Suisun Marsh Invertebrates

Robert Schroeter
U.C. Davis

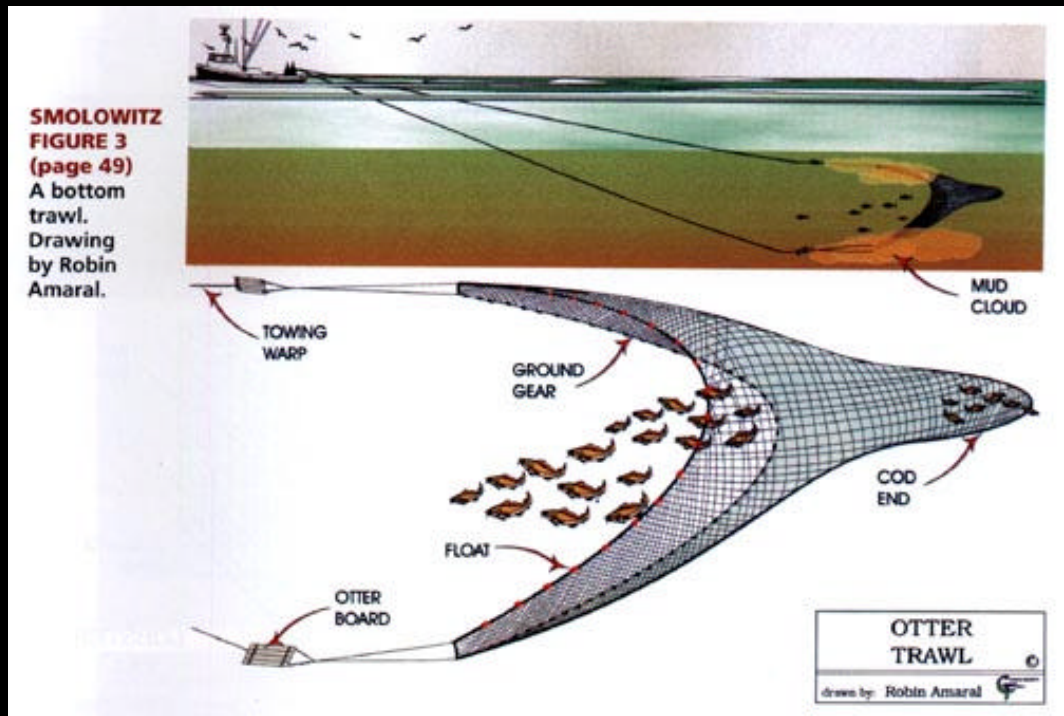
Suisun Marsh is a highly dynamic aquatic system with constantly shifting environmental conditions and aquatic communities

Outline

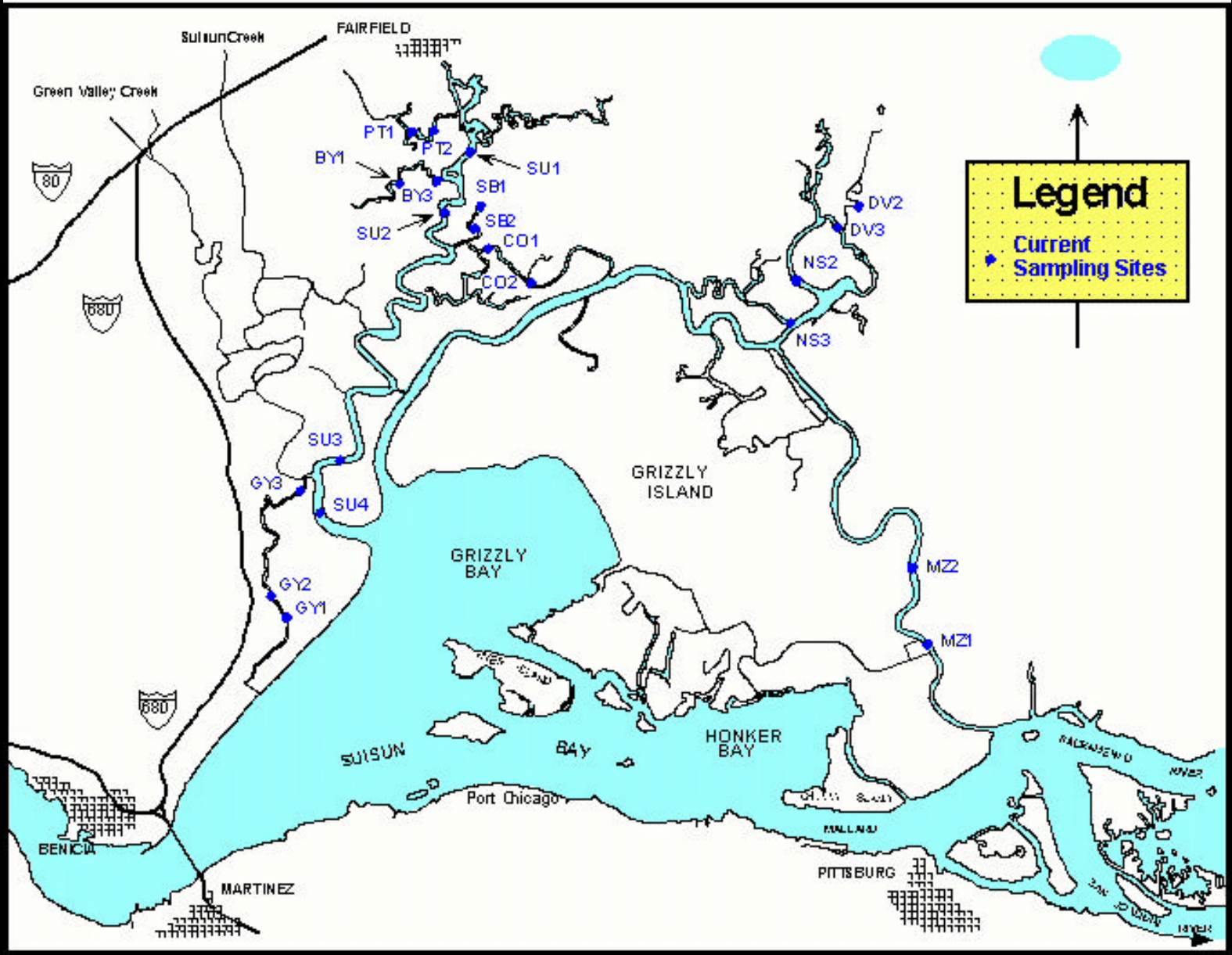
- Introduction to Taxa and Sampling Programs
  - Mega Shrimp (Crangon, Palaemon, Exopalaemon)
  - MacroZoops (Mysids)
  - Benthos (Numerous Groups)
- Conclusions
- Oh, What the heck how about some DO data

