

LaCrosse, WI

WWOA Annual Conference

October 13, 2016

Nitrogen Removal at Danbury WWTP
Jerry Doriott, PE



Background Information

- Danbury WI – North Burnett County
- Started planning process in 2001, but preliminary work started in 1999
- Danbury is an unincorporated community

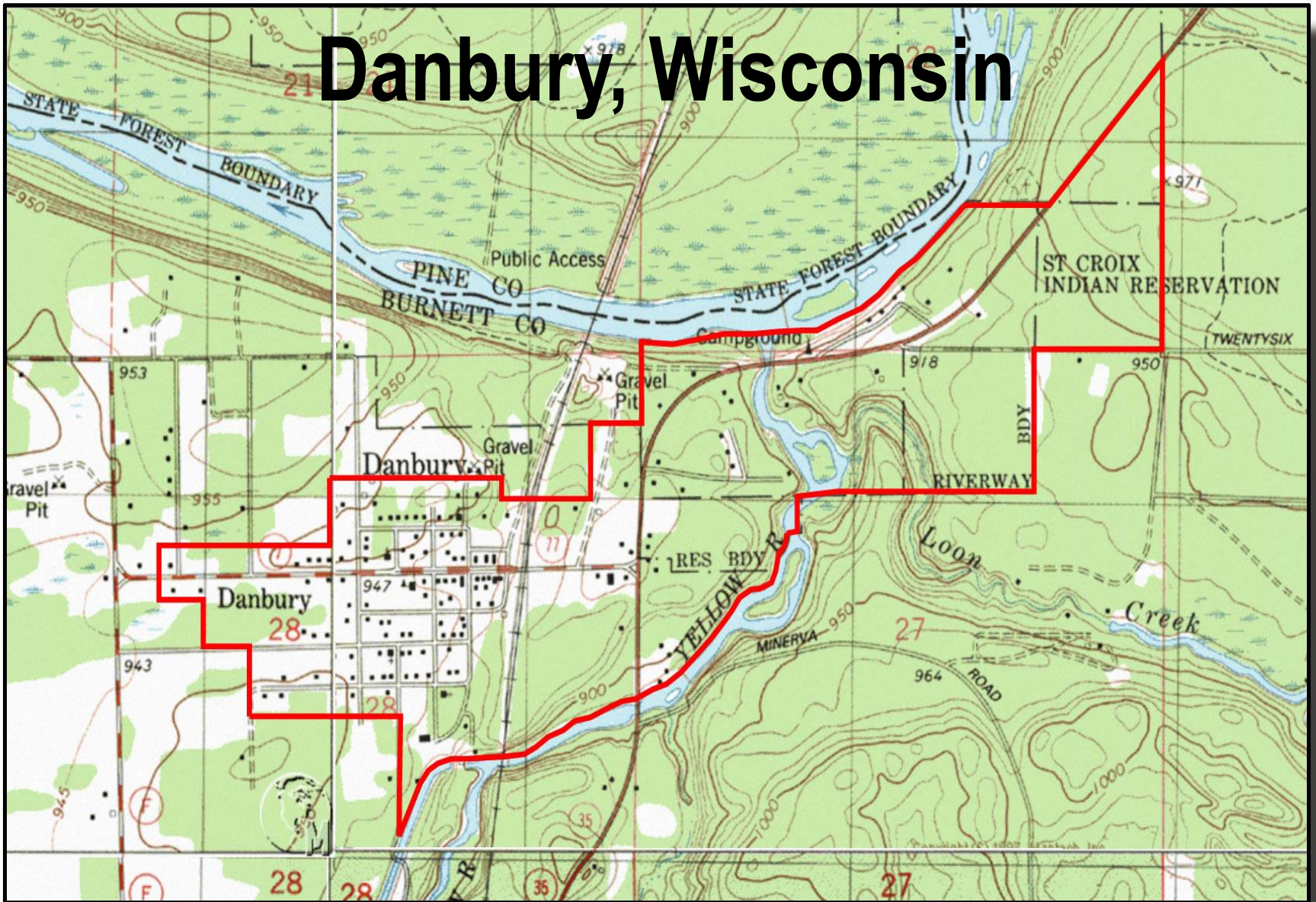


Background Information

- Danbury consists of
 - Town of Swiss
 - St. Croix Chippewa Indians of WI.
- The Town formed a Sanitary District and developed a Compact with the St. Croix Chippewa to create:
 - Joint Water Quality Commission



Danbury, Wisconsin



Background Information

- Danbury was a community with no public water system or wastewater system
- All residences, industries, and casino were on private wells and septic systems.
- Septic systems were failing as nitrates were in high levels in water samples from private wells

