Forcing and Validation Data for Water Quality Simulation in the Chester River

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UMCES/CBPO

STAC Meeting on Shallow Water Modeling
May. 20 2015

Forcing data

- **Initial conditions: Daily output from CH3D-ICM, Jan 1 2002 and 2003.**
- **Open boundary: Daily output from CH3D-ICM.**
- **Falllines and PS: Daily WSM output, Lrsegments or CH3D cells.**
- **Atmospheric deposition: Daily to the Chester domain.**
- **Surface forcing: PAR and wind speed, NARR and Thomas Point buoy, already provided for physical simulation.**

CH3D-ICM variables

- T, S, ISS
- Phytoplankton: Cynobacteria, Diatom, Green
- Zoo1, Zoo2
- LDOC, LPOC, RPOC
- NH4, NO23, LDON, LPON, RPON,
- Phosphate, LDOP, LPOP, RPOP, PIP
- COD, DO
- Psi, Dsi
- Clay, Silt, Sand, OrgSed

Diagenesis model

- T
- POC, PON, POP, PBS
- PO4, NH4, NO3, SO4
- HS, CH4
- Bottom Stress
- Algae
- Deposit Feeders
- Suspension feeders
- PIP

WSM variables

- T
- DO
- Total phytoplankton, Chl_a
- NH4, NO23
- PO4, PIP
- TOTN, TOTP, ORGP, ORGN, TOC
- TSS, Sand, Silt, Clay

Partitioning WSM variables

- Phyt. : 0.5 Cynobacteria, 0.5 Green, 0 Diatom.
- C:Chl : 30 for Cynobacteria, 75 for diatom and 50 for green
- DON=0.25xORGN
- PON=0.75xORGN
- LPON=0.0xPON
- RPON=1x PON
- DOC=8xDON
- LPOC=8xLPON
- RPOC=8xRPON
- ISS = TSS – 2.5(Phyt.+LPOC+RPOC)

