CBP Allocation Loads

SCENARIO RESULTS

MDE

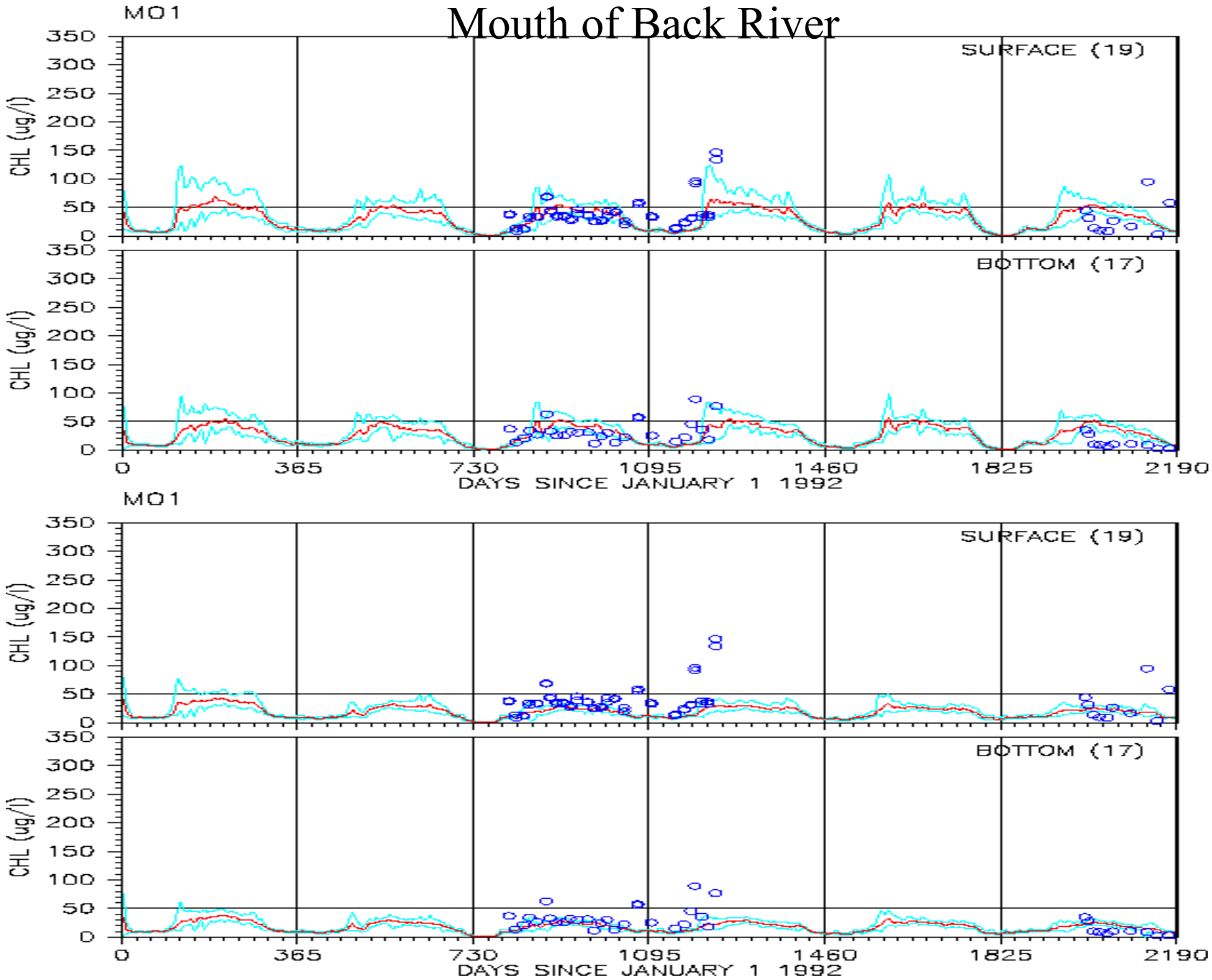
CBP Allocation Loads

SCENARIO RESULTS

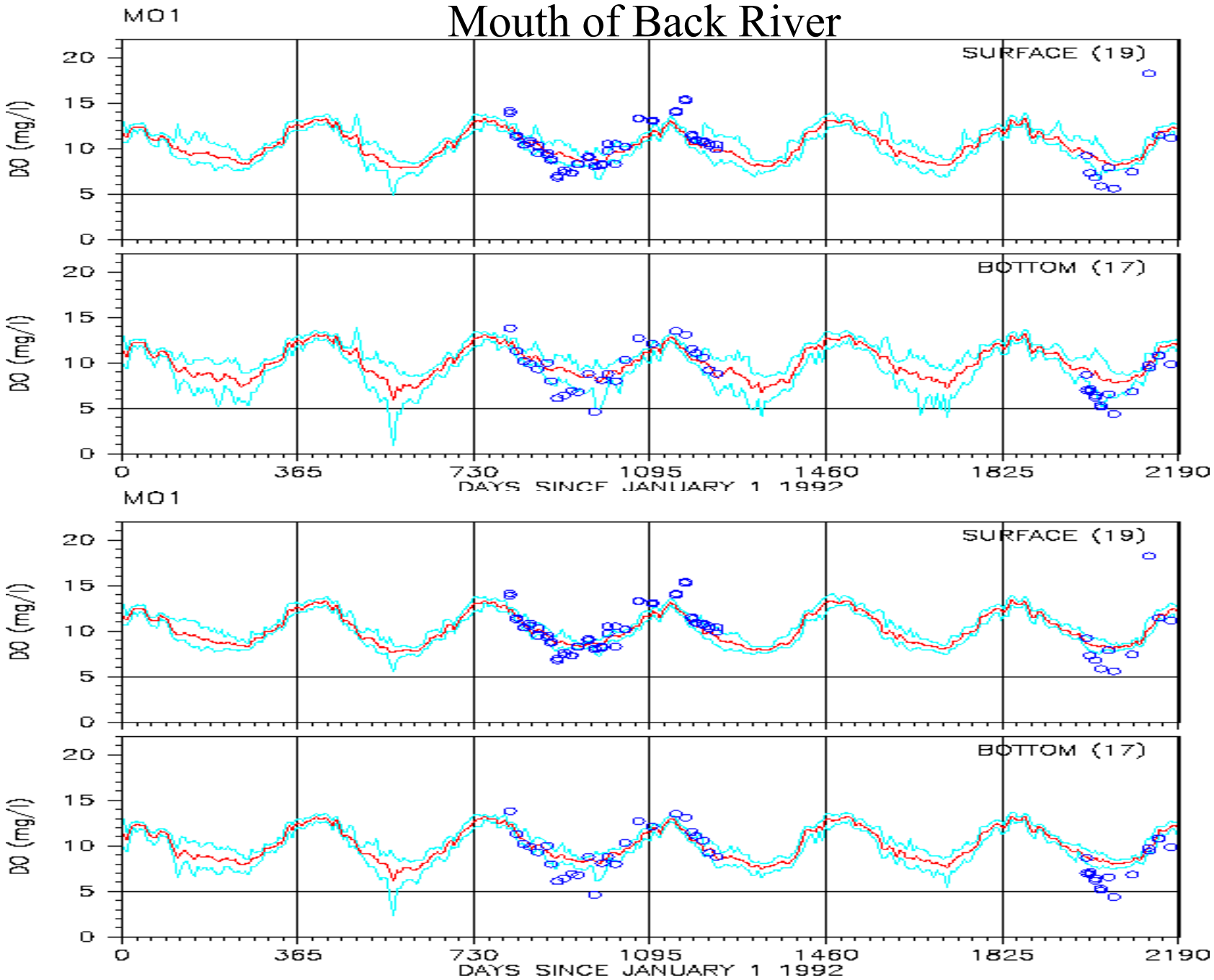
Back River

MDE

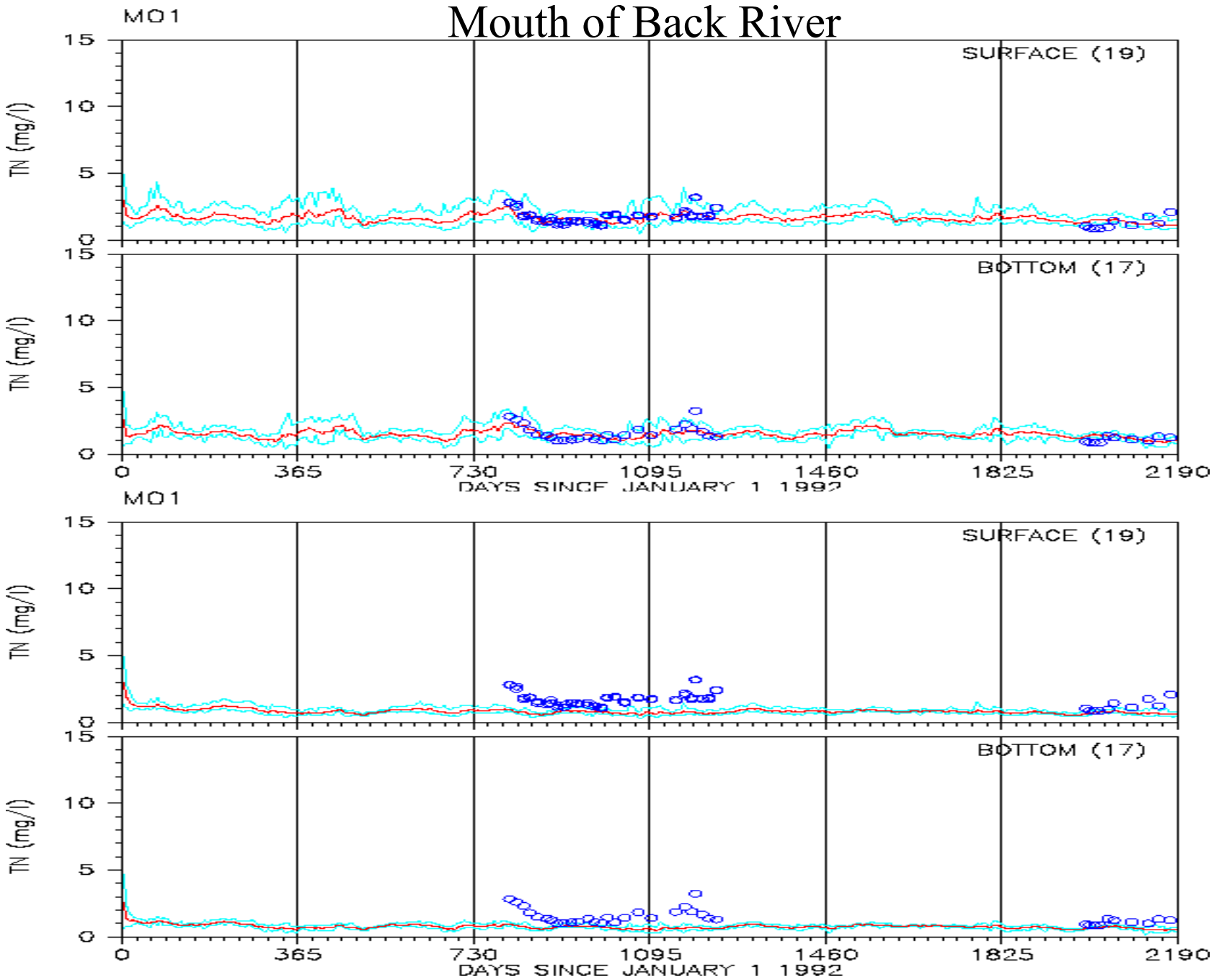
Mouth of Back River



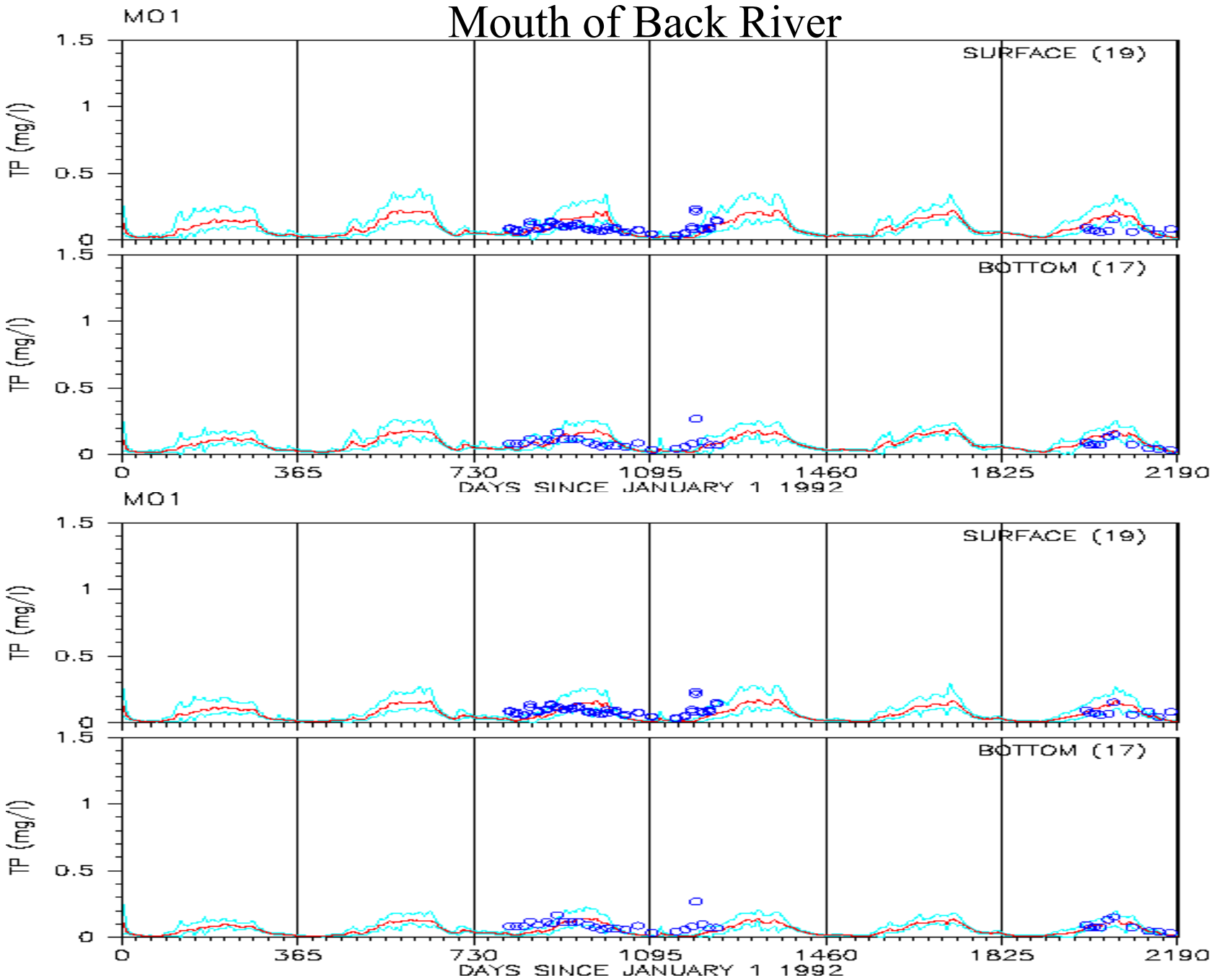
Mouth of Back River



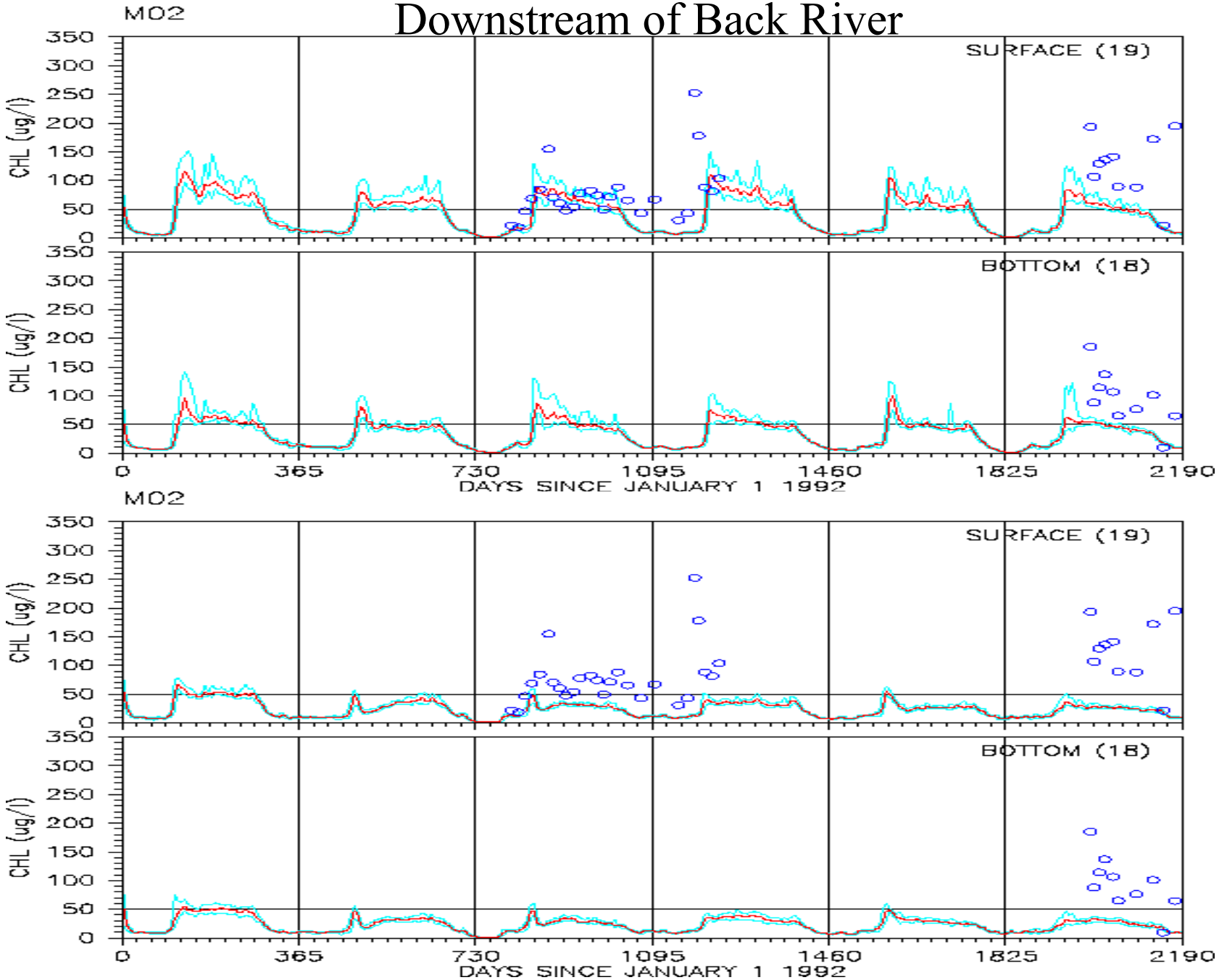
Mouth of Back River



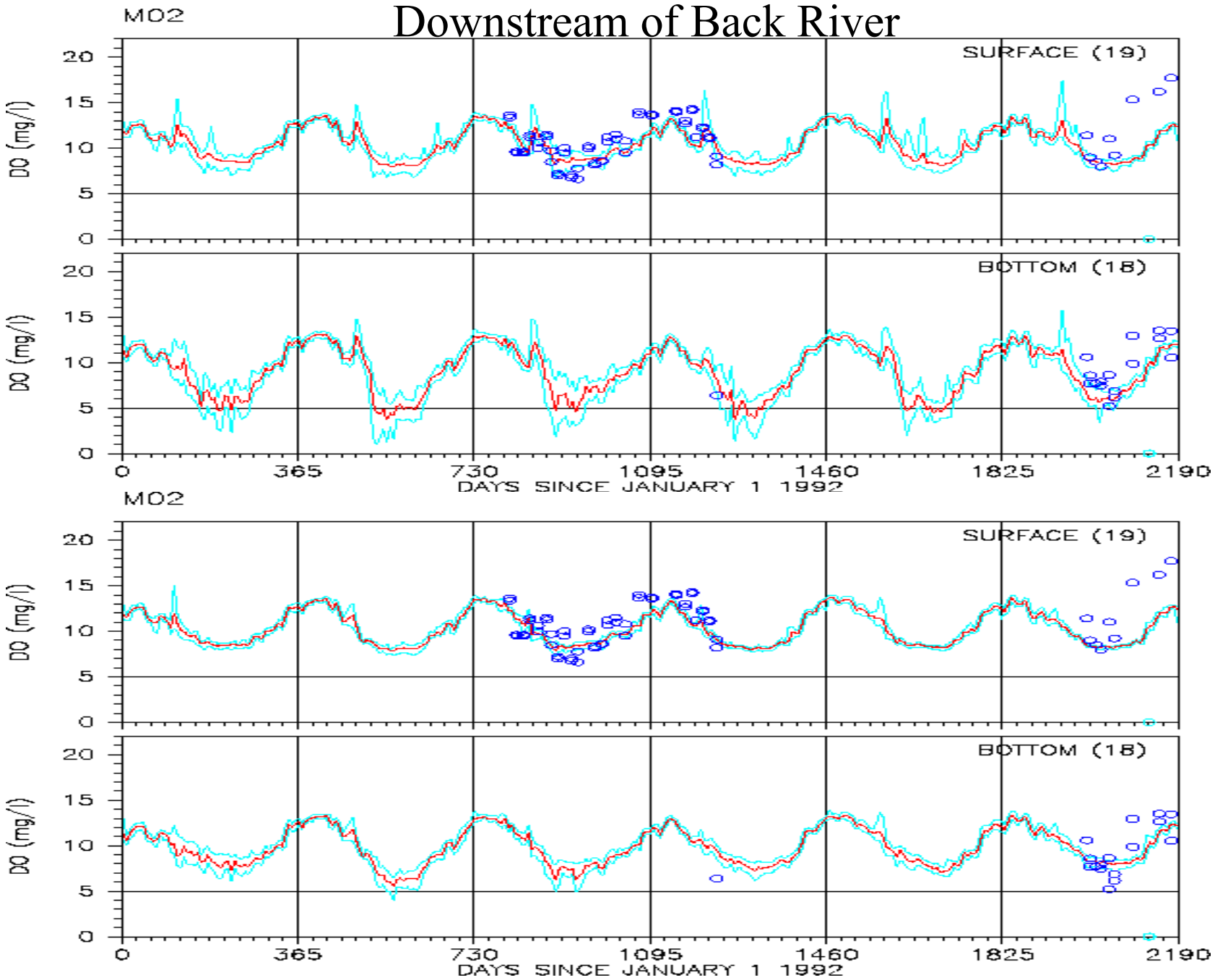
Mouth of Back River



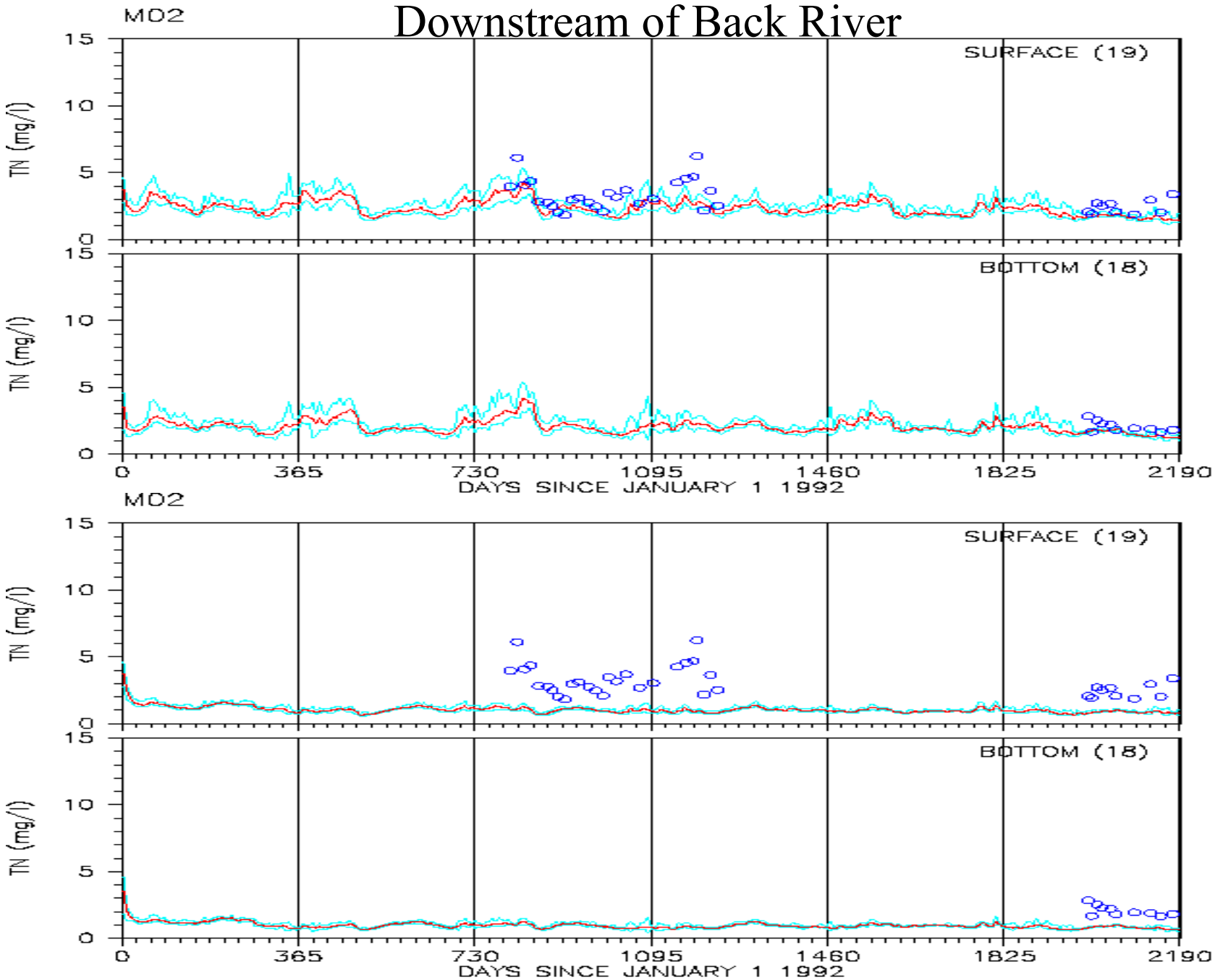
Downstream of Back River



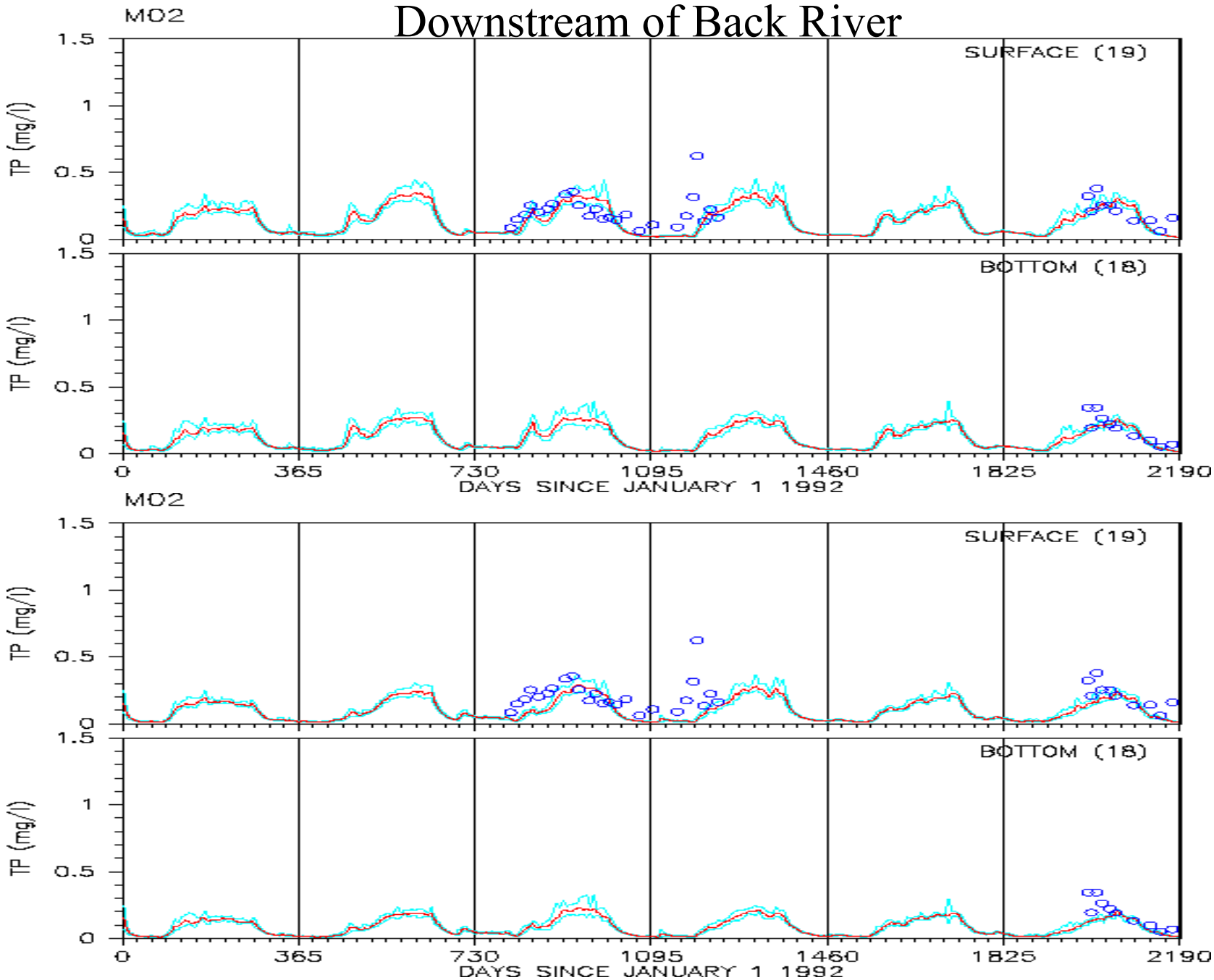
Downstream of Back River



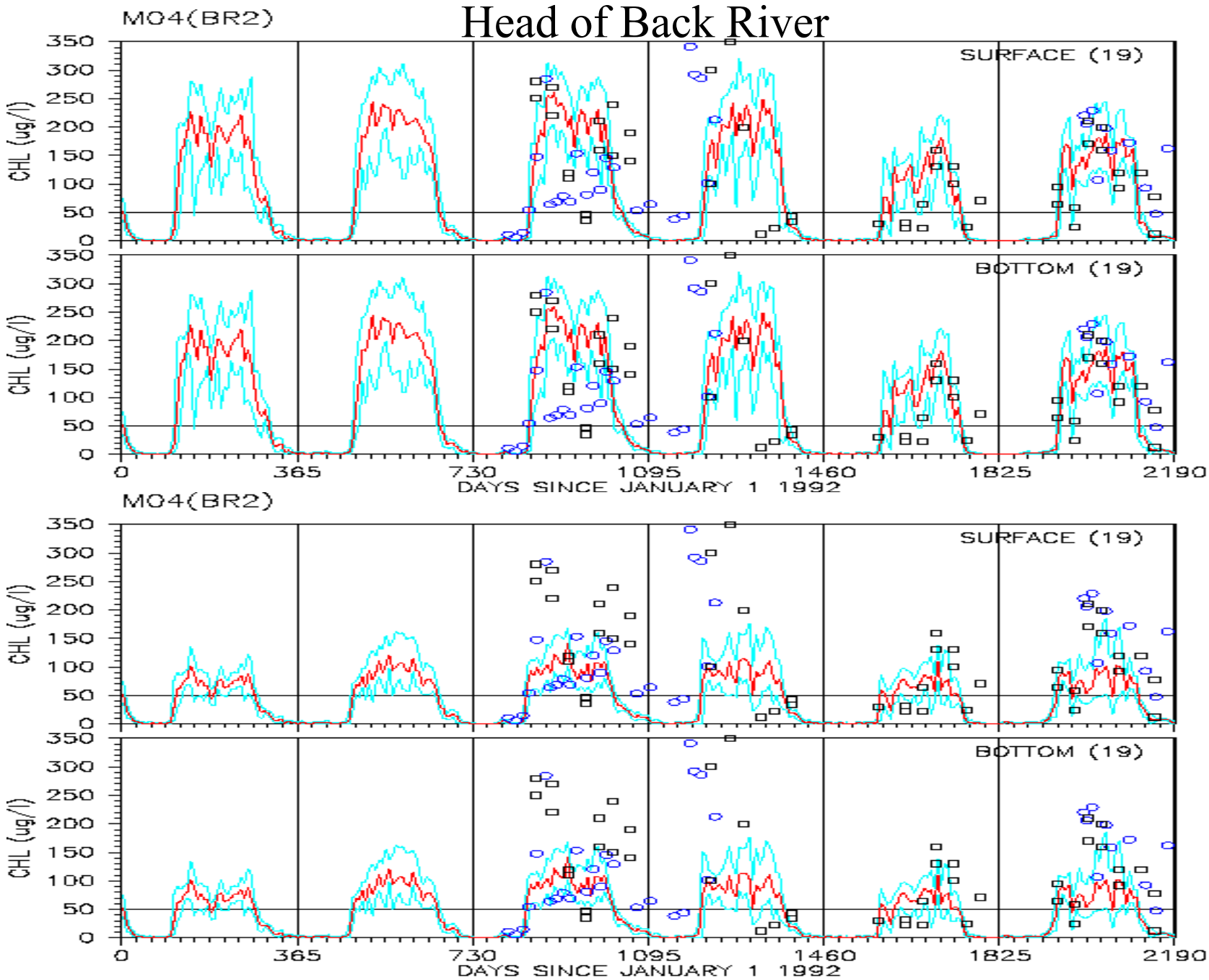
Downstream of Back River



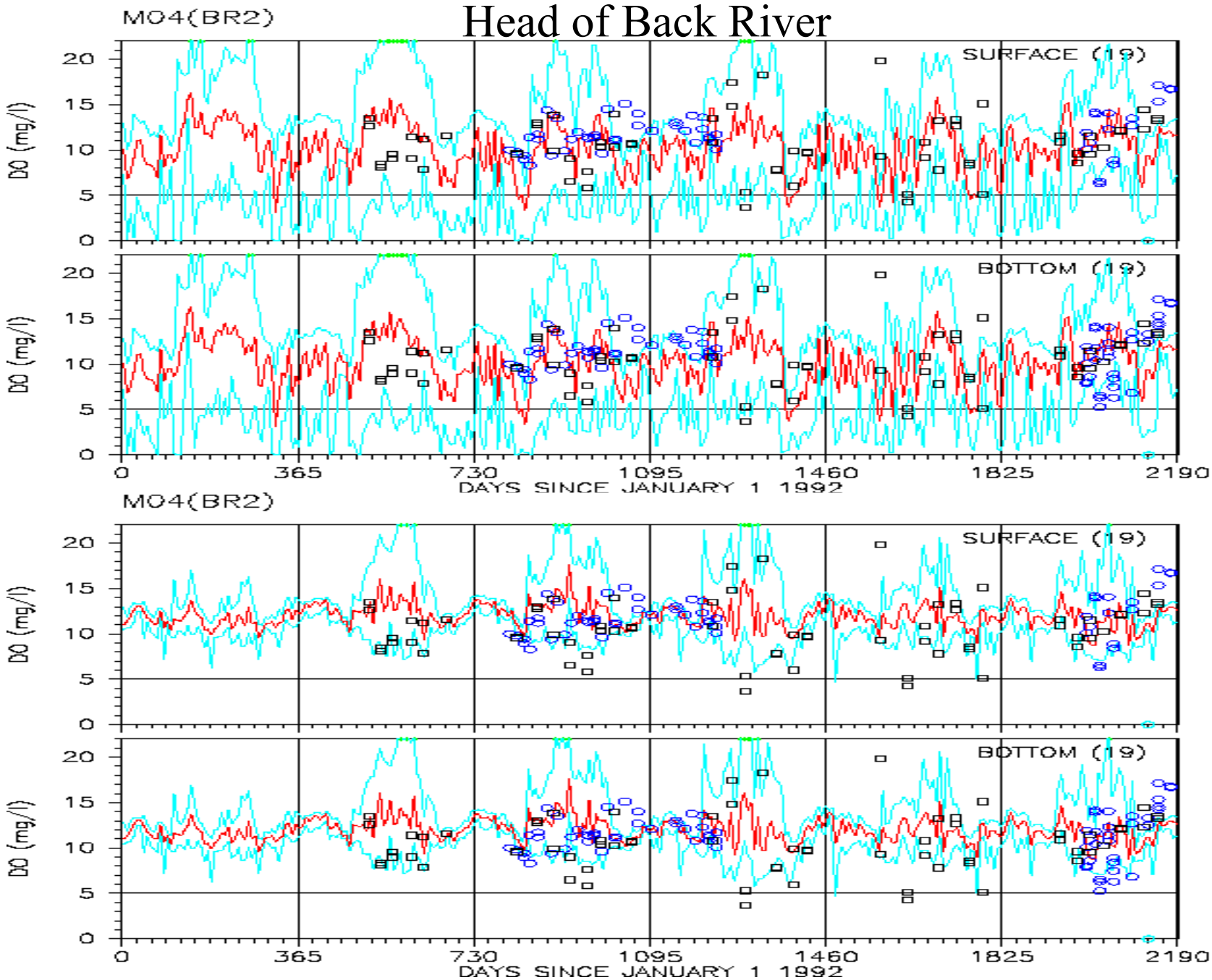
Downstream of Back River



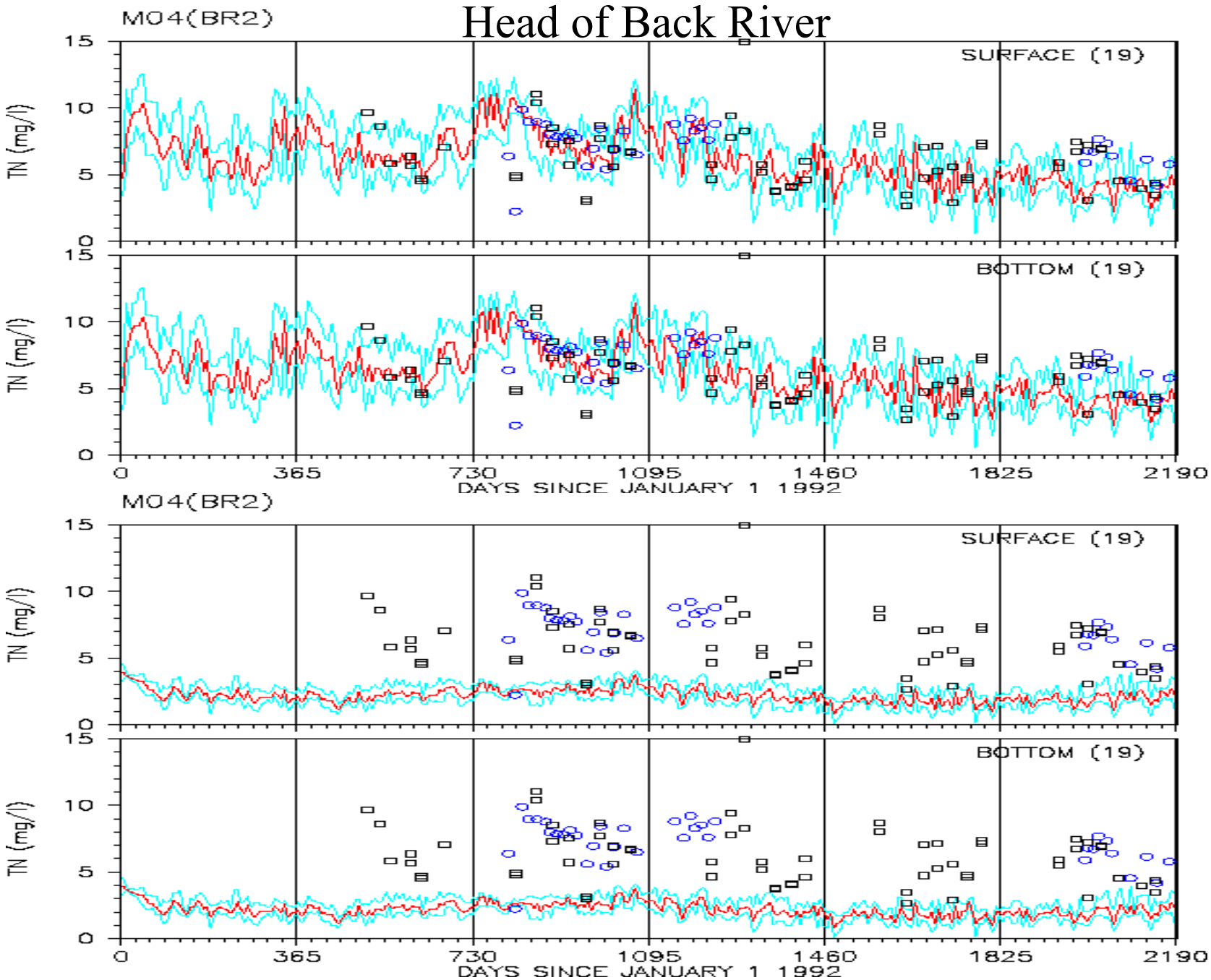
Head of Back River



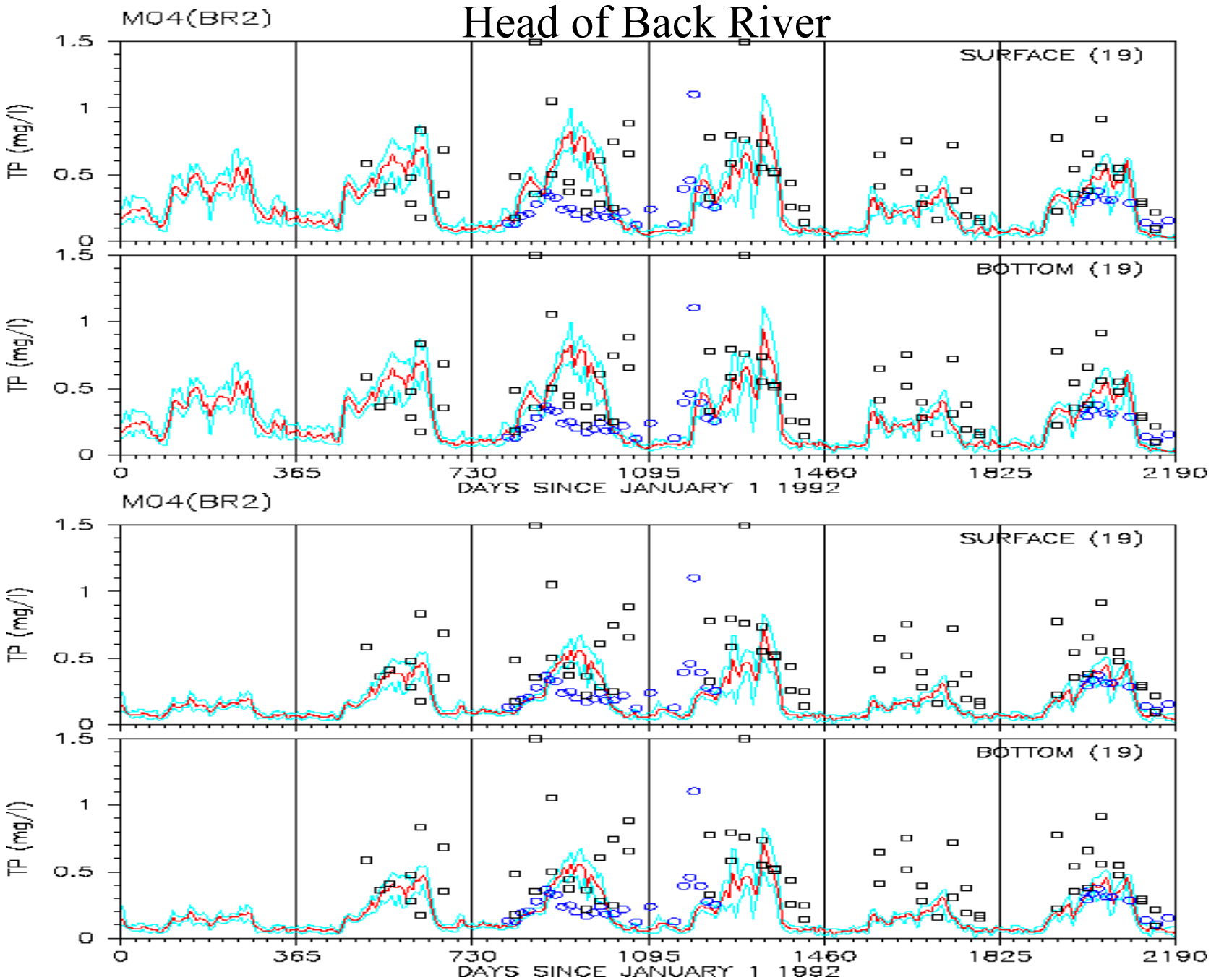
Head of Back River



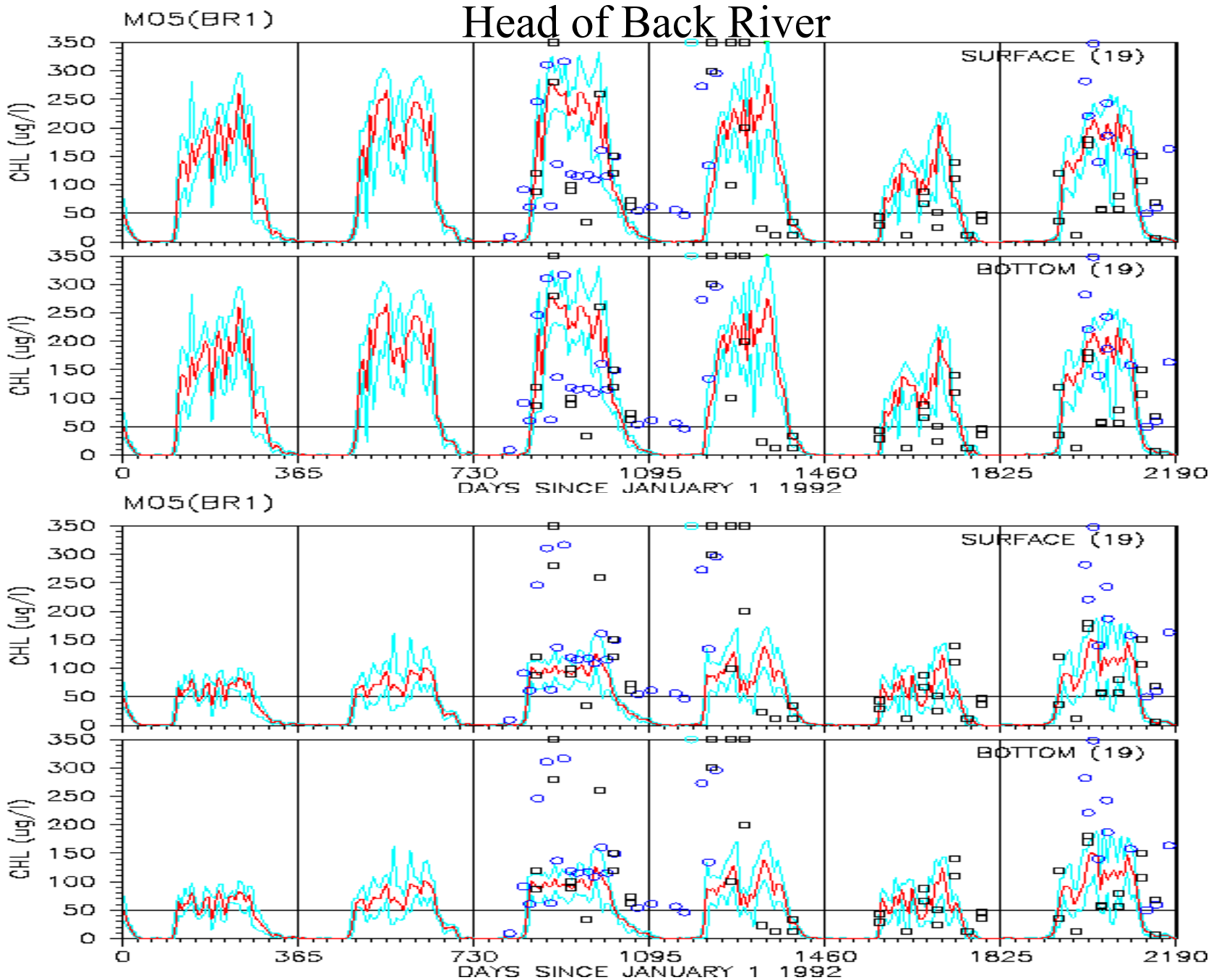
Head of Back River



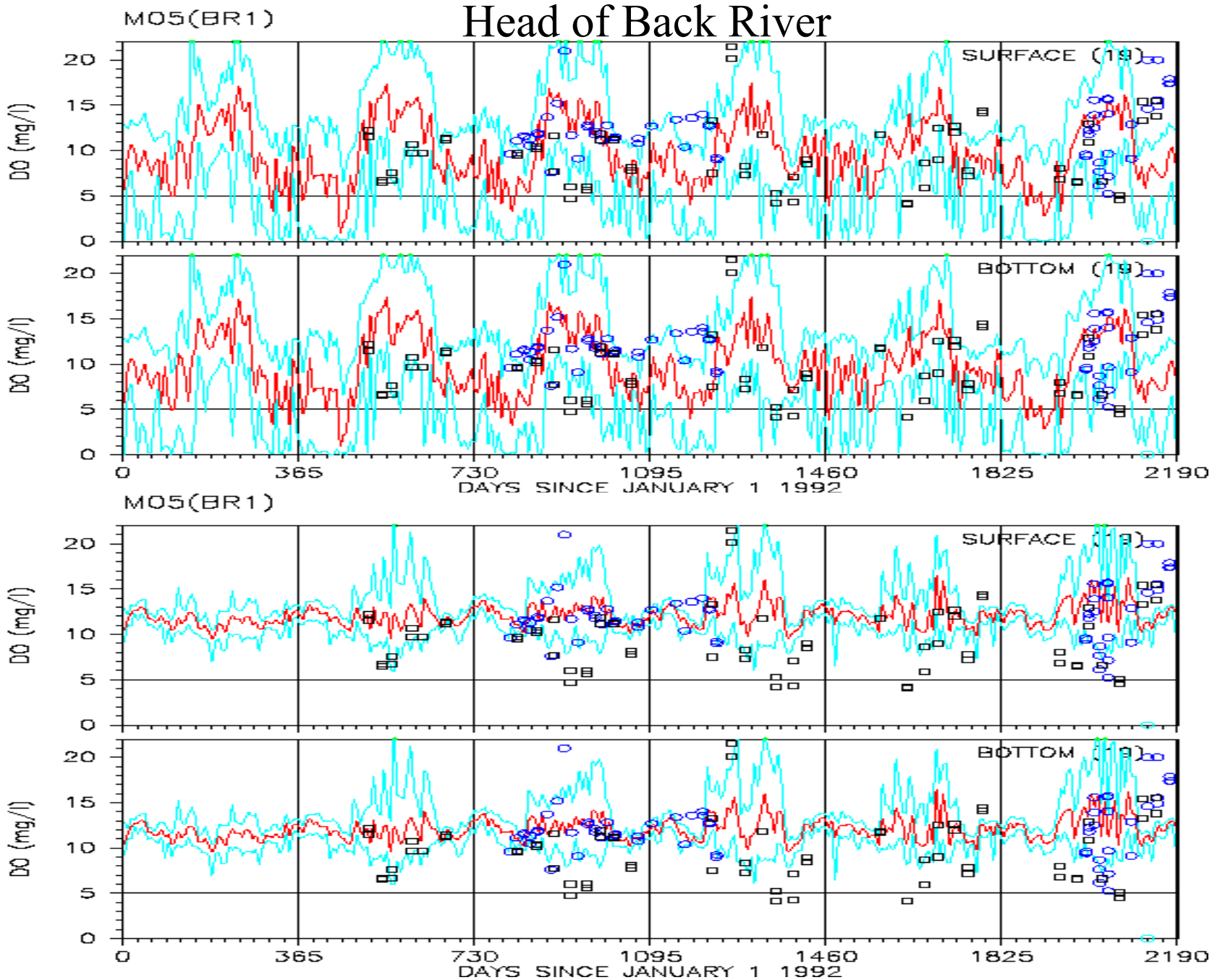
Head of Back River



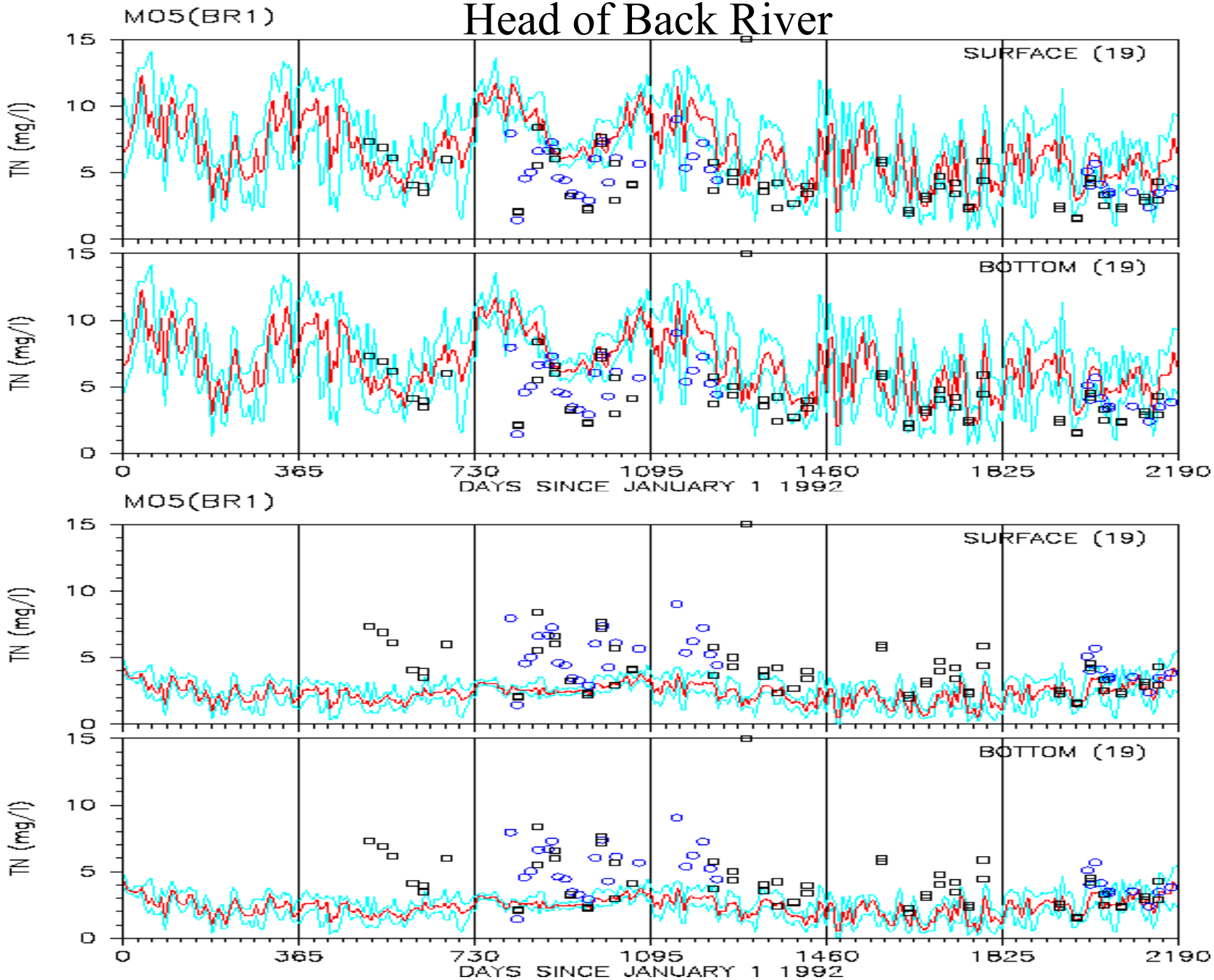
