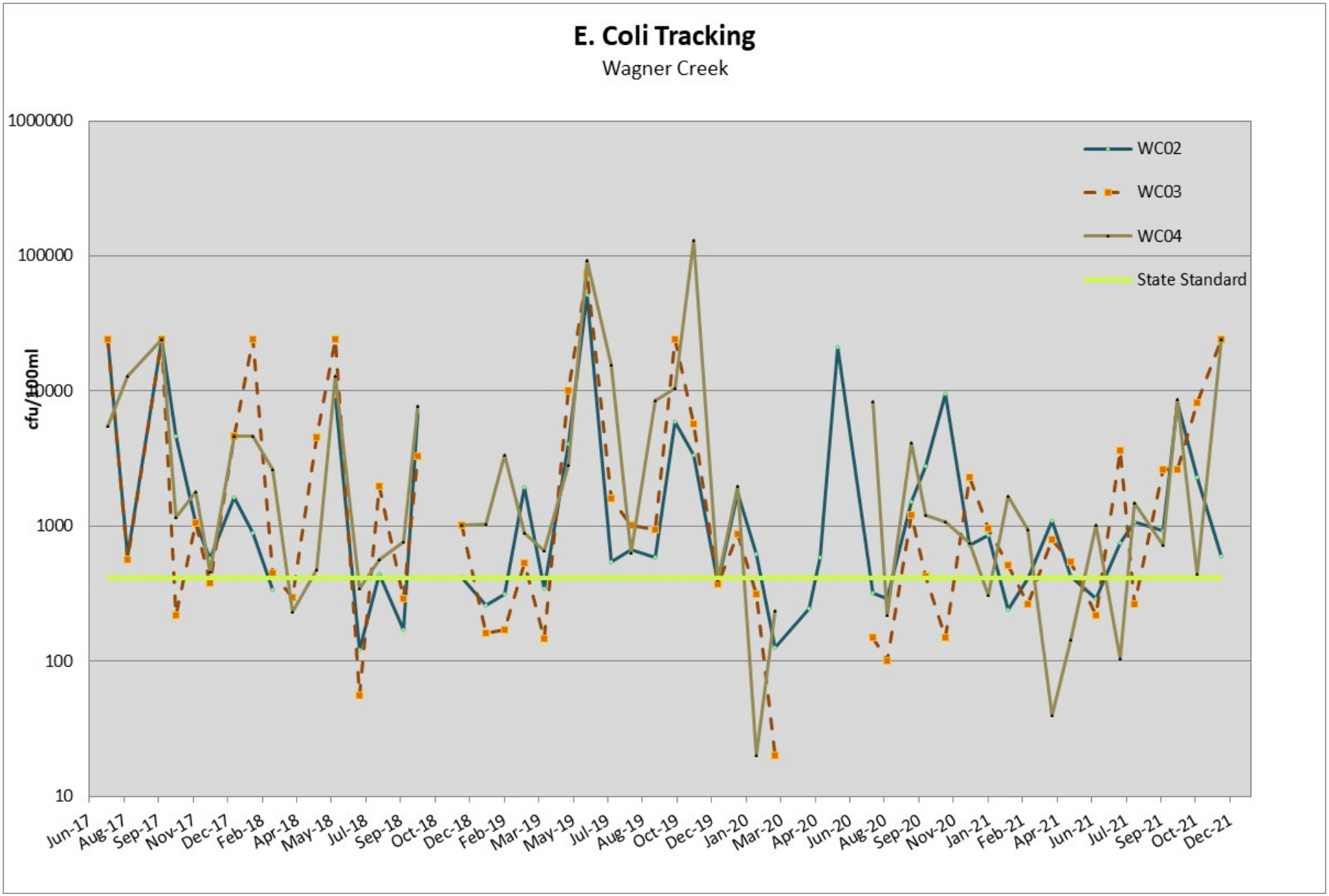
Dec-21

**Chart 11.**


E. Coli Tracking
Wagner Creek
1000000
100000
10000
1000
100
10
cfu/100ml
WC02
WC03
WC04
State Standard
Jun-17
Aug-17
Sep-17
Nov-17
Dec-17
Feb-18
Apr-18
May-18
Jul-18
Sep-18
