

Analysis of D.O. Sinks in the DWSC with the Link-Node Model

Joel Herr and Carl Chen
Systech Water Resources, Inc.

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Outline

- Status of Link-Node Model
- Calibration of Link-Node Model (live)
- Testing D.O. Sinks in the Model (live)
- Conclusion

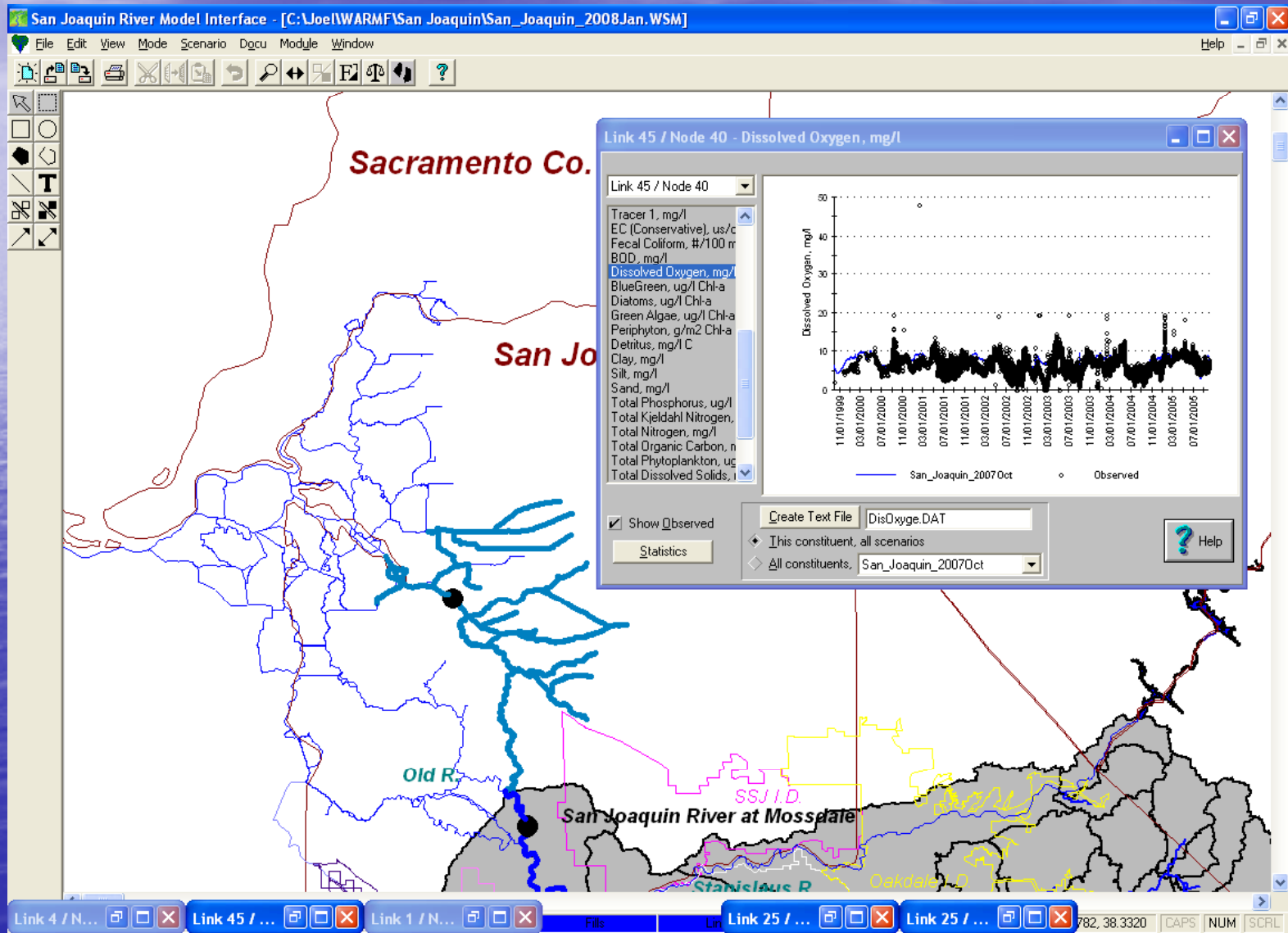
Status of the Link-Node Model

- Calibrated for summers of 1999 & 2000
- Linked to WARMF model in San Joaquin River Model Interface
- Updating Link-Node in progress

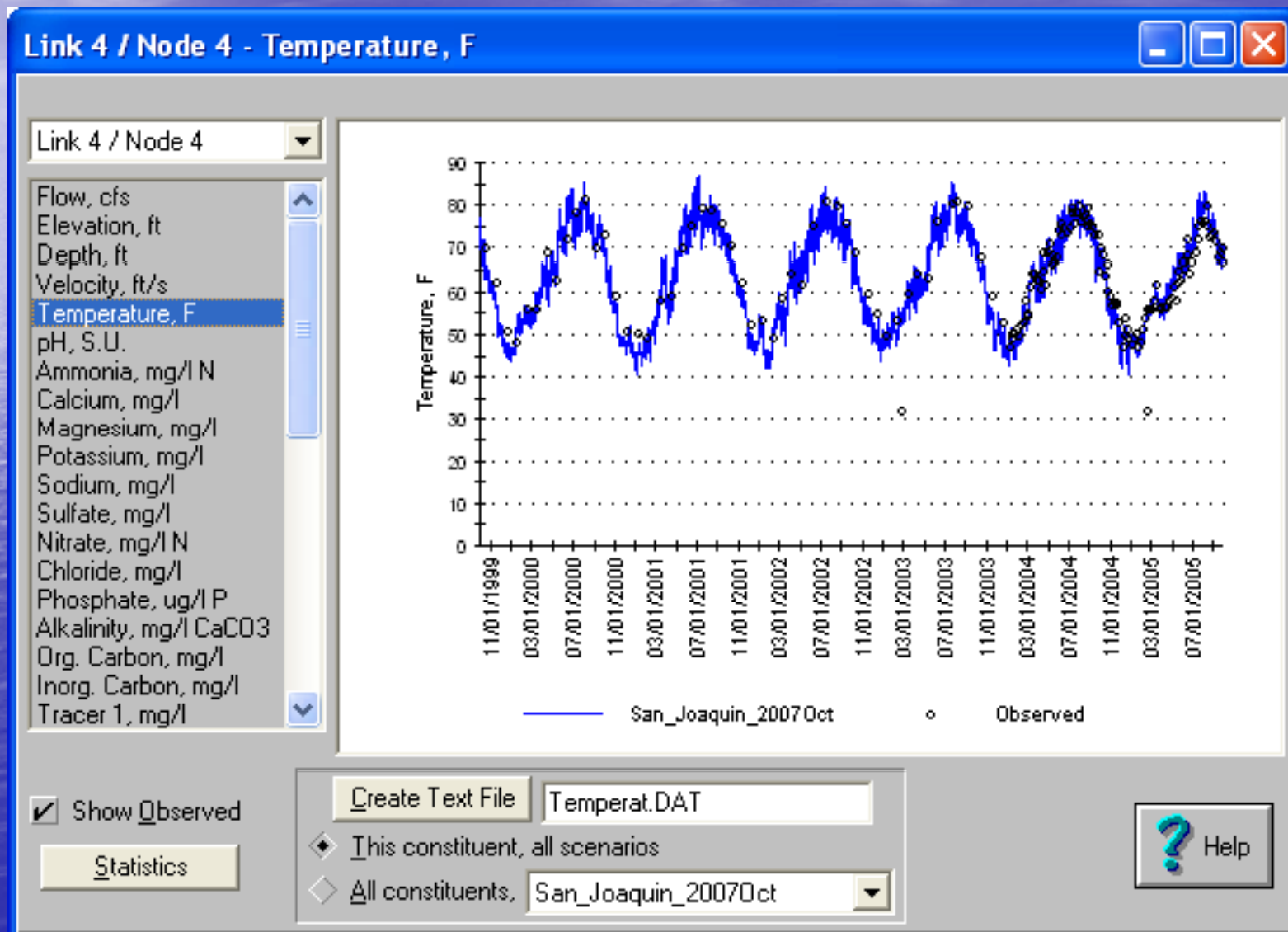
Calibration of Link-Node Model

- Monitoring data compiled and entered into Model Interface: Data Atlas, CDEC, DWR, BDAT, USGS, STORET
- Data linked to segments in Link-Node model domain
- Simulation run using 2001 calibration

