2001 – 2011 Simulation

- This is a new base simulation for activities through to the 2017 re-evaluation. The previous base was 1991 - 2001
  - Move to recent land uses, loads, data.
  - Incorporate bulk of shallow-water data.
  - Provide boundary conditions for multiple model project.

What Did We Need to Do?

- Watershed Model Loads – Prepared by CBP July 2013.
- Hydrodynamics – Prepared by CBP circa July 2013.
- Meteorological Files – Prepared by CBP circa July 2013.
- Conventional Monitoring Program – Data downloaded by ERDC circa July 2014. Organized according to previous procedures. Time series at selected stations. Seasonal-averages along axes of Bay and major tributaries.

What Did We Need to Do?

- Boundary Conditions – Required at open mouth and at fall line for several substances.
  - Few or no DOC observations near mouth.
  - Minimal dissolved silica observations at fall lines.
  - Potentially switch to WSM for fall-line DO, temperature, chlorophyll.

What Do We Need to Do?

- The S3 File – Atmospheric Loads, Bank Erosion, Wetlands Loads.
  - At this minute, we have annual atmospheric loads to the water surface (in lbs.).
  - Bank erosion is the major hurdle.
  - For the moment, use wetland DO uptake as previously.

Bank Erosion

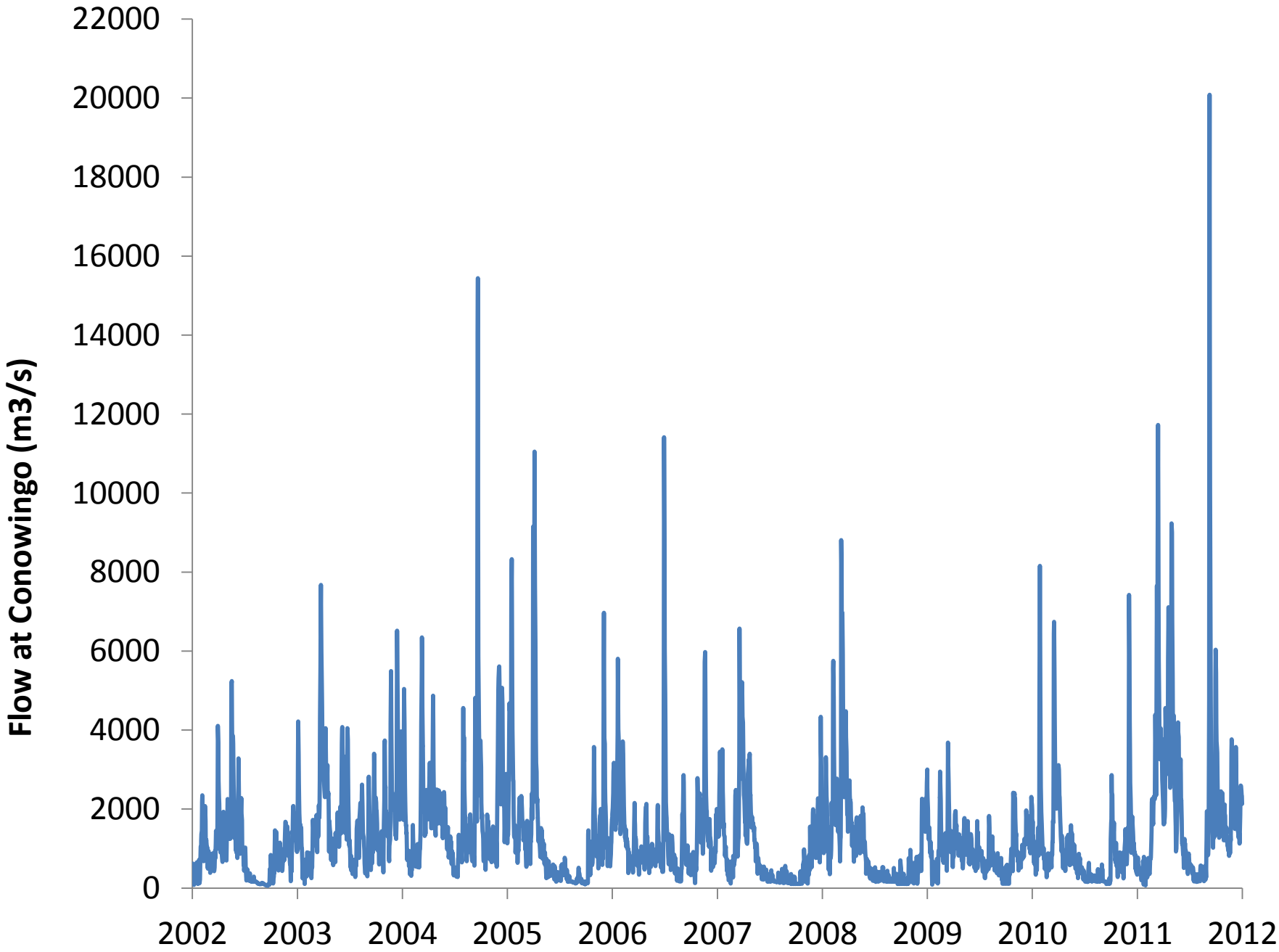
- We have long-term estimates of bank erosion.
- We previously computed daily erosion loads based on daily energy dissipated by waves and inundation. Labor intensive and maybe not worthwhile.
- For much of the bay, wave energy is negligible compared to inundation.
- Do we need daily variation in loads or are long-term average loads sufficient?