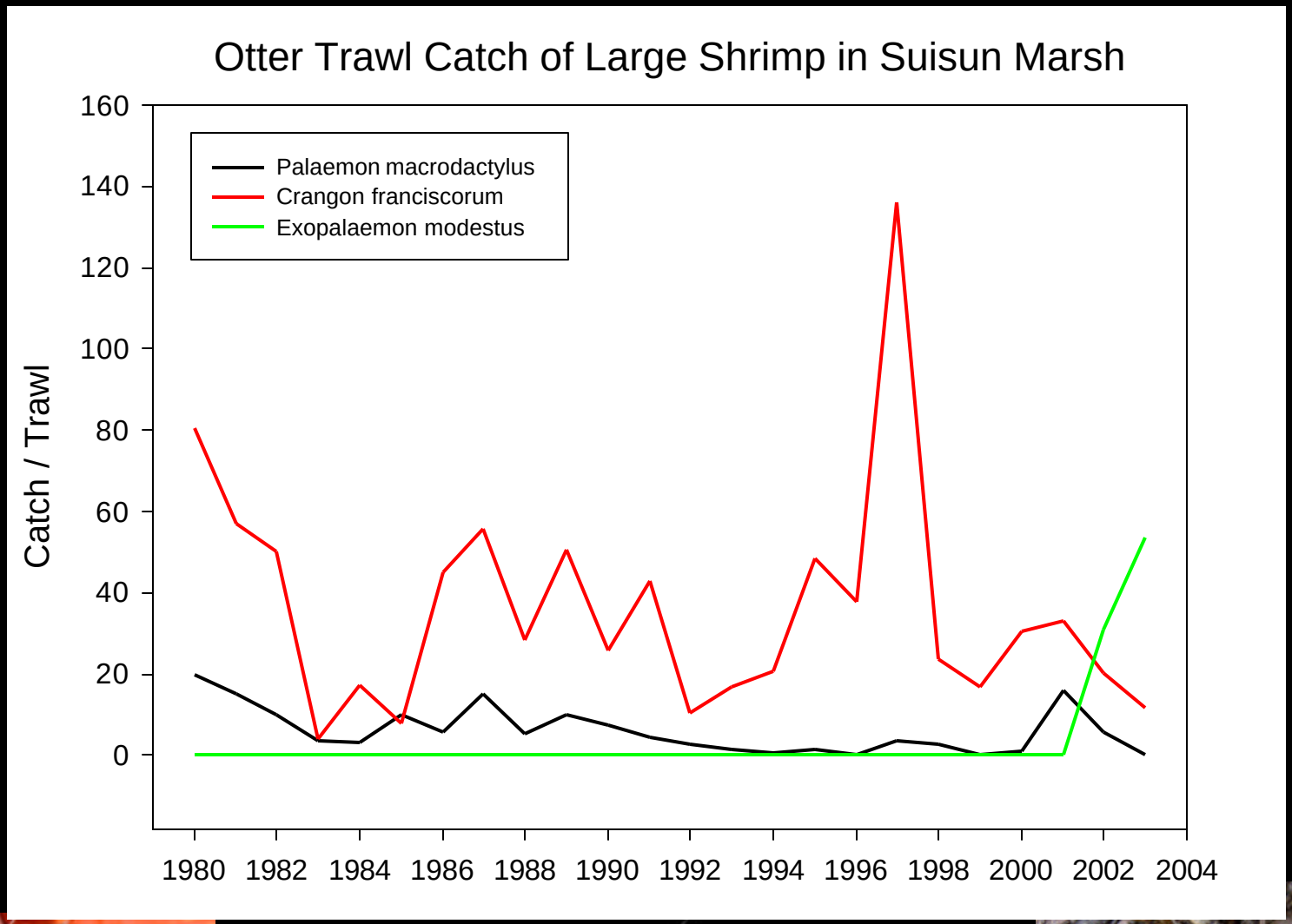
Mega Shrimp

- Sampled via otter trawl by UCD Fish Survey
  - 1979-Present

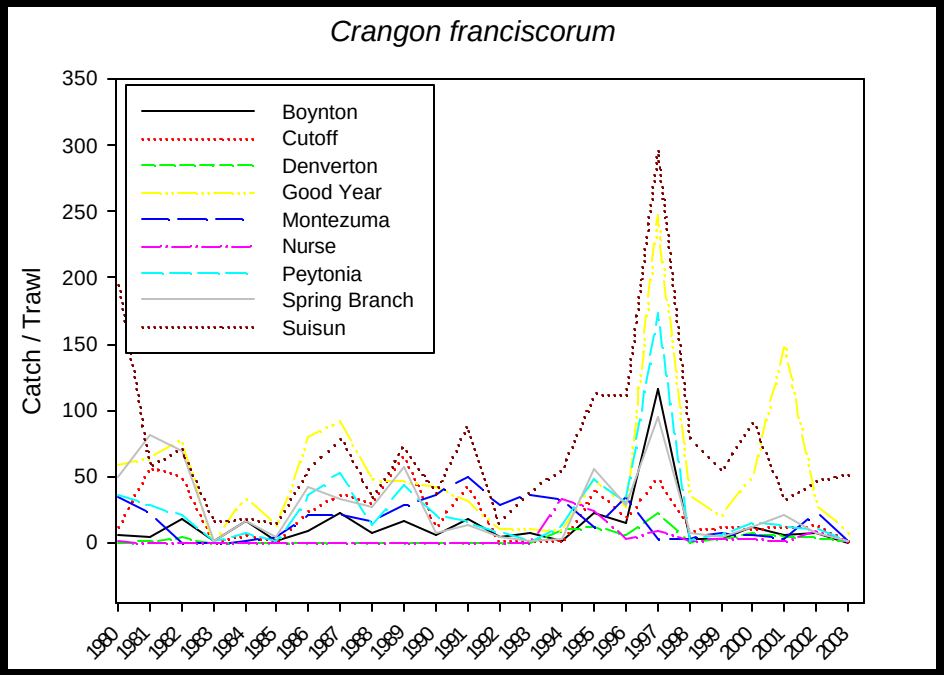


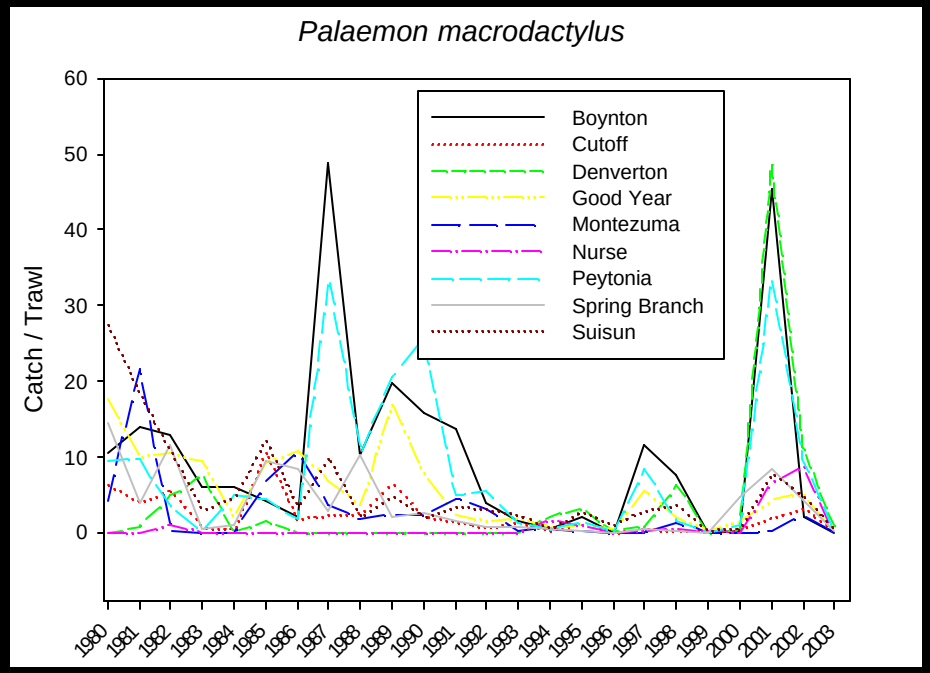
UCD - Otter Trawl Sites

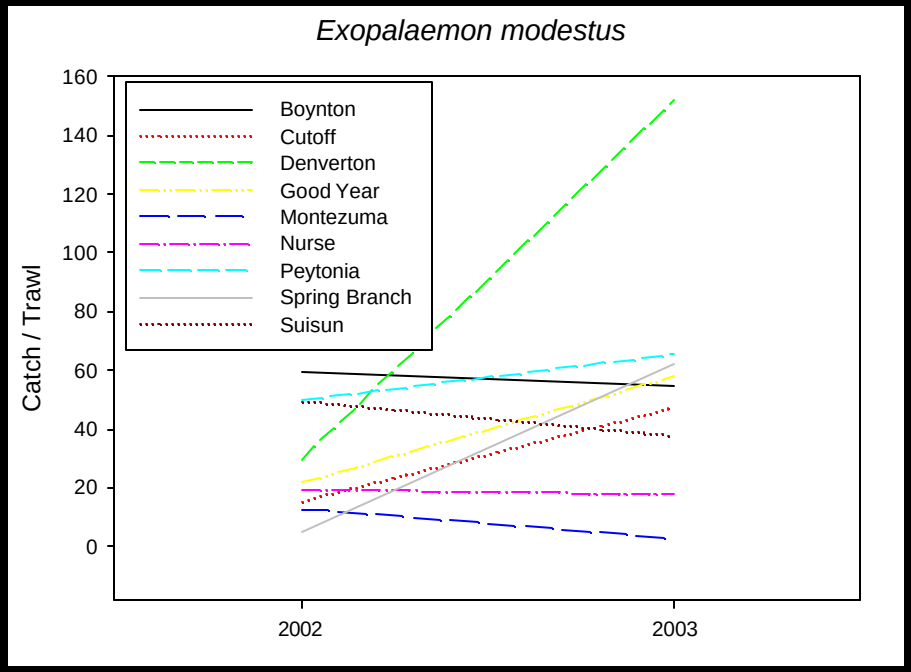



Otter Trawl Catch of Large Shrimp in Suisun Marsh
Palaemon macrodactylus
Crangon franciscorum
Exopalaemon modestus
Catch / Trawl
160
140
120
100
80
60
40
20
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004

1 cm


Crangon franciscorum
Catch / Trawl
350
300
250
200
150
100
50
0
Boynton
Cutoff
Denverton
Good Year
Montezuma
Nurse
Peytonia
Spring Branch
Suisun
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003

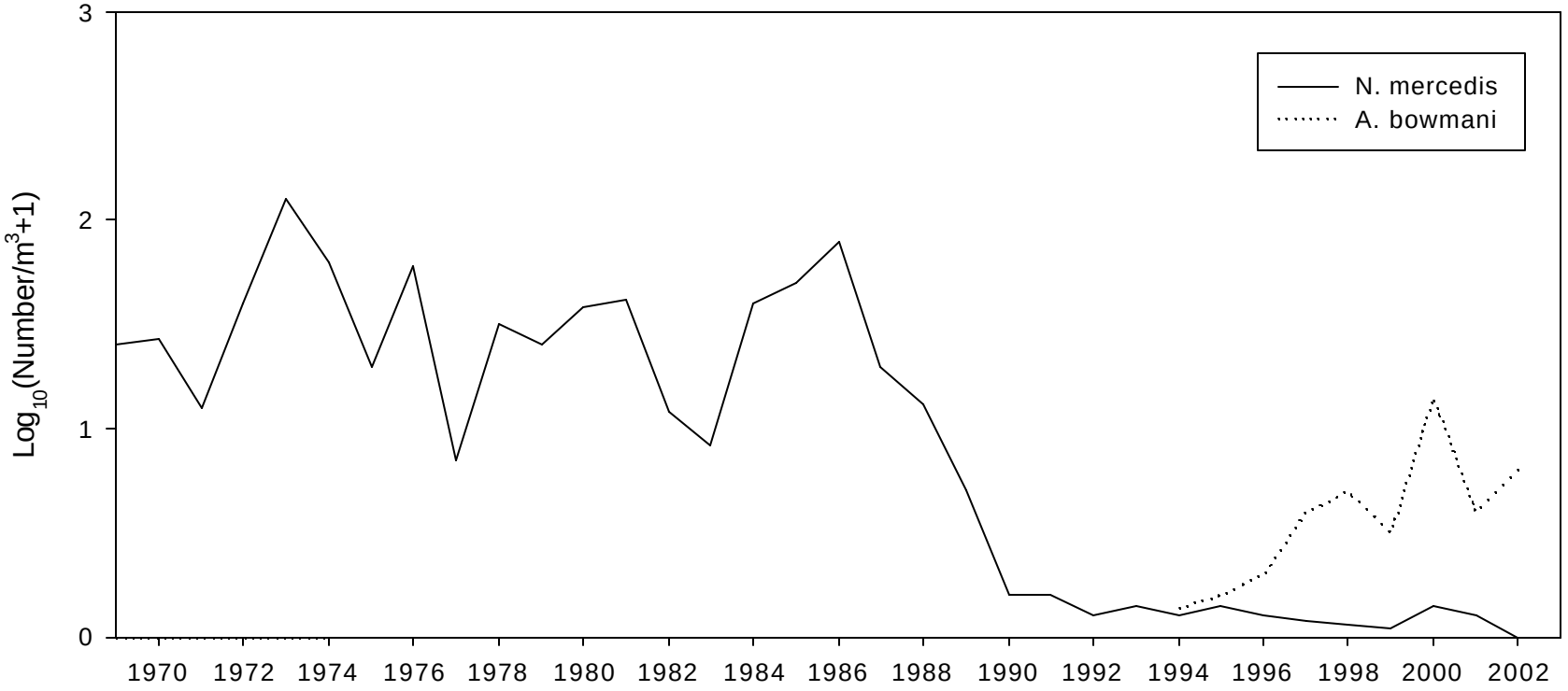

Palaemon macrodactylus
Catch / Trawl
60
50
40
30
20
10
0
Boynton
Cutoff
Denverton
Good Year
Montezuma
Nurse
Peytonia
Spring Branch
Suisun
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003

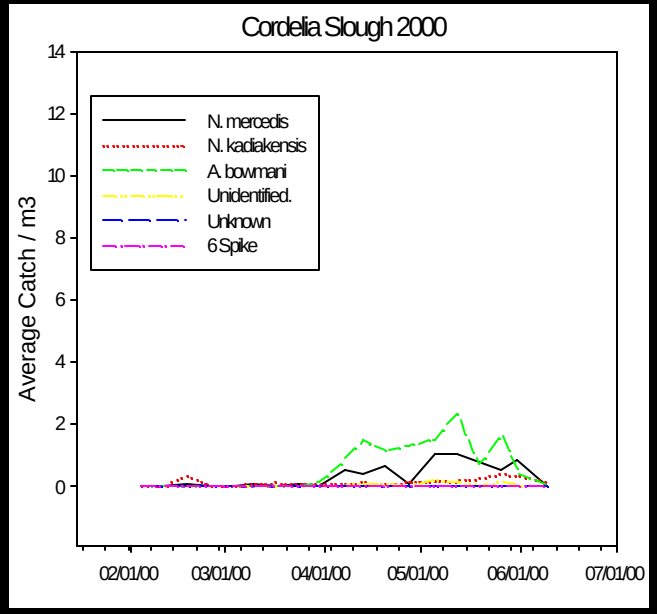

Exopalaemon modestus
Catch / Trawl
160
140
120
100
80
60
40
20
0
Boynton
Cutoff
Denverton
Good Year
Montezuma
Nurse
Peytonia
Spring Branch
Suisun
2002
2003

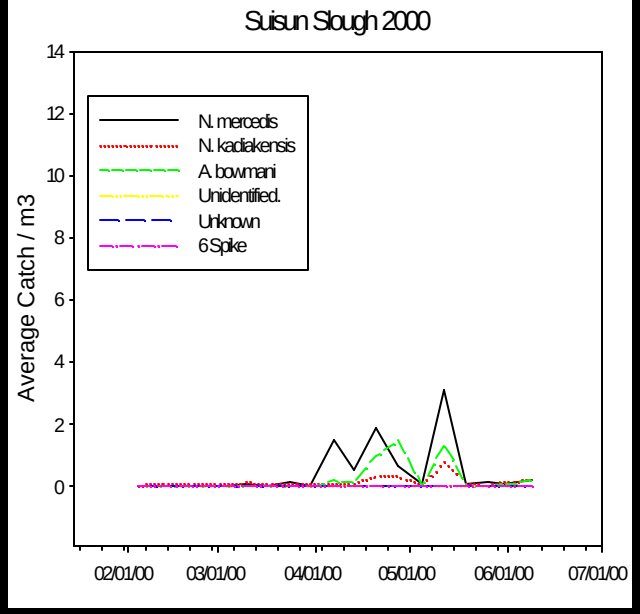
Macrozoops

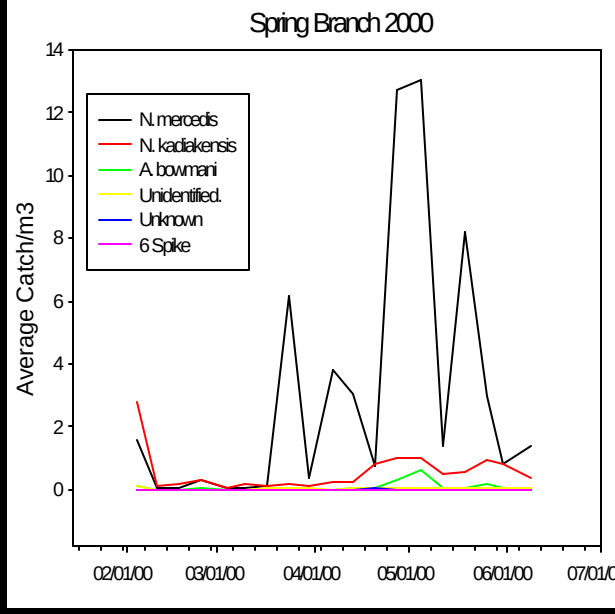
- Data from 2 sampling programs presented
  - CDFG Zooplankton Sampling
  - UCD Larval Fish / Neomysis Survey

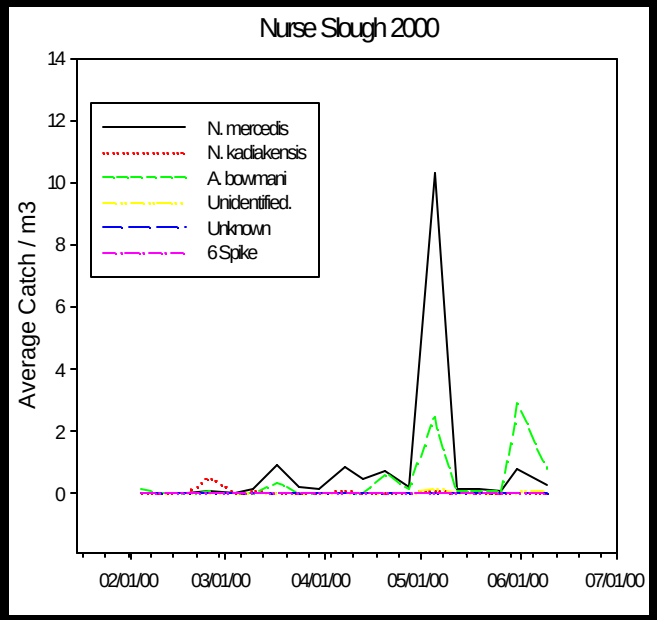
Spring Abundance of Mysids in the San Francisco Estuary (redrawn fromOrsi and Mecum 2003)

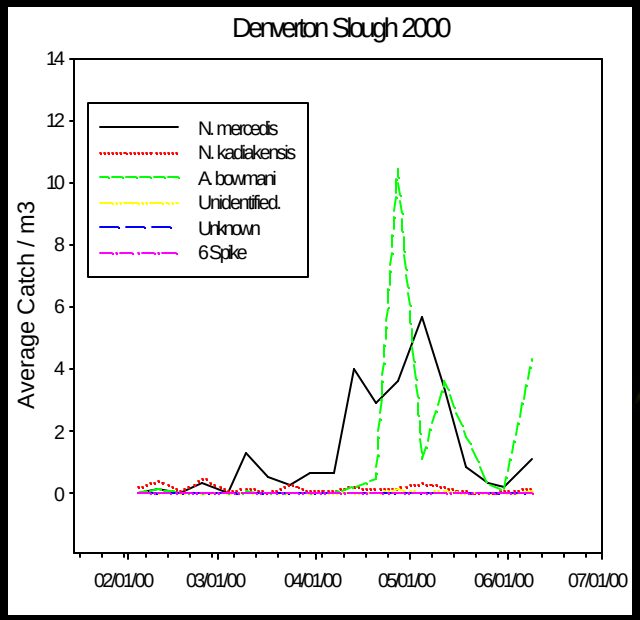


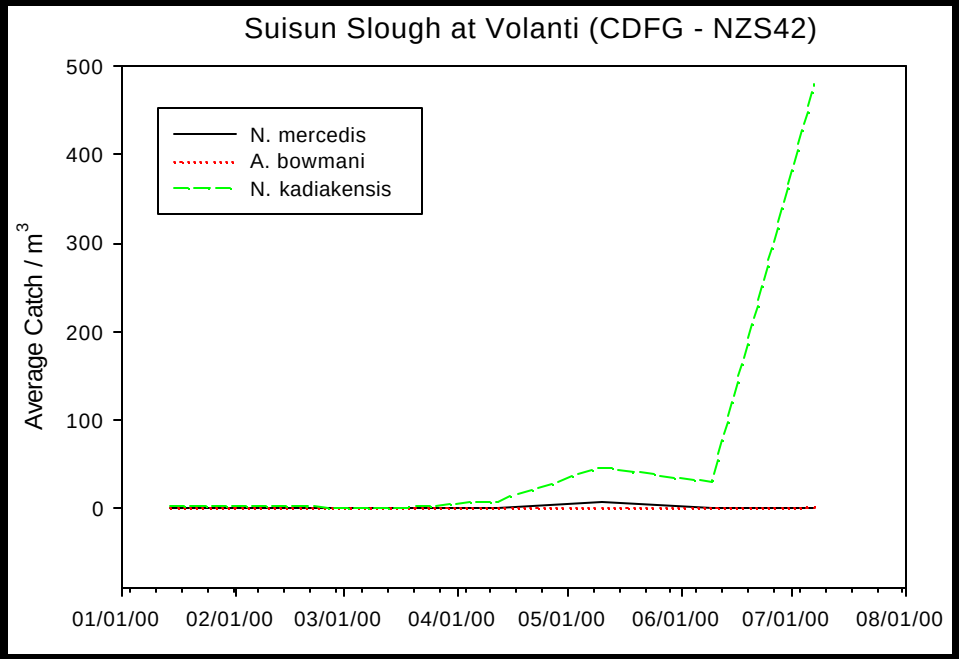

Cordelia Slough 2000
Average Catch / m3
N. mercedis
N. kadiakensis
A. bowmani
Unidentified.
Unknown
6 Spike
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00
07/01/00