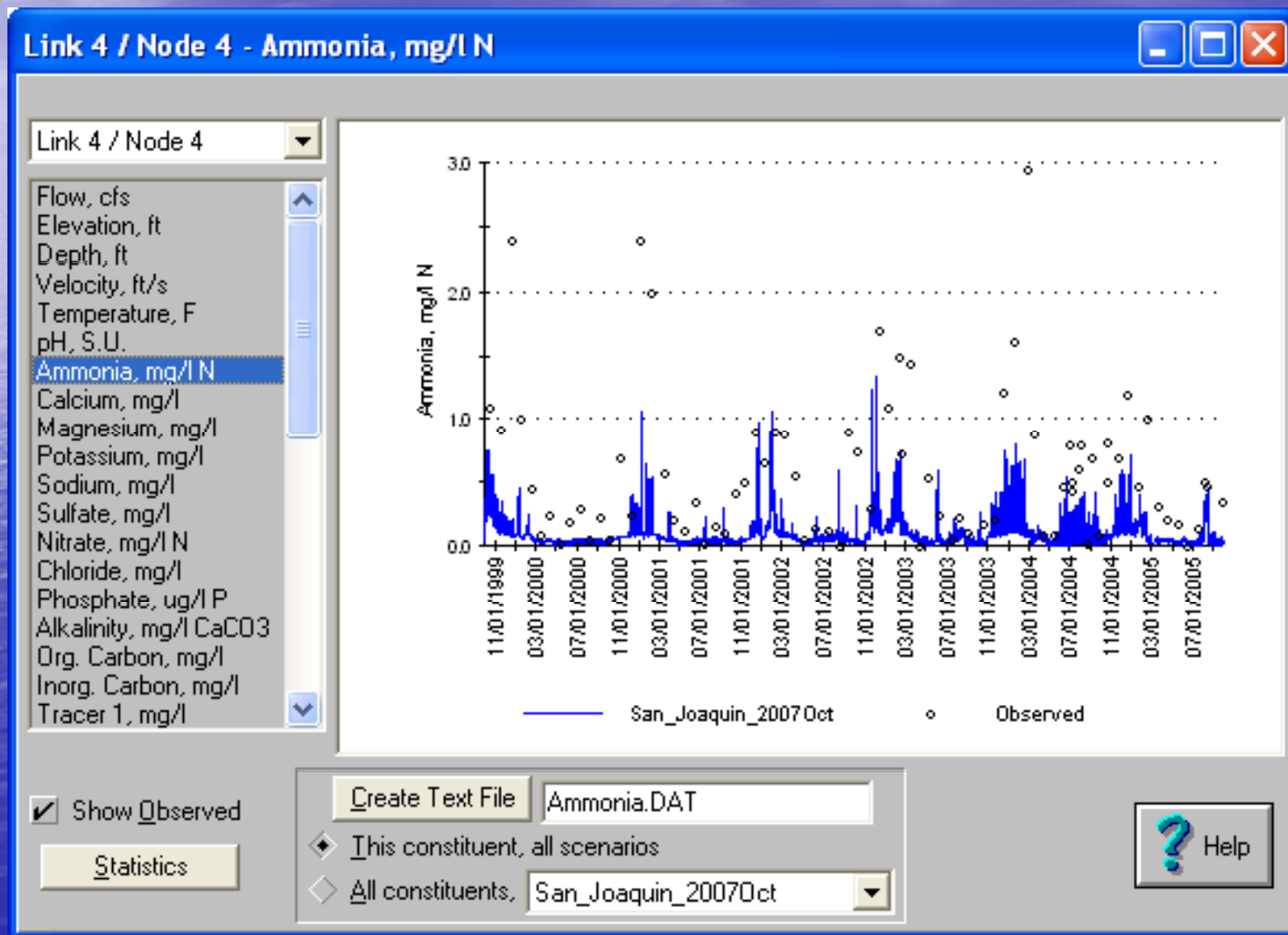
Live Demonstration of Results



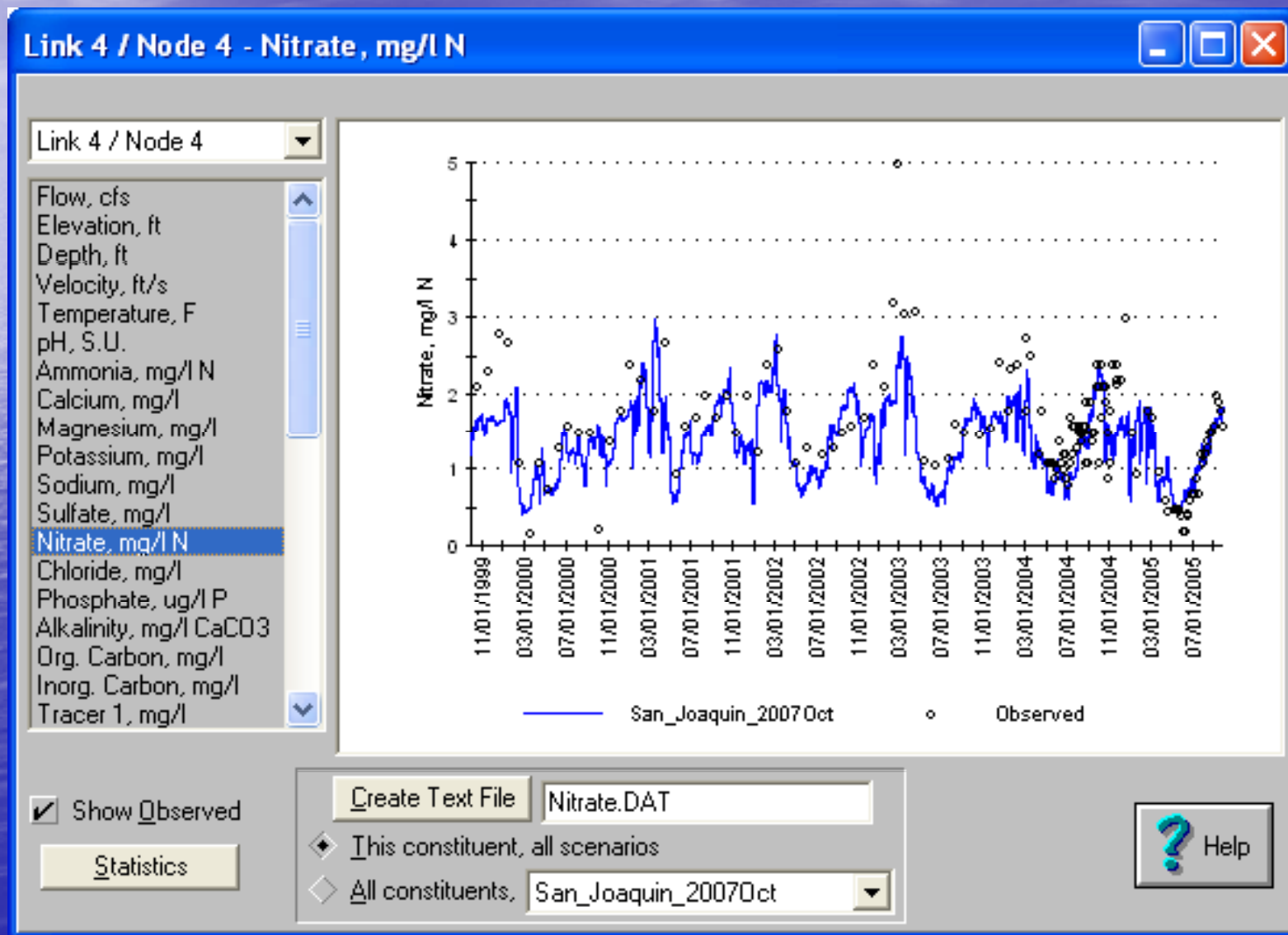
Brandt Bridge - Temperature



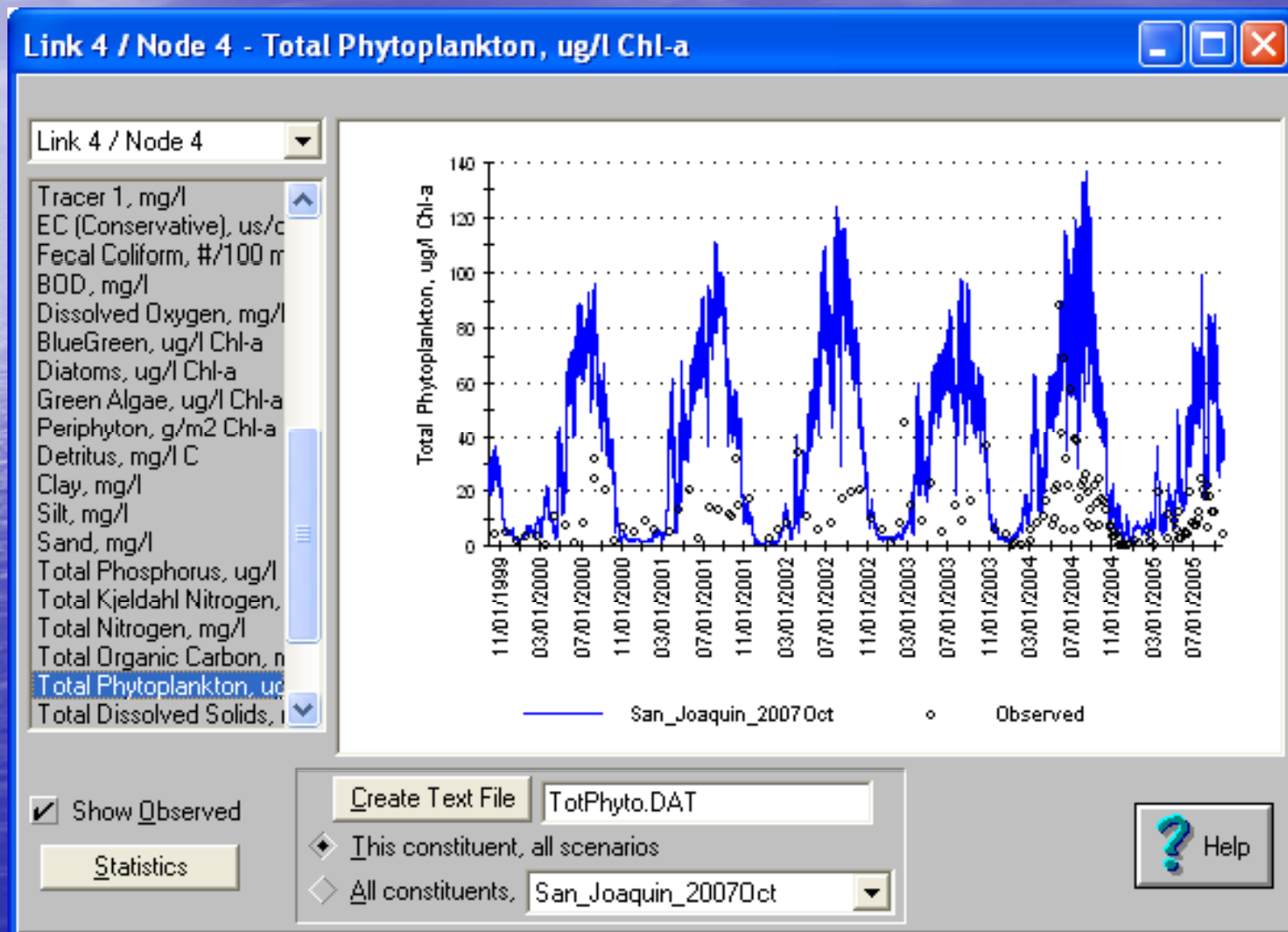
Brandt Bridge - Ammonia