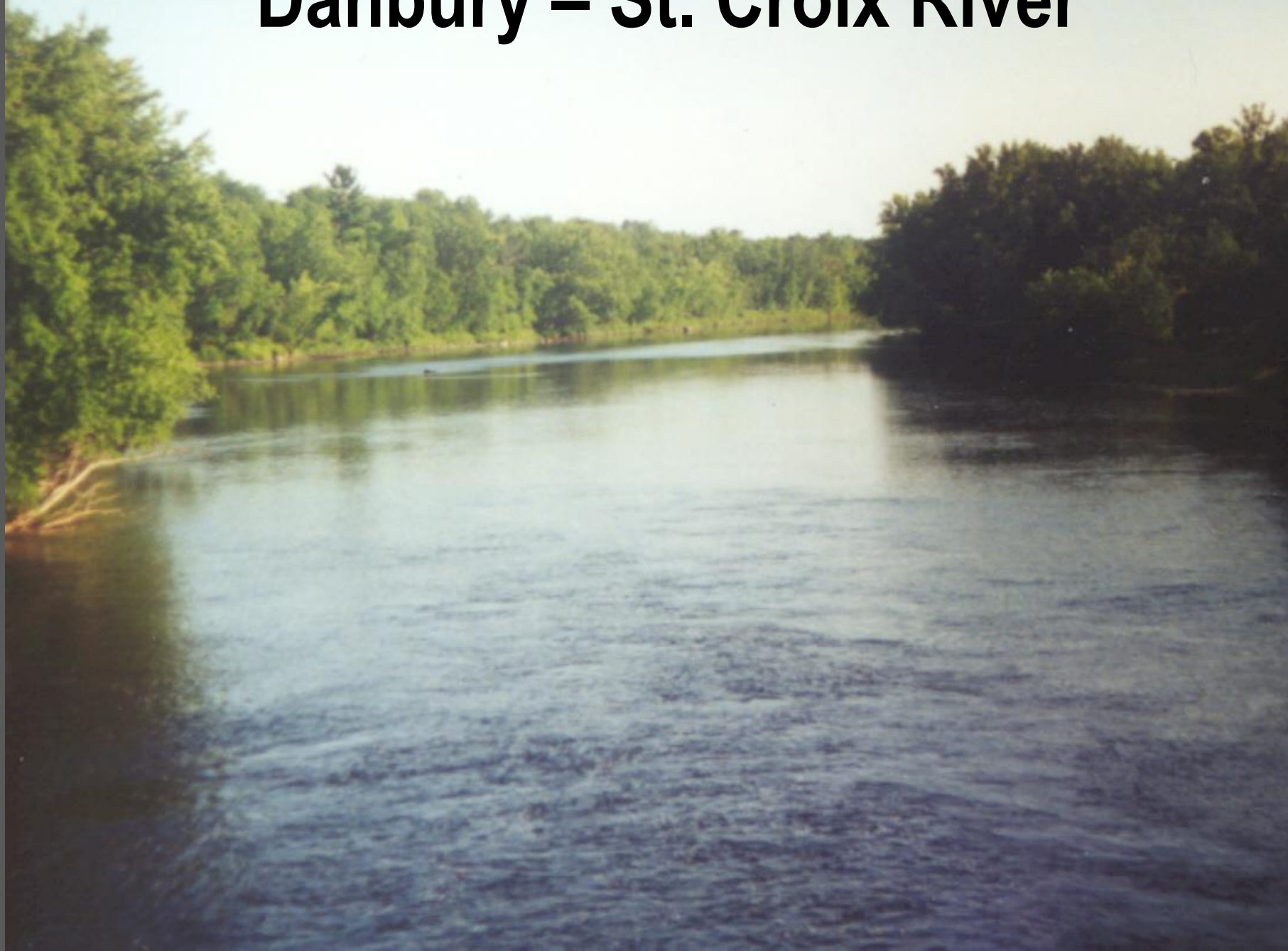


Background Information

- Special State legislation helped fund planning
- JWQC and SEH reviewed several types of WWTP and discharges
- Due to “all surface waters flowing into the St. Croix River” – A surface water discharge was cost prohibited
 - Effluent would need to meet background quality in St. Croix River due to it being an Outstanding Resource Water and a Wild and Scenic Waterway



Danbury – St. Croix River



Background Information

- Facility Plan concluded that a mechanical WWTP based on a continuous flow Sequencing Batch Reactor was most cost effective
- Discharge would be to seepage cells
- JWQC purchased land from Townships and traded the purchased land with the Burnett County Forest to get a parcel of vacant land next to the community



JWQC - Danbury WI locations



Legend

- Major Highways
- Interstate
 - US Highway
 - State Highway
 - Local Roads
 - 24K Open Water

0 2600 5200 7800 ft.



Scale: 1:27,117

This map is a user generated static output from an internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.



Background Information

- Sanitary District and Tribe and SEH worked on getting funding for WWTP, sanitary collection system, wells, water tower, and water distribution system.
- Put together a funding package that consisted of grants from State Special Legislation, DNR Clean Water Fund Hardship, and USDA Rural Development



Groundbreaking and Funds



Project Funding and WWTP Cost

- Entire project of water and wastewater was funded with Grants of \$10,454,400 and Loan of \$3,614,000.
- Grant was 74% of funds
- WWTP was 100% DNR CWF Hardship Grant of \$2,659,200



WWTP site



WWTP site



SBR

- Sized and designed to denitrify
- Two tanks with continuous flow to both
- SBR cycles are staggered
- Cycle consists of aeration, mixing and anoxic periods, settling, and decanting

