Incorporation of Sea Level Change Scenarios into Norfolk Harbor and Channels Deepening Study & Elizabeth River Southern Branch Navigation Improvements Study

Final Report

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by

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1. Introduction

Previously the VIMS modeling group has studied the impact of channel deepening on the water quality in lower James River, including Norfolk Harbor and Elizabeth River. A study of the response of the water quality to future Sea Level Change (SLC) is required by present USACE guidance (ER 1100-2-8162 and ETL 1100-2-1). ETL 1100-2-1 recommends analyzing the effects of SLC on the projects at three future time periods of post-construction, including 20 years, 50 years, and 100 years. The future change of sea level is mainly caused by the sea level rise (SLR) in this region. This document provides results for water quality model simulations with future SLR to assess the impact of SLR on change of water quality in the lower James River.

Since the rate of future SLR is unknown, the USACE guidance specifies that the evaluation should consider the three different SLR curves (low, intermediate, and high) included in the USACE's online SLR calculator. Fig. 1 shows the high (red), intermediate (green) and low (blue) SLR curves from the USACE calculator, along with markers representing values projected by VIMS in a 2013 study of recurrent flooding in Virginia. The figure includes nine yellow "x"s indicating the SLR values at the three future time periods at each of the three curves. Through the course of several PDT meetings a recommendation is developed to model the effects of a single future SLR value of 3.3 feet to represent a value indicative of a 50-year high level, 100-year intermediate level, and a +100-year low level, as suggested by Fig. 1-1.

Selecting a single water level allows the use of a manageable number of additional hydrodynamic and water quality modeling scenarios (four simulations) to represent the range of effects of SLR that would be projected to occur within the Project's design life. Altogether, four simulations will be added to the eight (8) physical scenarios already being modeled by VIMS. As SLR is not considered a high risk parameter in the plan selection or in evaluating the cumulative project impact, a decision was made to model a single water level.

This document provides model results and key findings related to environment assessment, particularly, changes of dissolved oxygen and flushing capacity due to SLR. For detailed model descriptions of hydrodynamic and water quality models and model calibration and verification, readers are referred to a project report submitted earlier (Shen et al., 2017).

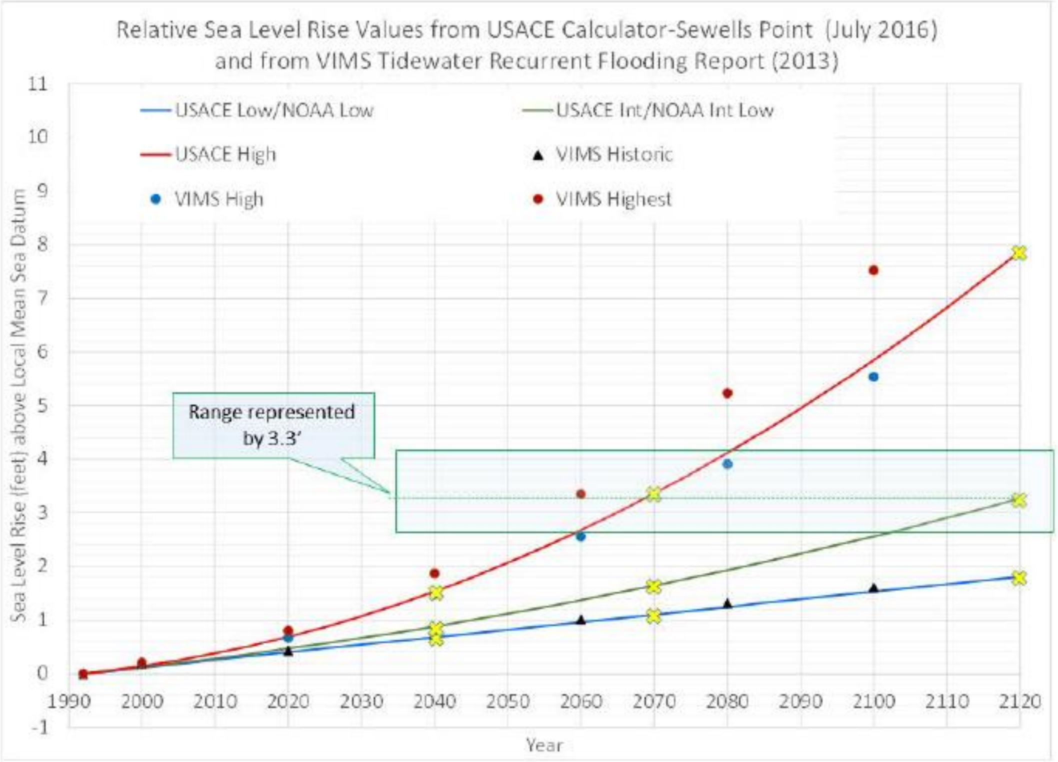

Figure 1-1: Sea Level Rise curves with markers (yellow "x"s) at 20-, 50- and 100-year time periods.

2. Approach

2.1 Model Configuration

For the present study, the refined model grids used for the channel deepening project (Shen et al., 2017) were used with respect to different channel deepening scenarios. An example of the model grid of the Elizabeth River is shown in Figure 2-1. Model simulations span the period from October 2009 until the end of 2013.

The water quality state variables are forced by the observation data measured at VADEQ Station LE5.5 (Fig. 3-1). This station is located near the northern part of the James, which represents the input of water quality conditions from the Bay. The model calibration results suggest that using measurements at this station as the open boundary condition is adequate for the model simulations. Daily freshwater and nutrient loadings at the fall line and below the fall line were provided by the DEQ watershed model (developed by Tetra Tech Inc.), which outputs daily flow, nitrogen (particulate organic nitrogen, ammonium, and nitrate) and phosphorus (particulate phosphorus and phosphate), carbon (particulate organic carbon and dissolved organic carbon). The point sources in the James River watershed below Richmond are also included and discharged to the James River. Hourly solar radiation, atmospheric pressure, wet and dry temperature, and wind data obtained at Norfolk Airport were used for the surface fluxes and wind forcing at the model surface. For each scenario run, the water quality boundary condition and freshwater discharge are unchanged.

To accurately apply the open boundary condition to the model, the model boundary conditions, including hourly tide, salinity, and temperature at the mouth of the James, were provided by the SCHISM model. The SCHISM model encompasses the entire Chesapeake Bay out to an open boundary extended further outside of the Bay mouth. The hydrodynamic simulations were conducted by the same SCHISM model applied in the channel deepening project (Zhang et al., 2017). The SLR of 1.0 m was applied to the Chesapeake Bay. The SLR was incorporated into the model via a uniform change in the initial water depths as 1.0 m SLR is relatively low compared to the depth and the water level adjustment can reach equilibrium quickly. An alternative approach is to apply the SLR as a boundary condition outside of the Bay, and a dynamic equilibrium will be established after a sufficiently long spin-up period. Previous studies (e.g., Hong and Shen, 2012; Chen et al., 2016) and our own experience suggest that 6 months of spin-up is sufficient, and the results are very similar to those from the first approach, which requires a much shorter spin-up period (Liu et al., 2017). The SLR at the James River is very close to 1.0 m as it close to the Bay mouth.

To evaluate the impact of the change of hydrodynamic conditions due to SLR and its impact on water quality in the James River and Elizabeth River, transport timescales, including freshwater age, saltwater age, and renewal time, were computed and compared. Freshwater age is the timescale for freshwater transport. The saltwater age measures the movement of salinity intrusion, and the renewal time measures the overall flushing of the system. Detailed descriptions of these methods and simulations of these timescales are provided in Shen et al. (2017).

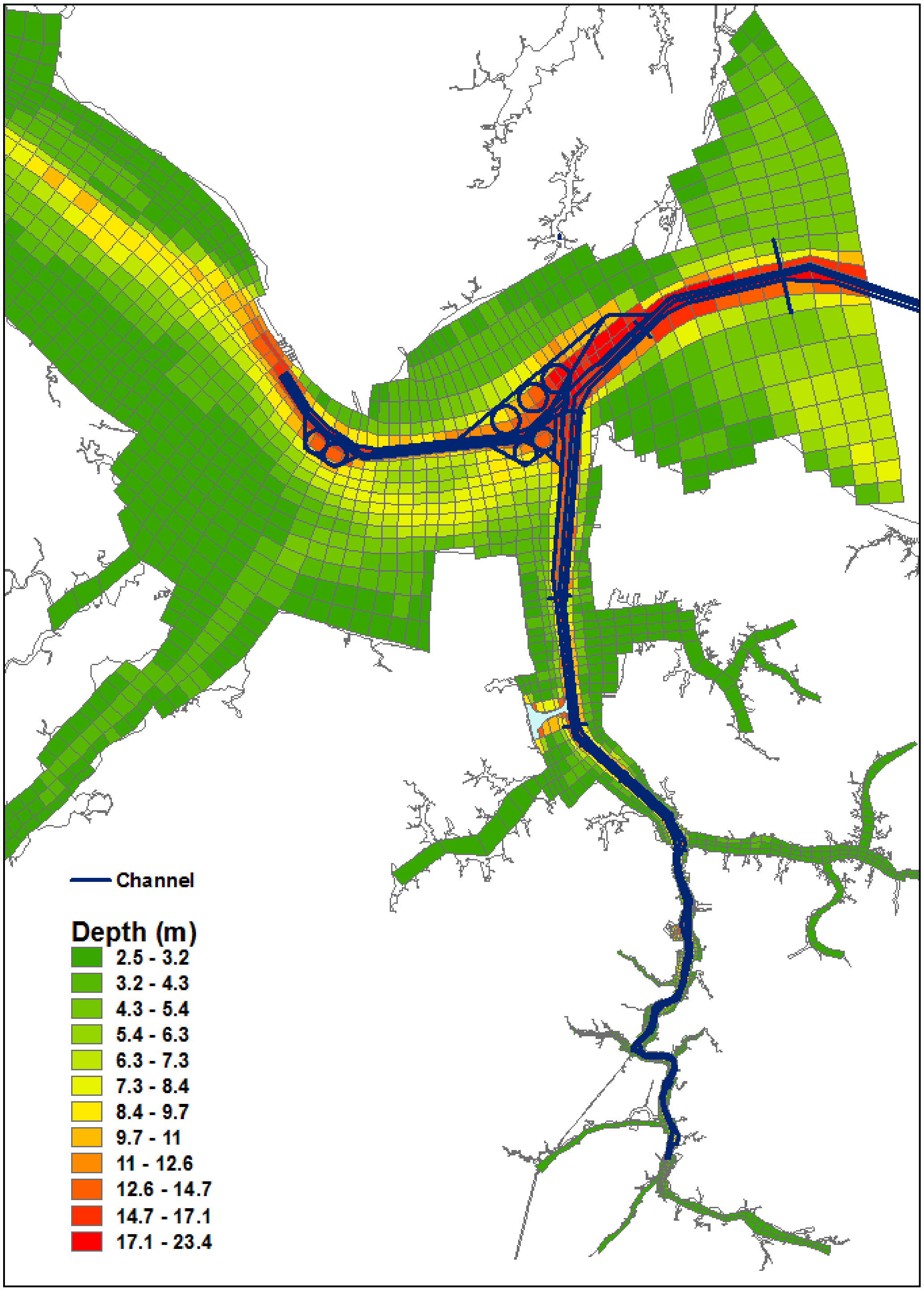

Figure 2-1: Model grid of existing condition near the mouth of James River and Elizabeth River

2.2 Existing Condition, Future Condition, and Scenarios

The Baseline 2 scenario (Table 2-1) is referred to as “future without project.” This baseline scenario is to include CIEE and NIT Piers as the future condition. According to the previous and current studies of the impact of the 3rd Crossing on the James and Elizabeth River, the impact of the 3rd Crossing is observed very locally and both minor changes of velocity and salinity occur only near the bridge pier within a couple of hundred meters. It will not affect vertical stratification of DO, nor the gravitational circulation (Shen et al., 2017, Appendix A). Therefore, the impact of the 3rd Crossing is not included in this study. A detailed description for each scenario is listed in Table 2-1. There are three design cases for channel deepening, which are referred to as the deepened NH channel, the deepened SB channel, and the deepened NH & SB channels. Each scenario case is evaluated against future condition Baseline 2.

Table 2-1: Description of the Scenarios

Scenario	Description	Norfolk Harbor Deepened	So Branch Deepened
Baseline 2 - Future Without Project Conditions	**Future without-project** **Includes consideration of:** • CBBT – TSC parallel tunnel • HRBT – parallel tunnel • 3rd Crossing/ Patriots Crossing • NIT Piers 1 and 2 removed, with dredged area to -50’ • CIEE full build out Note: VIMS will provide memo/input detailing how above is being taken into consideration.	**No**	**No**
3-2	***Future Conditions with deepened NH channel*** *With Project Scenario* that includes a deepening of the Norfolk Harbor and Channels <u>without</u> the So Branch of the Elizabeth River deepened, using future conditions noted in Run 2.	**Yes**	**No**
4-2	***Future Conditions with deepened SB Channel*** *With Project Scenario* that includes a deepening of the So Branch of the Elizabeth River <u>without</u> the Norfolk Harbor deepened, using future conditions noted in Run 2.	**No**	**Yes**
5-2	***Future Conditions with deepened NH & SB Channel*** *With Project Scenario* that includes a deepening of <u>both</u> the So Branch of the Elizabeth River <u>and</u> the Norfolk Harbor, using future conditions noted in Run 2.	**Yes**	**Yes**
Baseline 2- Baseline2-SLR	**Future without-project (SLR 3.3 feet)**	**No**	**No**
3-2-SLR	**Future Conditions with deepened NH channel (SLR 3.3 feet)**	**Yes**	**No**
4-2-SLR	**Future Conditions with deepened SB Channel (SLR 3.3 feet)**	**No**	**Yes**
5-2-SLR	**Future Conditions with deepened NH & SB Channel (SLR 3.3 feet)**	**Yes**	**Yes**

3. Model Results of DO

Model simulation results are presented for each scenario. We compare the difference between each scenario and the baseline conditions with respect to different scenarios of channel deepening. Statistics in spring (March-May) and summer (July-September) are presented as a comparison. Comparisons of the model result for each scenario and baseline condition are conducted at selected VADEQ monitoring stations. As all changes of bathymetry are located in the lower James and Elizabeth Rivers, the impact is expected to only occur in the lower James and Elizabeth Rivers. Therefore, we only compare the difference for the stations located in the lower James and the Elizabeth Rivers. The locations of observation stations are shown in Figure 3-1. Model results at stations encircled in Figure 3-1 will be included in the statistics and presented in figures. Time series plots at other stations are included in Appendix A.

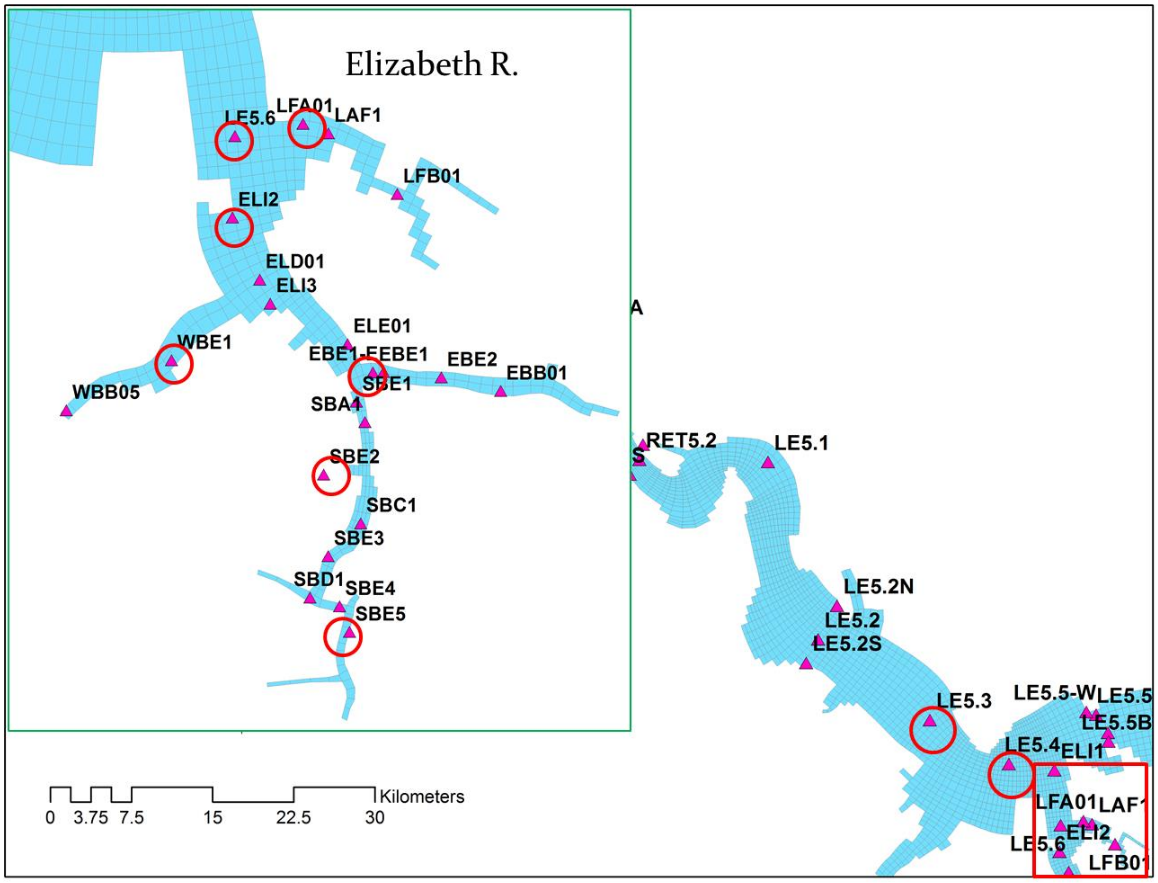

Figure 3-1: VADEQ Water quality monitoring stations (Circles are stations, for which results are shown in this report)

3.1 Baseline 2 and Baseline 2-SLR

The model simulations of the future condition and the scenario of sea-level rise (SLR) are conducted. The simulations are referred to as Baseline 2 (future condition) and Baseline 2-SLR (with SLR, Table 2-1). The future condition includes NIT Piers 1 and 2 removed, with an area dredged to -50’, and the CIEE fully built-out, and the 3rd Crossing. Because the 3rd Crossing has only very localized impact and does not affect any far-field circulation and stratification, it will not be implicitly simulated. The access channel is dredged to the same depth as the channel. The designing is to ensure the cross-section near the Elizabeth River mouth maintains the same area before and after CIEE modification. The reduced portion of the area near the shore is added to the channel. Baseline 2-SLR use same geometry as Baseline only replacing the boundary condition with SLR of 1.0 m.