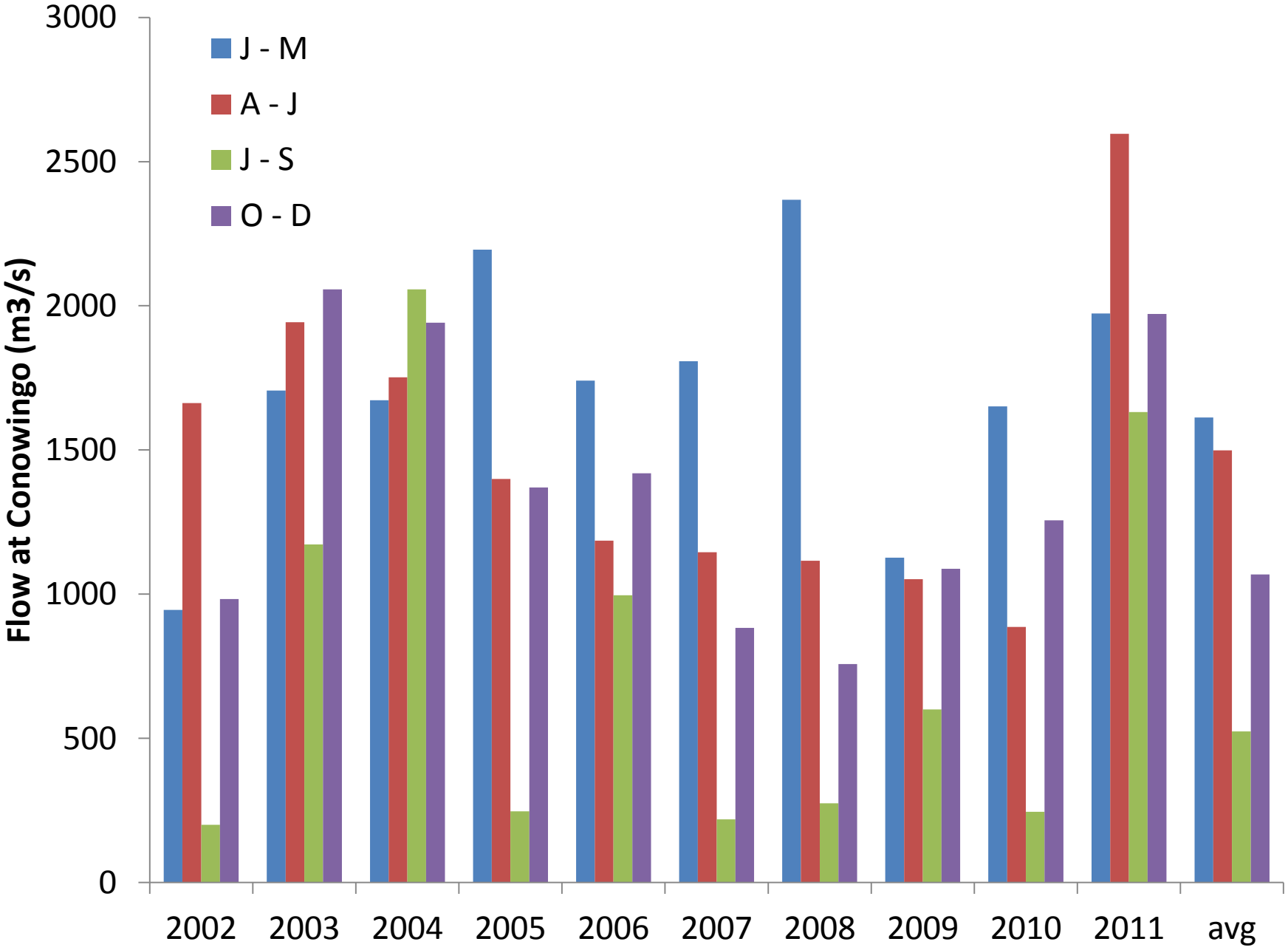
What Do We Need to Do?

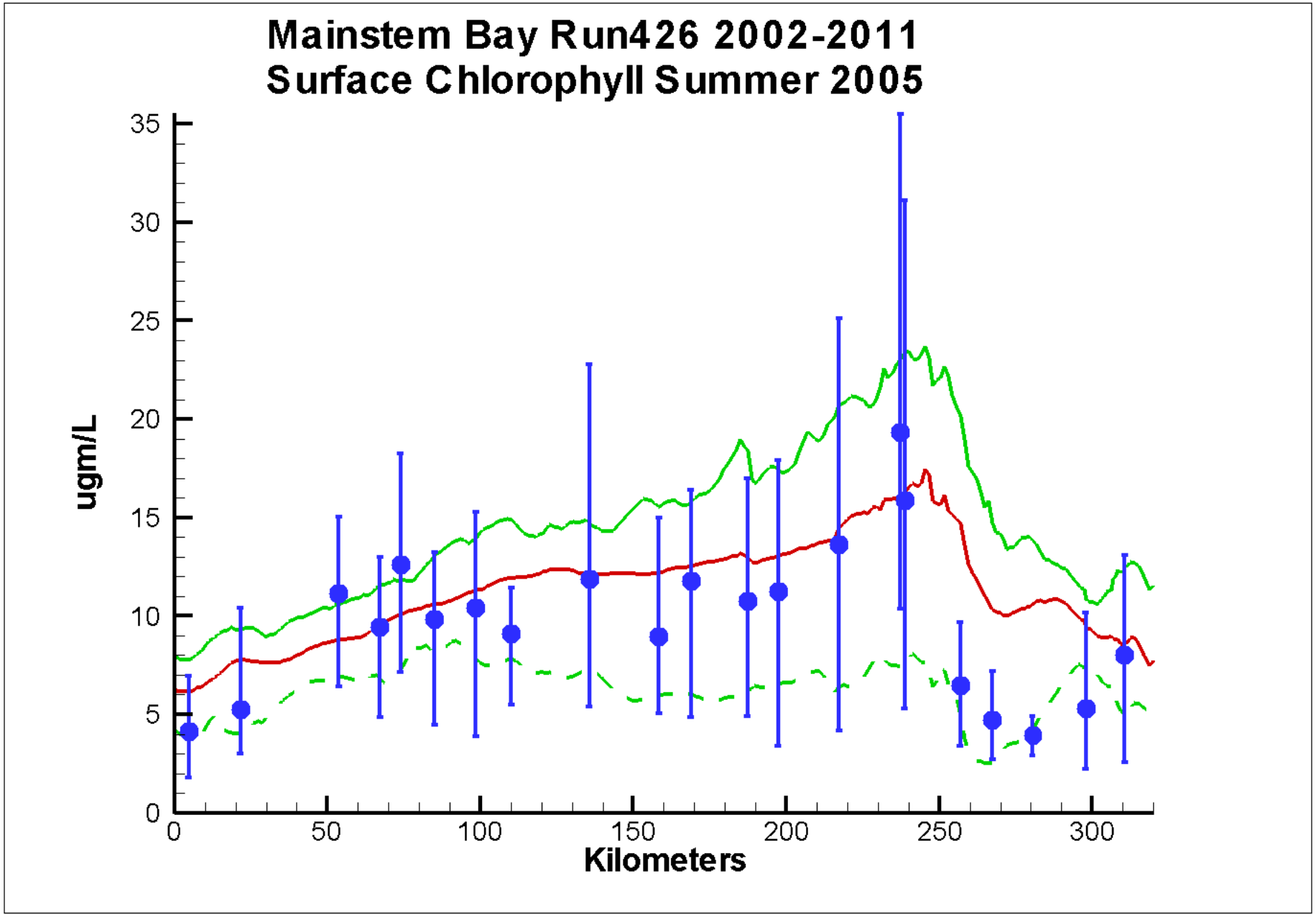
- Submerged Aquatic Vegetation – Annual surveys downloaded from VIMS. Needs to be organized for model comparisons.
- SONE Data – Discontinued in 2008. We have the Fluxzilla data base. Needs to be organized for model comparisons. Maybe some new formats or thinking.
- Primary Production – Discontinued during our period of interest. Need to give consideration to employment of the available data.