SBR construction



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SBR Aeration



SBR



SBR

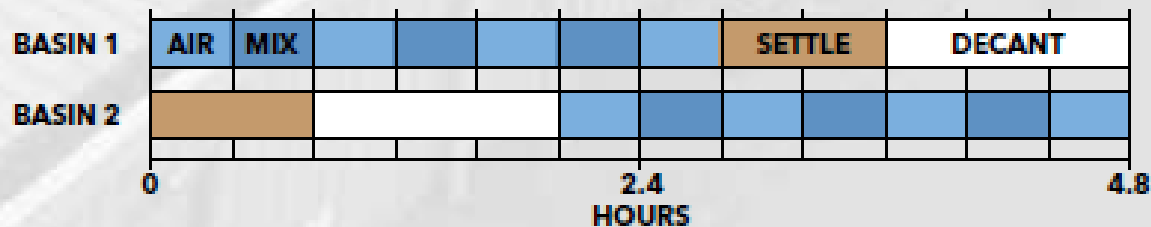


Denitrification

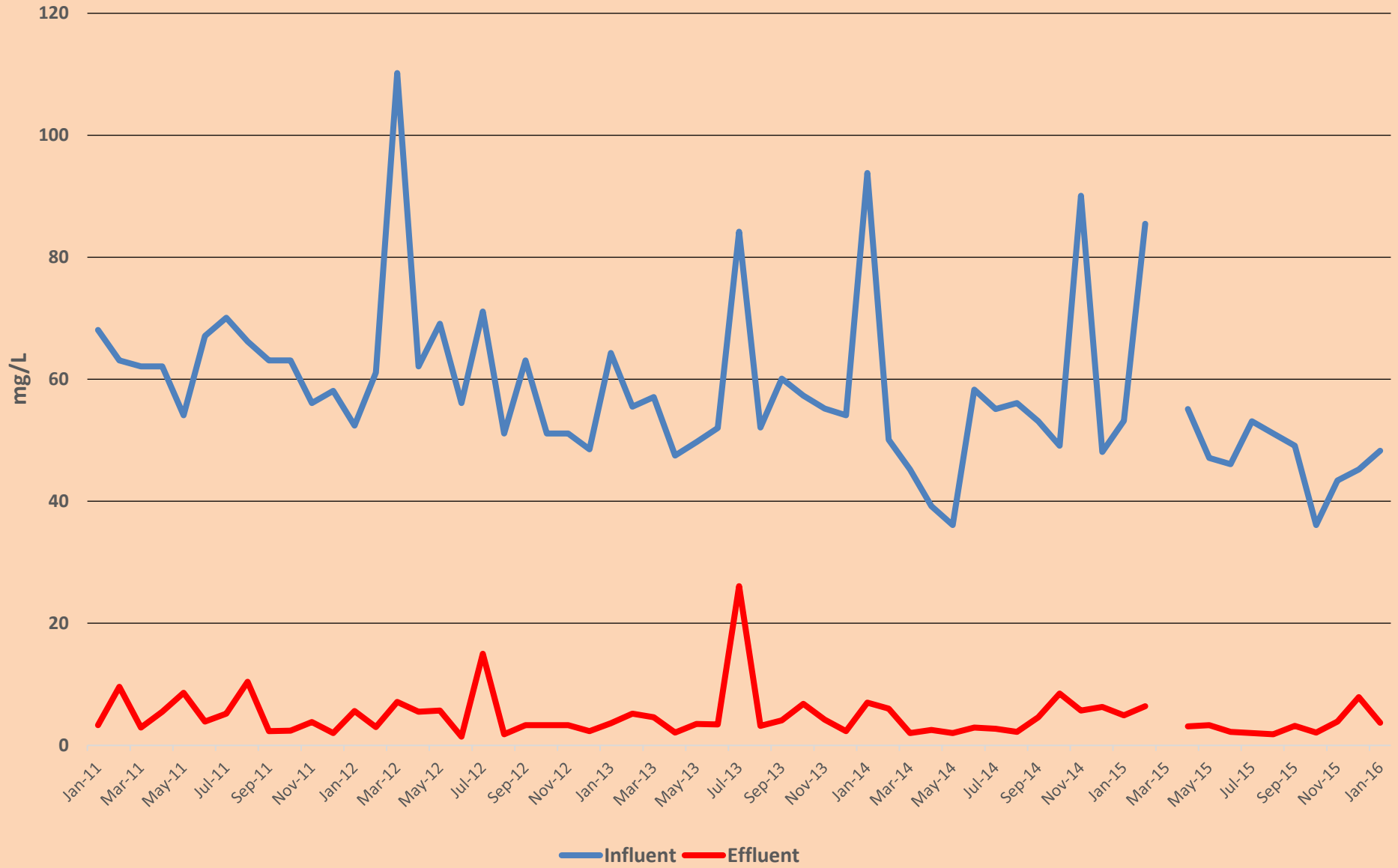
(From Xylem ICEAS Brochure)

NDNP Cycle

If nutrient removal is required the cycle time is extended to provide time for anoxic periods to allow denitrification and Bio P removal. The continual feed provides BOD at all times to provide good denitrification rates at all points in the cycles and optimize nitrogen removal.