Oct-18
Dec-18
Feb-19
Mar-19
May-19
Jul-19
Aug-19
Oct-19
Dec-19
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Aug-20
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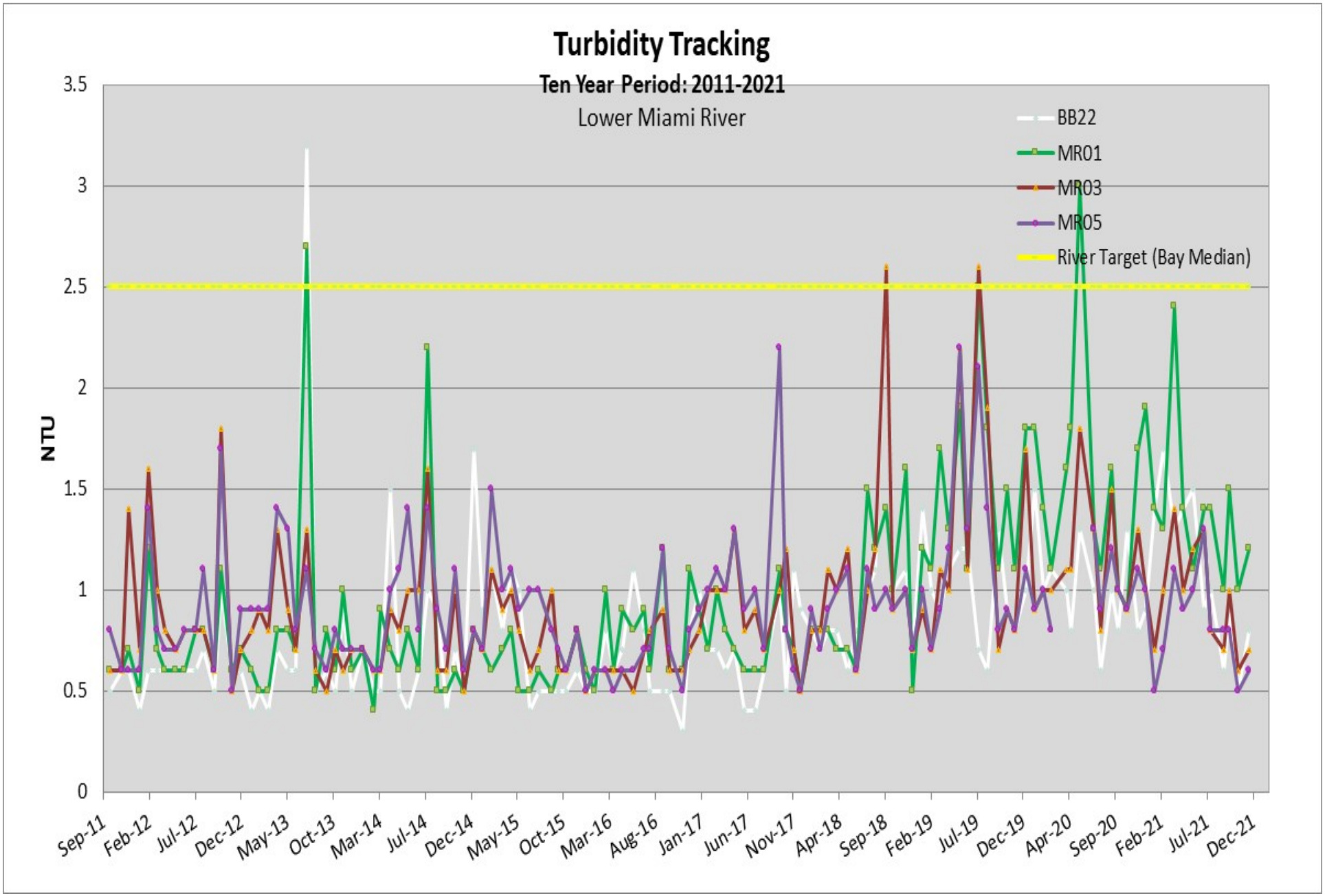
Oct-21
Dec-21