Summaries of DO statistics for the mean and bottom layers for spring (March to May) and summer (July to September), respectively, are listed in Tables 3-1-1 and 3-1-2. The largest change of DO during spring is less than 0.47 mg/L and the largest percentage change is less than 6.5%. The largest change occurred at Stations SBE5 and WBE1. During the summer period, relatively larger changes of DO occurred at Station LF01, which is 0.43 mg/L. It can be seen that the maximum reductions of DO are about 0.55 and 0.43 mg/L at Station WBE1 during spring and LF01 during summer, respectively. The largest percent change occurs at Station SBE5 during summer, which is about 11.3% at the bottom and the DO decrease is about 0.34 mg/L. In general, DO decreases with SLR. The cause of the decrease of DO is mainly due to the increased water depth resulting in a decrease of vertical mixing.

Comparisons of the two baseline conditions are shown in Figures 3-1-2 to 3-1-4 for selected sections at LE5-4, ELI2, and SBE5. The plots for other stations are shown in Appendix A. There is very little change in the James River (LE5-4). Relatively larger changes of DO occurred at Stations ELI2 and SBE5. The averaged DO change is less than 4%. The change during spring is larger compared to summer for DO when spring runoff is higher. Note that a large change occurring during the spring period at Station SBE5 will not cause a problem as DO is high during the spring period. There are no obvious changes for algae, DIN, and DIP in the Lower James River. It appears that Chl-a concentration increases slightly in the Elizabeth River at Stations ELI2 and SBE5, while DIN and DIP both decrease during spring due to increased uptake by algae.

Table 3-1-1: Comparison of Baseline 2 and Baseline 2-SLR DO Results in Spring

	Baseline 2 (mg/L)		Baseline 2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	7.36	7.14	7.15	6.86	-0.22	-0.28	-2.92	-3.98
LE5-4	7.08	6.92	6.90	6.76	-0.18	-0.17	-2.5	-2.42
LE5-6	6.90	6.01	6.84	5.74	-0.06	-0.27	-0.82	-4.56
ELI2	8.18	7.60	8.33	7.46	0.15	-0.14	1.89	-1.83
SBE2	6.48	5.37	6.68	5.48	0.20	0.10	3.12	1.92
SBE5	6.35	5.38	6.07	5.06	-0.28	-0.32	-4.38	-5.99
LFA01	8.14	7.98	8.37	7.95	0.23	-0.02	2.87	-0.28
WBE1	7.70	7.3	7.15	6.83	-0.55	-0.47	-7.12	-6.43
EBE1	6.62	5.61	7.04	5.82	0.43	0.22	6.42	3.85

Table 3-1-2: Comparison of Baseline 2 and Baseline2-SLR DO Results in Summer

	Baseline 1 (mg/L)		Baseline 2 (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	5.83	5.55	5.63	5.24	-0.2	-0.32	-3.44	-5.68
LE5-4	5.32	5.08	5.12	4.89	-0.2	-0.19	-3.74	-3.7
LE5-6	4.81	3.8	4.67	3.48	-0.14	-0.32	-2.90	-8.33
ELI2	6.12	5.28	6.10	4.94	-0.02	-0.34	-0.28	-6.52
SBE2	4.29	3.02	4.53	3.11	0.23	0.09	5.45	3.03
SBE5	4.12	2.99	3.95	2.66	-0.17	-0.34	-4.10	-11.29
LFA01	6.37	6.07	6.26	5.64	-0.12	-0.43	-1.82	-7.03
WBE1	6.12	5.54	5.77	5.28	-0.34	-0.26	-5.62	-4.7
EBE1	4.39	3.22	4.78	3.34	0.39	0.12	8.98	3.7

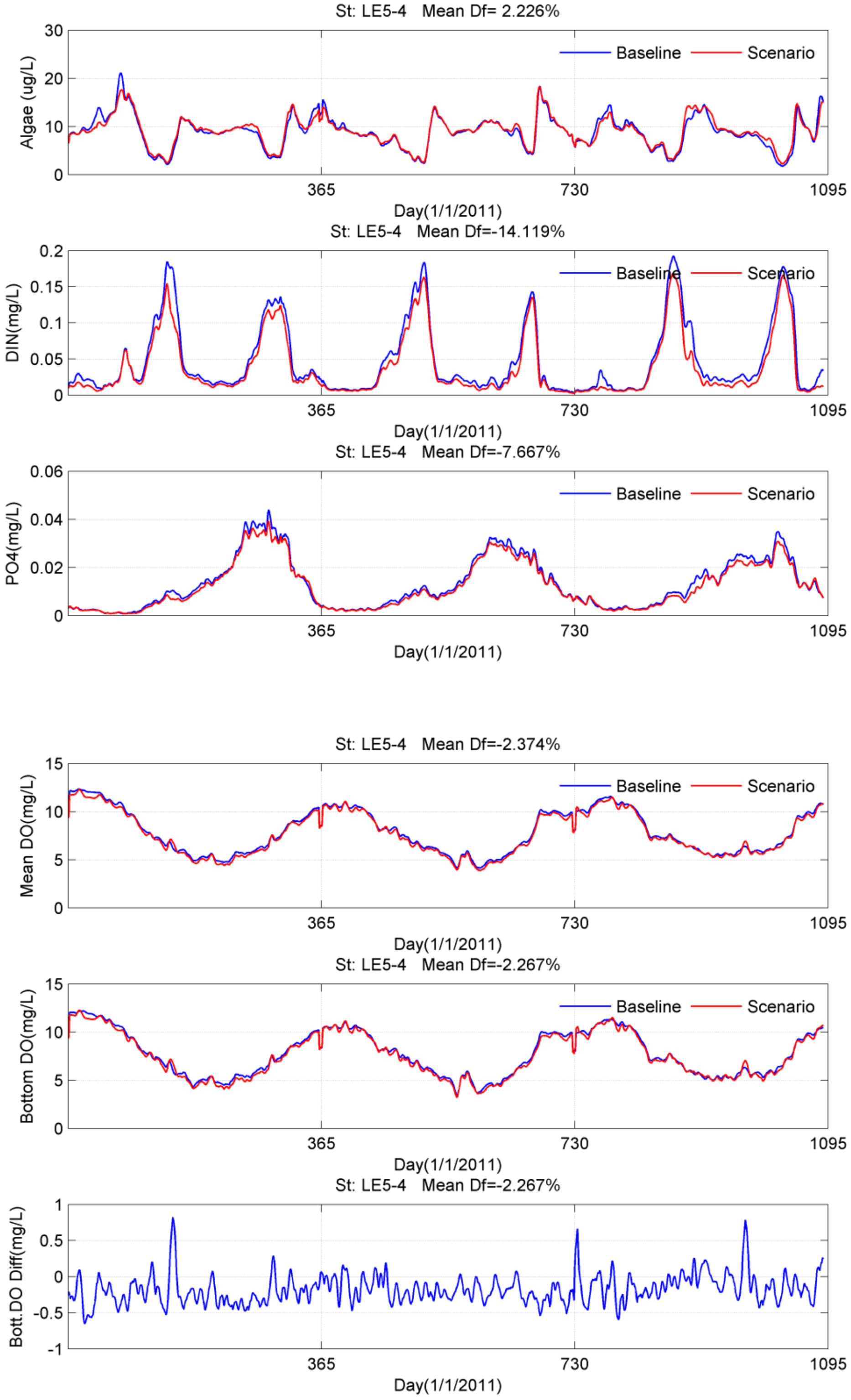

Figure 3-1-2: Comparison of Baseline 2 and Sea-Level Rise Results at Station LE5-4

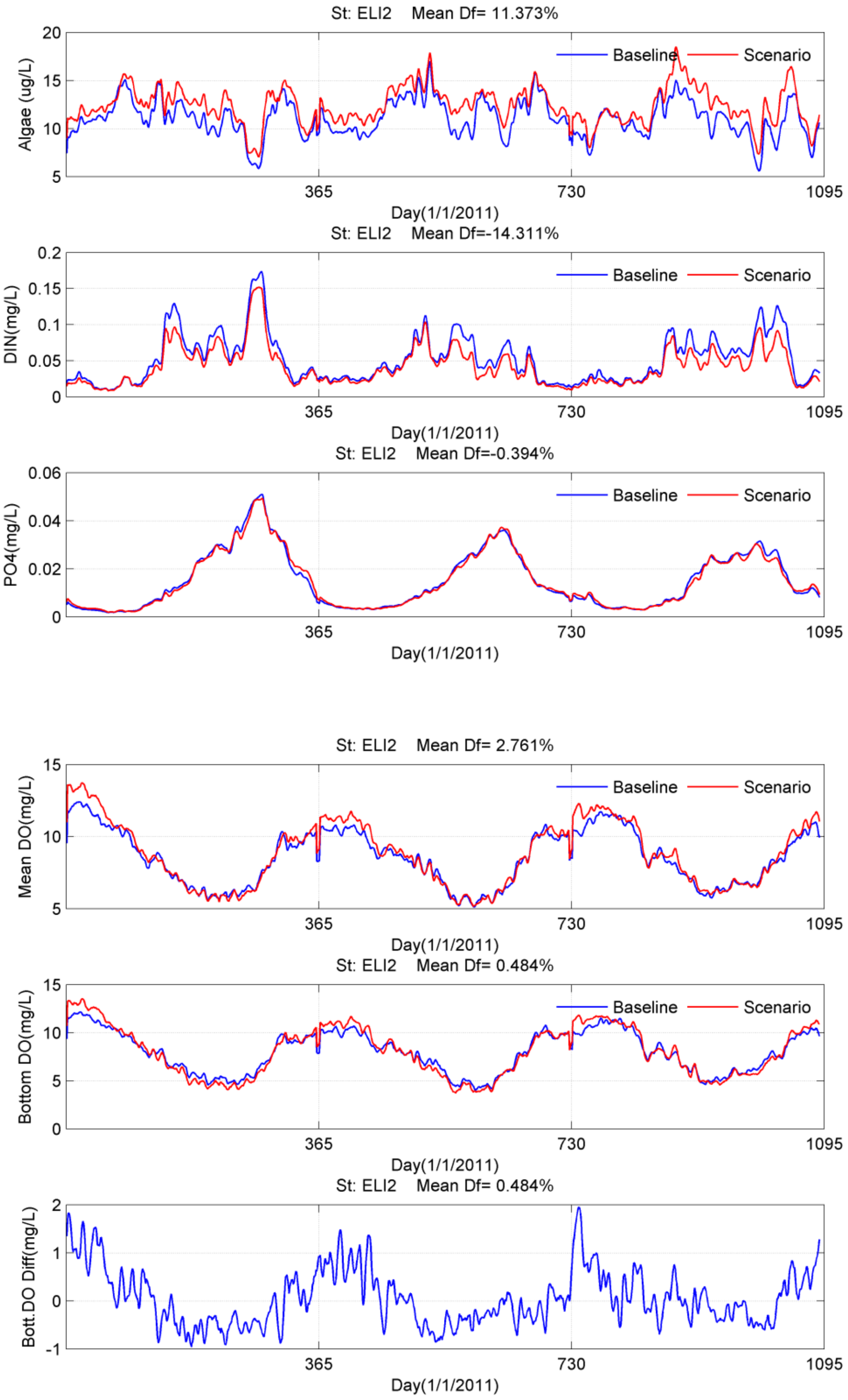

Figure 3-1-3: Comparison of Baseline 2 and Sea-Level Rise Results at Station ELI2

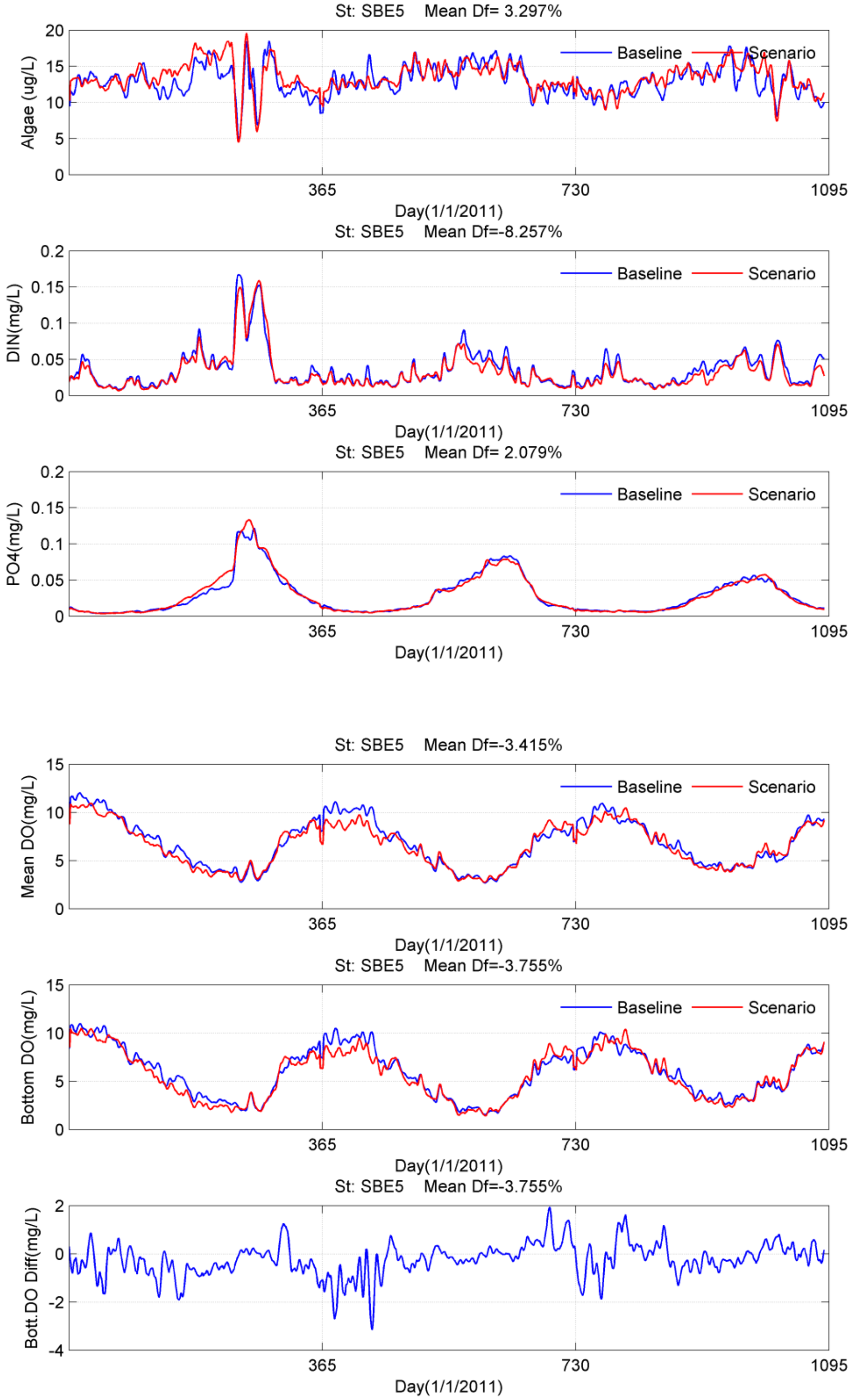

Figure 3-1-4: Comparison of Baseline 2 and Sea-Level Rise Results at Station SBE5

3.2 Model Scenarios 3-2 and 3-2-SLR

The scenarios are used to examine the change due to the SLR under Future Conditions with deepened NH channel (see Table 2-1).