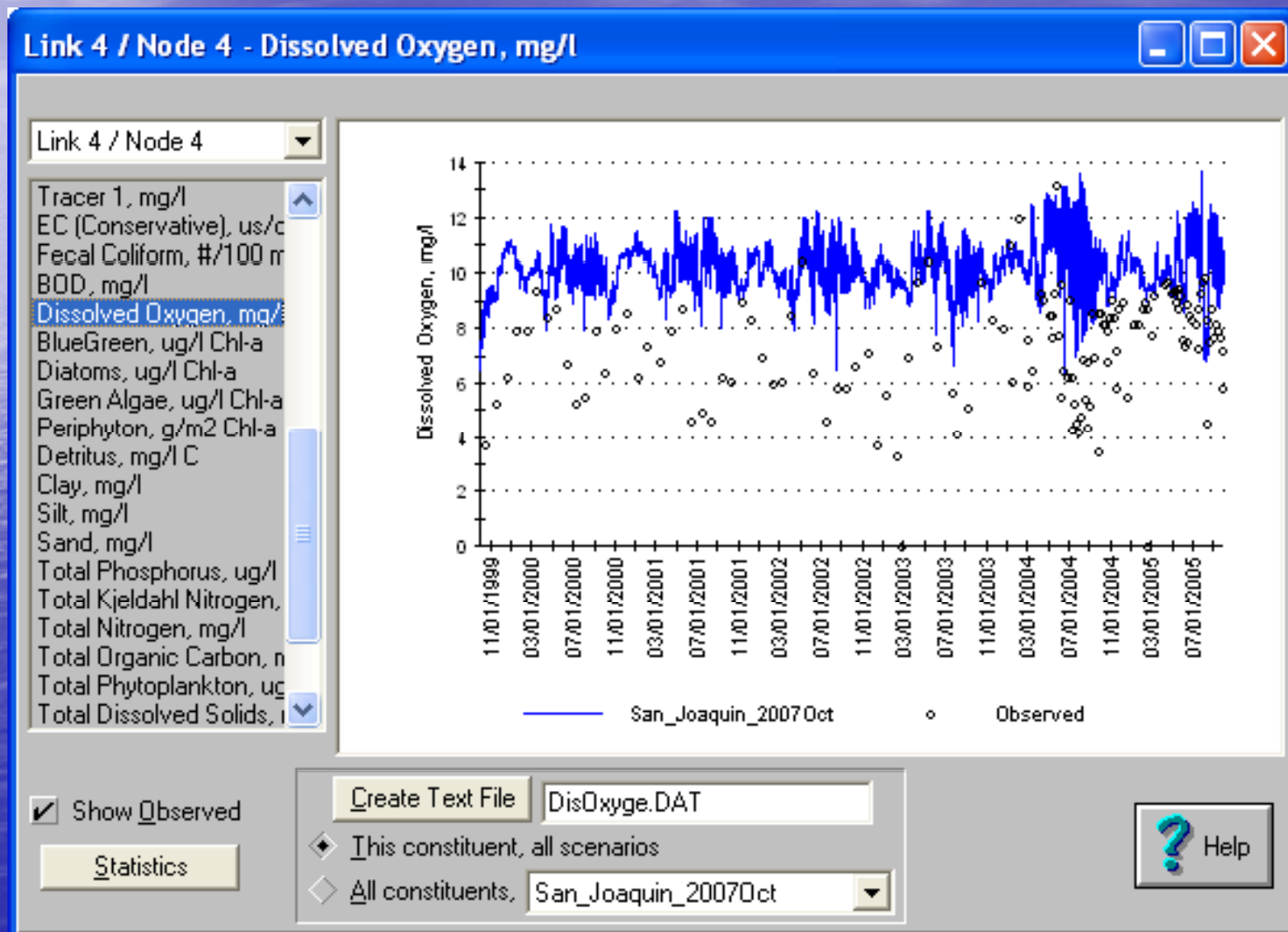
Brandt Bridge - Nitrate



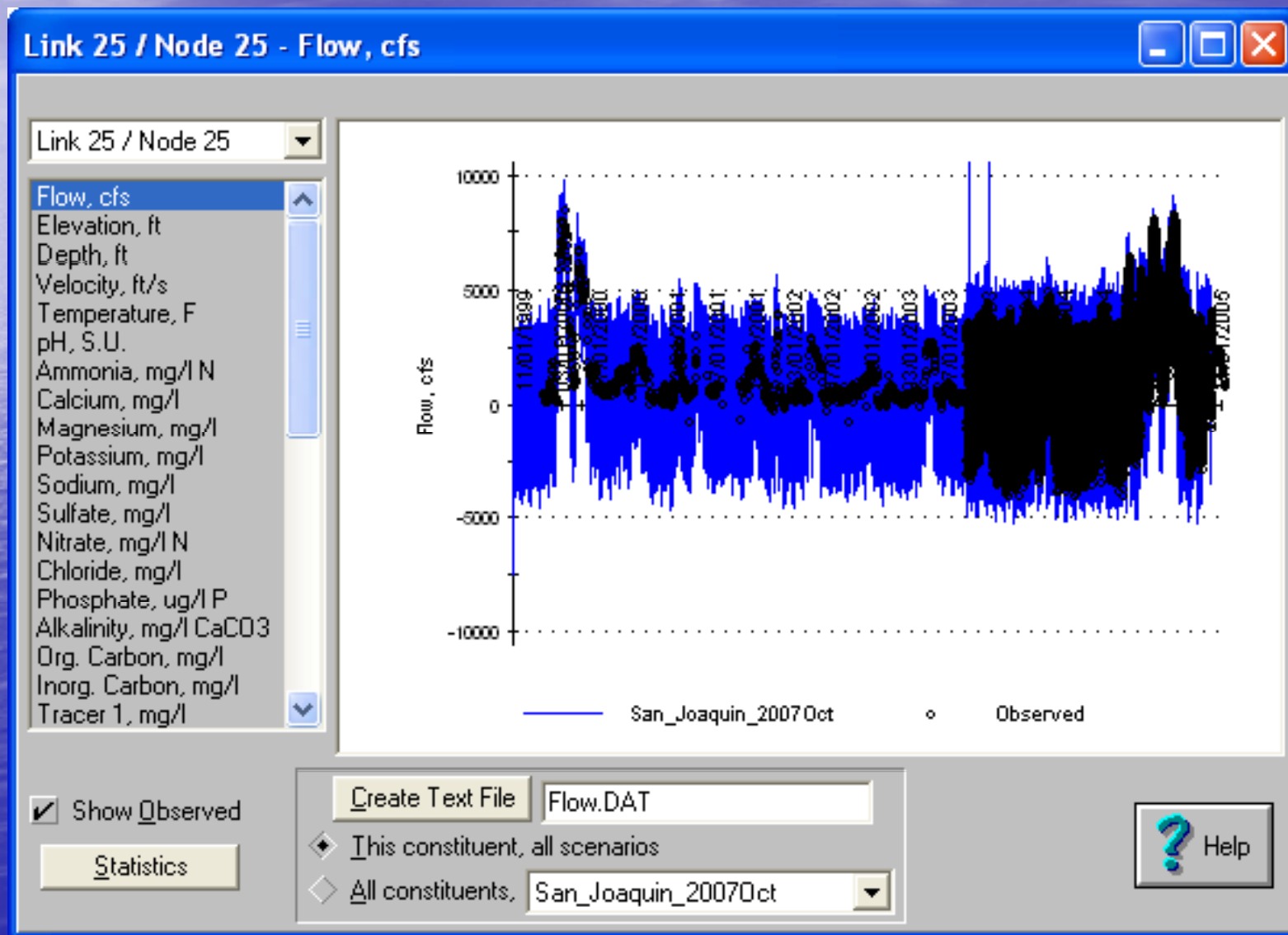
Brandt Bridge - Phytoplankton



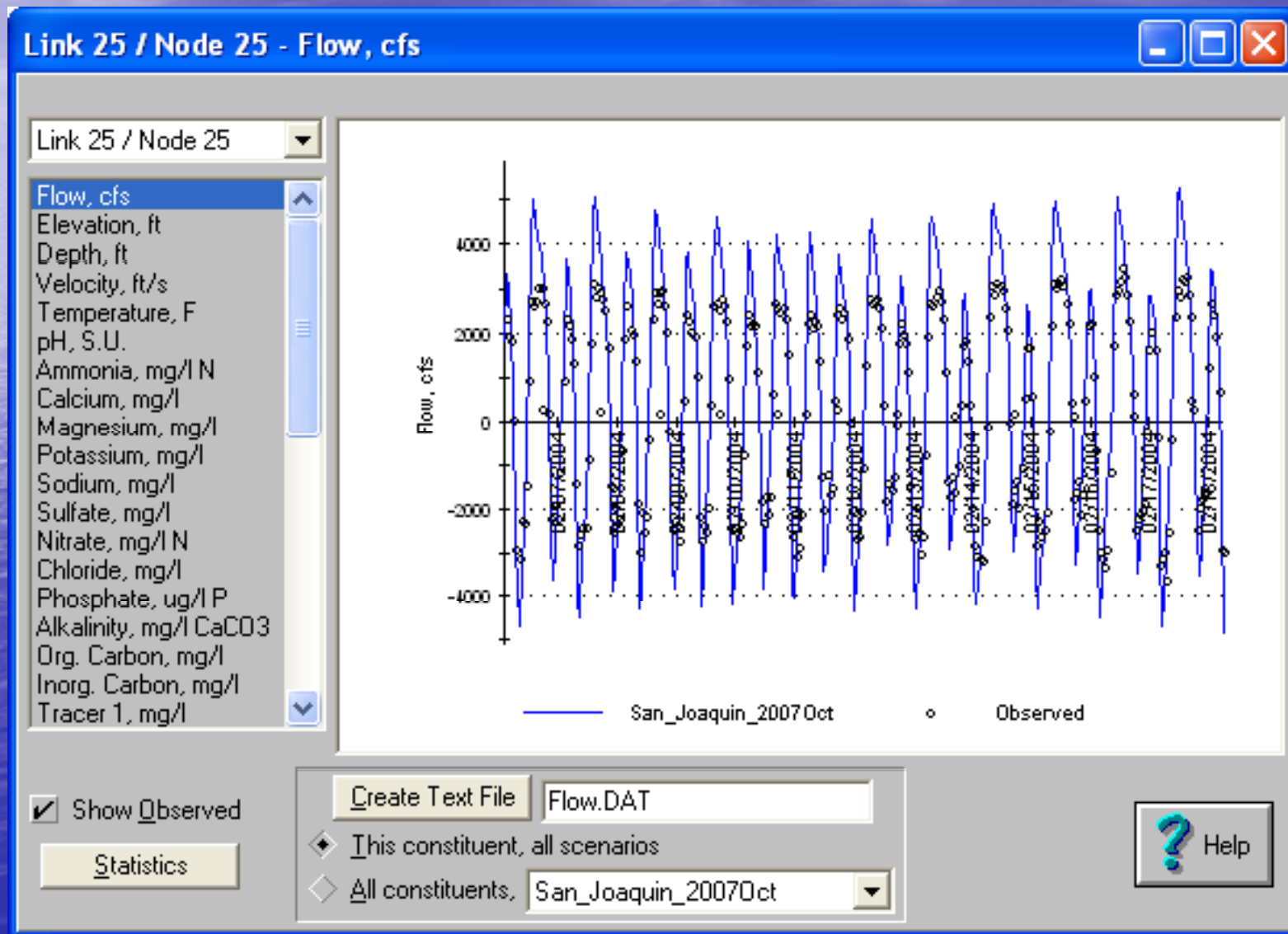
Brandt Bridge – D.O.