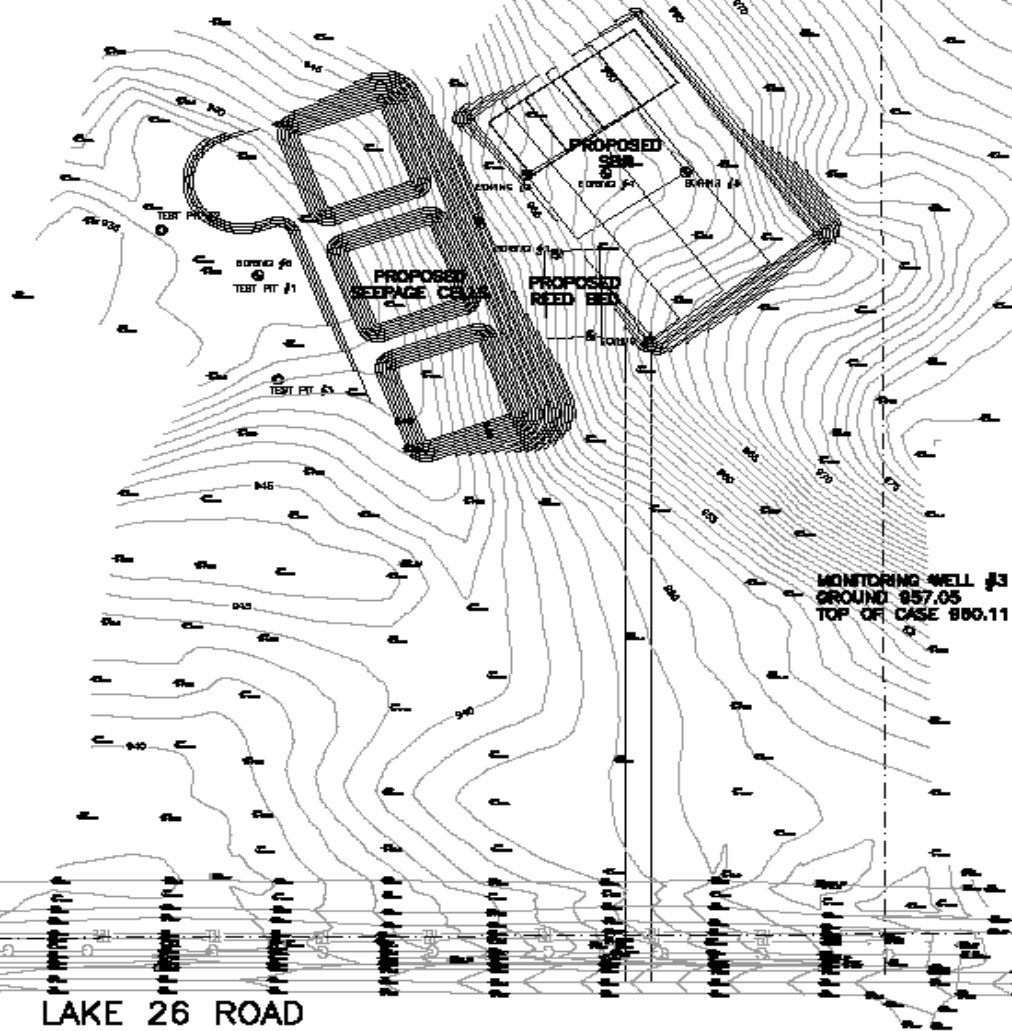


Total N Influent and Effluent



MONITORING WELL #1
GROUND 842.11
TOP OF CASE 844.99

MONITORING WELL #2
GROUND 838.20
TOP OF CASE 841.13