Partitioning WSM variables

- DOP = 0.0085ORGP
- POP = ORGP + PIP – DOP
- LPOP = 0.6xPOPx0.0
- RPOP = 0.6xPOP*1.0

- ORGSED = 0.4xCLAYwsm
- CLAYwq = CLAYwsm - ORGSED

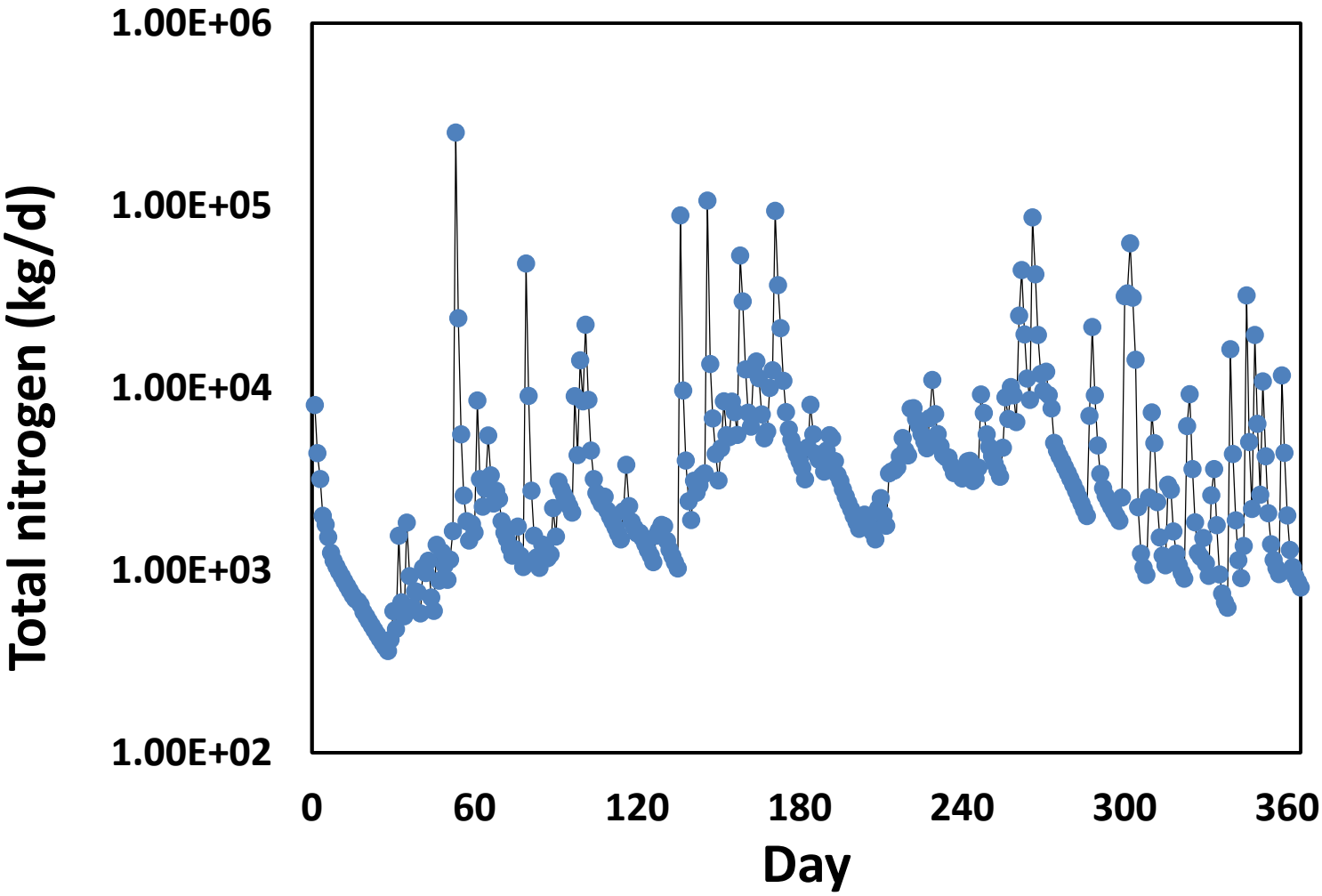
Atmospheric deposition variables

- Wet NO3
- Wet NH4
- Dry NO3
- Dry NH4
- Wet ORGN
- Wet PO4
- Wet ORGP

Sediment sources

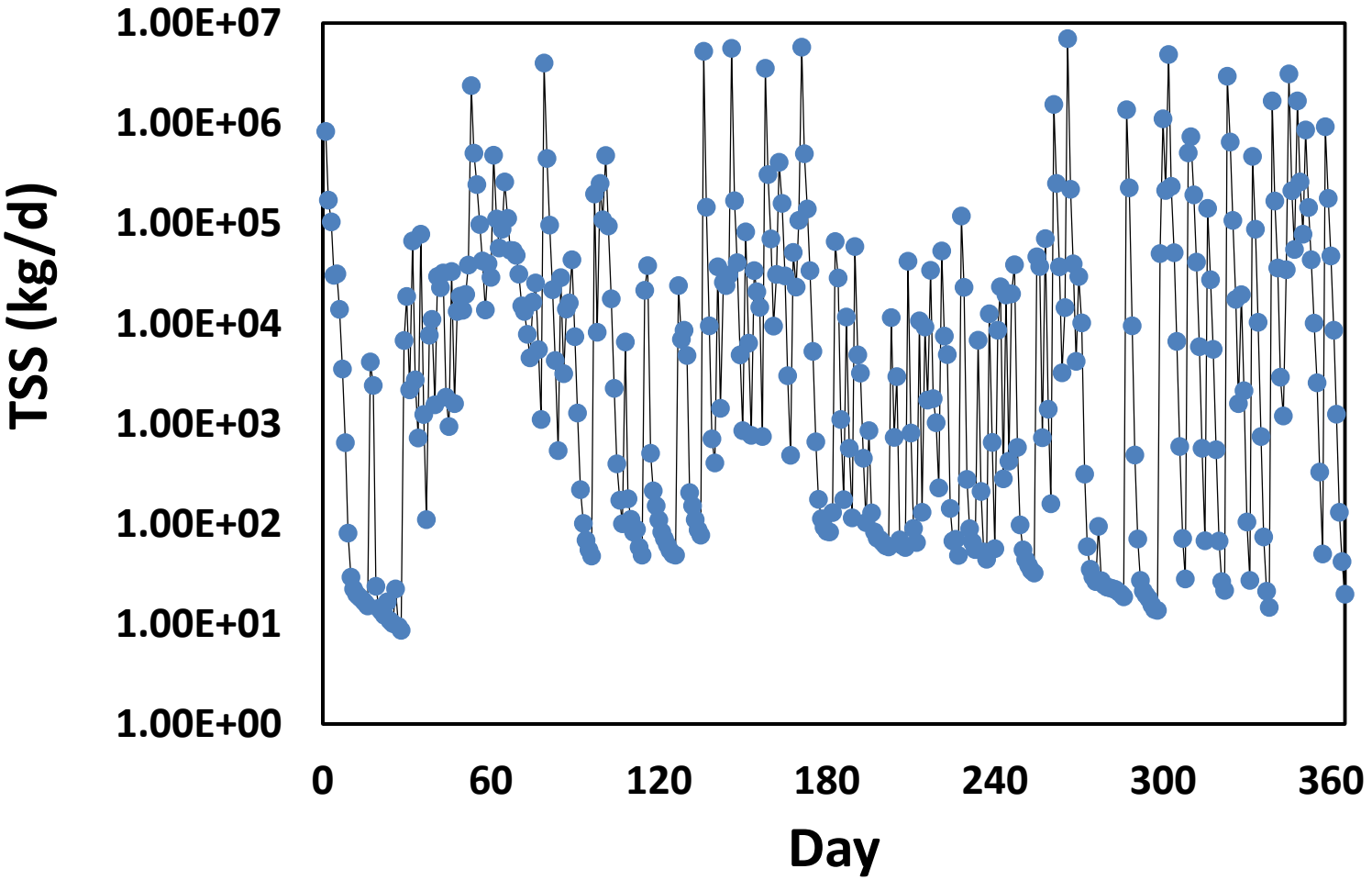
- Open boundary
- Shoreline erosion ?
- Watershed
- Sediment scoured from the bottom of Chester ?