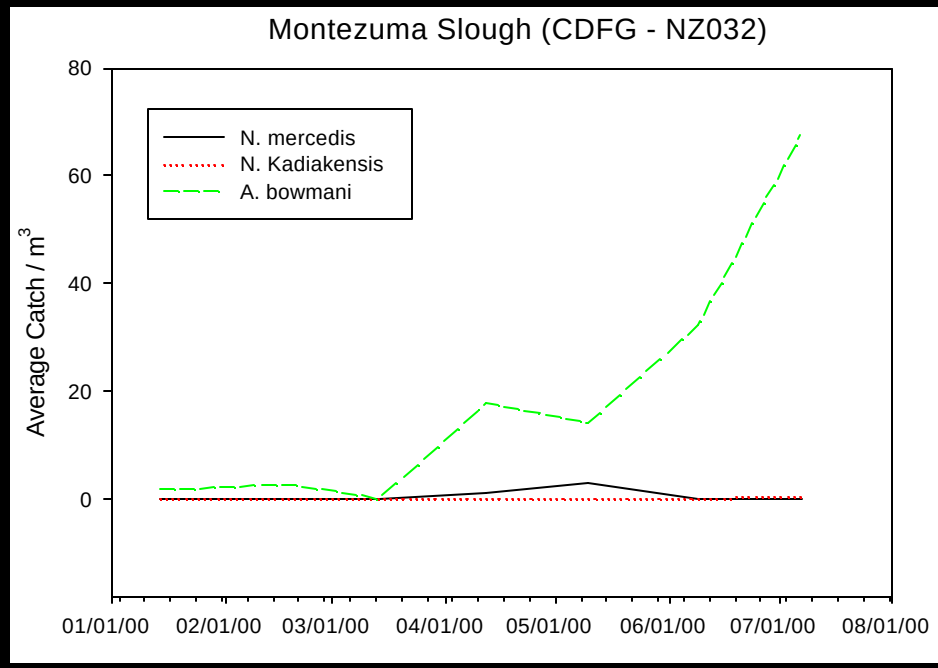

Suisun Slough 2000
Average Catch / m3
N. mercedis
N. kadiakensis
A. bowmani
Unidentified.
Unknown
6 Spike
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00
07/01/00


Spring Branch 2000
Average Catch/m3
N. mercedis
N. kadiakensis
A. bowmani
Unidentified.
Unknown
6 Spike
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00


Nurse Slough 2000
Average Catch / m3
N. mercedis
N. kadiakensis
A. bowmani
Unidentified.
Unknown
6 Spike
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00
07/01/00

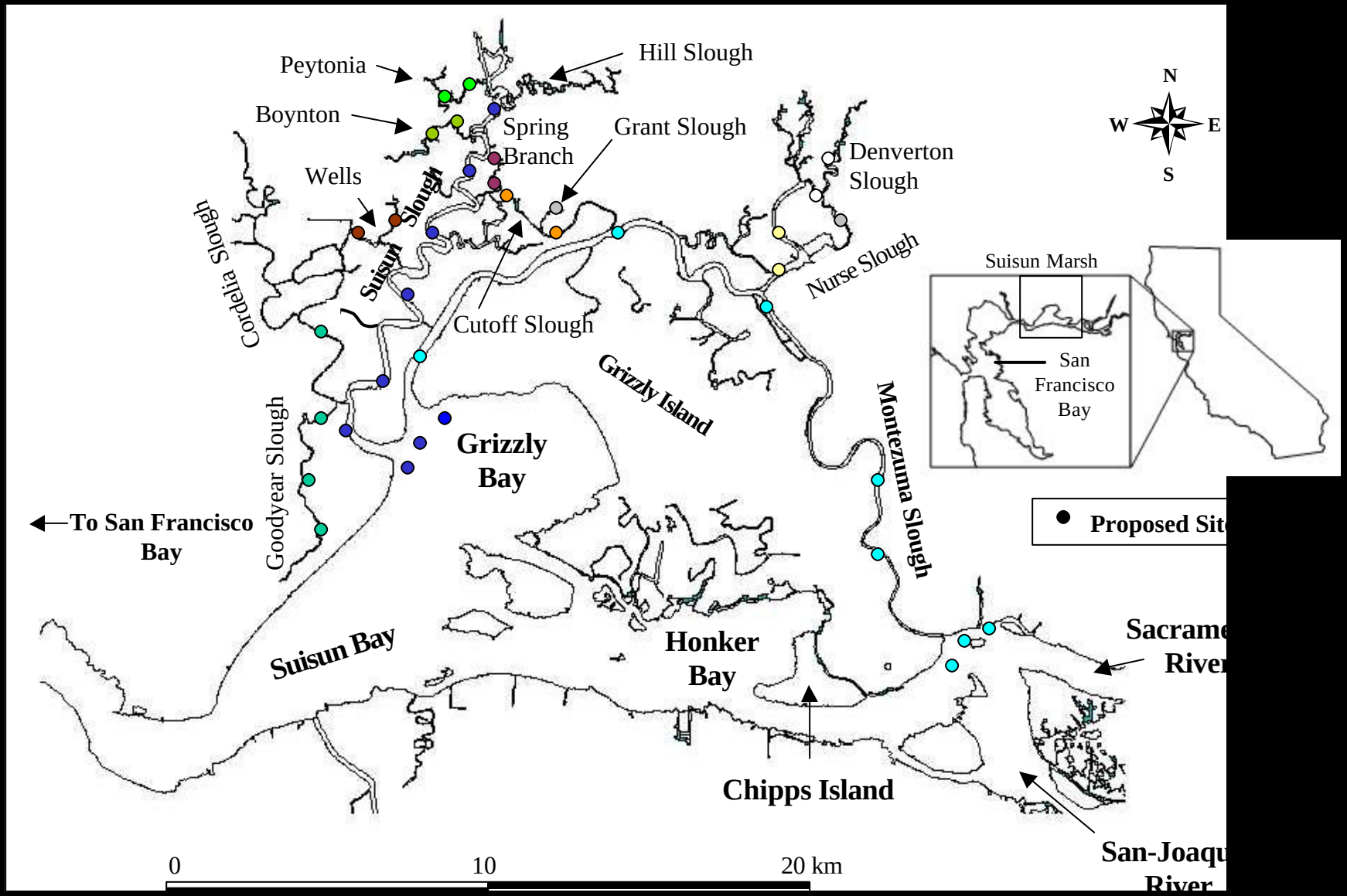

Denverton Slough 2000
Average Catch / m3
N. mercedis
N. kadiakensis
A. bowmani
Unidentified.
Unknown
6 Spike
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00
07/01/00


Suisun Slough at Volanti (CDFG - NZS42)
Average Catch / m3
500
400
300
200
100
0
N. mercedis
A. bowmani
N. kadiakensis
01/01/00
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00
07/01/00
08/01/00

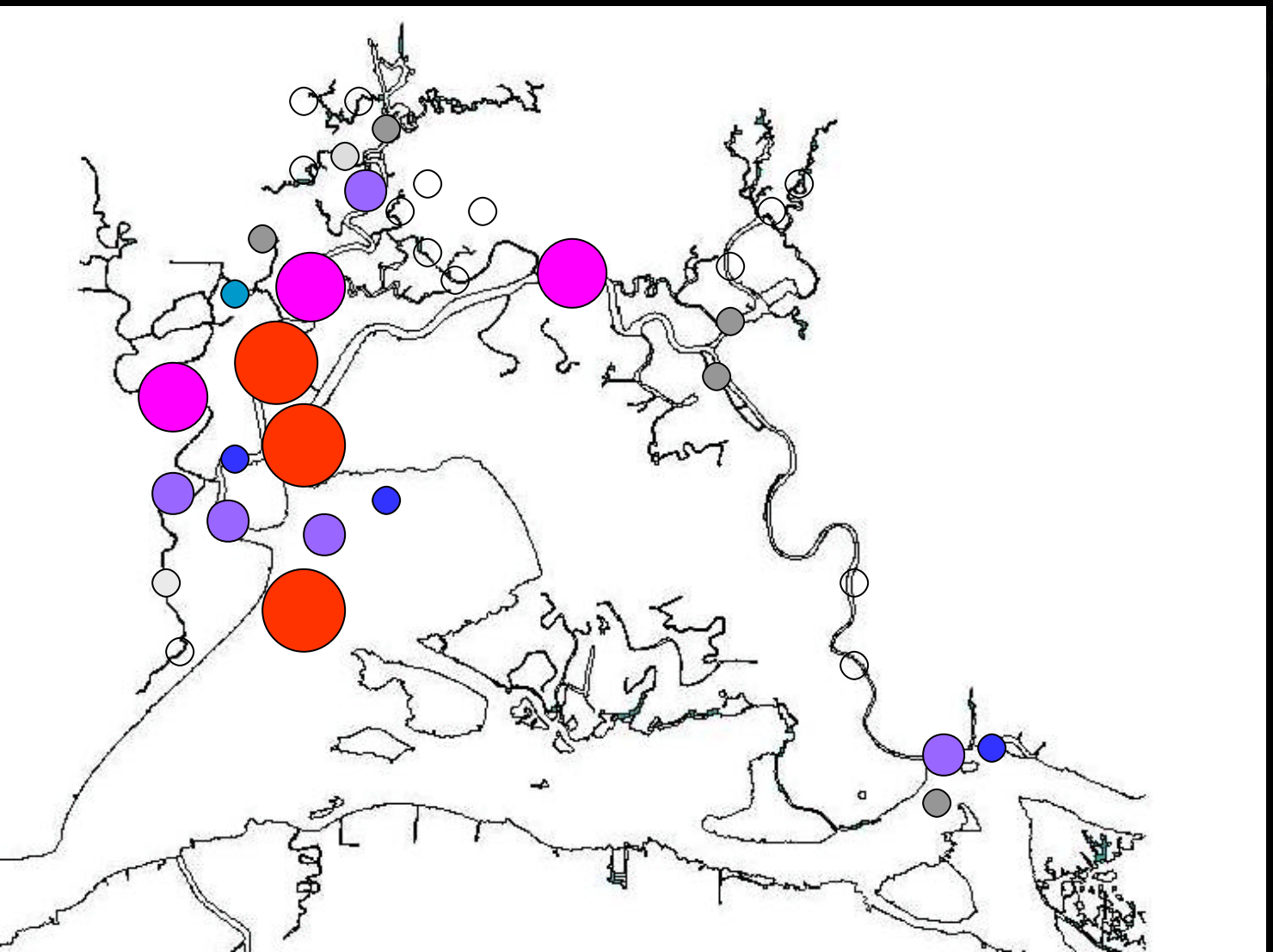

Montezuma Slough (CDFG - NZ032)
Average Catch / m3
80
60
40
20
0
N. mercedis
N. Kadiakensis
A. bowmani
01/01/00
02/01/00
03/01/00
04/01/00
05/01/00
06/01/00
07/01/00
08/01/00

Benthos

- CALFED funded study to investigate benthos and other invertebrates in the channels of Suisun Marsh
  - 36 sites sampled with a petite ponar dredge (15 X 15 cm)
  - 3 samples / site at 25, 50, 75% of channel width
  - Data presented today are Center Channel - January 2004