**Chart 12.**


Turbidity Tracking
Ten Year Period: 2011-2021
Lower Miami River
BB22
MR01
MR03
MR05
River Target (Bay Median)
NTU
3.5
3
2.5
2
1.5
1
0.5
0
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
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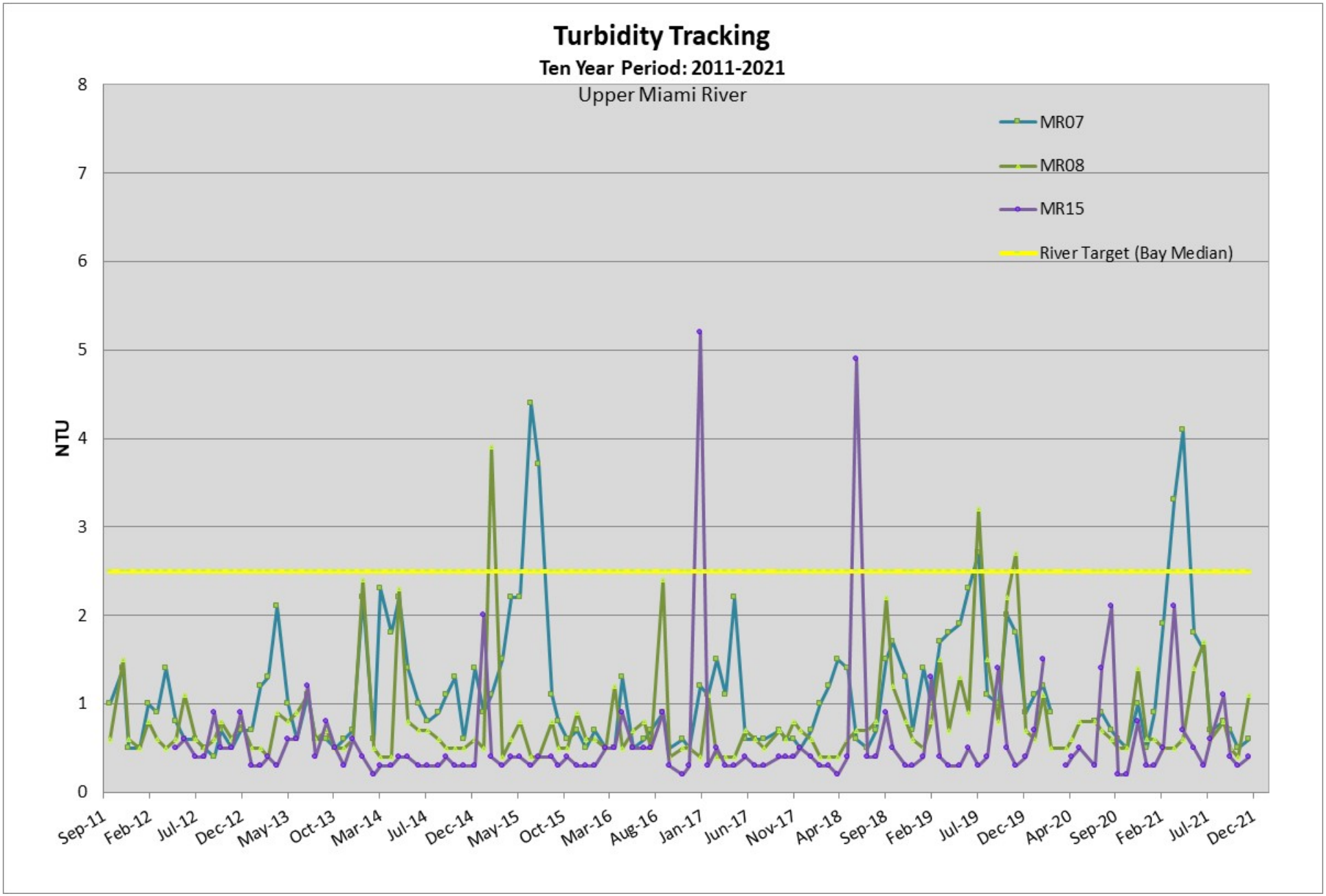
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 13.**