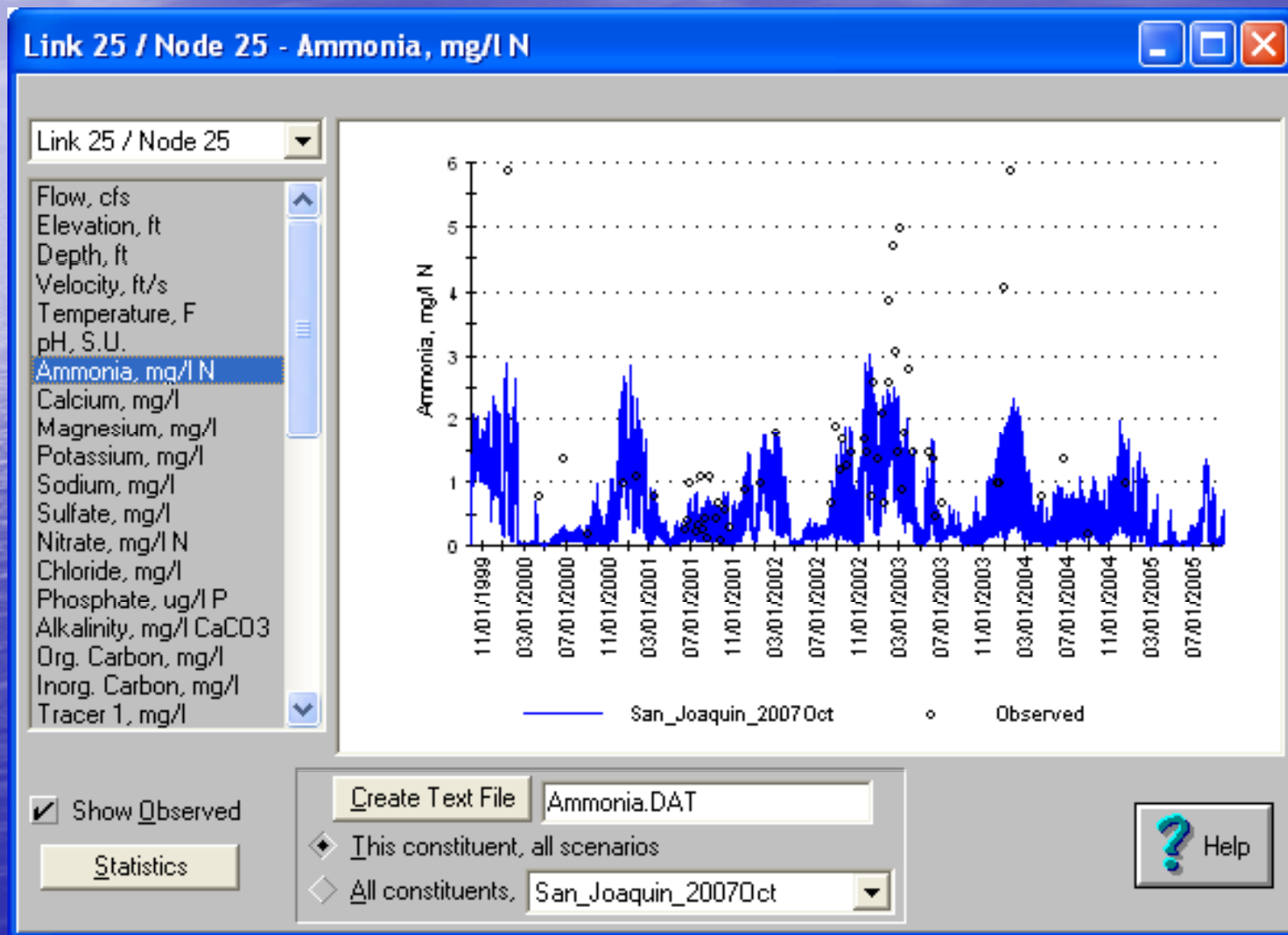
Garwood Bridge - Flow



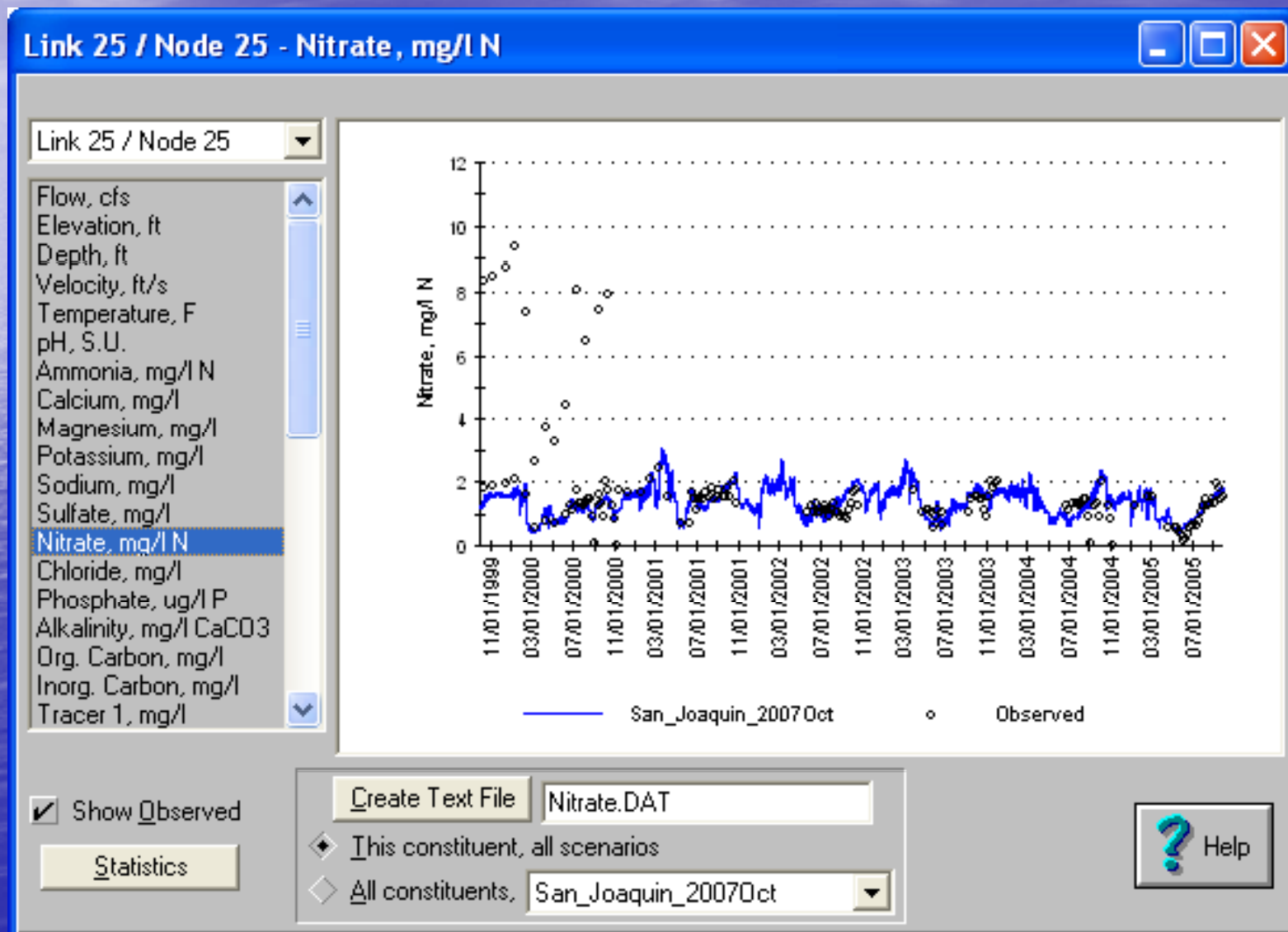
Garwood Bridge – Flow (detail)