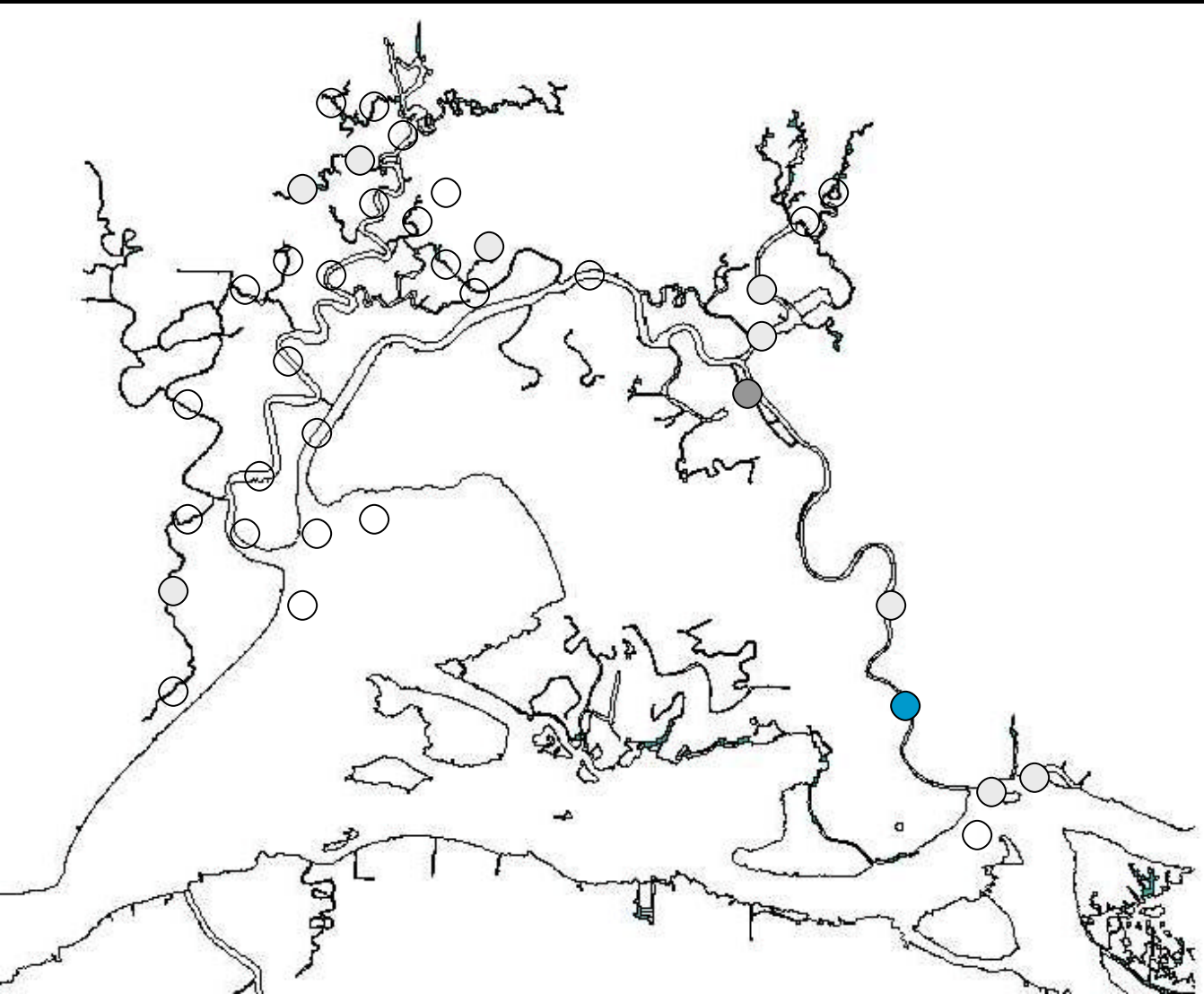

Peytonia
Hill Slough
Boynton
Spring Branch
Grant Slough
Denverton Slough
Wells
Suisun Slough
Cordelia Slough
Nurse Slough
Cutoff Slough
Grizzly Island
Grizzly Bay
Goodyear Slough
Montezuma Slough
To San Francisco Bay
Suisun Bay
Honker Bay
Chipps Island
Sacrame River
San-Joaqu River
N
W
E
S
Suisun Marsh
San Francisco Bay
Proposed Site
0
10
20 km

Overbite Clam (Potamocorbula *amurensis*)



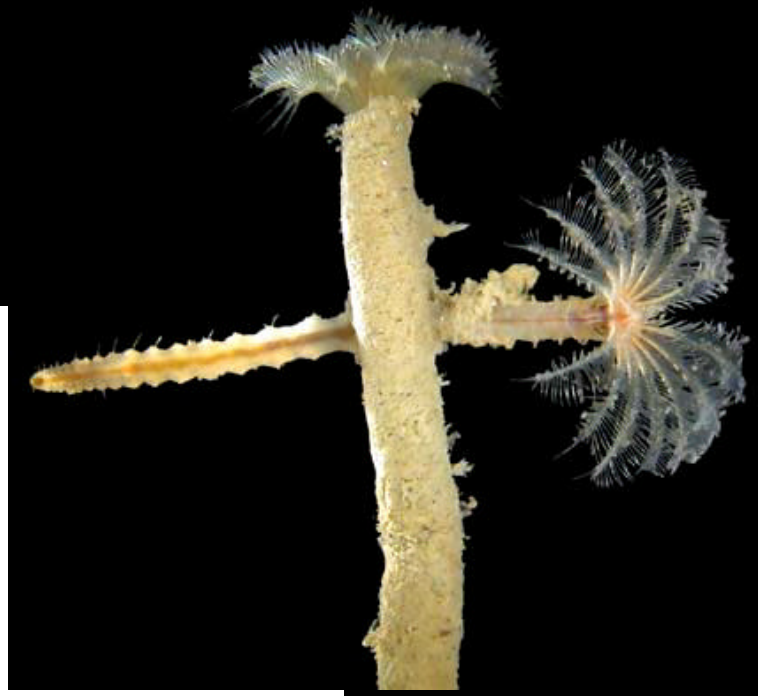
- >10,000 m^2
- 5,001-10,000
- 2,001-5000
- 1001-2,000
- 501-1,000
- 101-500
- 1-100
- 0

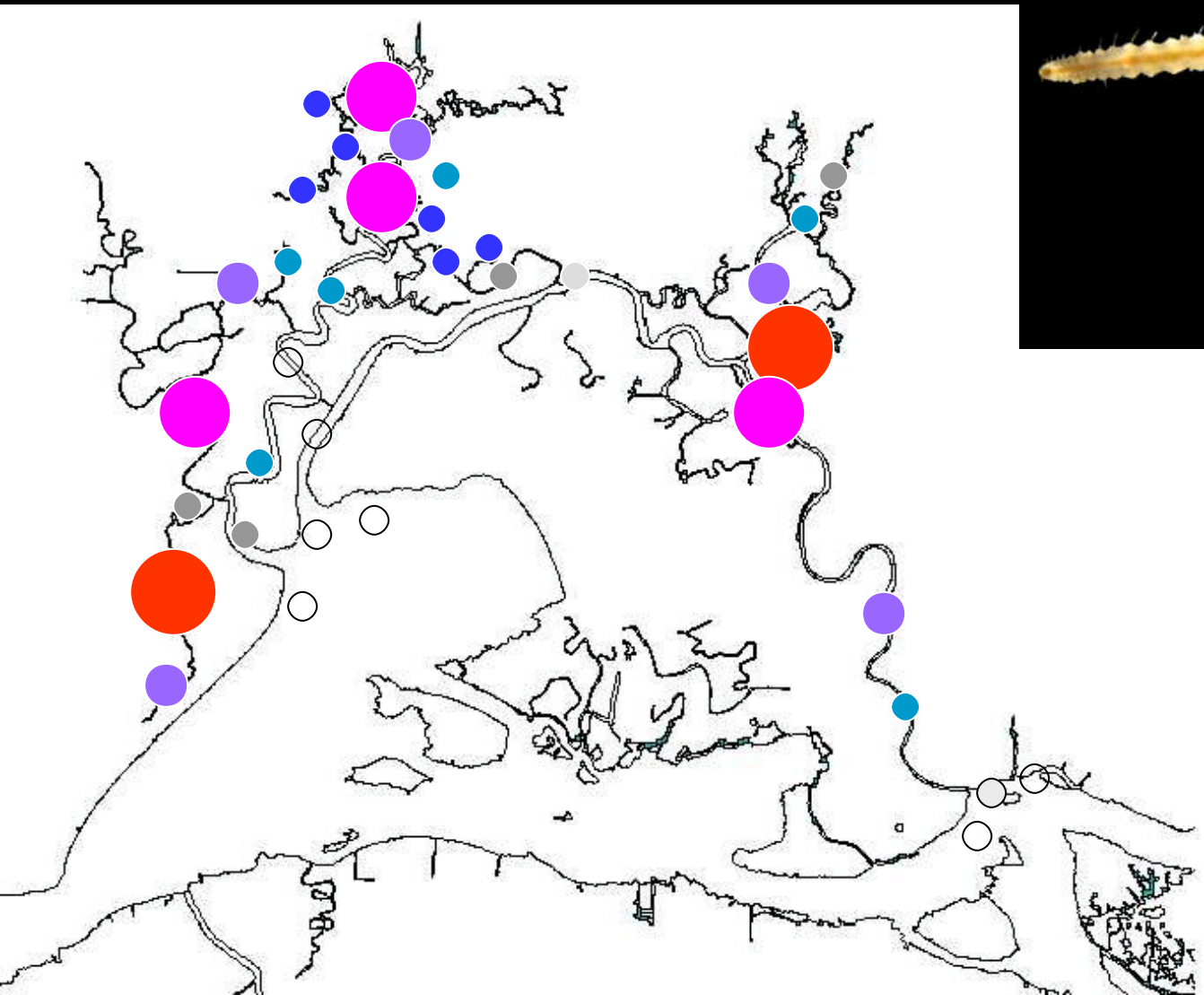
Asian Clam (Corbicula *fluminea*)



- >10,000 m²
- 5,001-10,000
- 2,001-5000
- 1001-2,000
- 501-1,000
- 101-500
- 1-100
- 0

Family Sabellidae (Fan Worms)
Laonome sp.A



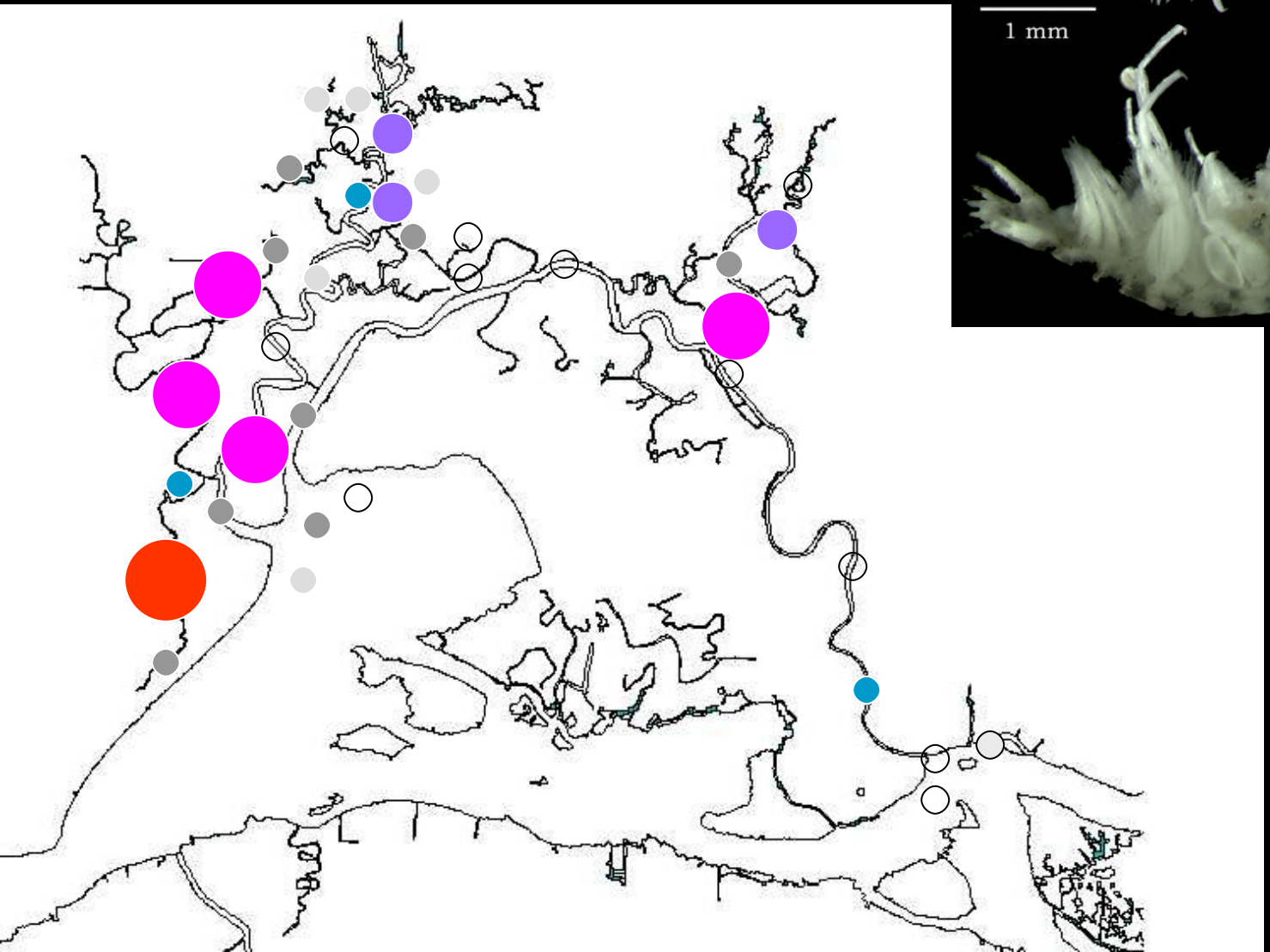


- >10,000 m²
- 5,001-10,000
- 2,001-5000
- 1001-2,000
- 501-1,000
- 101-500
- 1-100
- 0