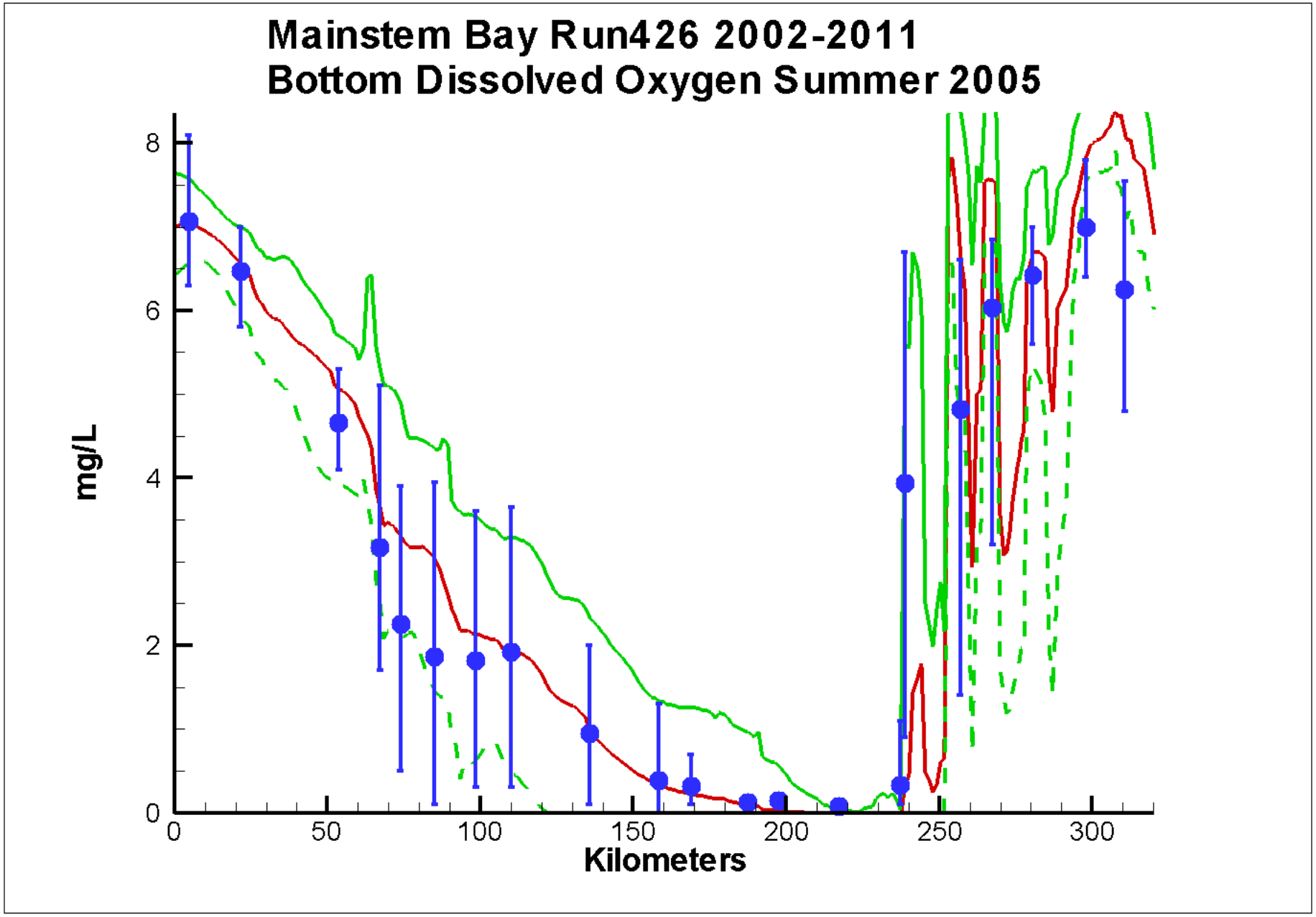
What Do We Need to Do?

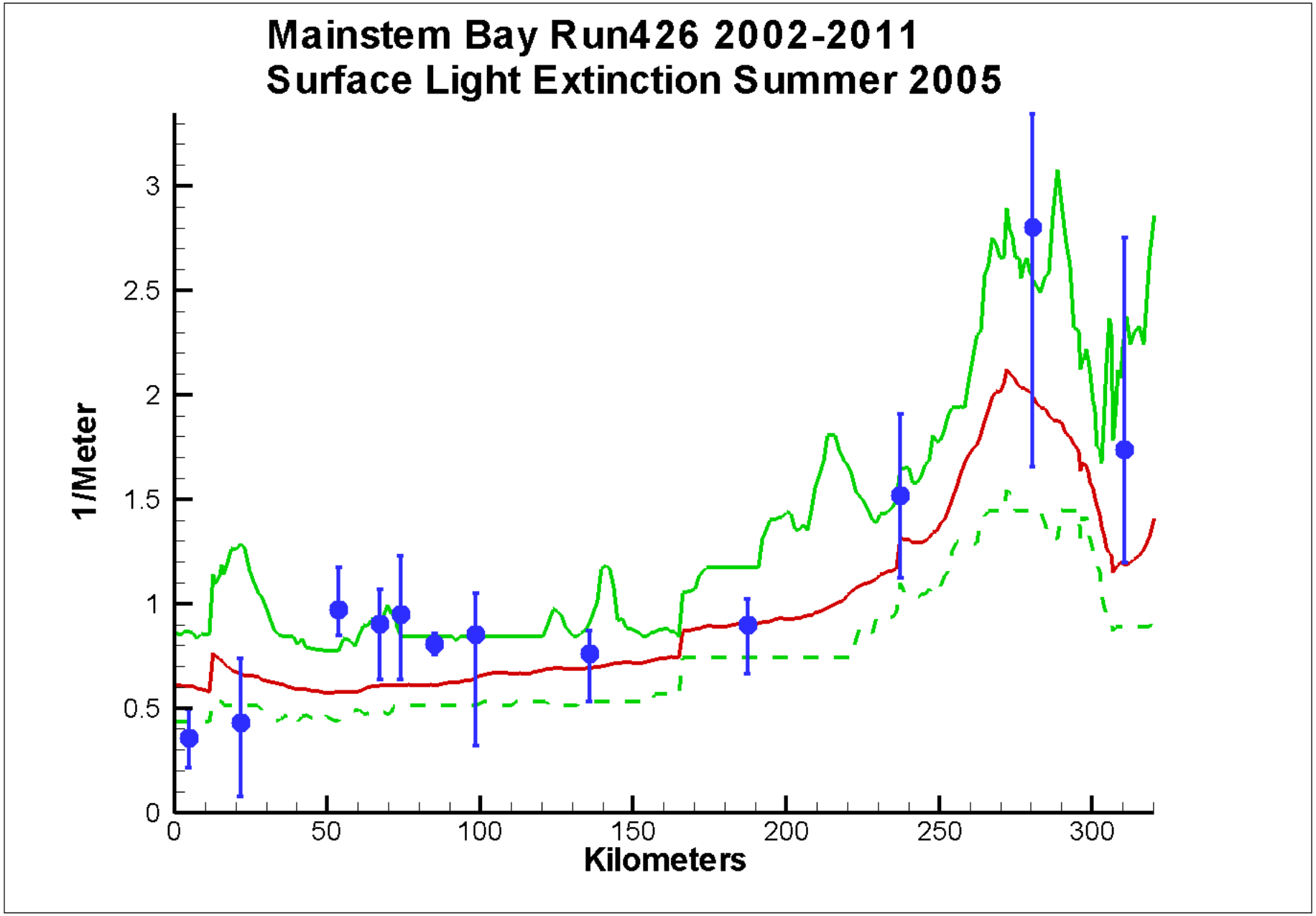
- We traditionally show axial distributions for wet, dry, and average years. We need to select the years for our new base period.