Total N watershed flux (kg/day) 2003



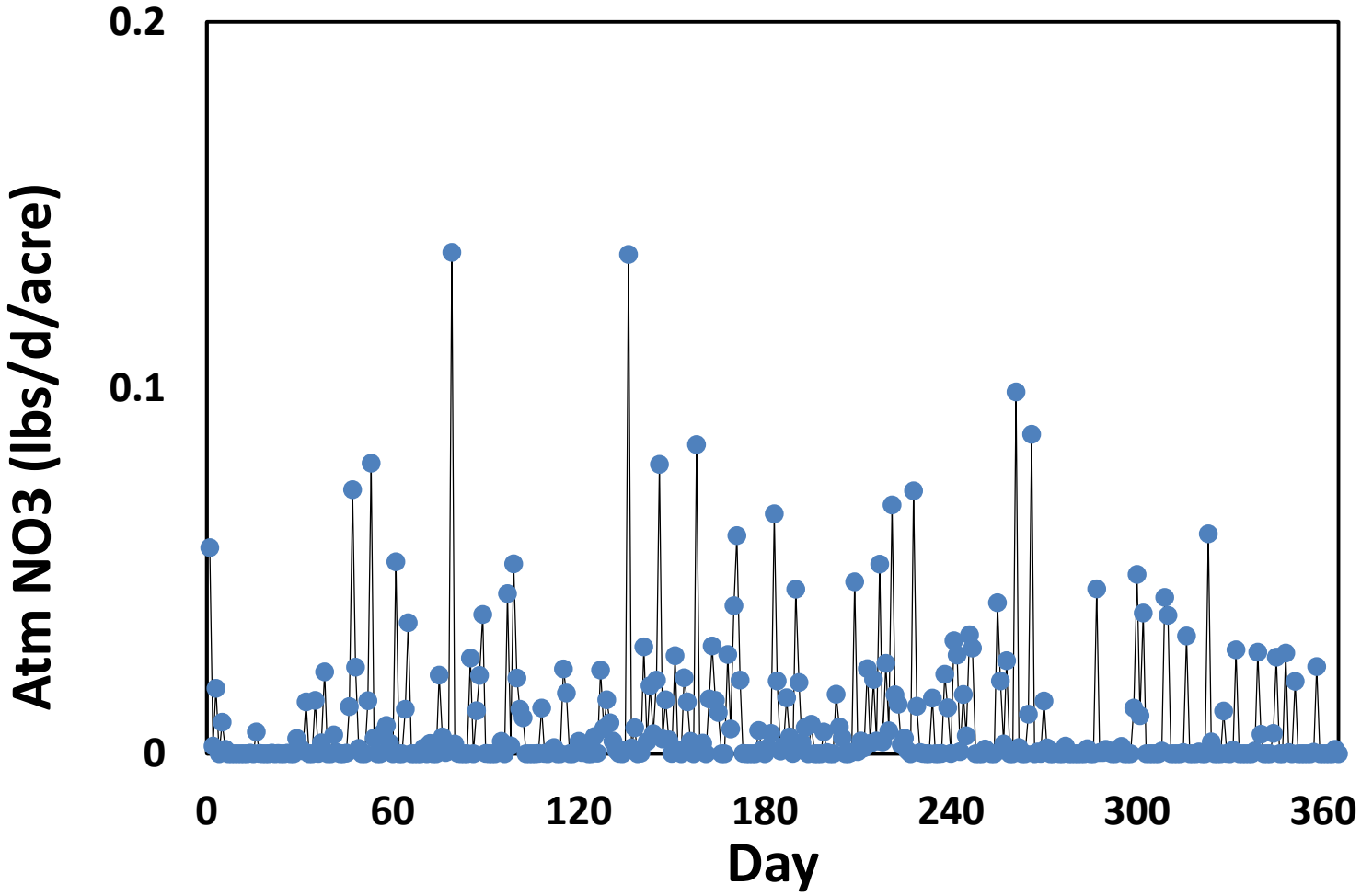
Data from Gopal Bhatt

TSS watershed flux (kg/day) 2003



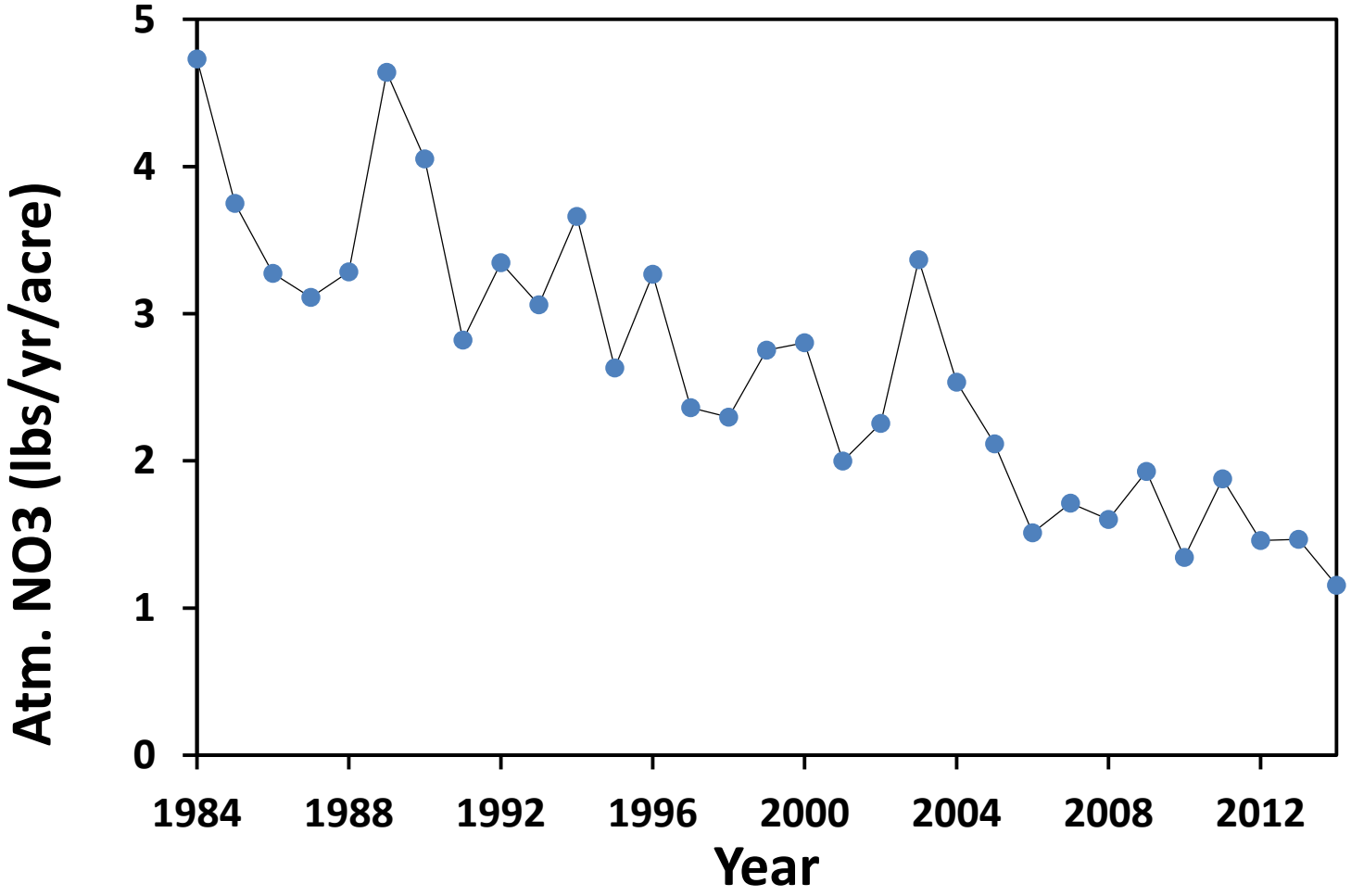
Data from Gopal Bhatt

Wet NO3 atm. deposition (lbs/day/acre) 2003



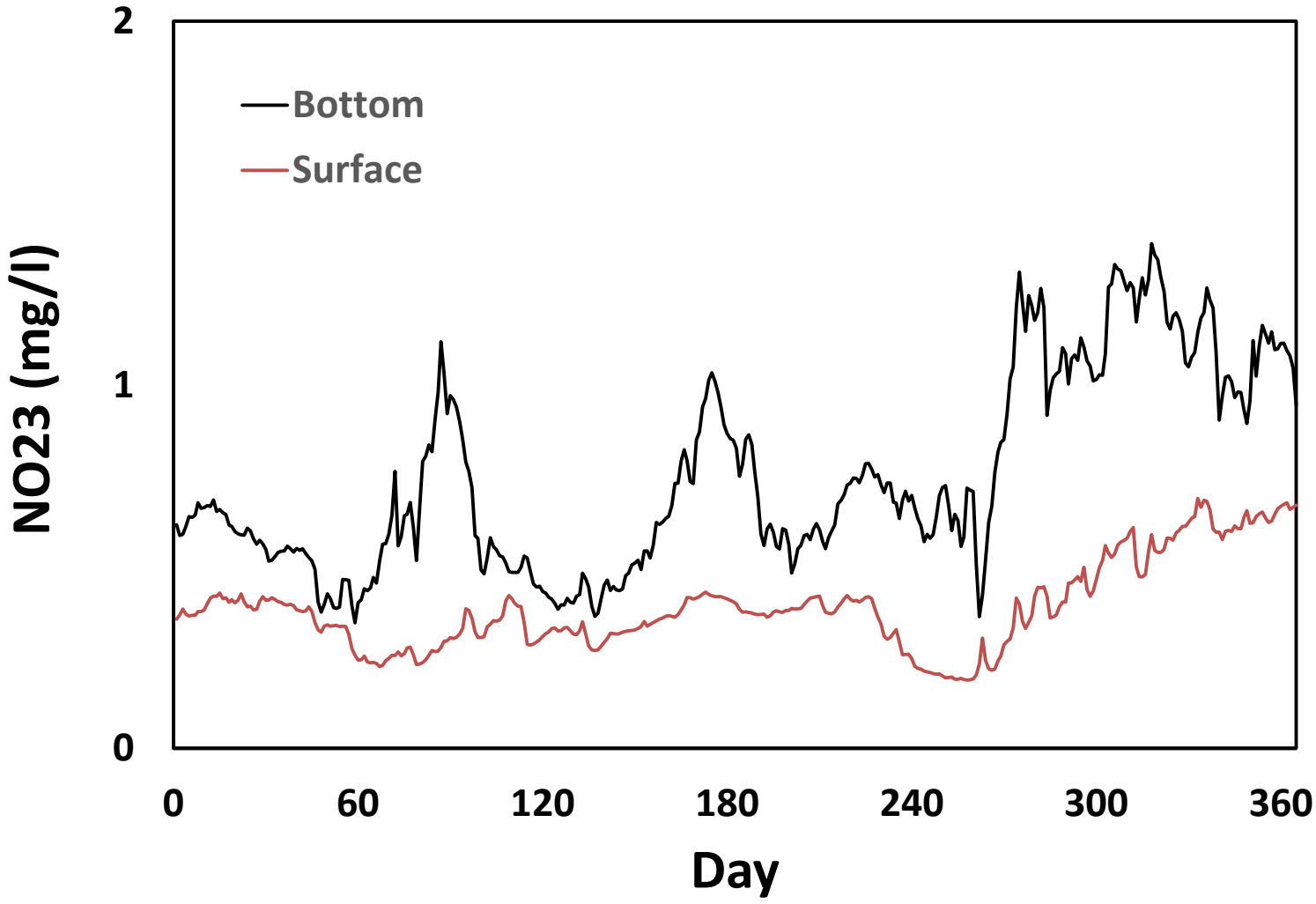