Head of Back River



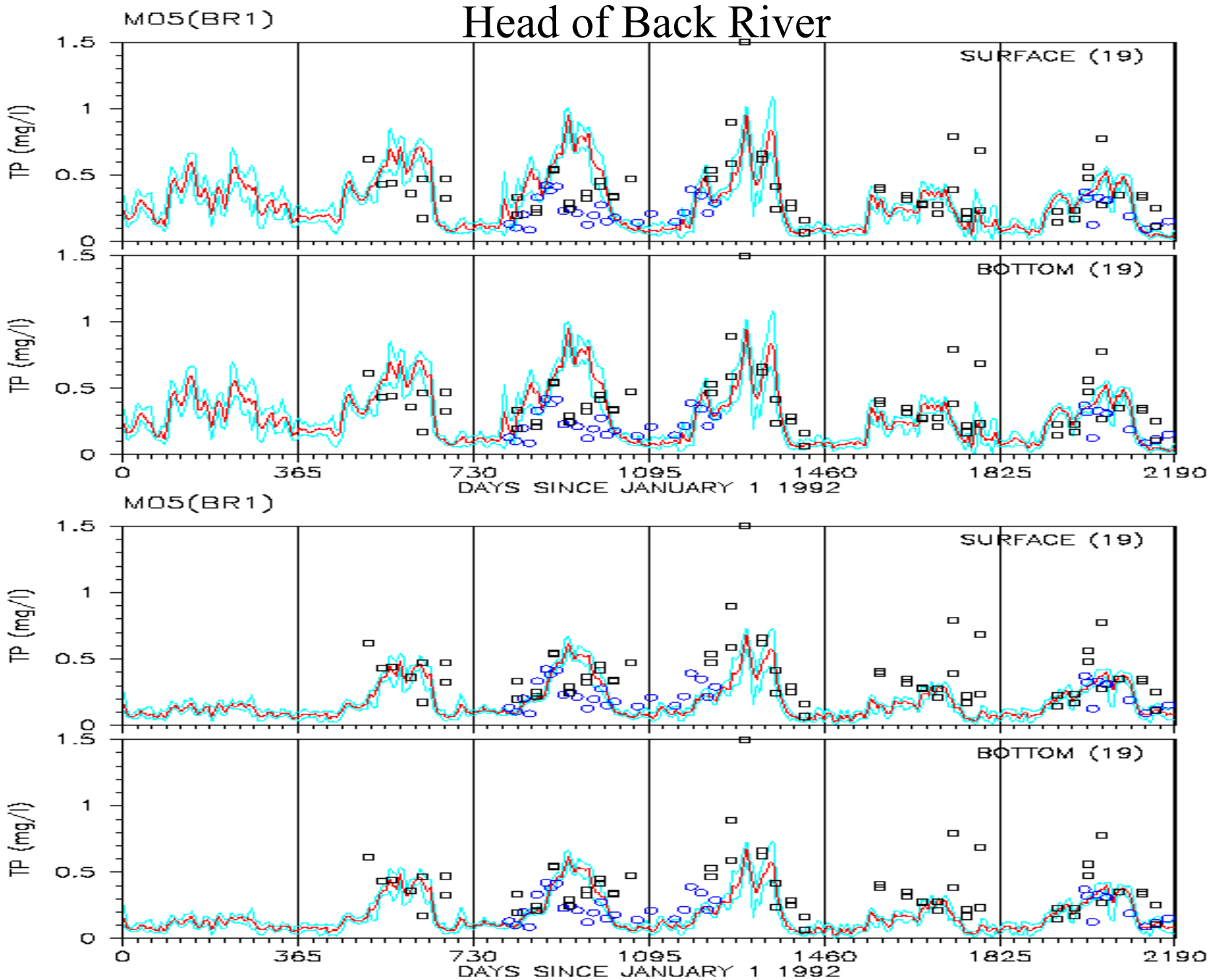
Head of Back River



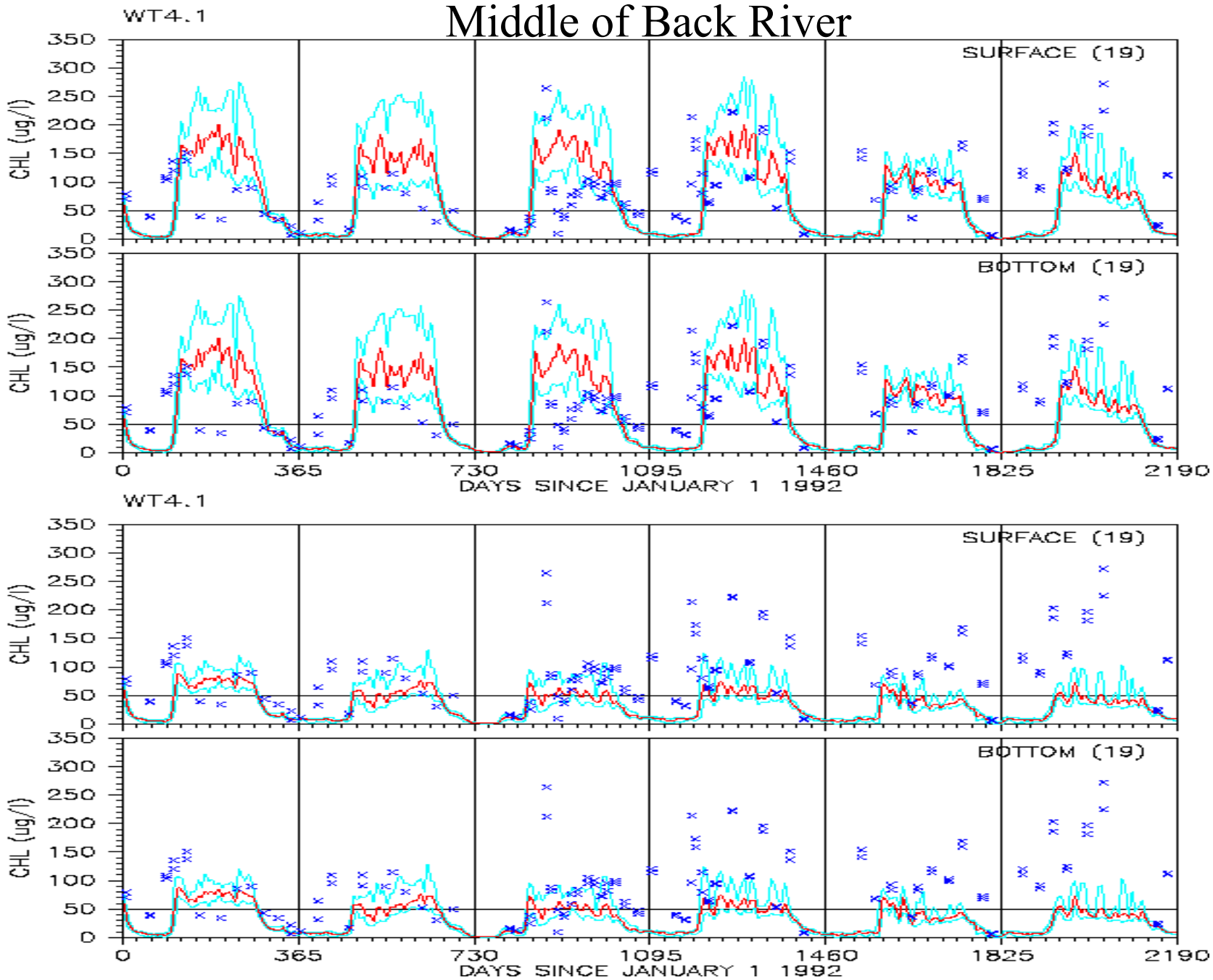
Head of Back River



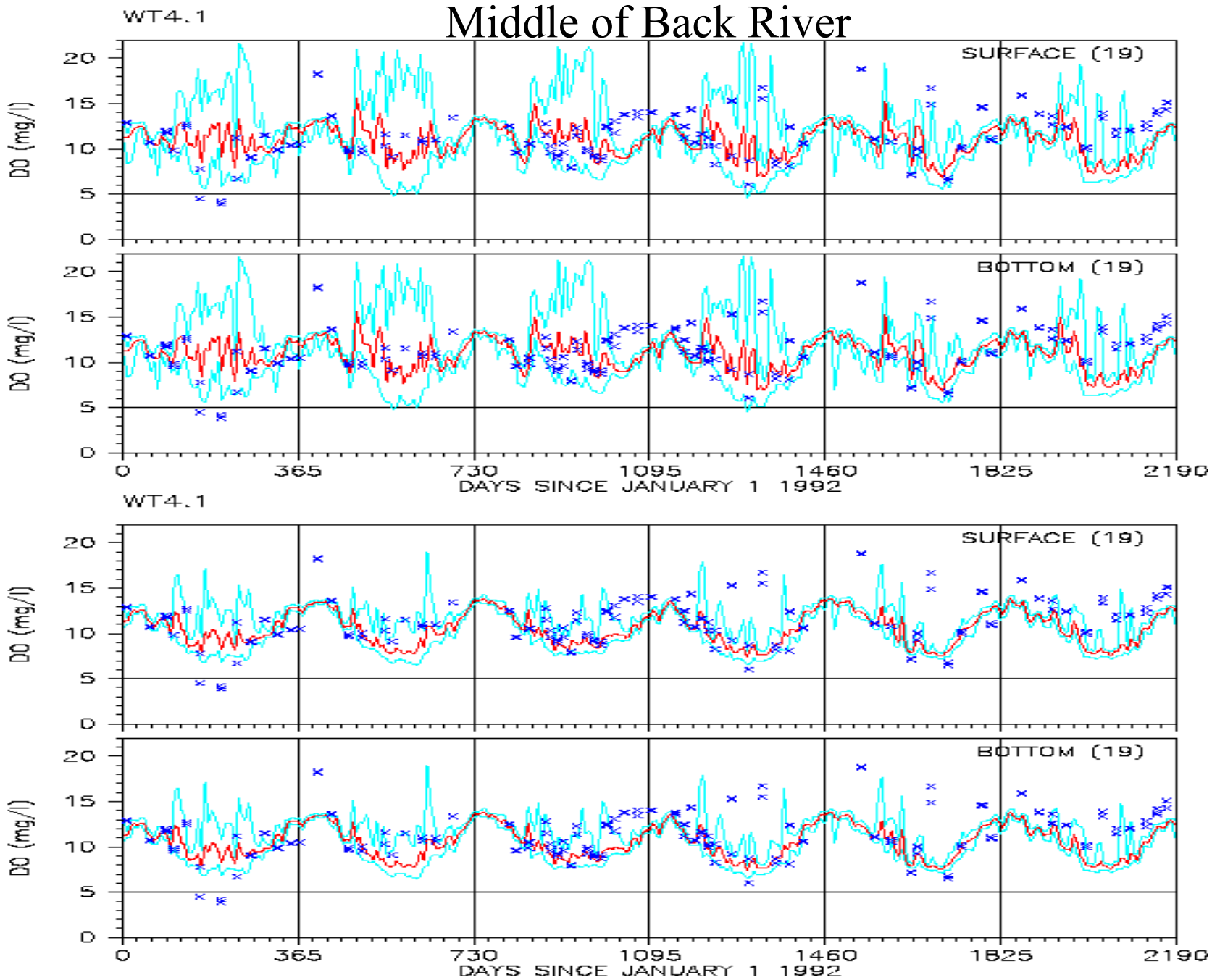
Head of Back River



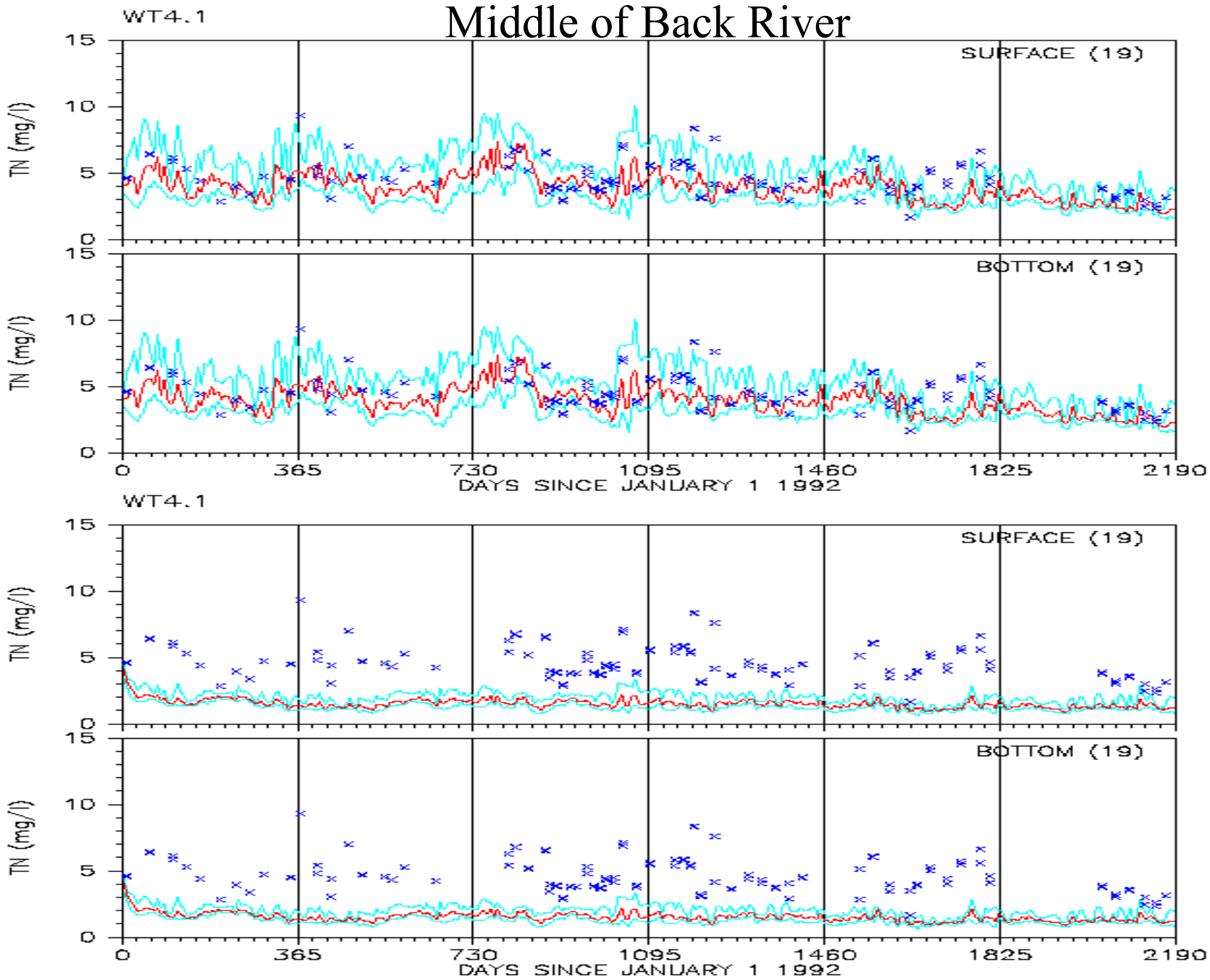
Middle of Back River



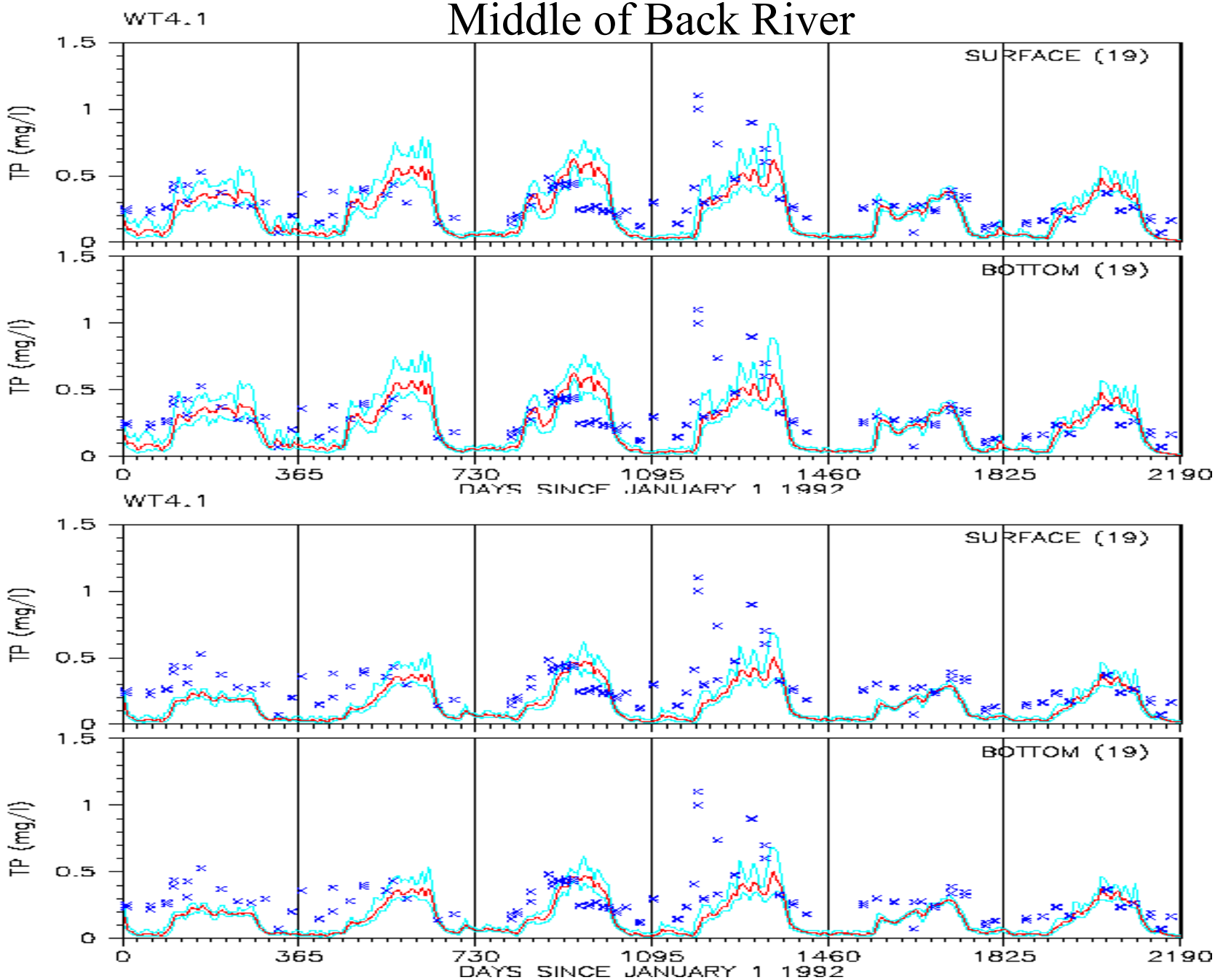
Middle of Back River



Middle of Back River



Middle of Back River



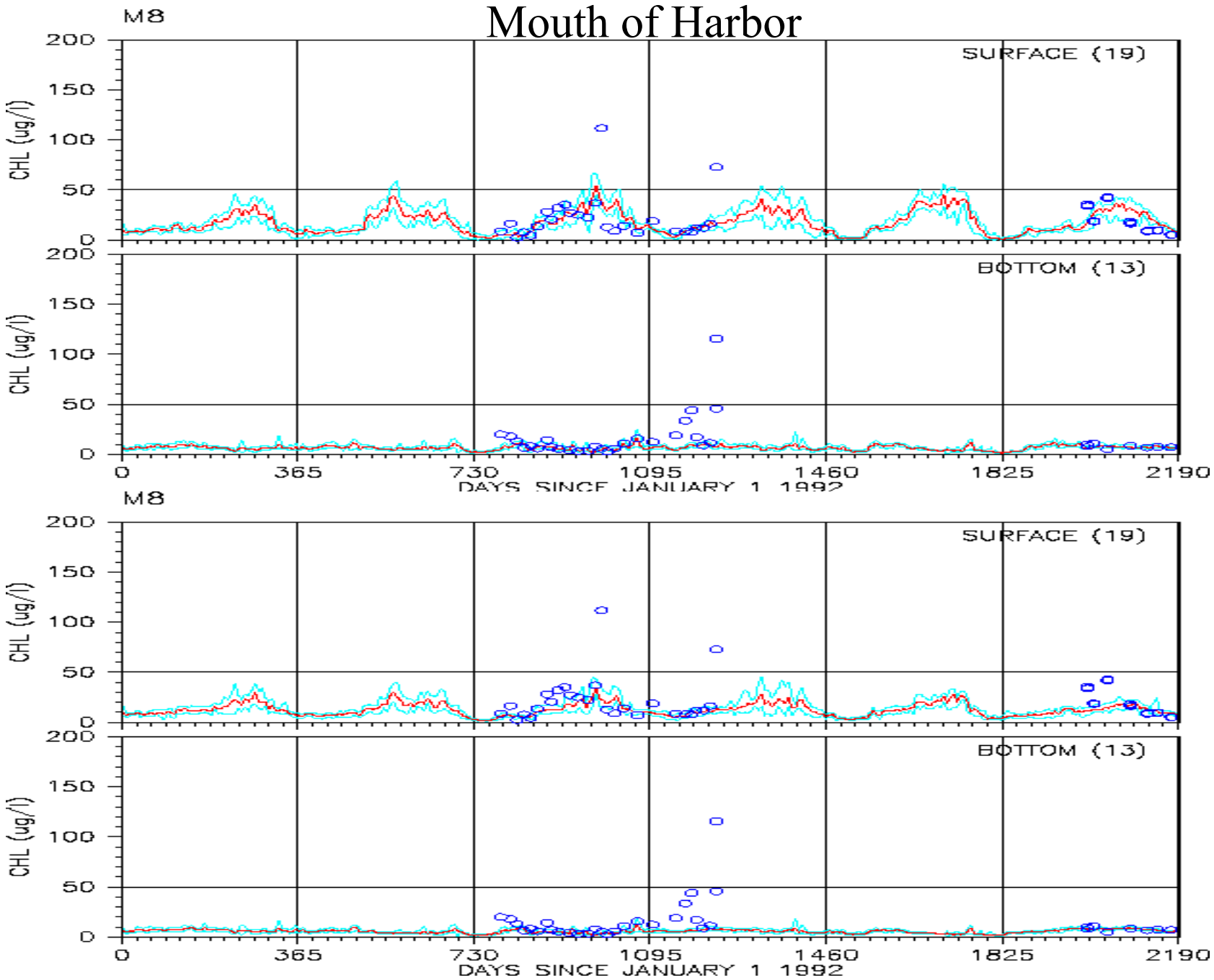
CBP Allocation Loads

SCENARIO RESULTS

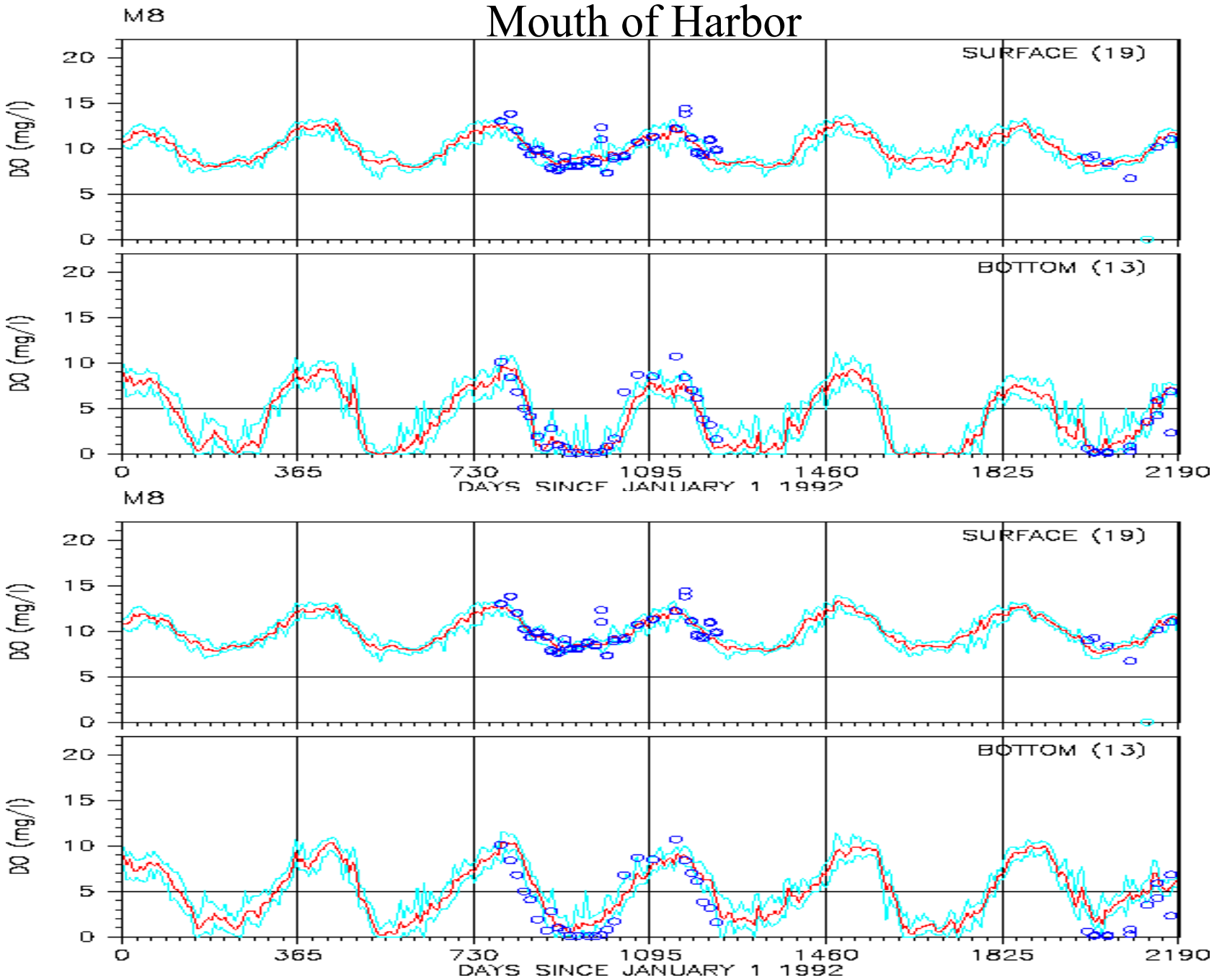
Baltimore Harbor

MDE

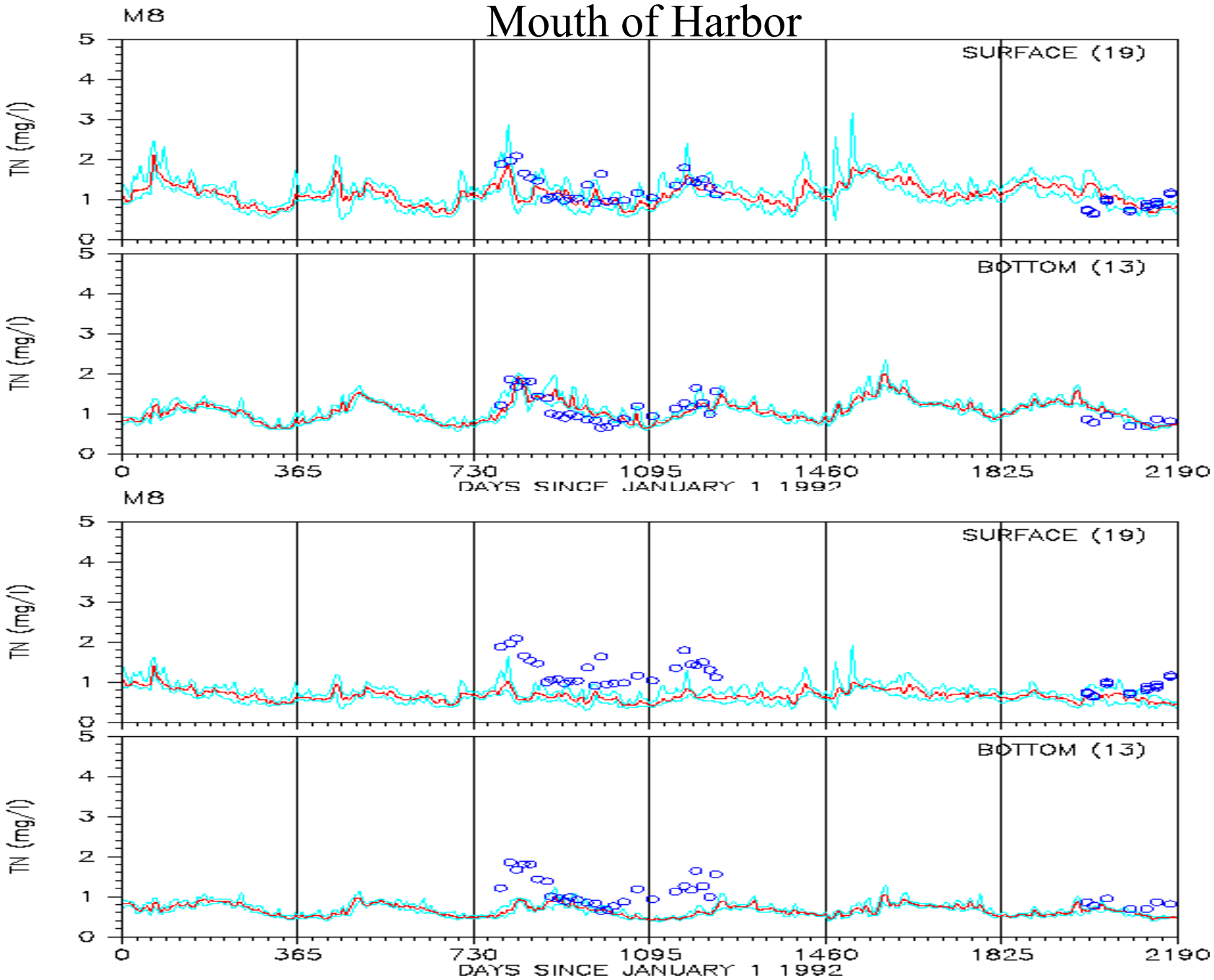
Mouth of Harbor



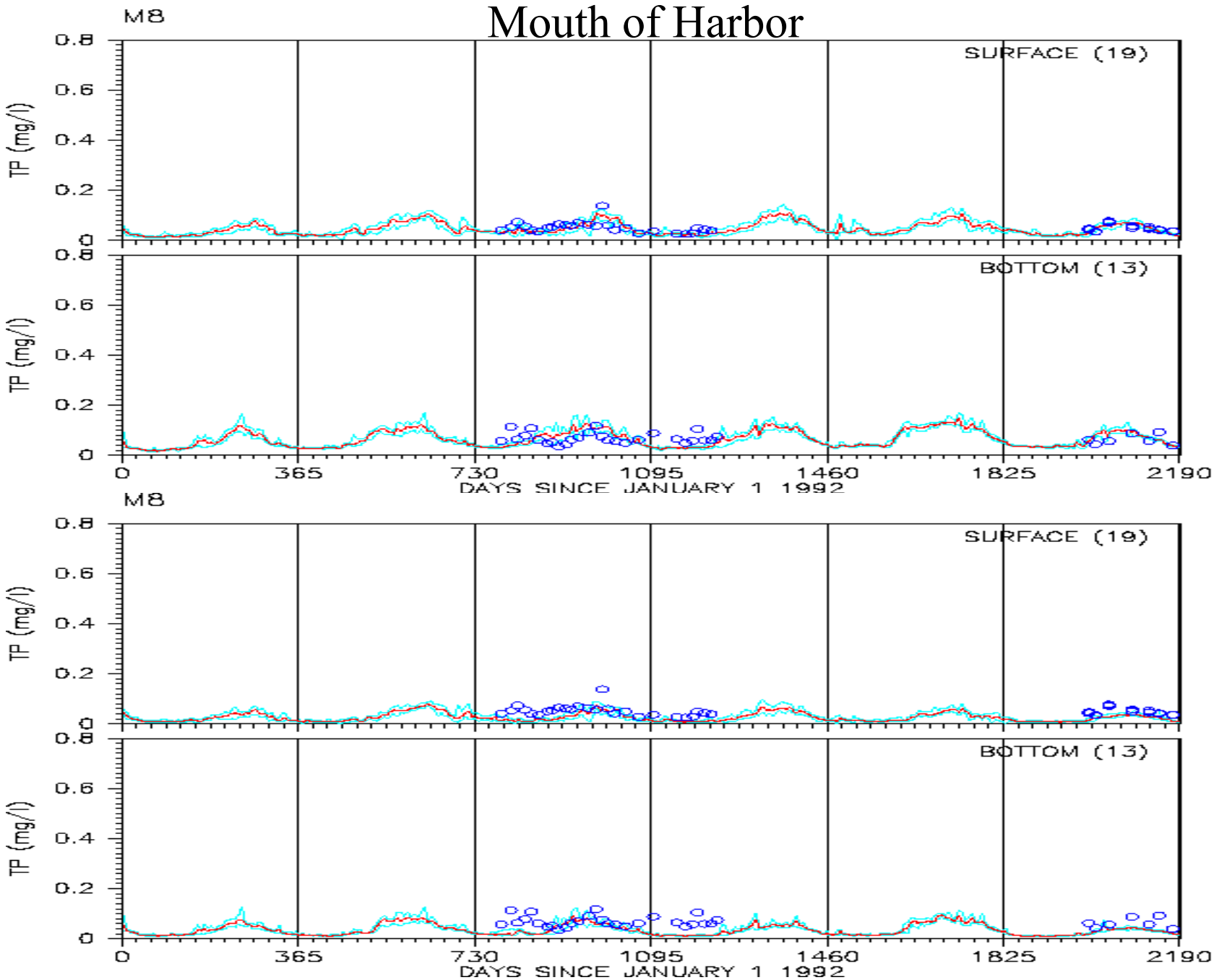
Mouth of Harbor



Mouth of Harbor



Mouth of Harbor



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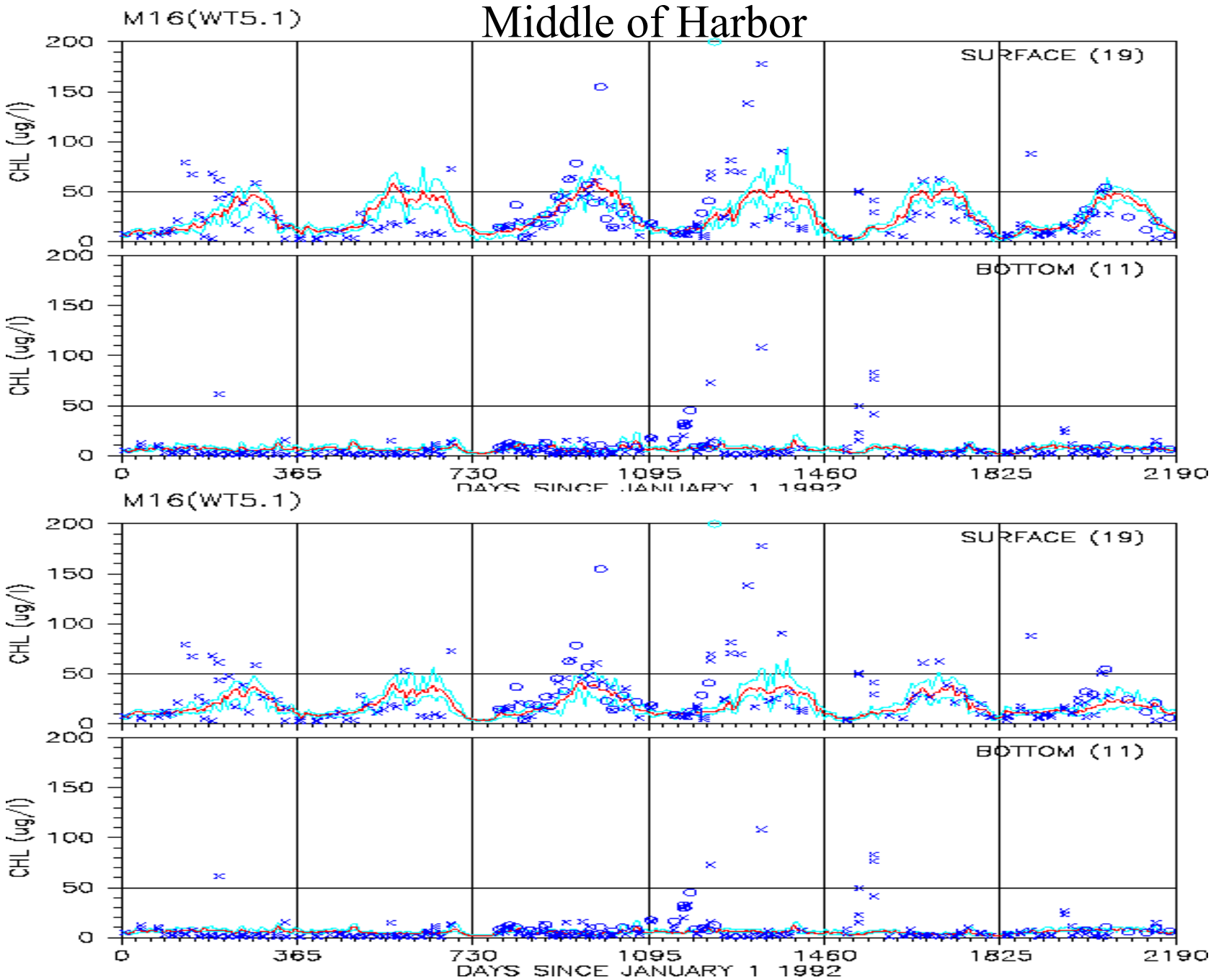

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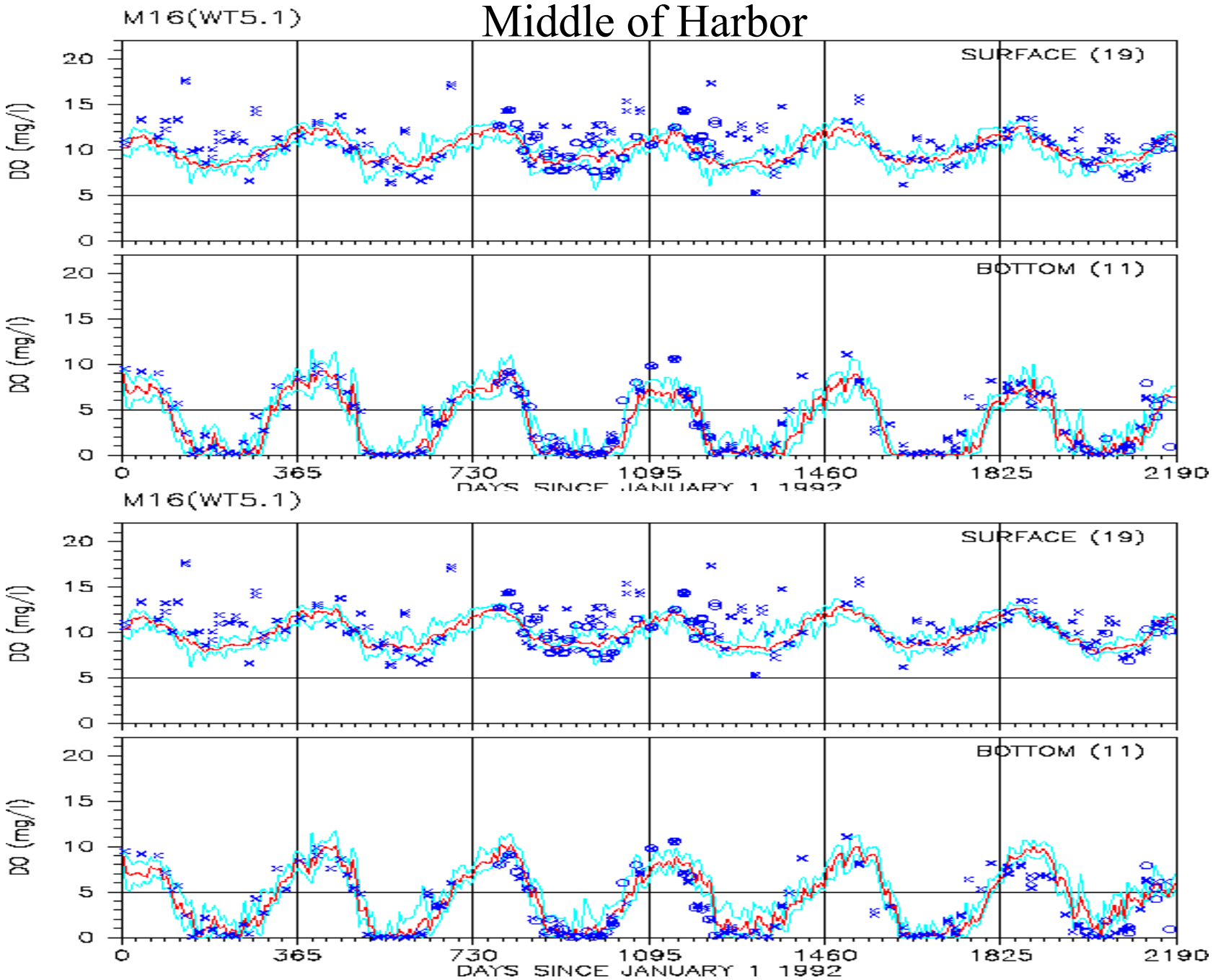

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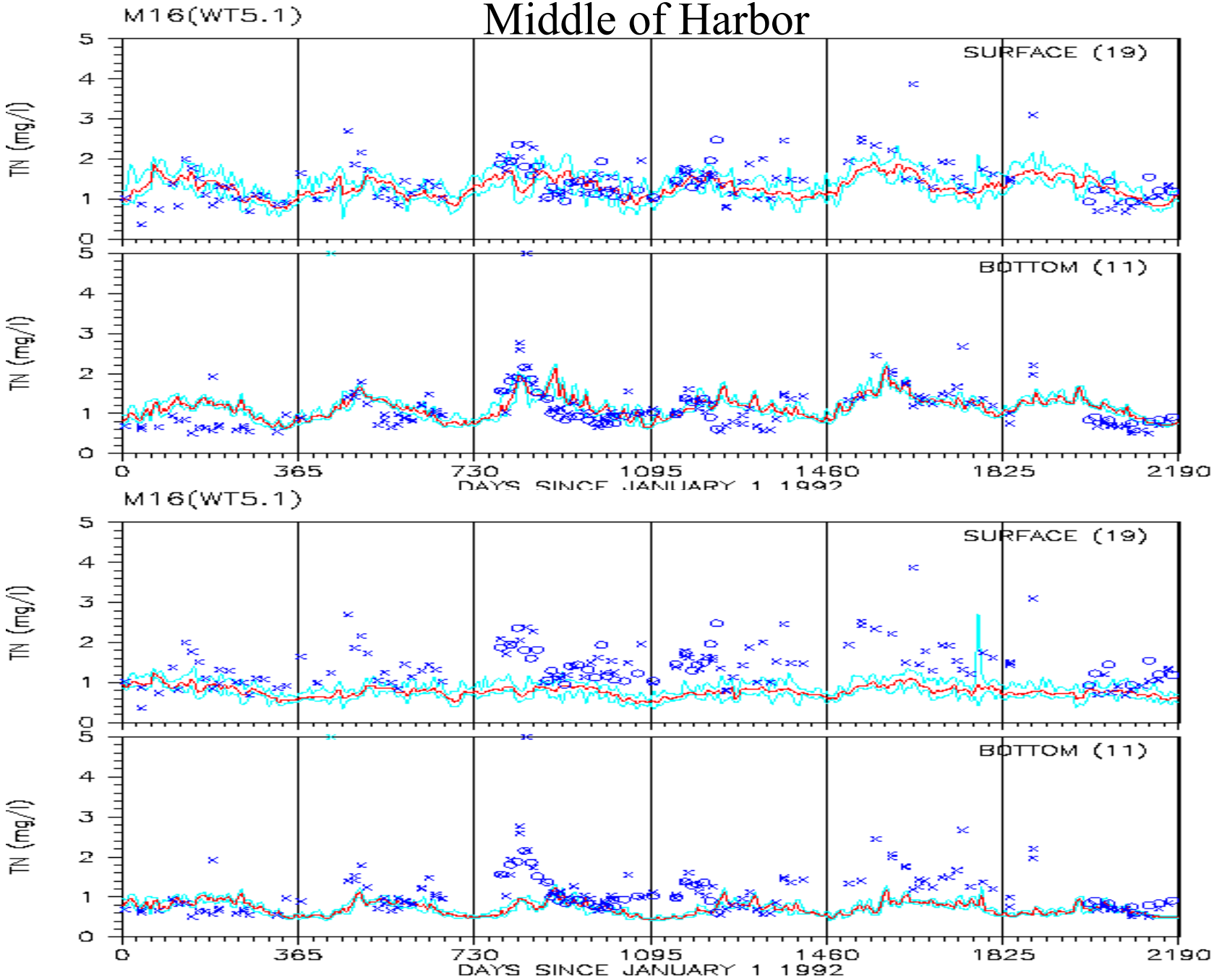