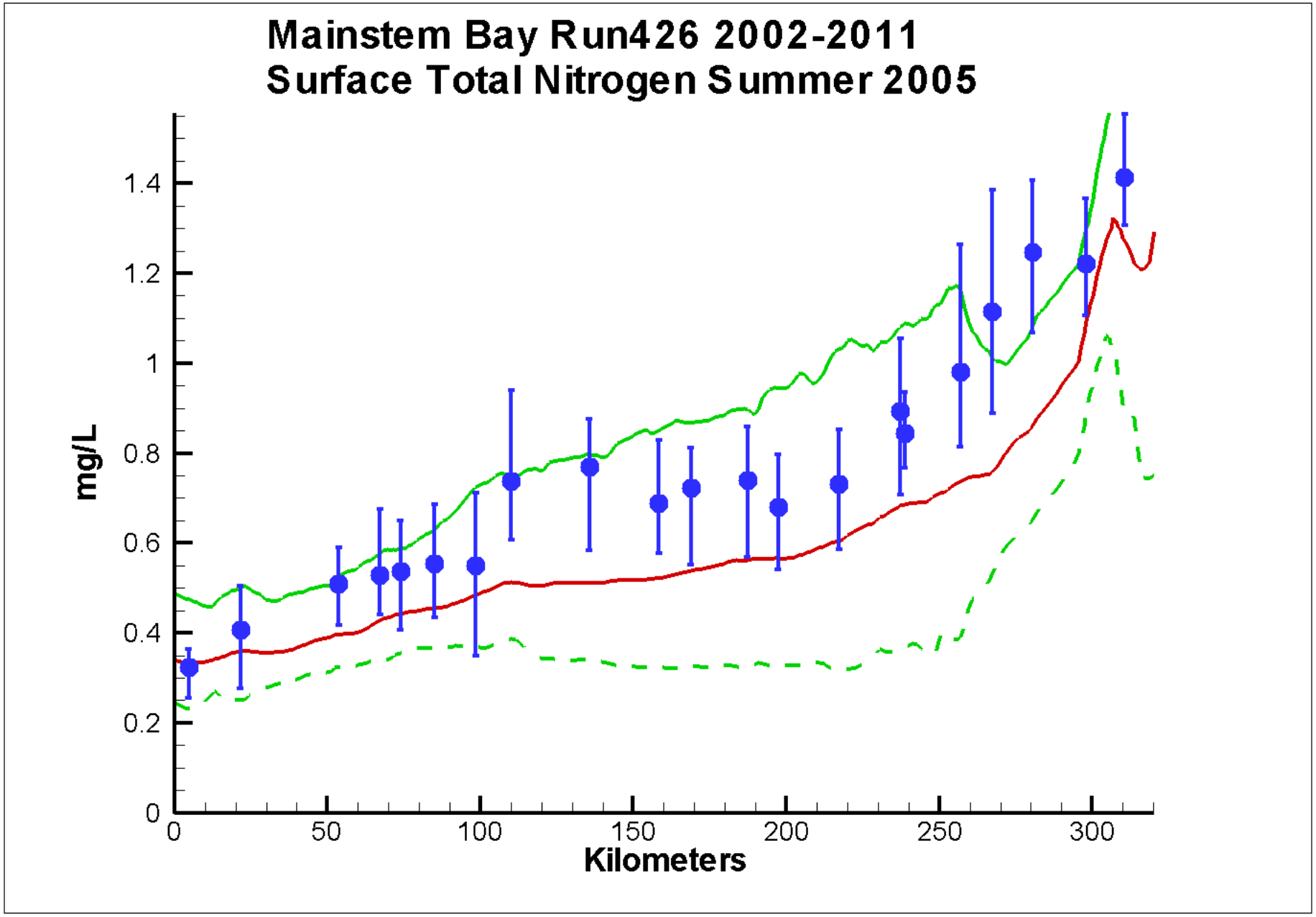

Flow at Conowingo (m3/s)
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012

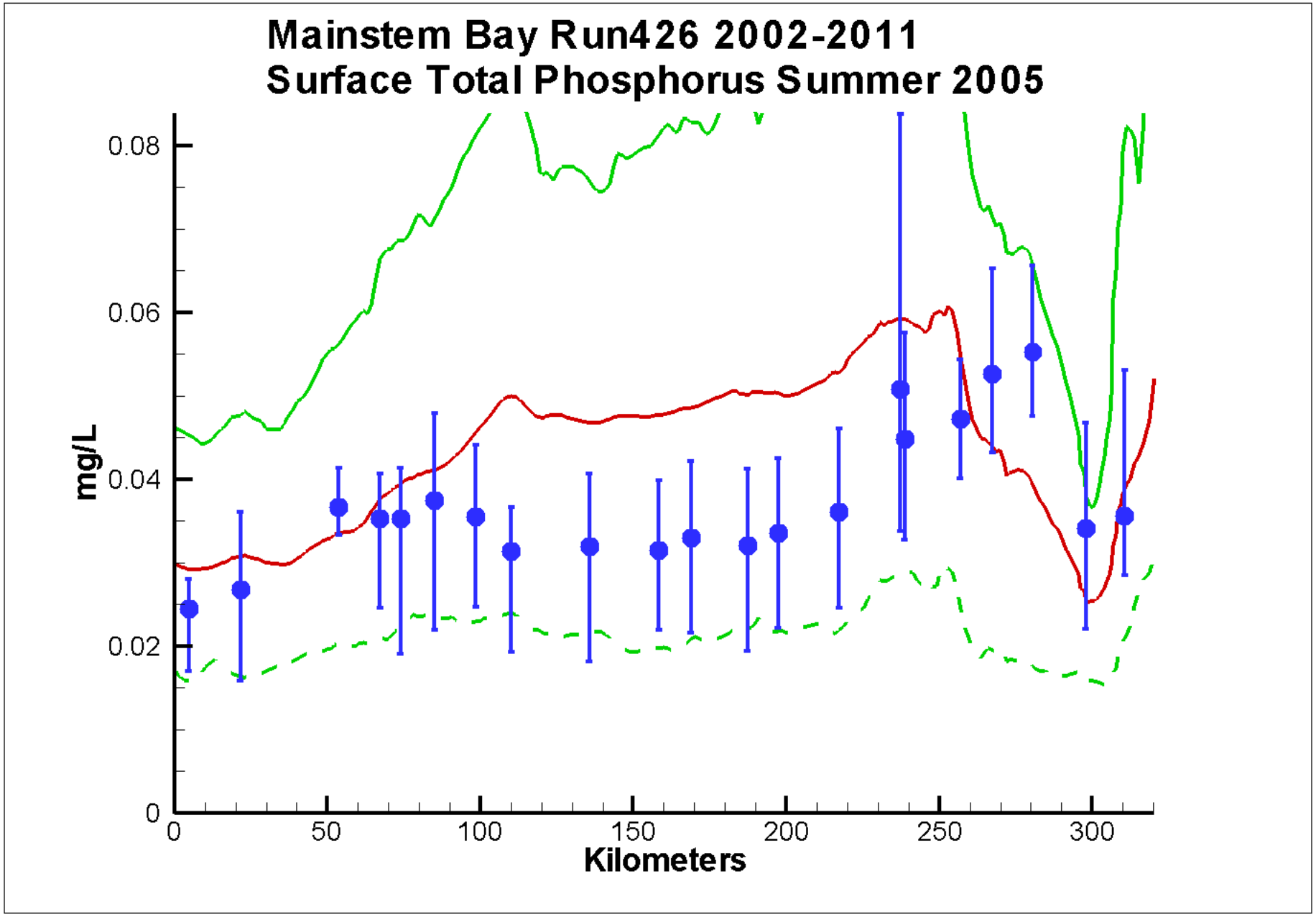

3000
2500
2000
1500
1000
500
0
Flow at Conowingo (m3/s)
J - M
A - J
J - S
O - D
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
avg