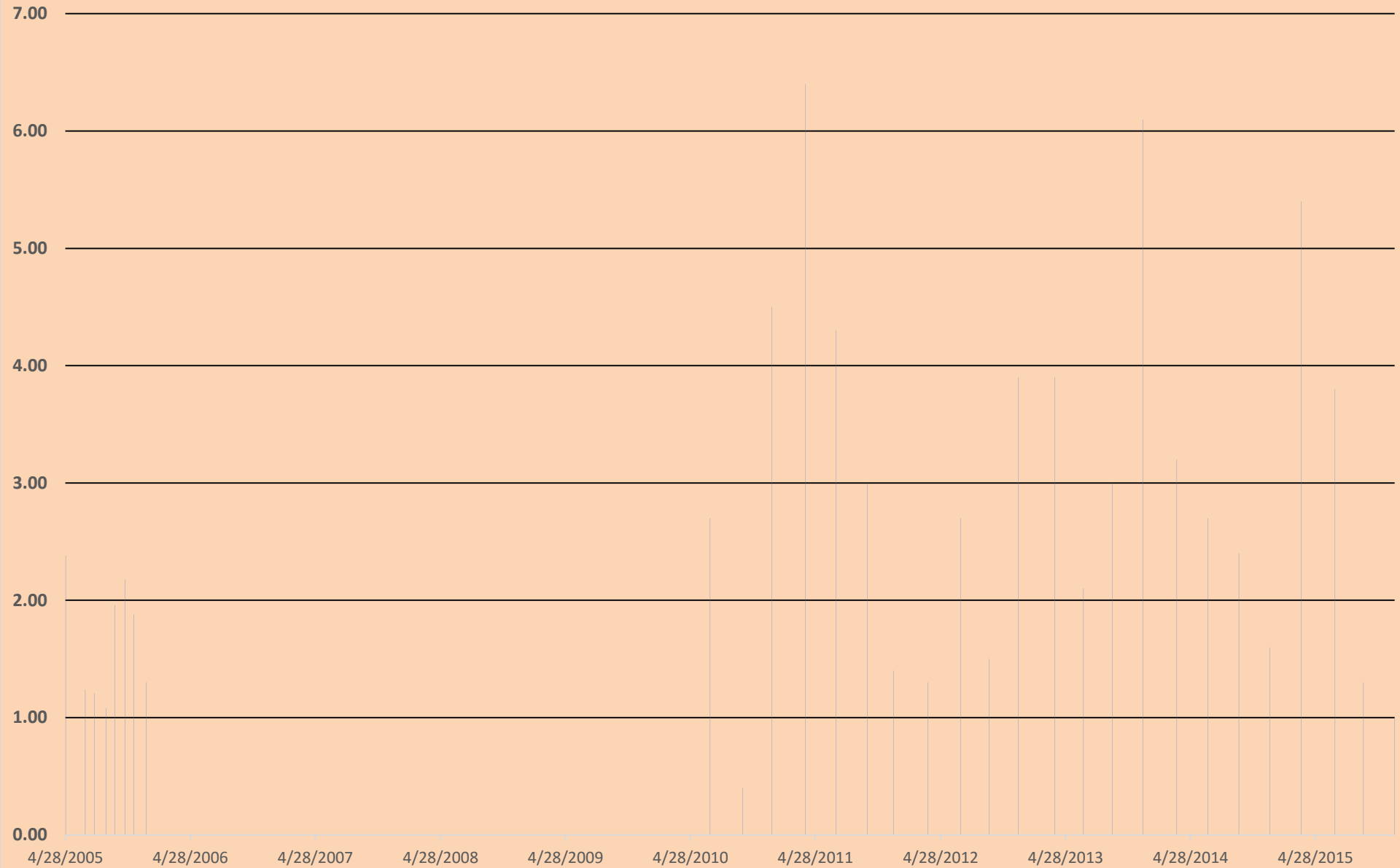


MONITORING WELL #3
GROUND 857.05
TOP OF CASE 860.11

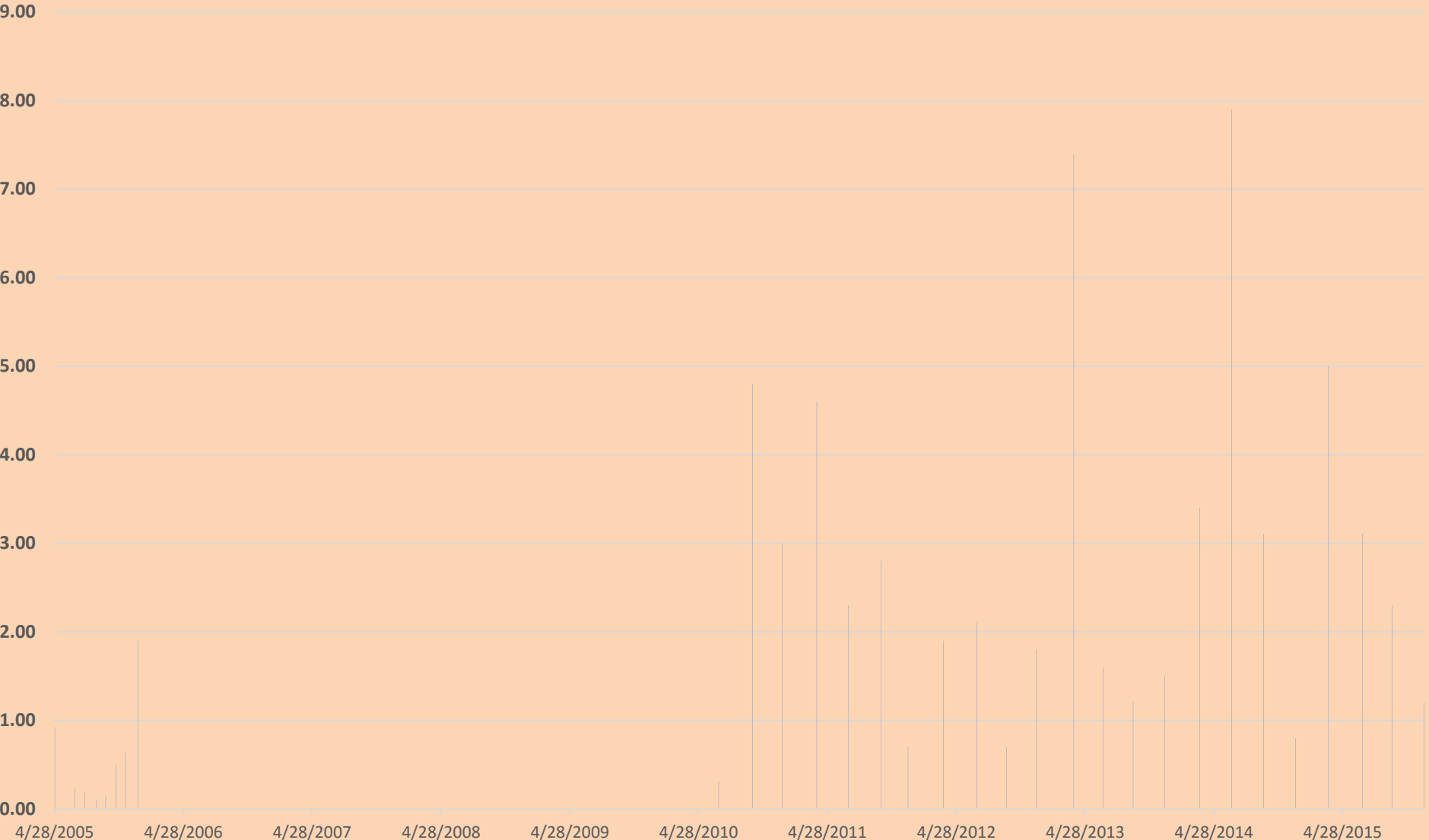
MONITORING WELL #4
GROUND 837.71
TOP OF CASE 840.68