Family Corophiidae

Americorophium *spinicorne* - N

A. *stimpsoni* - N



>10,000 m²

5,001-10,000

2,001-5000

1001-2,000

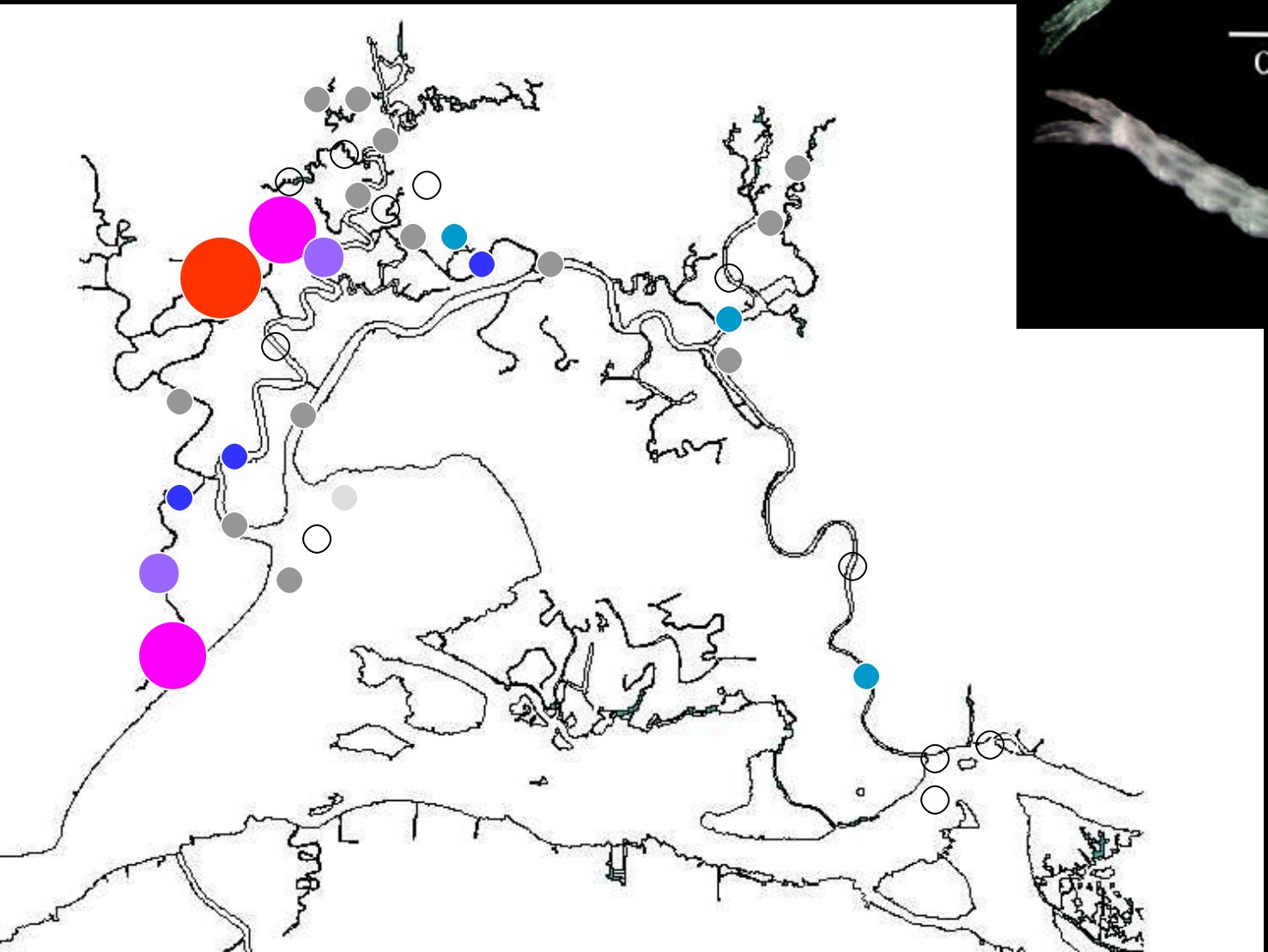
501-1,000

101-500

1-100

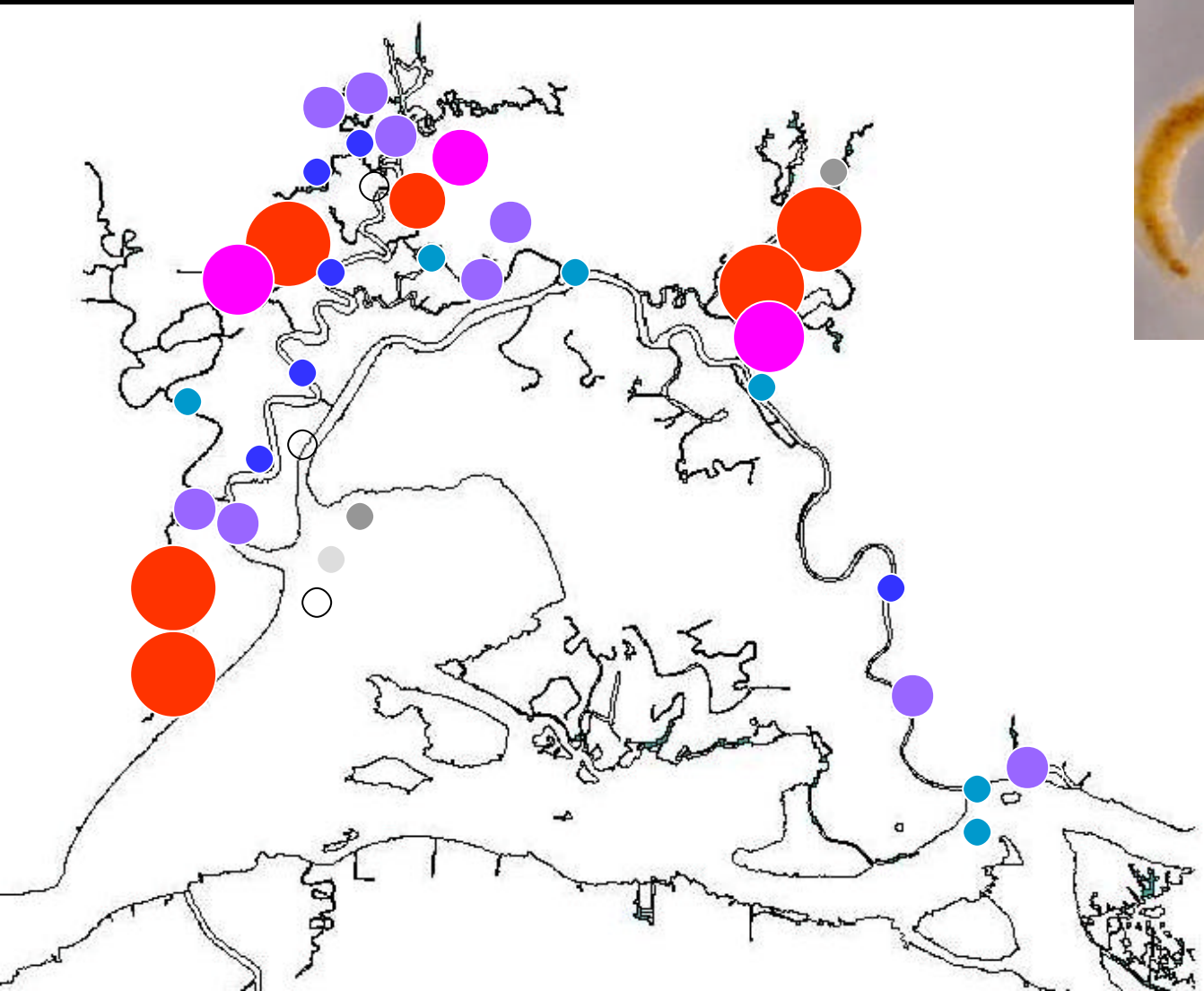
0

Order Cumacea
Family Leuconididae



- >10,000 m²
- 5,001-10,000
- 2,001-5000
- 1001-2,000
- 501-1,000
- 101-500
- 1-100
- 0

Class Oligochaeta



>10,000 m²

5,001-10,000

2,001-5000

1001-2,000

501-1,000

101-500

1-100

0

Conclusions

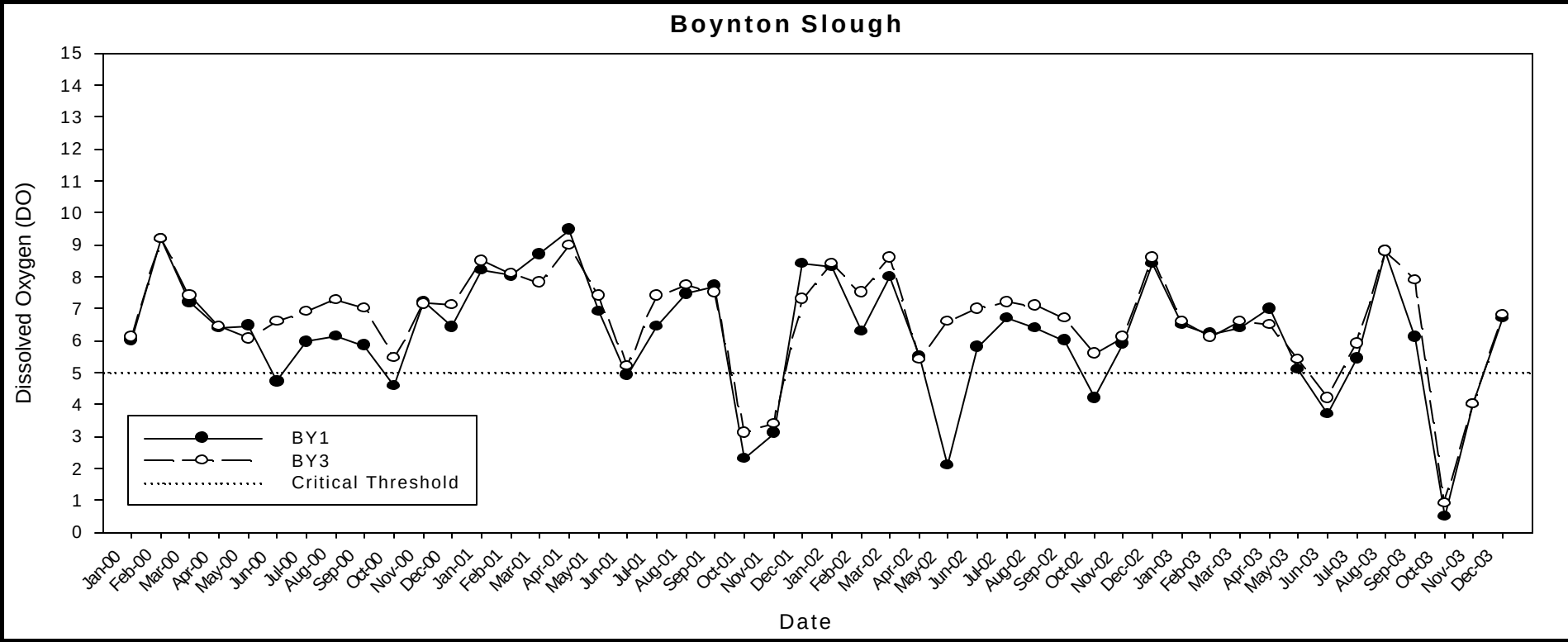
- **Mega Shrimp**
  - Community continues to change. Role of E. modestus in Food Web??????
- **Macrozooplankton**
  - Native mysid shrimps continue to decline estuary wide / Introduced species continue to increase in abundance. Refugia for native species in small tidal sloughs?
- **Benthos**
  - Preliminary data indicates local “hotspots” in abundance.
  - Overbite and Asian clams largely restricted in distribution
  - Benthic community largely dominated by filterers (clams & polychaetes) and collectors (oligochaetes, corophium)

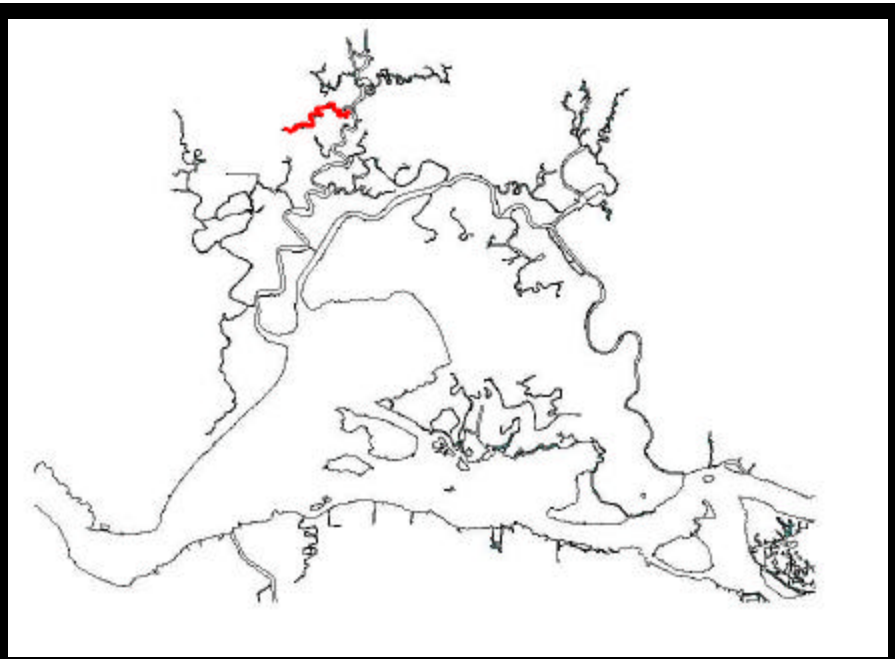
Conclusions cont…..