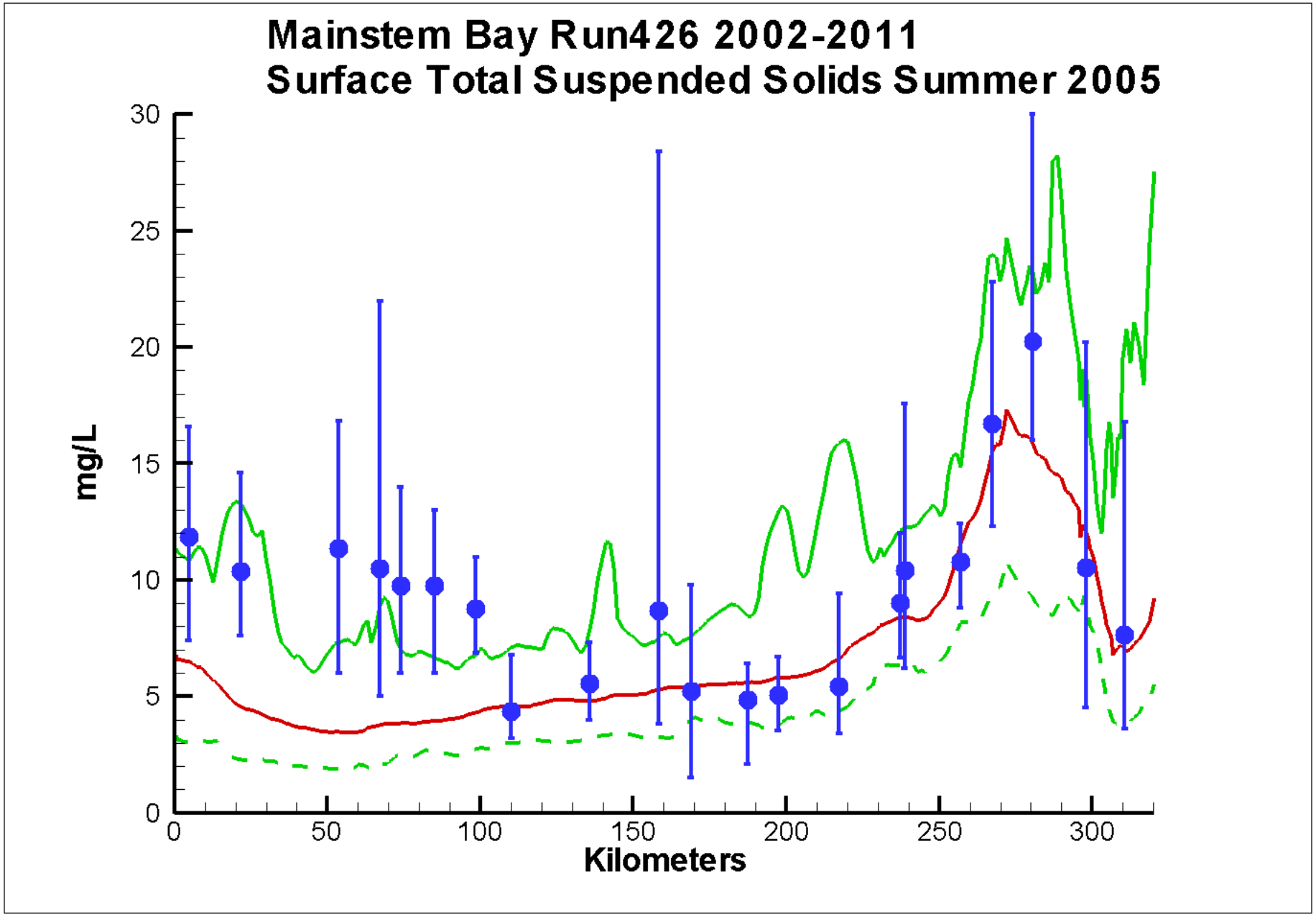

Mainstem Bay Run426 2002-2011
Surface Chlorophyll Summer 2005
ugm/L
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
Kilometers

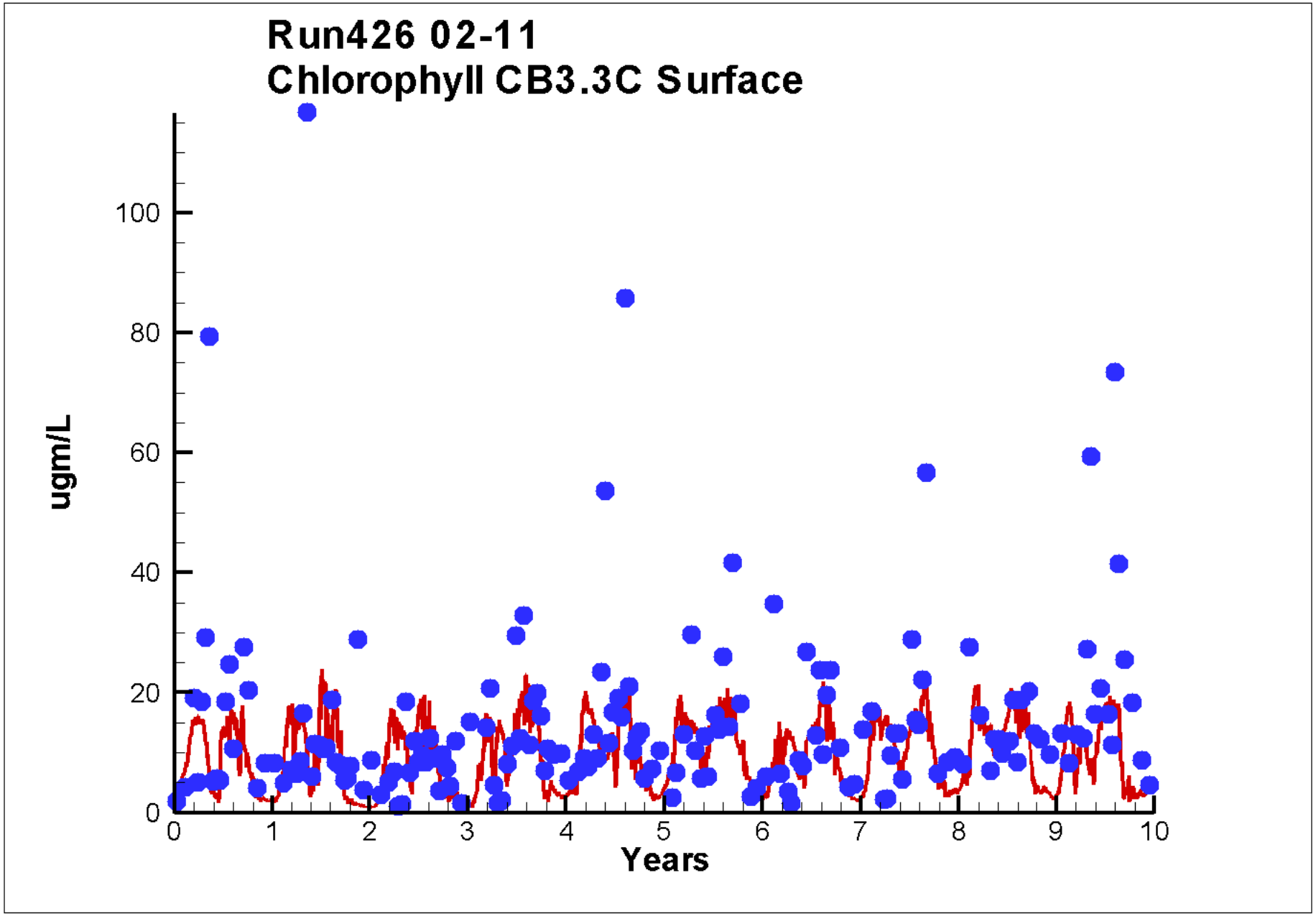

Mainstem Bay Run426 2002-2011
Bottom Dissolved Oxygen Summer 2005
mg/L
0
2
4
6
8
0
50
100
150
200
250
300
Kilometers