Data from Gopal Bhatt

Wet NO3 atm. deposition (lbs/year/acre) 2003



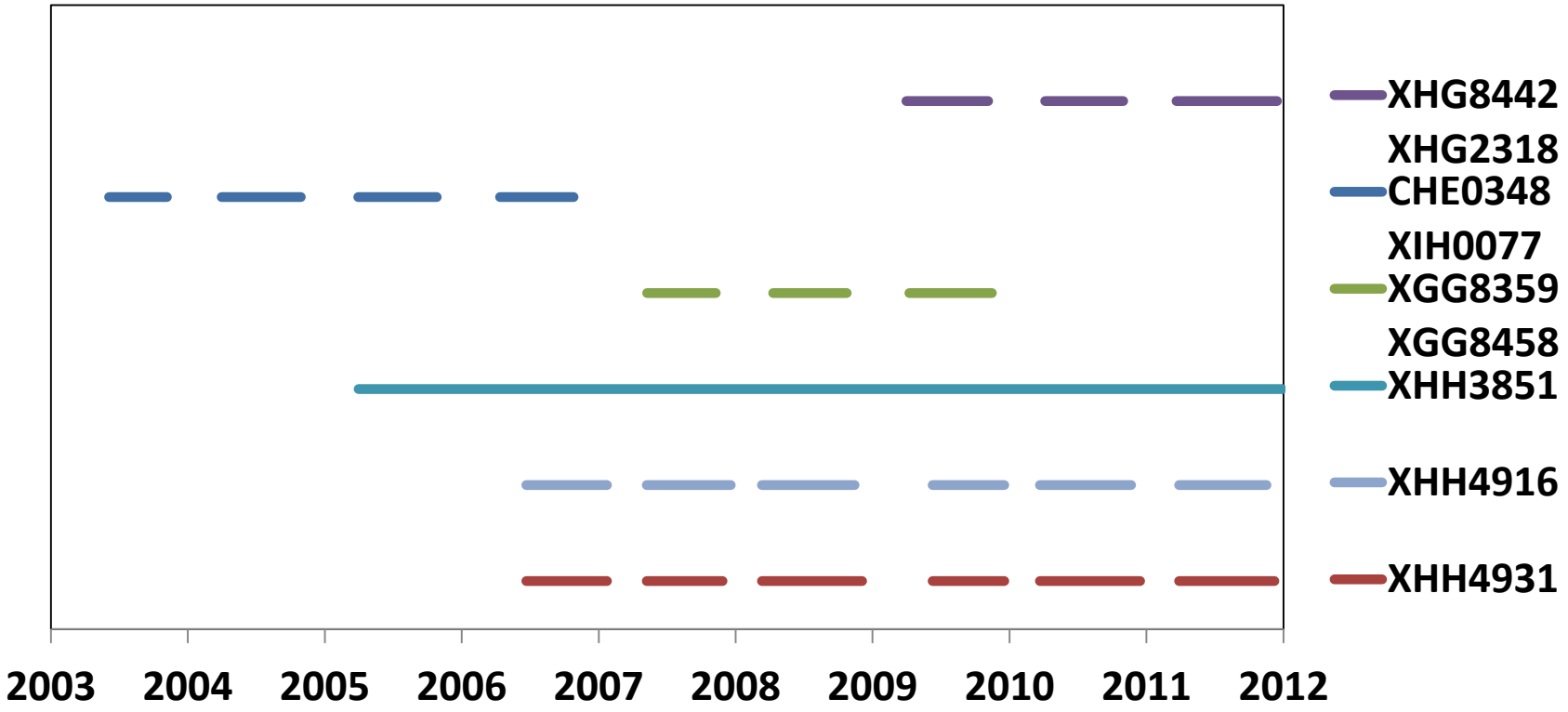
Data from Gopal Bhatt

NO23 Open Boundary 2003
Cell 10013



Data from Ping Wang

CMON data availability at different stations (Ph, DO, Chl, Turb)