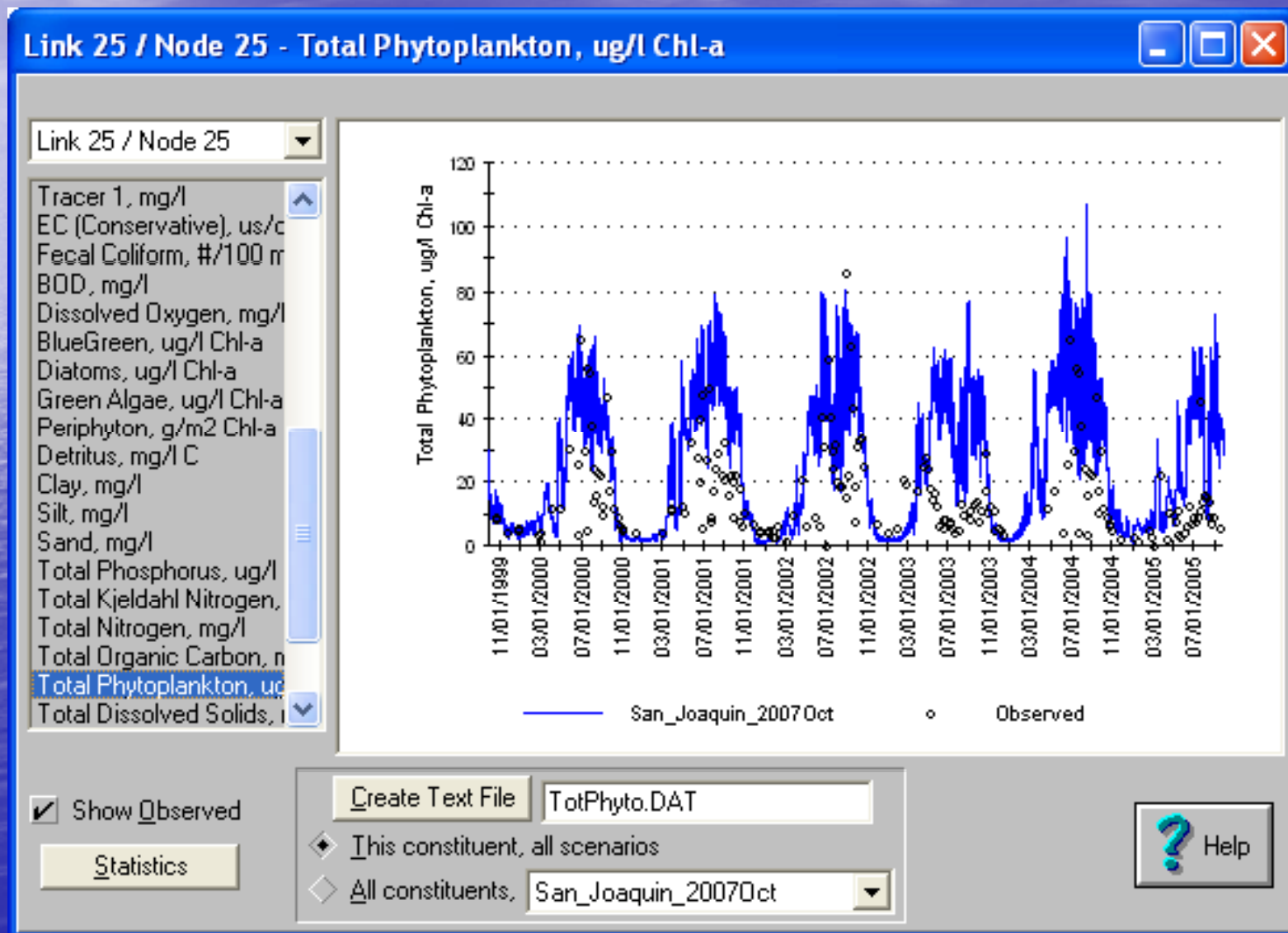
Garwood Bridge - Ammonia



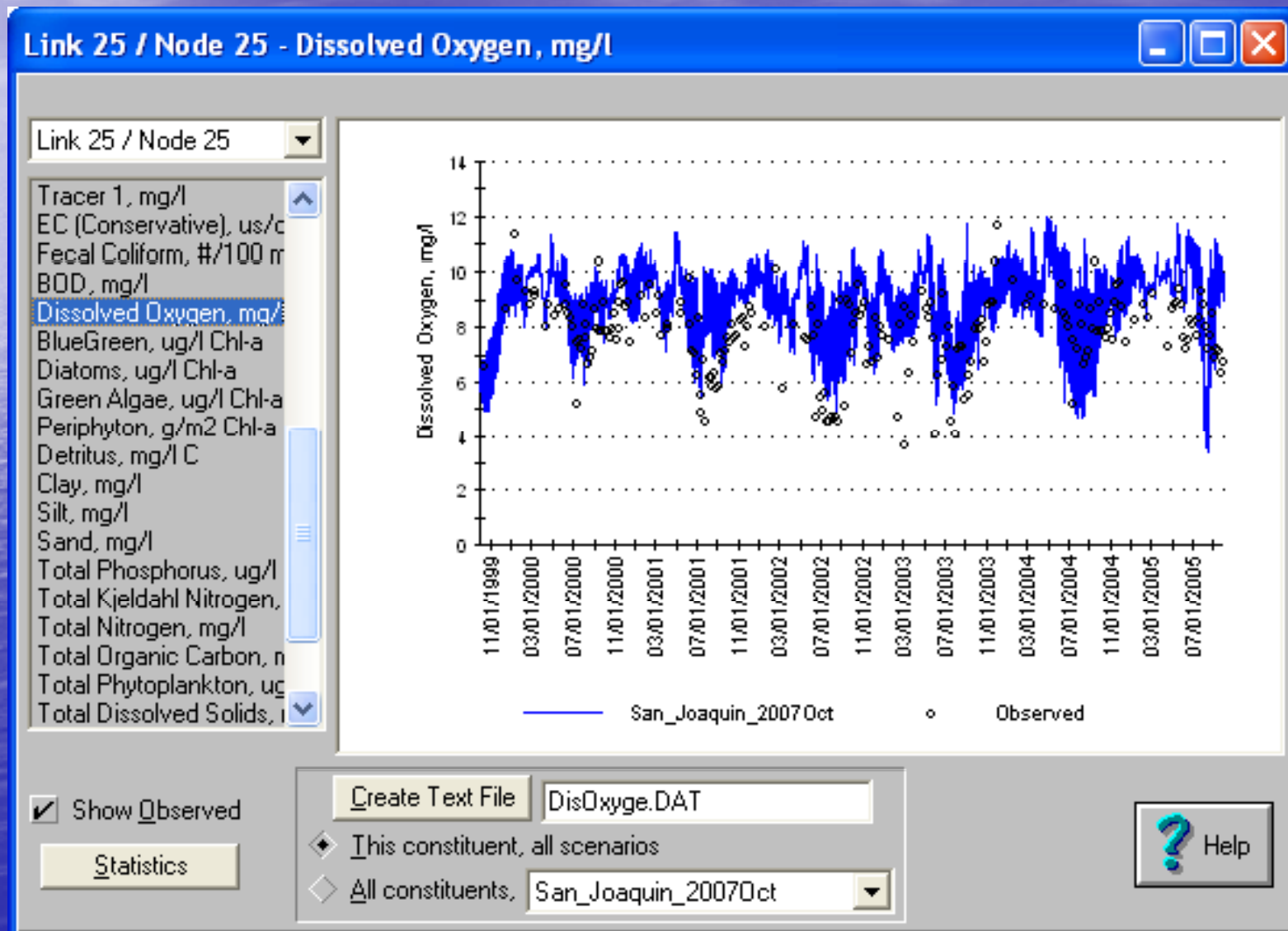
Garwood Bridge - Nitrate



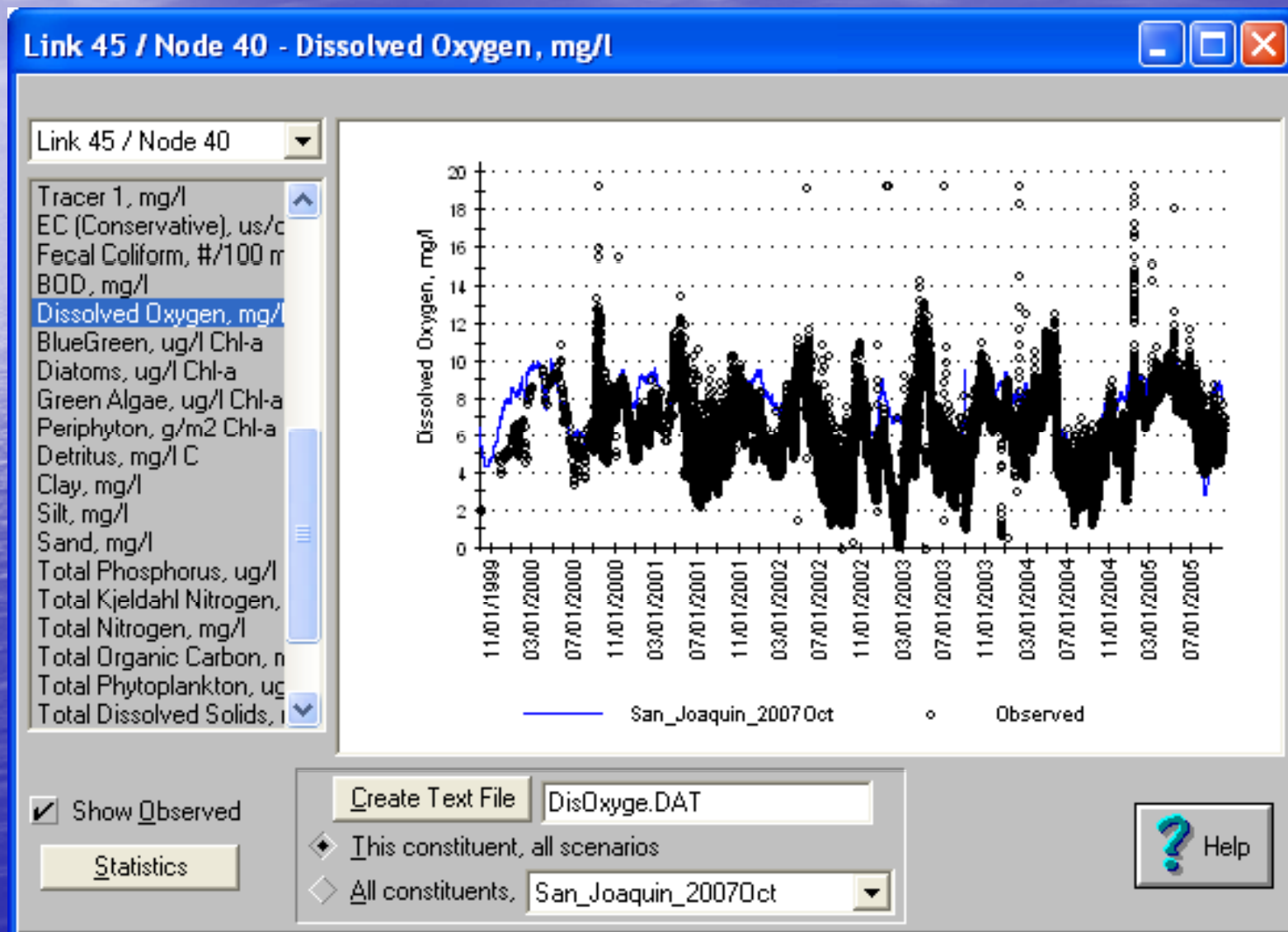
Garwood Bridge - Phytoplankton



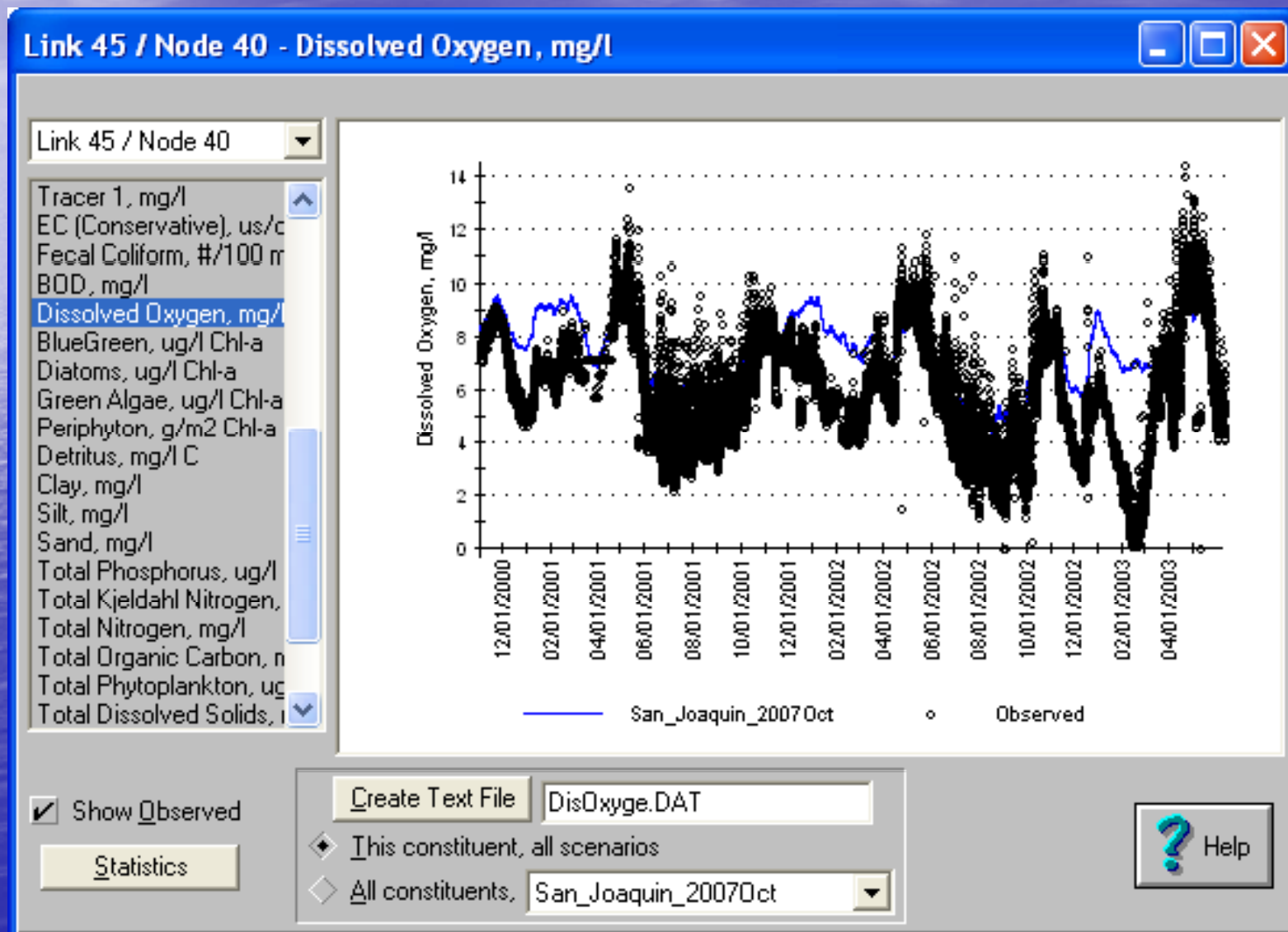
Garwood Bridge – D.O.



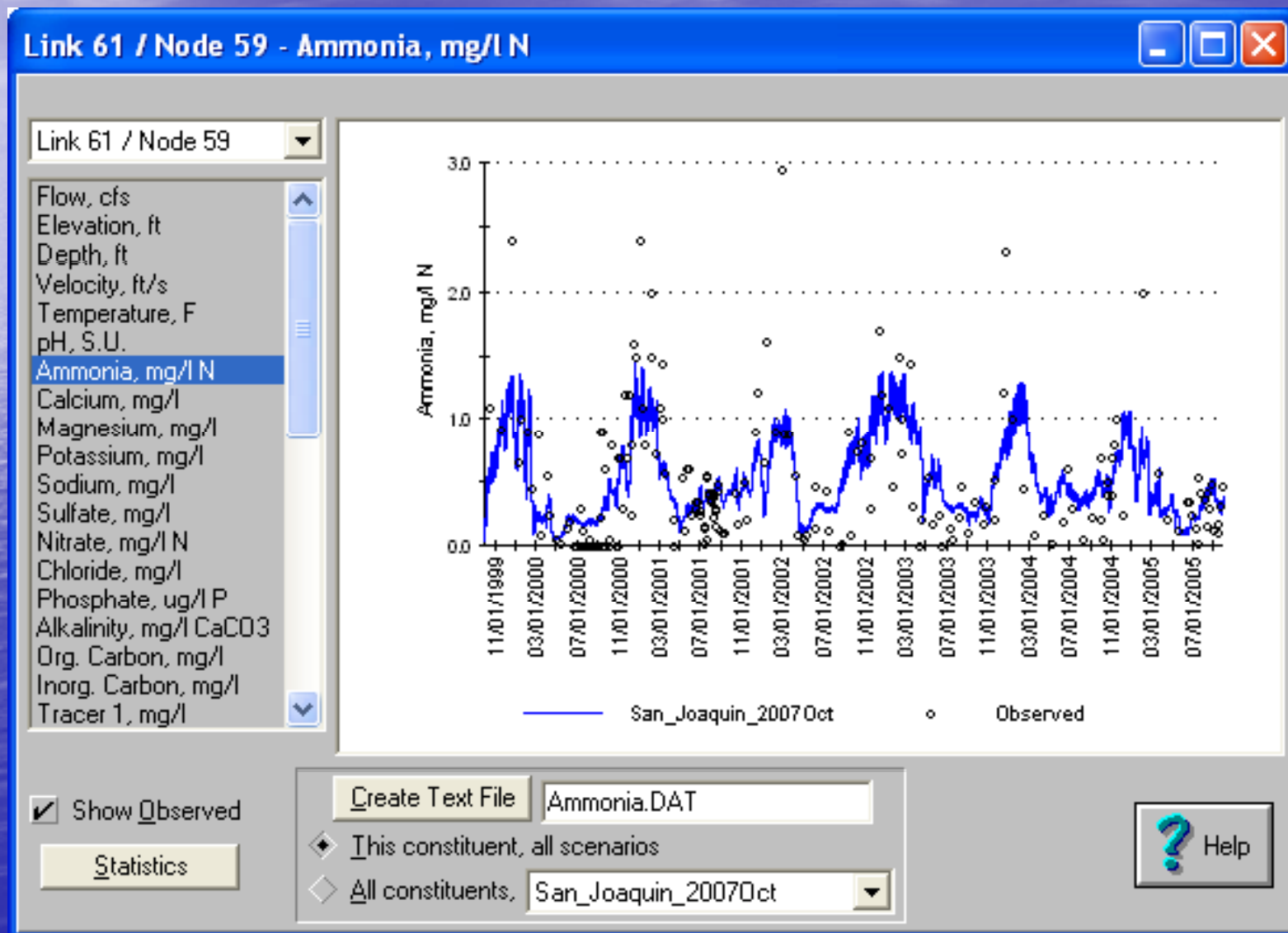
Rough & Ready – D.O.