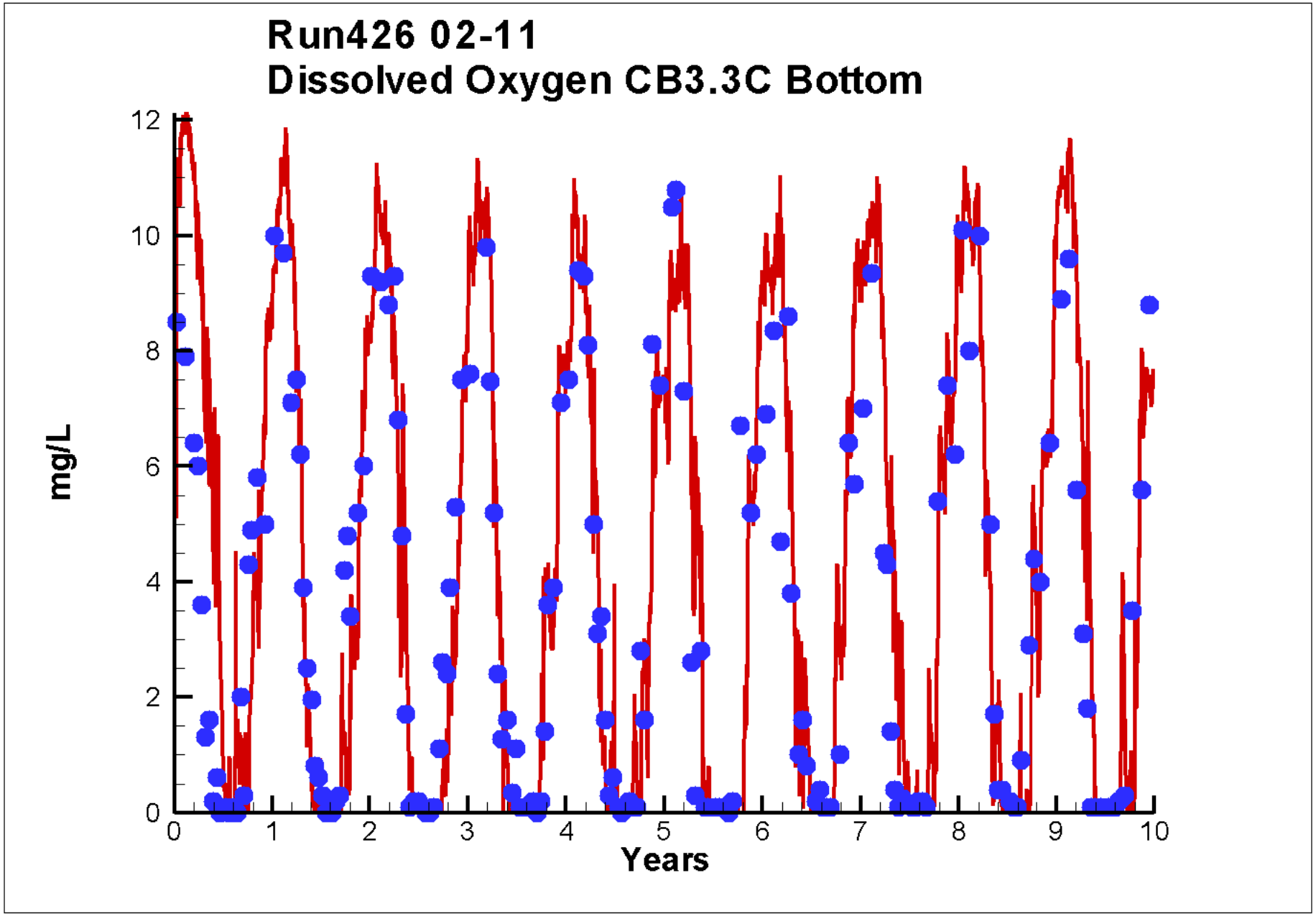

Mainstem Bay Run426 2002-2011
Surface Light Extinction Summer 2005
1/Meter
0
0.5
1
1.5
2
2.5
3
0
50
100
150
200
250
300
Kilometers