Summaries of DO statistics for the mean and bottom layers for spring (March to May) and summer (July to September), respectively, are listed in Tables 3-2-1 and 3-2-2. There is a slight change in the James River (LE5-3). Relatively larger changes of DO occurred at Stations LE5-6, WBE1, and LFA01. It can be seen that the maximum reductions of DO are about 0.46 and 0.71 mg/L at Station LFA01during spring and summer, respectively. Changes are less than 11.3% at the bottom in summer.

Comparisons of the two scenario simulations are shown in Figures 3-2-1 to 3-2-3 for selected sections at LE5-4, ELI2, and SBE5. The plots for other stations are shown in Appendix A. There is a slight change in the James River (LE5-4). Relatively larger changes of DO occurred at Stations ELI2 and SBE5. The averaged change is less than 2% and the DO change is less than 1.0 mg/L during spring. The change during summer is less compared to that during spring when runoff is higher (Fig. 3-2-3). Note that a large change that occurred during the spring period at Station SBE5 will not cause a problem as DO is high during spring. The decrease of DO during summer is more important. Large changes of Chl-a and DIN occurred at Station ELI2, and mean differences were about 10% and 19%, respectively. However, the mean difference of DO at Station ELI2 is about 1.3%. Mean differences of Chl-a and DIN at Station SBE5 are about 7% and 8%, respectively.

Table 3-2-1: Comparison of Scenario 3-2 and Scenario 3-2-SLR DO results in spring

	Baseline 3-2 (mg/L)		Baseline 3-2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	7.35	7.16	7.14	6.86	-0.21	-0.3	-2.85	-4.22
LE5-4	7.05	6.91	6.91	6.77	-0.13	-0.14	-1.89	-2.03
LE5-6	6.9	5.99	6.81	5.72	-0.09	-0.27	-1.33	-4.5
ELI2	8.25	7.69	8.27	7.39	0.02	-0.3	0.26	-3.95
SBE2	6.4	5.38	6.75	5.51	0.35	0.13	5.5	2.43
SBE5	6.14	5.25	6.14	5.14	-0.01	-0.11	-0.08	-2.13
LFA01	8.42	8.28	8.22	7.82	-0.2	-0.46	-2.38	-5.55
WBE1	7.58	7.21	7.19	6.88	-0.39	-0.33	-5.11	-4.63
EBE1	6.59	5.64	7.09	5.84	0.5	0.2	7.65	3.49

Table 3-2-2: Comparison of Scenario 3-2 and Scenario 3-2-SLR DO results in summer

	Baseline 3-2 (mg/L)		Baseline 3-2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	5.8	5.53	5.61	5.22	-0.19	-0.31	-3.24	-5.67
LE5-4	5.26	5.01	5.09	4.84	-0.17	-0.17	-3.31	-3.38
LE5-6	4.76	3.64	4.62	3.41	-0.14	-0.23	-2.94	-6.3
ELI2	6.17	5.32	6.06	4.89	-0.11	-0.43	-1.79	-8.1
SBE2	4.26	3.04	4.6	3.16	0.34	0.12	7.98	3.78
SBE5	3.98	2.93	4	2.71	0.02	-0.22	0.45	-7.37
LFA01	6.58	6.28	6.17	5.57	-0.41	-0.71	-6.22	-11.28
WBE1	5.99	5.45	5.81	5.32	-0.18	-0.13	-3.02	-2.39
EBE1	4.38	3.24	4.84	3.37	0.45	0.13	10.33	3.98

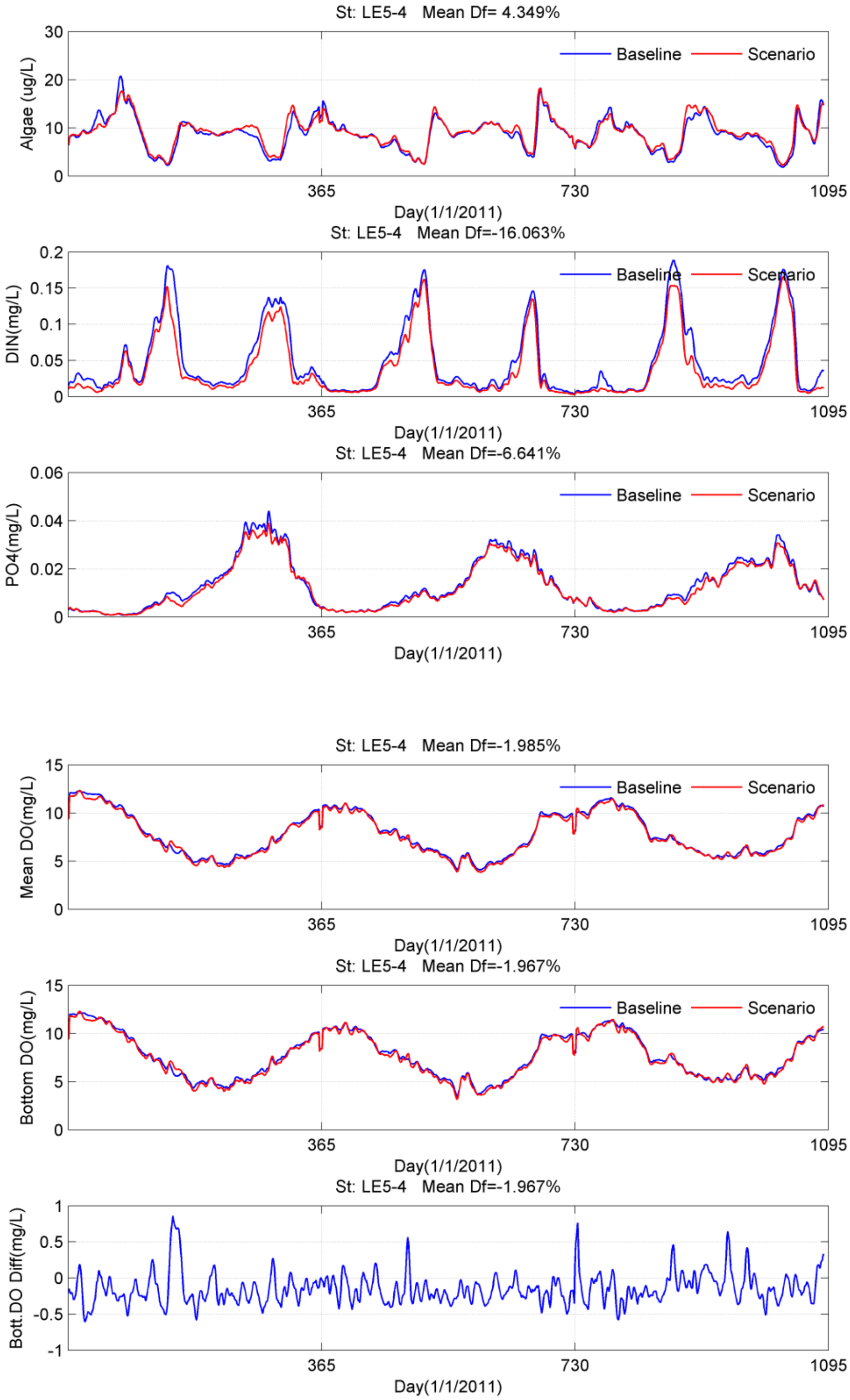

Figure 3-2-1: Comparison of Scenario 3-2 and Scenario 3-2-SLR Results at Station LE5-4 (baseline is Scenario 3-2 and Scenario is 3-2-SLR)

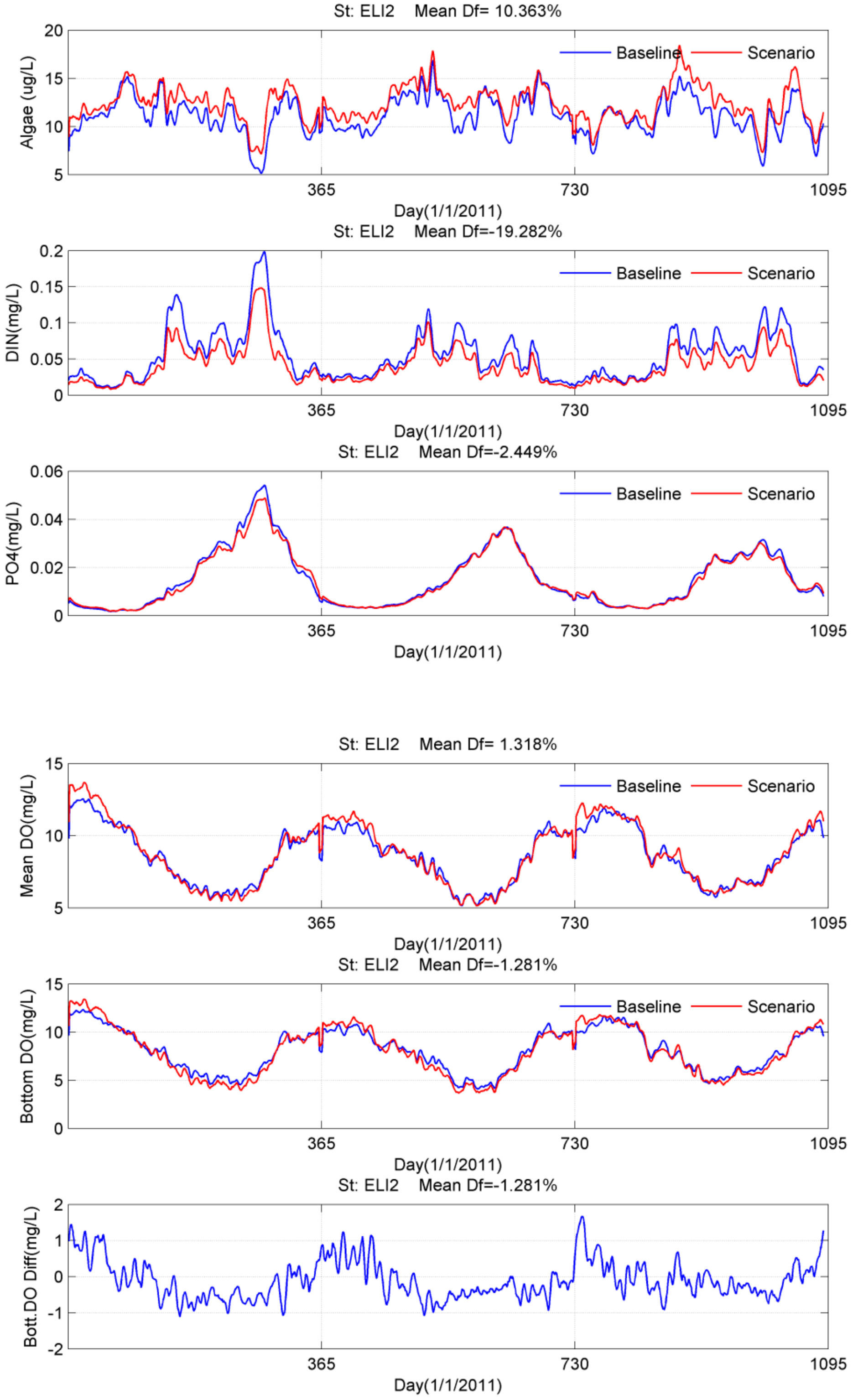

Figure 3-2-2: Comparison of Scenario 3-2 and Scenario 3-2-SLR Results at Station ELI2

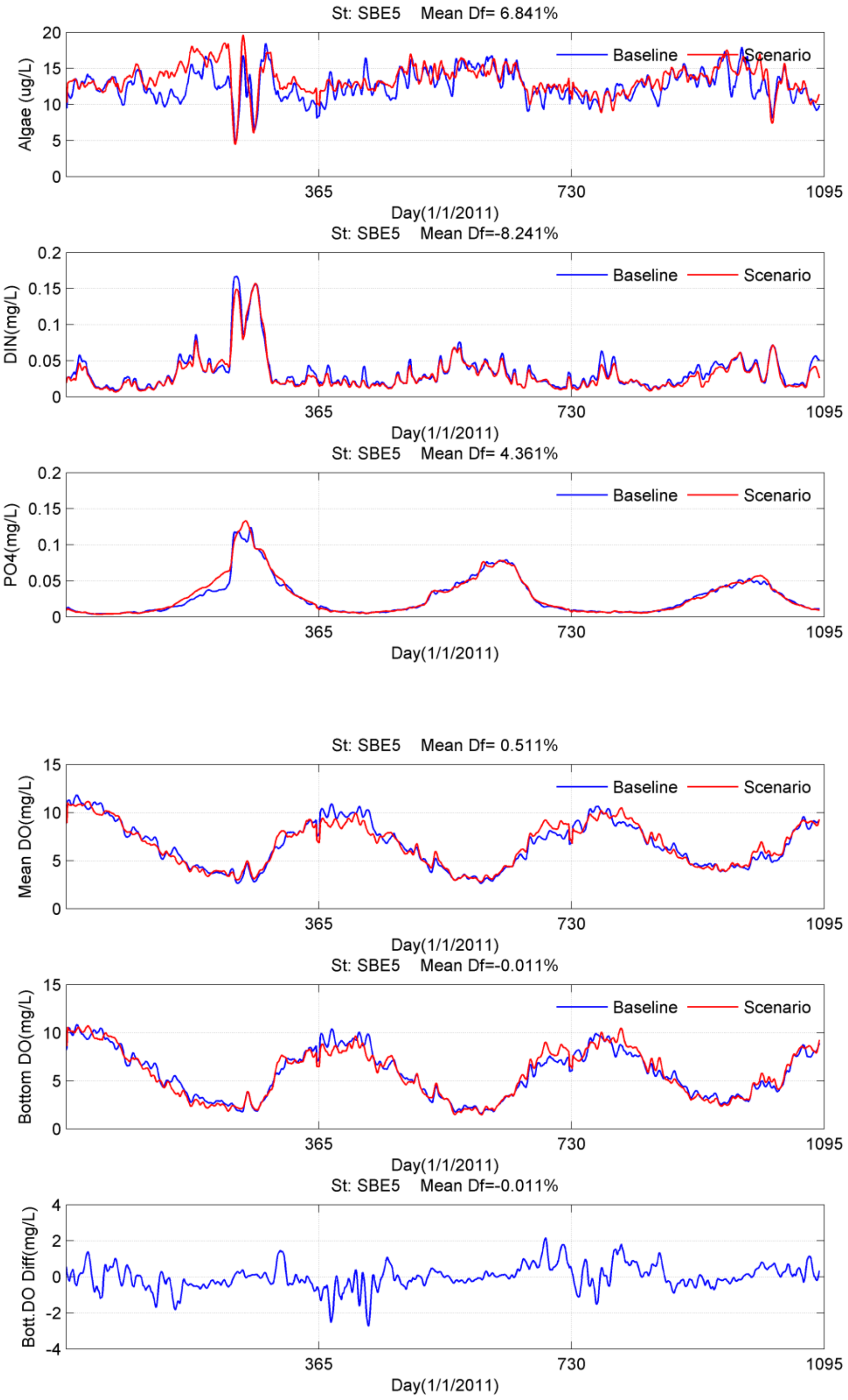

Figure 3-2-3: Comparison of Scenario 3-2 and Scenario 3-2-SLR Results at Station SBE5

3.3 Model Scenarios 4-2 and 4-2-SLR

These scenarios are simulated to examine the change due to the deepening of the ERSB channel and to compare to the scenario of SLR by 1.0 meter (Table 2-1).

Summaries of DO statistics for the mean and bottom layers for spring (March to May) and summer (July to September), respectively, are listed in Tables 3-3-1 and 3-3-2. There is a slight change in the James River (LE5-4). Relatively larger changes of DO occurred at Stations LE5-6, LFA01, and WBE1. The maximum reductions of DO are about 0.56 and 0.58 mg/L at Stations WBE1 and LFA01 during spring and summer, respectively. Changes are less than 10% at the bottom. The DO has less than a 9% decrease at Station LFA01, which is located inside the Lafayette River.

Comparisons of the two simulations are shown in Figures 3-3-1 to 3-3-3 for selected sections at LE5-4, ELI2, and SBE5. The plots for other stations are shown in Appendix A. There is little change in the James River (LE5-4). Relatively larger changes of DO occurred at Stations ELI2 and SBE-5. The averaged change of DO is less than 3%. The change during summer is even smaller compared to spring when runoff is higher. Note that a large change occurred during the spring period at Station SBE5. However, DO is high during the spring period. The average change of Chl-a ranges from 4% to 12%. A large change occurs at Station ELI2. Chl-a concentration increases. About a 17% decrease of DIN was observed at ELI2 as more uptake occurred at this station.