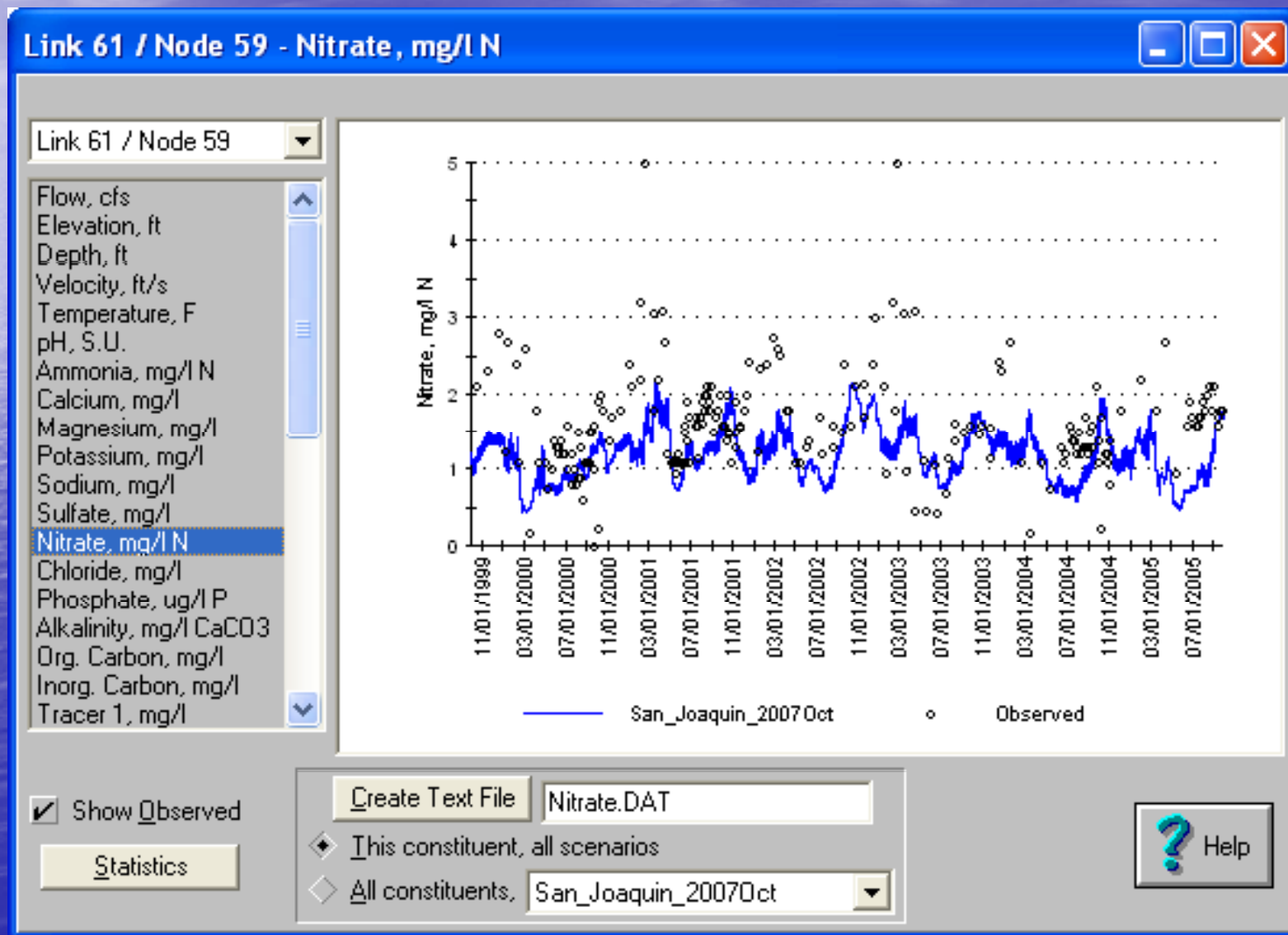
Rough & Ready – D.O. (detail)