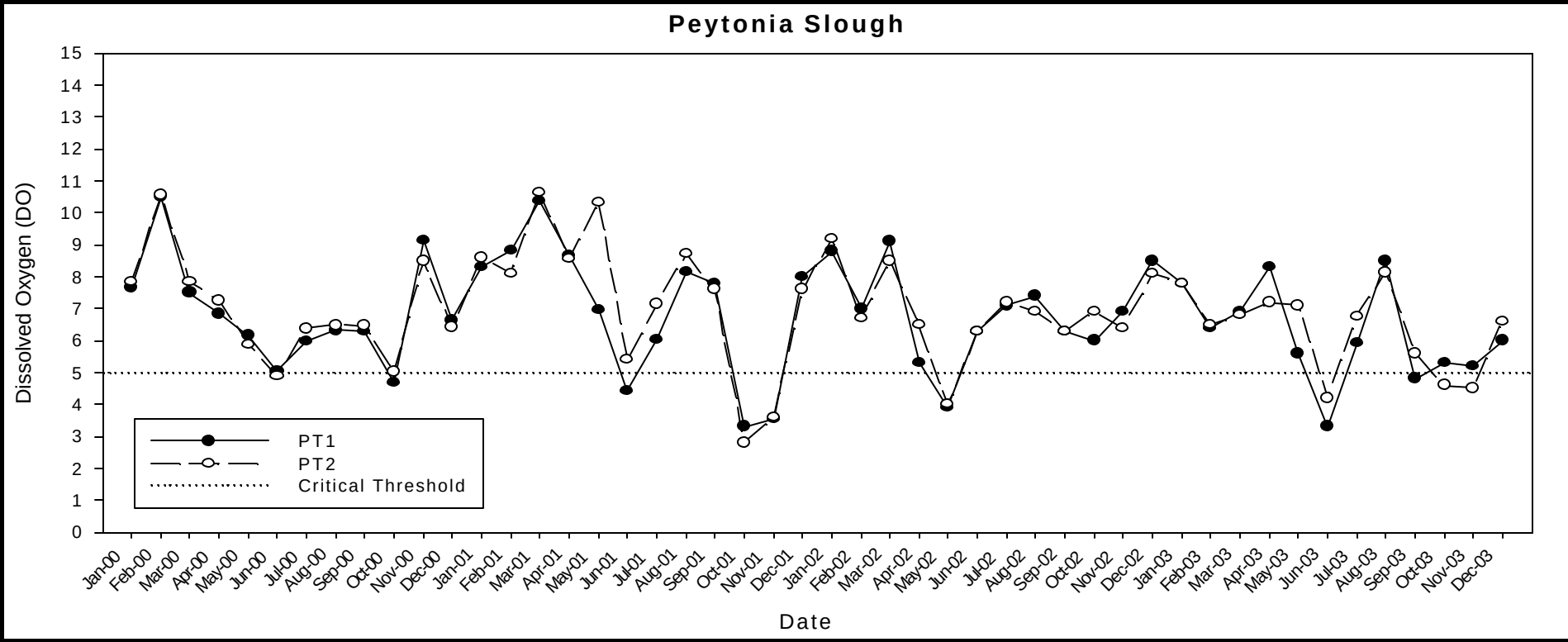
- **Overall, Marsh appears to be a very productive system!!!!!**
- **The invertebrate community is very diverse, made up partly by native species as well as introduced species.**

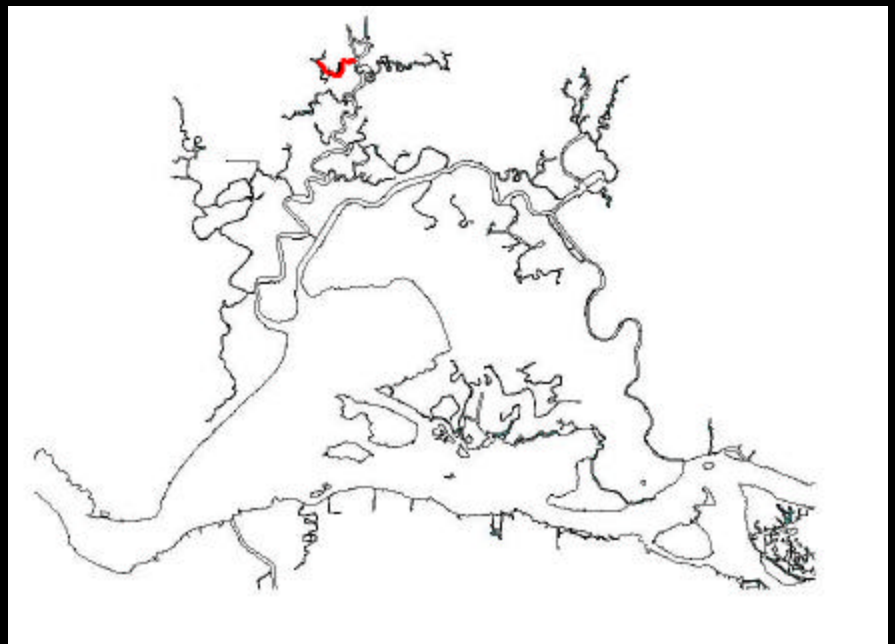
Dissolved Oxygen

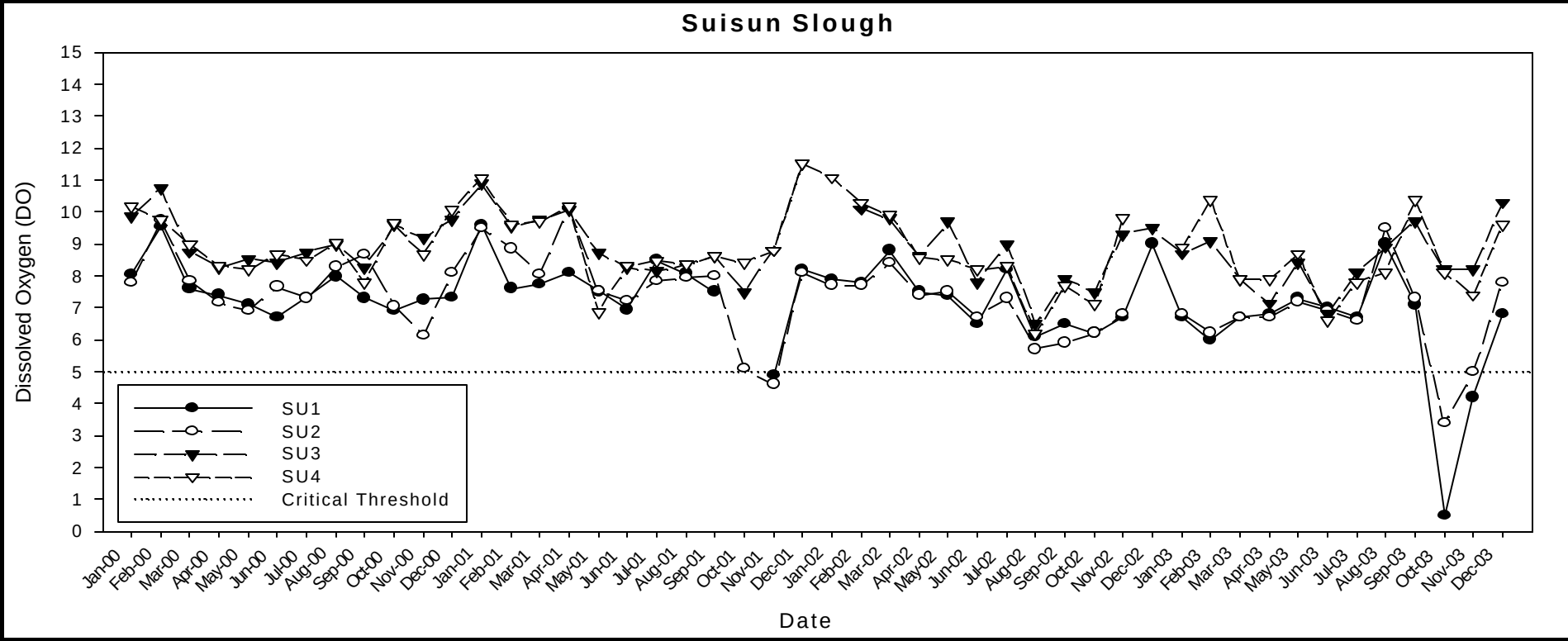
- Considerable Dissolved Oxygen sag events occur seasonally and regionally in the marsh.
- These sags appear to coincide in both time and space with pond discharge / flood up activities.
- Sags are persistent lasting from weeks to even months covering considerable areas of the marsh
- Fish mortality has been observed during these events as have reduced abundance of various aquatic taxa.

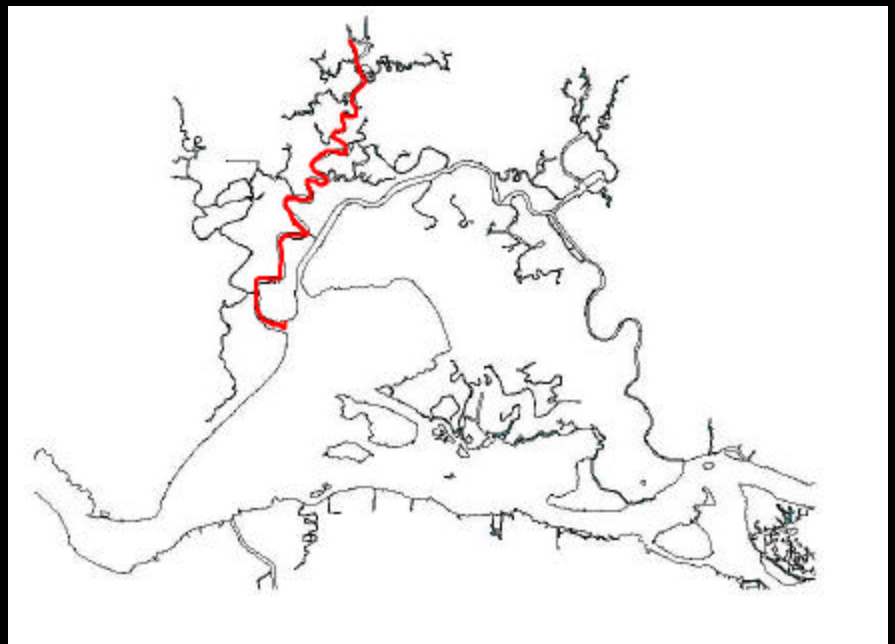

Boynton Slough
Dissolved Oxygen (DO)
Date
BY1
BY3
Critical Threshold
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03

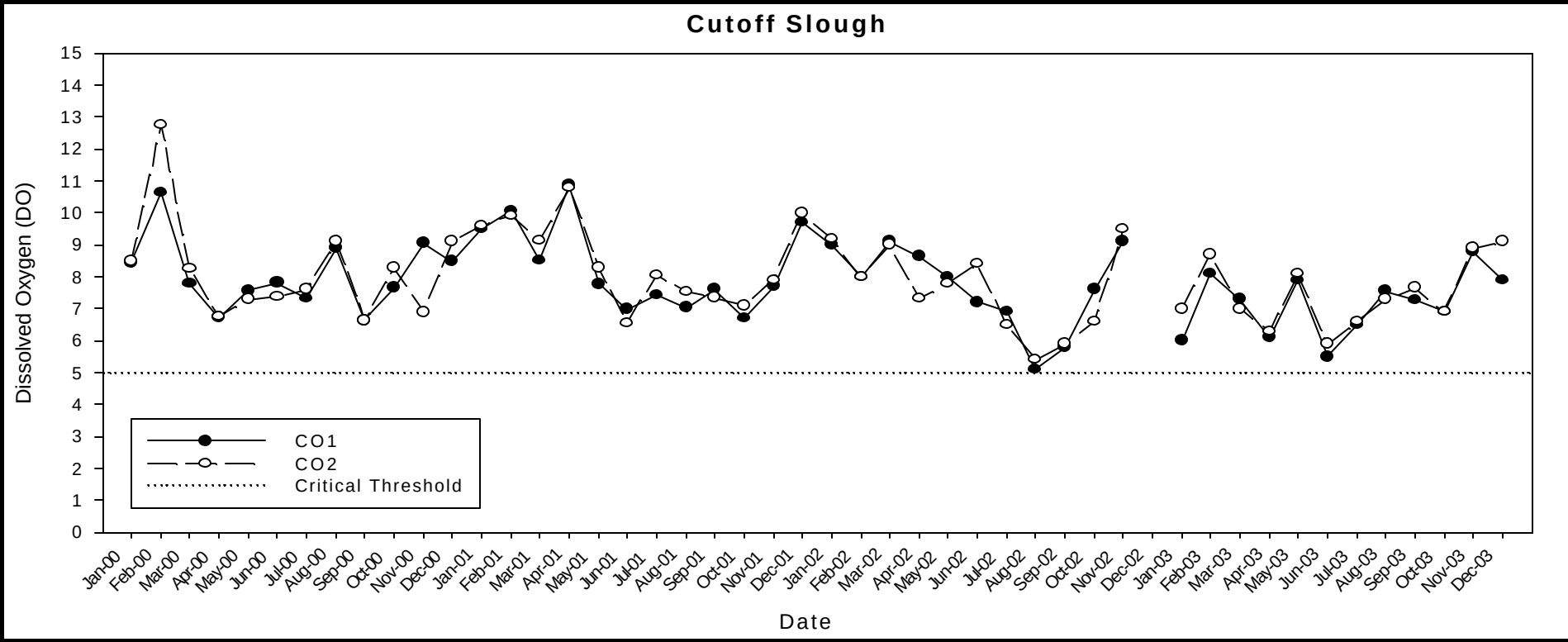


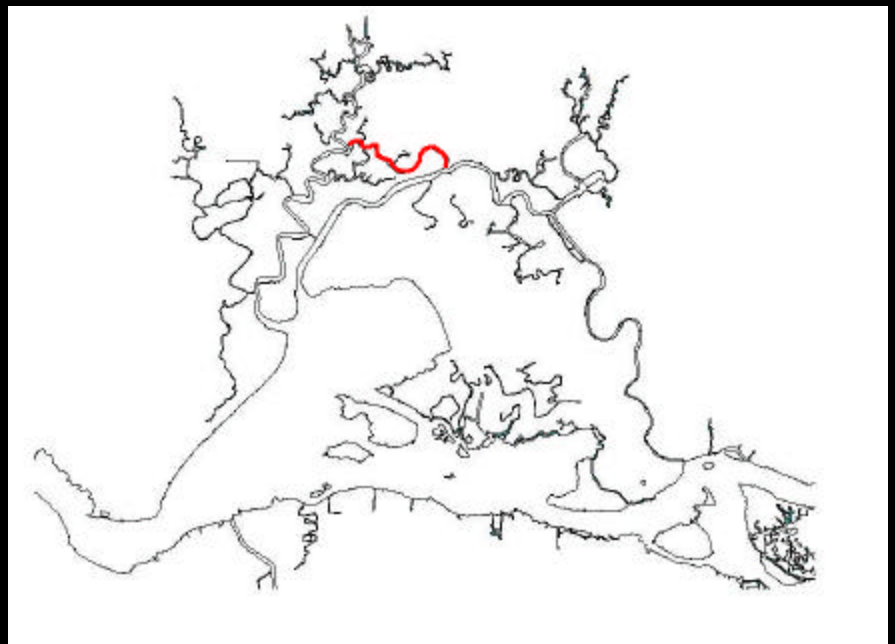

Peytonia Slough
Dissolved Oxygen (DO)
Date
PT1
PT2
Critical Threshold
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03