Turbidity Tracking
Ten Year Period: 2011-2021
Upper Miami River
MR07
MR08
MR15
River Target (Bay Median)
NTU
0
1
2
3
4
5
6
7
8
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
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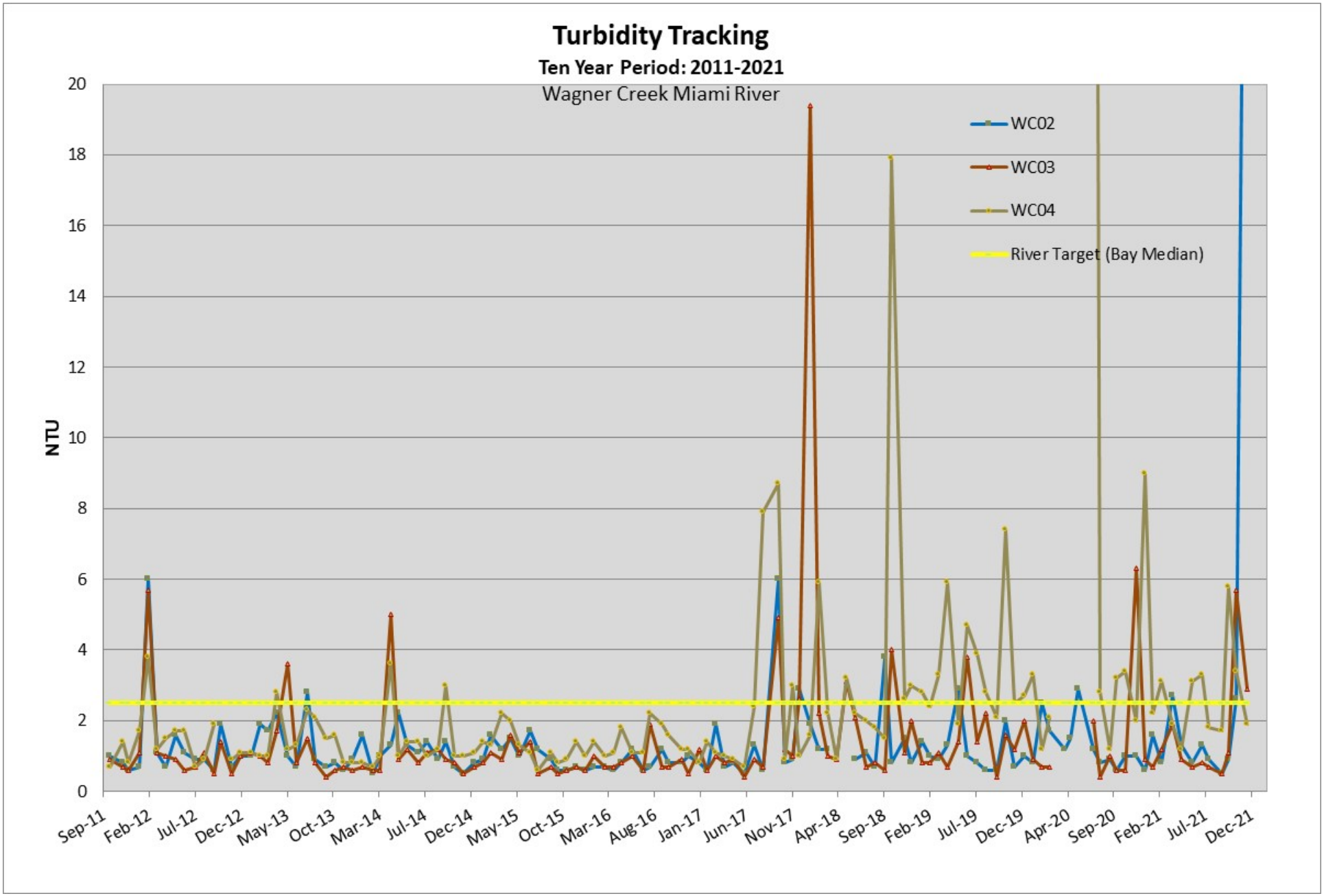
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21

**Chart 14.**


Turbidity Tracking
Ten Year Period: 2011-2021
Wagner Creek Miami River
WC02
WC03
WC04
River Target (Bay Median)
NTU
0
2
4
6
8
10
12
14
16
18
20
Sep-11
Feb-12
Jul-12
Dec-12
May-13
Oct-13
Mar-14
Jul-14
Dec-14
May-15
Oct-15
Mar-16
Aug-16
Jan-17
Jun-17
Nov-17
Apr-18
Sep-18
Feb-19
Jul-19
Dec-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21