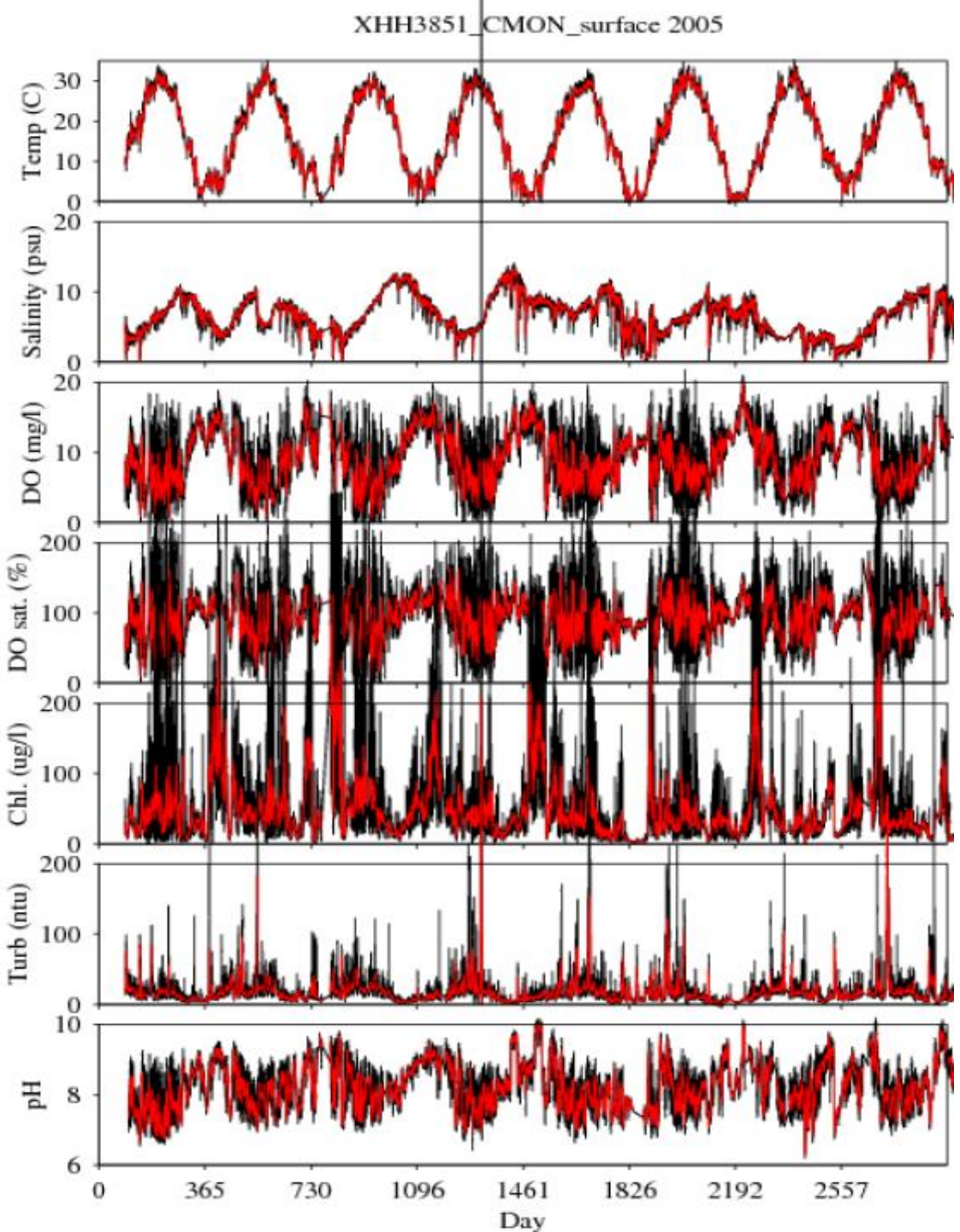


Grab data availability at different stations (Nutrient)

Station	Month	Year
ET4.2	Jan. 24 through Dec. 13	2000 - 2011
ET4.1	Jan. 18 through Dec. 13	2000 - 2011
CHE0348	May 29 – Oct. 26	2003 - 2006
XIH4495	May 29 – Oct. 30	2003
XIH3581	May 29 – Oct. 12	2003 - 2006
XIH0077	Jun. 5 – Oct. 26	2003 - 2006
XHH9362	May 29 – Oct. 30	2003
XHH7848	May 29 – Oct. 30	2003
XHH6419	May 27 – Oct. 12	2003 - 2006

Station	Month	Year
XHH4822	May 27 – Oct. 13	2003 - 2005
XHH5046	May 26 – Jun. 8	2005 - 2006
XHH3851	Apr. 1 - Dec. 8	2005 - 2011
XHG6496	May 27 – Oct. 12	2003 - 2006
GYI0001	May 27 – Oct. 12	2003 - 2006
XHG1579	May 27 – Oct. 12	2003 - 2006
XGG9992	May 27 – Oct. 12	2003 - 2006
XHG0859	May 27 – Oct. 12	2003 - 2006
XGG8359	May 10 – Oct. 22	2007 - 2009
XGG8251	Jan. 18 – Dec. 13	2000 - 2011
XGG8458	May 10 – Oct. 4	2007 - 2009