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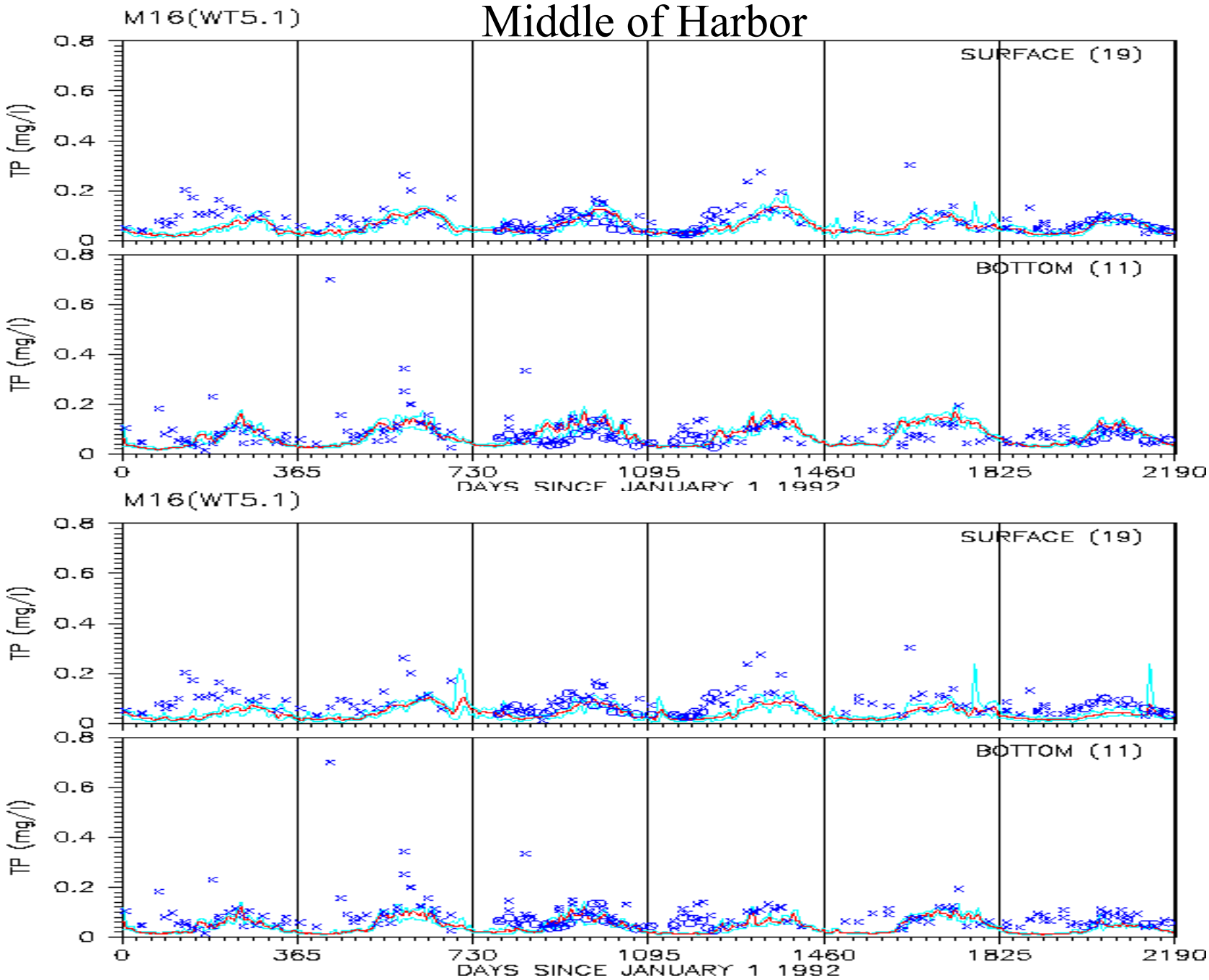

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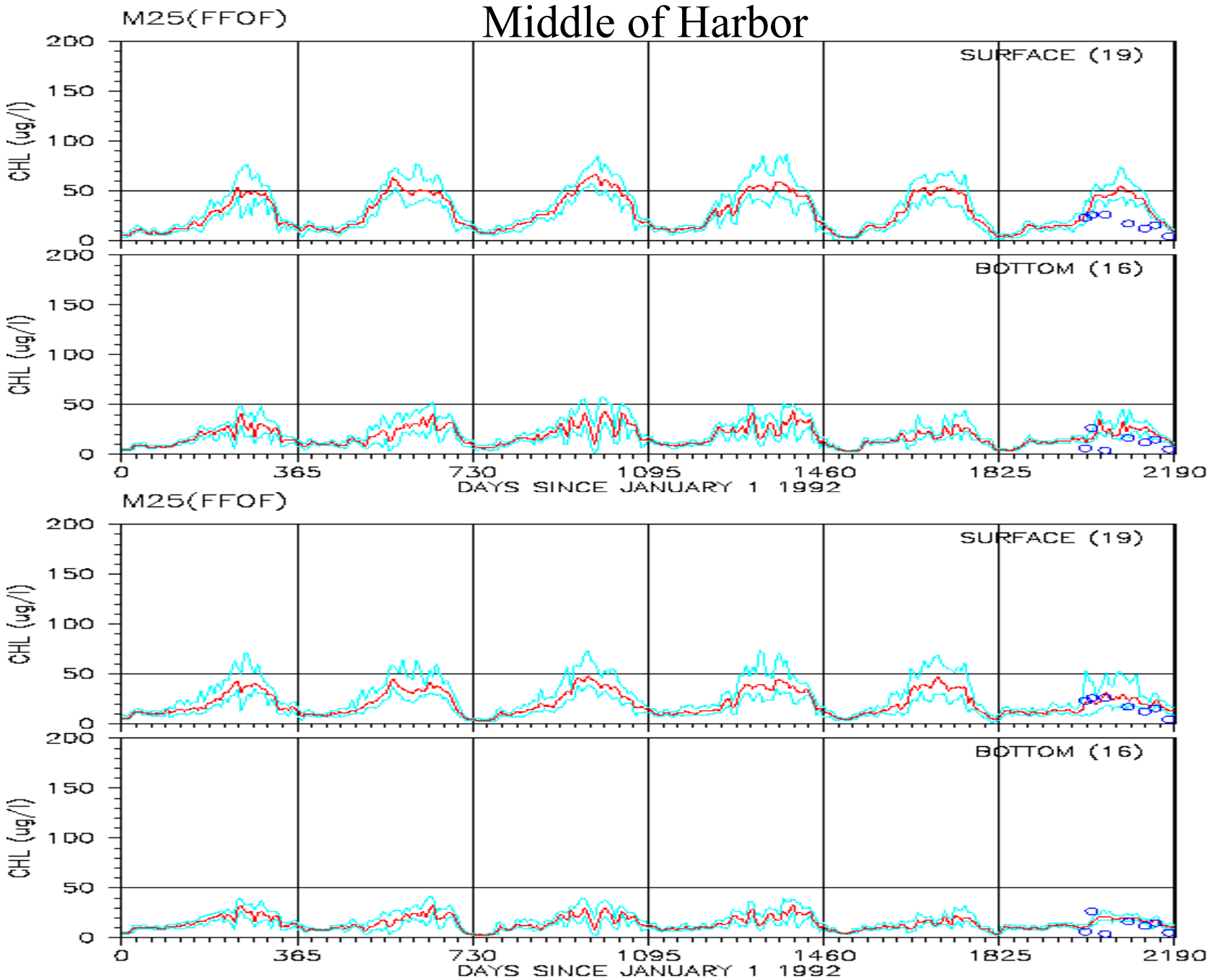

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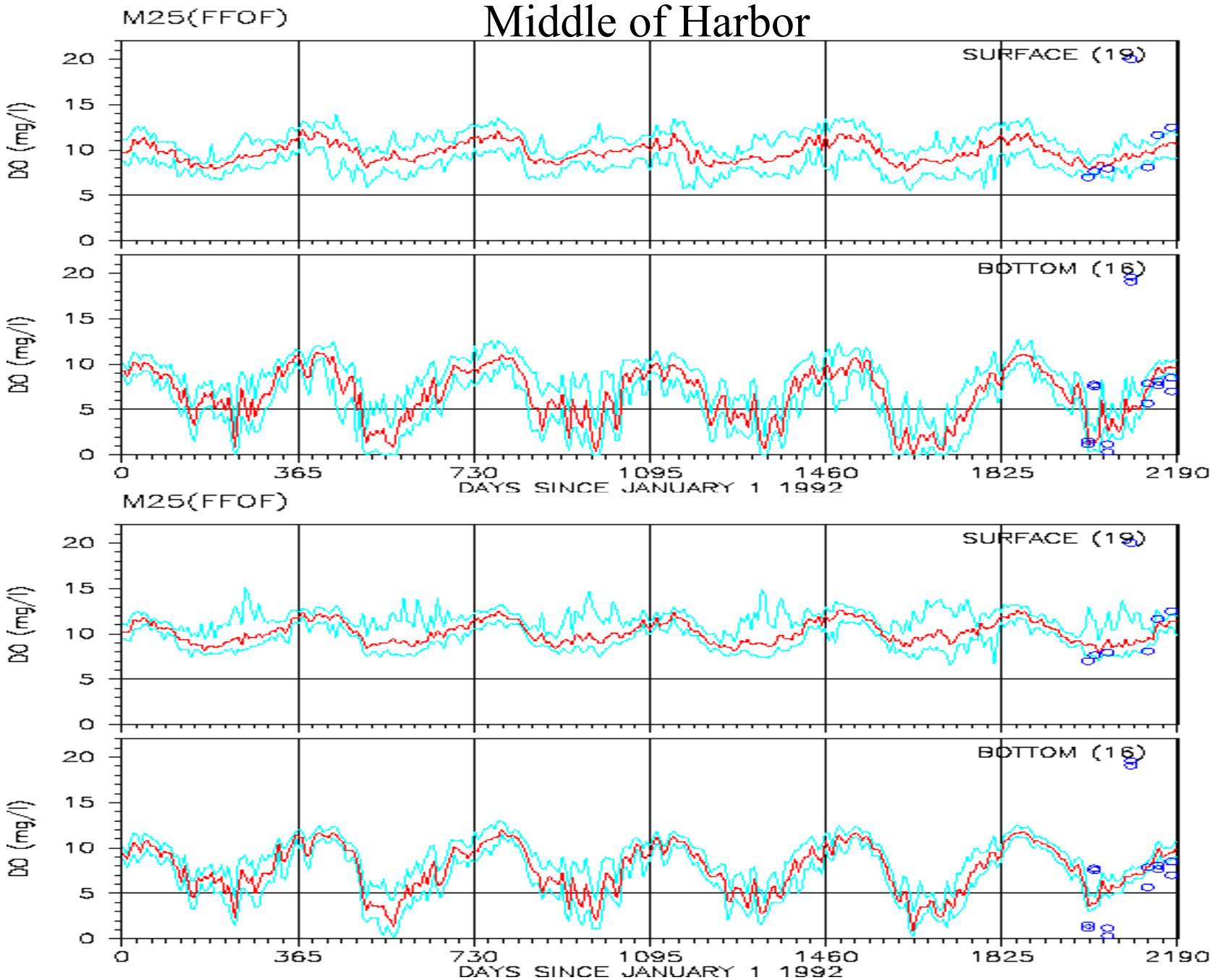

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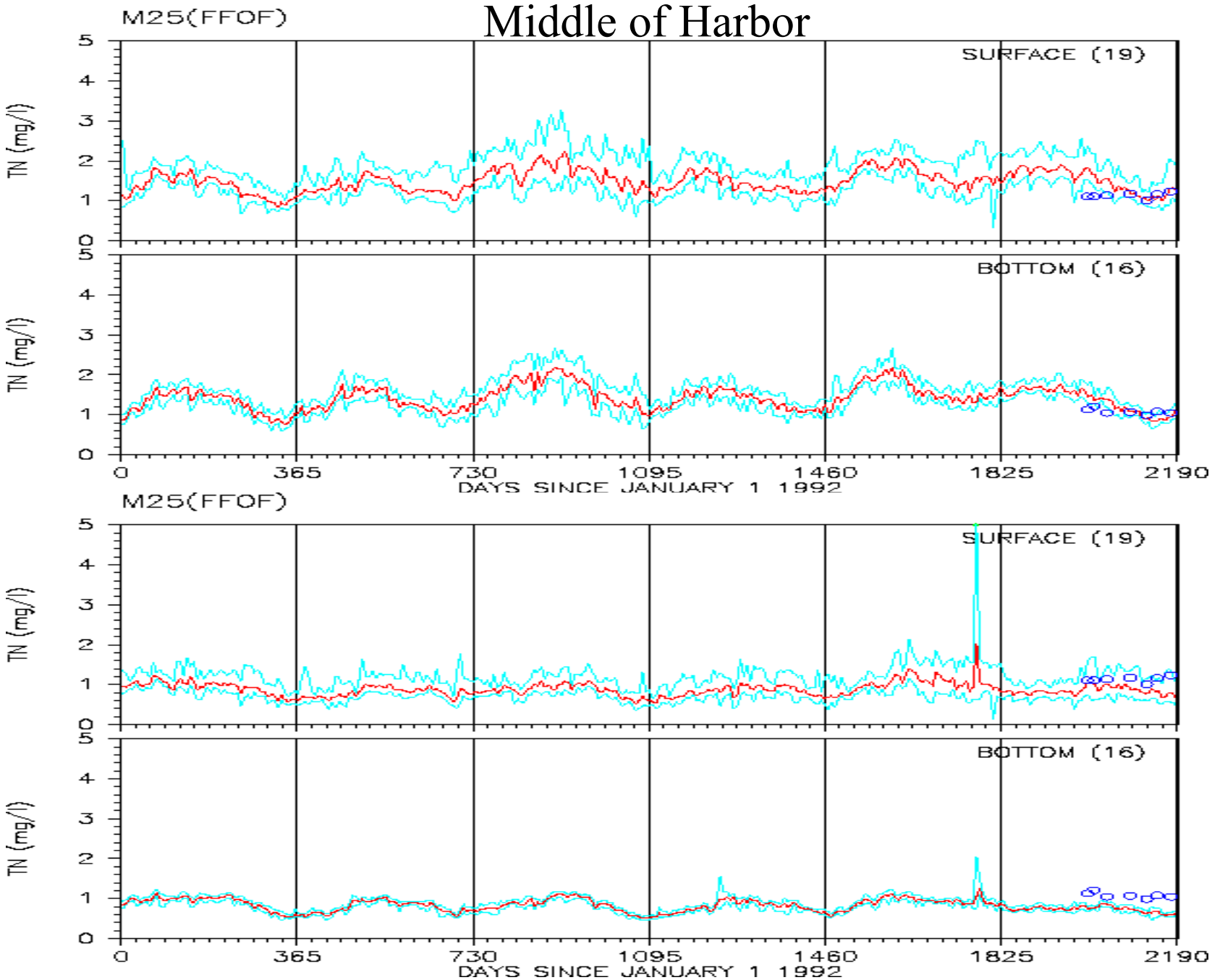

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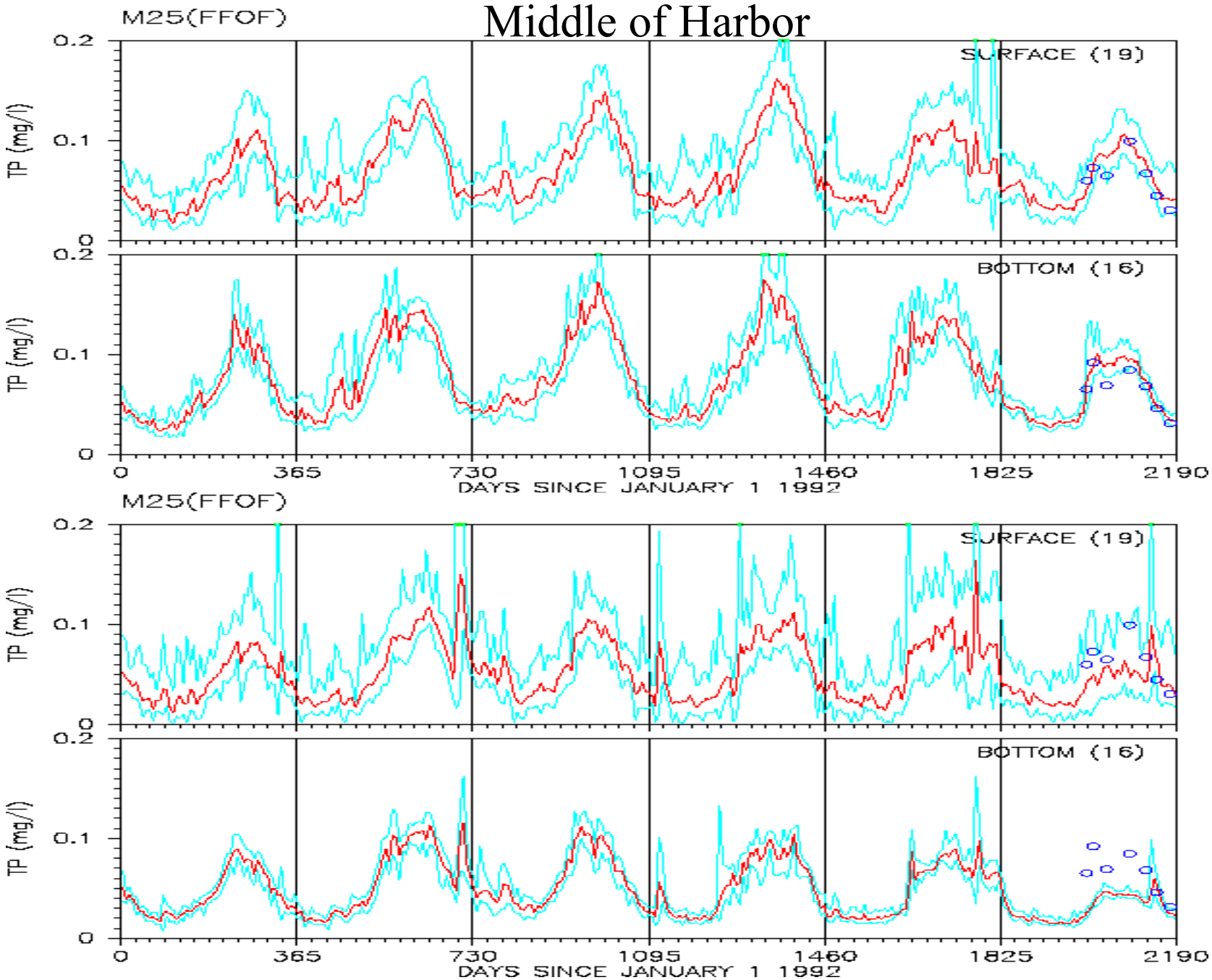
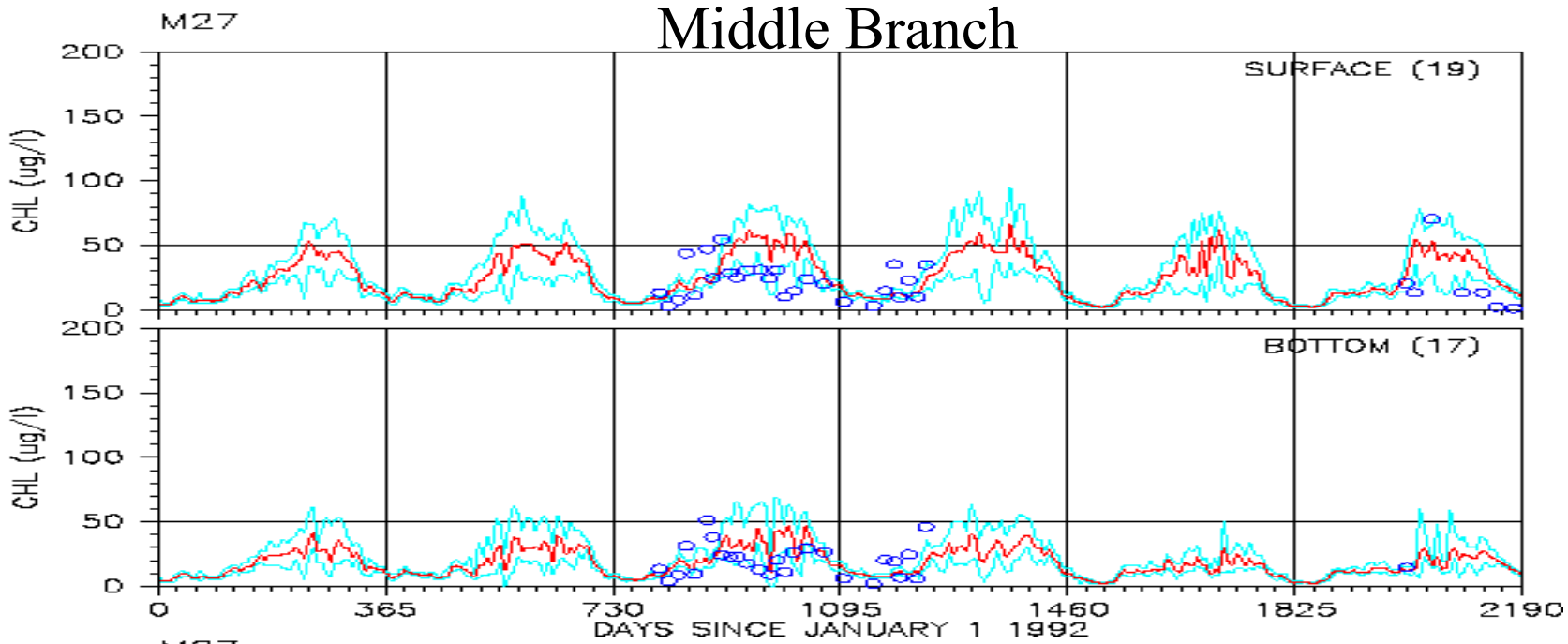
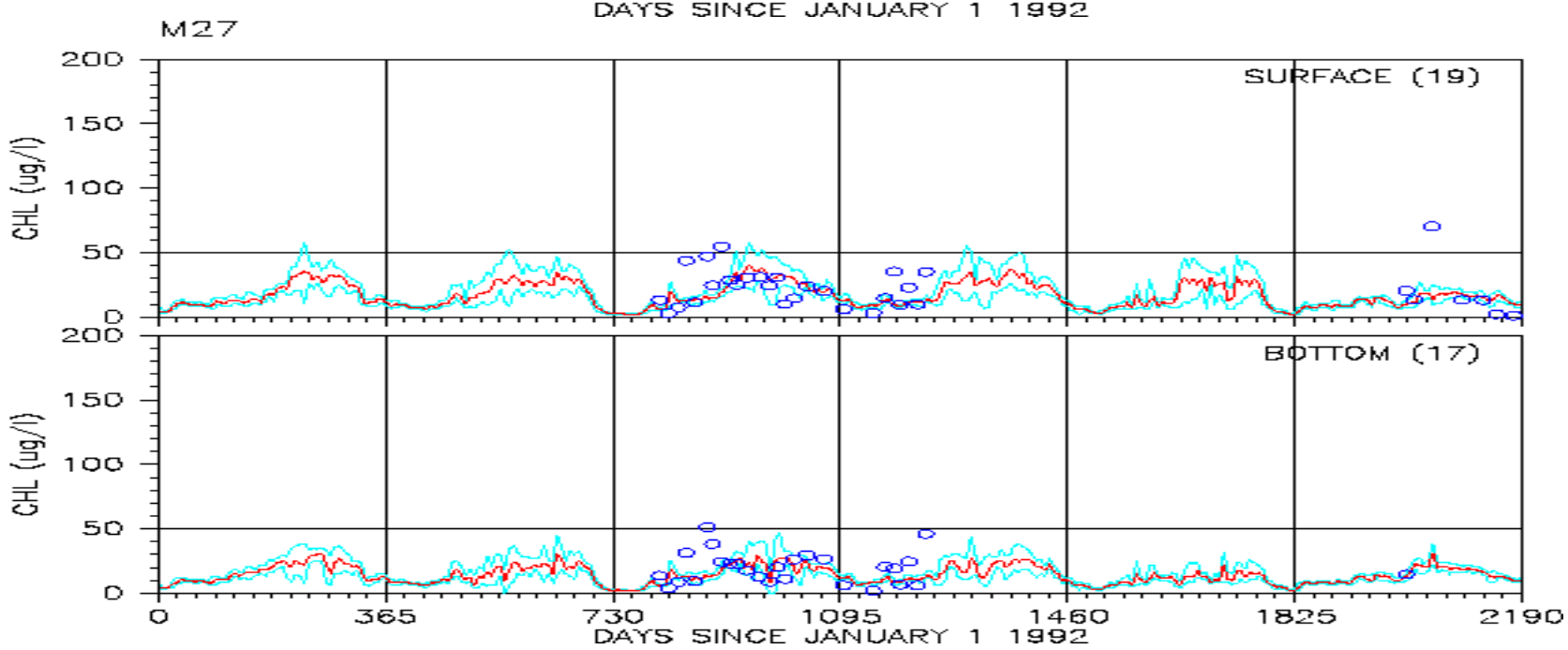


Middle Branch





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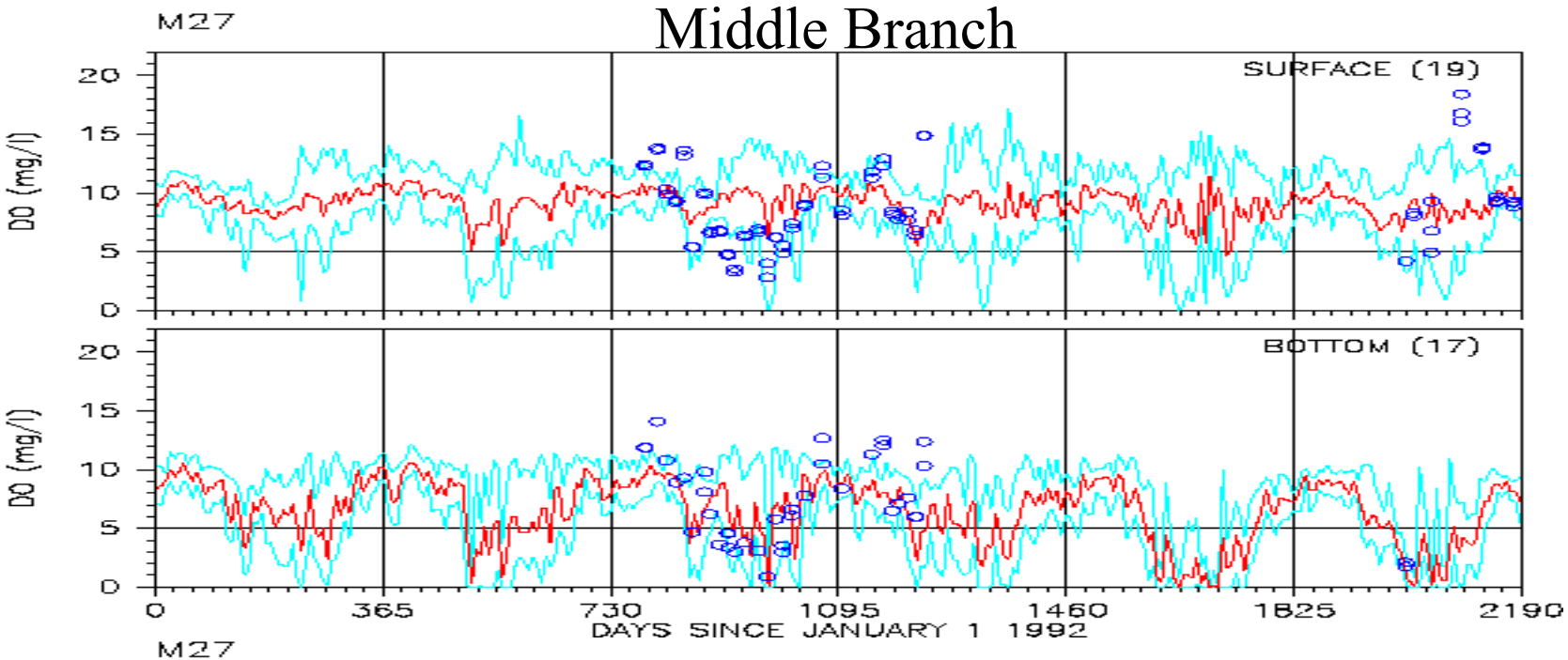

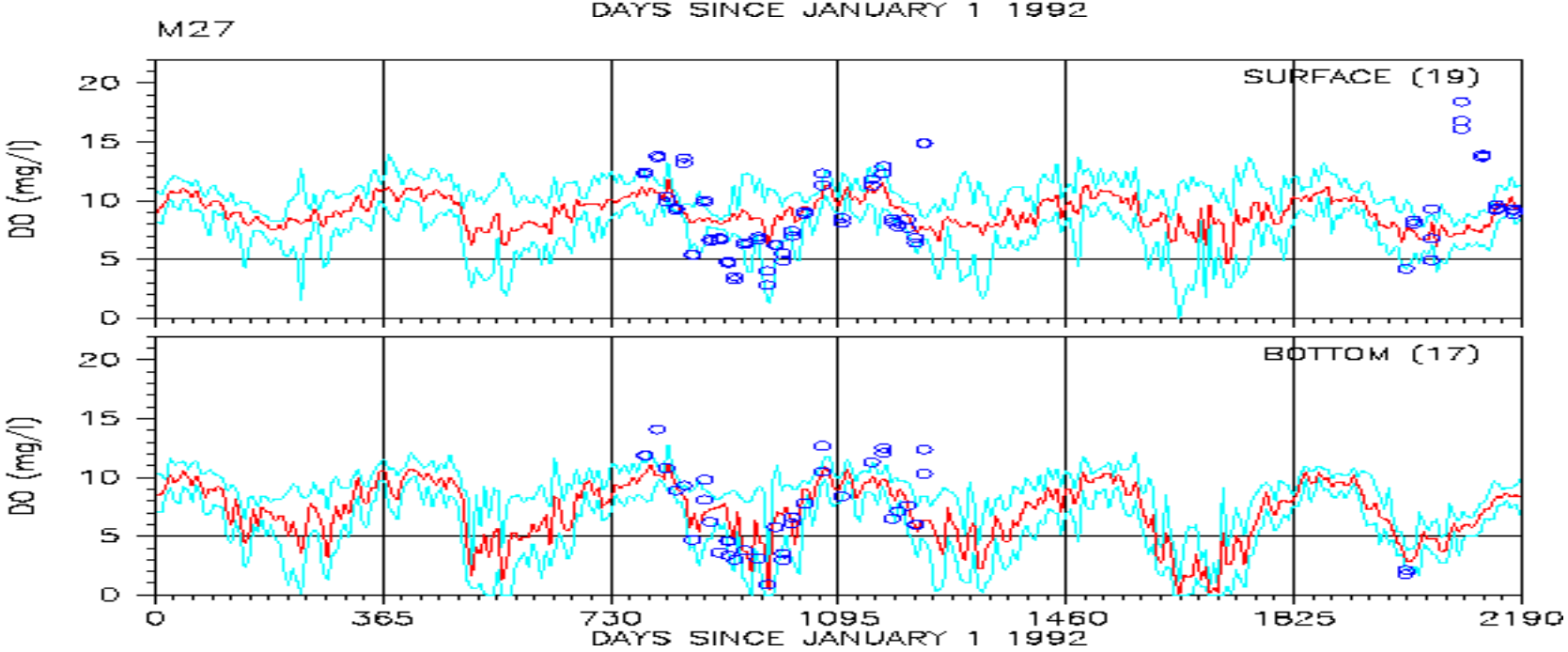

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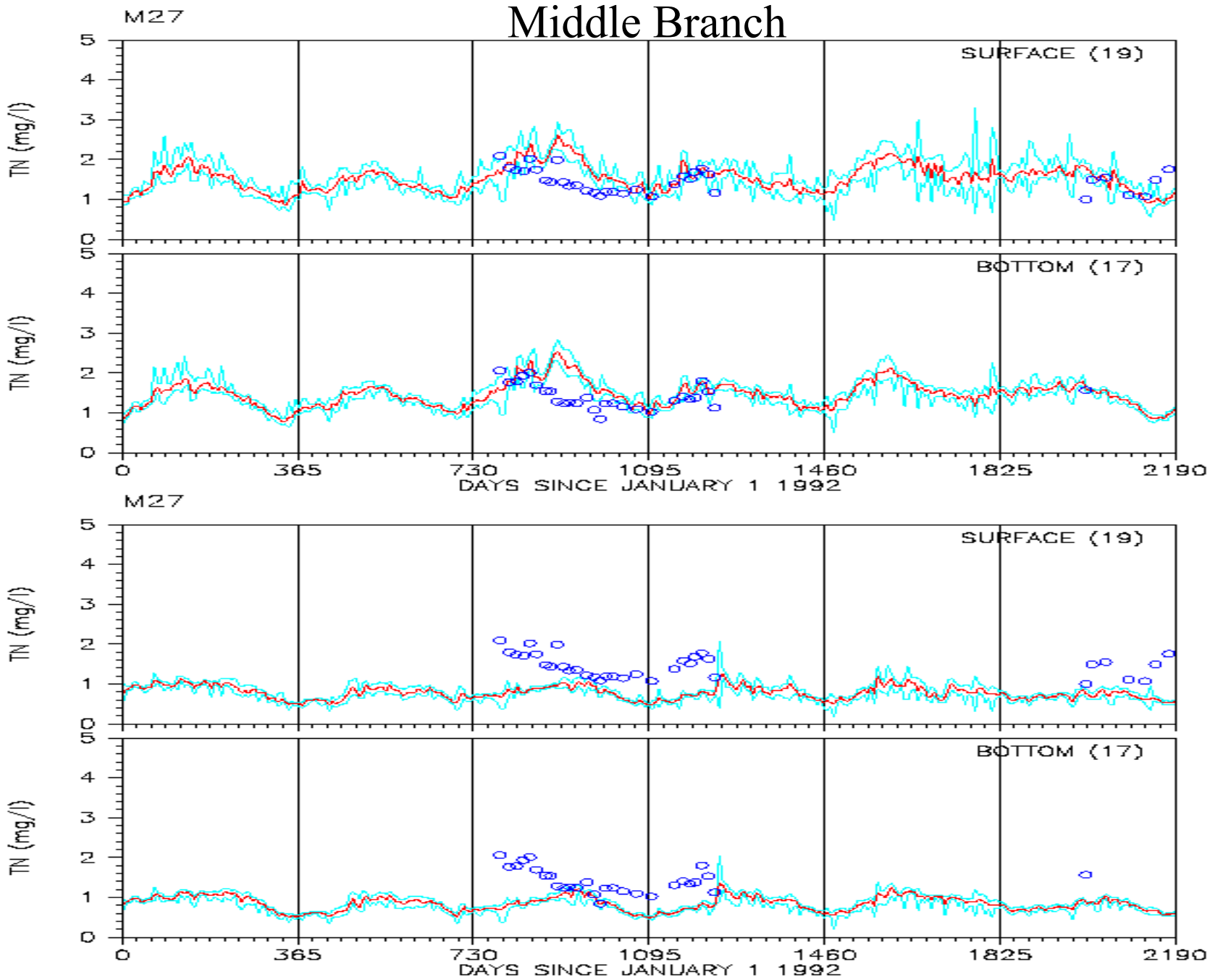

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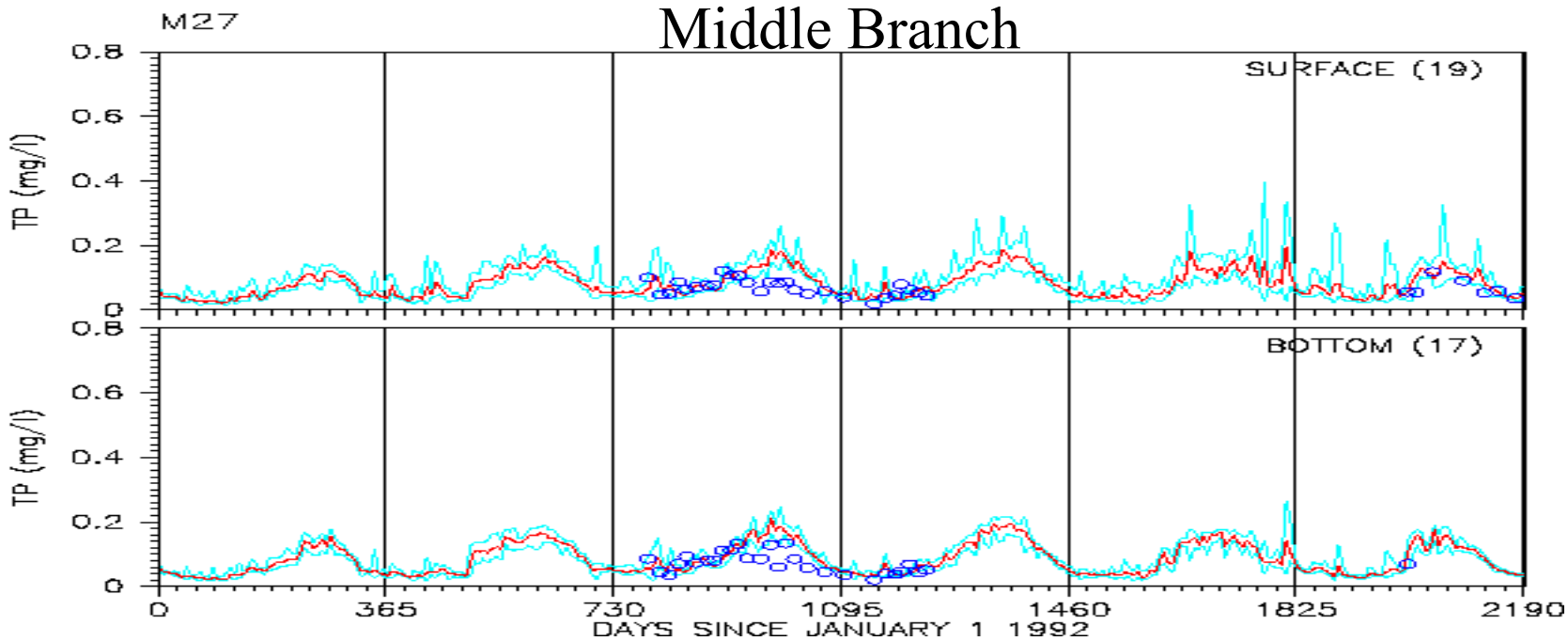
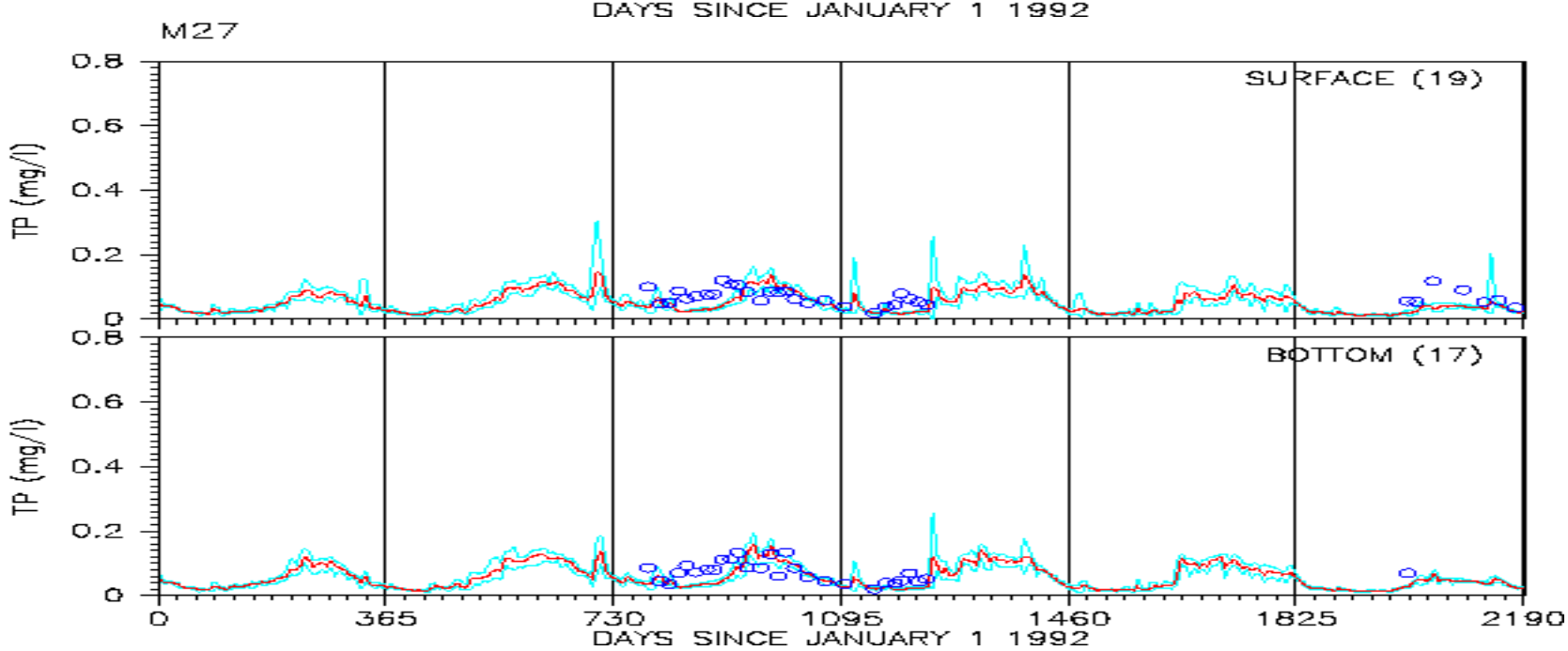
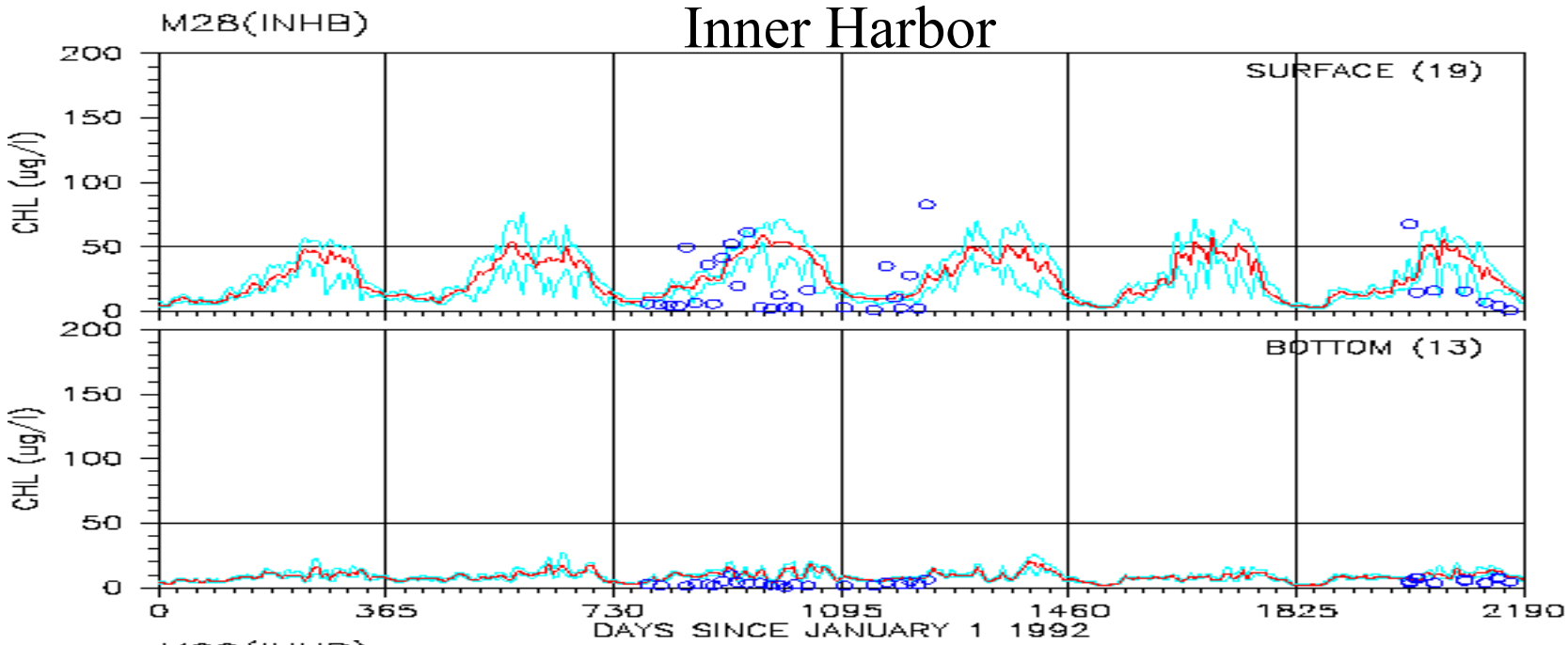
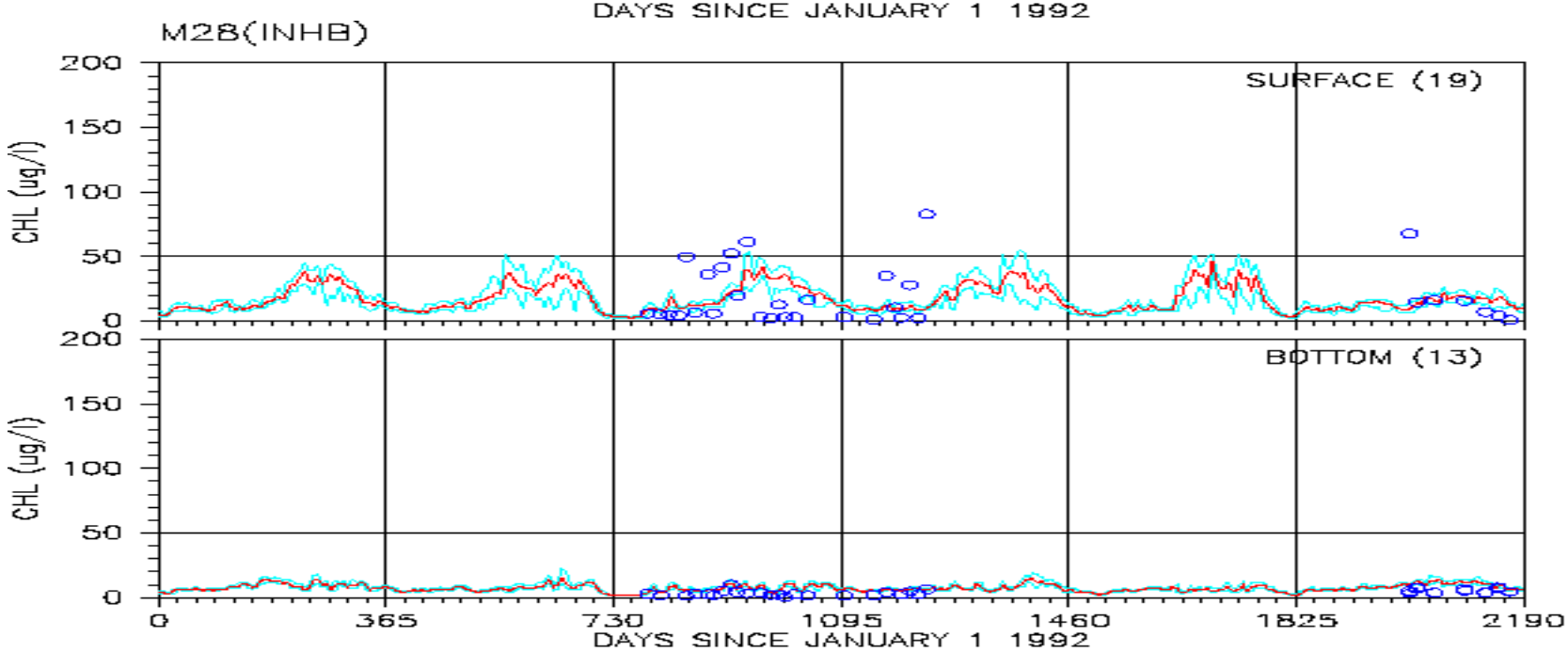