Table 3-3-1: Comparison of Scenario 4-2 and Scenario 4-2-SLR DO Results in Spring

	Baseline 4-2 (mg/L)		Baseline 4-2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	7.38	7.19	7.15	6.86	-0.23	-0.33	-3.16	-4.57
LE5-4	7.09	6.95	6.89	6.74	-0.2	-0.21	-2.83	-3.08
LE5-6	6.91	6.07	6.84	5.74	-0.07	-0.33	-1.05	-5.46
ELI2	8.17	7.63	8.33	7.48	0.16	-0.16	1.99	-2.03
SBE2	6.25	5.16	6.61	5.26	0.36	0.1	5.72	2
SBE5	5.91	4.83	6.12	4.88	0.21	0.05	3.56	1.05
LFA01	8.29	8.14	8.28	7.87	-0.01	-0.27	-0.09	-3.3
WBE1	7.73	7.36	7.1	6.8	-0.63	-0.56	-8.18	-7.64
EBE1	6.5	5.53	6.99	5.68	0.5	0.15	7.65	2.74

Table 3-3-2: Comparison of Scenario 4-2 and Scenario 4-2-SLR DO Results in Summer

	Baseline 4-2 (mg/L)		Baseline 4-2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	5.83	5.57	5.63	5.24	-0.2	-0.32	-3.39	-5.83
LE5-4	5.32	5.09	5.12	4.89	-0.2	-0.2	-3.8	-3.99
LE5-6	4.85	3.82	4.69	3.51	-0.16	-0.32	-3.24	-8.25
ELI2	6.14	5.34	6.11	4.96	-0.03	-0.37	-0.45	-6.97
SBE2	4.06	2.81	4.37	2.87	0.31	0.06	7.64	2.28
SBE5	3.71	2.46	3.87	2.33	0.16	-0.13	4.38	-5.25
LFA01	6.48	6.19	6.21	5.61	-0.27	-0.58	-4.21	-9.44
WBE1	6.12	5.55	5.73	5.27	-0.39	-0.29	-6.34	-5.17
EBE1	4.3	3.15	4.69	3.19	0.39	0.04	9.11	1.24

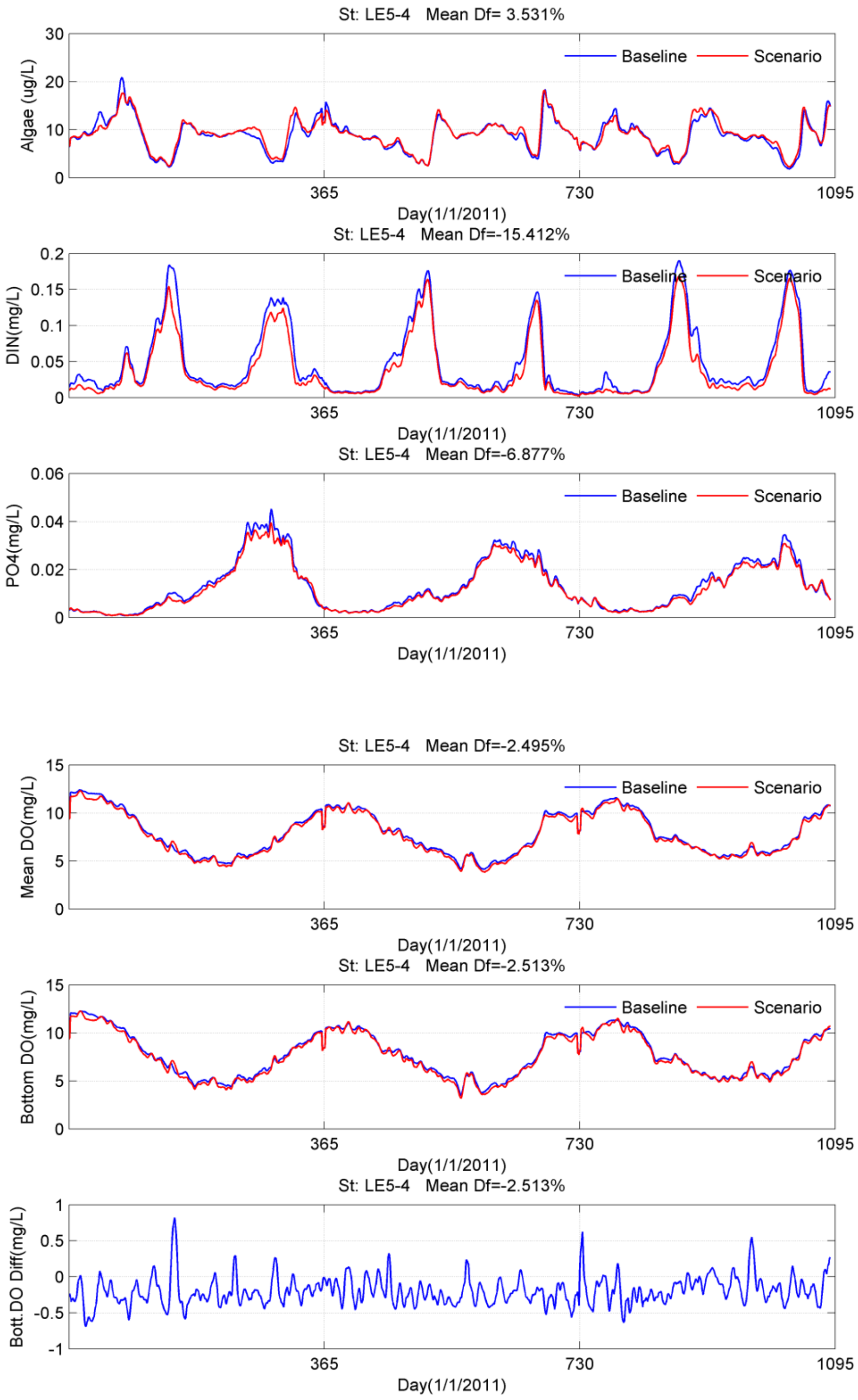

Figure 3-3-1: Comparison of Scenario 4-2 and Scenario 4-2-SLR Results at Station LE5-4 (baseline is Scenario 4-2 and Scenario is Scenario 4-2-SLR)

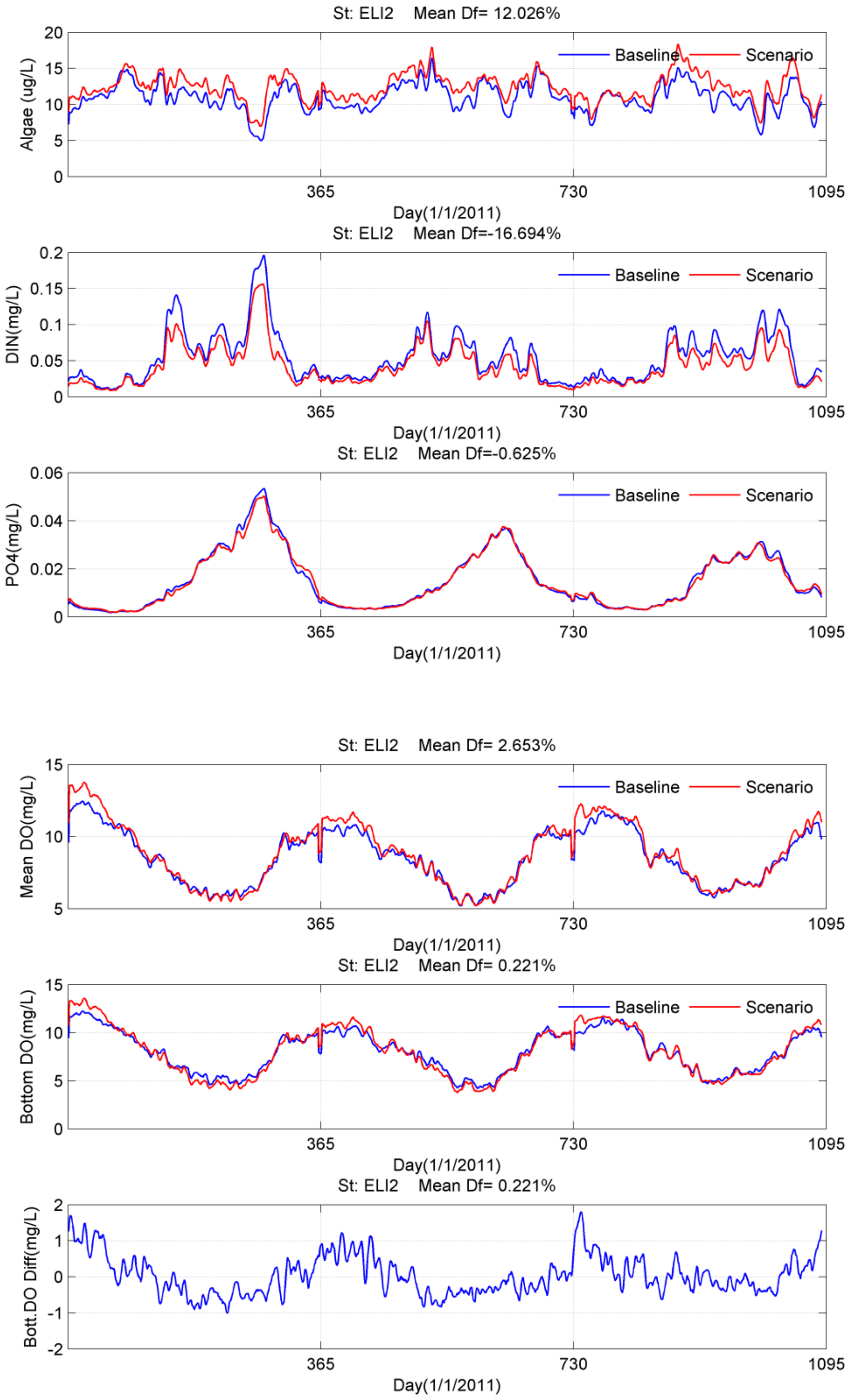

Figure 3-3-2: Comparison of Scenario 4-2 and Scenario 4-2-SLR Results at Station ELI2

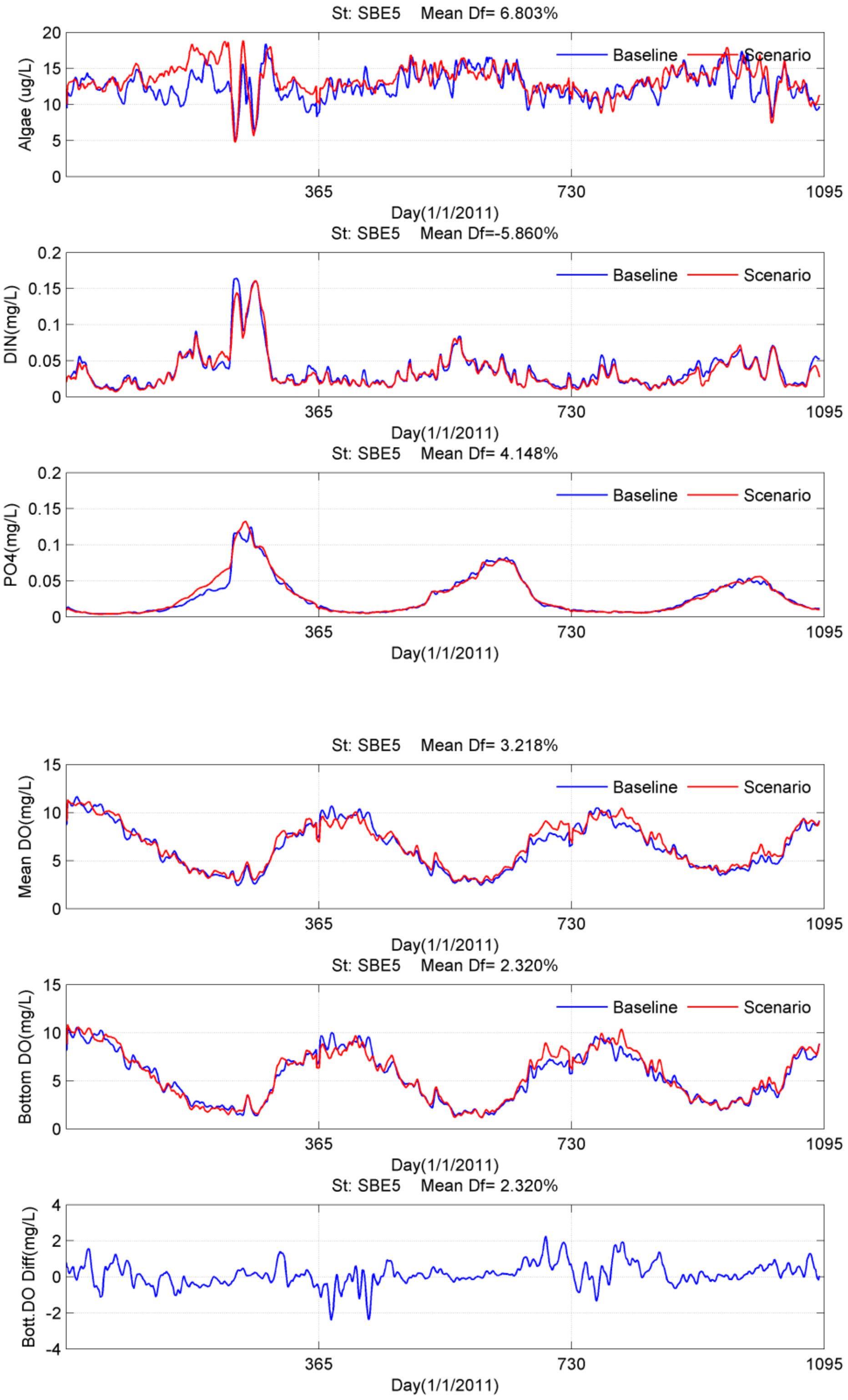

Figure 3-3-3: Comparison of Scenario 4-2 and Scenario 4-2-SLR Results at Station SBE5

3.4 Model Scenarios 5-2 and 5-2-SLR

These scenarios are simulated to examine the change due to channel deepening of James River and Elizabeth River with NHC channels and to compare to the scenario of sea-level rise by 1.0 meter (Table 2-1).

Summaries of DO statistics for the mean and bottom layers for spring (March to May) and summer (July to September), respectively, are listed in Tables 3-4-1 and 3-4-2. There is a slight change in the James River (LE5-4). Relatively larger changes of DO occurred at Stations LE5-6 and WBE1, while there was a slight increase at Station SBE5. It can be seen that the maximum reductions of DO were about 0.59 and 0.78 mg/L at Station LFA01 during spring and summer, respectively. Changes were less than 12.4% at the bottom during the summer at the Station LFA01, which is located inside the Lafayette River.

Comparisons of the two simulations are shown in Figures 3-4-1 to 3-4-3 for selected sections at LE5-4, ELI-2, and SBE-5. The plots for other stations are shown in Appendix A. There is a slight change in the James River (LE5-4). Relatively larger changes of DO occurred at Stations ELI2 and SBE5. The averaged change is less than 6% and the DO change is less than 0.5 mg/L during summer. The change during summer is even smaller compared to that during spring when runoff is higher. However, DO is high during the spring period. The chl-a concentration increases at Station ELI2 by about 10%. The DIN decrease at the same station is about 16%, but the DIP only decreases by about 2%.