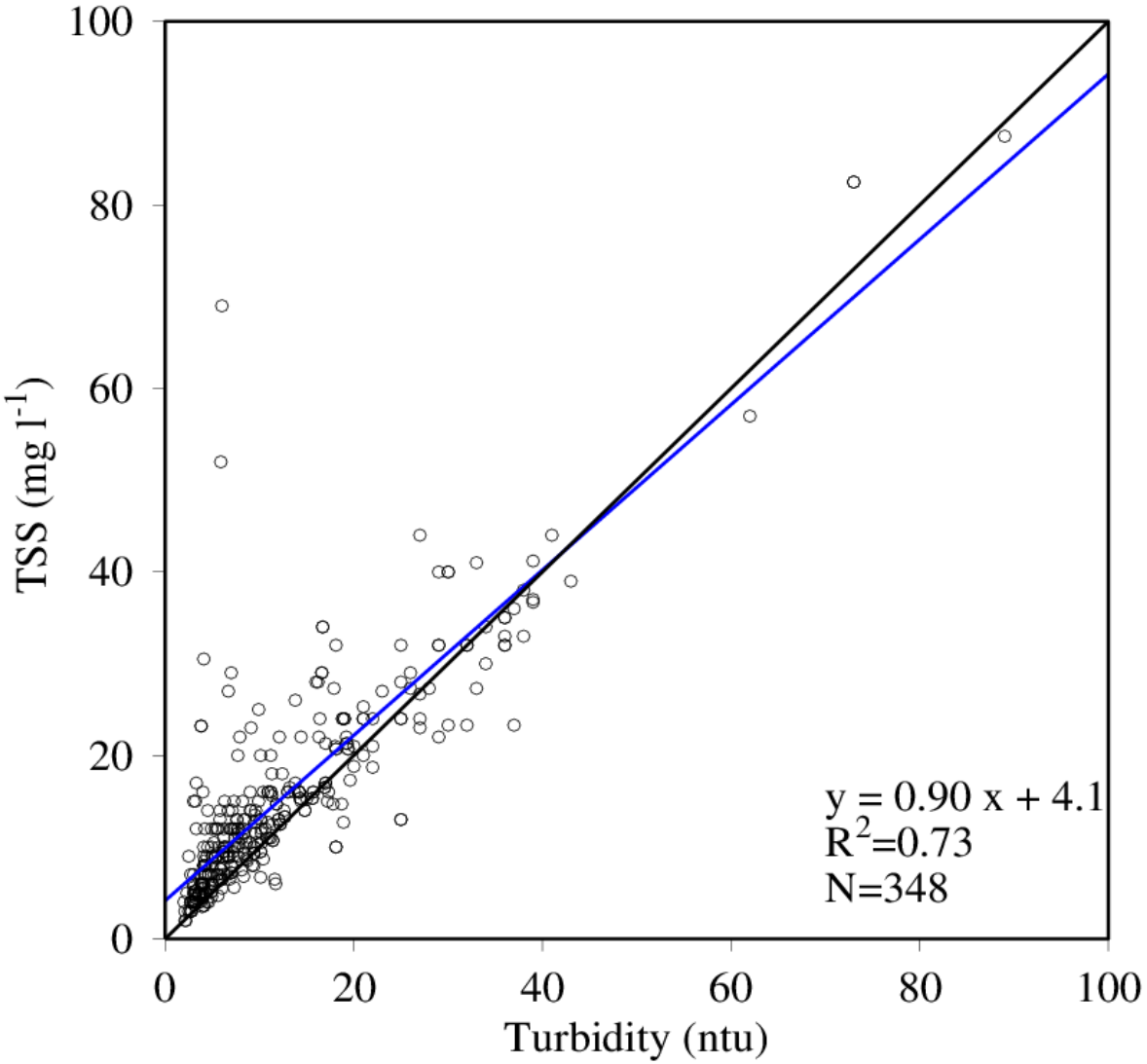
Surface CMON data at CHE3851 2005-2013



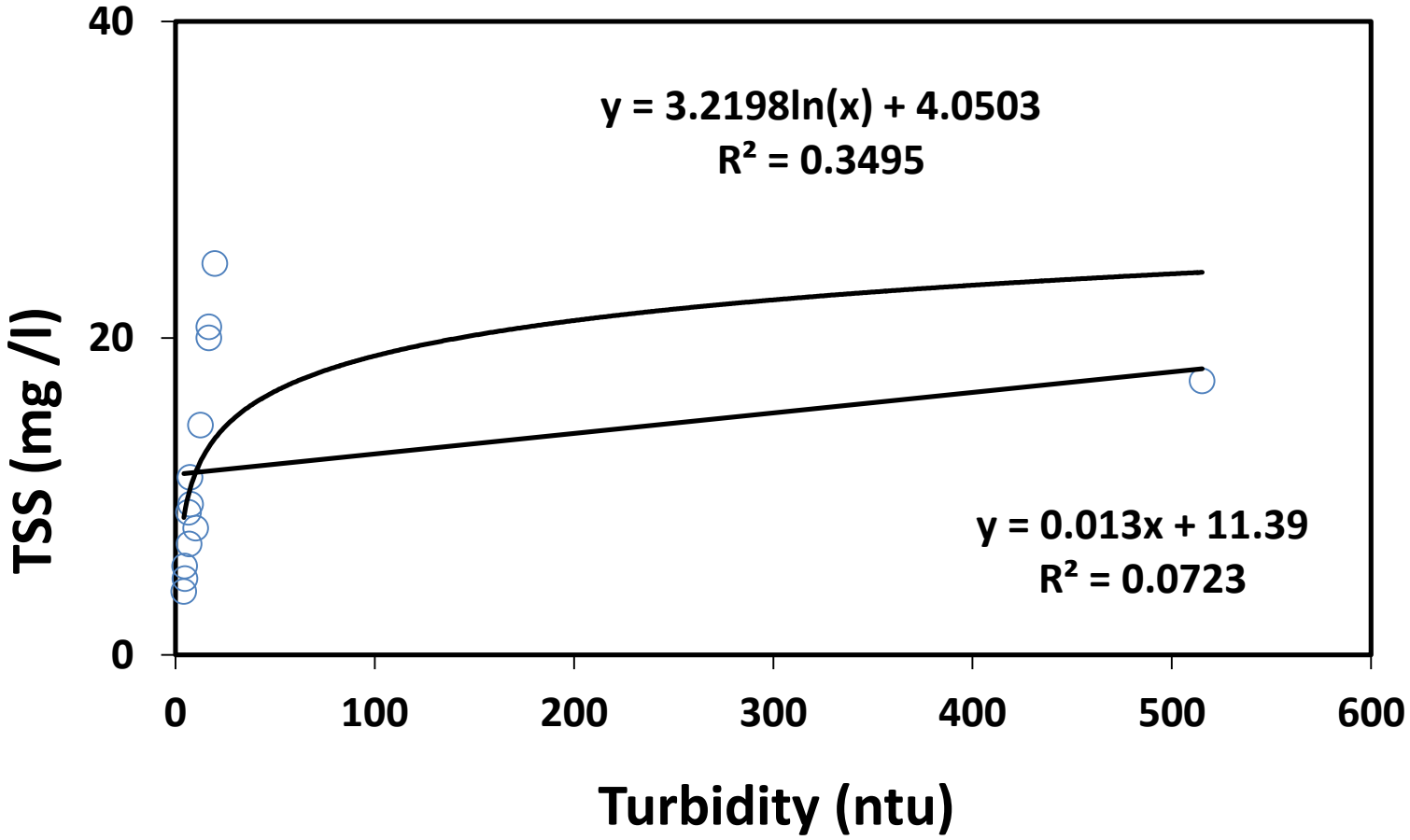
Data from DNR