LAKE 26 ROAD

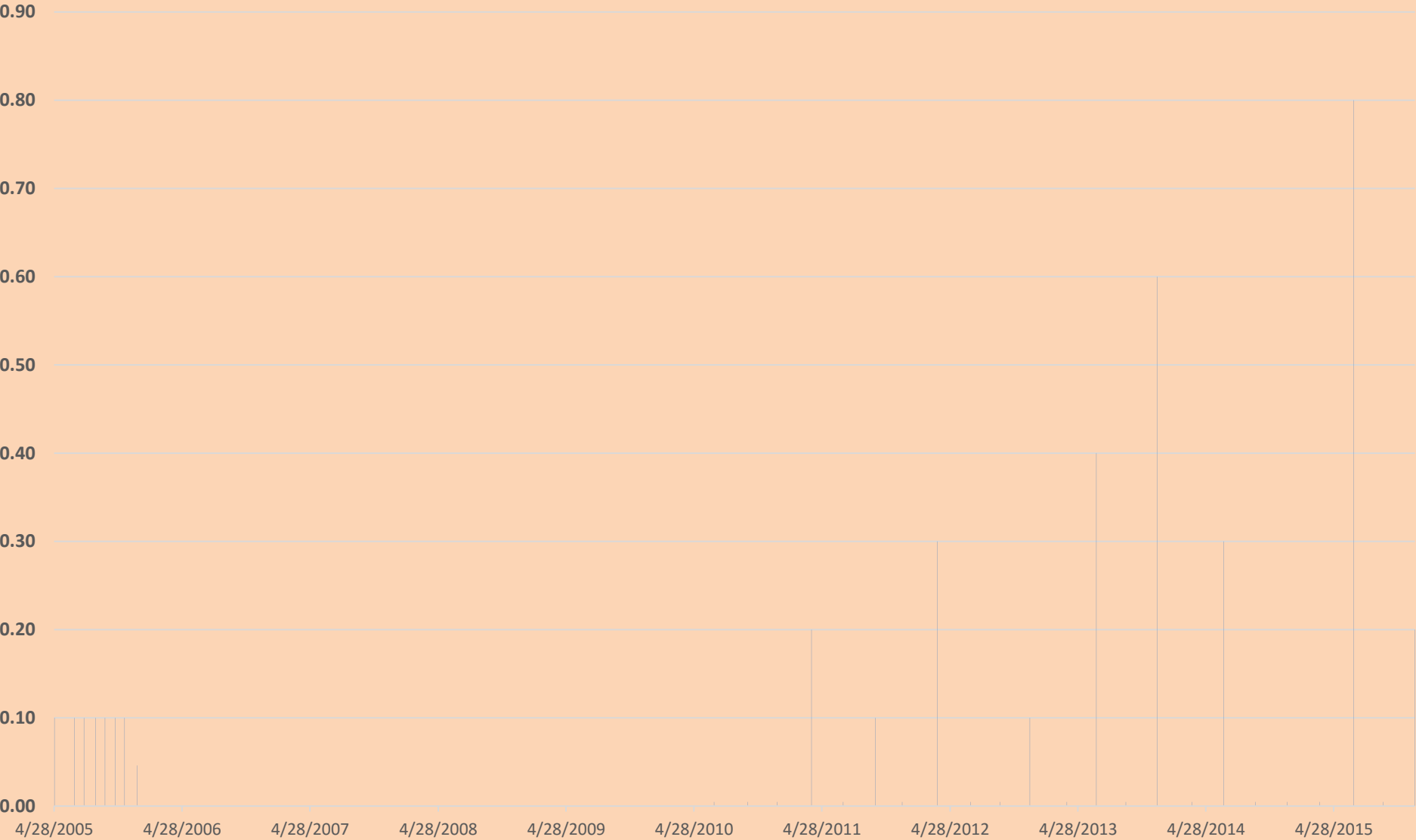
MW 1 : nitrate+nitrite-N



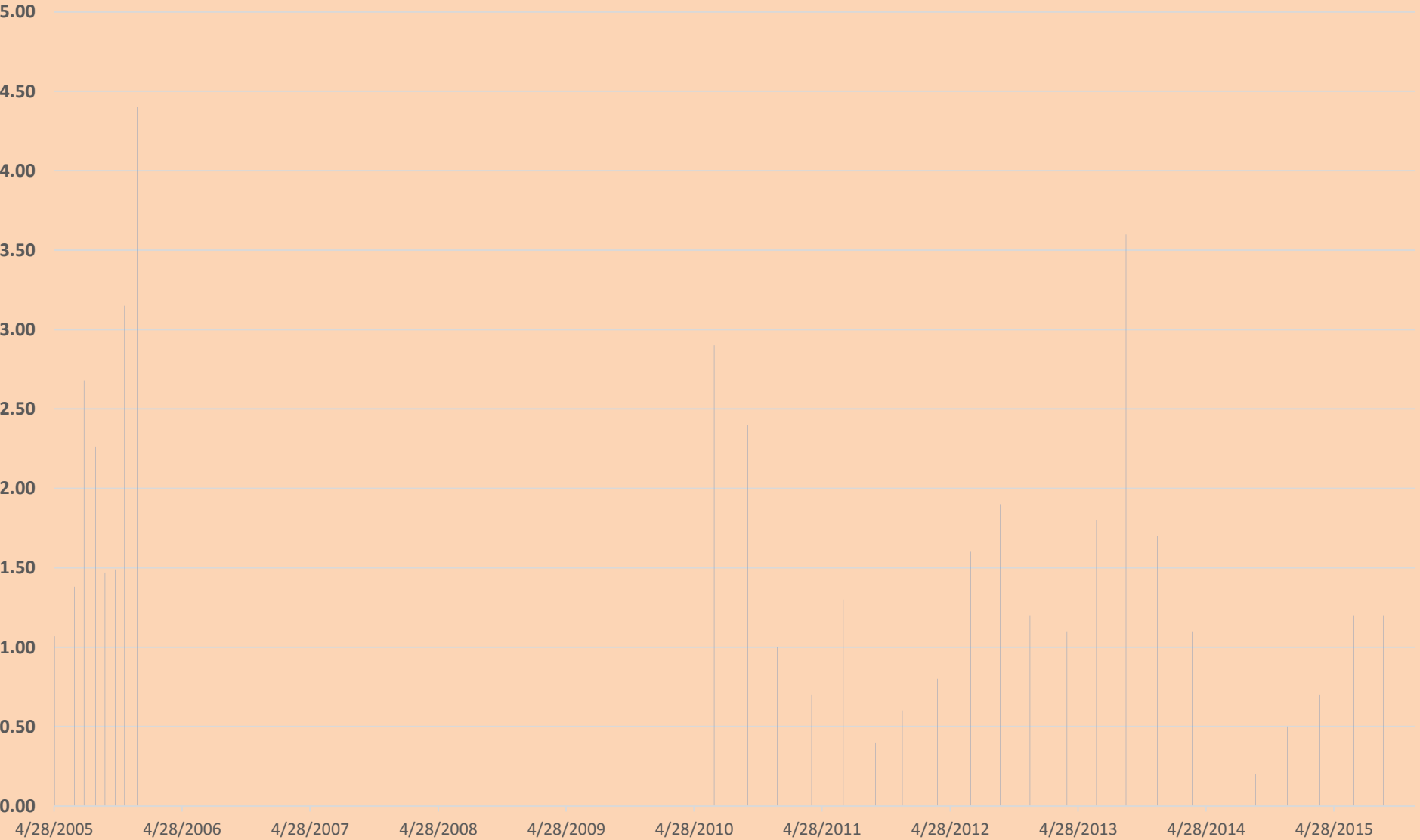