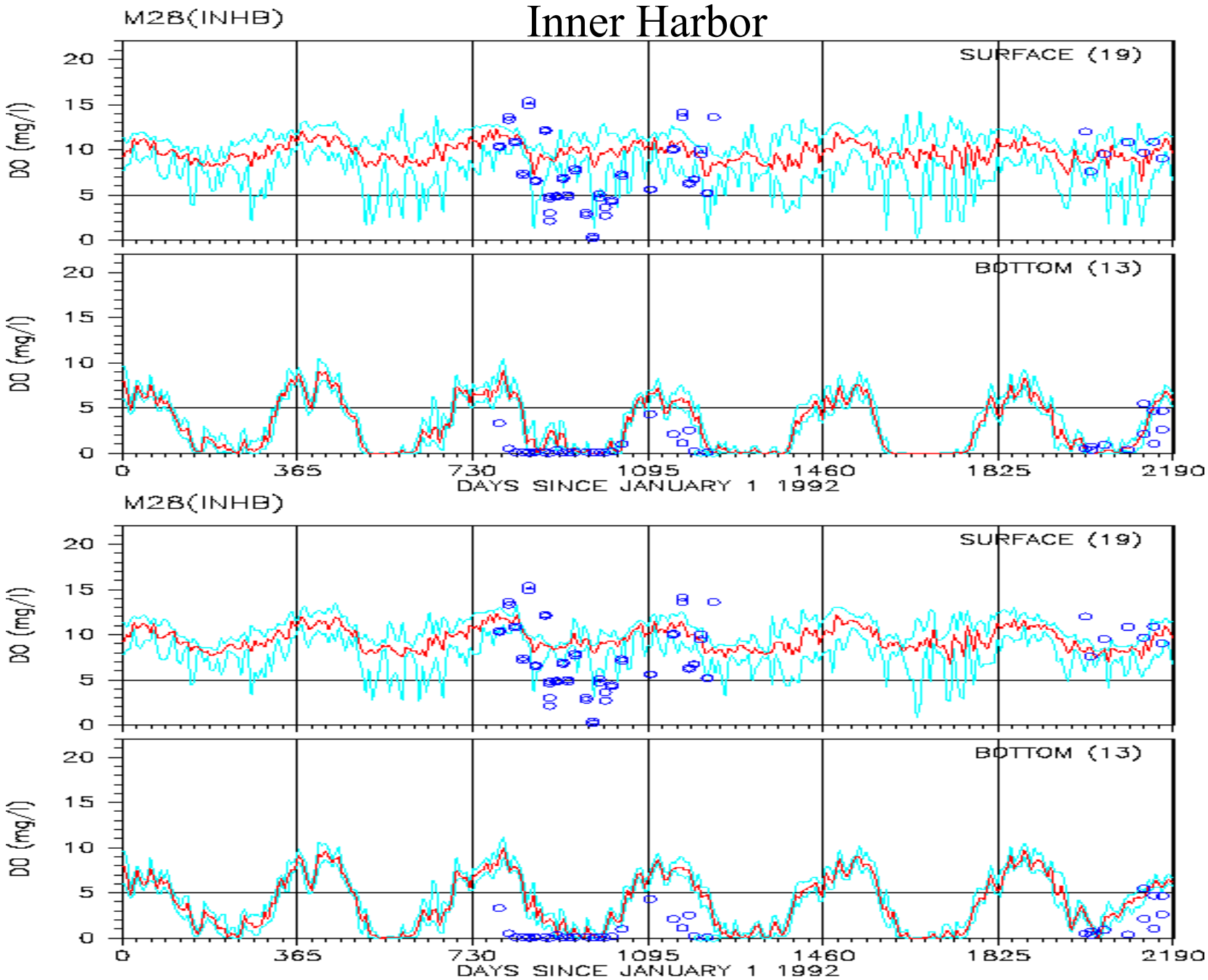


Inner Harbor

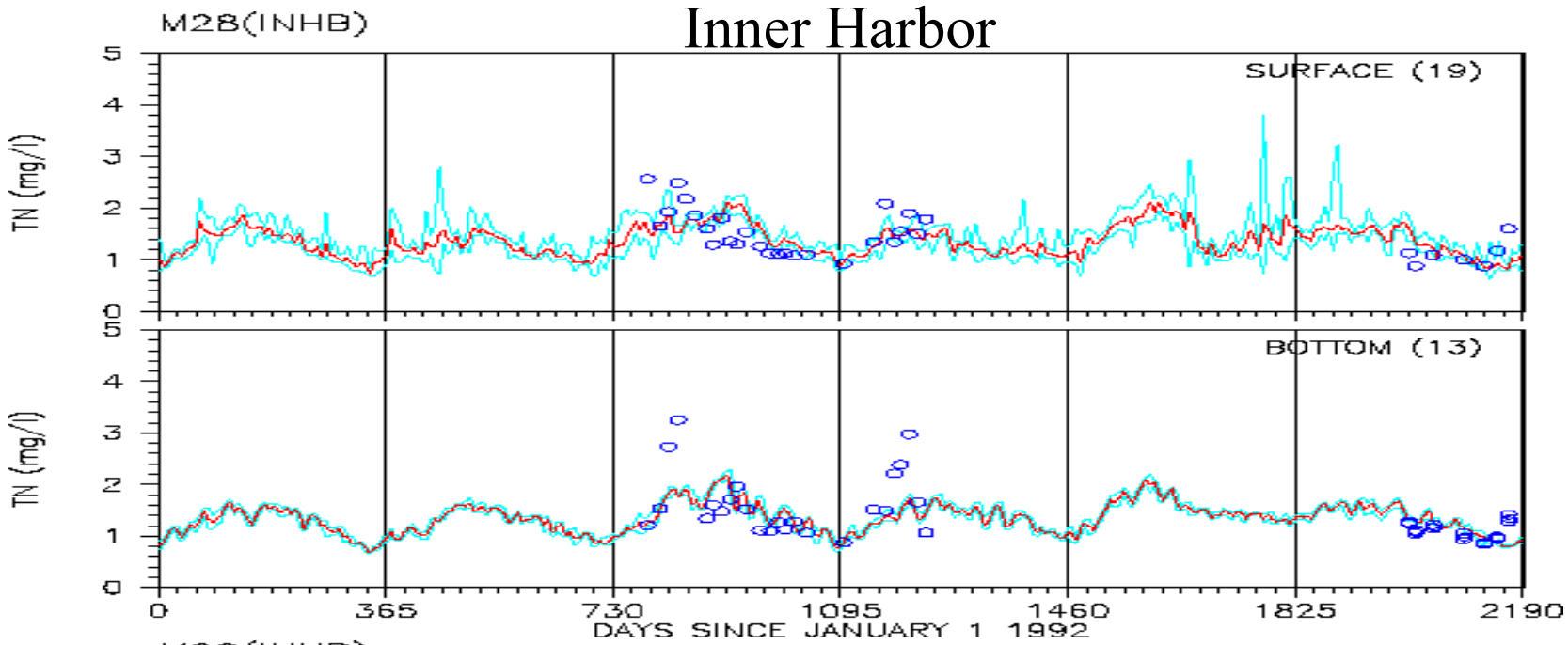


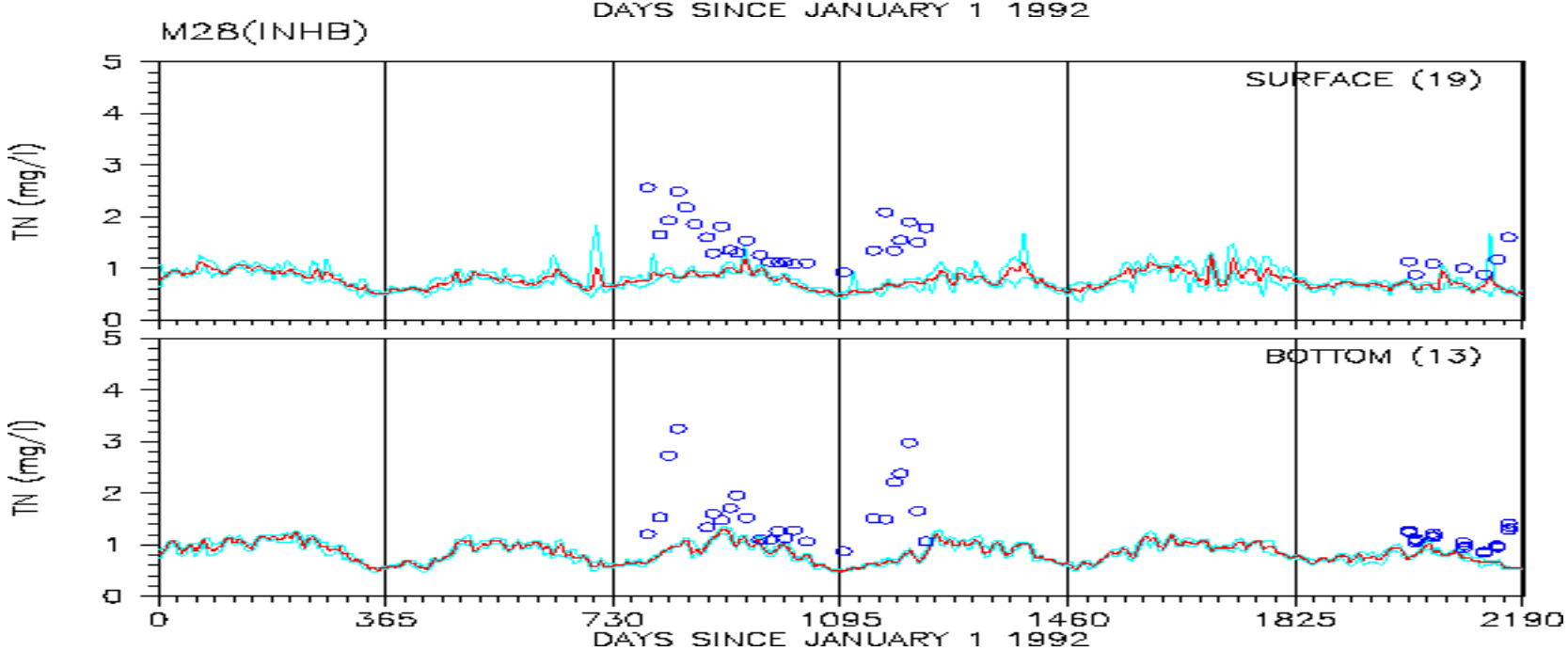


Inner Harbor

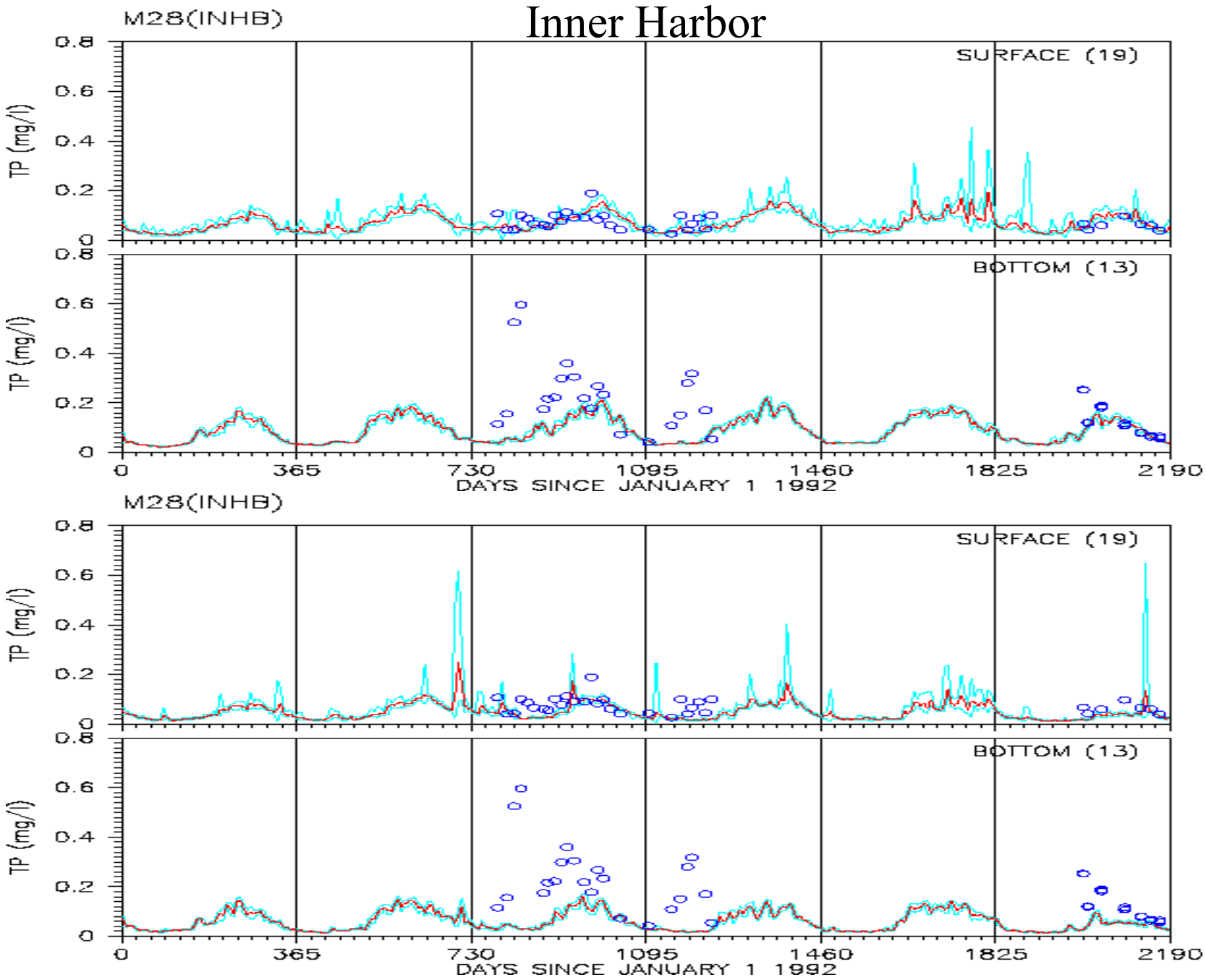


Inner Harbor

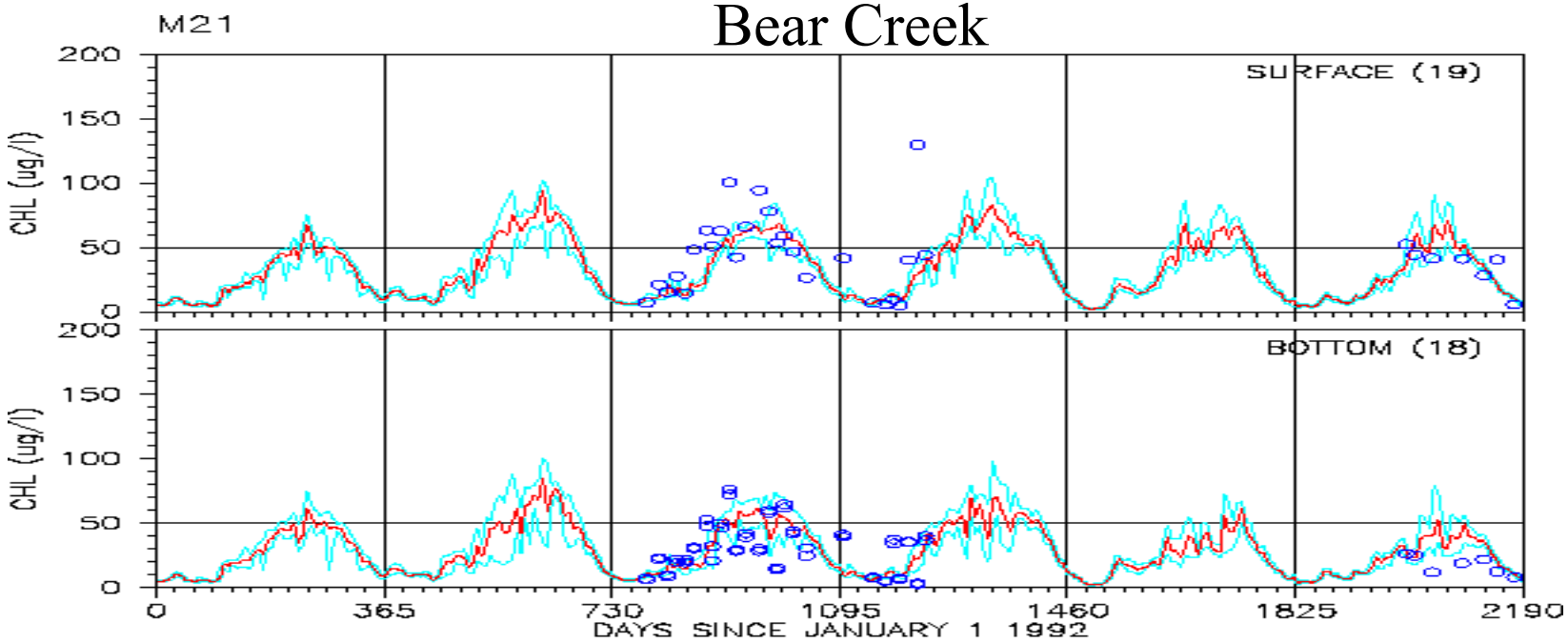




Inner Harbor



Bear Creek


M21
SURFACE (19)
BOTTOM (18)
CHL (ug/l)
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100
50
0
0
365
730
1095
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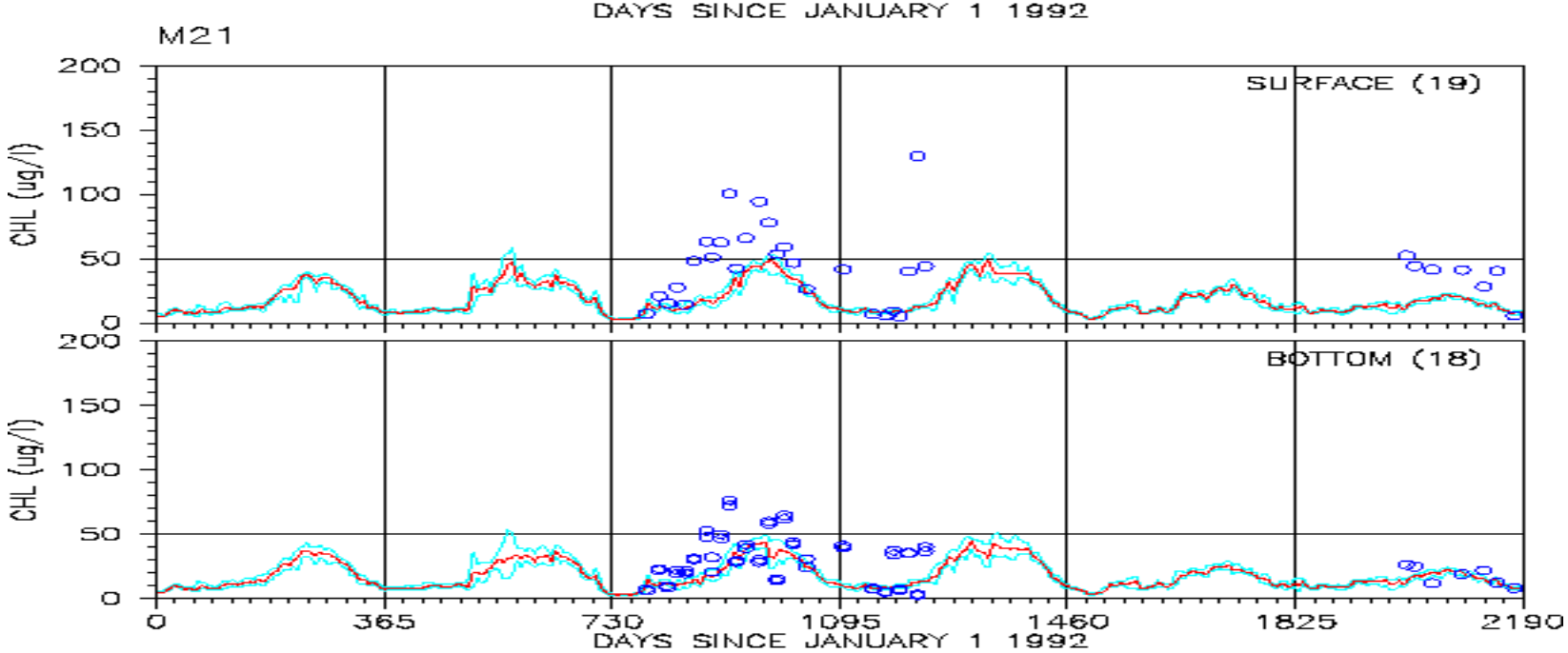
2190
DAYS SINCE JANUARY 1 1992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CHL (ug/l)
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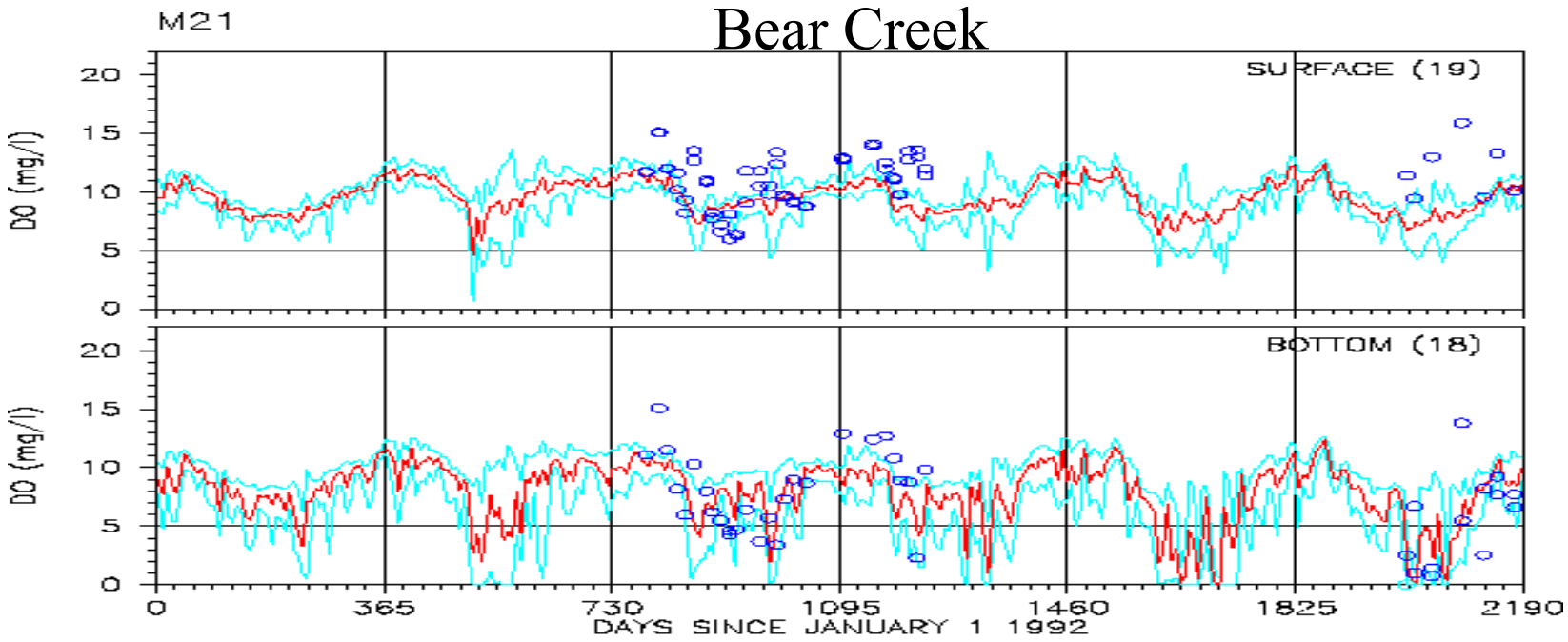
DAYS SINCE JANUARY 1 1992

Bear Creek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BOTTOM (18)
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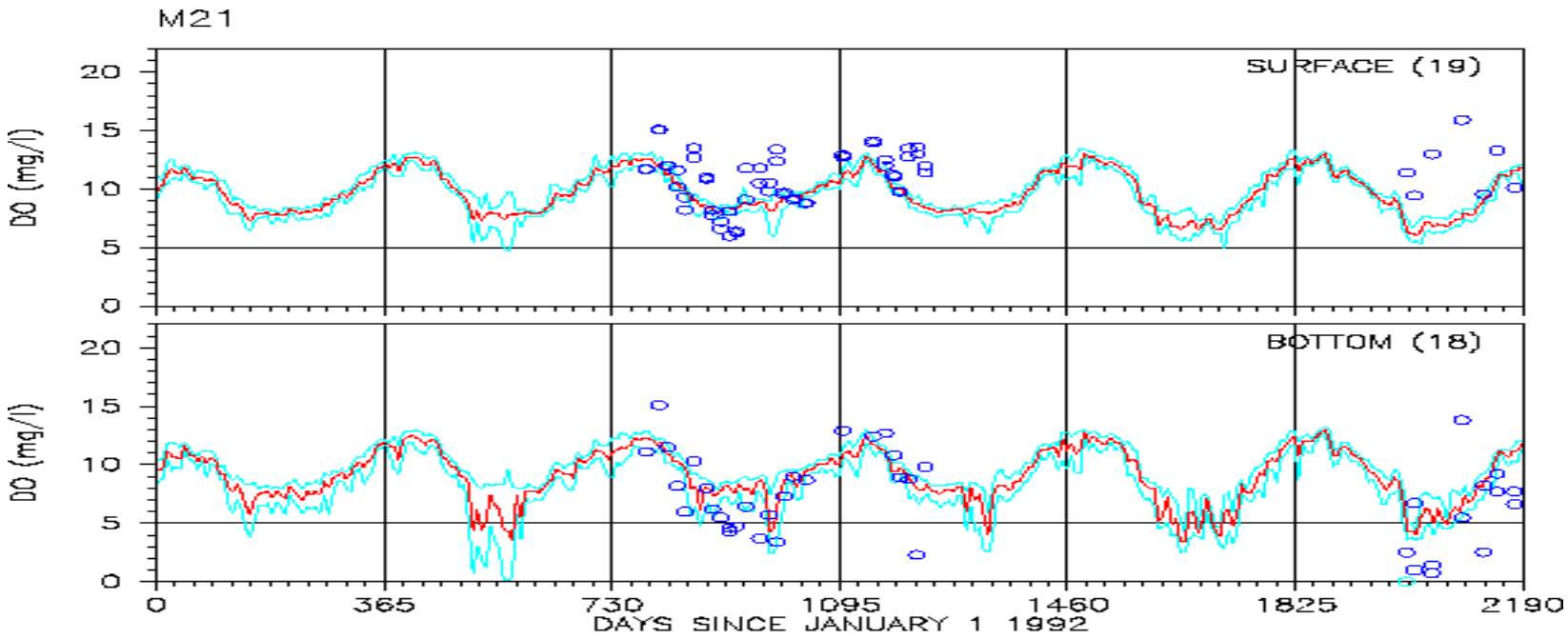
DAYS SINCE JANUARY 1 1992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BOTTOM (18)
DO (mg/l)
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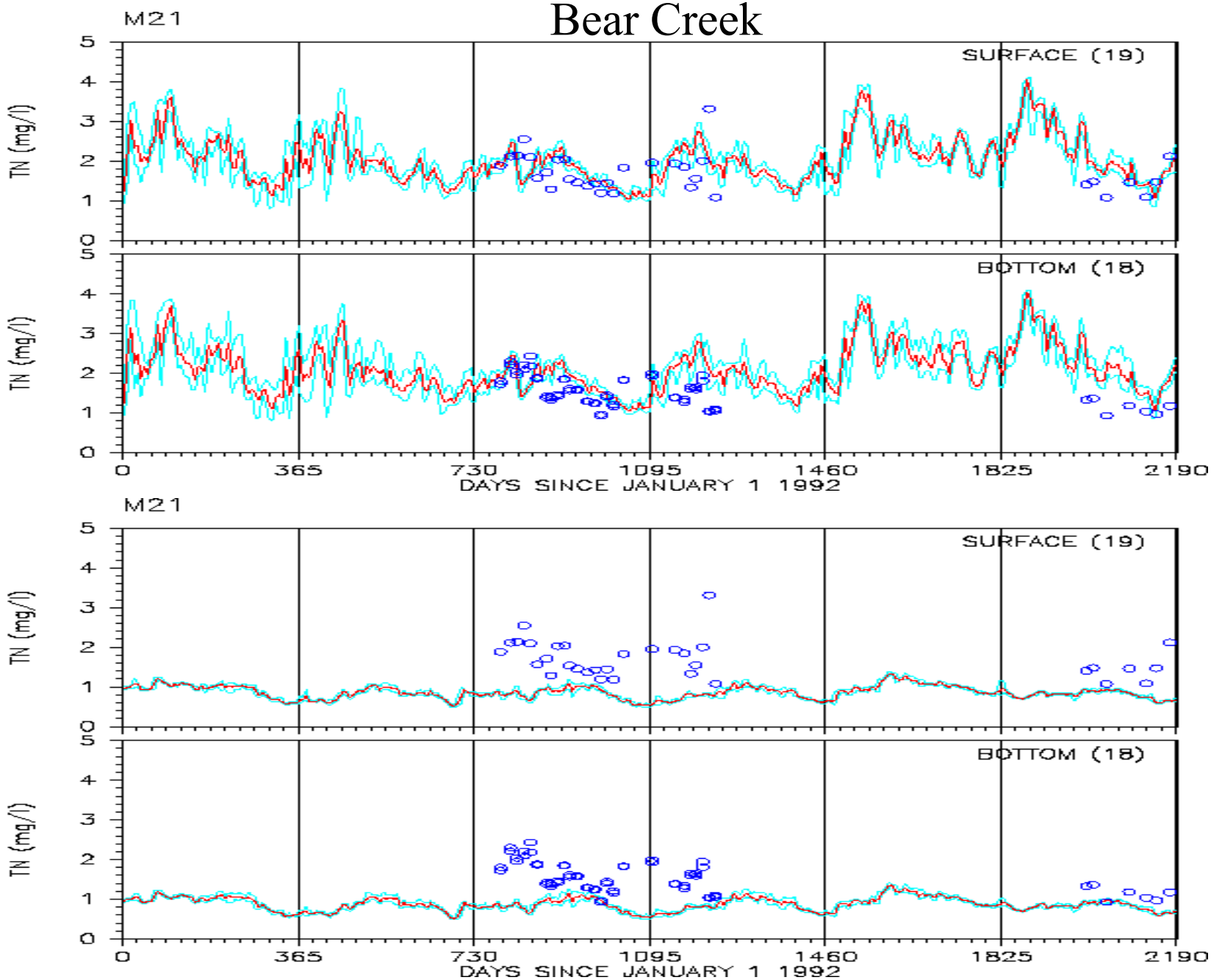
DAYS SINCE JANUARY 1 1992

Bear Creek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BOTTOM (18)
TN (mg/l)
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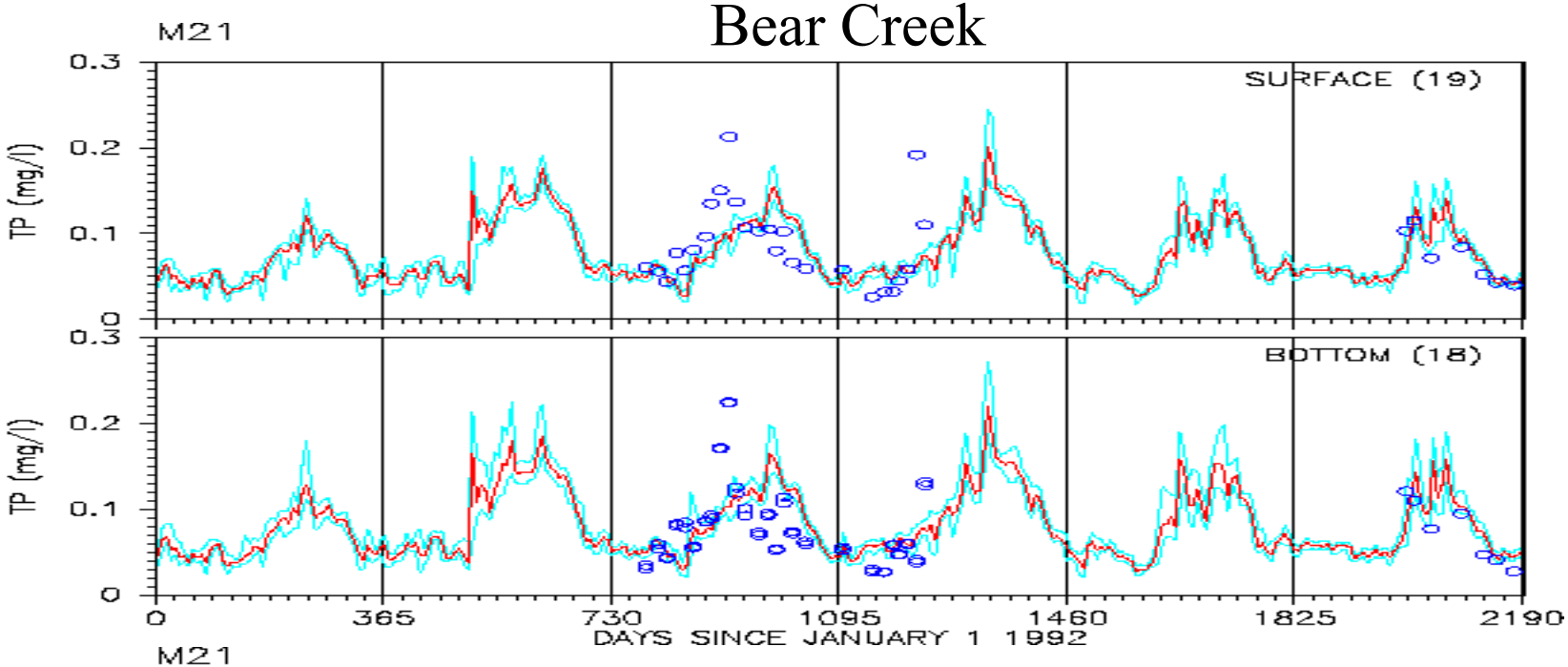
1460
1825
2190
DAYS SINCE JANUARY 1 1992
M21
SURFACE (19)
BOTTOM (18)
TN (mg/l)
DAYS SINCE JANUARY 1 1992

Bear Creek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BOTTOM (18)
TP (mg/l)
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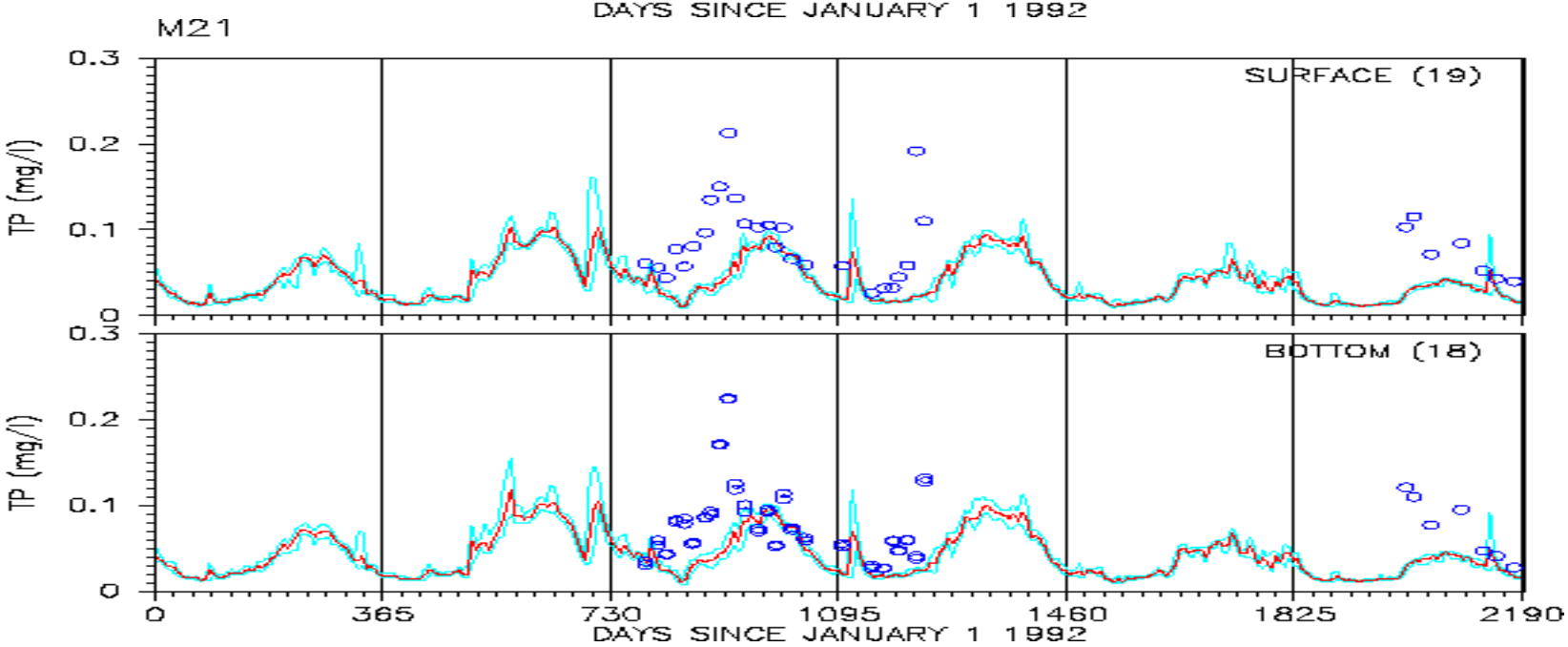
1825
2190
DAYS SINCE JANUARY 1 1992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BOTTOM (18)
TP (mg/l)
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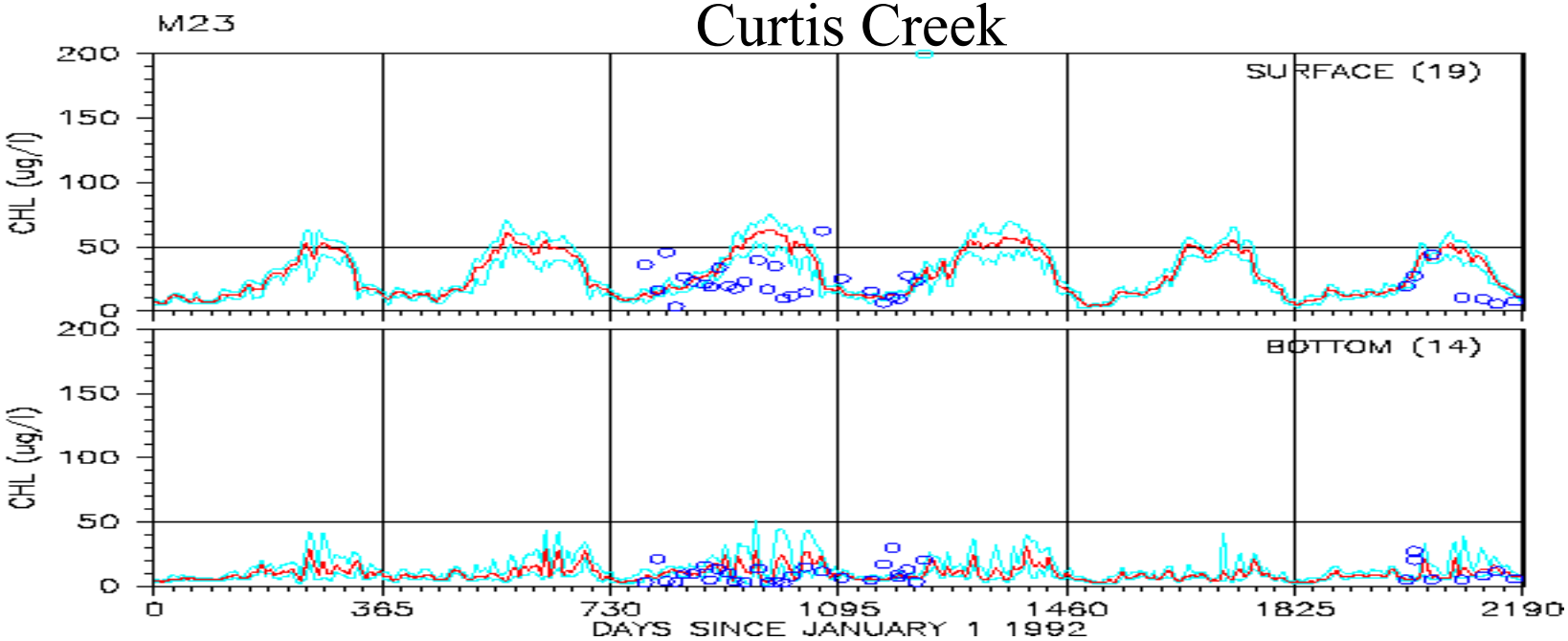
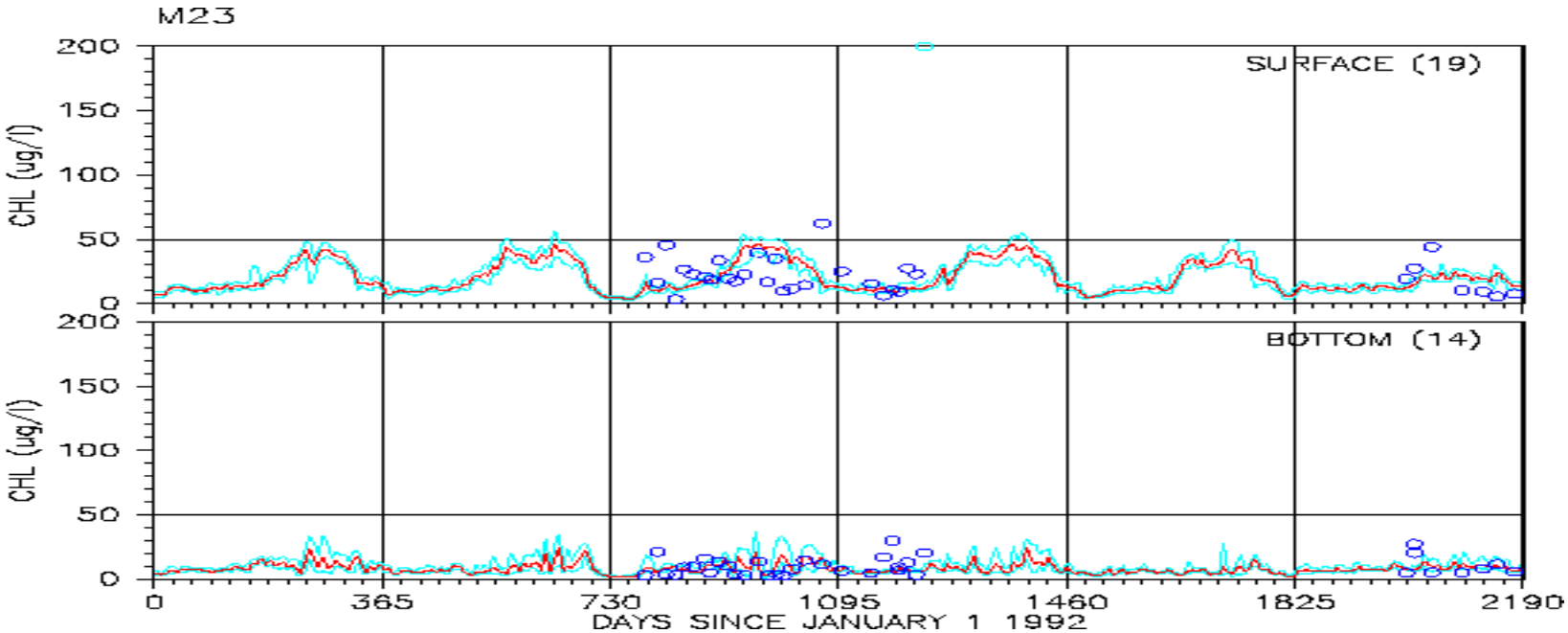
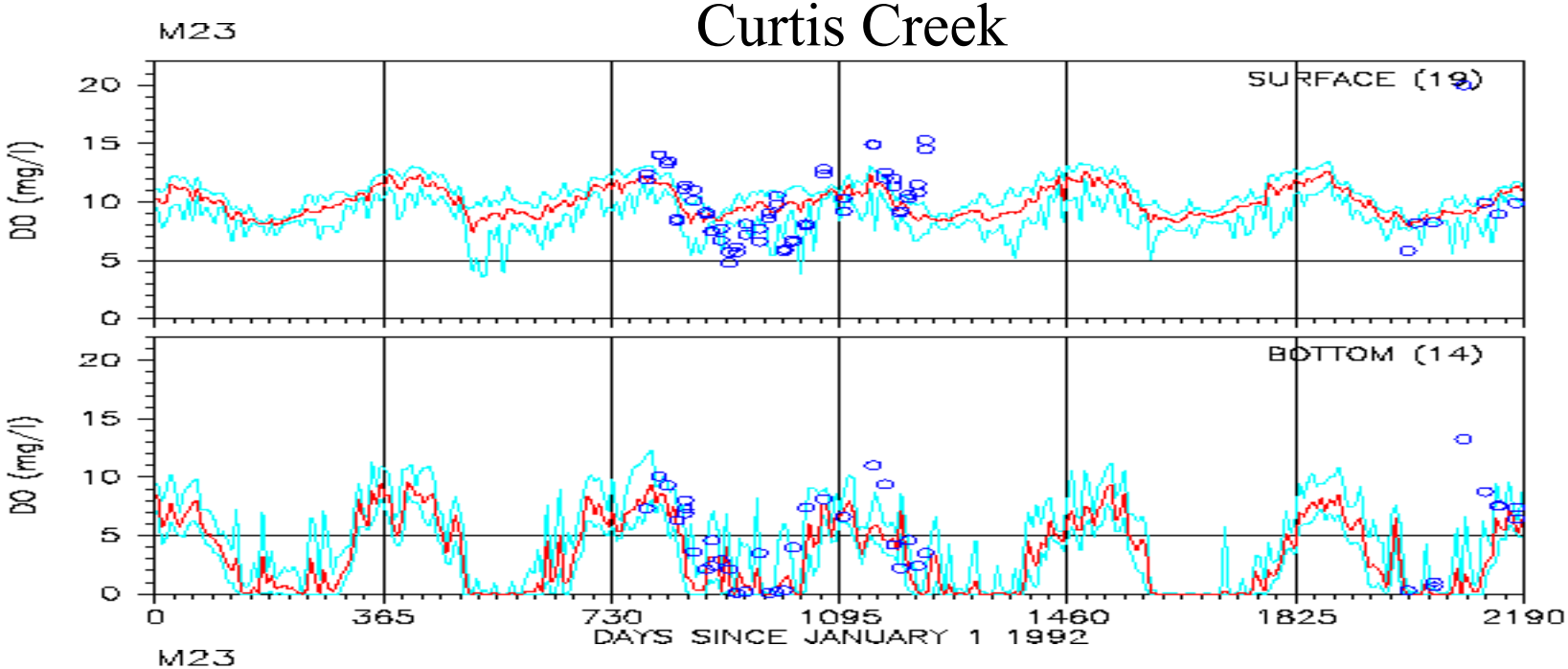
1825
2190
DAYS SINCE JANUARY 1 1992