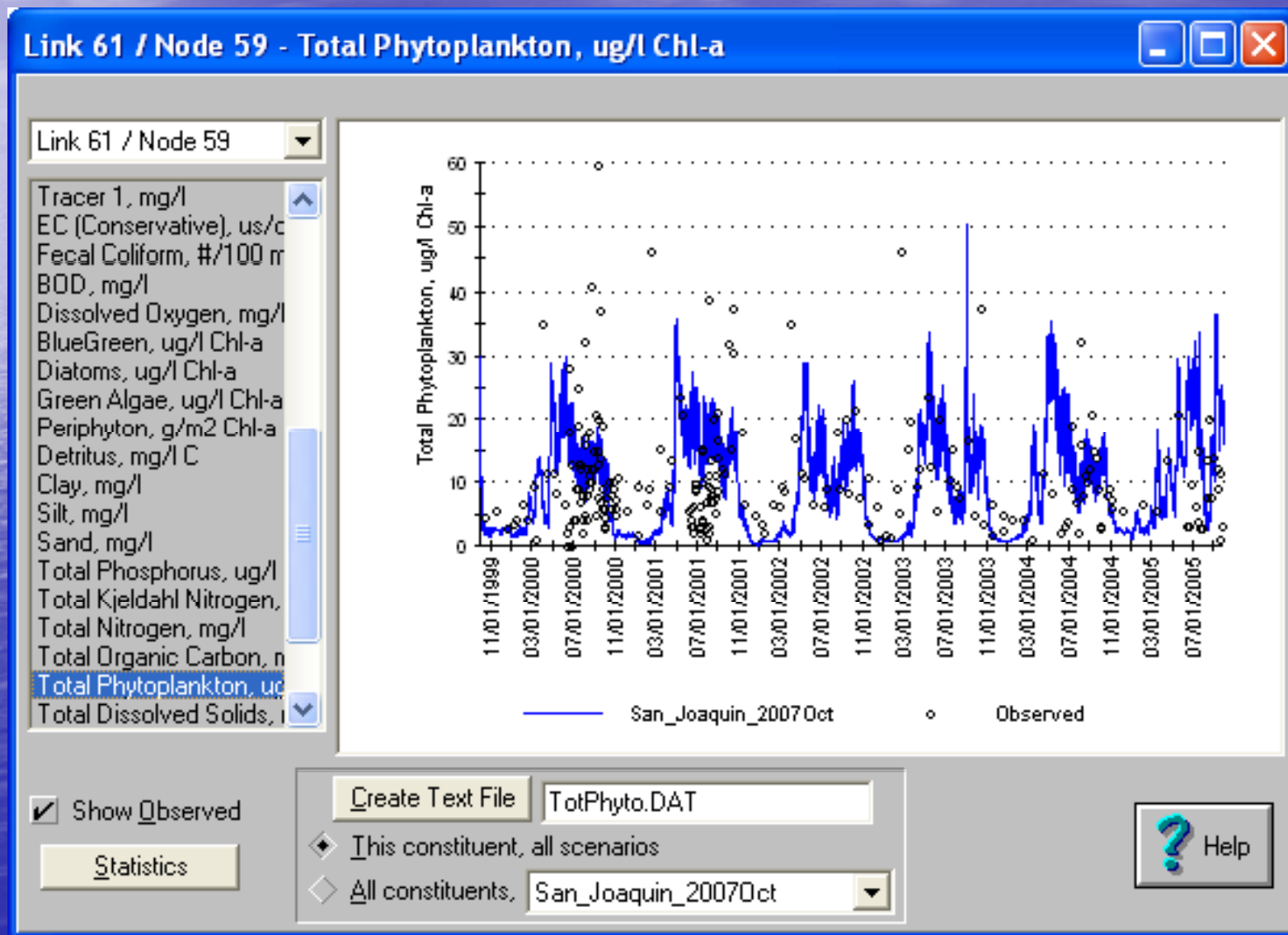
Buckley Cove - Ammonia



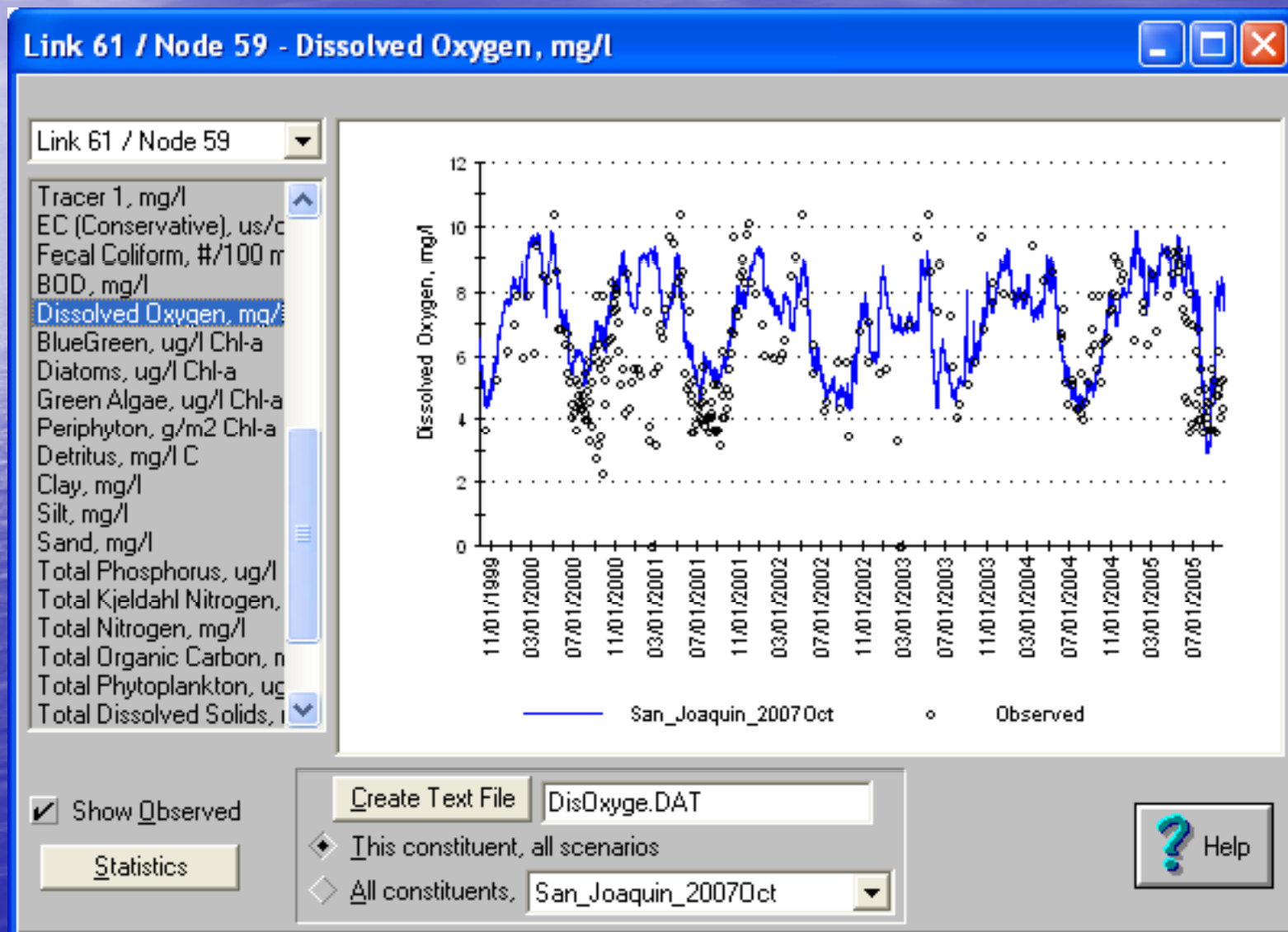
Buckley Cove - Nitrate



Buckley Cove - Phytoplankton



Buckley Cove – D.O.



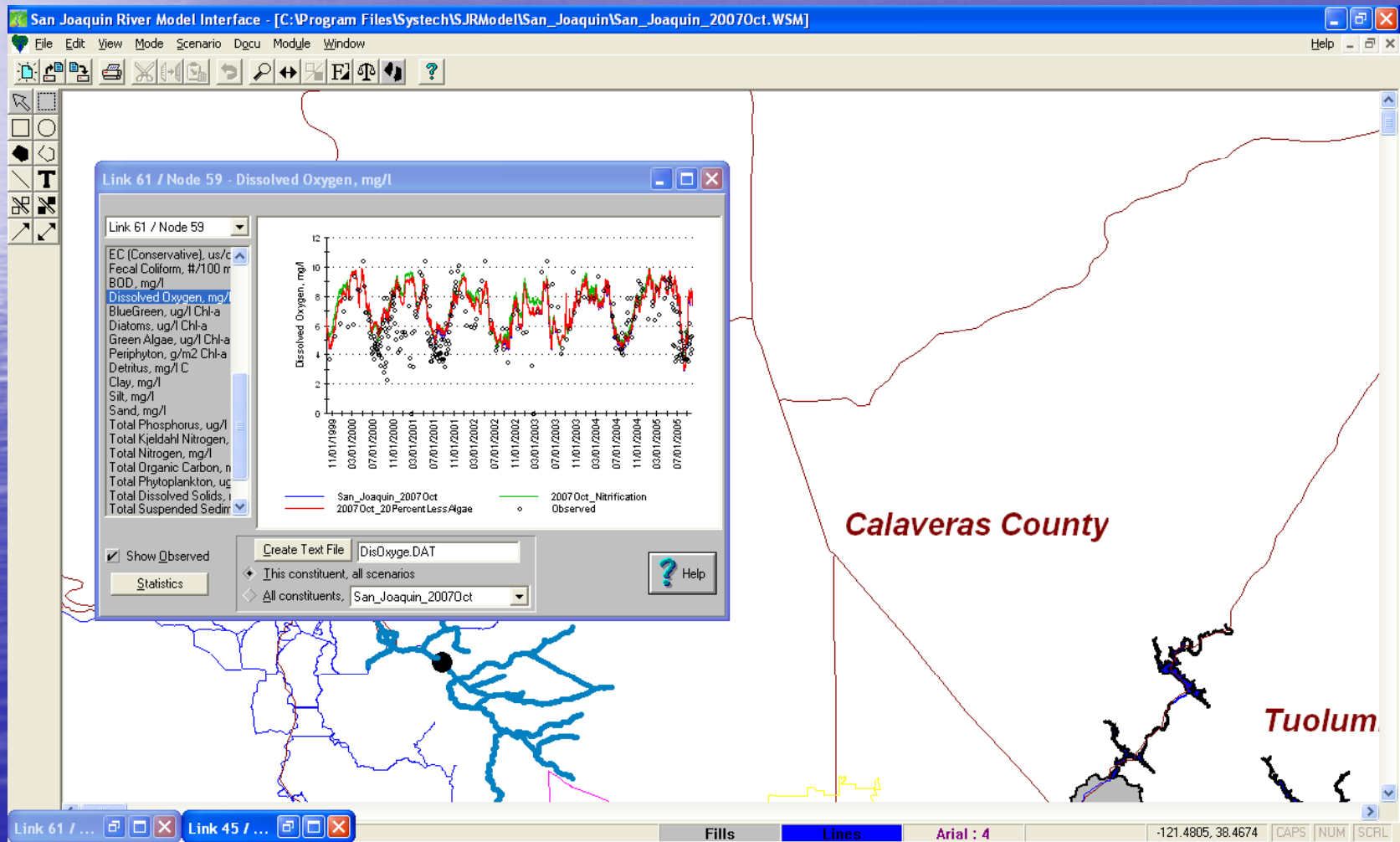
Summary of Original Calibration

- Temperature
 - Simulated ~ 0.3-0.9 °F less than observed upstream of Channel Point
 - Simulated ~1 °F less than observed in DWSC
- Ammonia
 - Simulated NH_4 much less than observed upstream of Channel Point
 - Little bias, seasonal pattern matched well at Buckley Cove
- Nitrate
 - Simulated NO_3 accurate upstream of Channel Point
 - Simulated NO_3 ~25% too low at Buckley Cove

Summary of Original Calibration

- Phytoplankton
 - Simulated phytoplankton too high upstream of Channel Point
 - Little model bias in DWSC, but simulated less than observed in winter
- Dissolved Oxygen
 - Simulated is much too high at Brandt Bridge
 - Simulated is 0.6-1.0 mg/l too high in DWSC
 - Winter D.O. depletion not simulated well