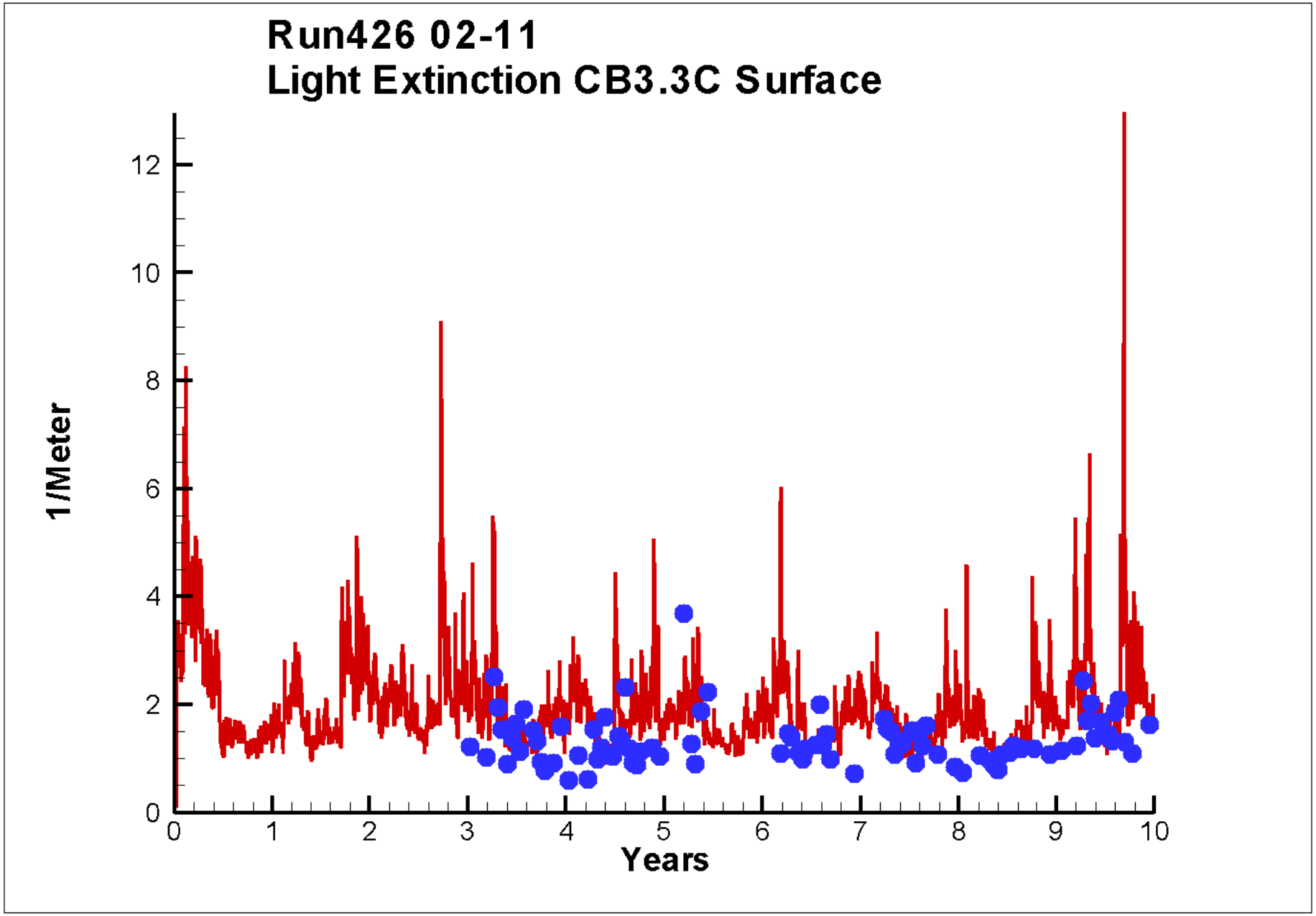

Mainstem Bay Run426 2002-2011
Surface Total Nitrogen Summer 2005
mg/L
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
50
100
150
200
250
300
Kilometers

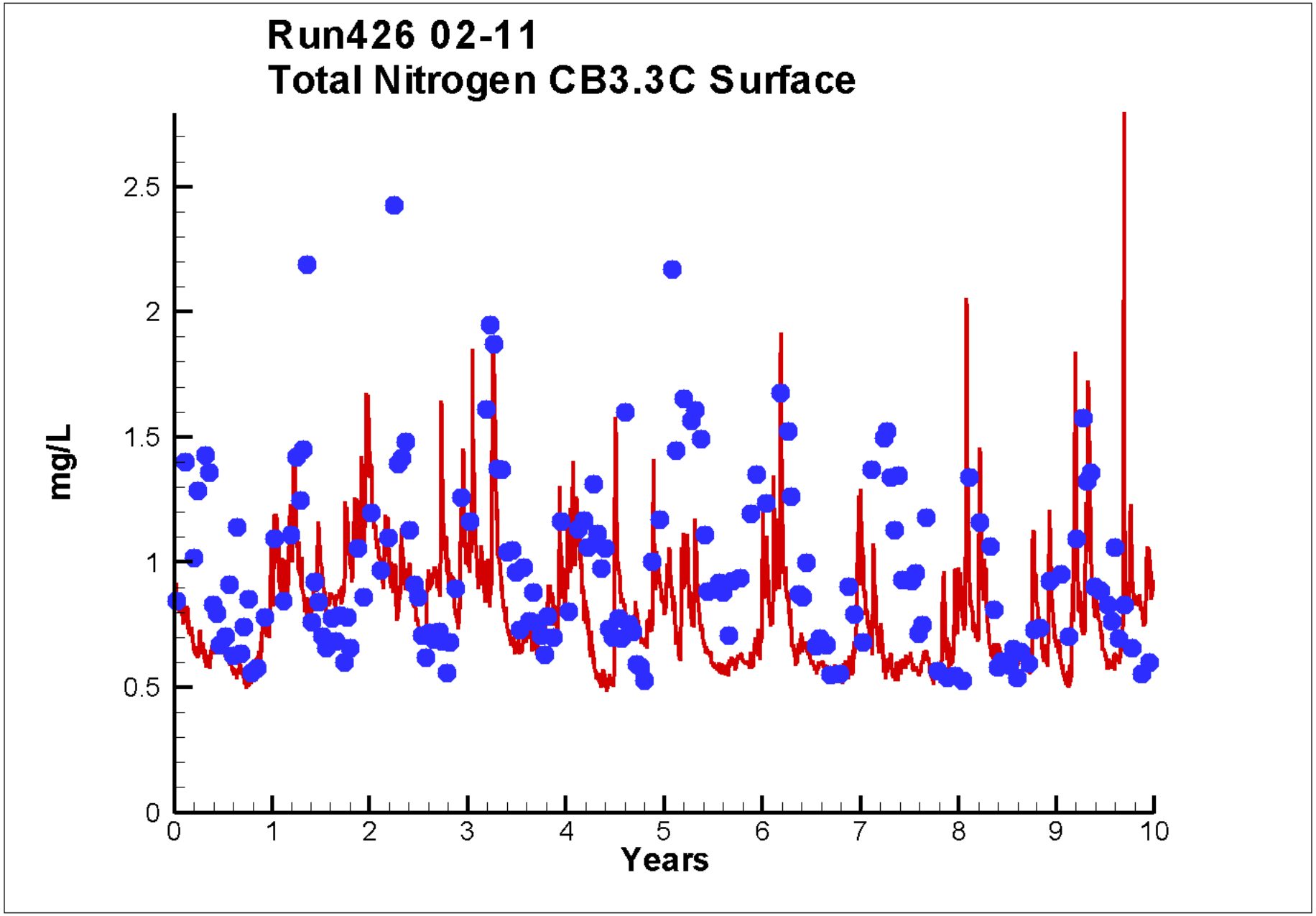

Mainstem Bay Run426 2002-2011
Surface Total Phosphorus Summer 2005
mg/L
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
Kilometers