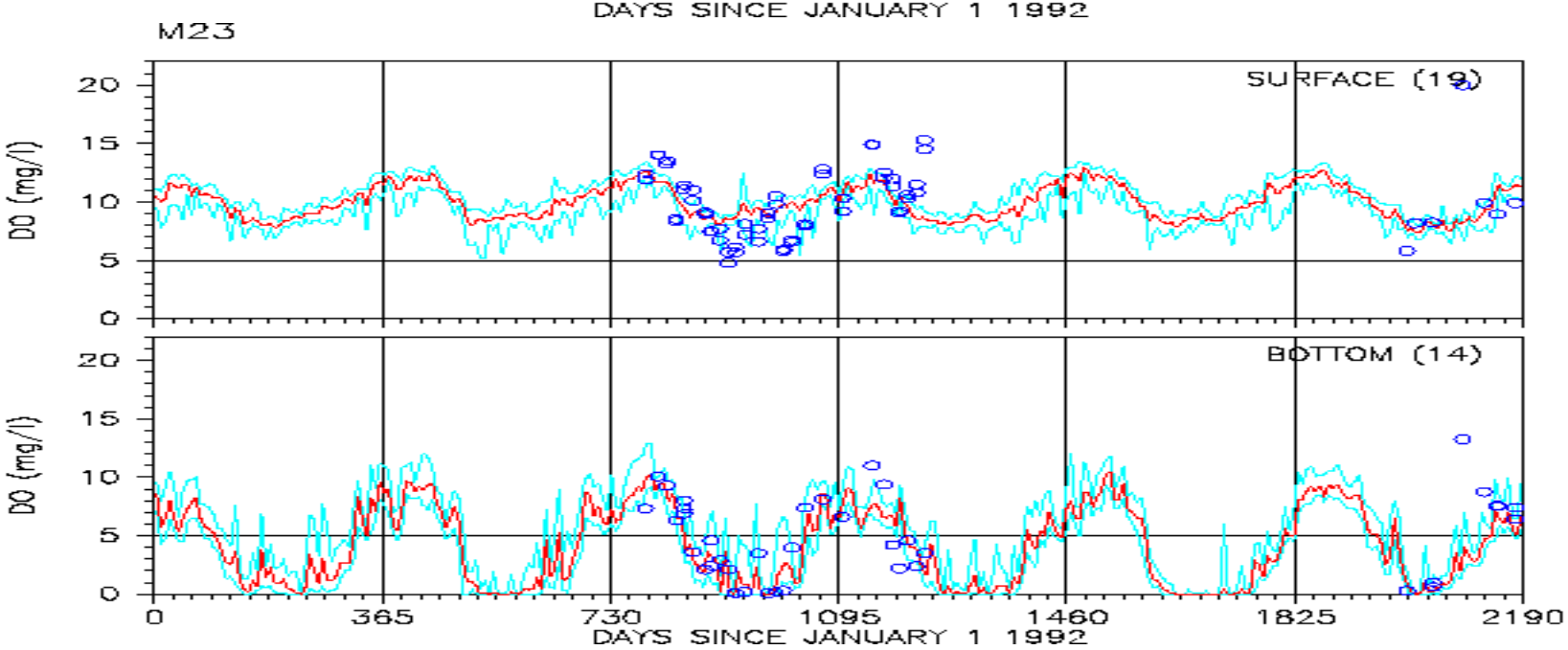
Curtis Creek



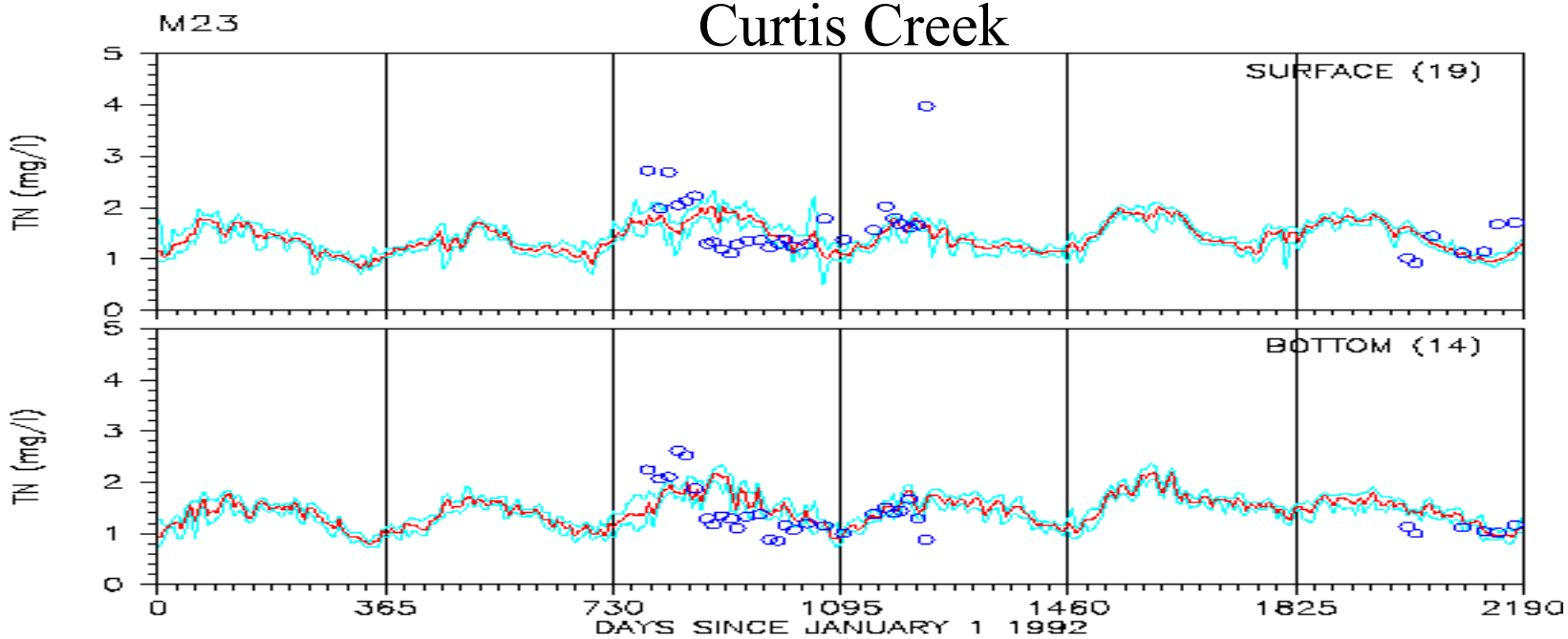


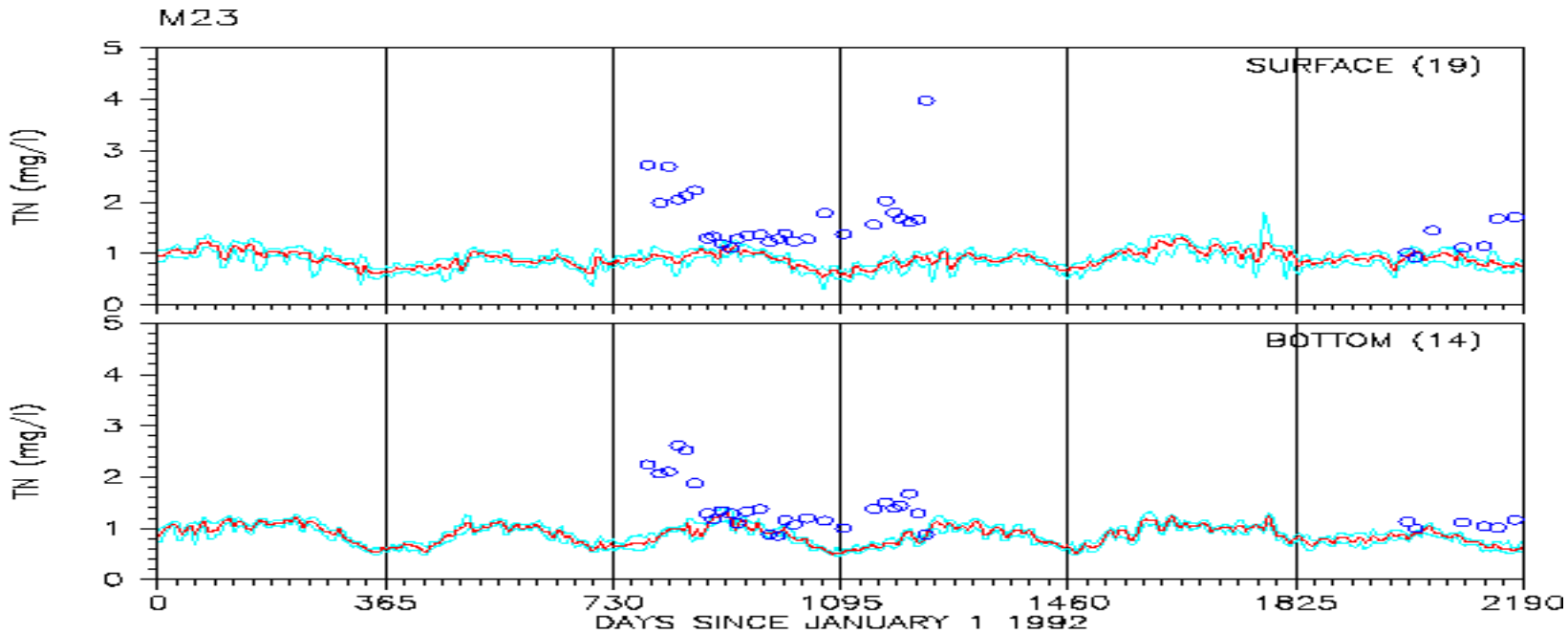
Curtis Creek



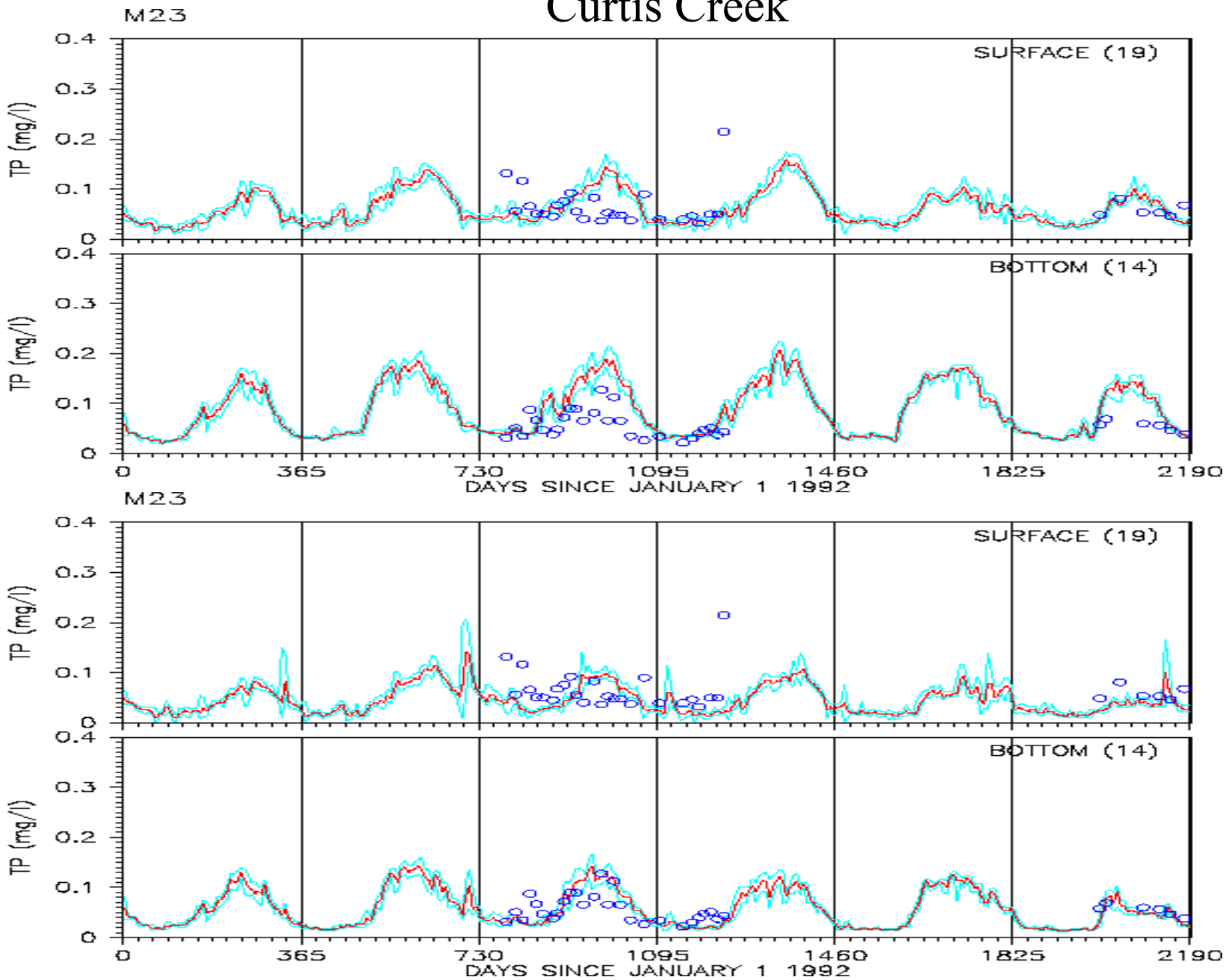


Curtis Creek





Curtis Creek



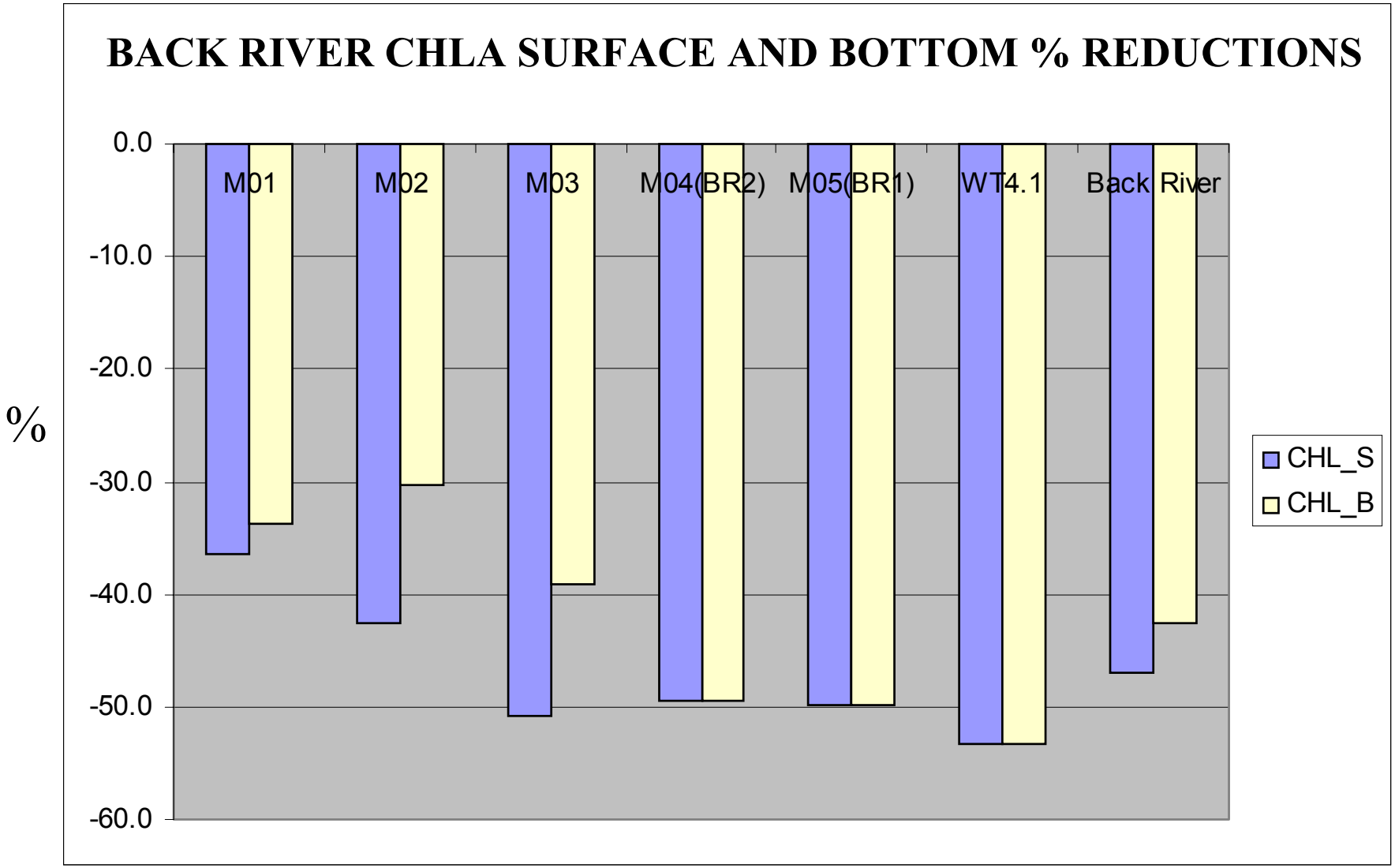
Before and After Scenario Results
PERCENTAGE
REDUCTIONS

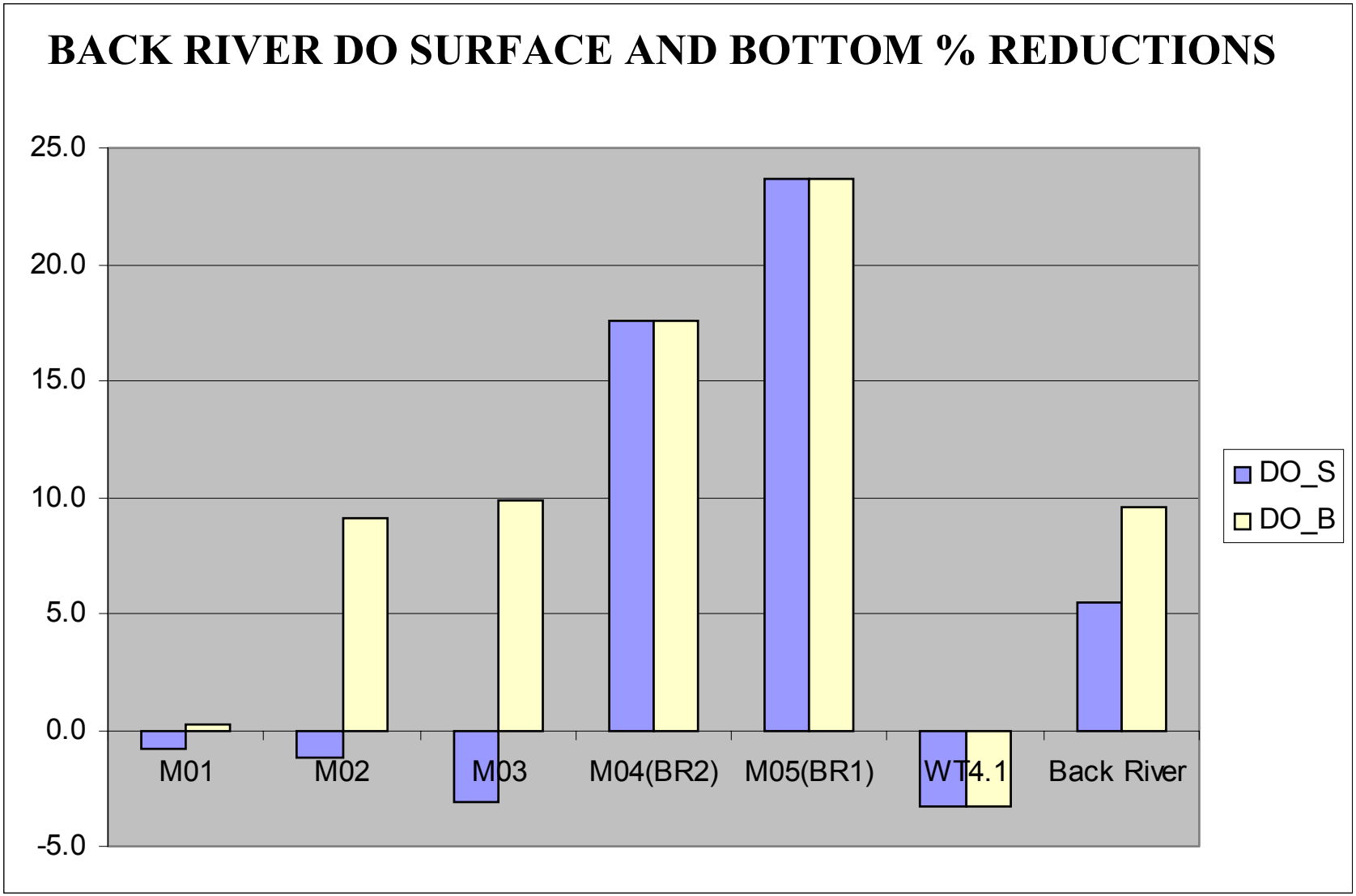
between

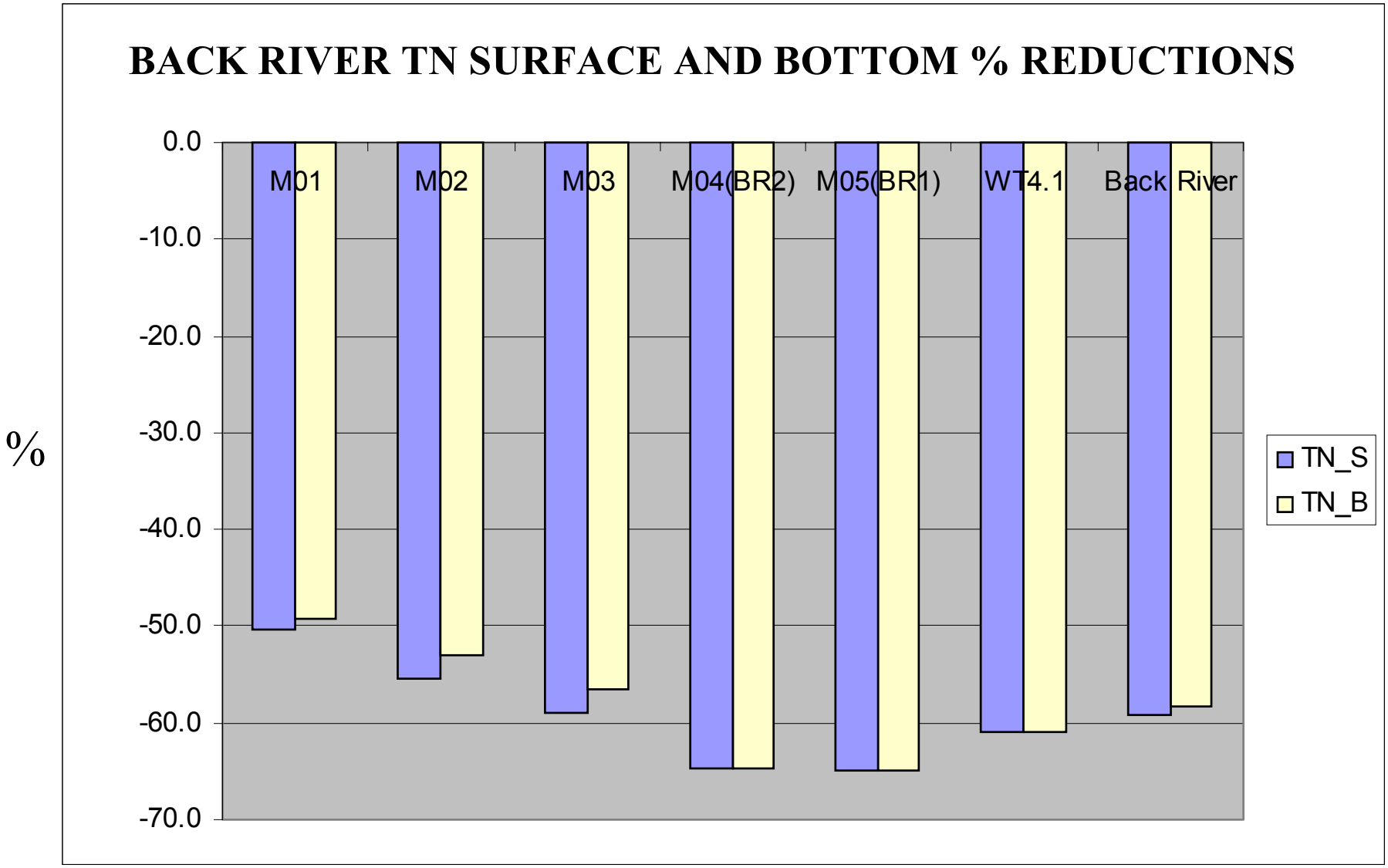
MDE Calibration Loads

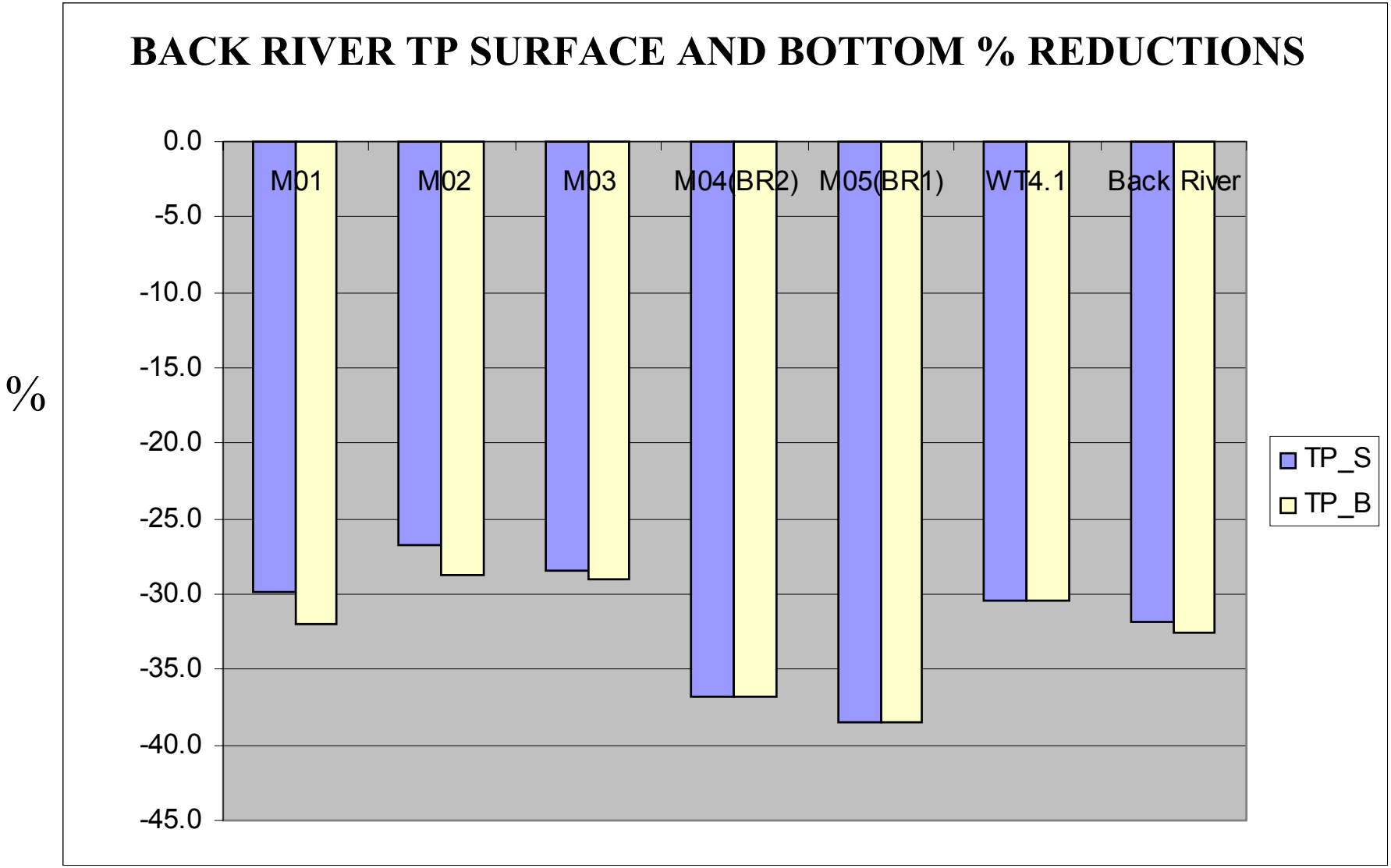
CBP Allocation Loads

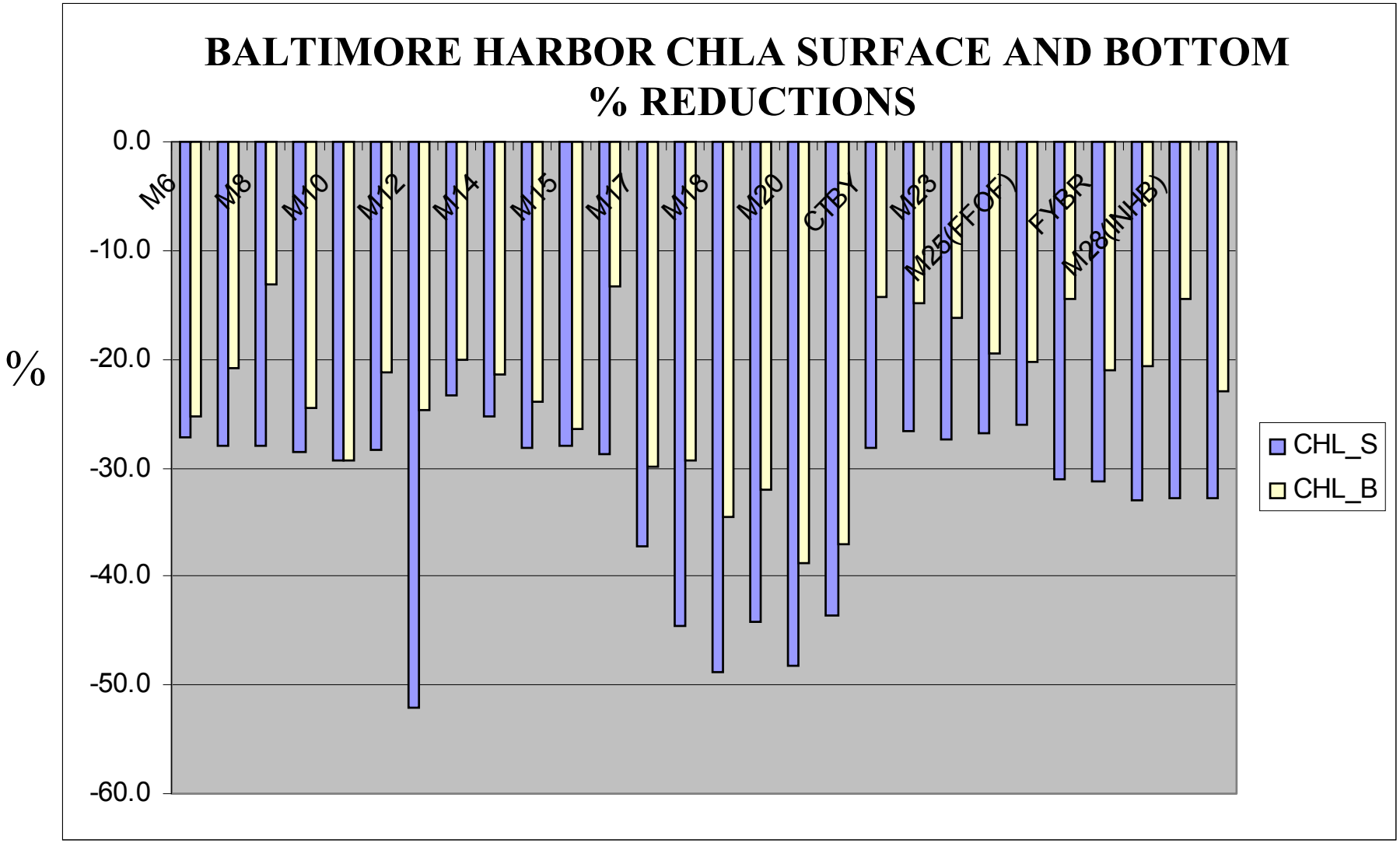
MDE

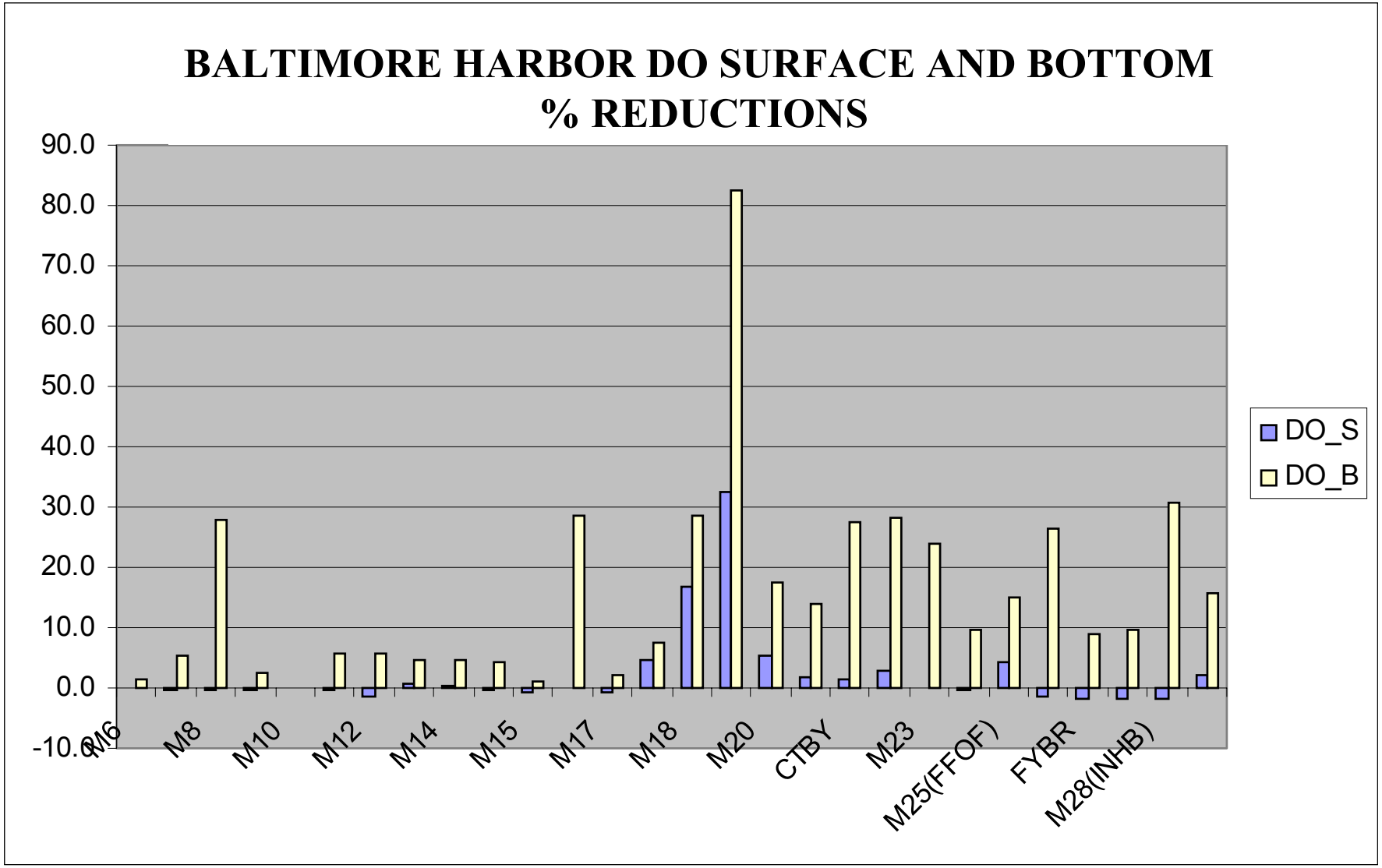

BACK RIVER CHLA SURFACE AND BOTTOM % REDUCTIONS
%
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
M01
M02
M03
M04(BR2)
M05(BR1)
WT4.1
Back River
CHL_S
CHL_B

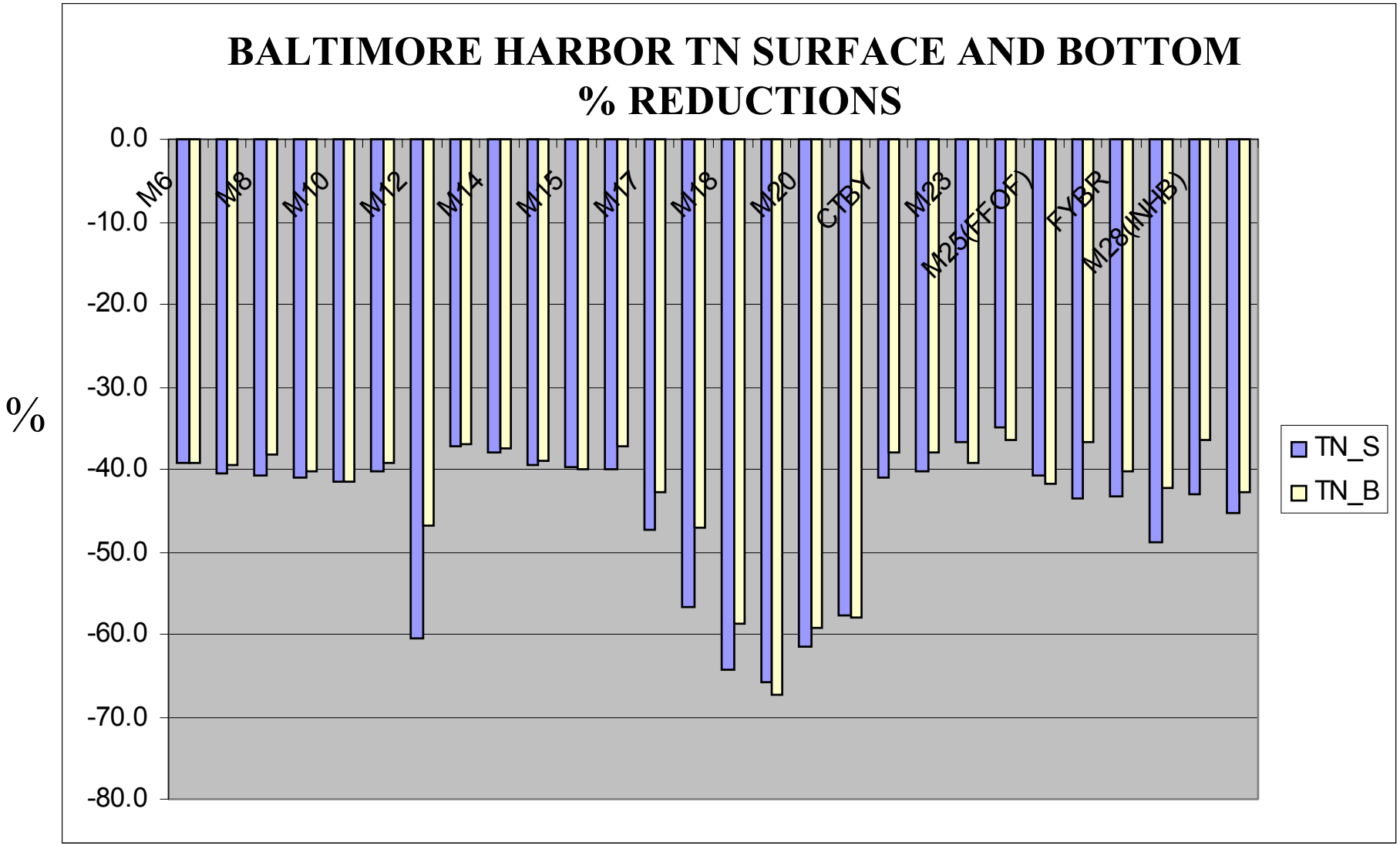

BACK RIVER DO SURFACE AND BOTTOM % REDUCTIONS
%
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
M01
M02
M03
M04(BR2)
M05(BR1)
WT4.1
Back River
DO_S
DO_B

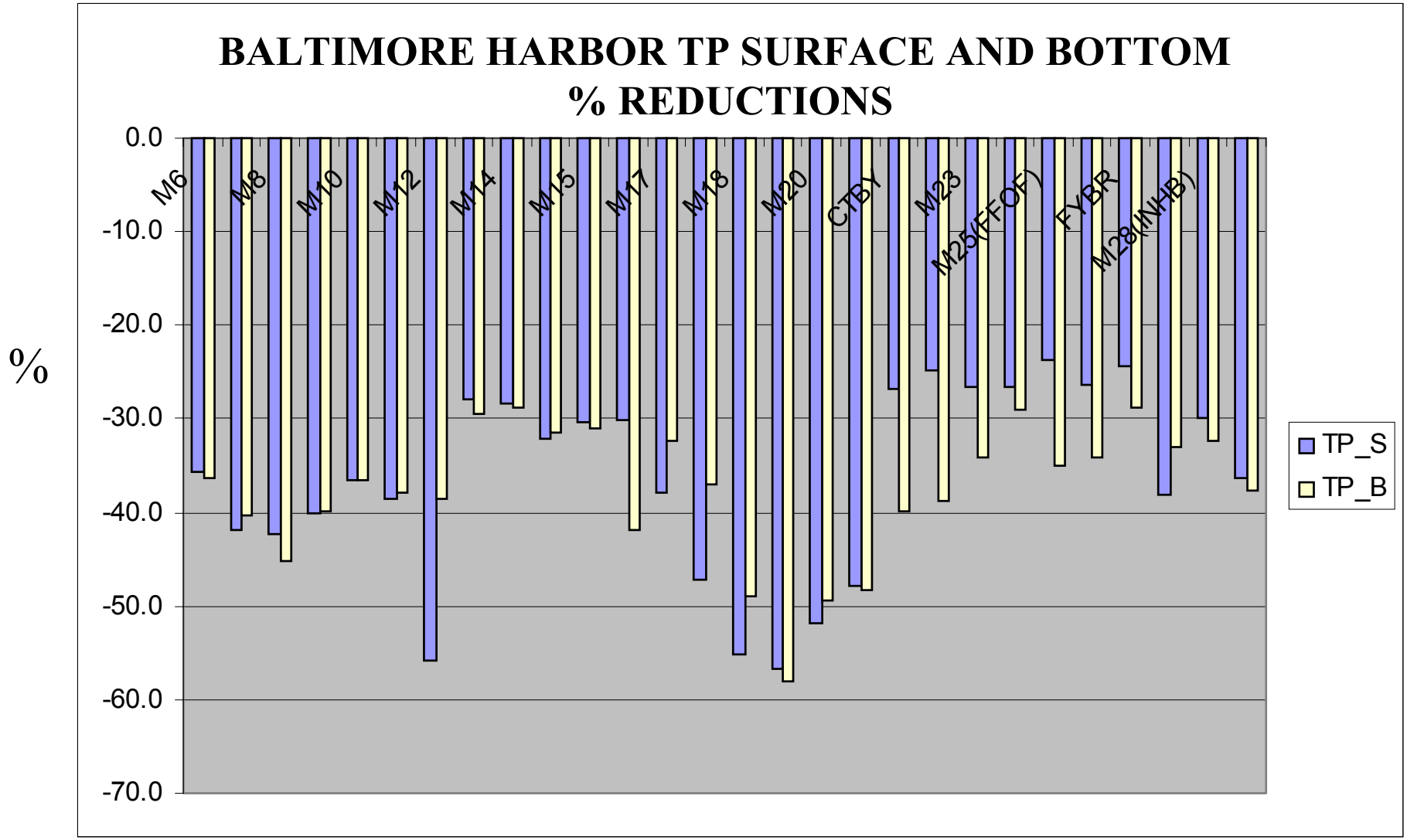

BACK RIVER TN SURFACE AND BOTTOM % REDUCTIONS
%
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
M01
M02
M03
M04(BR2)
M05(BR1)
WT4.1
Back River
TN_S
TN_B


BACK RIVER TP SURFACE AND BOTTOM % REDUCTIONS
%
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
M01
M02
M03
M04(BR2)
M05(BR1)
WT4.1
Back River
TP_S
TP_B


BALTIMORE HARBOR CHLA SURFACE AND BOTTOM
% REDUCTIONS
%
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
M6
M8
M10
M12
M14
M15
M17
M18
M20
CTBY
M23
M25(FFOF)
FYBR
M28(INHB)
CHL_S
CHL_B


BALTIMORE HARBOR DO SURFACE AND BOTTOM
% REDUCTIONS
%
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
M6
M8
M10
M12
M14
M15
M17
M18
M20
CTBY
M23
M25(FFOF)
FYBR
M28(INHB)
DO_S
DO_B

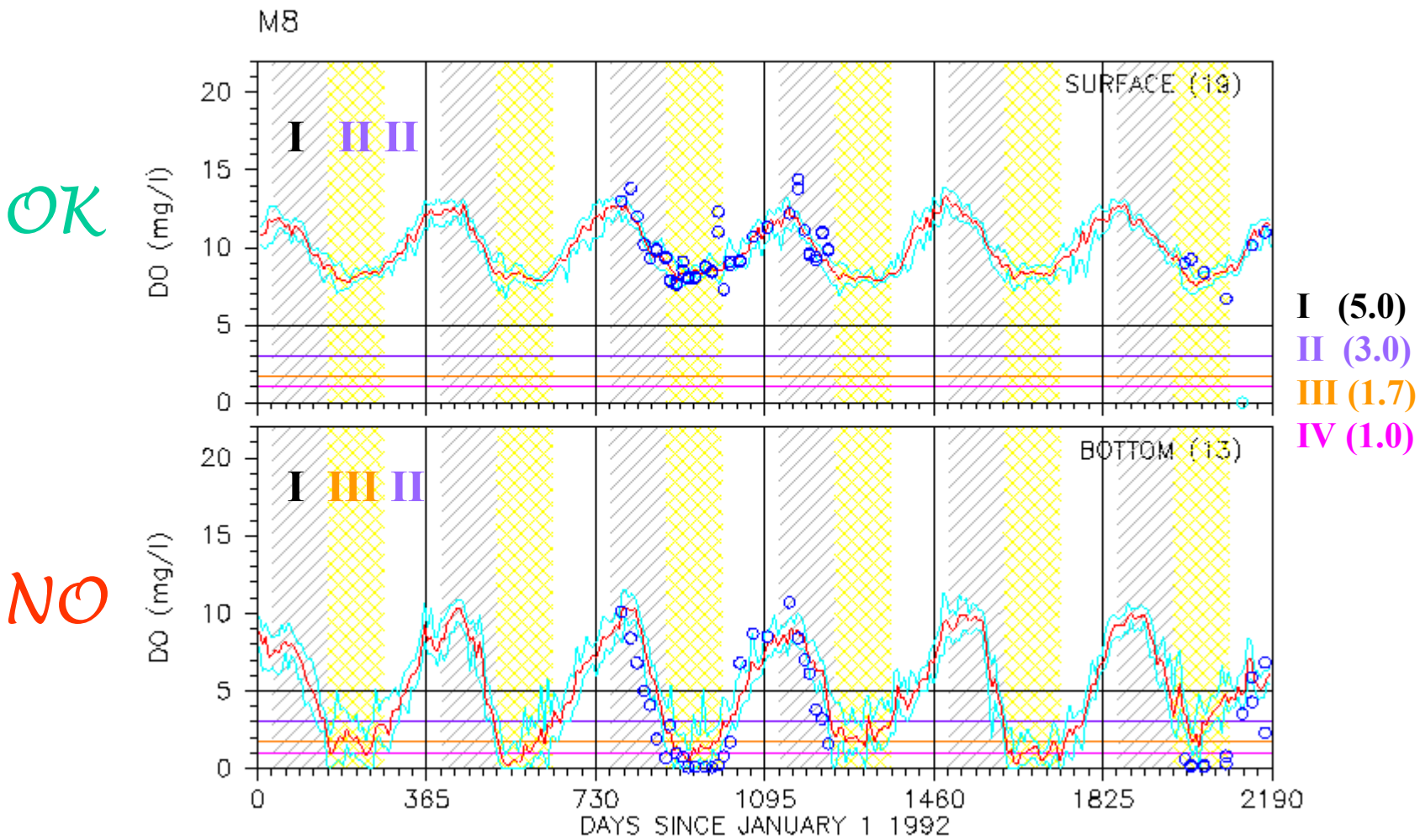

BALTIMORE HARBOR TN SURFACE AND BOTTOM
% REDUCTIONS
%
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
M6
M8
M10
M12
M14
M15
M17
M18
M20
CTBY
M23
M25(FFOF)
FYBR
M28(INHB)
TN_S
TN_B


BALTIMORE HARBOR TP SURFACE AND BOTTOM
% REDUCTIONS
%
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
M6
M8
M10
M12
M14
M15
M17
M18
M20
CTBY
M23
M25(FFOF)
FYBR
M28(INHB)
TP_S
TP_B