TSS-Turbidity relationship

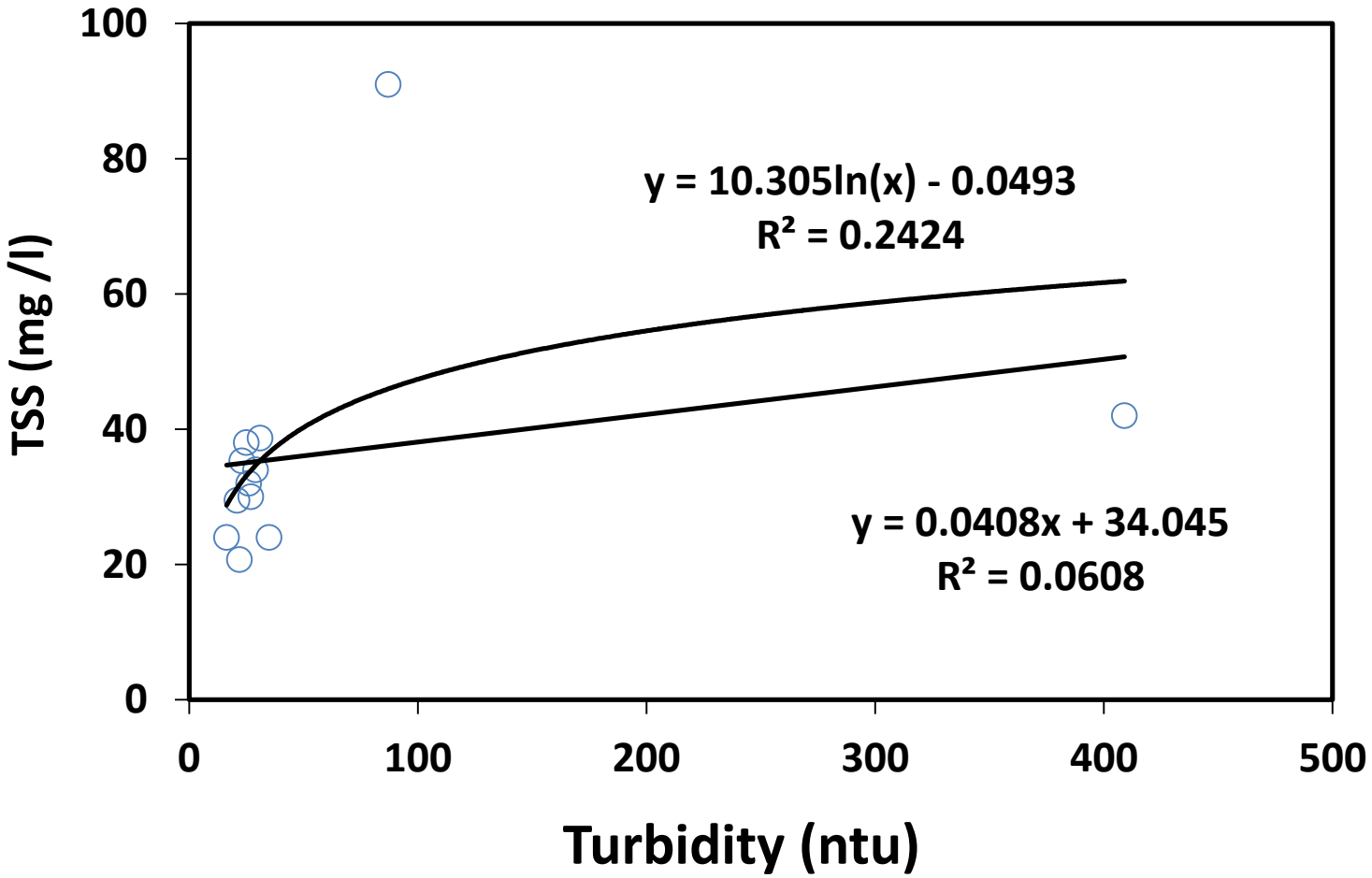
(based on data in the Chester River domain and value < 100 nut)