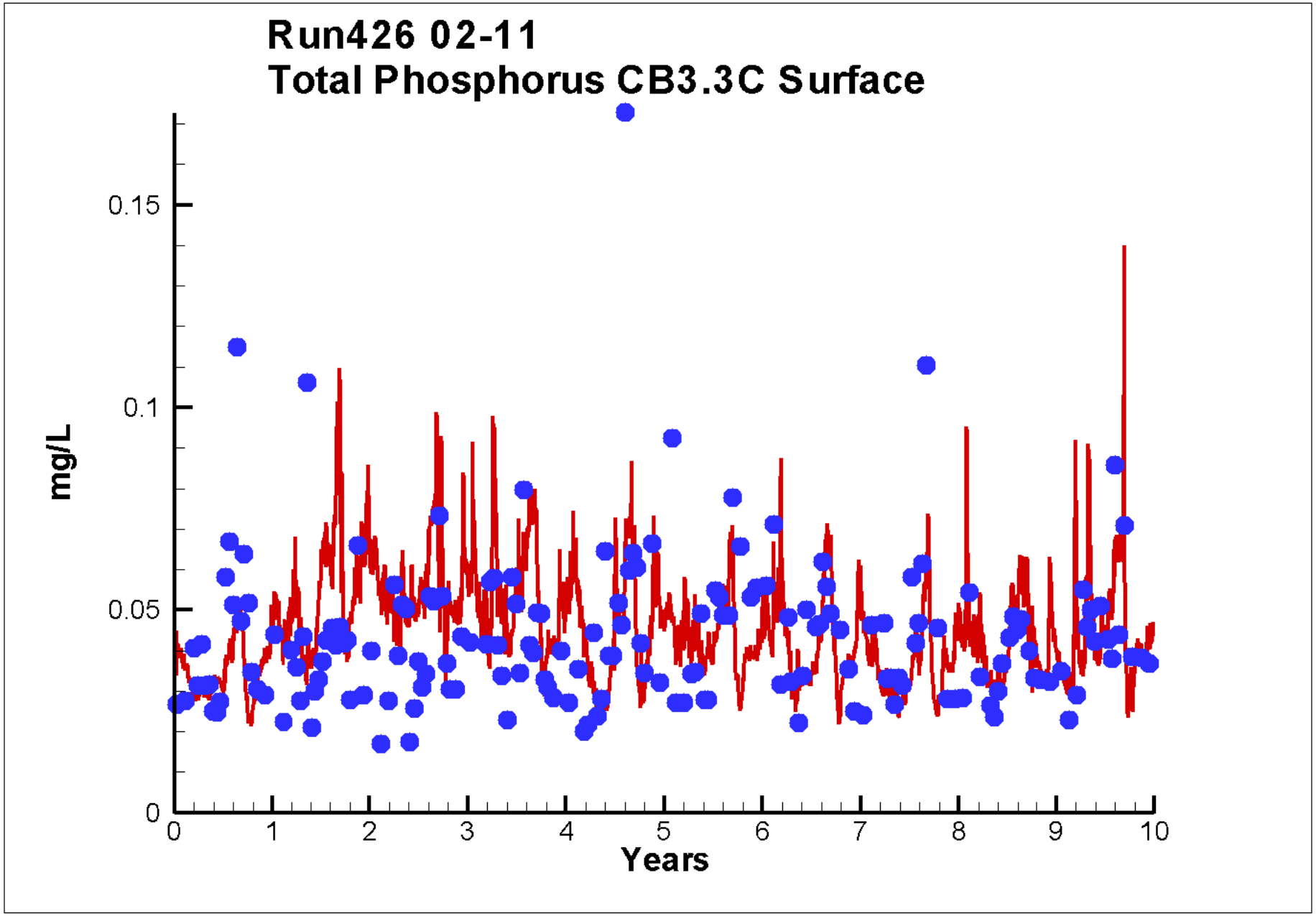

Mainstem Bay Run426 2002-2011
Surface Total Suspended Solids Summer 2005
mg/L
0
5
10
15
20
25
30
0
50
100
150
200
250
300
Kilometers

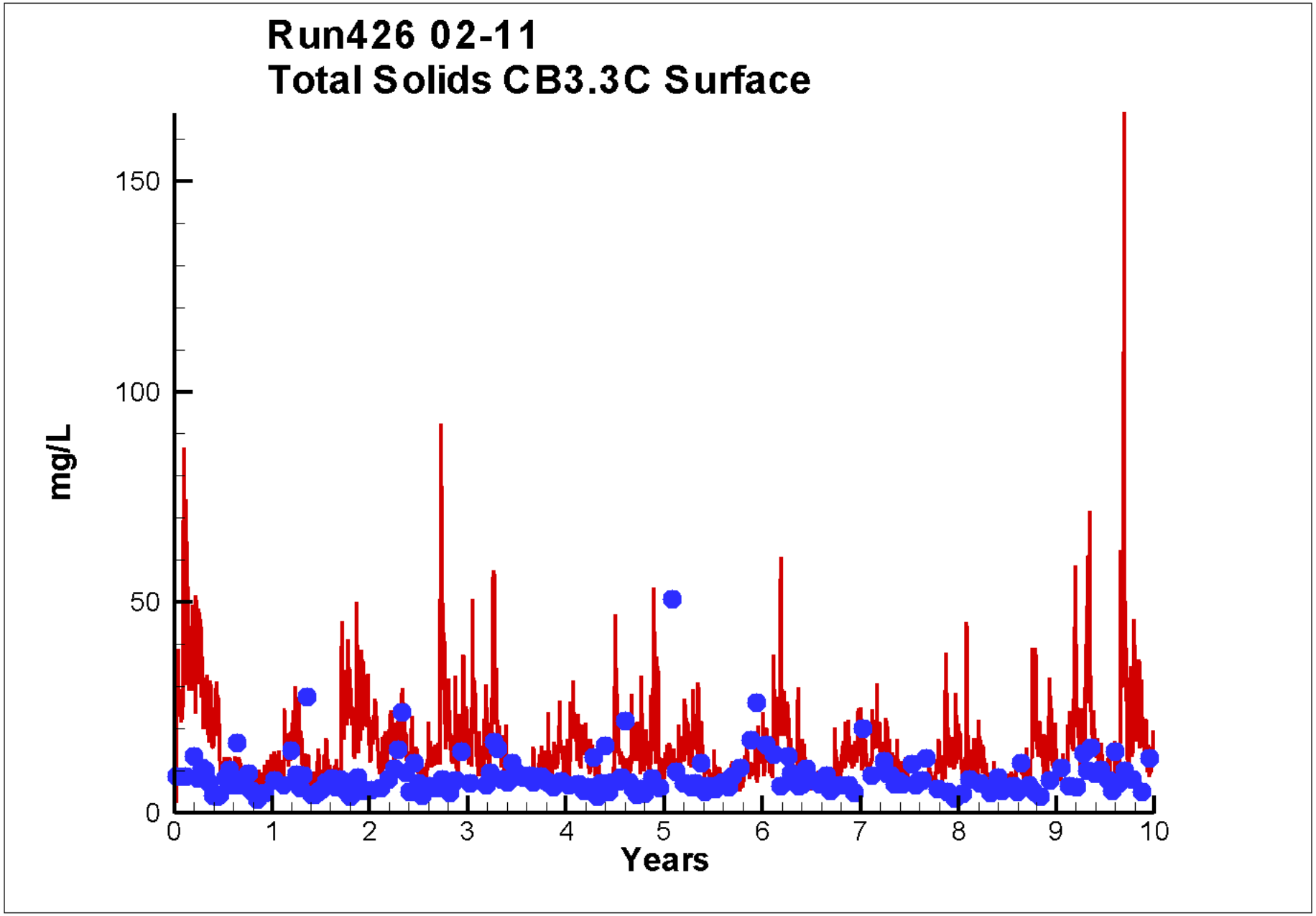

Run426 02-11
Chlorophyll CB3.3C Surface
ugm/L
0
20
40
60
80
100
0
1
2
3
4
5
6
7
8
9
10
Years


Run426 02-11
Dissolved Oxygen CB3.3C Bottom
mg/L
Years
0
2
4
6
8
10
12
0
1
2
3
4
5
6
7
8
9
10


Run426 02-11
Light Extinction CB3.3C Surface
1/Meter
0
2
4
6
8
10
12
0
1
2
3
4
5
6
7
8
9
10
Years


Run426 02-11
Total Nitrogen CB3.3C Surface
mg/L
2.5
2
1.5
1
0.5
0
0
1
2
3
4
5
6
7
8
9
10
Years


Run426 02-11
Total Phosphorus CB3.3C Surface
mg/L
0.15
0.1
0.05
0
0
1
2
3
4
5
6
7
8
9
10
Years


Run426 02-11
Total Solids CB3.3C Surface
mg/L
150
100
50
0
0
1
2
3
4
5
6
7
8
9
10
Years

So Where Are We?

- The basic elements of the 2002 – 2011 simulation are in place.
- We need further examination of the model results and monitoring data base. Compare to previous base simulation 1991 – 2001.
- We need to think about, potentially investigate bank erosion.
- We need to work on the auxiliary data such as SONE. Also statistical summaries of model results.
- We're ready for an initial transmission of the model to CBP for use in multiple models effort.