Table 3-4-1: Comparison of Scenario 5-2 and Scenario 5-2-SLR DO Results in Spring

	Baseline 5-2 (mg/L)		Baseline 5-2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	7.35	7.16	7.14	6.85	-0.21	-0.31	-2.85	-4.3
LE5-4	7.05	6.91	6.9	6.74	-0.15	-0.17	-2.16	-2.43
LE5-6	6.91	6.01	6.81	5.71	-0.1	-0.3	-1.39	-5.02
ELI2	8.24	7.69	8.28	7.41	0.05	-0.28	0.55	-3.58
SBE2	6.19	5.12	6.67	5.28	0.48	0.17	7.69	3.3
SBE5	5.75	4.7	6.17	4.94	0.42	0.24	7.29	5.09
LFA01	8.49	8.35	8.16	7.76	-0.34	-0.59	-3.97	-7.09
WBE1	7.6	7.24	7.13	6.83	-0.47	-0.41	-6.16	-5.67
EBE1	6.4	5.44	6.96	5.61	0.55	0.17	8.61	3.2

Table 3-4-2: Comparison of Scenario 5-2 and Scenario 5-2-SLR DO Results in Summer

	Baseline 5-2 (mg/L)		Baseline 5-2-SLR (mg/L)		Difference (mg/L)		% difference	
Station	Mean	Bottom	Mean	Bottom	Mean	Bottom	Mean	Bottom
LE5-3	5.8	5.53	5.61	5.22	-0.19	-0.31	-3.22	-5.62
LE5-4	5.26	5.01	5.07	4.82	-0.19	-0.2	-3.69	-3.91
LE5-6	4.77	3.67	4.62	3.41	-0.15	-0.26	-3.12	-7.19
ELI2	6.16	5.33	6.07	4.92	-0.09	-0.41	-1.4	-7.78
SBE2	4.01	2.76	4.43	2.9	0.42	0.14	10.54	4.92
SBE5	3.61	2.39	3.92	2.38	0.31	-0.01	8.52	-0.49
LFA01	6.63	6.33	6.13	5.55	-0.5	-0.78	-7.5	-12.39
WBE1	6.03	5.5	5.77	5.32	-0.27	-0.18	-4.41	-3.23
EBE1	4.18	3.03	4.65	3.14	0.47	0.1	11.13	3.33

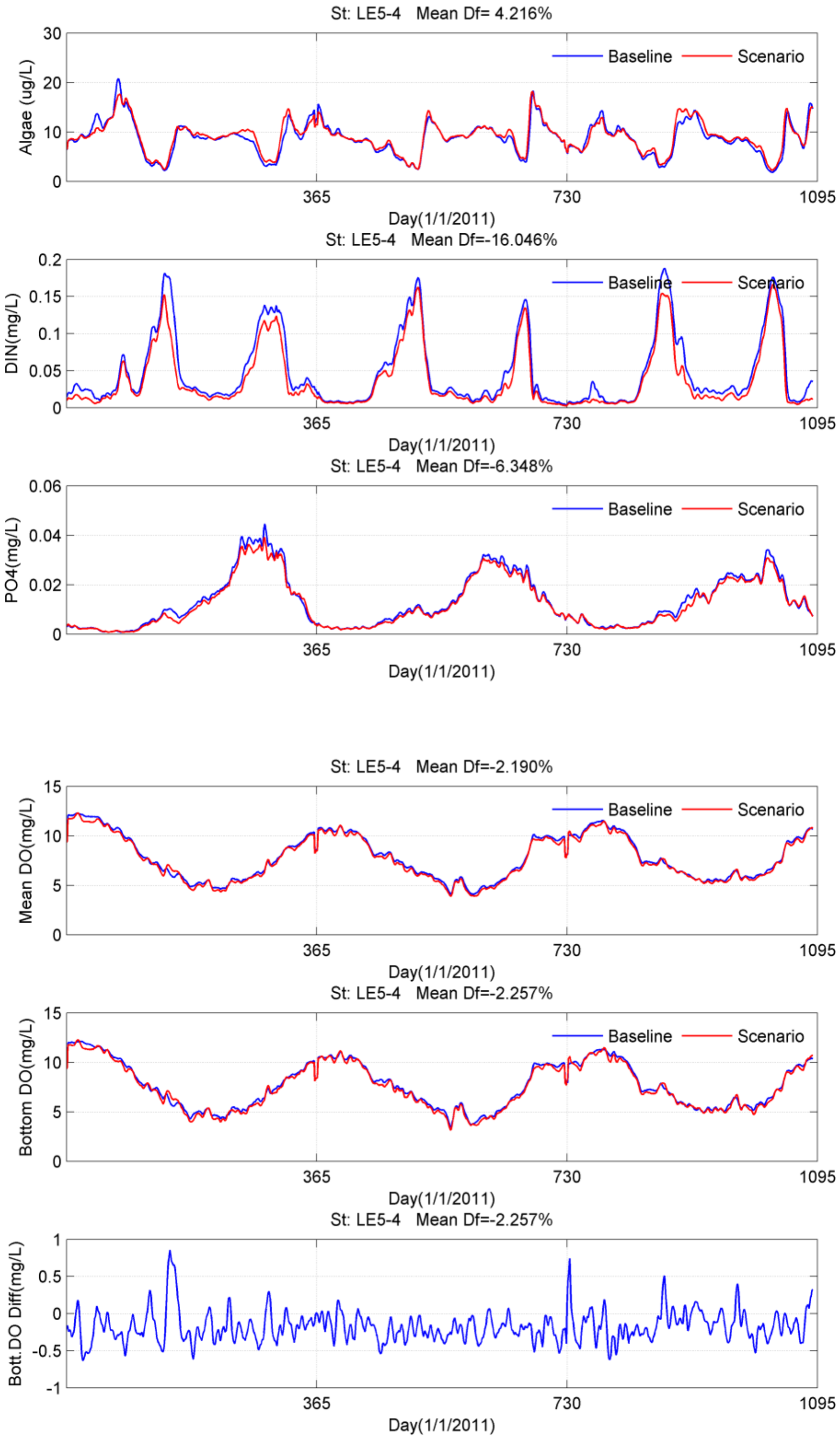

Figure 3-4-1: Comparison of Scenario 5-2 and Scenario 5-2-SLR Results at Station LE5-4 (Baseline is Scenario 5-2 and Scenario is Scenario 5-2-SLR)

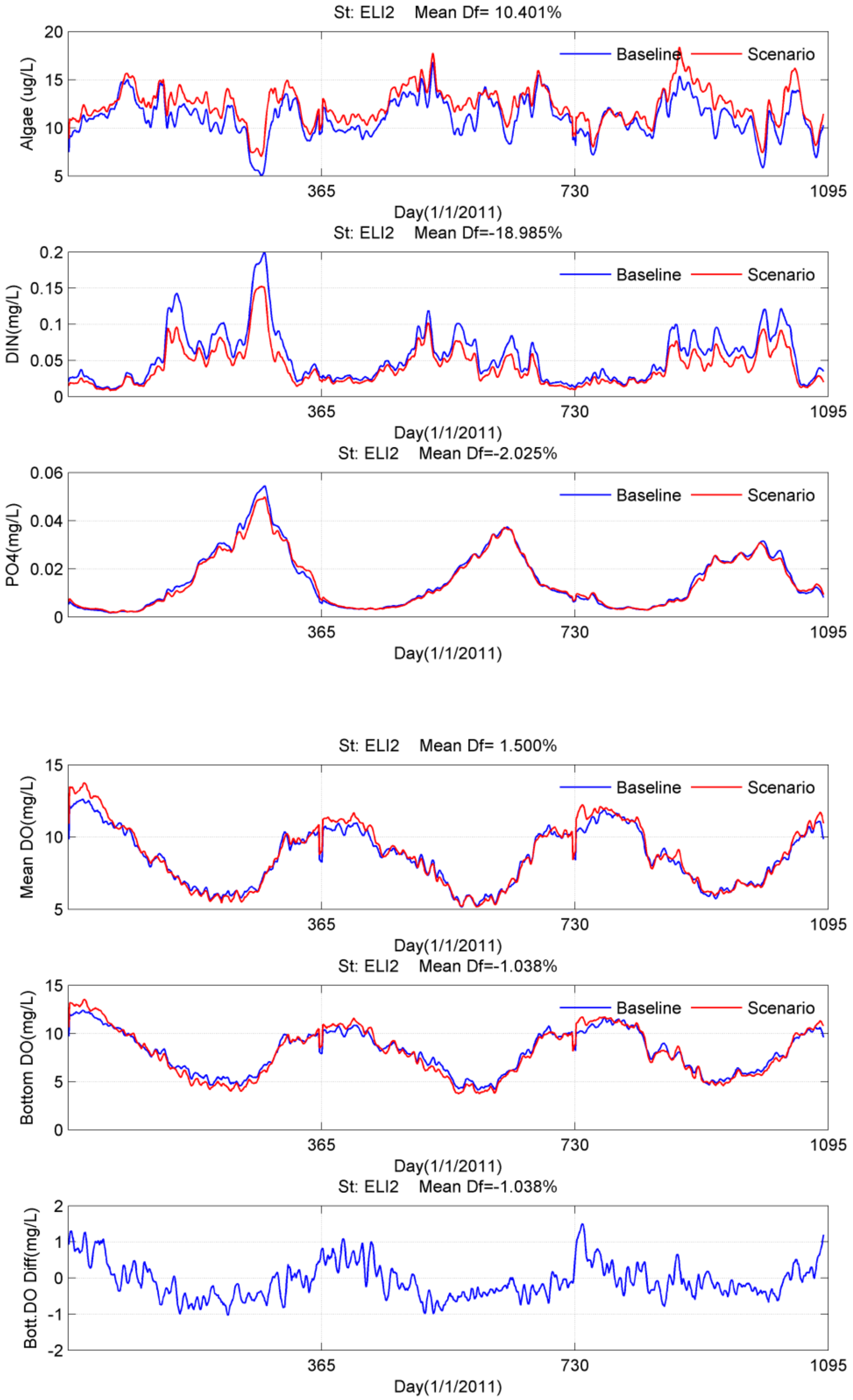

Figure 3-4-2: Comparison of Scenario 5-2 and Scenario 5-2-SLR Results at Station ELI2

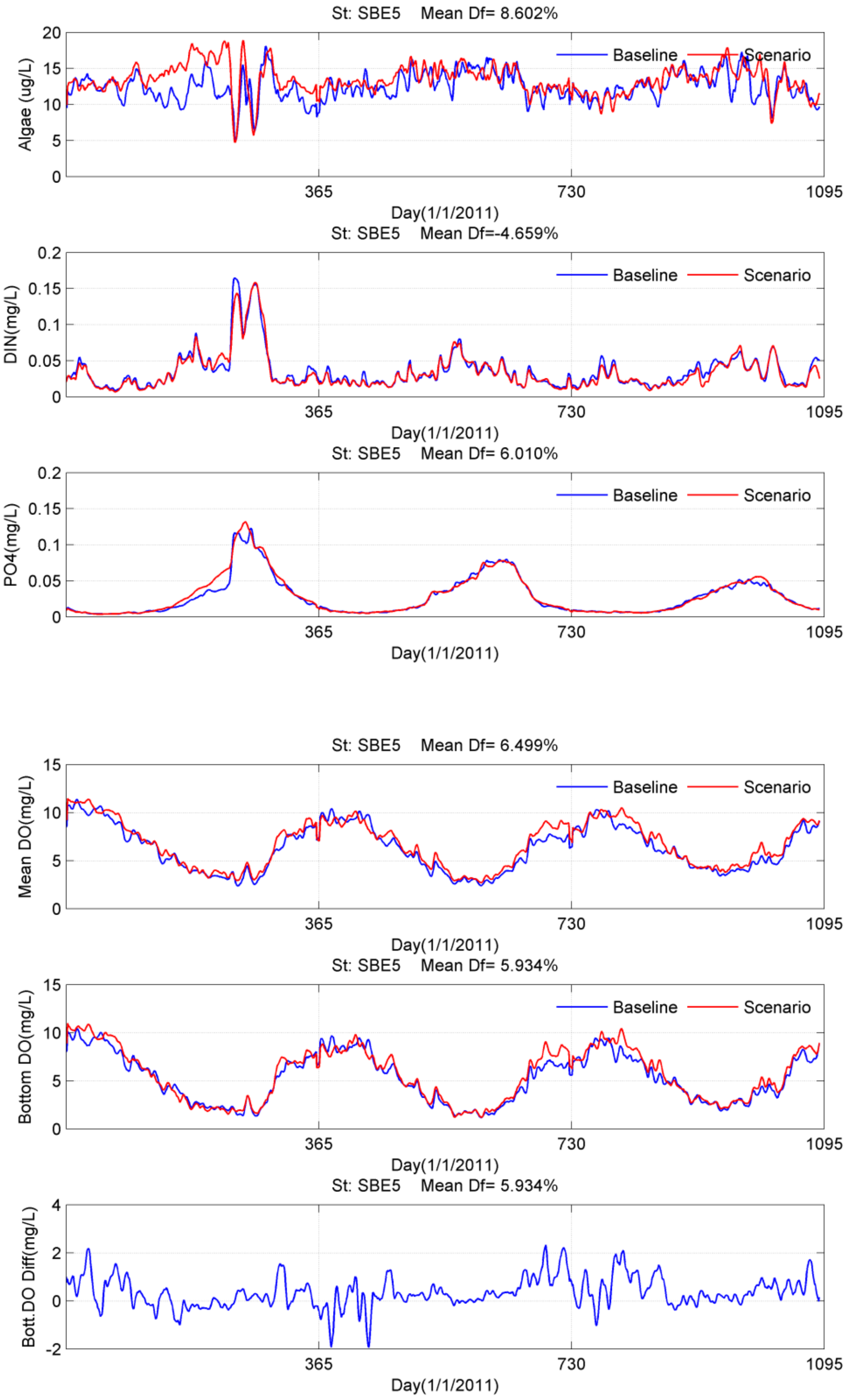

Figure 3-4-3: Comparison of Scenario 5-2 and Scenario 5-2-SLR Results at Station SBE5

4. Transport Time

4.1. Baseline 2 and Baseline 2-SLR

Three timescales, namely freshwater age, saltwater age, and renewal time, are examined and their differences are compared. We compared the difference of daily vertical mean age for each timescale at each location for a period of three years. The spatial distributions between Baseline 2 (future condition) and Baseline 2-SLR are compared. Spatial plots of the mean for the difference of each timescale are shown in Figures 4-1-1 for freshwater age, in Figure 4-1-2 for saltwater age, and in Figure 4-1-3 for renewal time.

The freshwater age indicates the change of freshwater movement. A decrease of freshwater age indicates that pollutants discharged into the estuary can be more quickly transported out of the estuary. It can be seen that the age increases to about 5 days in the lower James and 0.2-2 days in the lower Elizabeth River. Less increase occurs in the upstream of the Elizabeth River. As sea-level increases, the volume of the waterbody increases and affects the water age.

The saltwater age indicates the change of saltwater movement. When the saltwater age decreases, it shows the clean water from outside of estuary can be quickly transported to the estuary. It also indicates that it has less time for oxygen near the bottom layer to be consumed. It can be seen that the age decreased in the channel of the mesohaline region of the James River and decreases in the Elizabeth River, where a decrease of 2 days can be observed. However, a large increase (~2 days) occurs in the upper Lafayette River.

The renewal time measures the overall flushing of the estuary. Renewal time is a scale to measure the overall pollutant transport time. A short renewal time suggests pollutants discharged into the estuary will be more quickly transported out of the estuary. The renewal time increases in the lower James River and Elizabeth River. Overall, change is less than 2.0 days. As sea level increases, the volume of the waterbody increases, resulting in an increase of renewal time.