MW 2: nitrate+nitrite-N



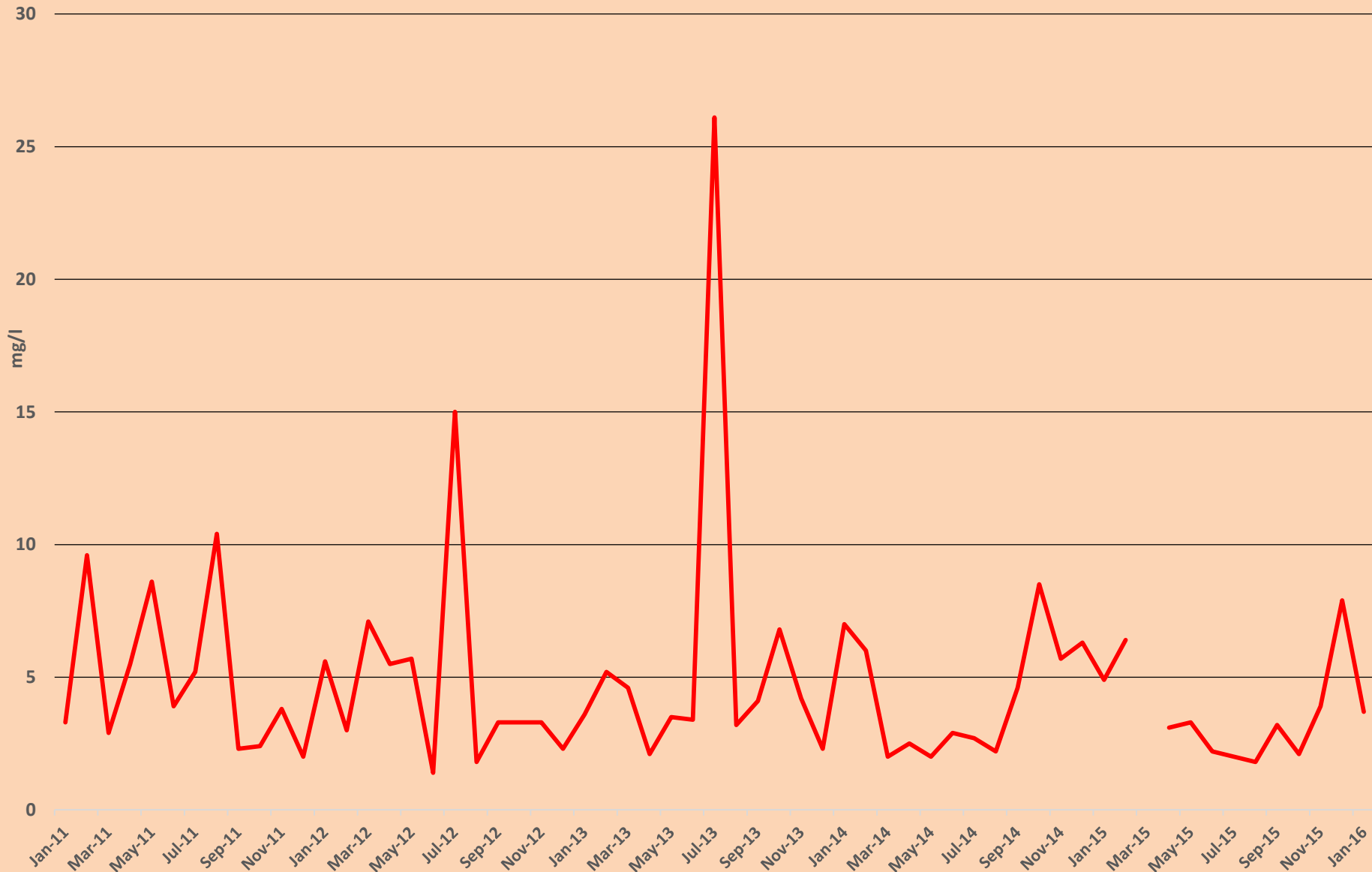
MW 3 : nitrate+nitrite-N



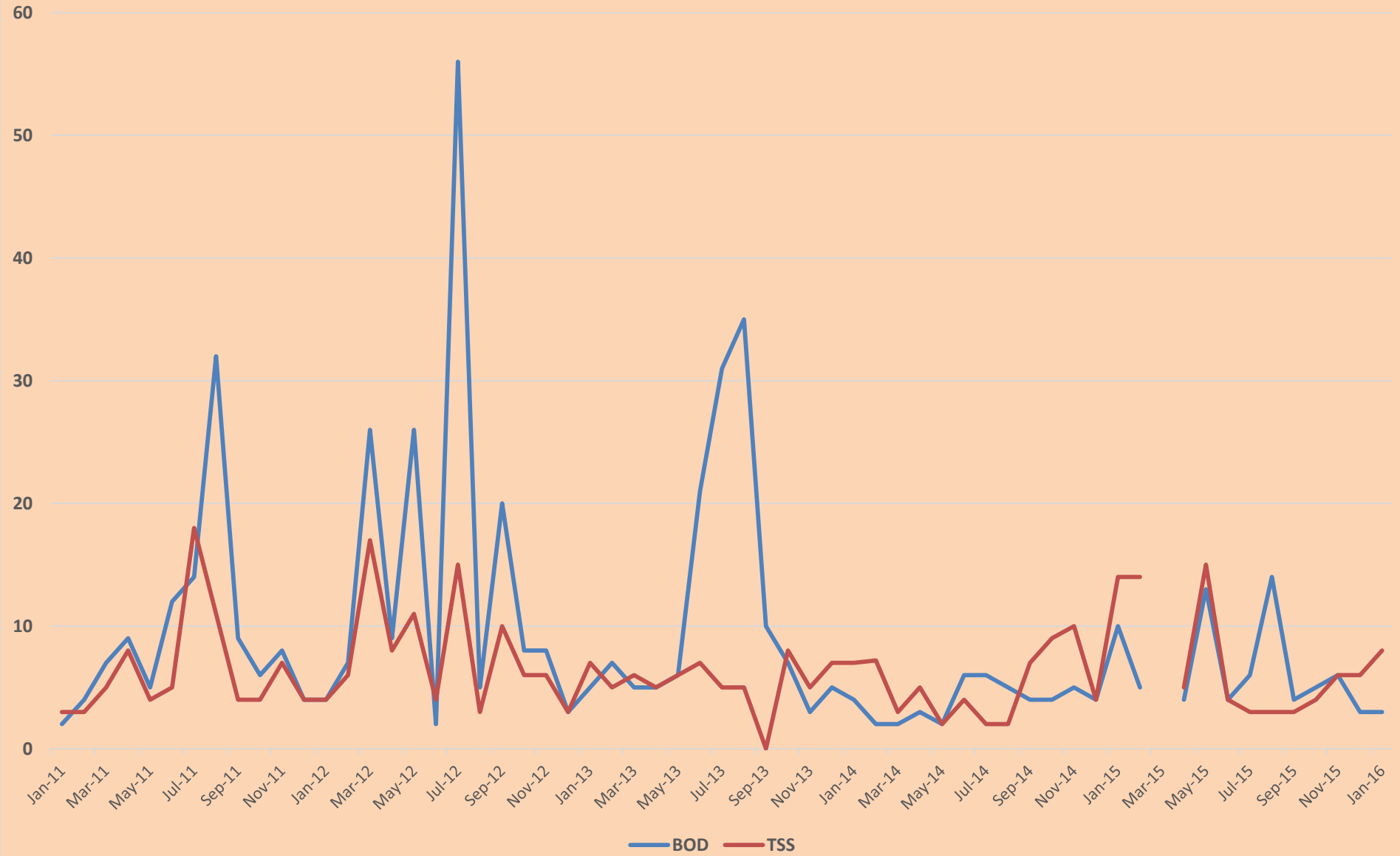
MW 4 : nitrate+nitrite-N



Total N Effluent



Effluent BOD and TSS





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Questions