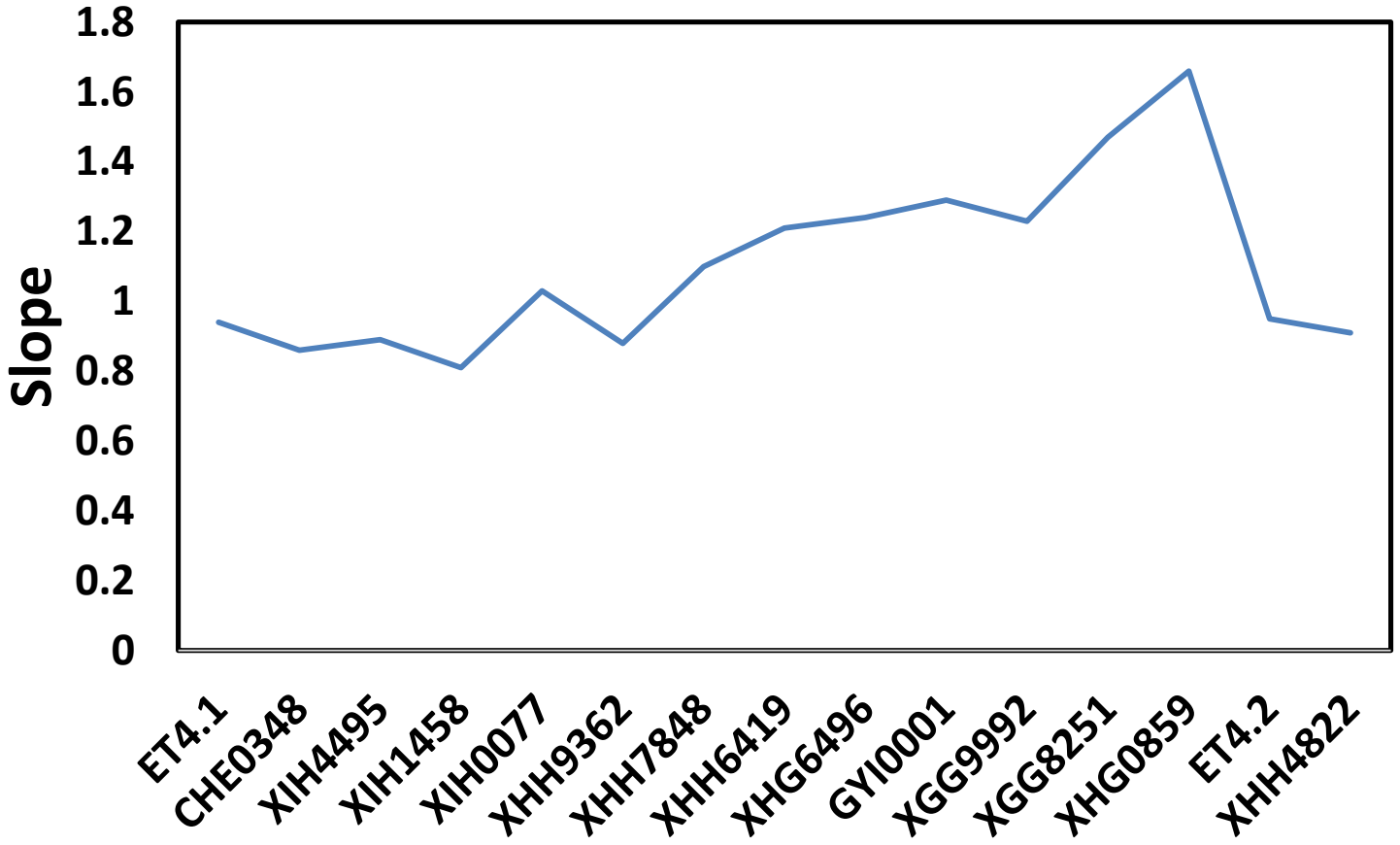
TSS-TURB at XHG6496



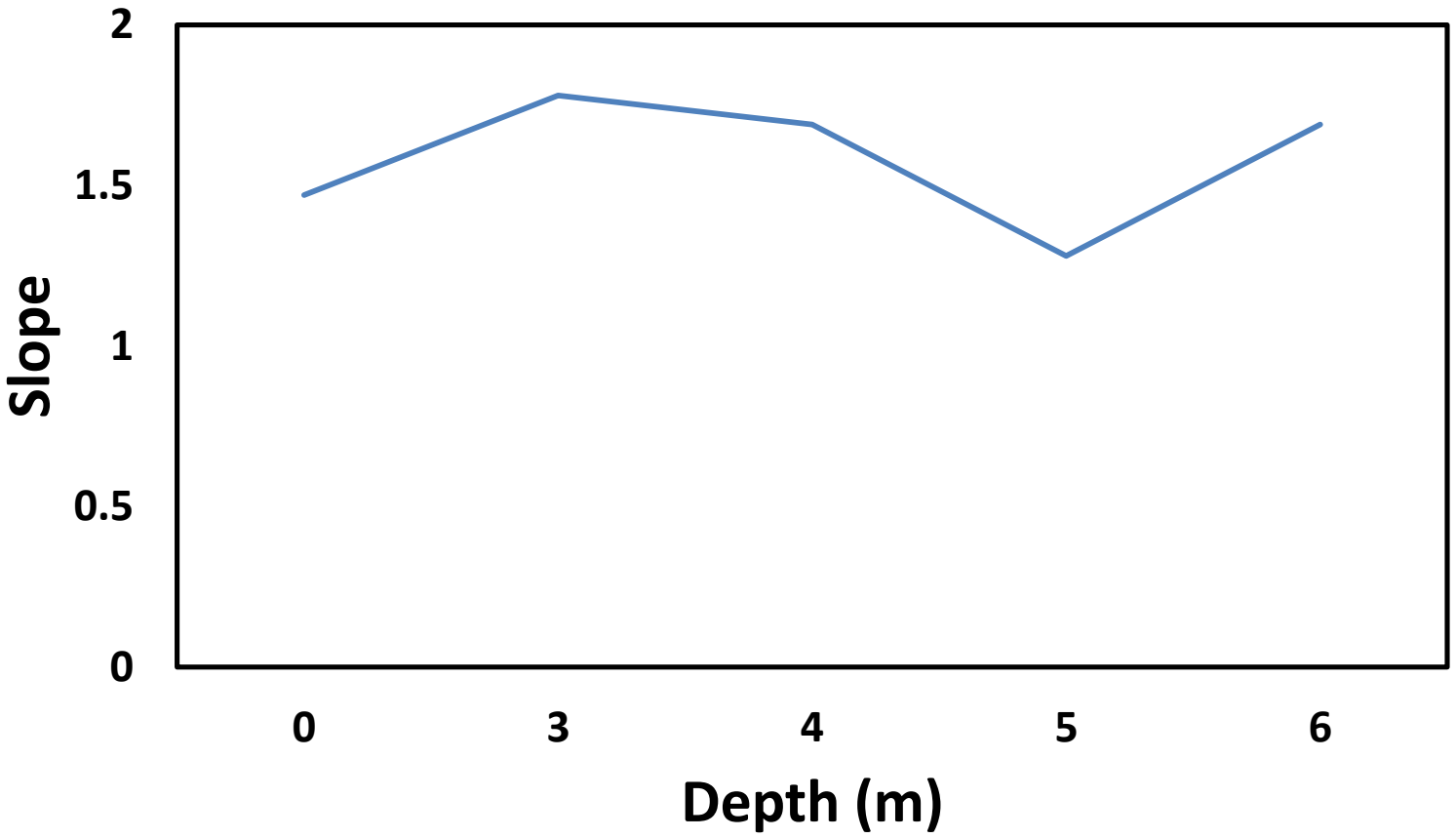
TSS-TURB at ET4.1



TSS-TURB Slope



TSS-TURB Slope at XGG8251



Message

- **Pretty much ready to go.**
- **Lack of Sediment scour, Shoreline & marsh erosion, Wetland loads,… ?**