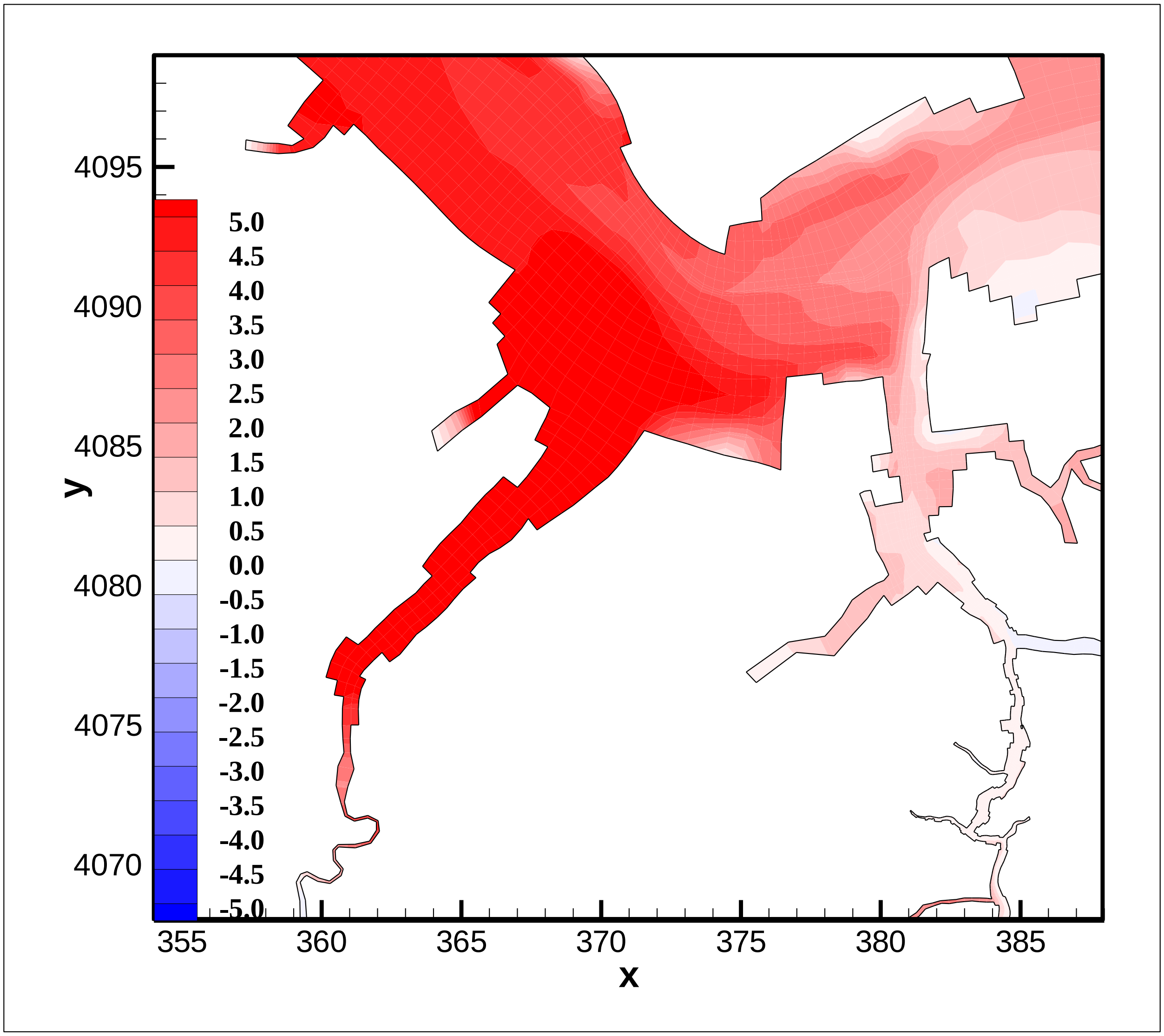

Figure 4-1-1: Distribution of mean difference of daily vertically averaged freshwater age (days) (Baseline2-SLR minus Baseline 2, mean difference)

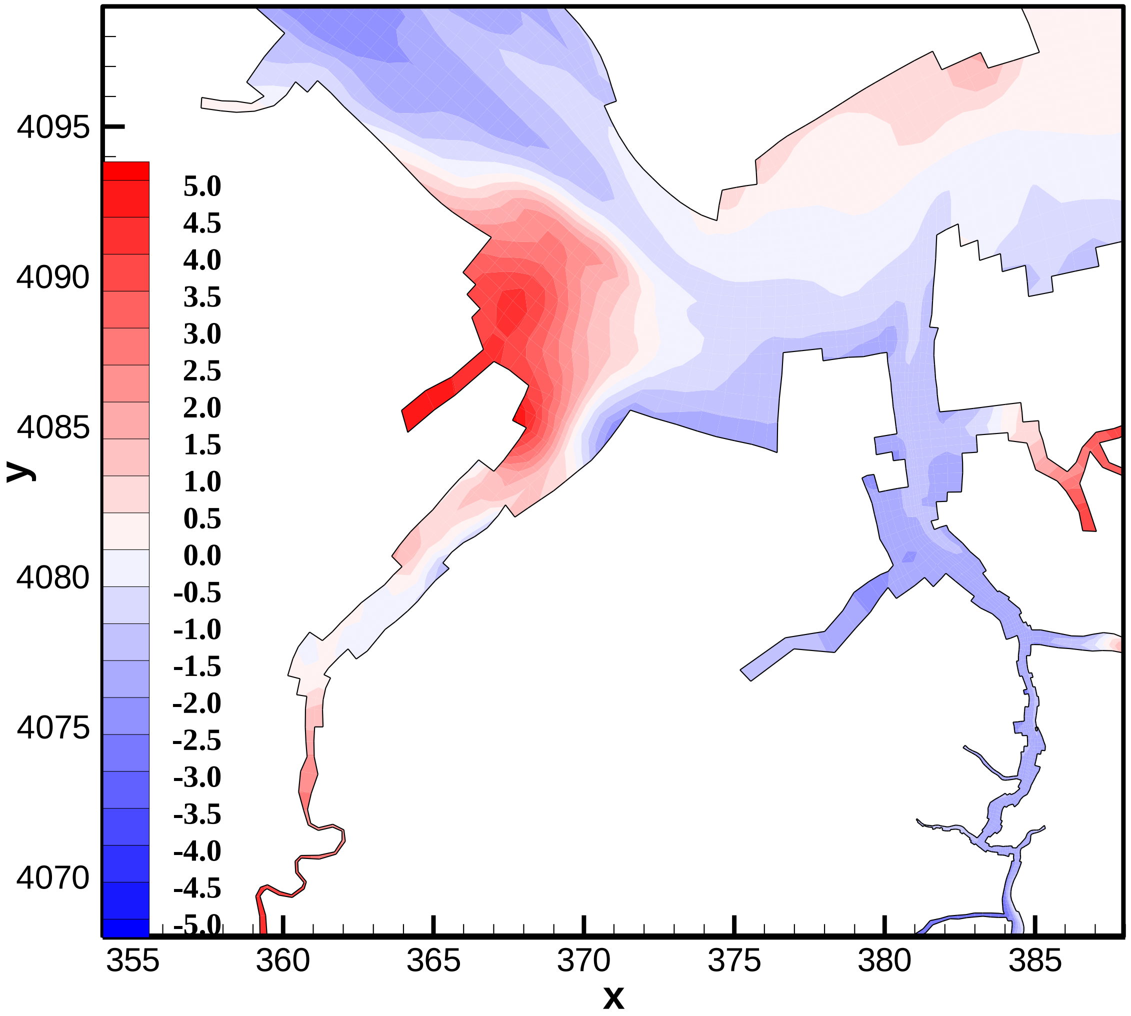

Figure 4-1-2: Distribution of difference of saltwater age (days) (Baseline2-SLR minus Baseline 2, mean difference)

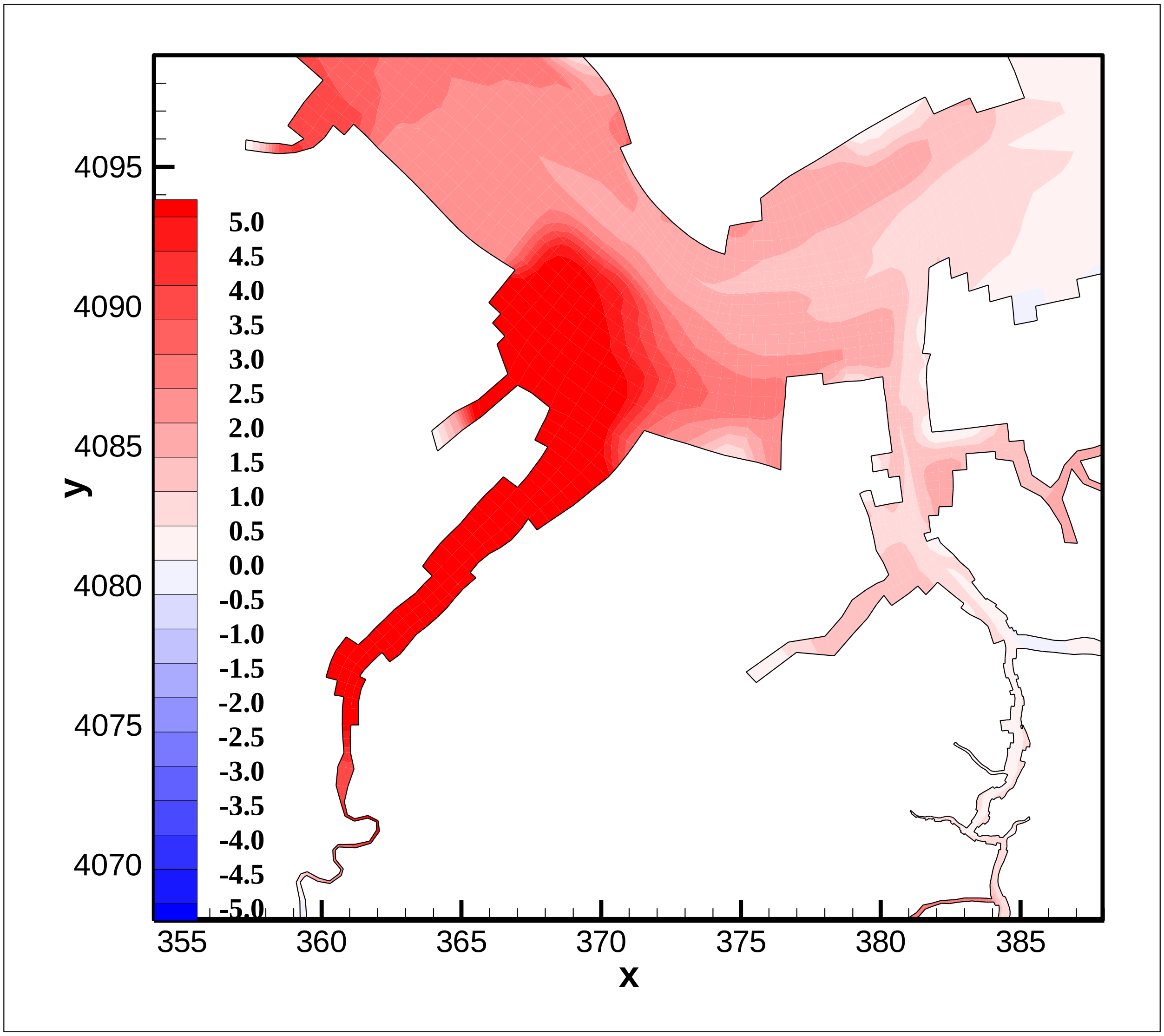

Figure 4-1-3: Distribution of difference of renewal time (days) (Baseline2-SLR minus Baseline 2, mean difference)

4.2. Model Scenarios 3-2 and 3-2-SLR

Three timescales, namely freshwater age, saltwater age, and renewal time, are examined and their differences are compared. We compared the difference of daily vertical mean age for each timescale at each location for a period of three years. The spatial distribution between the sea level rises under the Future Conditions with deepened NH channel are compared. Spatial plots for mean for the difference of each timescale are shown in Figures 4-2-1 for freshwater age, in Figure 4-2-2 for saltwater age, and in Figure 4-2-3 for renewal time.

The freshwater age indicates the change of freshwater movement. A decrease of freshwater age indicates that pollutants discharged into the estuary can be more quickly transported out of the estuary. It can be seen that the age increases in the lower James and Elizabeth River, but slightly decreases in the upper part of the Elizabeth River.

The saltwater age indicates the change of saltwater movement. When saltwater age decreases, it shows the clean water from outside of the estuary can be quickly transported to the estuary. It also indicates that it has less time for the oxygen near the bottom layer to be consumed. It can be seen that the age decreases in the mesohaline region of the James River and decreases in the Elizabeth River. An increase occurs in the upstream of the Lafayette River.

The renewal time measures the overall flushing of the estuary. Renewal time is a scale to measure the overall pollutant transport time. A short renewal time suggests pollutants discharged into the estuary will be more quickly transported out of the estuary. The renewal time increases slightly in the lower James River and Elizabeth River. Overall, the change is about 2.0 days.

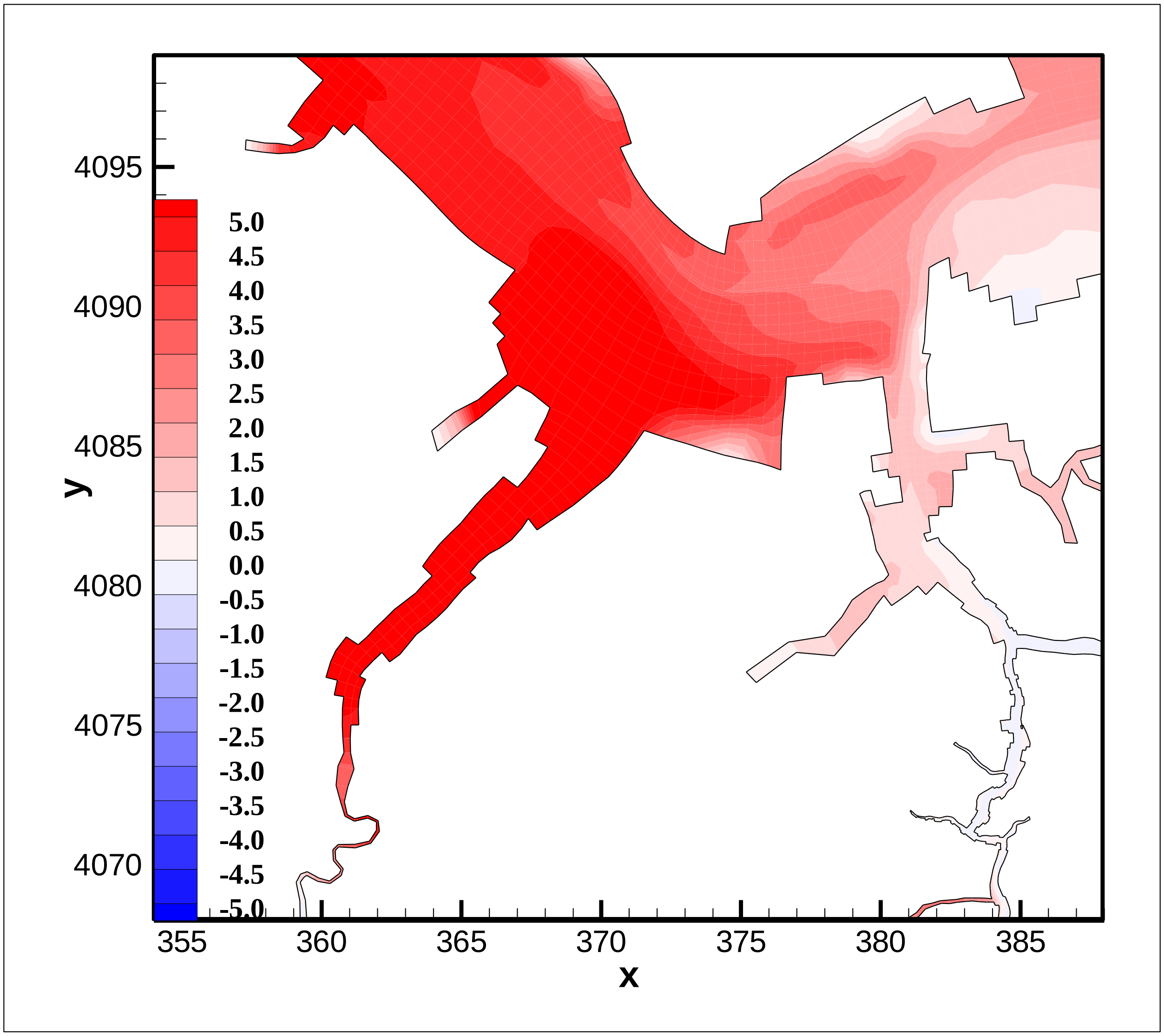

Figure 4-2-1: Distribution of mean difference of daily vertically averaged freshwater age (days) (Scenario 3-2-SLR minus Scenario 3-2, mean difference)

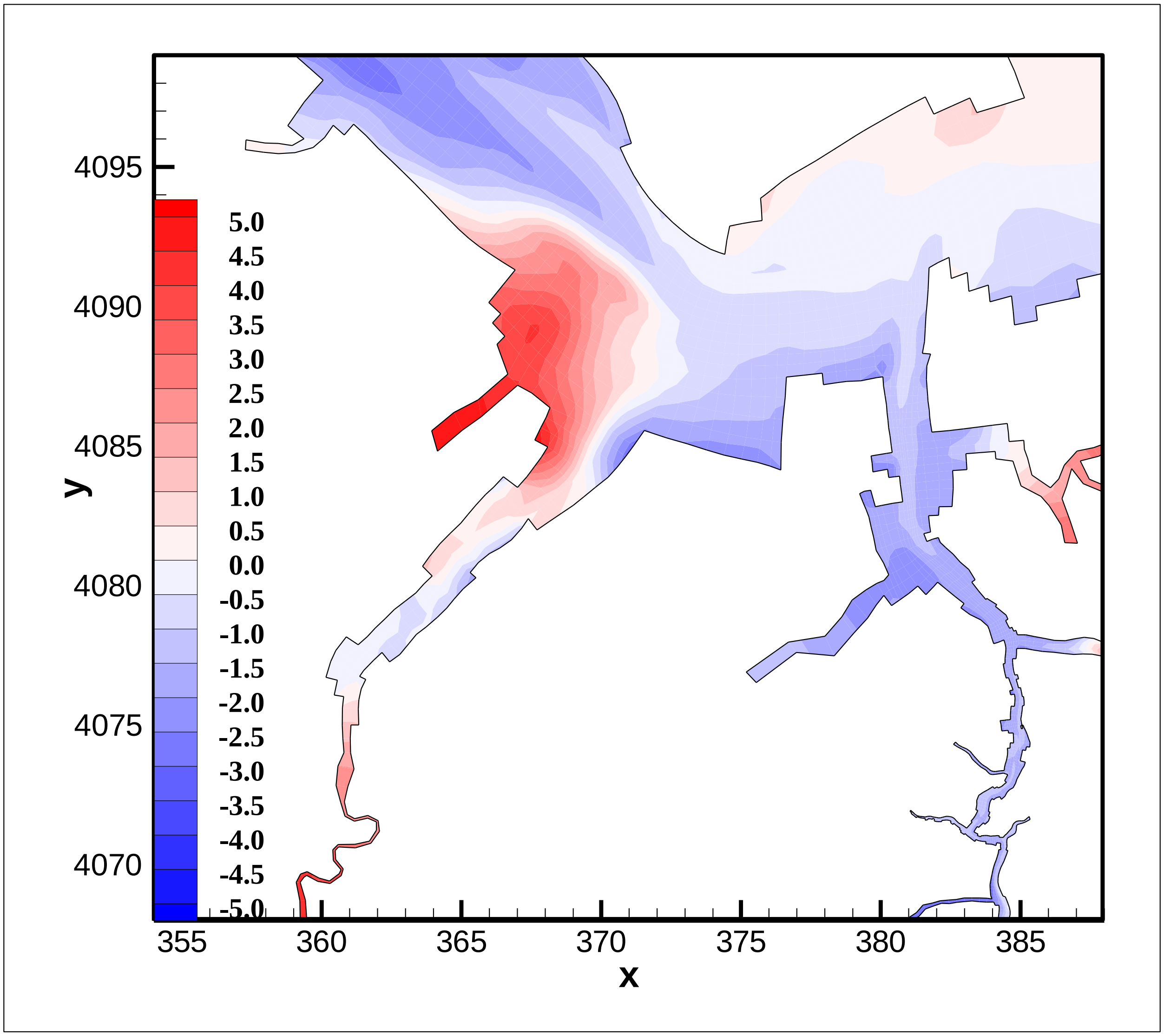

Figure 4-2-2: Distribution of difference of saltwater age (days) (Scenario 3-2-SLR minus Scenario 3-2, mean difference)