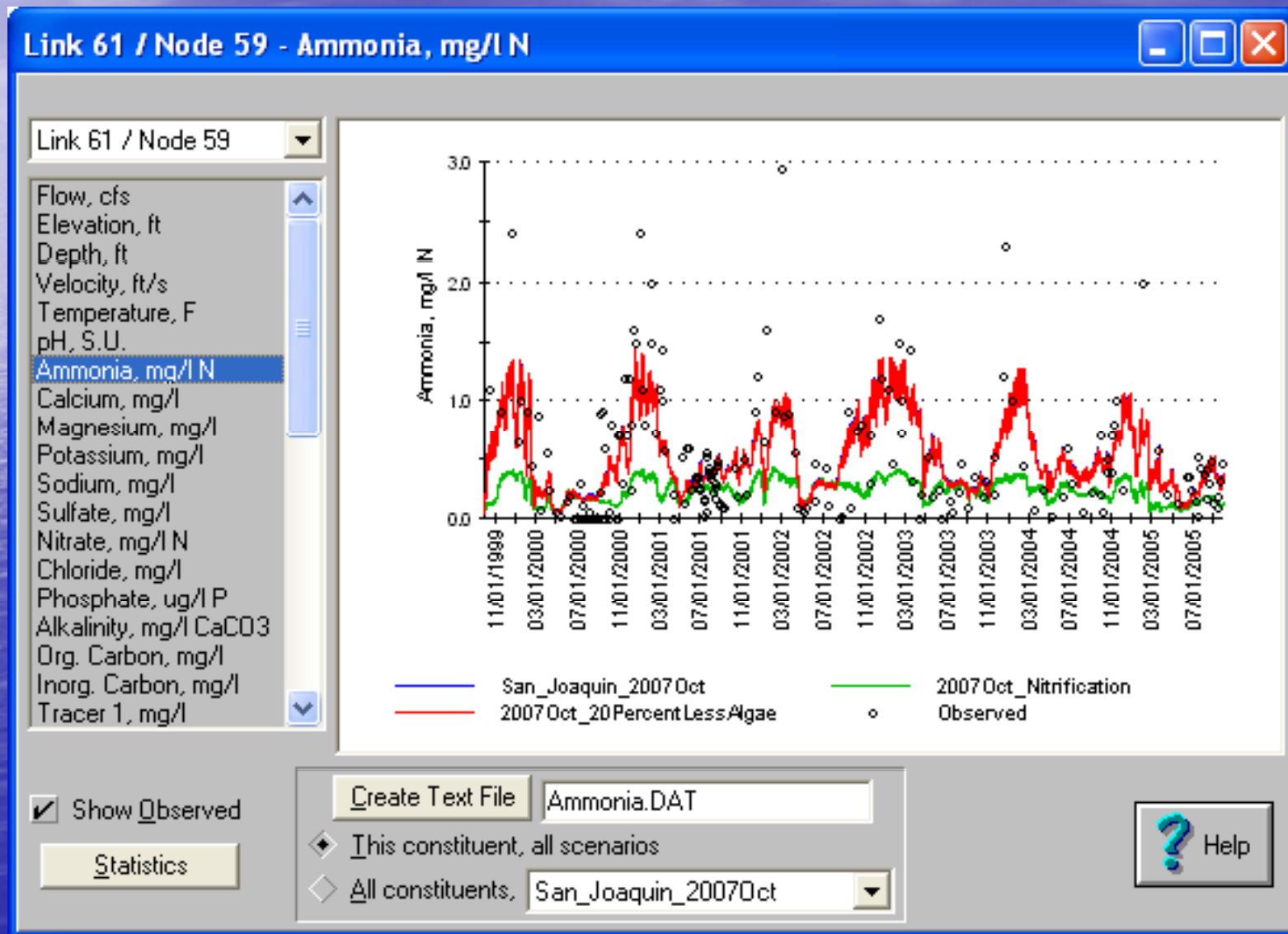
Live Demonstration of Scenarios



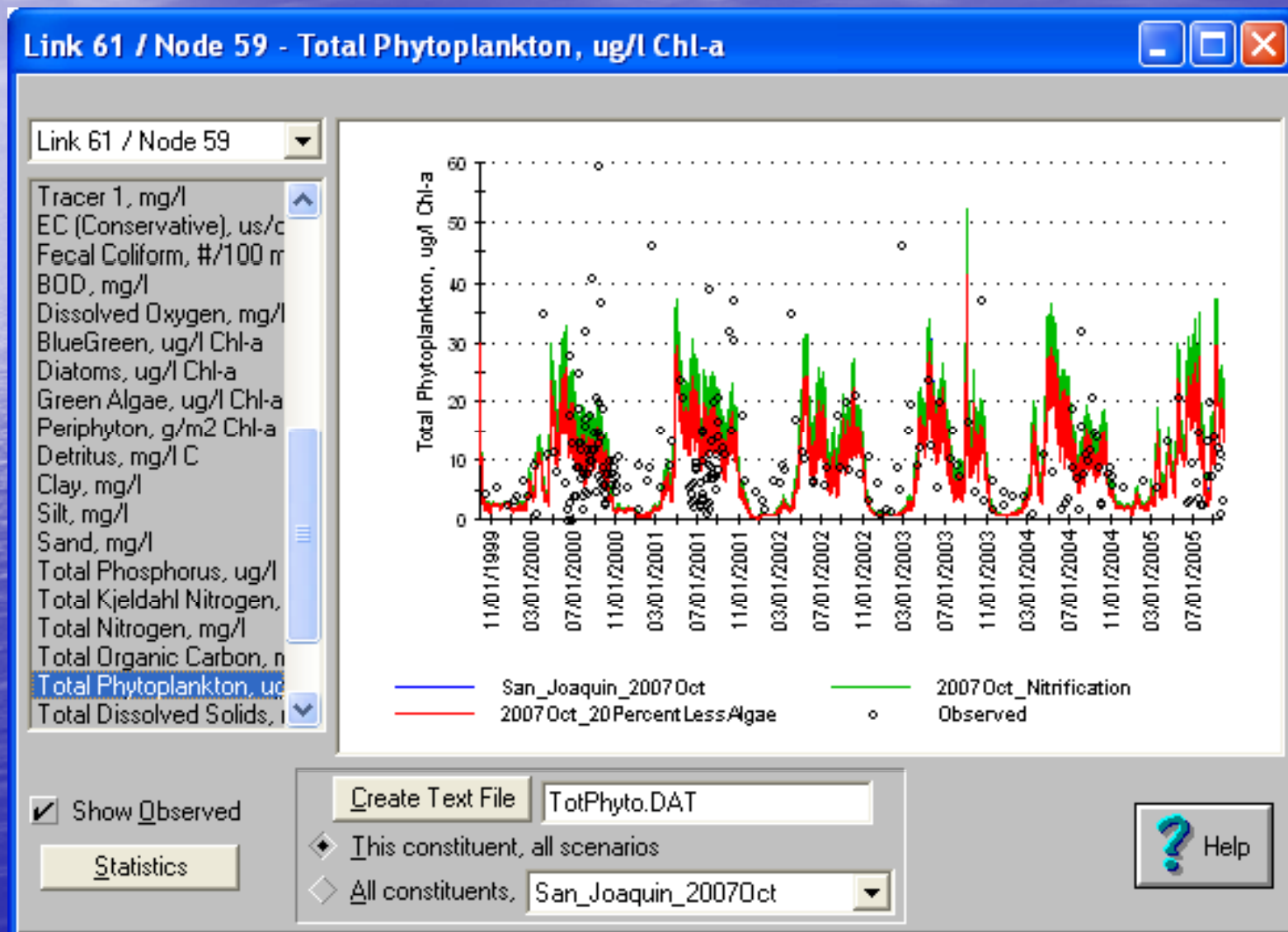
Scenarios

- Base Case (results in blue)
Original Model Calibration
- Stockton RWCF Nitrification (green)
 $\text{NH}_4\text{-N}$ Discharge ≤ 2 mg/l
- 20% Less Algae Load (red)
Constant percentage reduction of load at
Old River

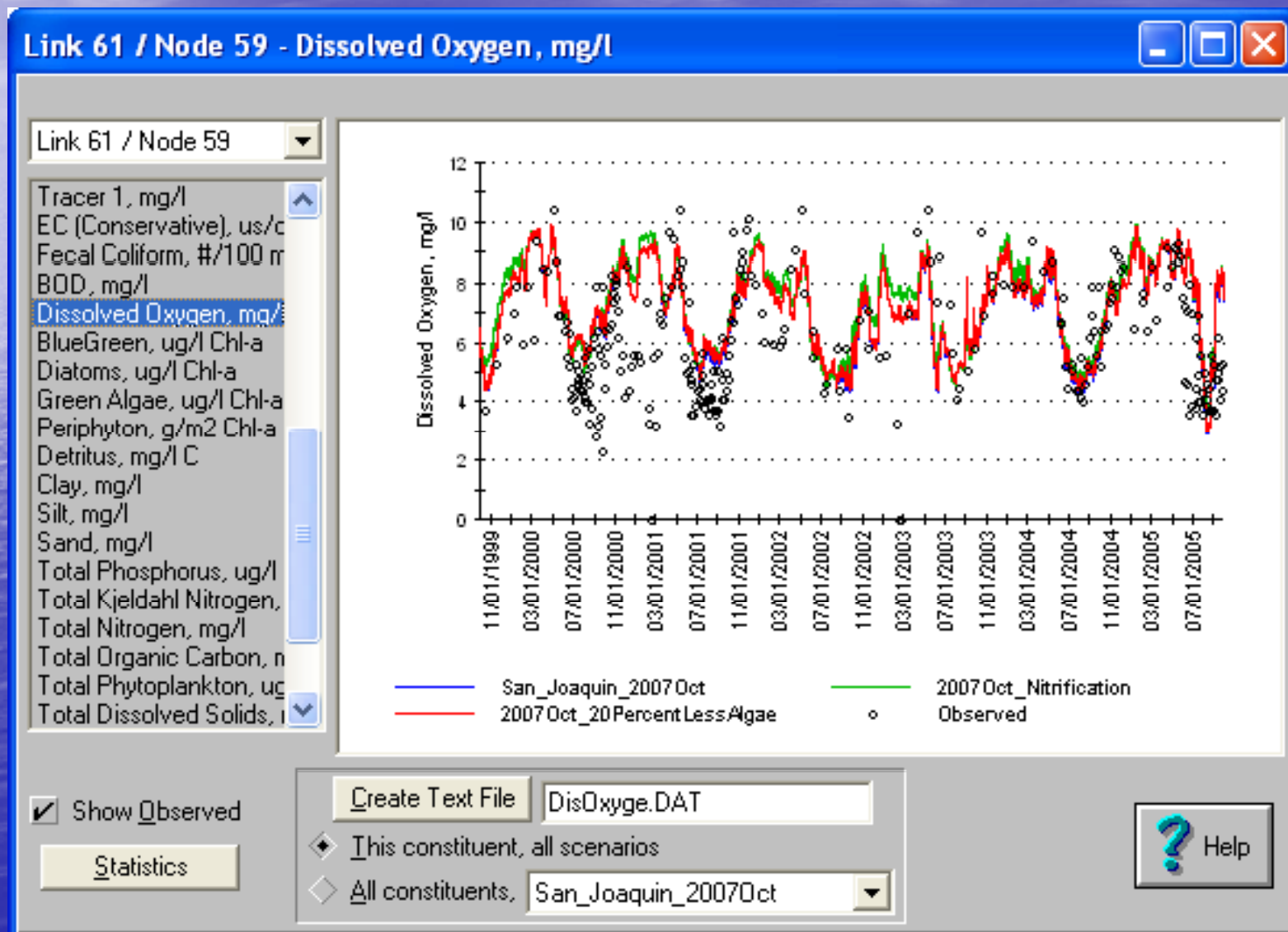
Buckley Cove - Ammonia



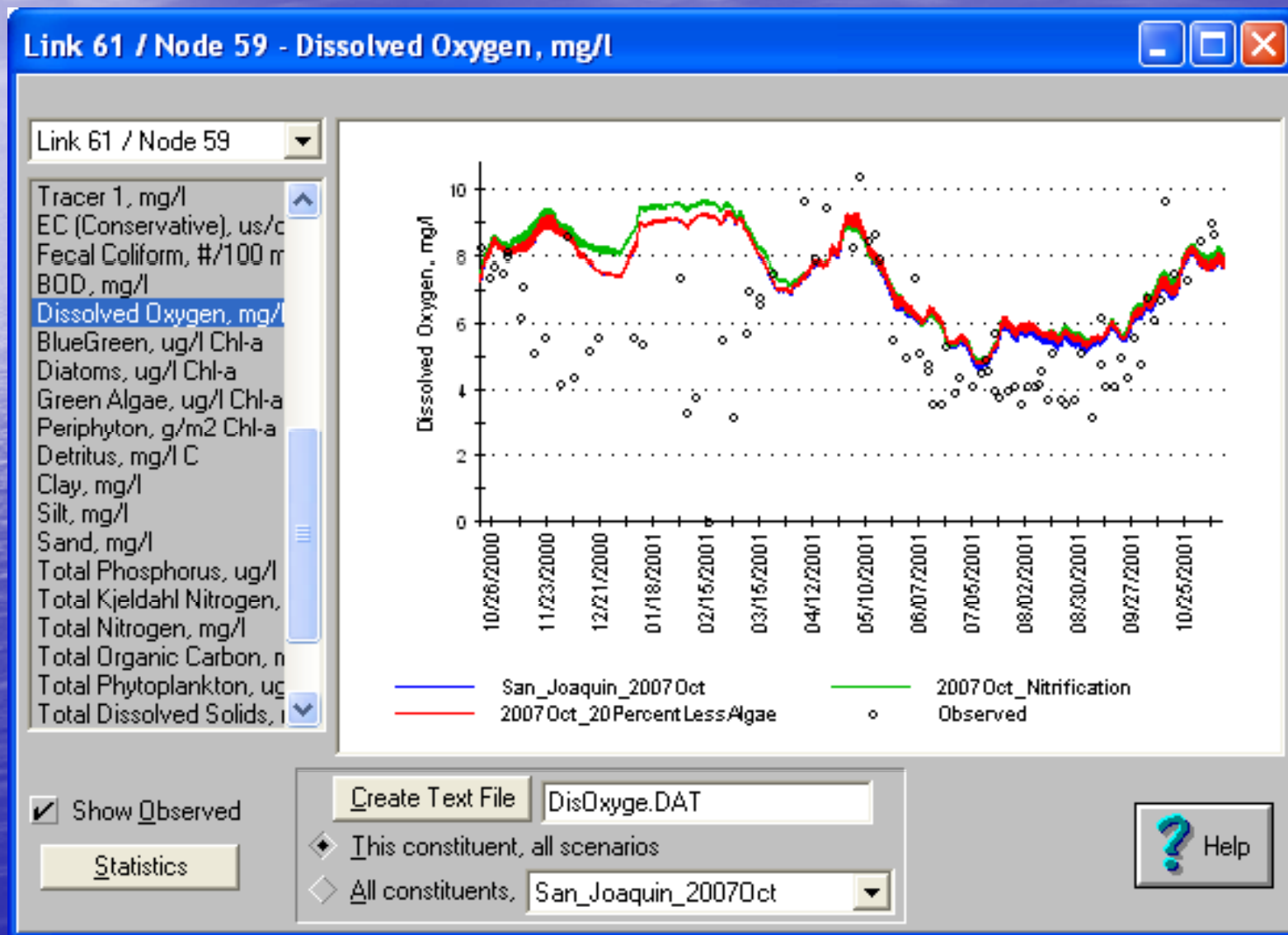
Buckley Cove - Phytoplankton



Buckley Cove – D.O.



Buckley Cove – D.O. (detail)



Conclusion

- New data (since 2000) provides opportunity to upgrade DWSC modeling
- Important phytoplankton decay / grazing from Old River to Channel Point not currently captured by model
- Model not simulating enough nitrification in DWSC
- Scenarios show improvement in D.O.
 - In winter with Stockton RWCF nitrification
 - In summer with phytoplankton reduction