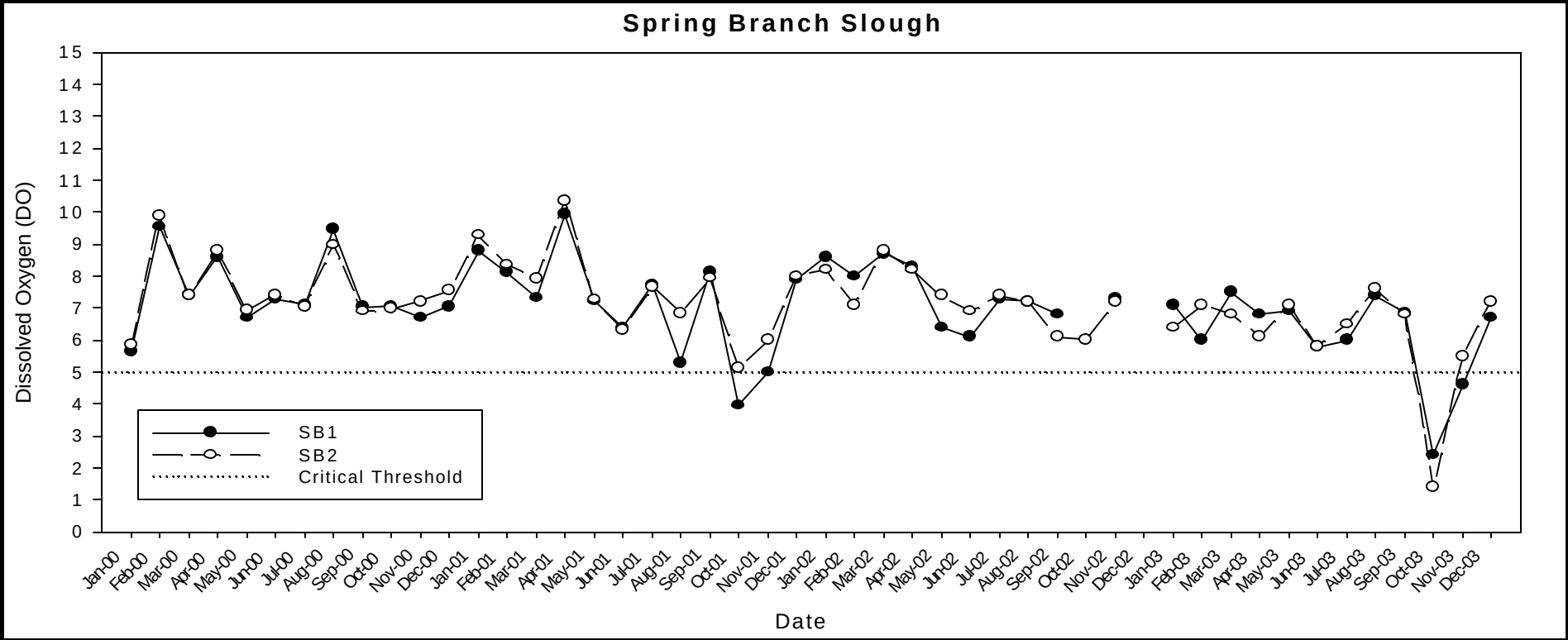


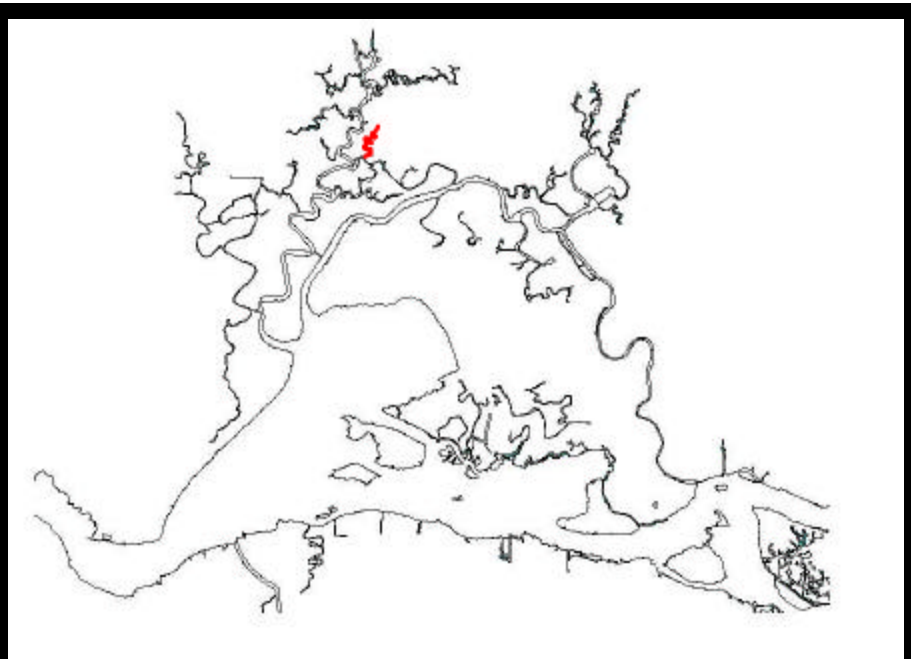

Suisun Slough
Dissolved Oxygen (DO)
Date
SU1
SU2
SU3
SU4
Critical Threshold

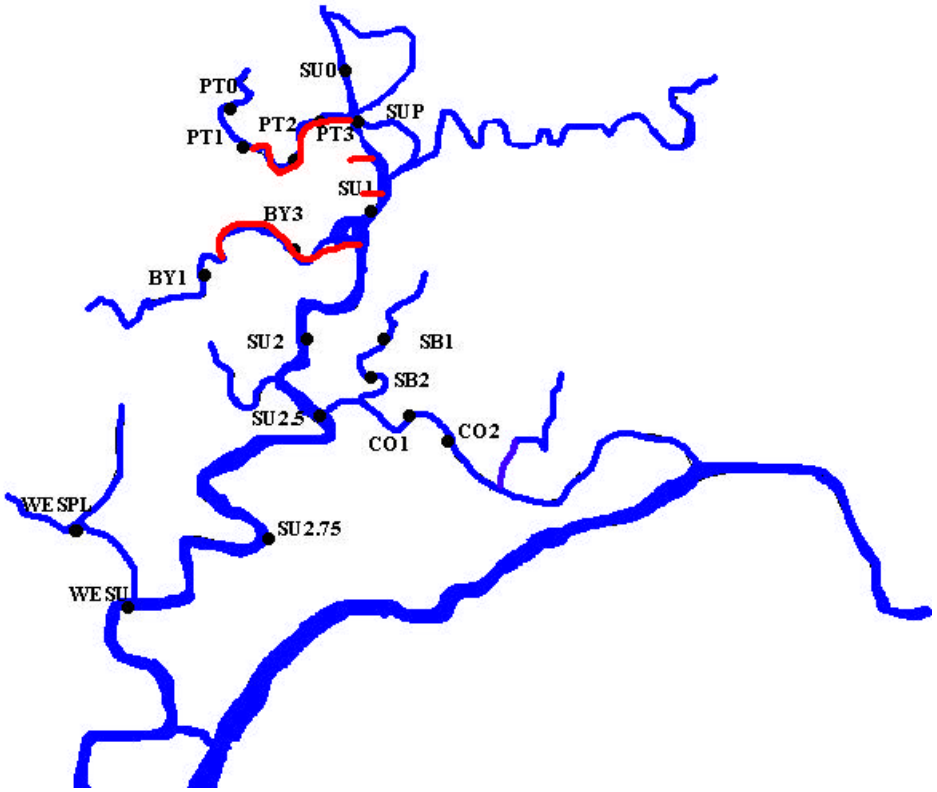


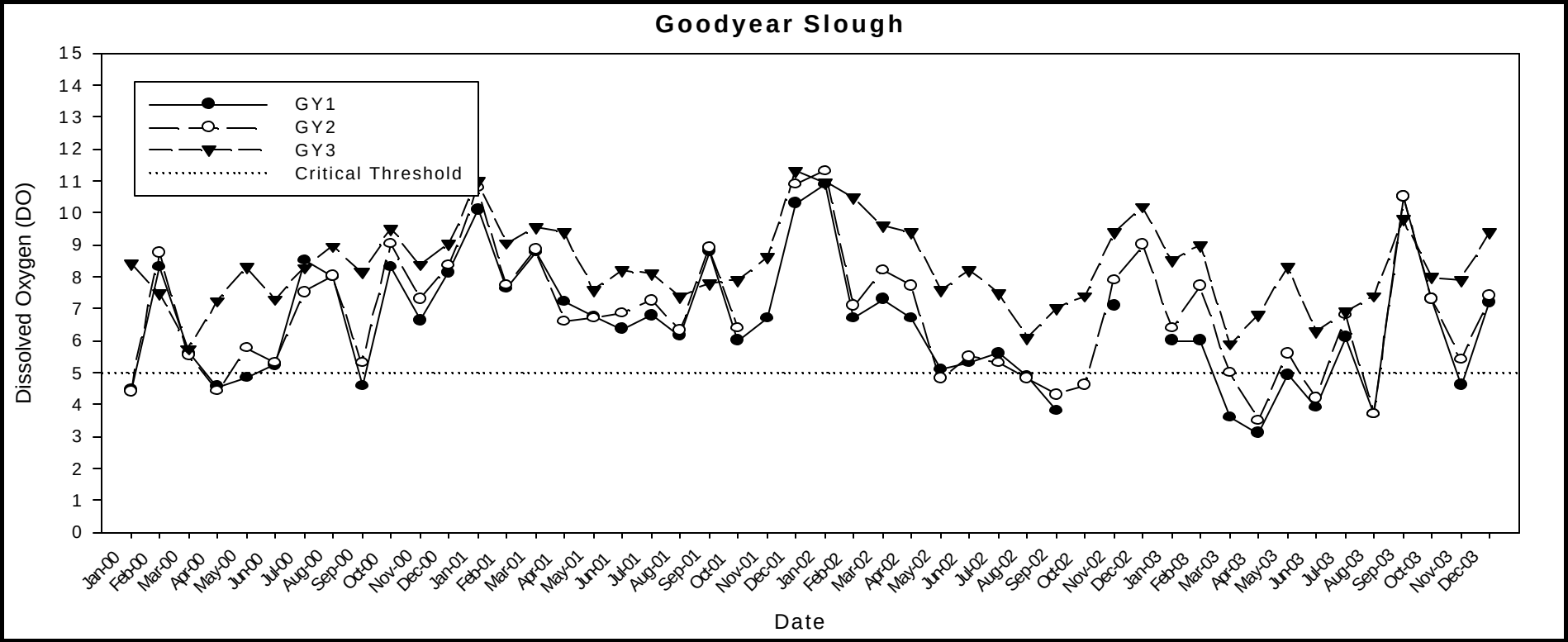

Cutoff Slough
Dissolved Oxygen (DO)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
CO1
CO2
Critical Threshold
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Date

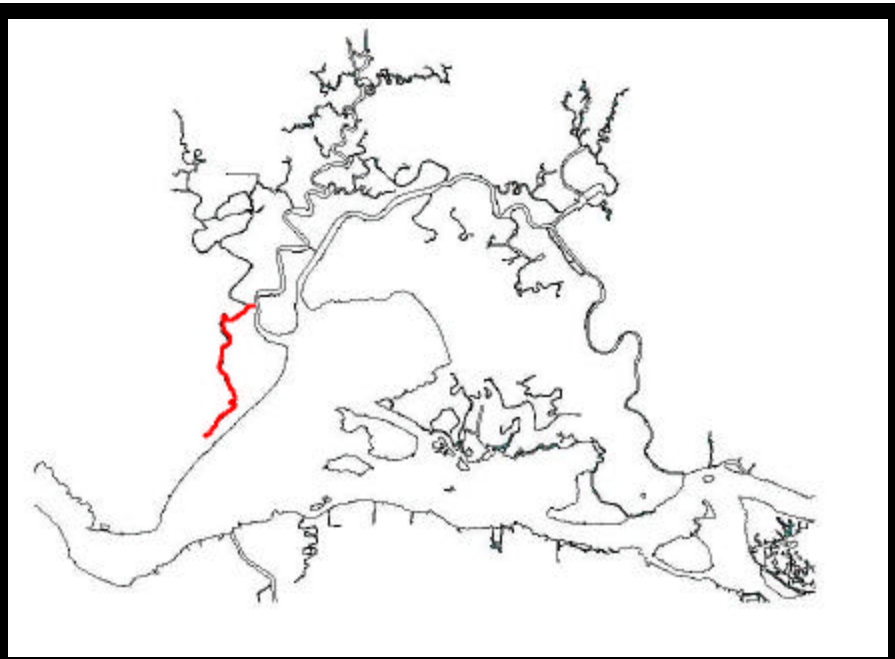


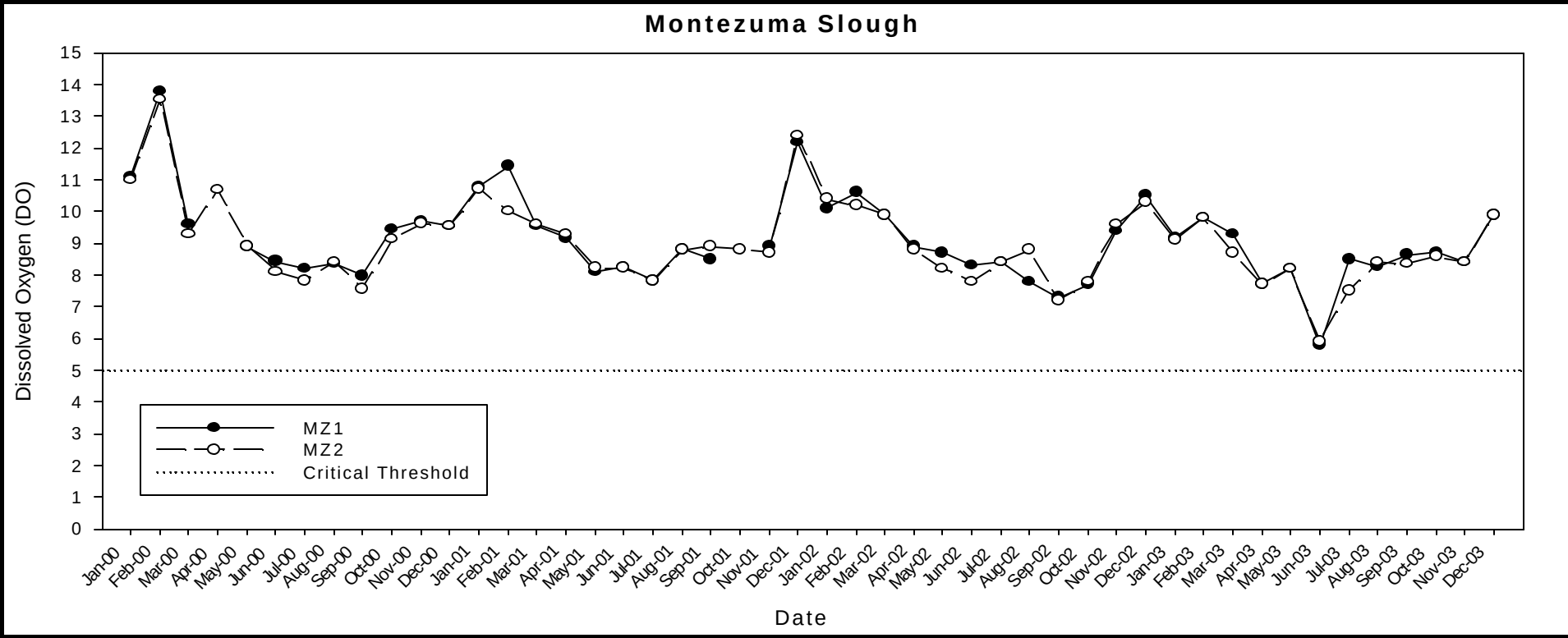

Spring Branch Slough
Dissolved Oxygen (DO)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
SB1
SB2
Critical Threshold
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Date