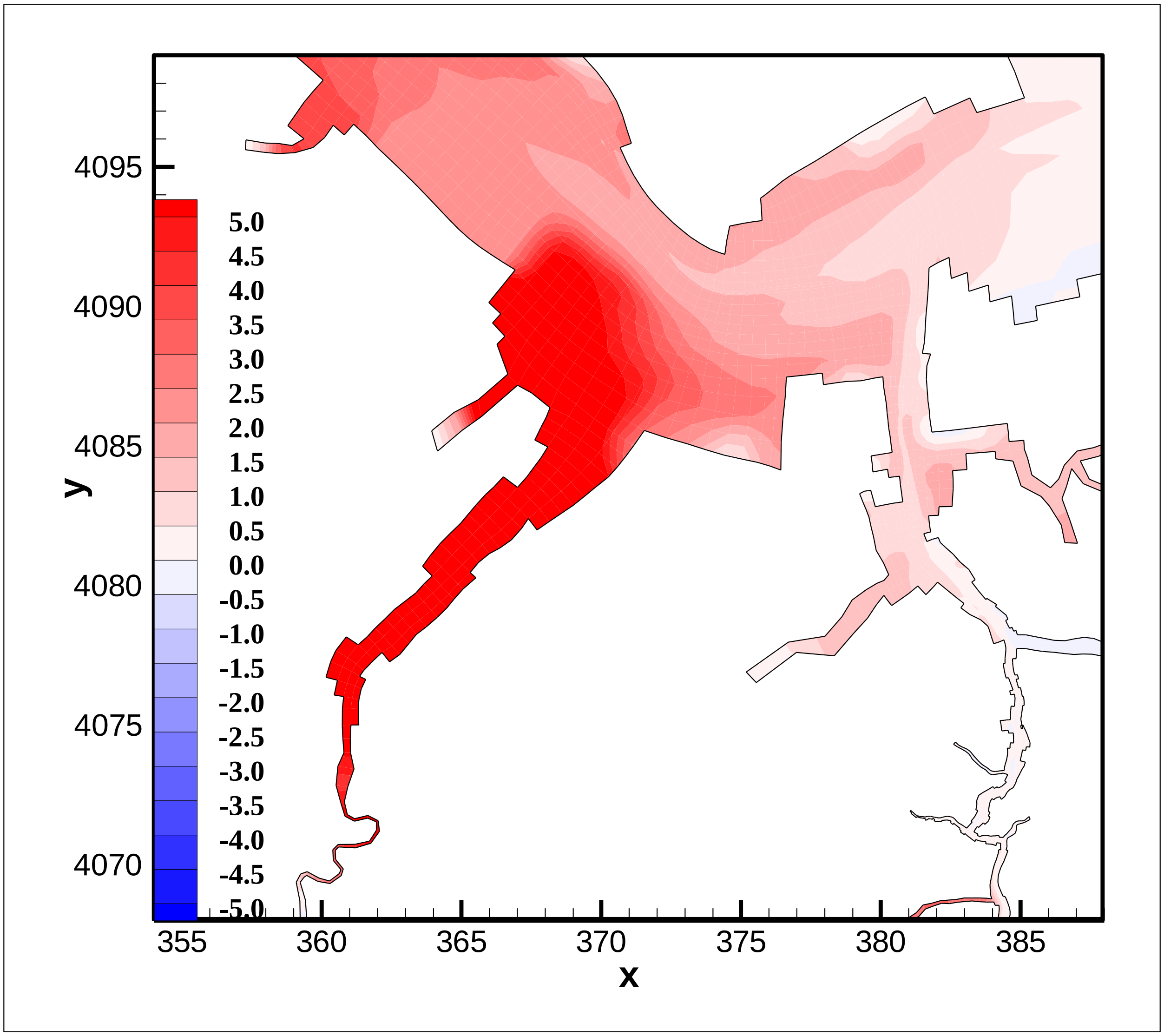

Figure 4-2-3: Distribution of difference of renewal time (days) (Scenario 3-2-SLR minus Scenario 3-2, mean difference)

4.3. Model Scenarios 4-2 and 4-2-SLR

Three timescales, namely freshwater age, saltwater age, and renewal time, are examined and their differences are compared. We compared the difference of daily vertical mean age for each timescale at each location for a period of three years. The spatial distributions between the change due to channel deepening of the ERSB channel and the scenario of sea-level rise by 1 meter are compared. Spatial plots for the mean of the difference of each timescale are shown in Figures 4-3-1 for freshwater age, in Figure 4-3-2 for saltwater age, and in Figure 4-3-3 for renewal time.

The freshwater age indicates the change of freshwater movement. A decrease of freshwater age indicates that pollutants discharged into the estuary can be more quickly transported out of the estuary. It can be seen that the age increases in the Lower James and Elizabeth Rivers, but decreases in the upstream of the Elizabeth River.

The saltwater age indicates the change of saltwater movement. When saltwater age decreases, it shows the clean water from outside of the estuary can be quickly transported to the estuary. It also indicates that it has less time for oxygen near the bottom layer to be consumed. It can be seen that the age decreased in the mesohaline region of the James River and decreased in the Elizabeth River as well. A large increase occurred in the Lafayette River.

The renewal time measures overall flushing of the estuary. Renewal time is a scale to measure the overall pollutant transport time. A short renewal time suggests pollutants discharged into the estuary will be more quickly transported out of the estuary. The renewal time increases in the Lower James River and the Elizabeth River. Overall, change is less than 2.0 days.

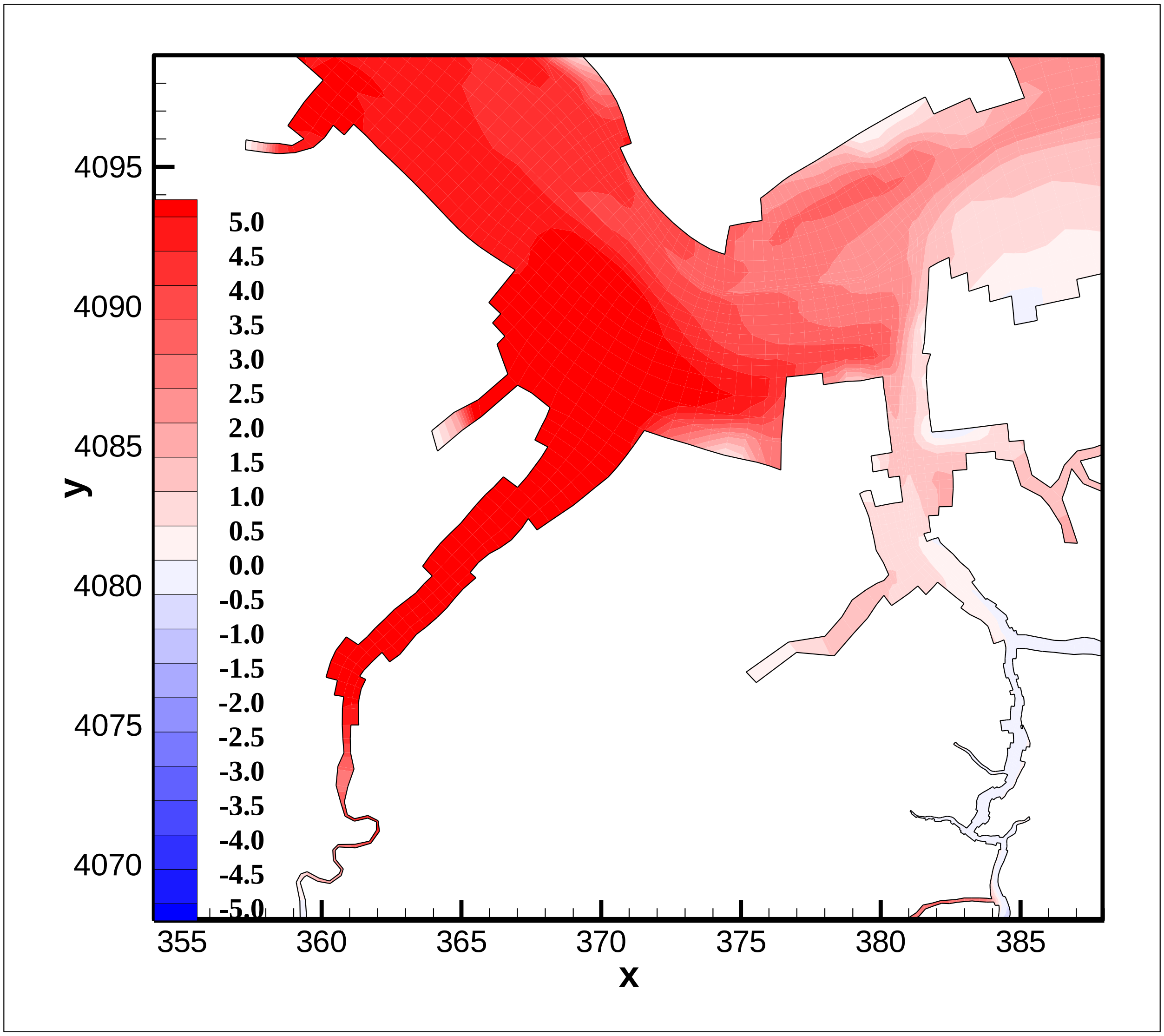

Figure 4-3-1: Distribution of mean difference of daily vertically averaged freshwater age (days) (Scenario 4-2-SLR minus Scenario 4-2, mean difference)

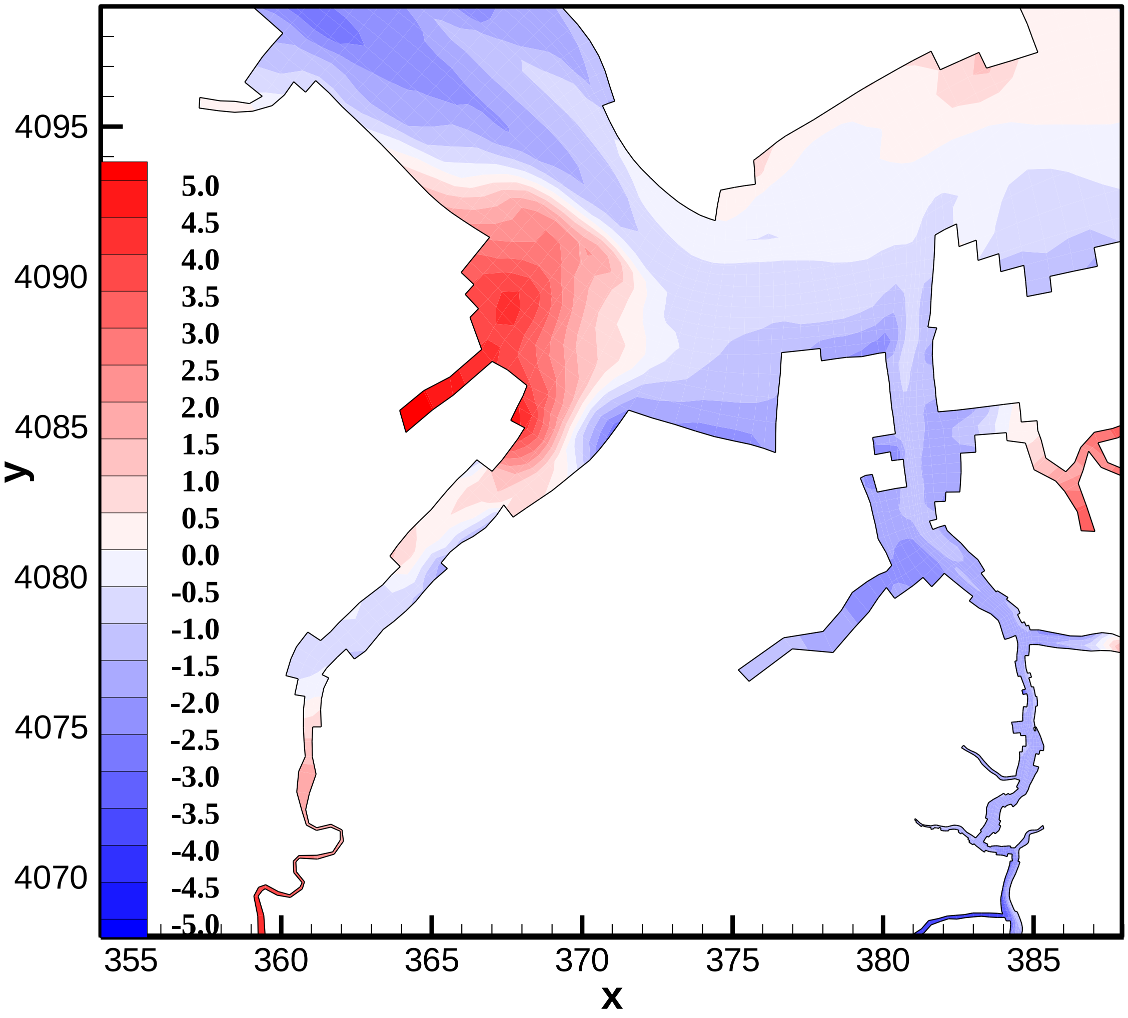

Figure 4-3-2: Distribution of difference of saltwater age (days) (Scenario 4-2-SLR minus Scenario 4-2, mean difference)