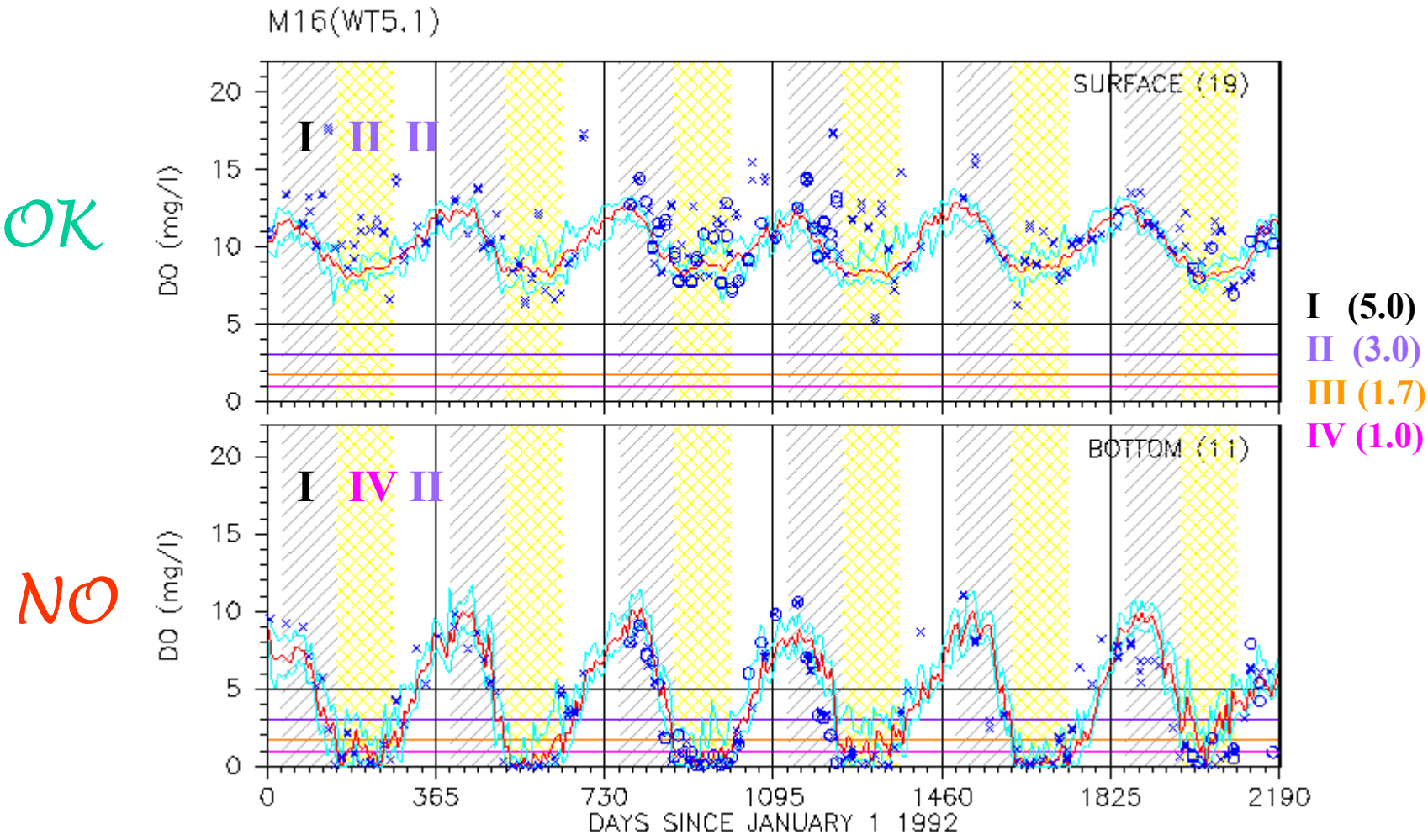
Attainment Determination

MDE

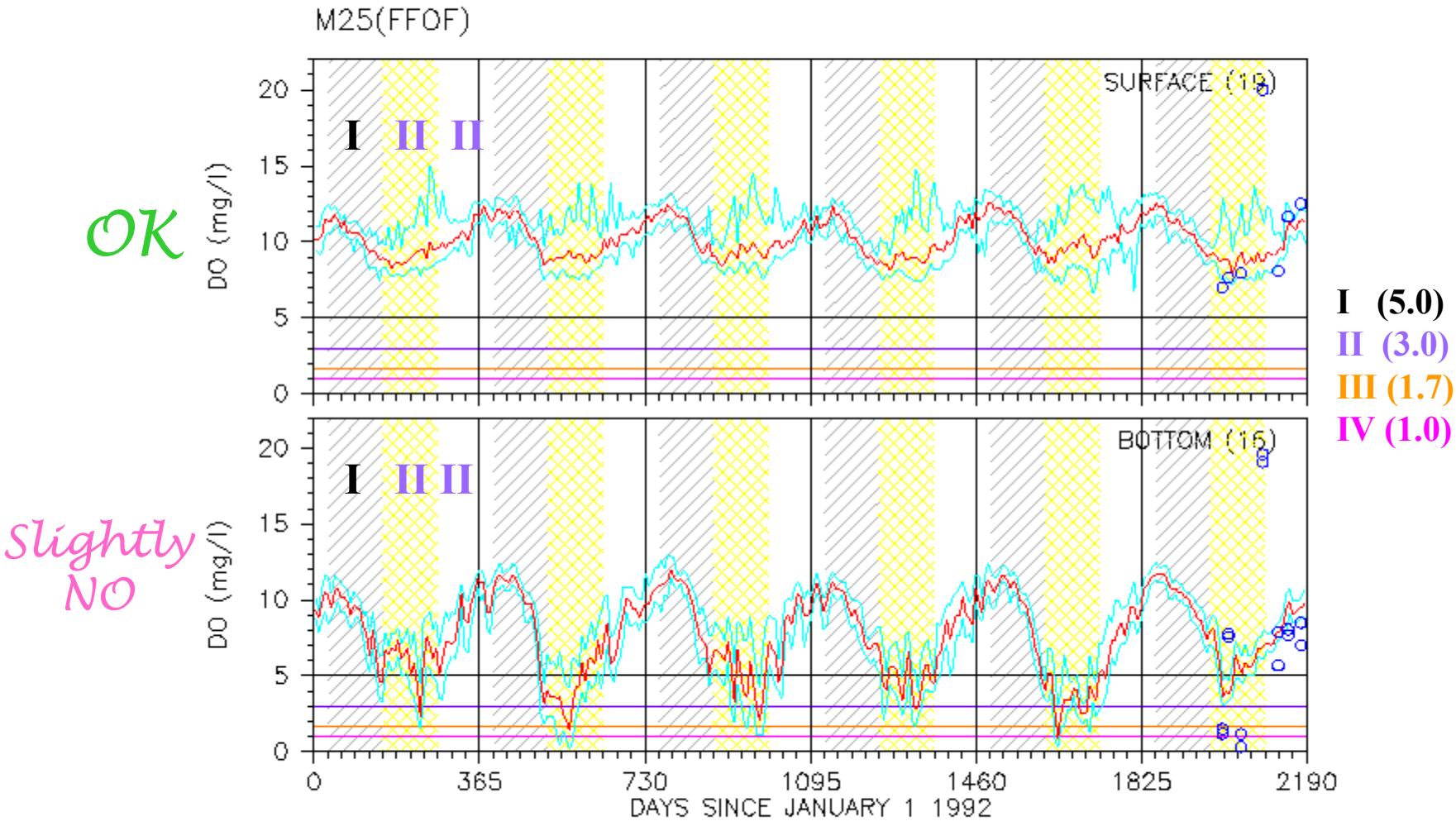
Harbor Mouth
DO



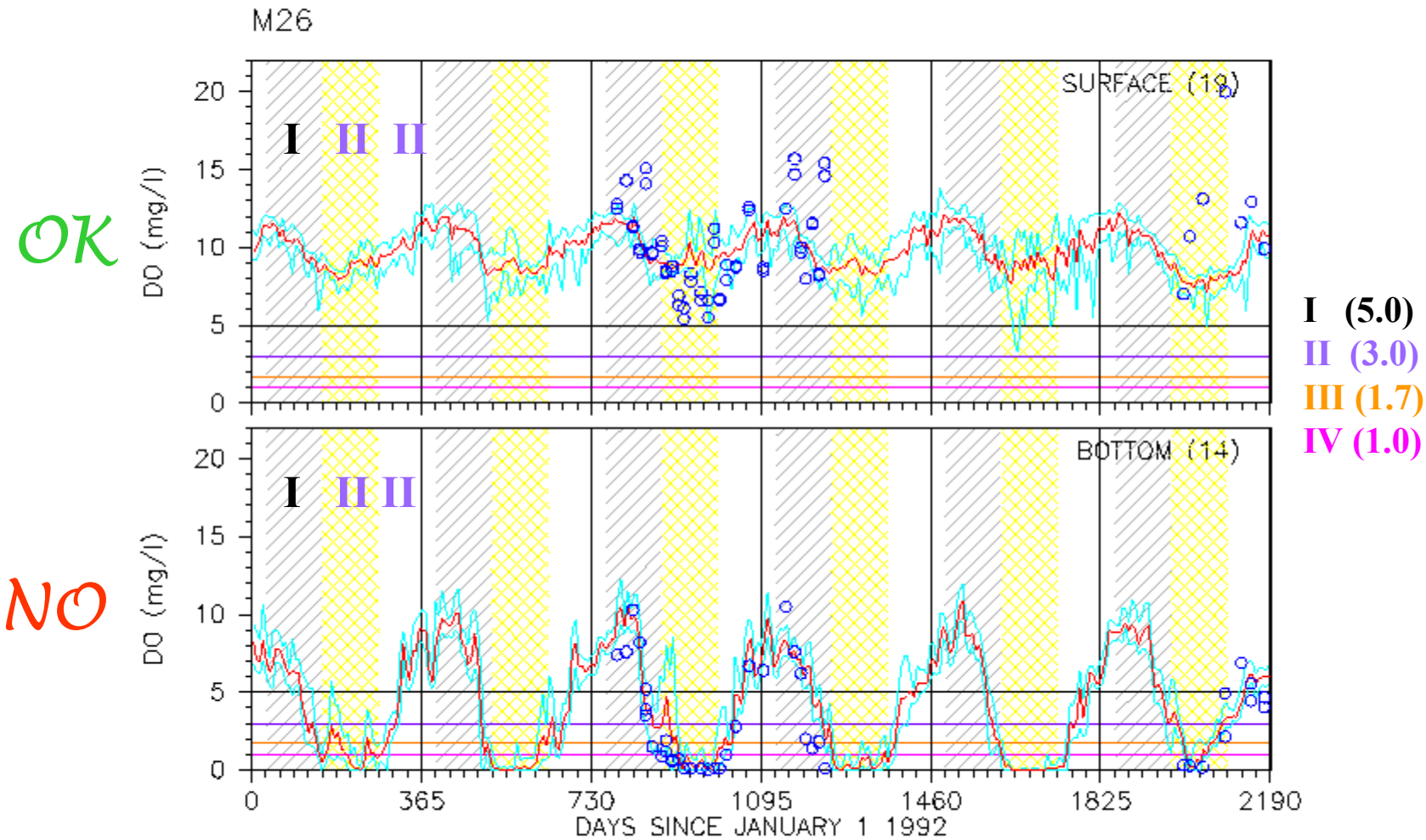
Middle of Harbor
DO



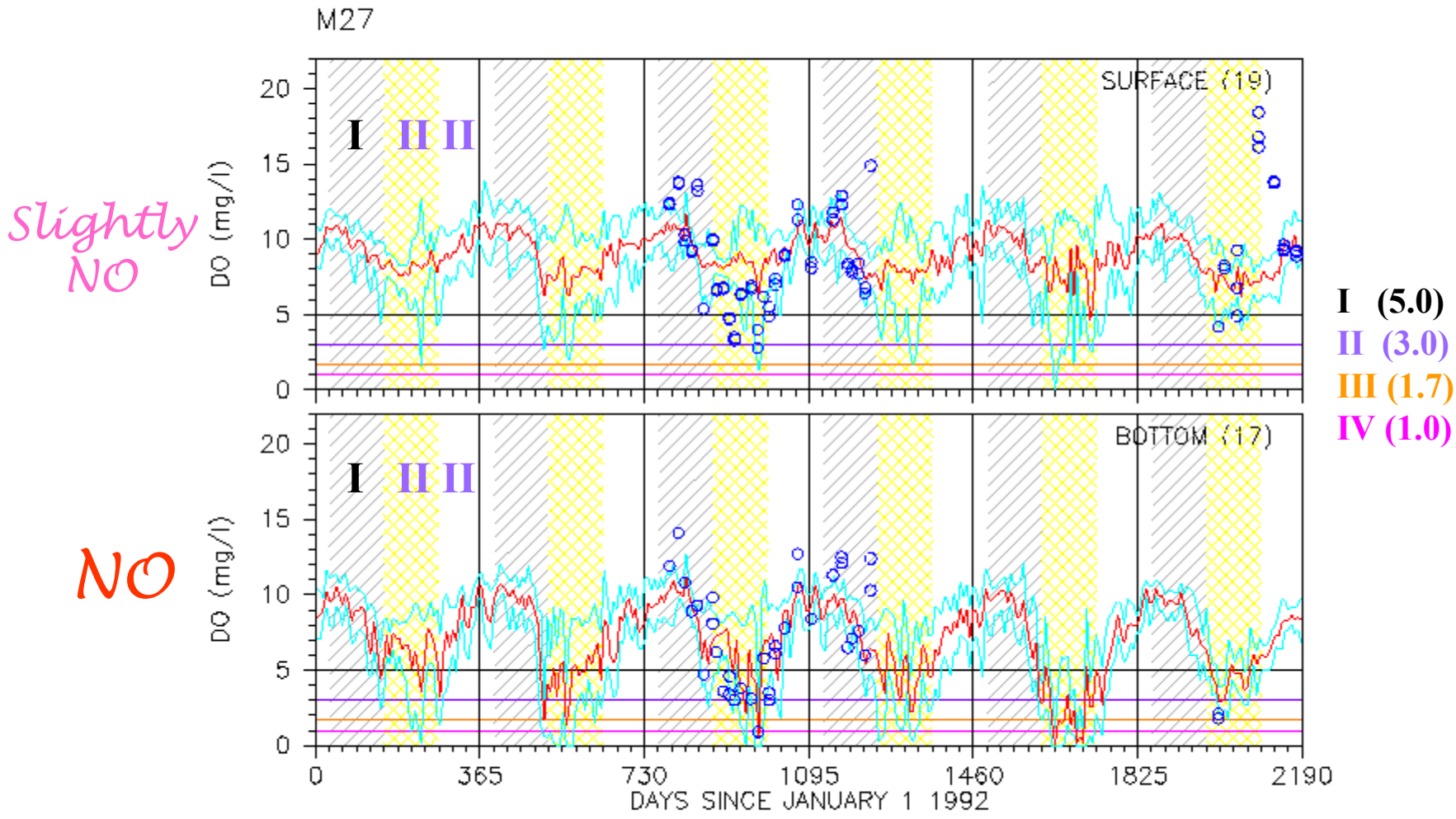
Mouth of Curtis Creek
DO



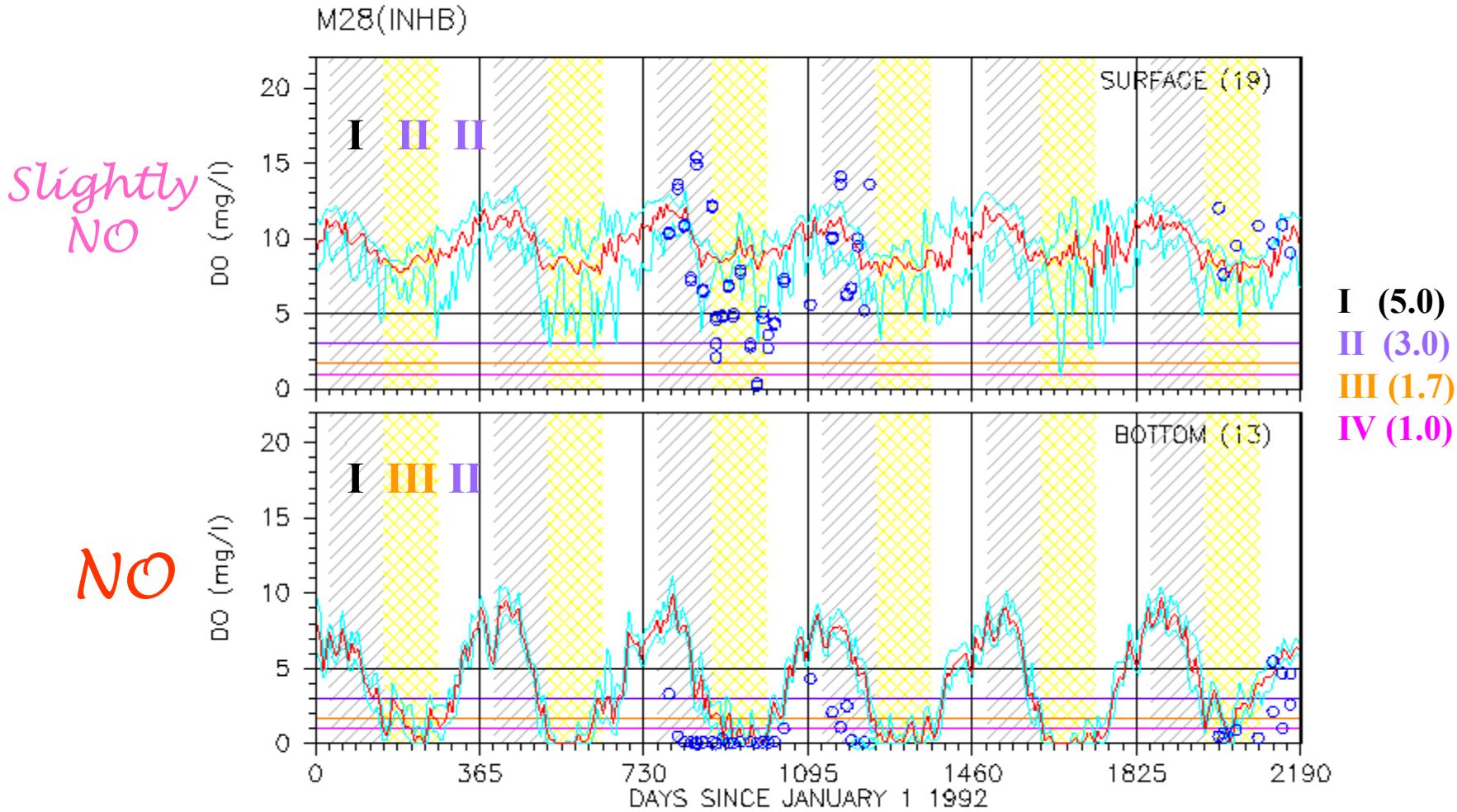
Outside of Middle Branch
DO



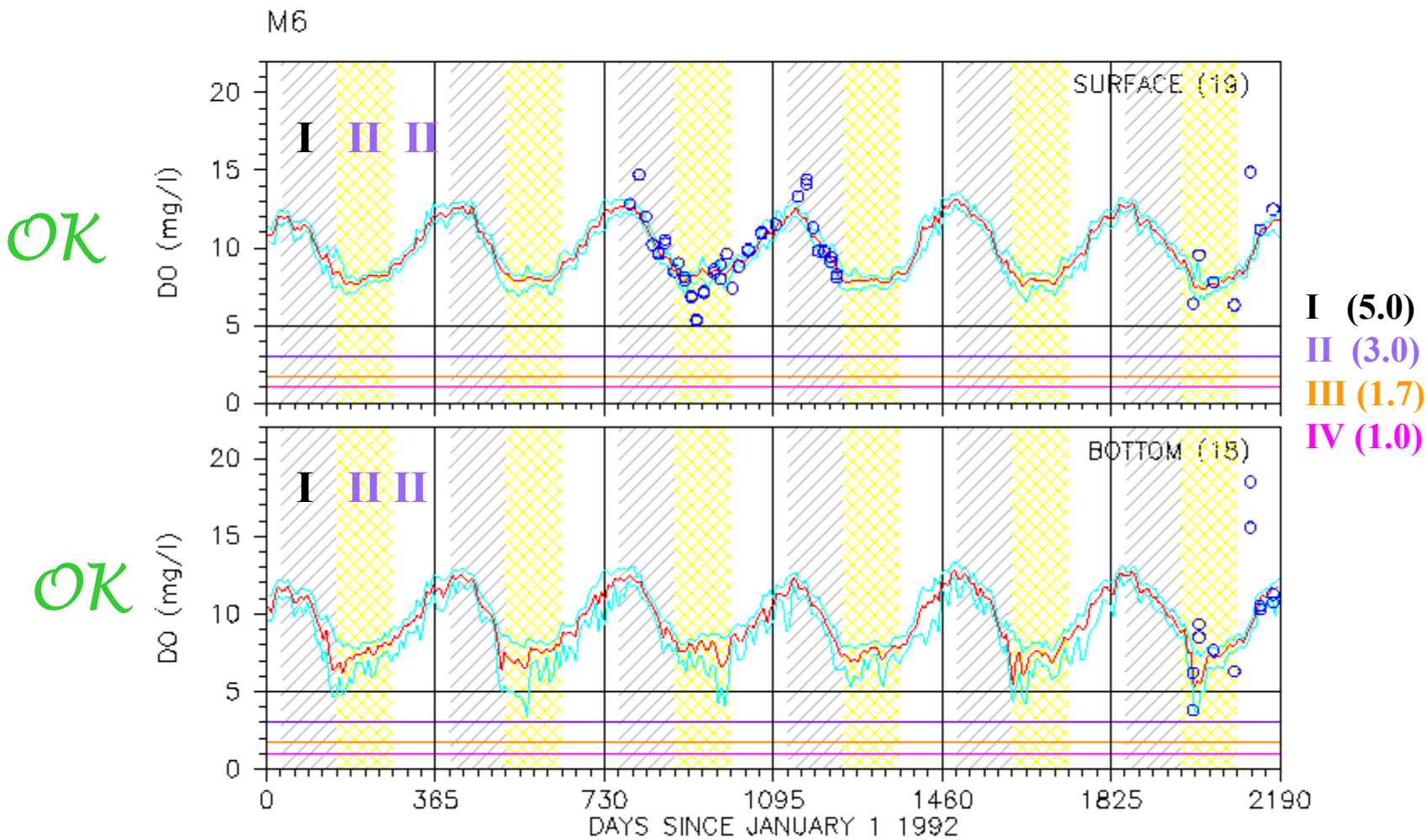
Middle Branch
DO



Inner Harbor
DO

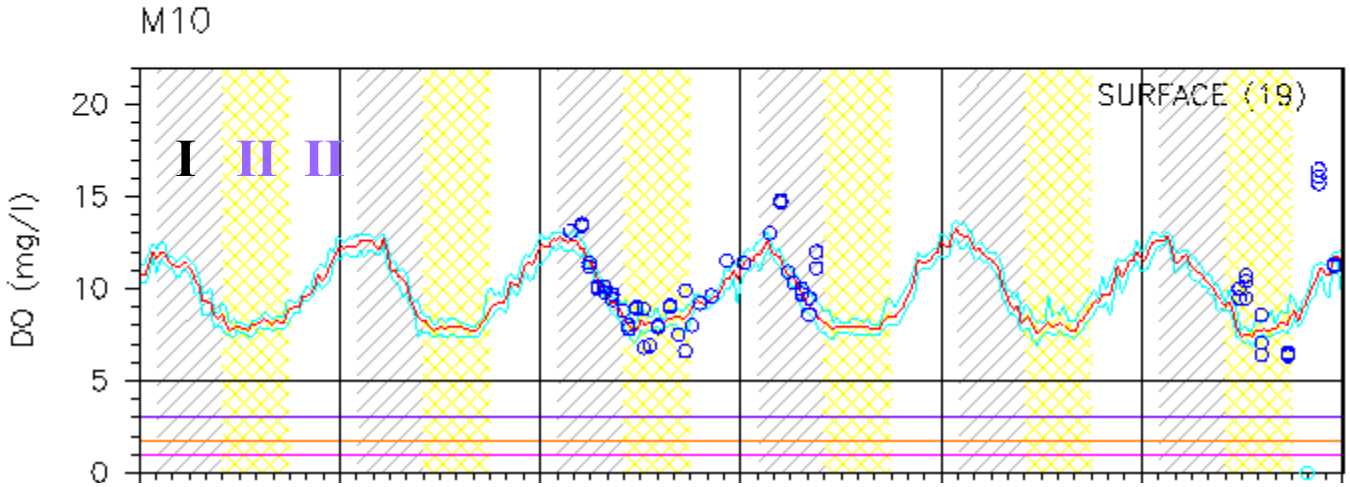


South Shore of Harbor Mouth
DO



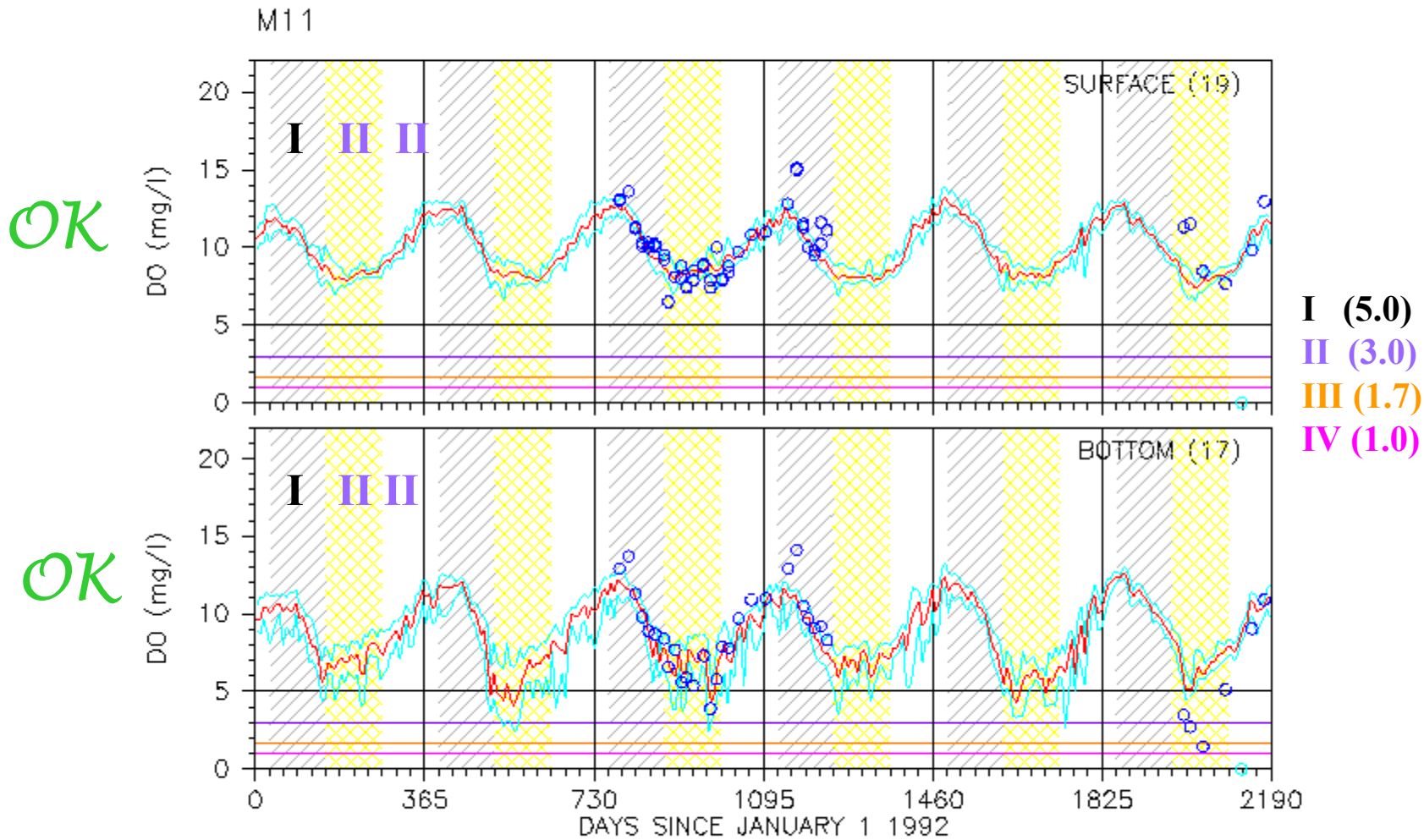
North Shore of Harbor Mouth
DO

OK

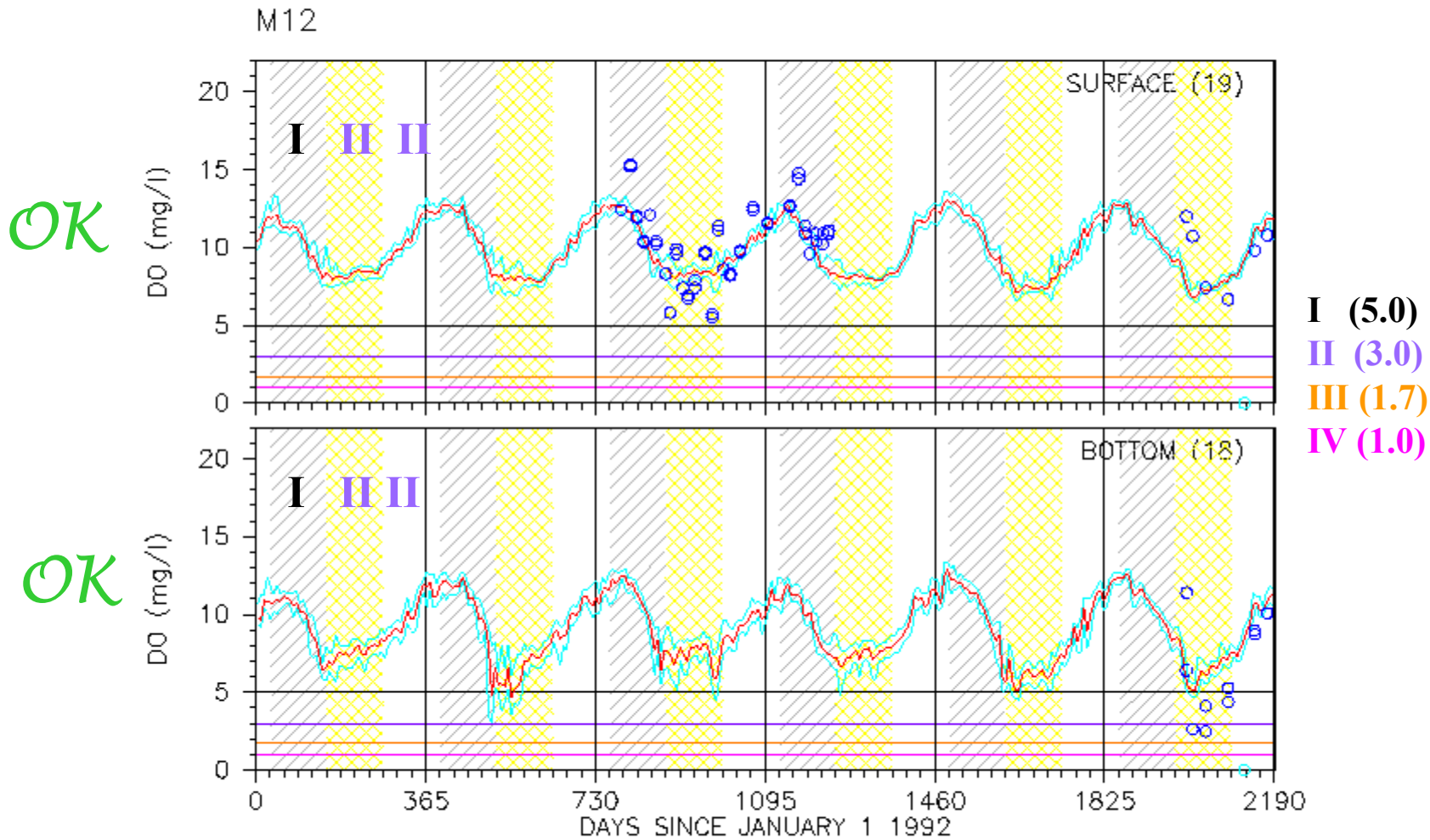


I (5.0)
II (3.0)
III (1.7)