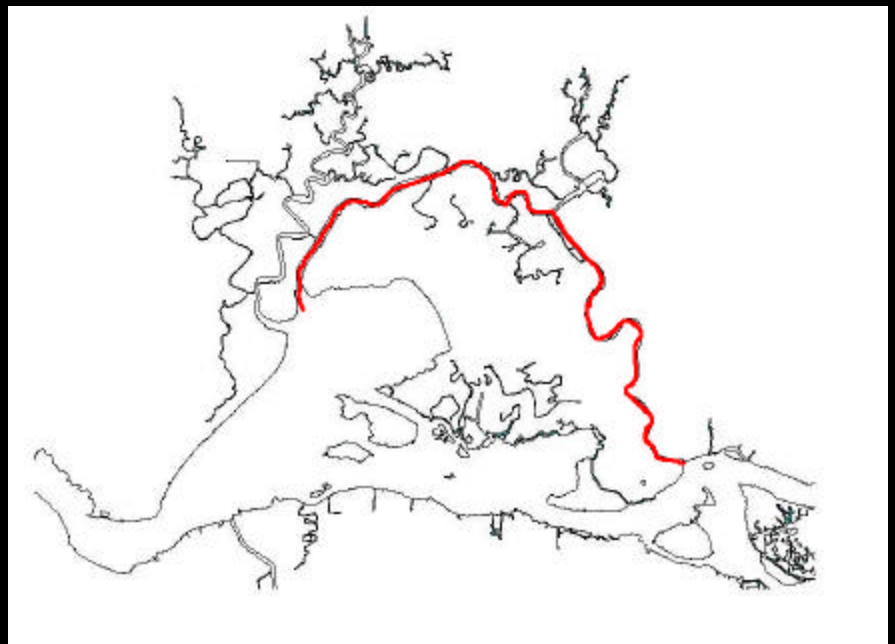


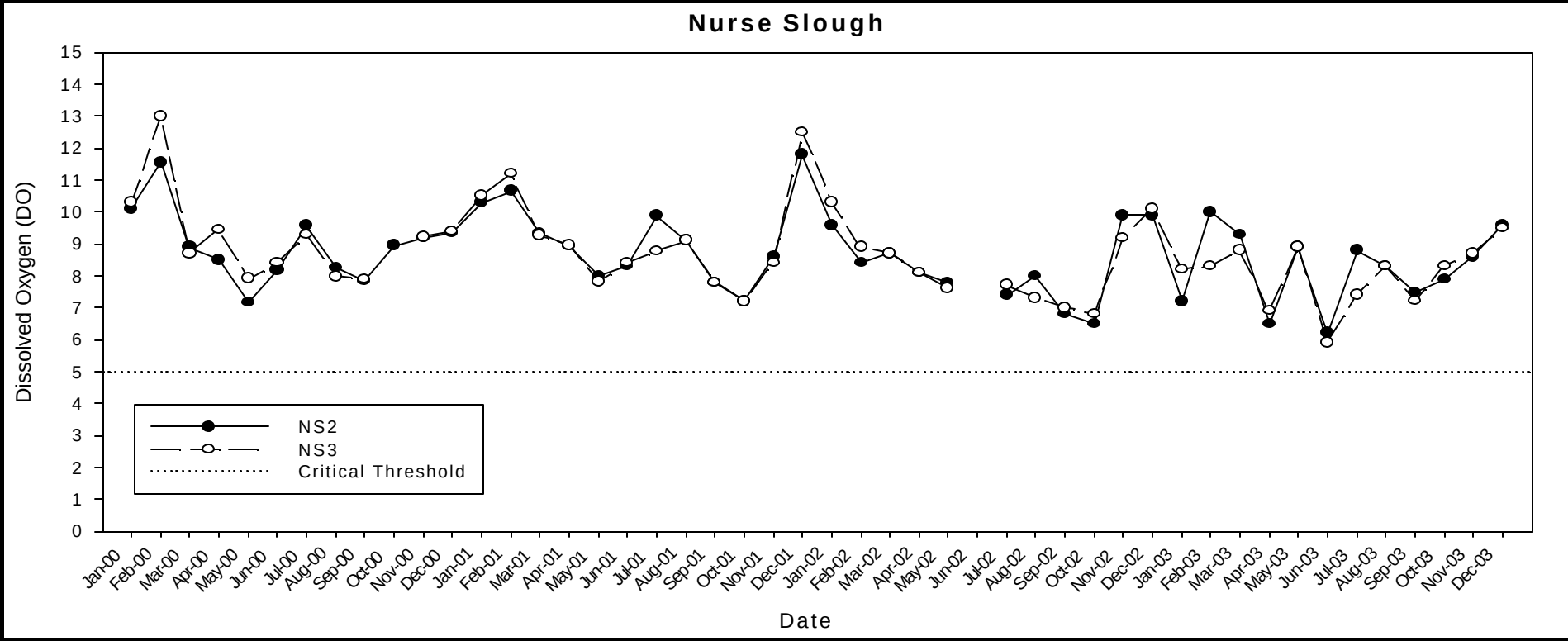

SU0
PT0
SUP
PT2
PT3
PT1
SU1
BY3
BY1
SU2
SB1
SB2
SU2.5
CO1
CO2
WESPL
SU2.75
WESU

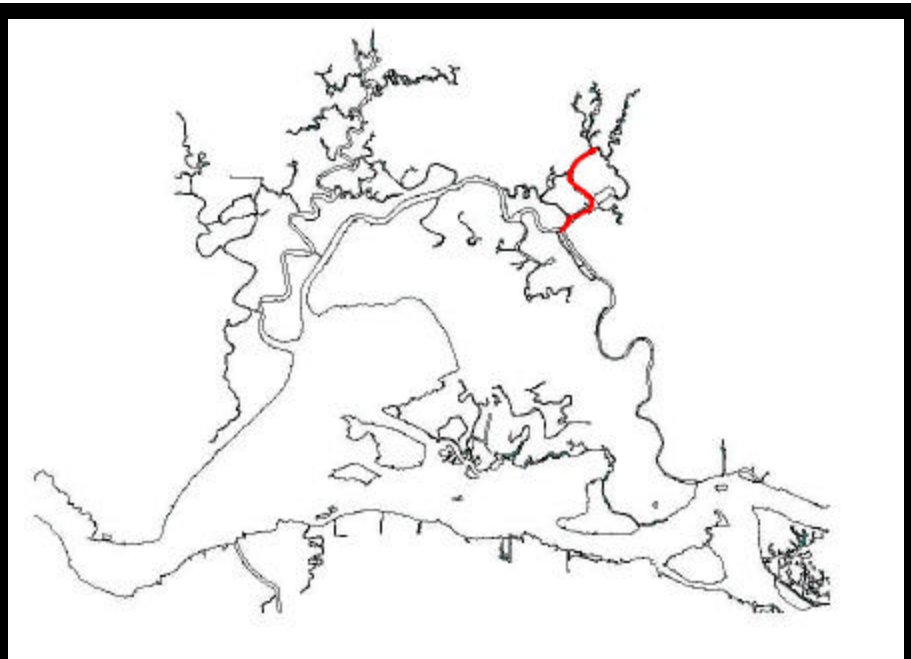

Goodyear Slough
GY1
GY2
GY3
Critical Threshold
Dissolved Oxygen (DO)
Date
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03

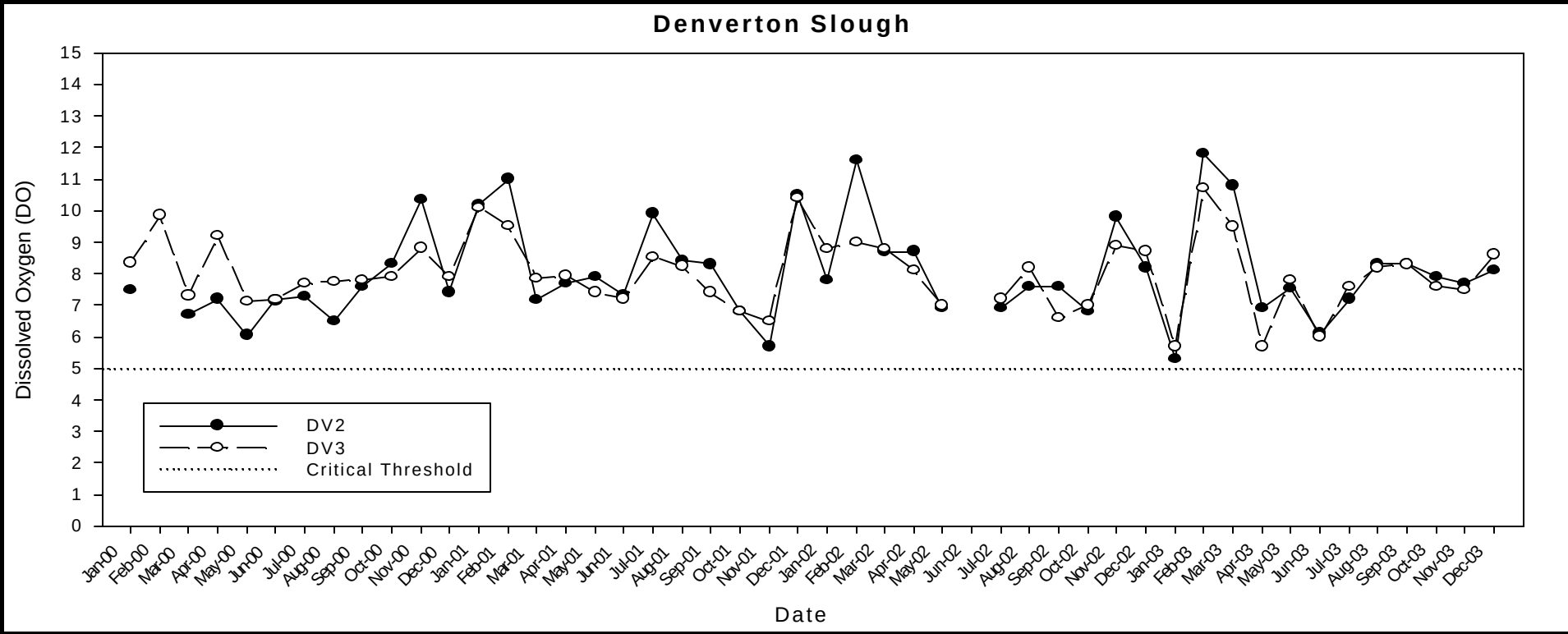


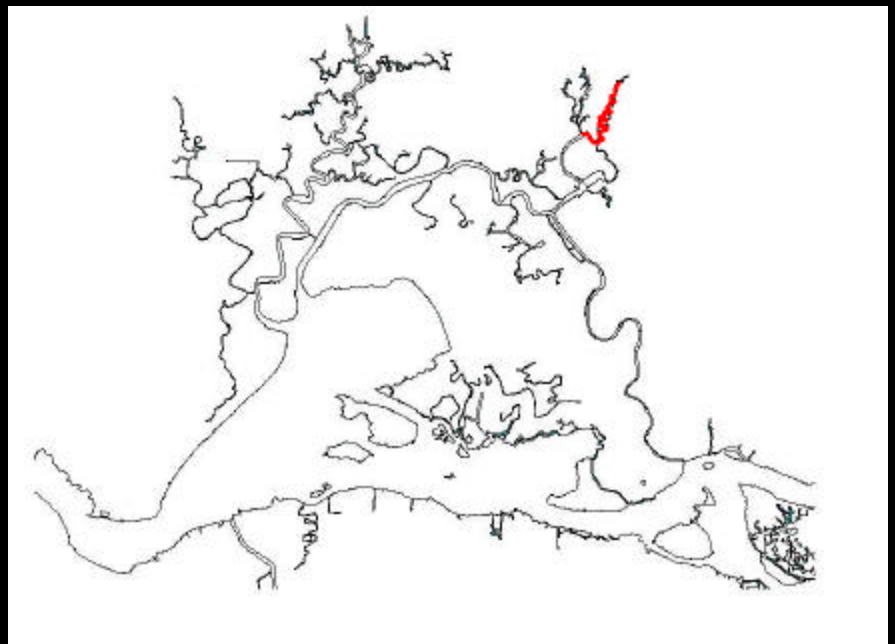

Montezuma Slough
Dissolved Oxygen (DO)
Date
MZ1
MZ2
Critical Threshold
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03




Nurse Slough
Dissolved Oxygen (DO)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
NS2
NS3
Critical Threshold
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Date




Denverton Slough
Dissolved Oxygen (DO)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
DV2
DV3
Critical Threshold
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02
May-02
Jun-02
Jul-02
Aug-02
Sep-02
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03
Oct-03
Nov-03
Dec-03
Date



The End