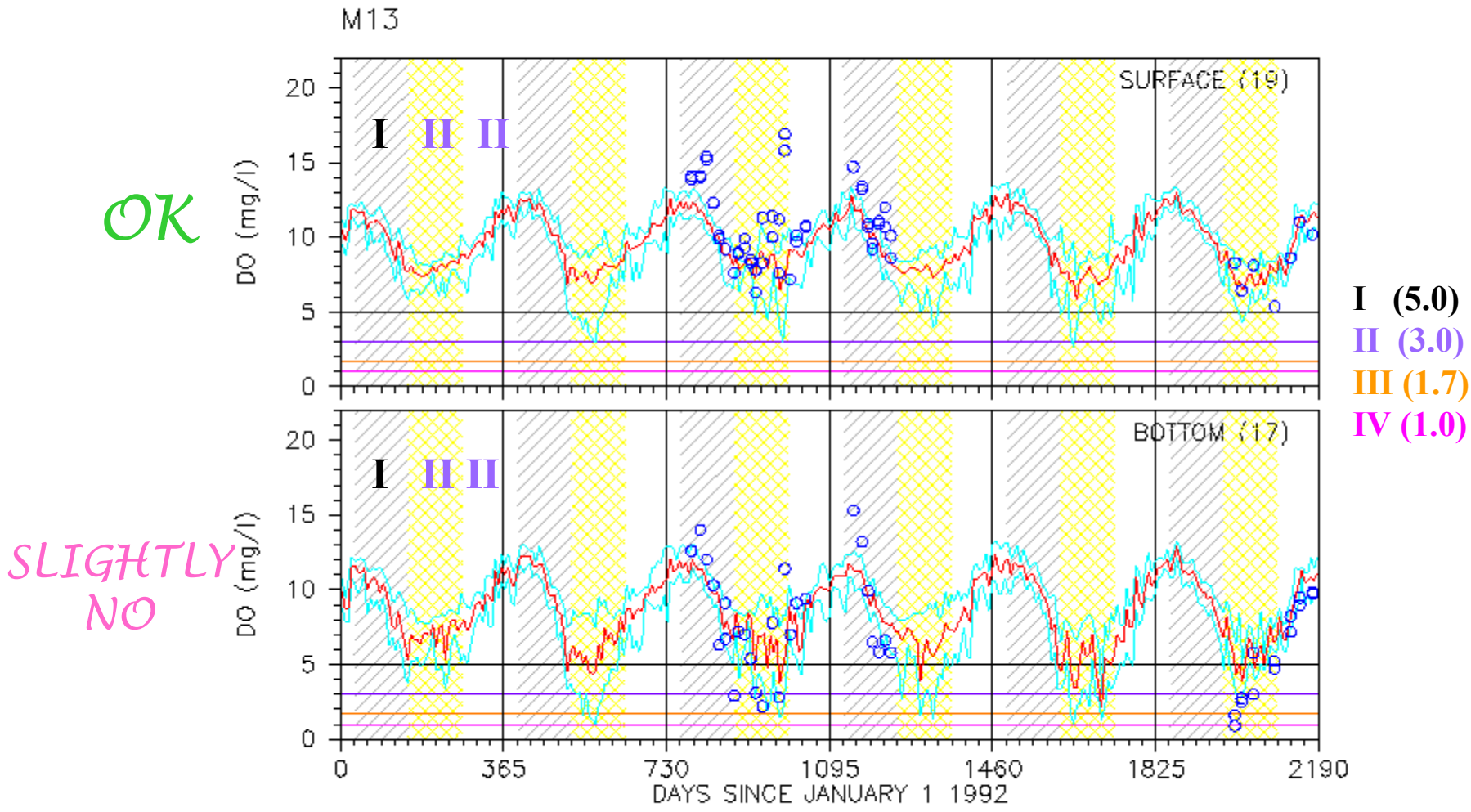
Outside of Old Road Bay
DO



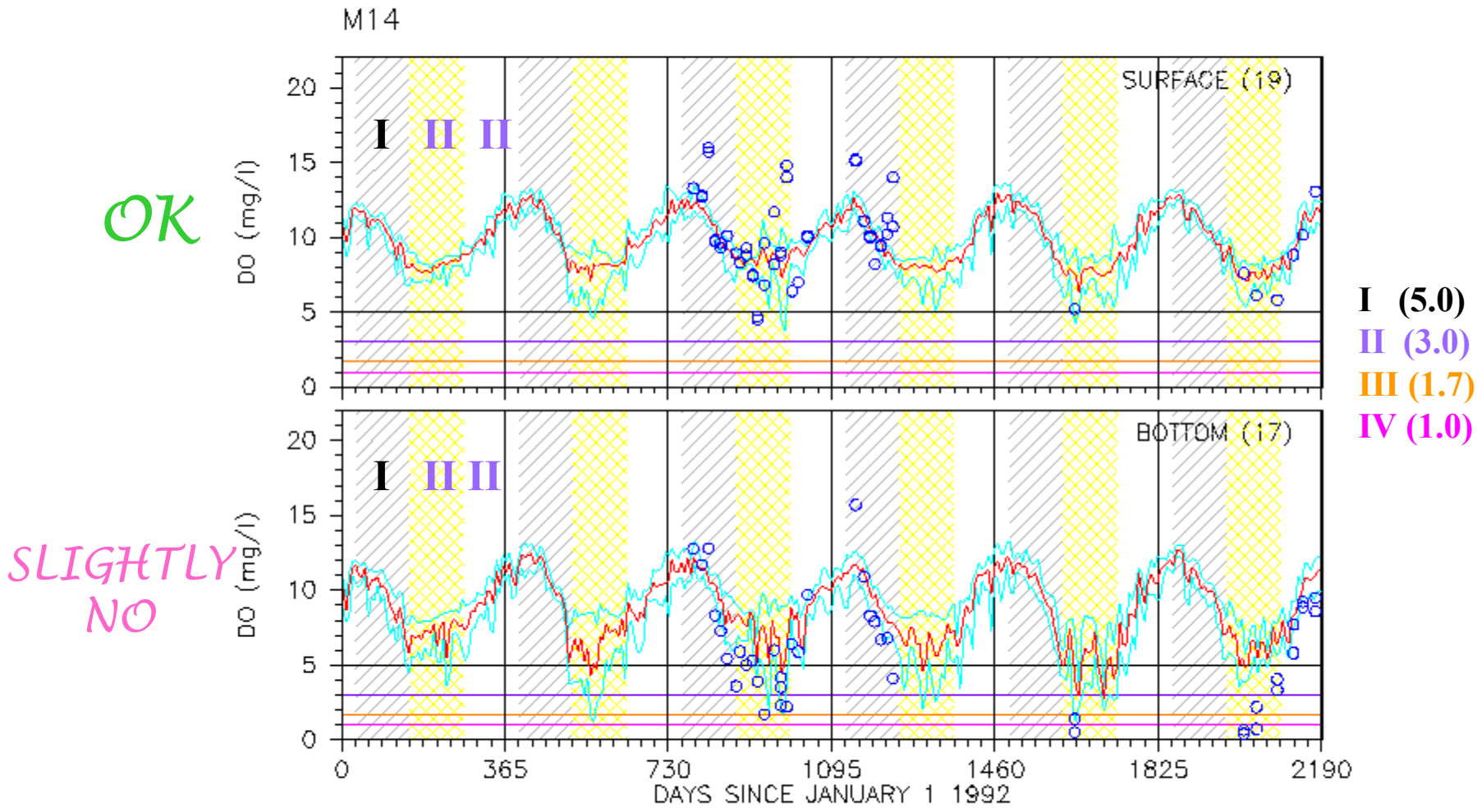
Old Road Bay
DO



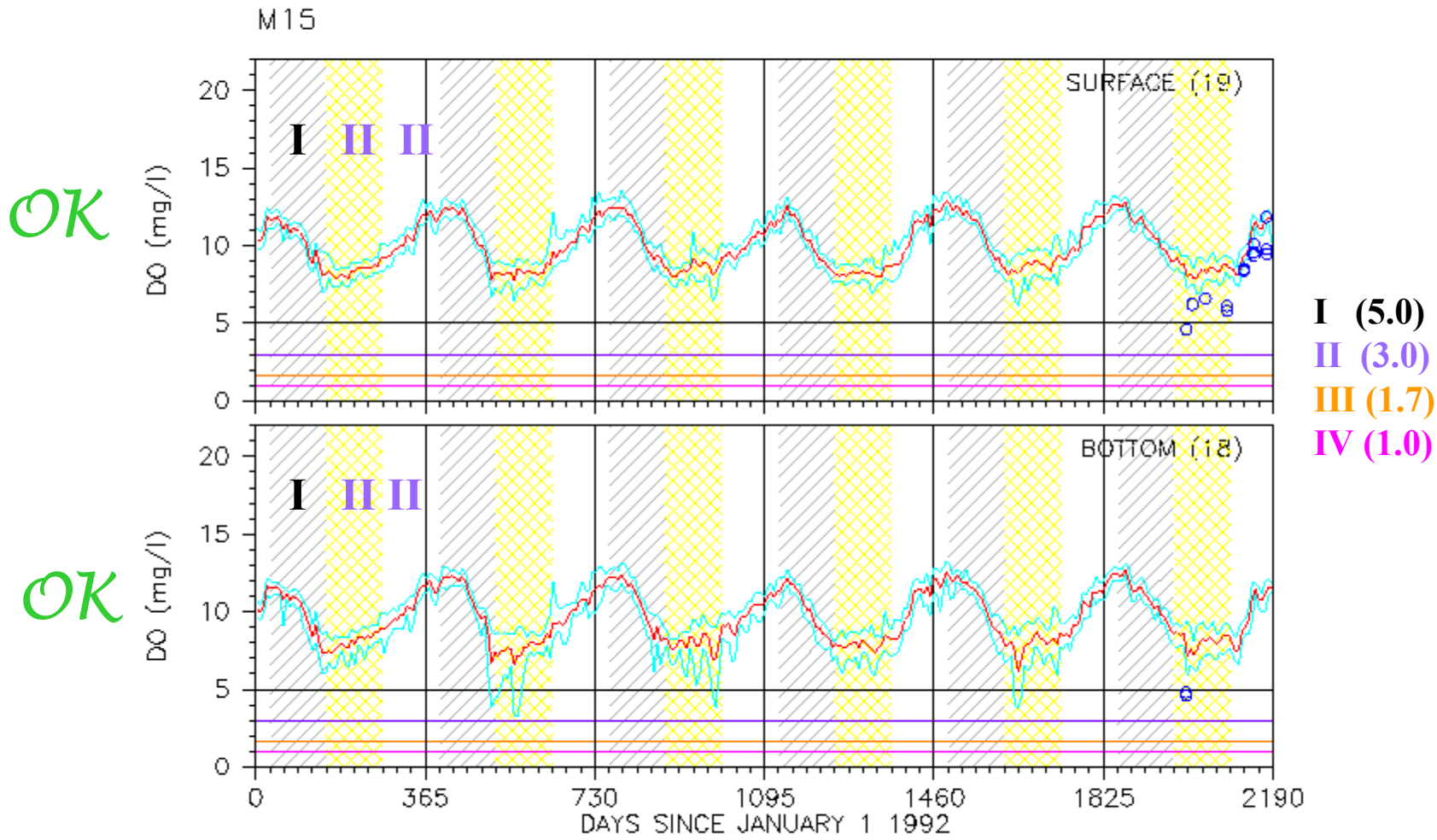
Rock Creek
DO



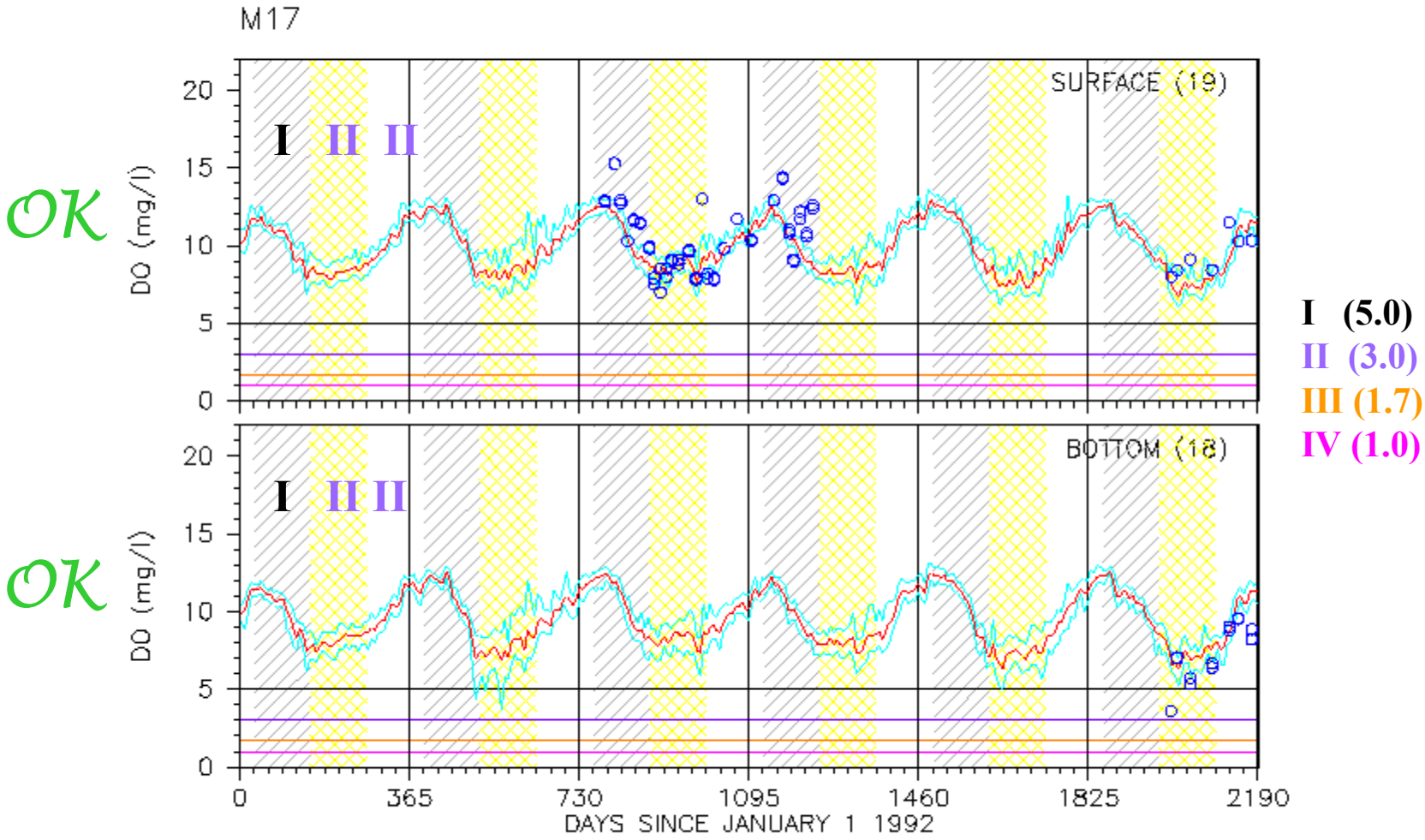
Stoney Creek
DO



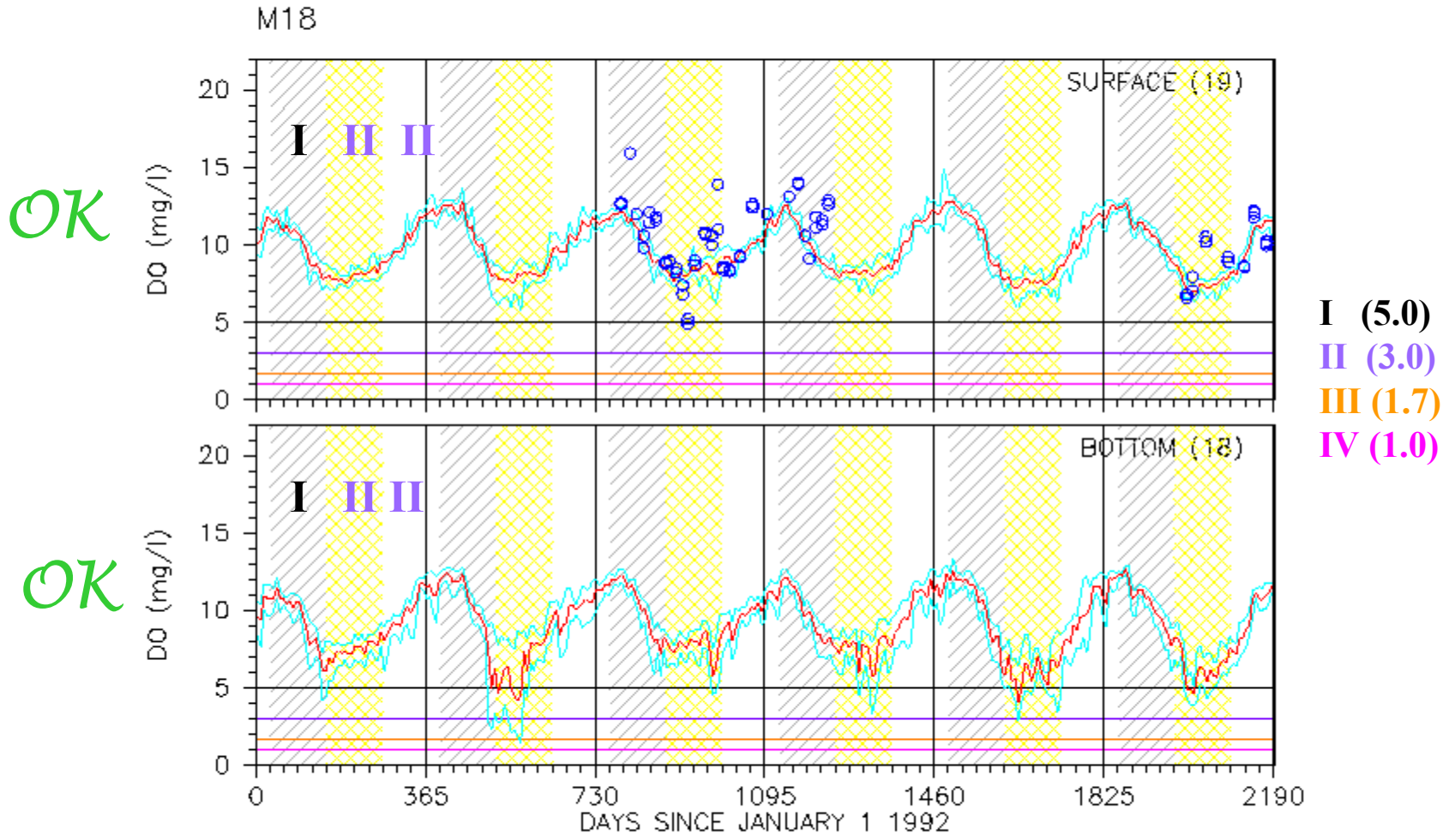
Close to Cox Creek
DO



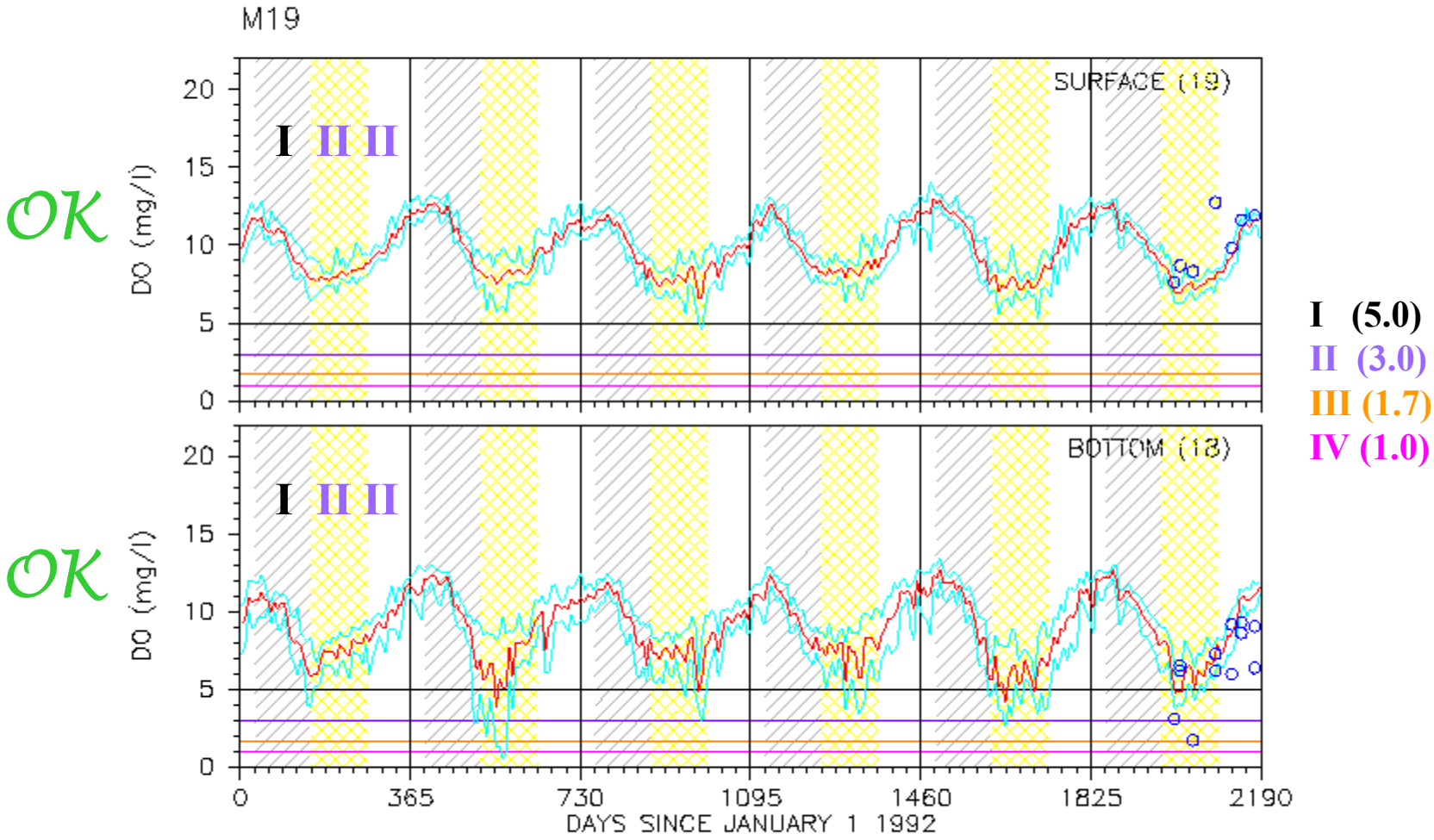
Mouth of Bear Creek
DO



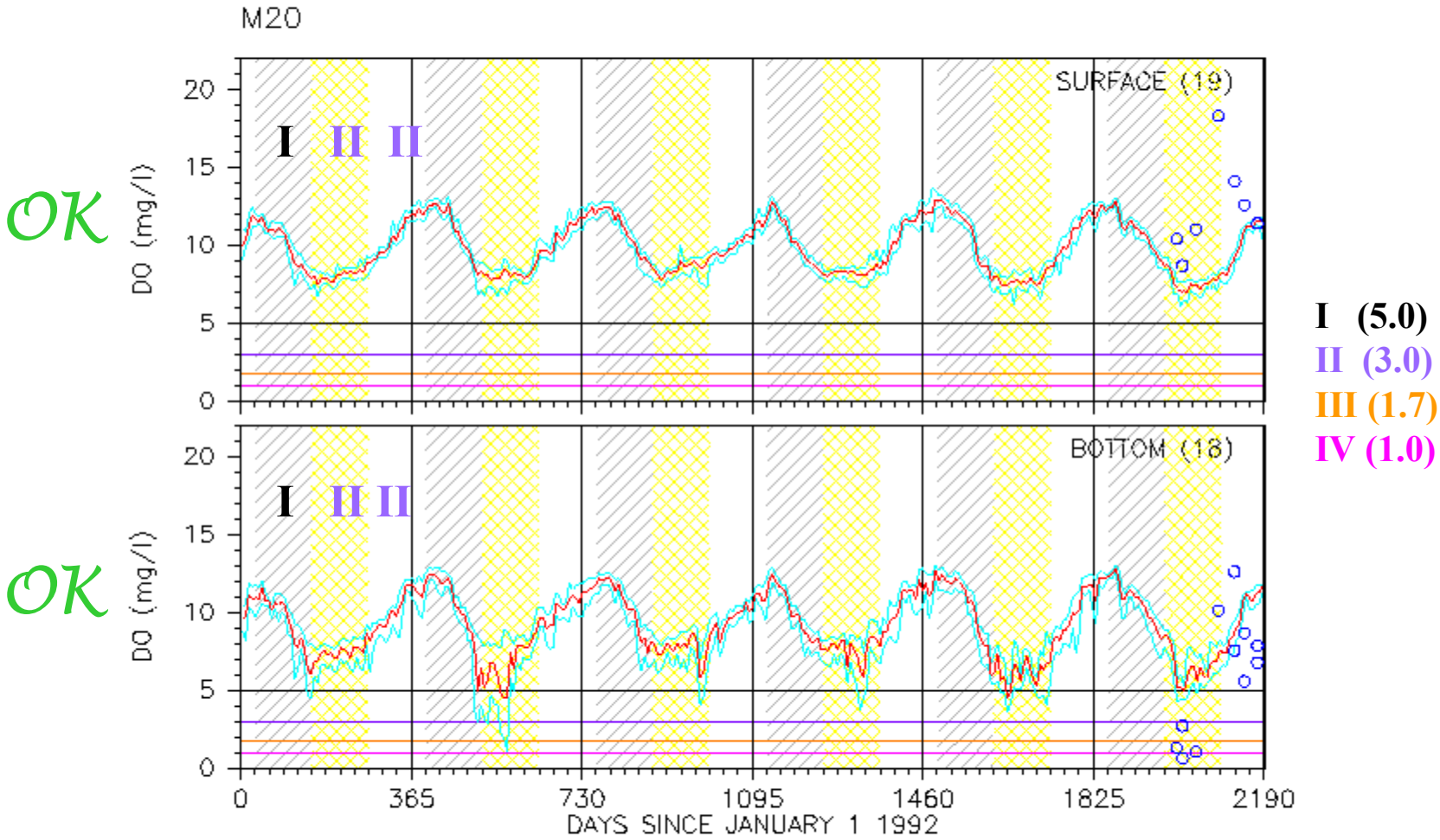
Downstream of Bear Creek
DO



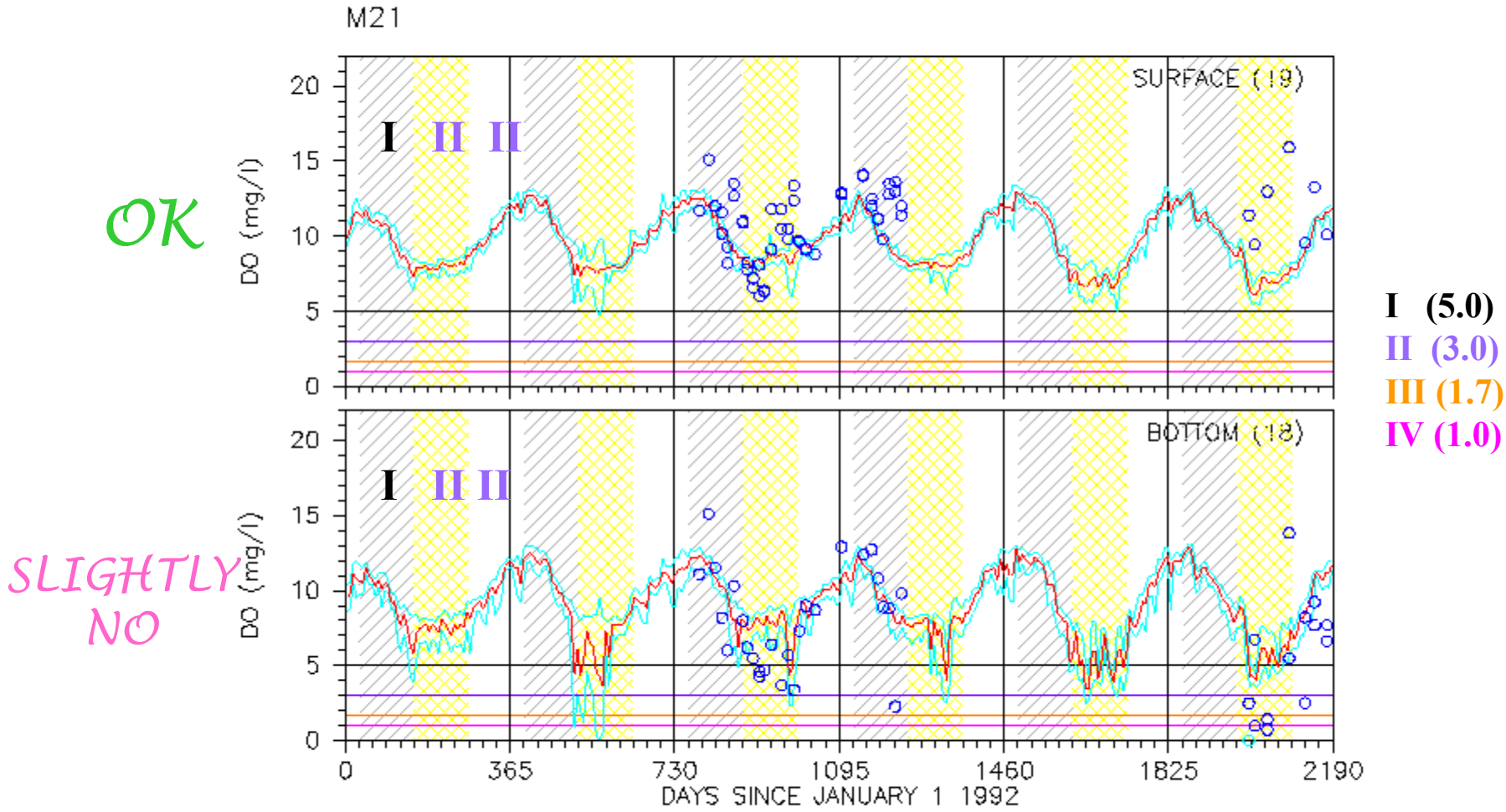
Downstream of Bear Creek
DO



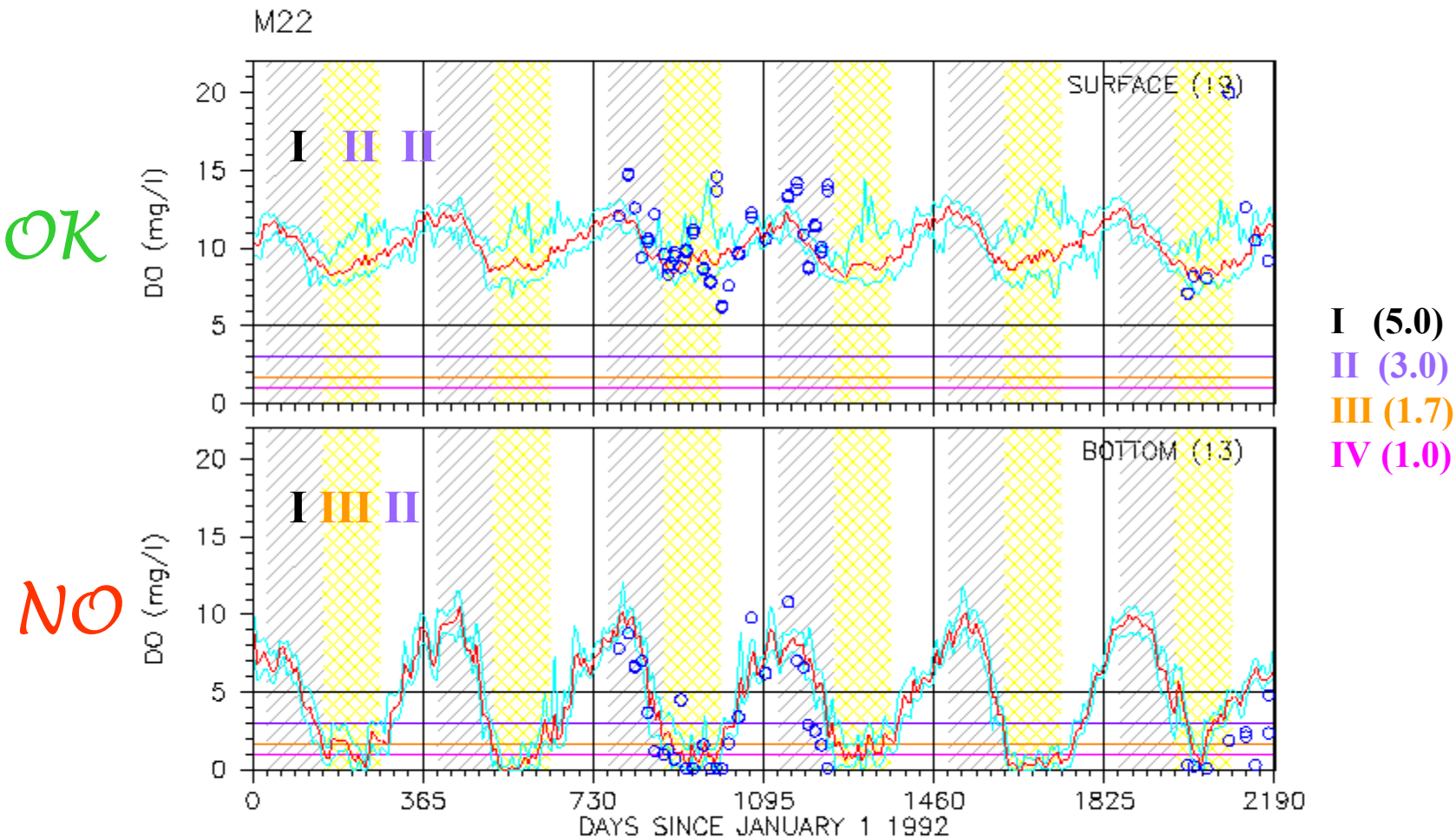
Middle of Bear Creek
DO



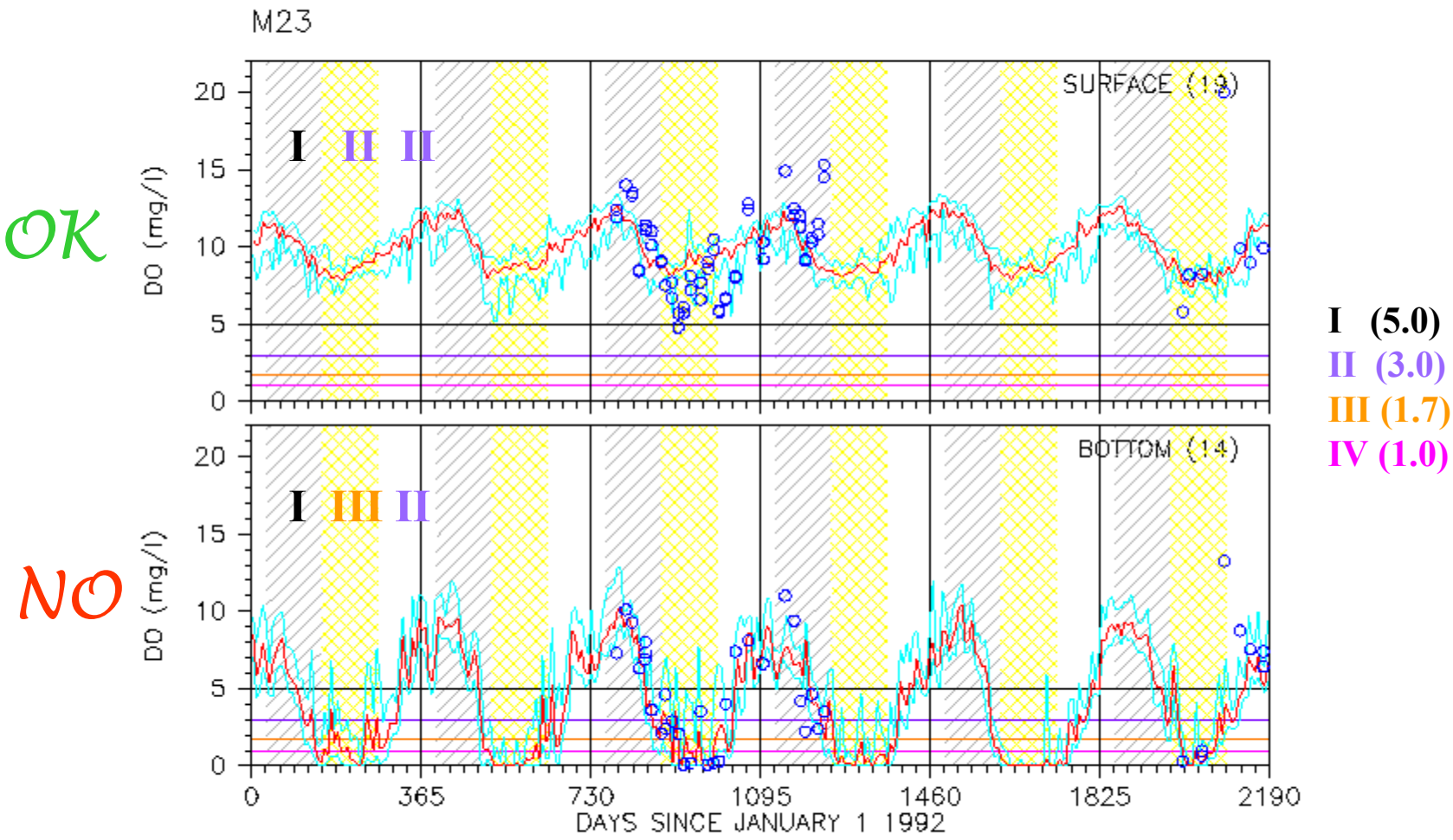
Head of Bear Creek
DO



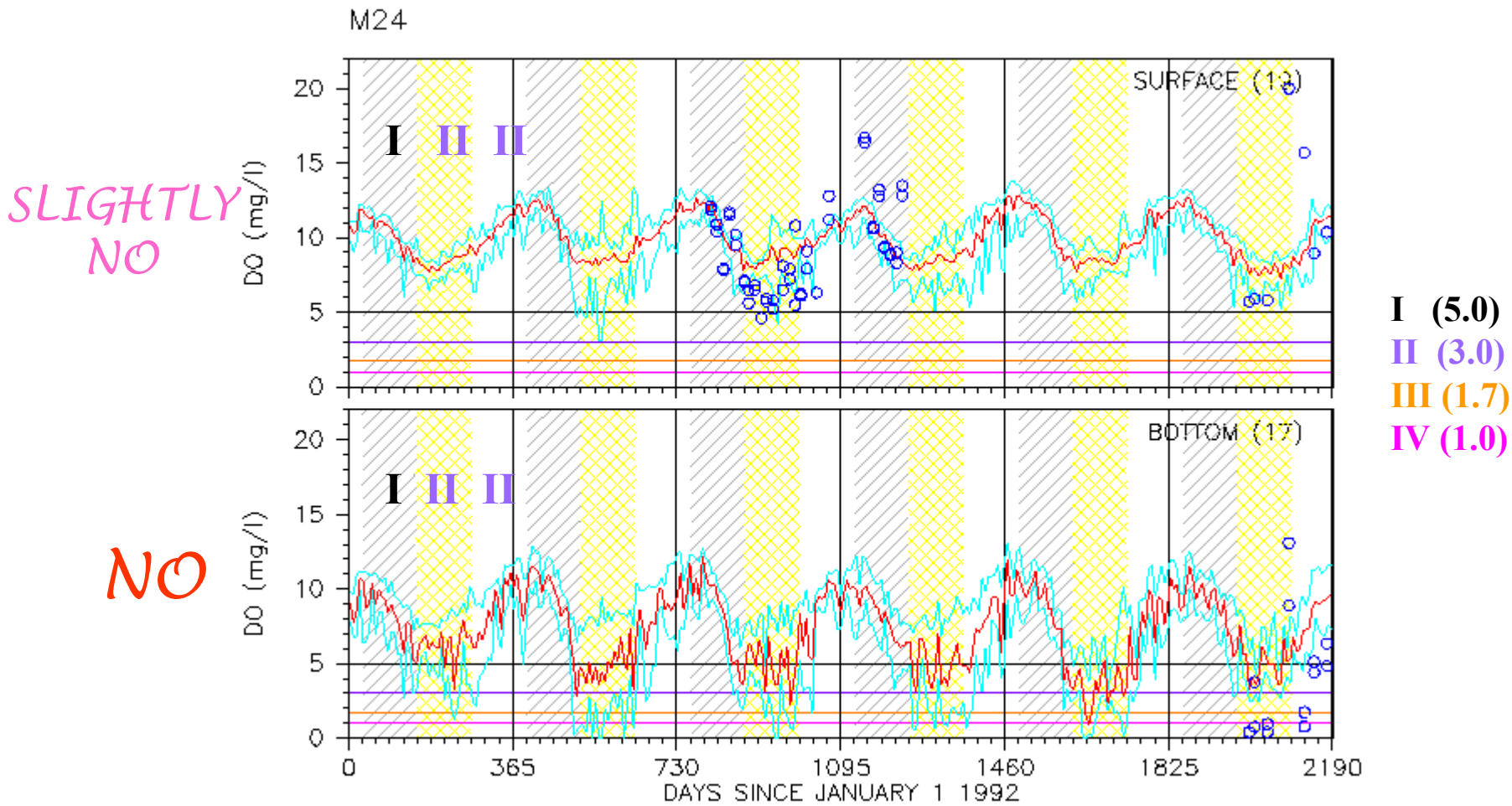
Curtis Bay
DO



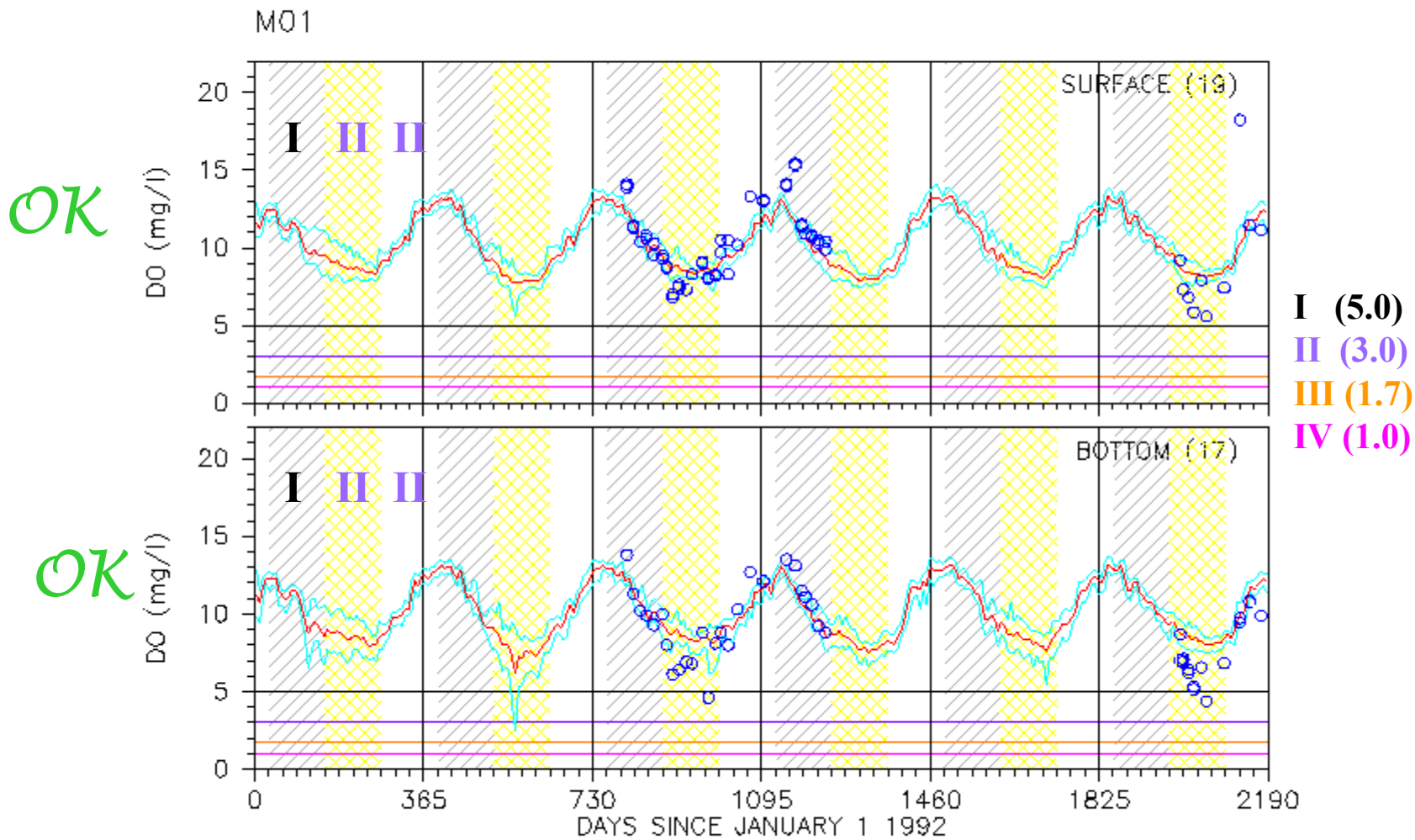
Curtis Creek
DO



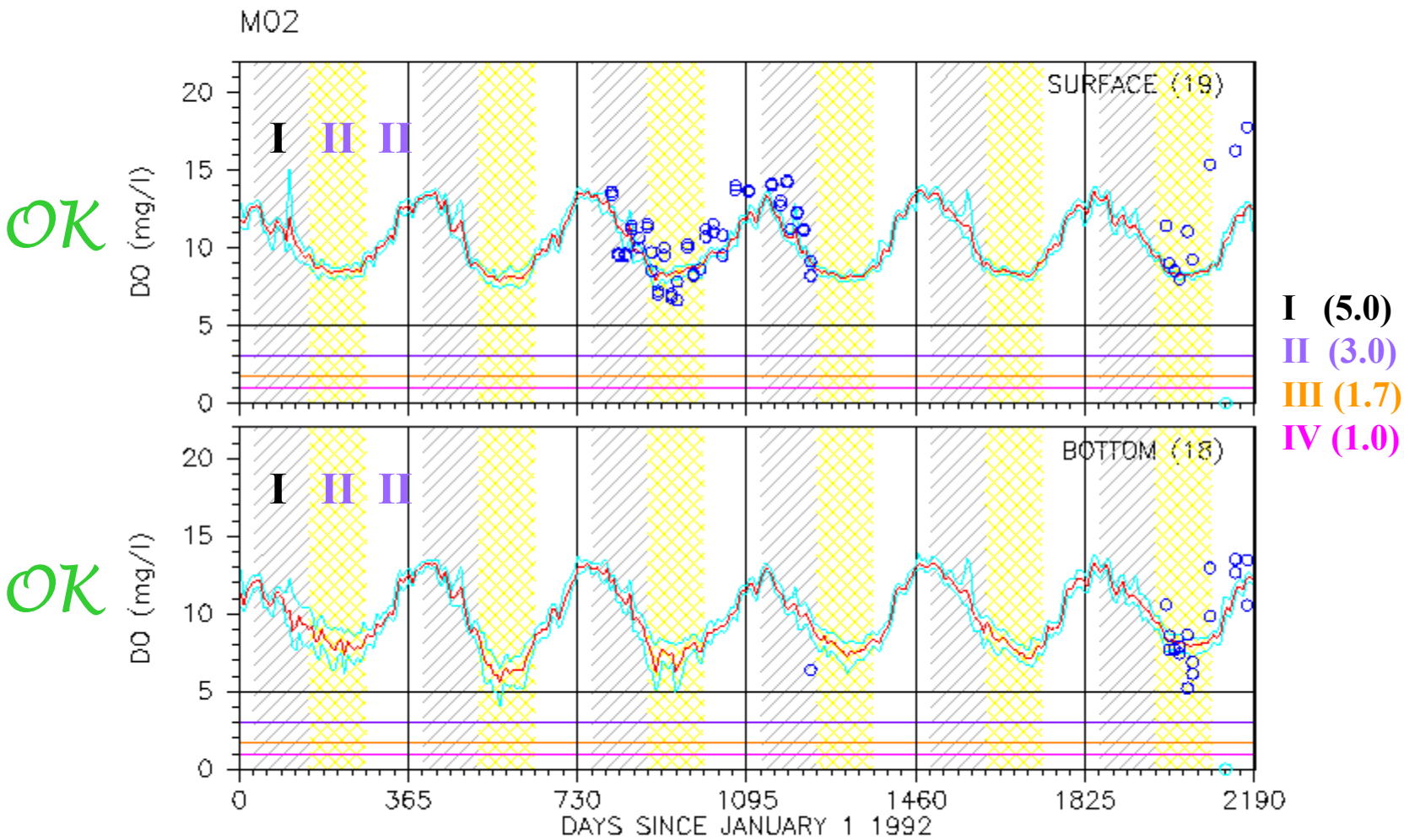
Marley Creek
DO



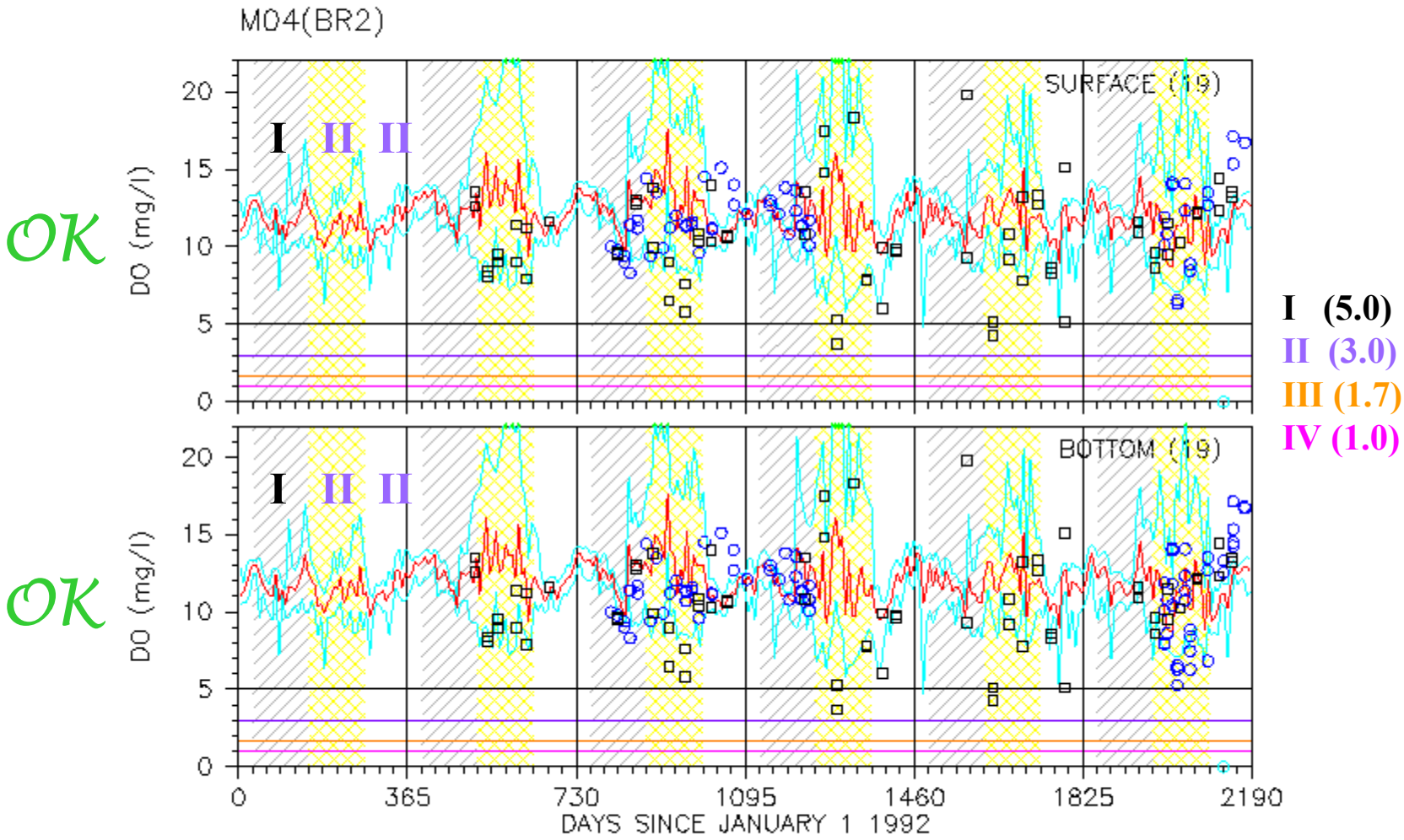
Mouth of Back River
DO



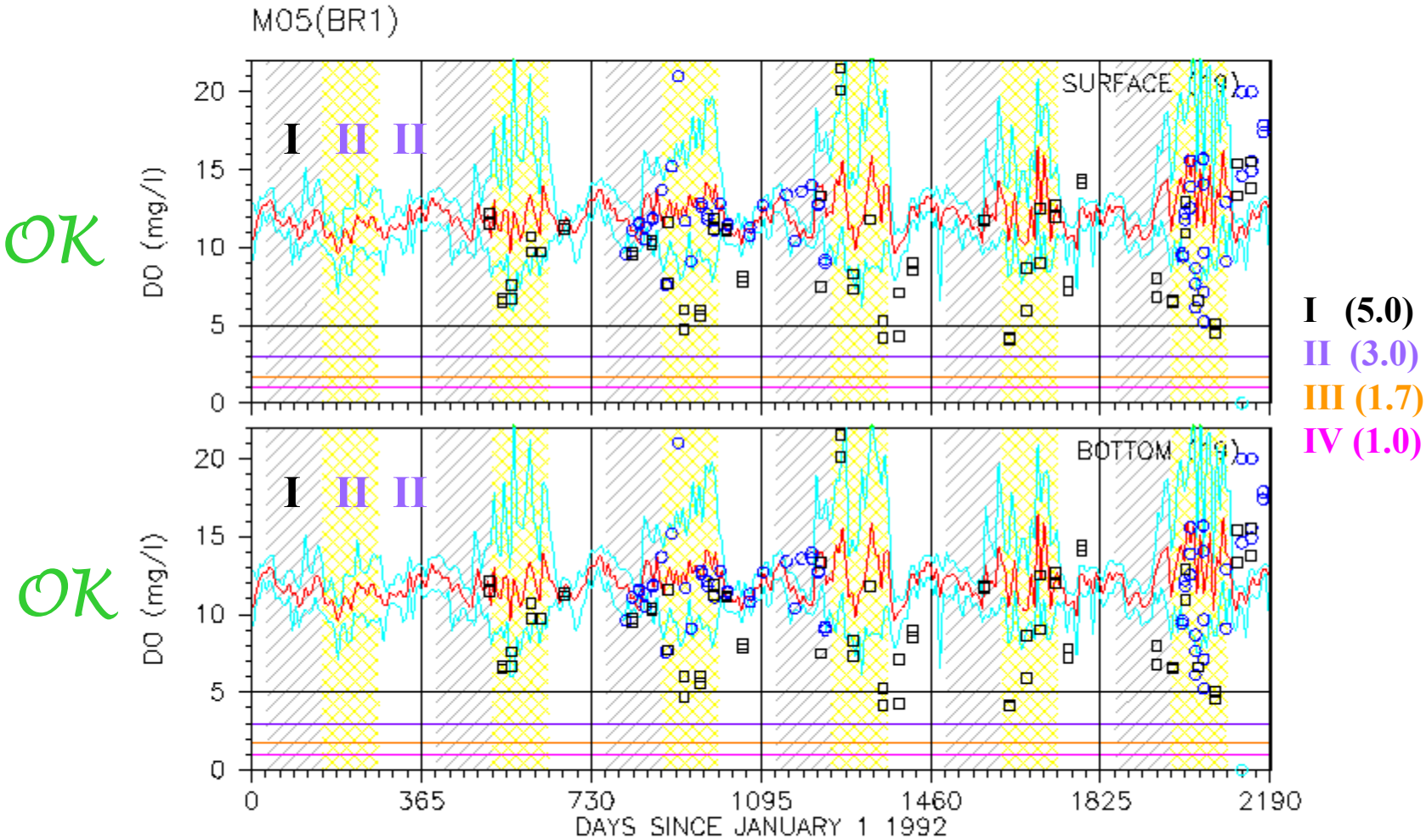
Downstream of Back River
DO



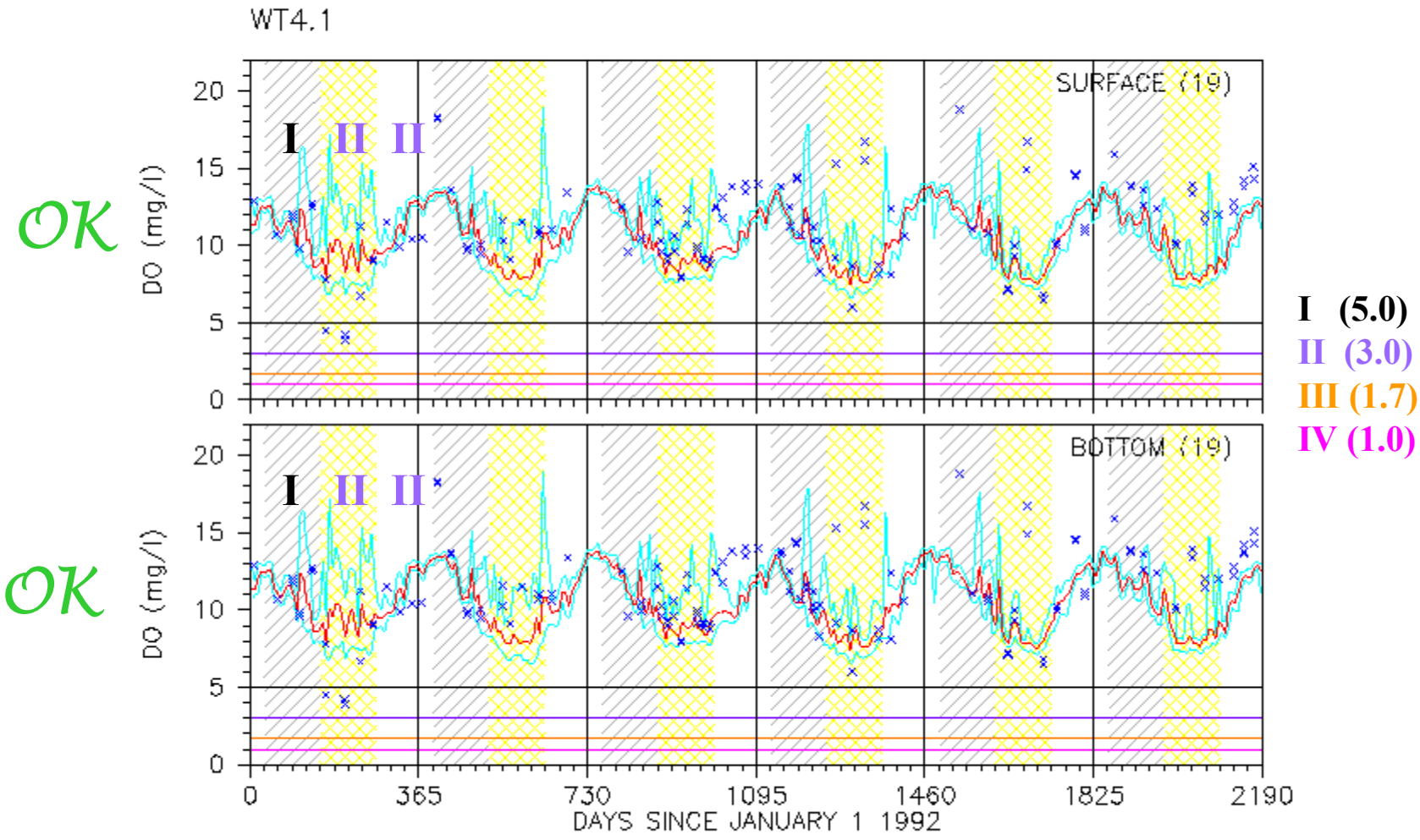
Upstream of Back River
DO



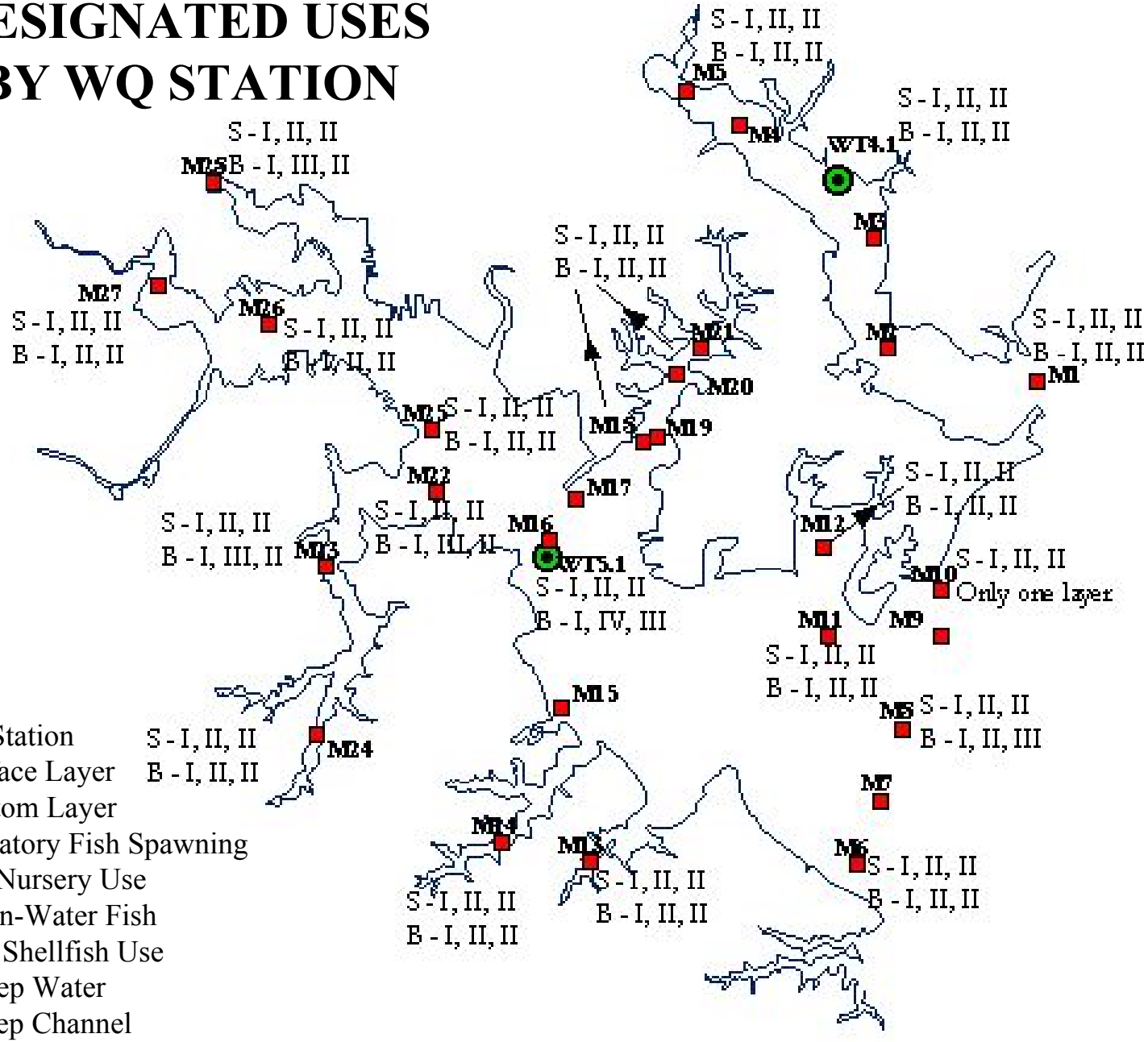
Head of Back River
DO



Middle of Back River
DO

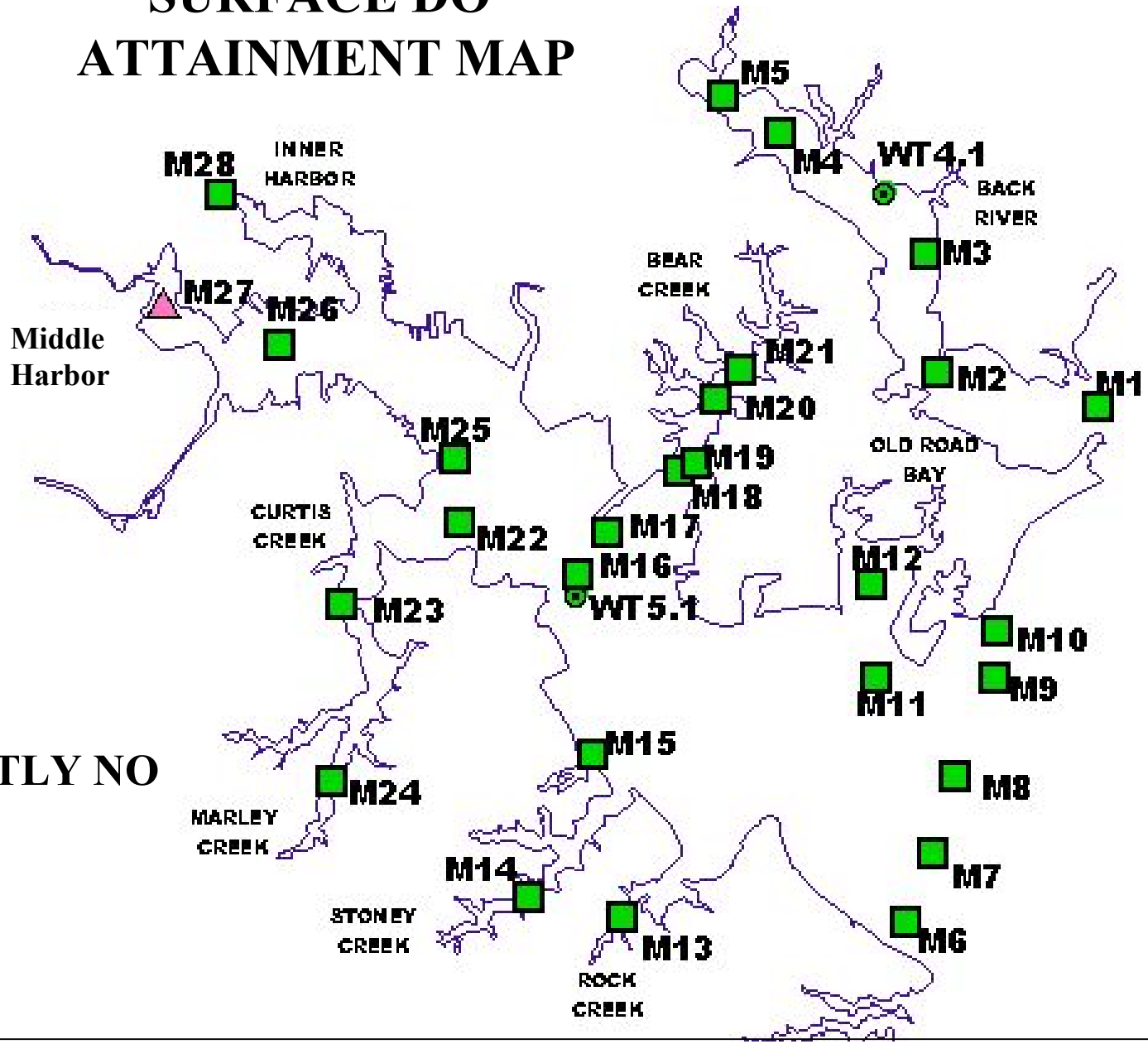


DESIGNATED USES BY WQ STATION



- WQ Station
S – Surface Layer
B – Bottom Layer
I – Migratory Fish Spawning and Nursery Use
II – Open-Water Fish and Shellfish Use
III - Deep Water
IV – Deep Channel

SURFACE DO ATTAINMENT MAP

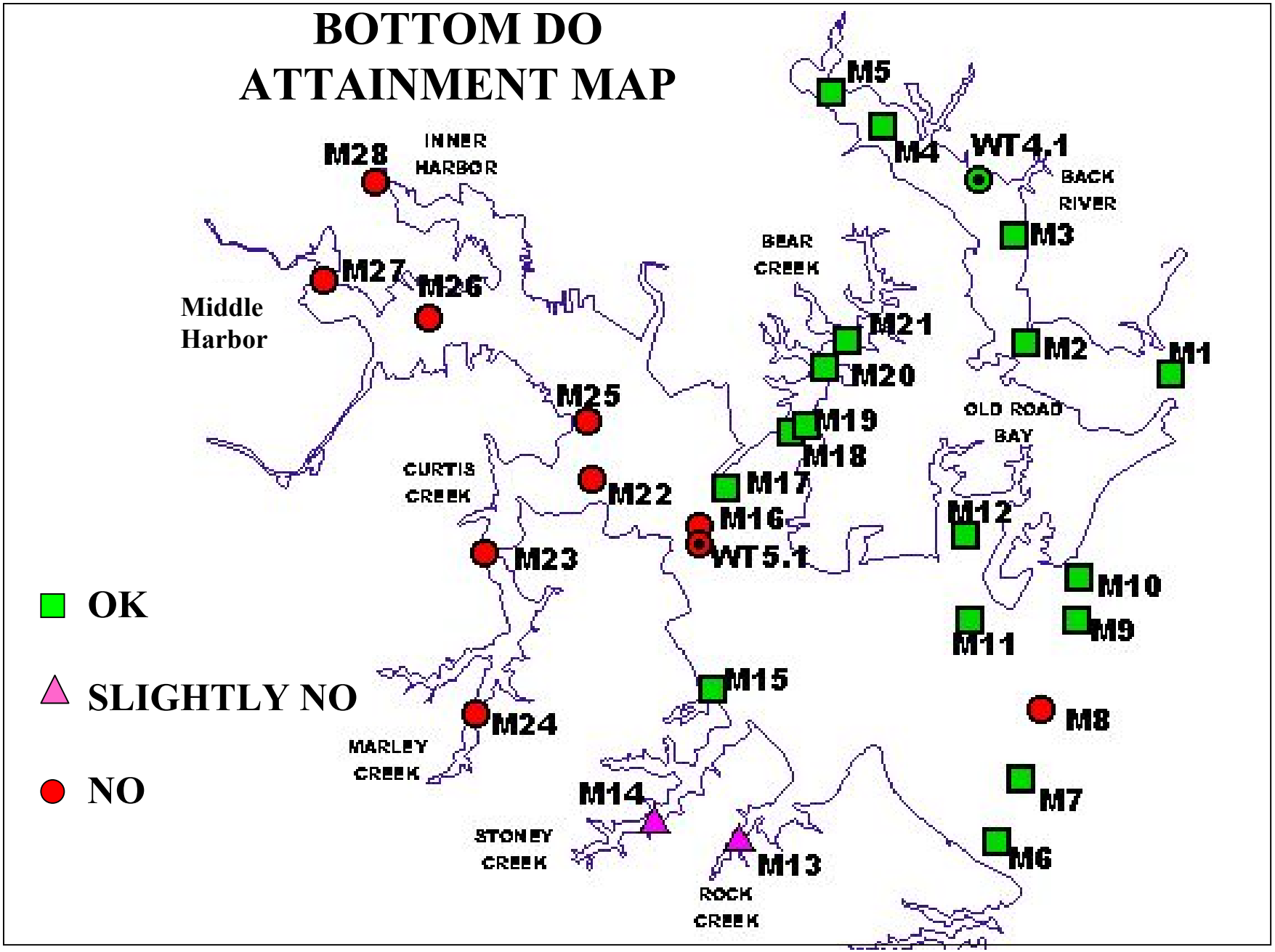


OK

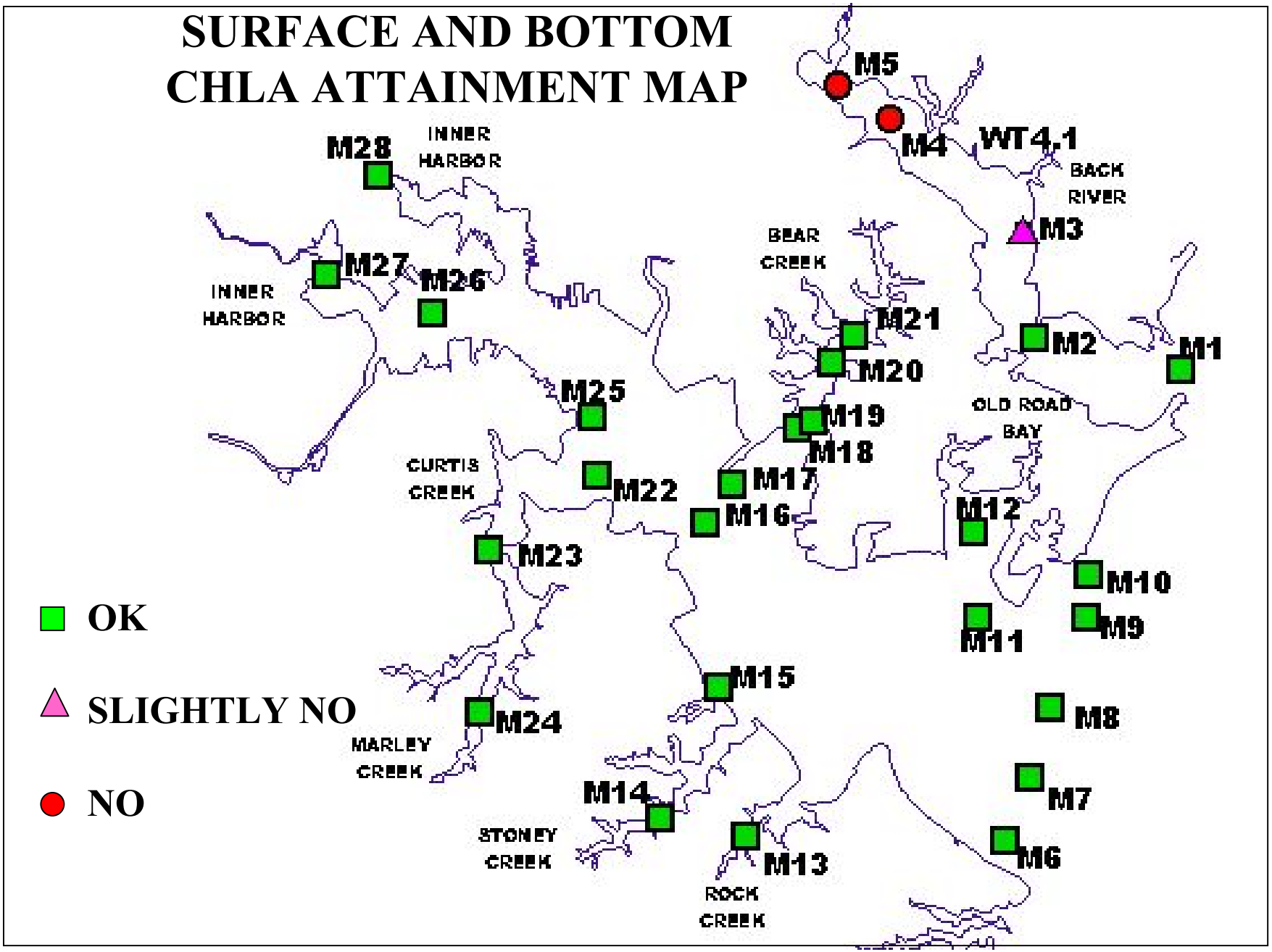
SLIGHTLY NO

NO

BOTTOM DO ATTAINMENT MAP



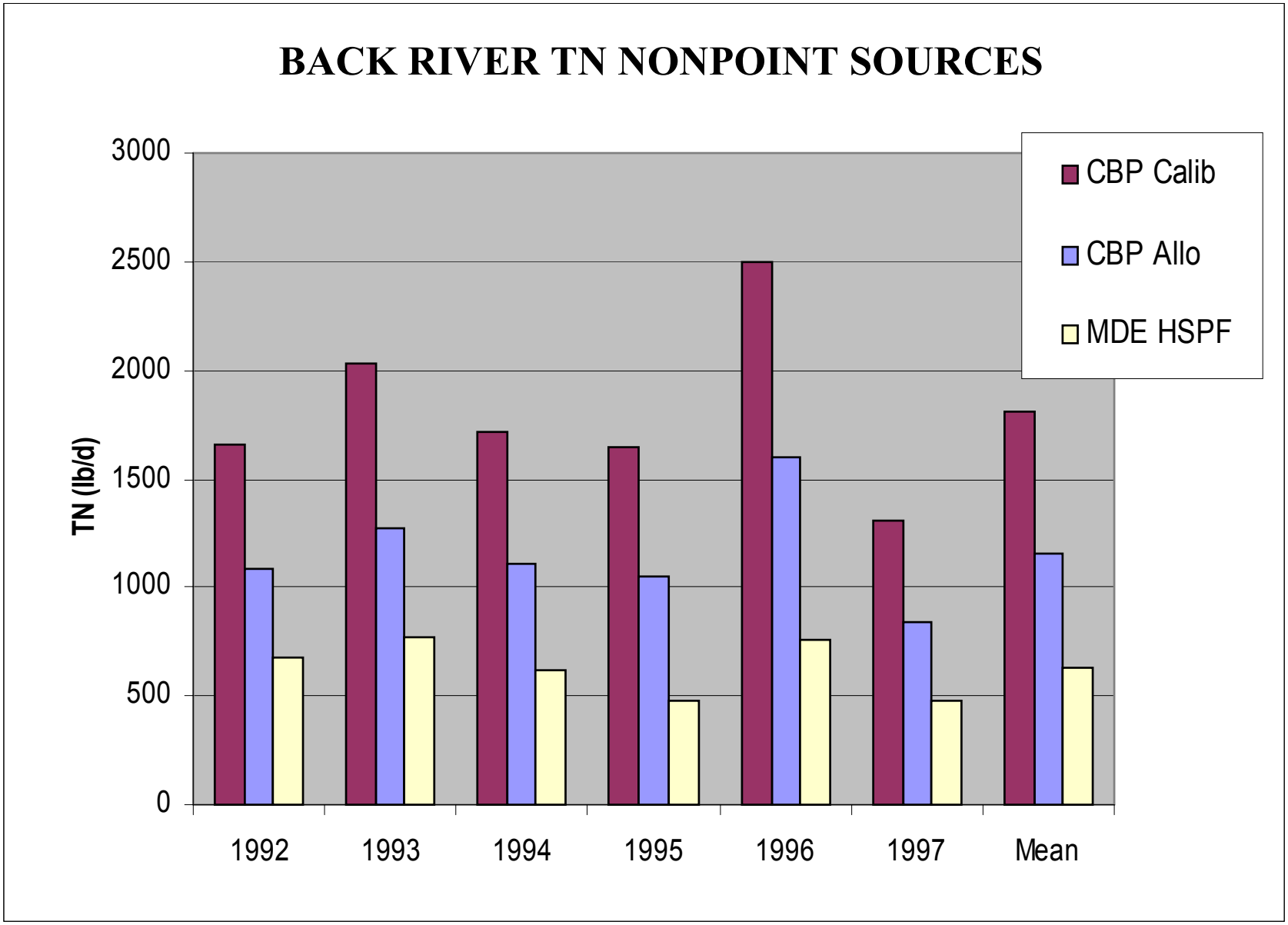
SURFACE AND BOTTOM CHLA ATTAINMENT MAP

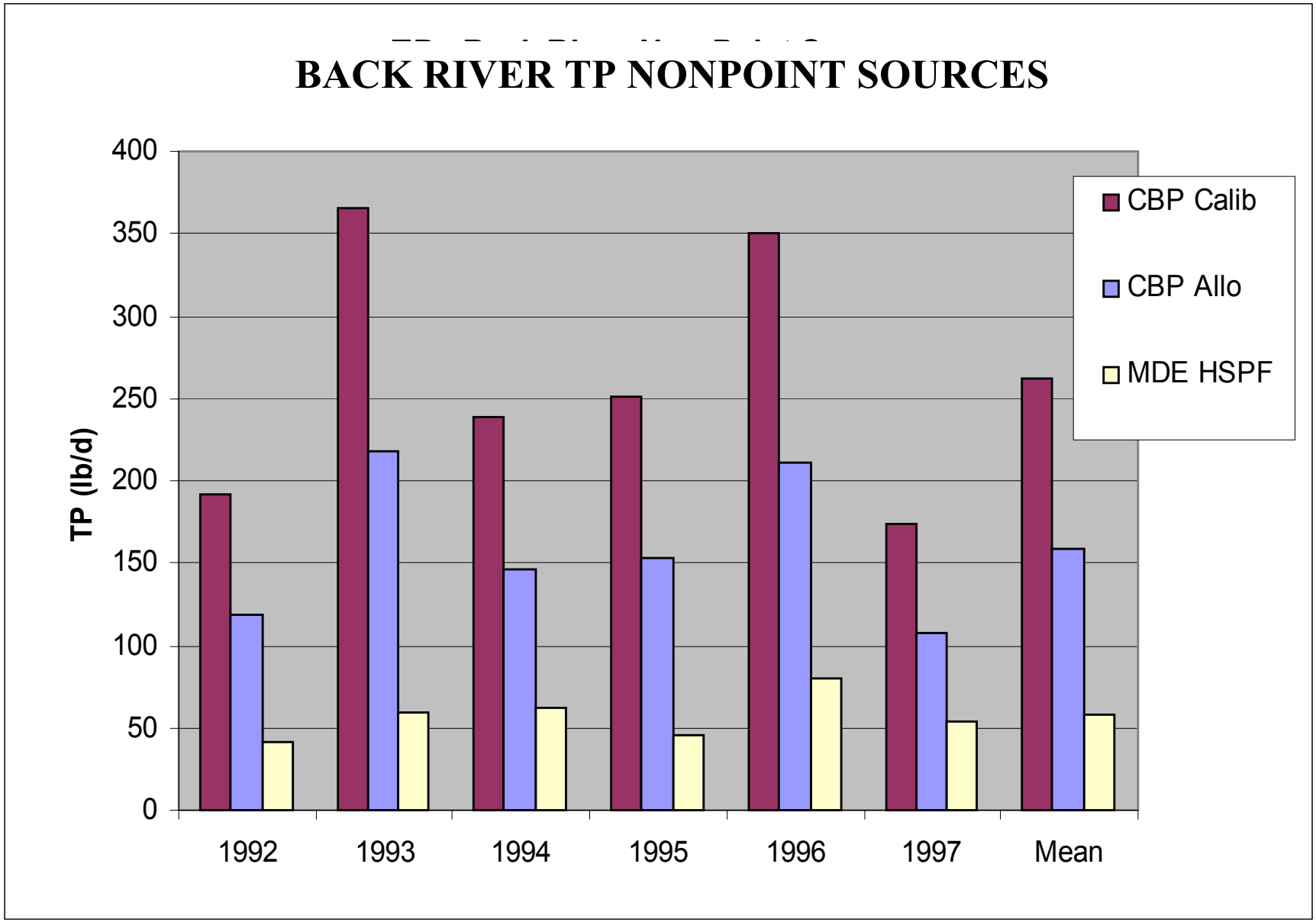


LOADS COMPARISON

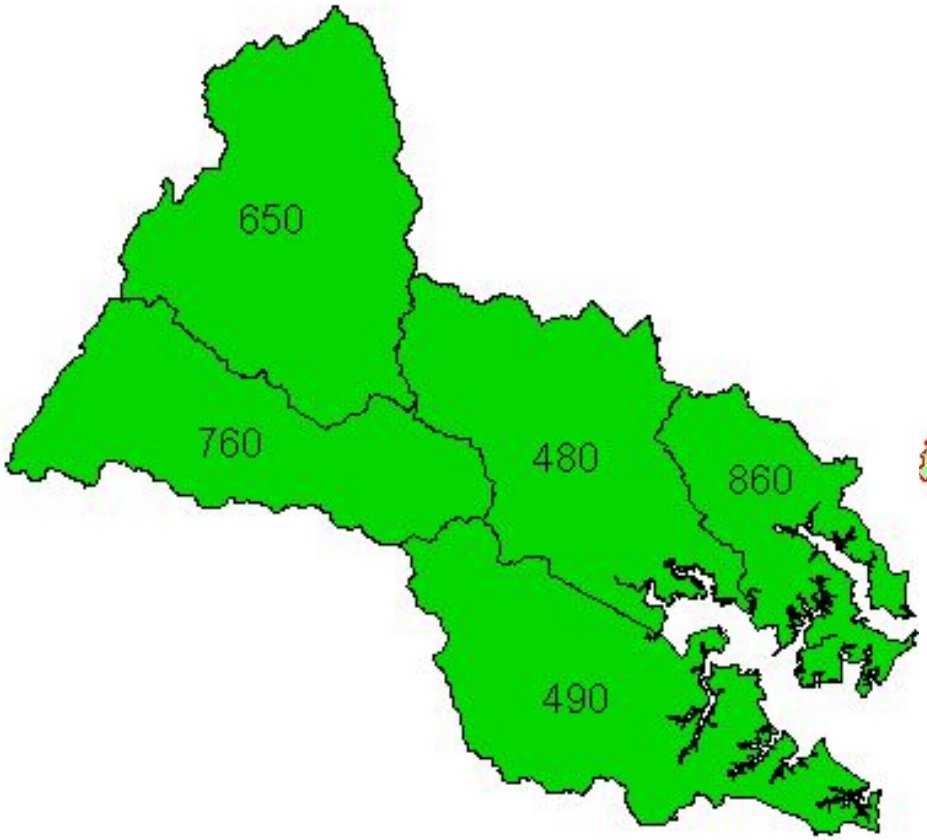
CBP Calibration
CBP Allocation
MDE HSPF

MDE

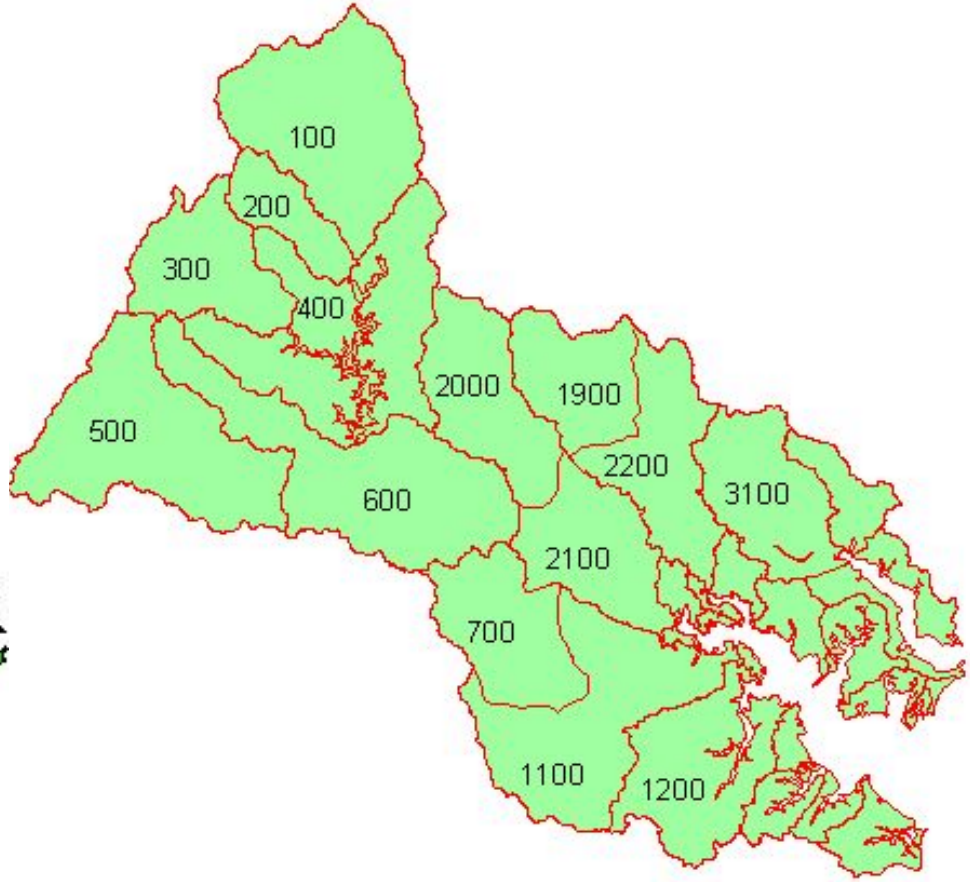

BACK RIVER TN NONPOINT SOURCES
TN (lb/d)
3000
2500
2000
1500
1000
500
0
1992
1993
1994
1995
1996
1997
Mean
CBP Calib
CBP Allo
MDE HSPF

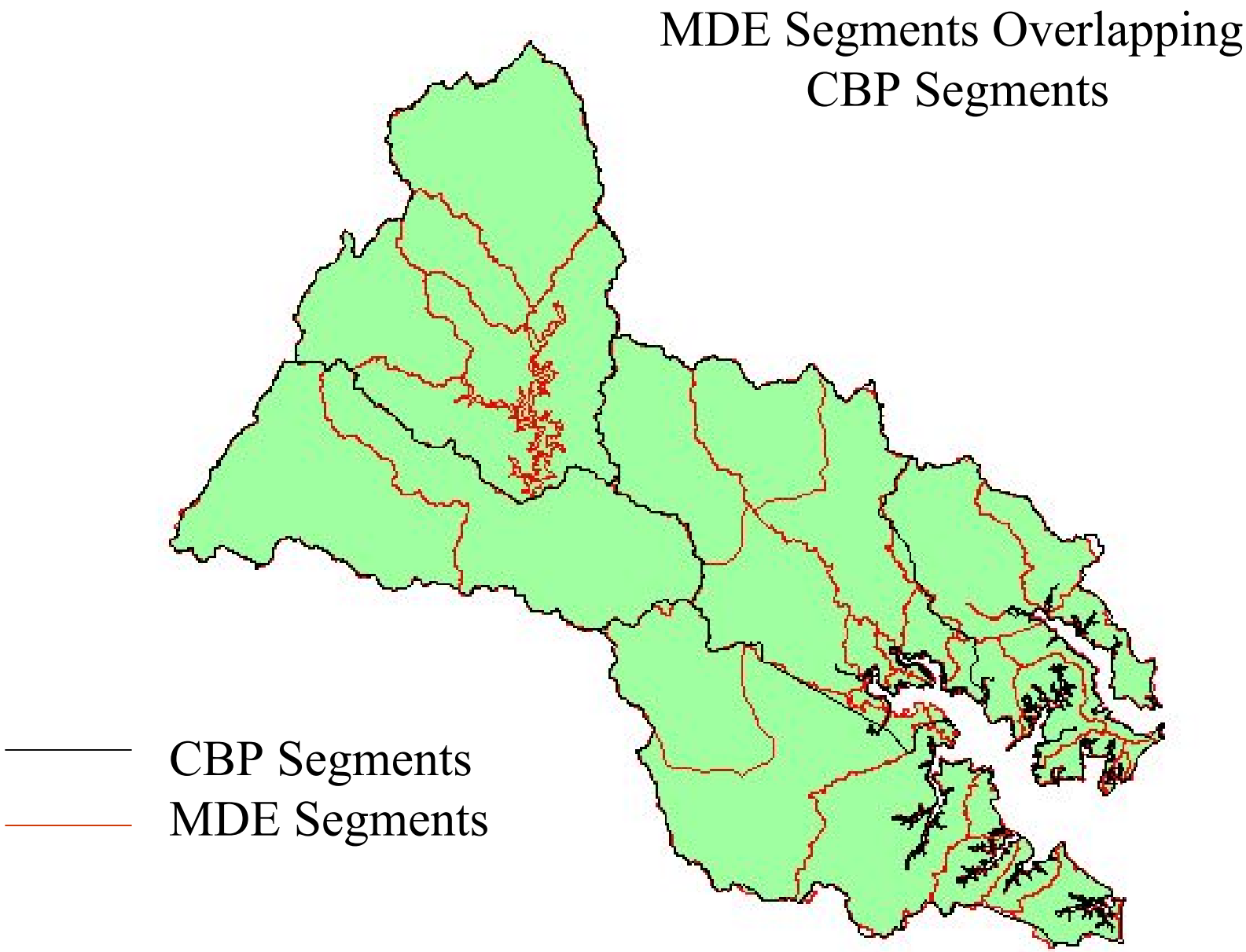

BACK RIVER TP NONPOINT SOURCES
TP (lb/d)
400
350
300
250
200
150
100
50
0
1992
1993
1994
1995
1996
1997
Mean
CBP Calib
CBP Allo
MDE HSPF

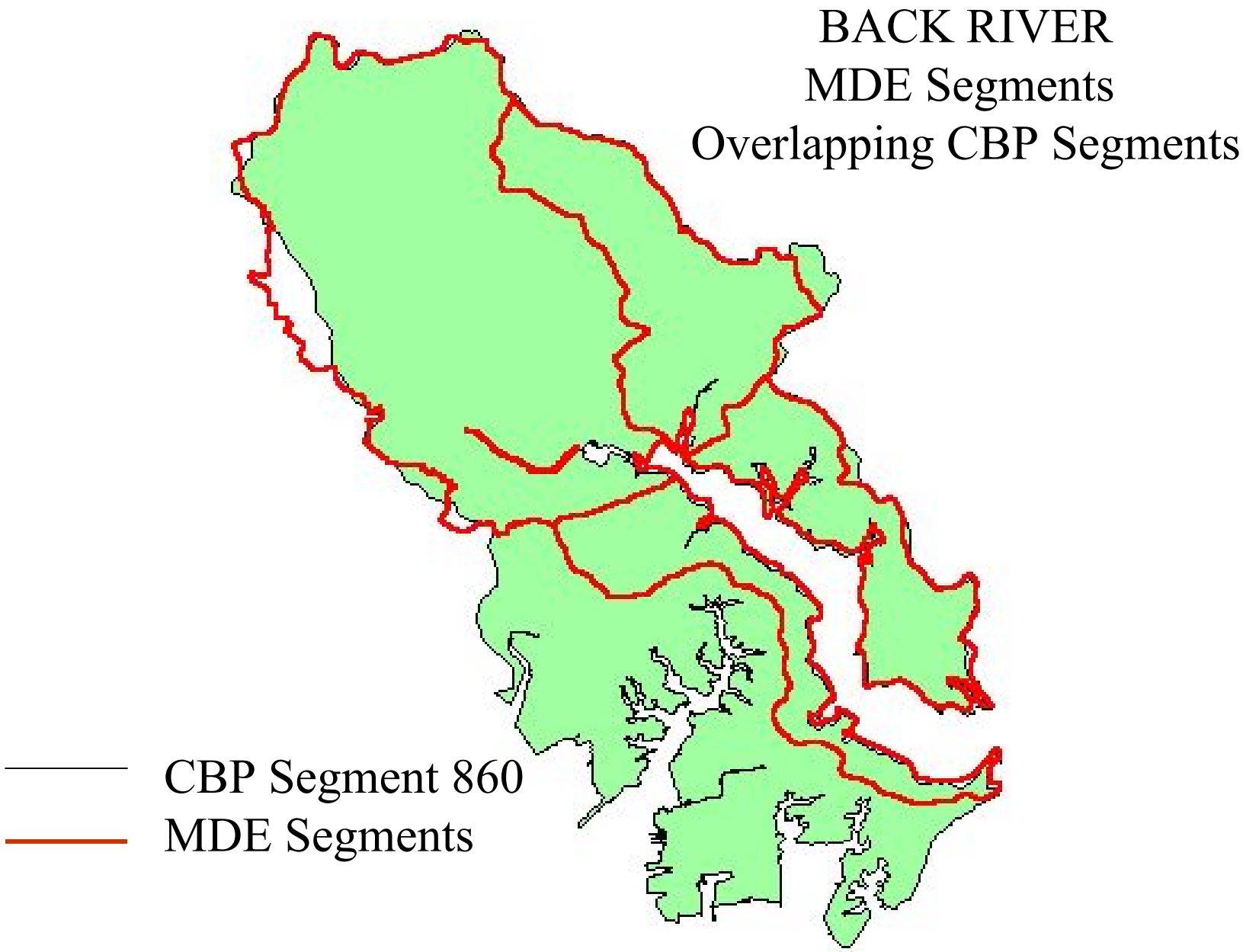
CBP SEGMENTS

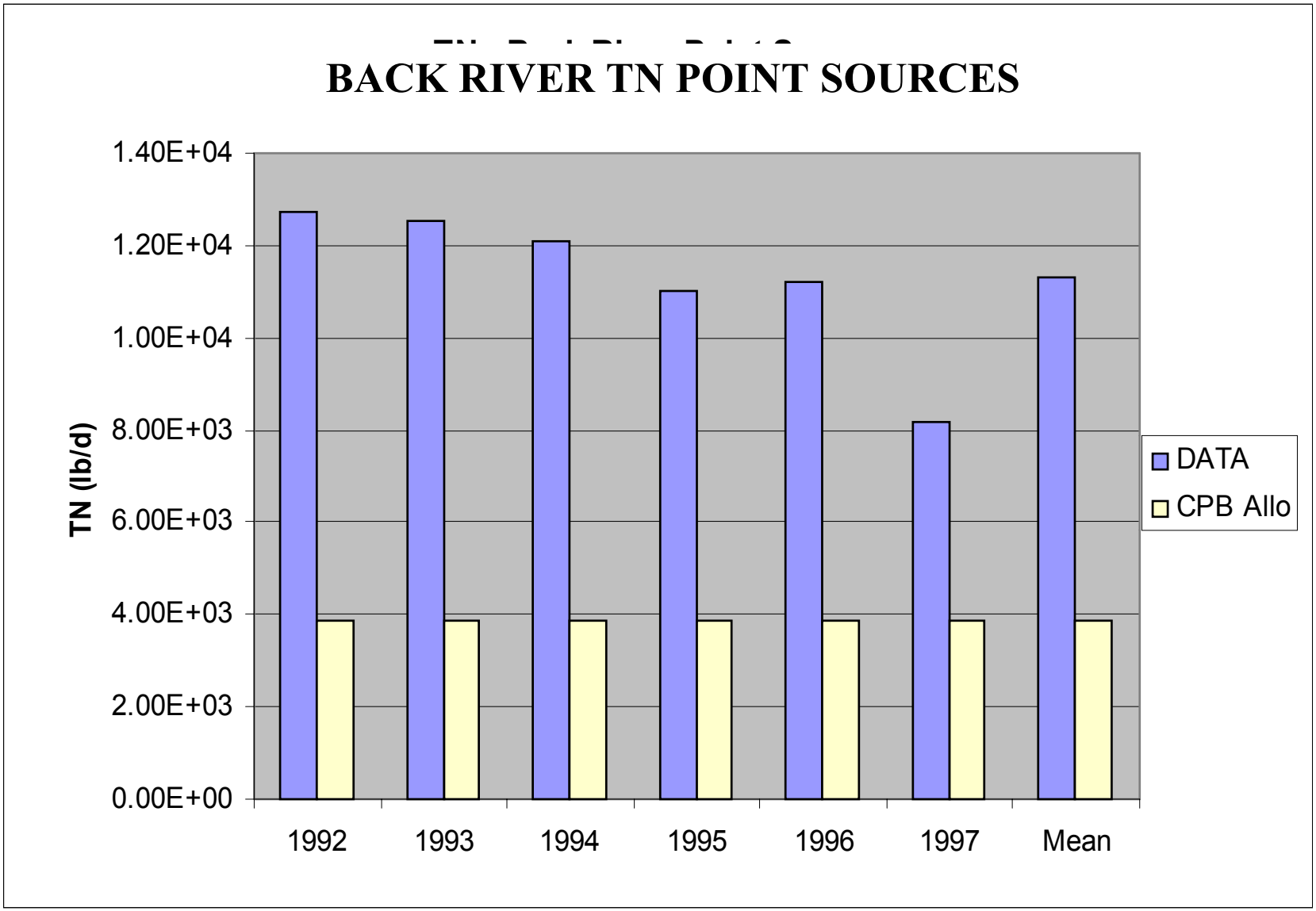


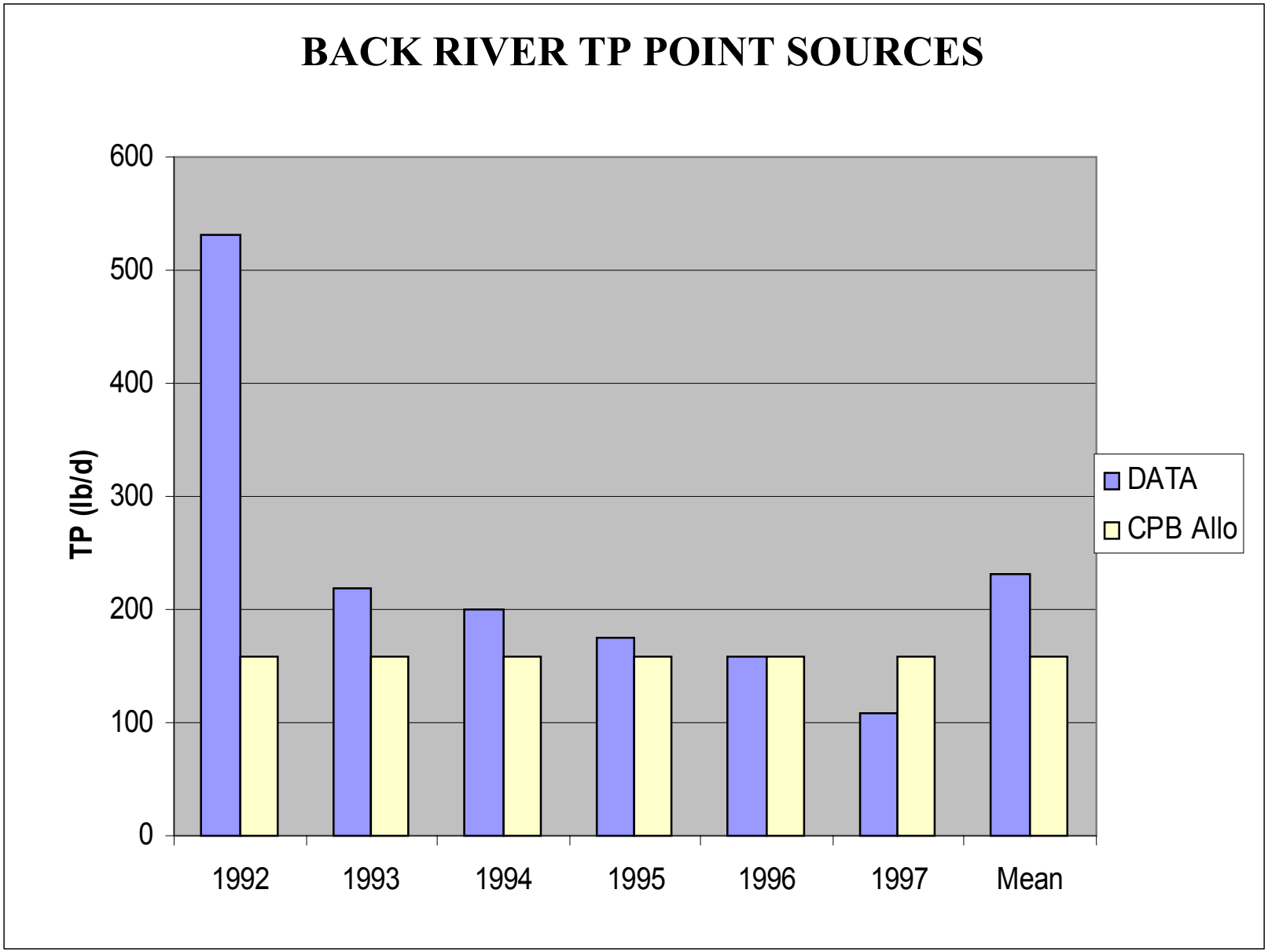
MDE SEGMENTS



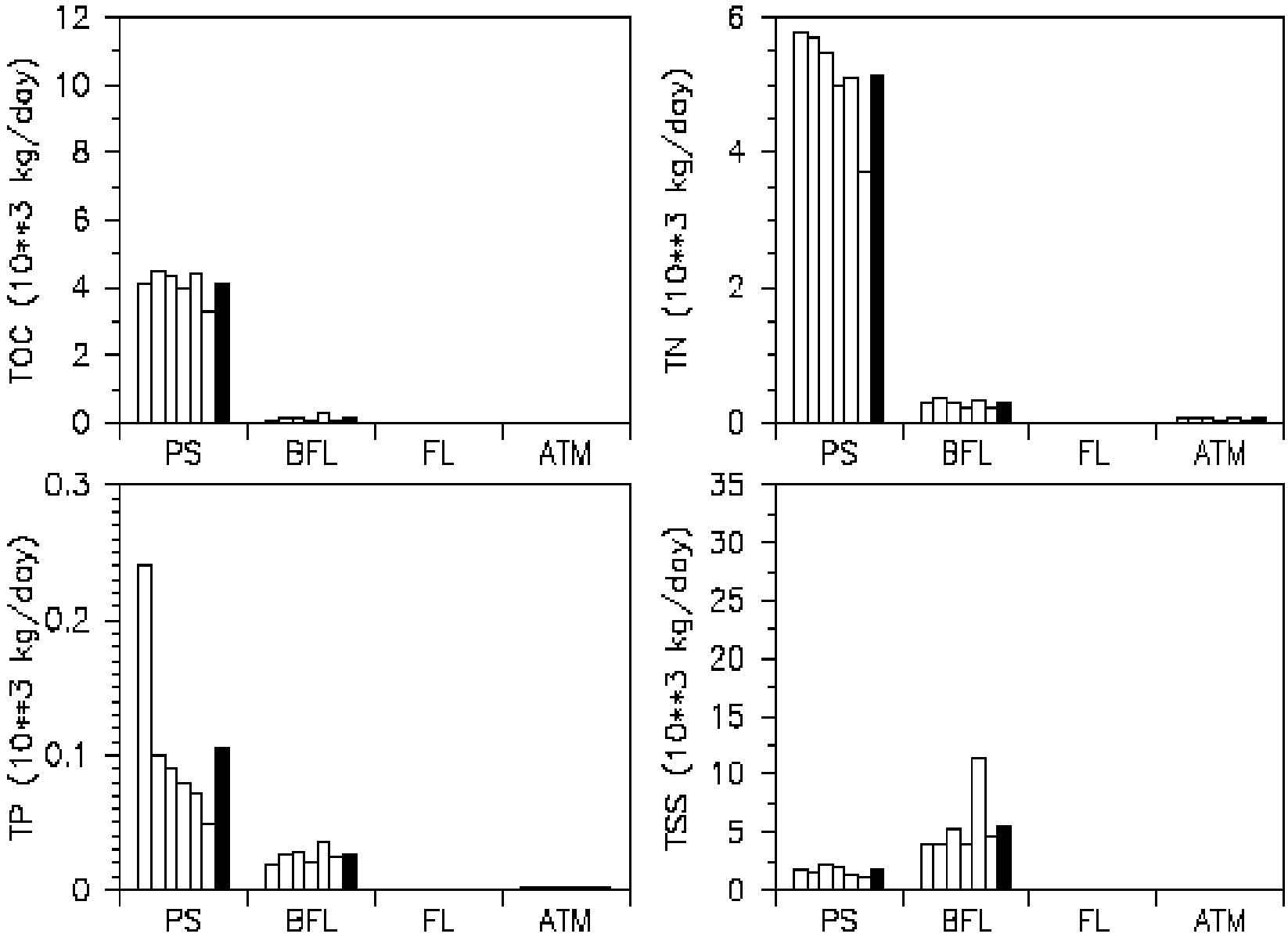

MDE Segments Overlapping
CBP Segments
CBP Segments
MDE Segments

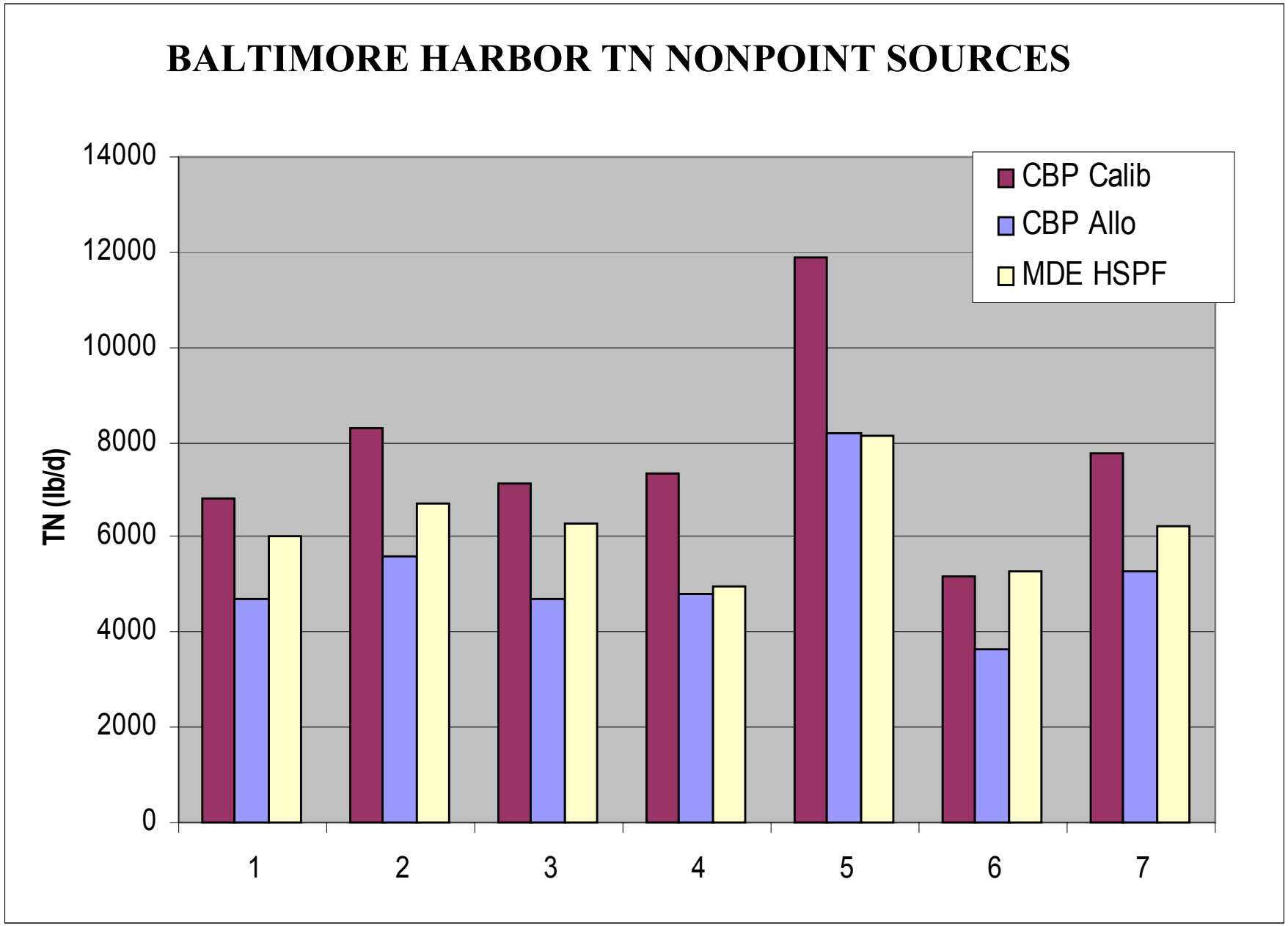

BACK RIVER
MDE Segments
Overlapping CBP Segments
CBP Segment 860
MDE Segments

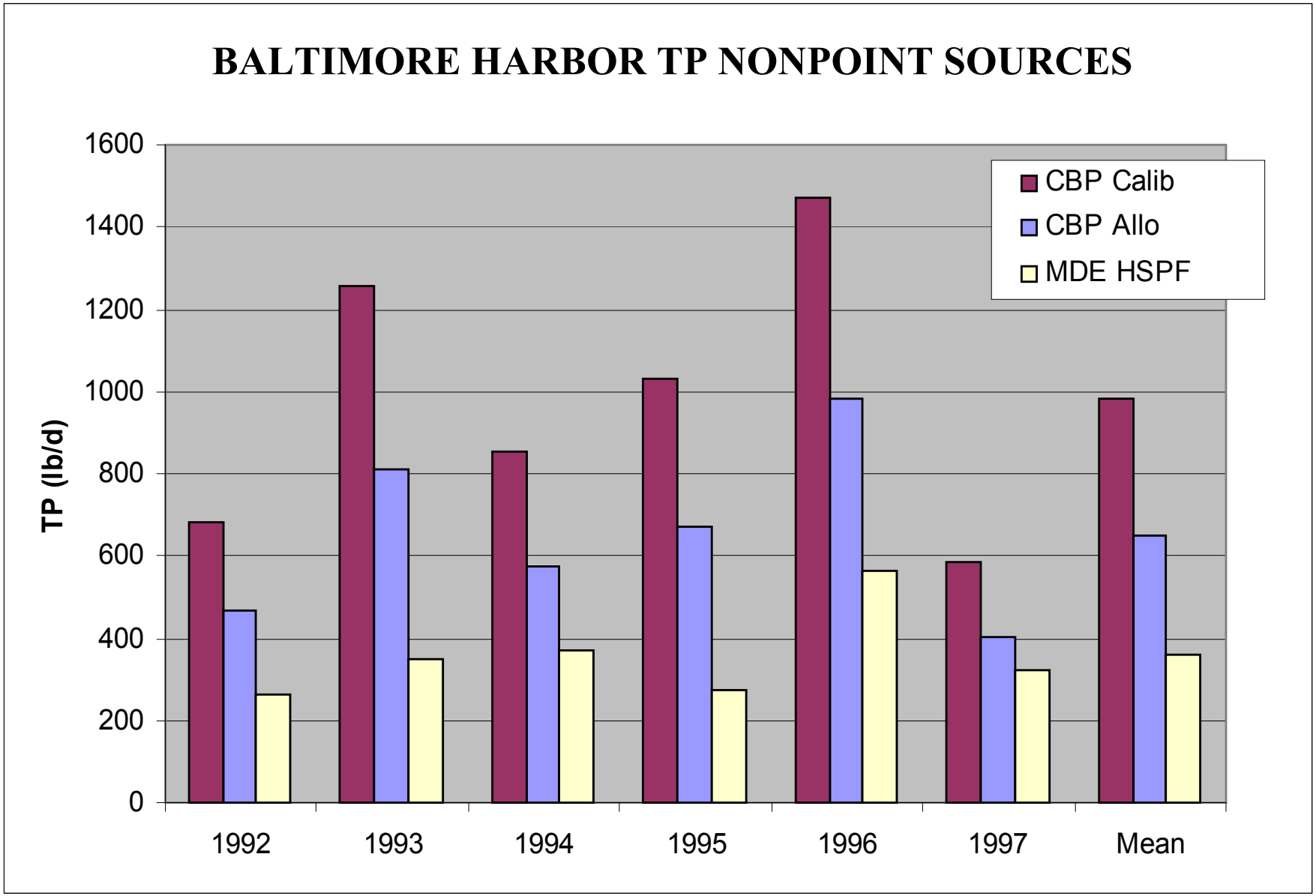

BACK RIVER TN POINT SOURCES
TN (lb/d)
1.40E+04
1.20E+04
1.00E+04
8.00E+03
6.00E+03
4.00E+03
2.00E+03
0.00E+00
1992
1993
1994
1995
1996
1997
Mean
DATA
CPB Allo

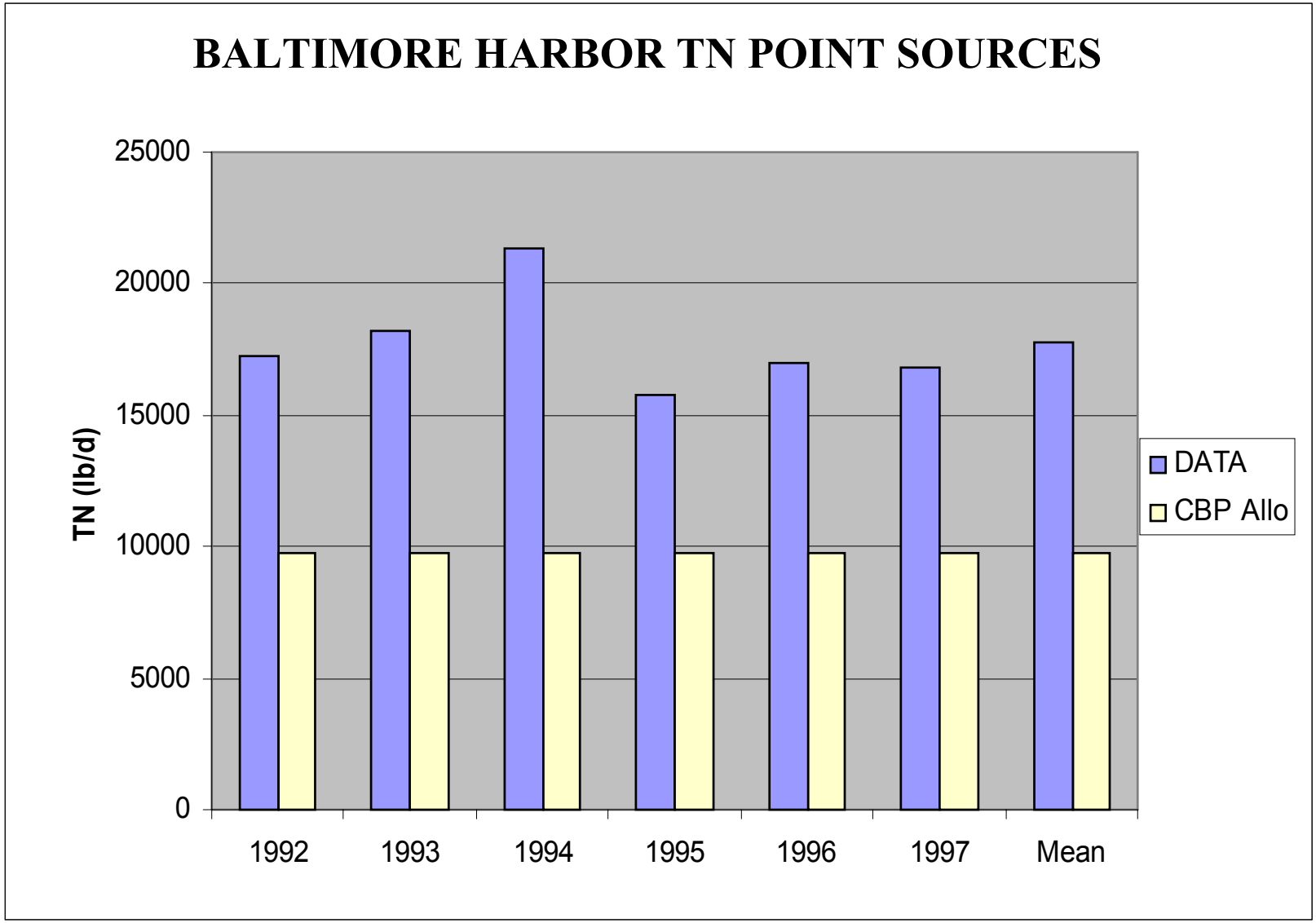

BACK RIVER TP POINT SOURCES
TP (lb/d)
600
500
400
300
200
100
0
1992
1993
1994
1995
1996
1997
Mean
DATA
CPB Allo

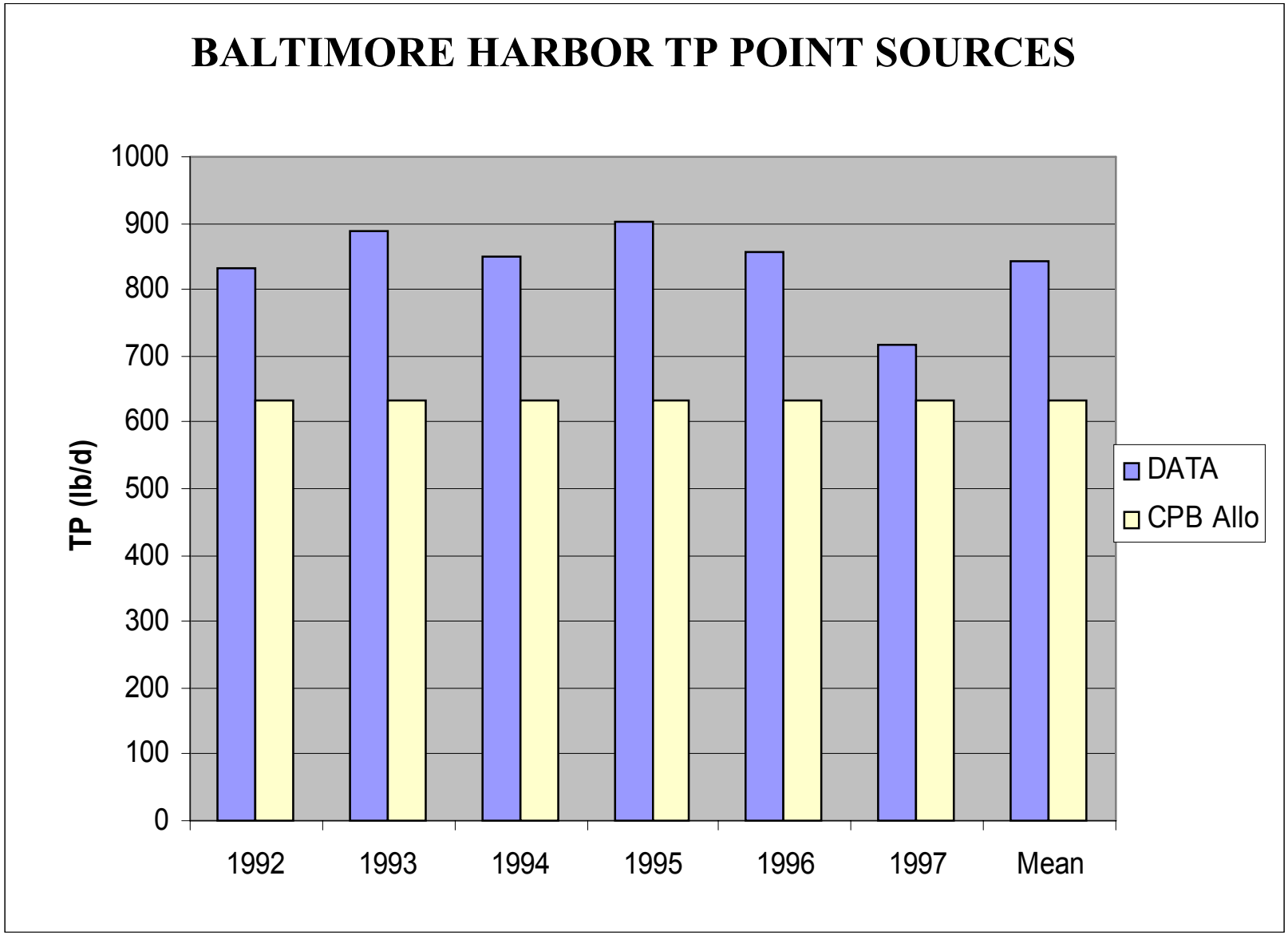
BACK RIVER (MDE HSPF LOADS)



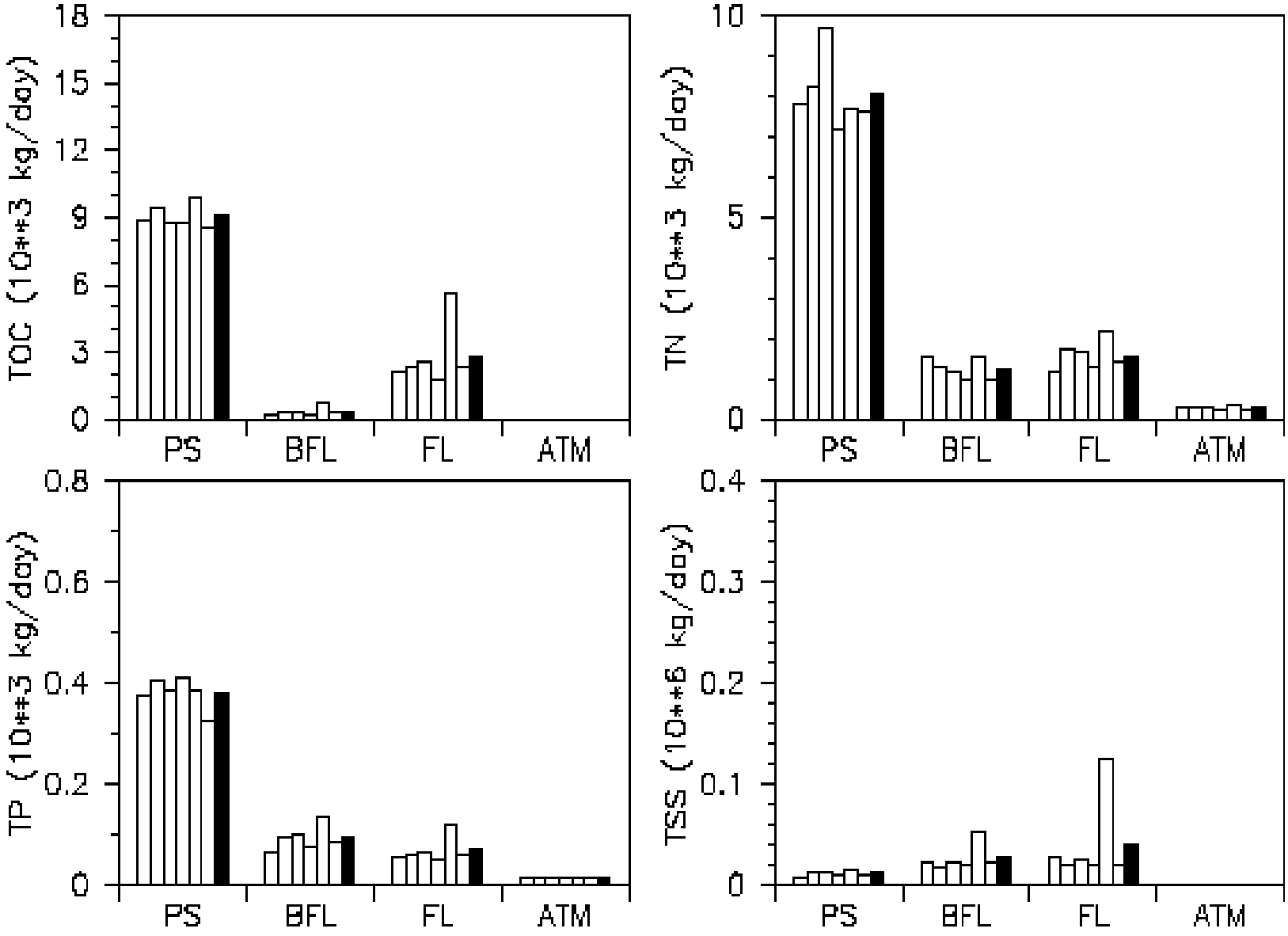

BALTIMORE HARBOR TN NONPOINT SOURCES
TN (lb/d)
14000
12000
10000
8000
6000
4000
2000
0
1
2
3
4
5
6
7
CBP Calib
CBP Allo
MDE HSPF


BALTIMORE HARBOR TP NONPOINT SOURCES
TP (lb/d)
1600
1400
1200
1000
800
600
400
200
0
1992
1993
1994
1995
1996
1997
Mean
CBP Calib
CBP Allo
MDE HSPF

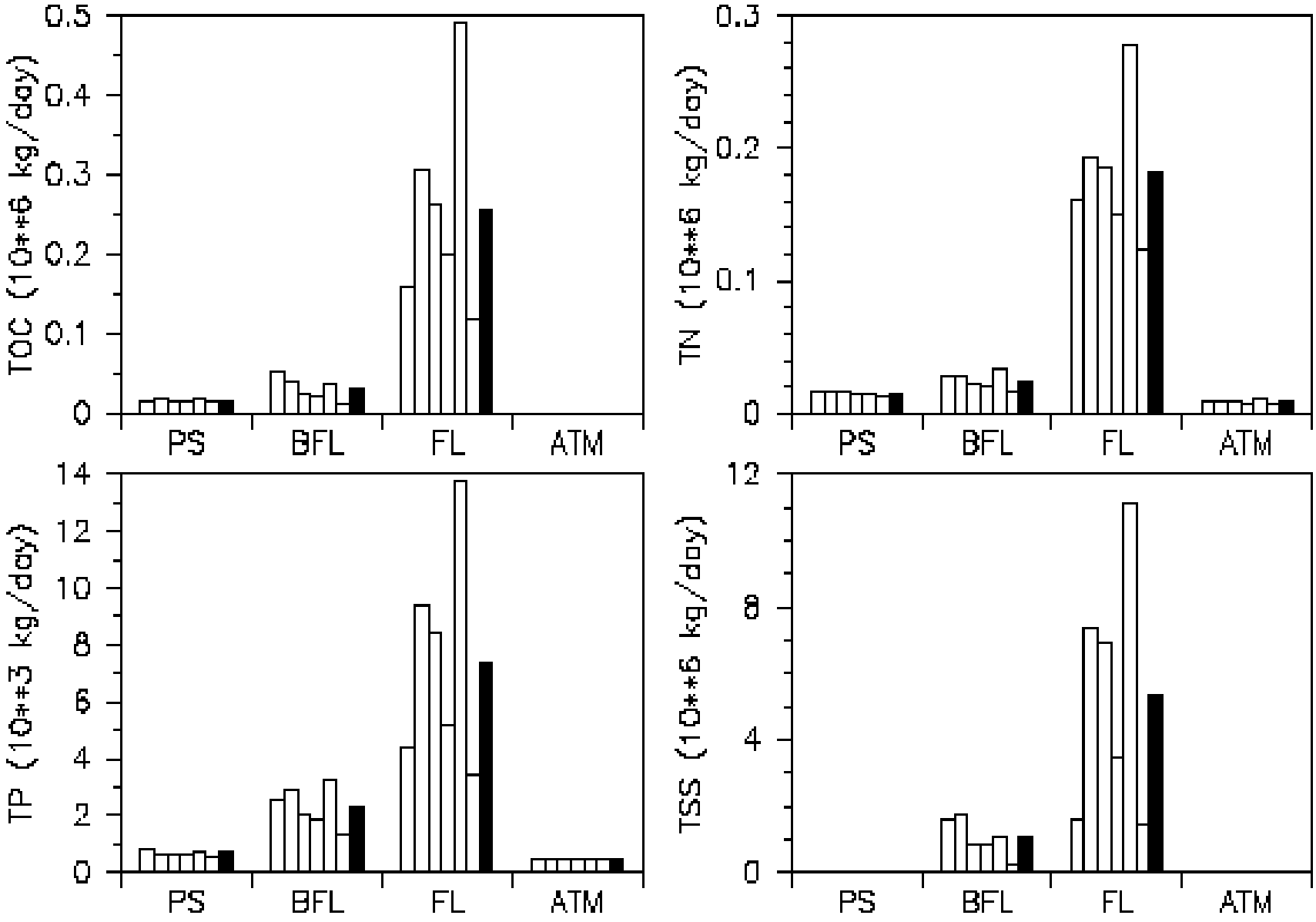

BALTIMORE HARBOR TN POINT SOURCES
TN (lb/d)
25000
20000
15000
10000
5000
0
1992
1993
1994
1995
1996
1997
Mean
DATA
CBP Allo


BALTIMORE HARBOR TP POINT SOURCES
TP (lb/d)
1000
900
800
700
600
500
400
300
200
100
0
1992
1993
1994
1995
1996
1997
Mean
DATA
CPB Allo

BALTIMORE HARBOR (MDE HSPF LOADS)



TOTAL LOADS (UPPER BAY CBP LOADS)



Loads Comparison

MDE Loads		TN		TP
PS Harbor		6,470,912.86		307,070.90
NPS Harbor		2,272,729.04		130,341.82
PS Back		4,120,402.43		84,727.41
NPS Back		230,407.76		20,916.91
Total		13,094,452.10		543,057.03
CBP Allocation Caps →		8,500,000		670,000
% Reduction required				
to meet Bay Program		36%		0%
allocation				

SUMMARY

With CBP allocation loads,

- **Baltimore Harbor:**
  - **Chlorophyll *a:* below the criteria goal of 50 ug/l in all stations at all times.**
  - **DO: shows impairment in the bottom layers throughout the Middle of the Harbor and in the Inner Harbor, the Middle Branch and in some of the Curtis Creek stations.**

- **Back River:**
  - **Chlorophyll *a:***
    - **below the goal of 50 ug/l in stations M01 (mouth), M02, M03 (middle)**
    - **above the goal (in the range of 100 – 150 ug/l) in stations M04 and M05 located near the Back River WWTP effluent.**
  - **DO: always above the criteria goal for all 5 stations and all layers.**

MDE

NEXT MODEL RUNS

- **MDE Nonpoint Sources Loads with CBP-Point Sources Cap Loads.**

- **Estimate NH_4 and PO_4 loads from sediments fluxes and SOD and compare to NPS and PS loads.**

- **All Nonpoint Source Loads and Point Source Loads equal to "0" (to see what is the DO level in the bottom water under 100 % control of NPS and PS).**

- **Close Back River WWTP only to check how much it influences the high Chla concentrations seen at the stations near the WWTP effluent.**

MDE