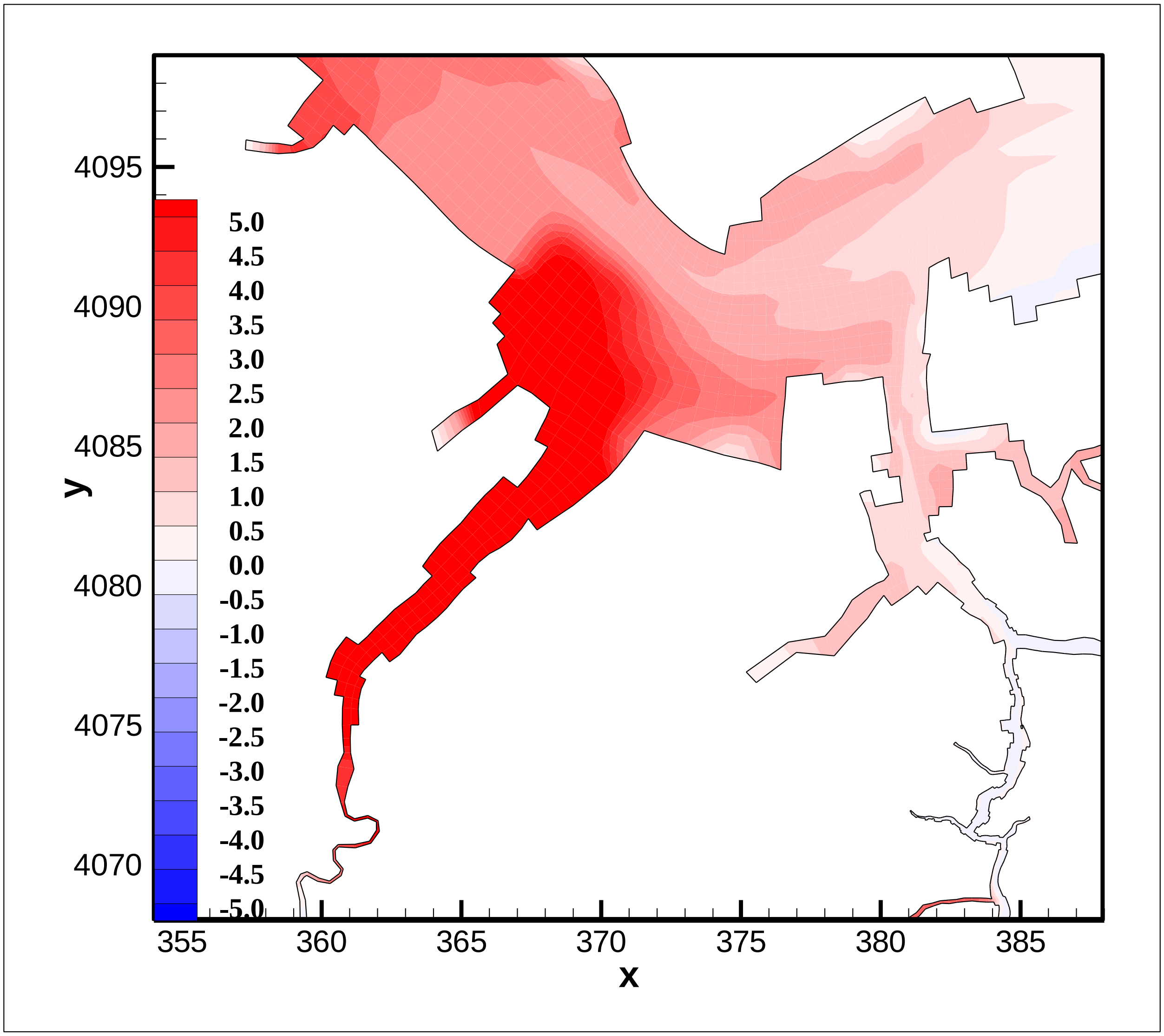

Figure 4-3-3: Distribution of difference of renewal time (days) (Scenario 4-2-SLR minus Scenario 4-2, mean difference)

4.4. Model Scenarios 5-2 and 5-2-SLR

Three timescales, namely freshwater age, saltwater age, and renewal time, are examined and their differences are compared. We compared the difference of daily vertical mean age for each timescale at each location for a period of three years. The spatial distributions of the differences between the channel deepening of James River and Elizabeth River with NHC channels compared to the scenario of sea-level rise by 1 meter are examined. Spatial plots for mean for the difference of each timescale are shown in Figures 4-4-1 for freshwater age, in Figure 4-4-2 for saltwater age, and in Figure 4-4-3 for renewal time.

The freshwater age indicates the change of freshwater movement. A decrease of freshwater age indicates that pollutants discharged into the estuary can be more quickly transported out of the estuary. It can be seen that the age increases in the Lower James and Elizabeth Rivers.

The saltwater age indicates the change of saltwater movement. When saltwater age decreases, it shows the clean water from outside of estuary can be quickly transported to the estuary. It also indicates that it has less time for oxygen near the bottom layer to be consumed. It can be seen that the age decreases in the mesohaline region of the James River and decreases in the upstream of the Elizabeth River. A large increase occurs in the upstream of the Lafayette River.

The renewal time measures the overall flushing of the estuary. Renewal time is a scale to measure the overall pollutant transport time. A short renewal time suggests pollutants discharged into the estuary will be more quickly transported out of the estuary. The renewal time increases slightly in the Lower James River and Elizabeth River. Overall, the change is less than 2.0 days.

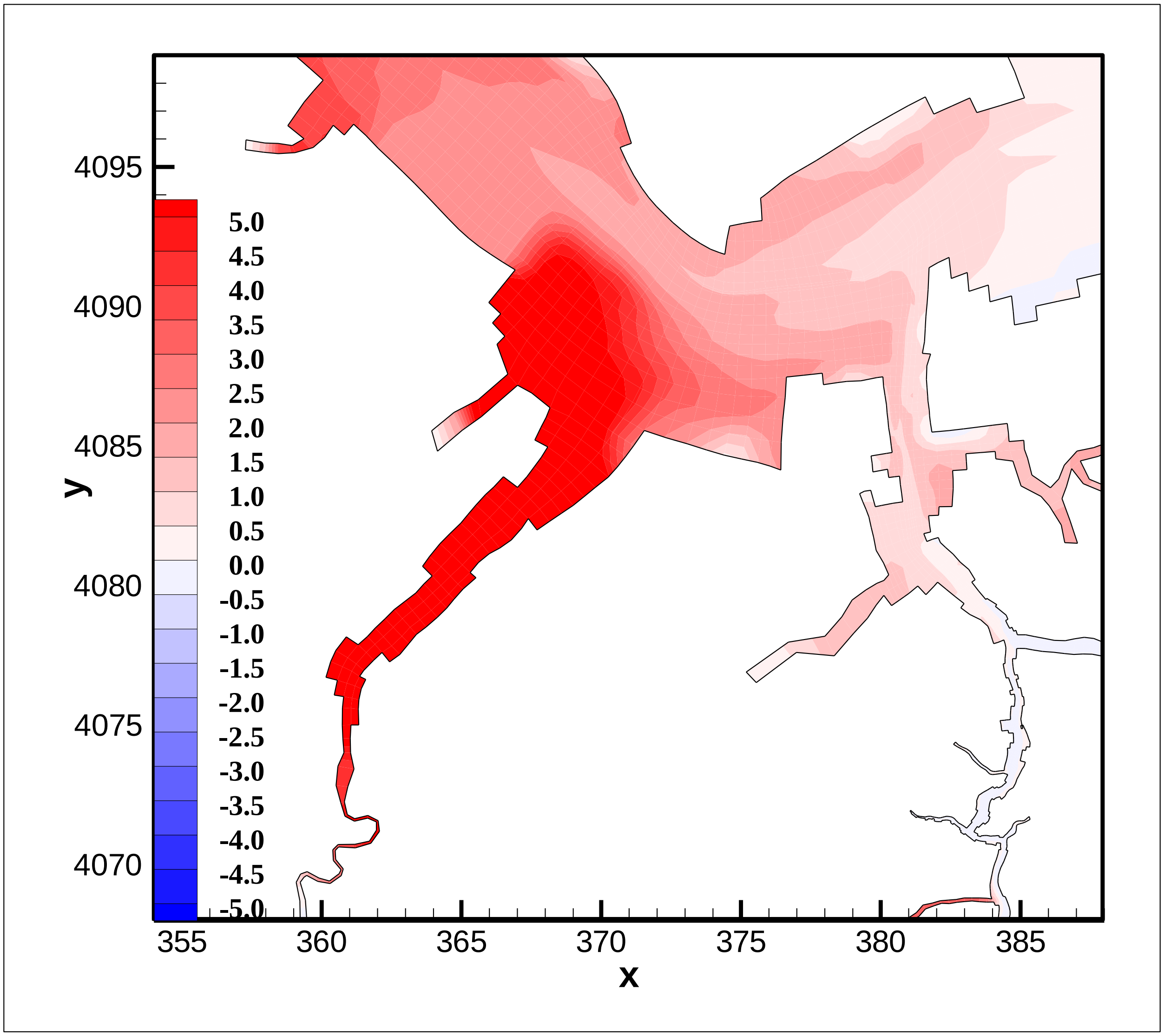

Figure 4-4-1: Distribution of mean difference of daily vertically averaged freshwater age (days) (Scenario 5-2-SLR minus Scenario 5-2, mean difference)

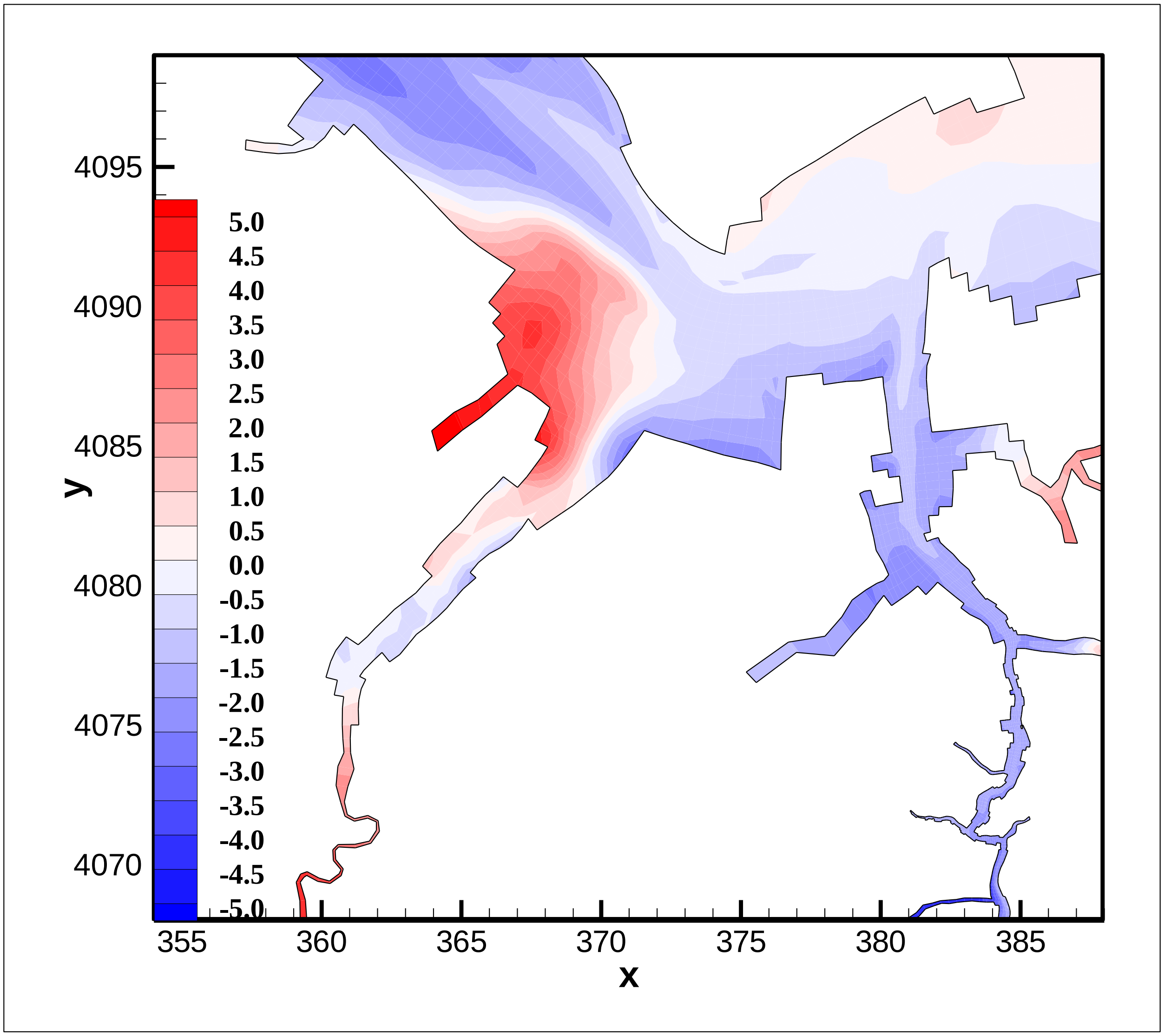

Figure 4-4-2: Distribution of difference of saltwater age (days) (Scenario 5-2-SLR minus Scenario 5-2, mean difference)

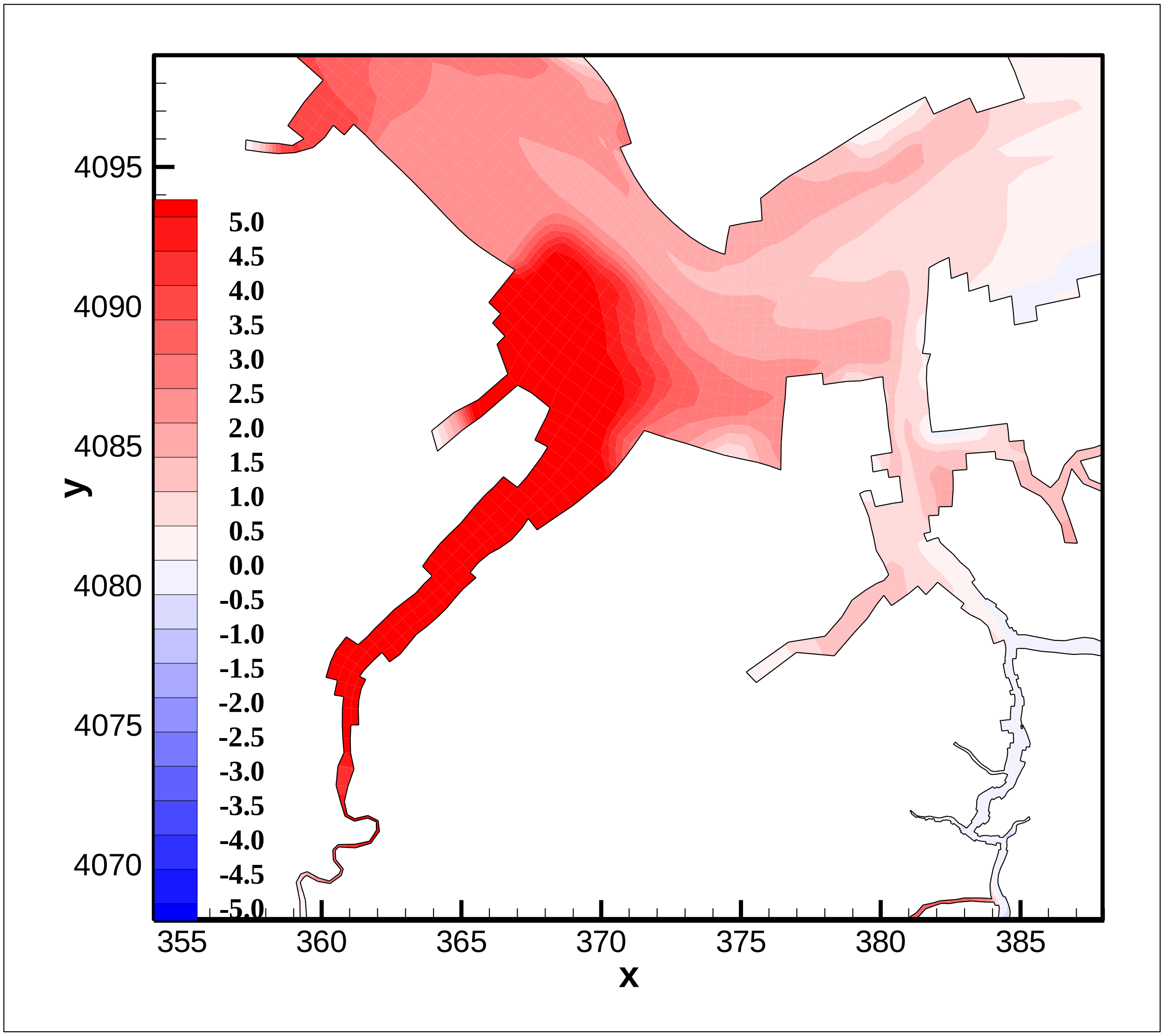

Figure 4-4-3: Distribution of difference of renewal time (days) (Scenario 5-2-SLR minus Scenario 5-2, mean difference)

5. Summary

The water quality model developed for the James and Elizabeth Rivers has been applied to simulate different scenarios for a projected sea-level rise of 1.0 m. Eight model scenarios have been conducted for multiple dredging designs in the lower James River and Elizabeth River (Table 2-1). The results show that DO would not be changed much in the James River. DO decreases slightly in the Elizabeth River. The changes vary from scenario to scenario. The largest change of mean DO concentration is about 0.78 mg/L during the summer period for the Scenario 5-2-SLR at Station LFA01, but bottom DO is still about 5 mg/L at LFA01. DO decrease occurred at Station SBE5 overall under the SLR condition. Note that Station SBE5, which is located at upper stream of the Elizabeth, has low DO (about 5 mg/L) under existing conditions. The largest bottom DO depression at SBE5 compared to other stations suggests this area is the most problematic.

With SLR in both the James and Elizabeth Rivers, the renewal time is increased in the mesohaline region of the lower James River and tributaries in the Elizabeth River. However, saltwater age decreases in both the James and Elizabeth Rivers, indicating that bottom DO will be consumed less due to increased gravitational circulation. This increased movement of saltwater reduces the pressure of the decrease of vertical mixing due to SLR. However, this effect is not large enough to counter the overall increase in renewal time and the effect of increase depth with less vertical mixing. Therefore, a decrease of DO in summer in the Elizabeth can be observed as SRL occurs.

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Appendix A

This appendix includes time series plot of Water quality model results. The water quality time series comparison between different scenarios was plotted during the period from 2011 to 2013. The locations of monitoring stations are shown in Appendix Figure A-1.

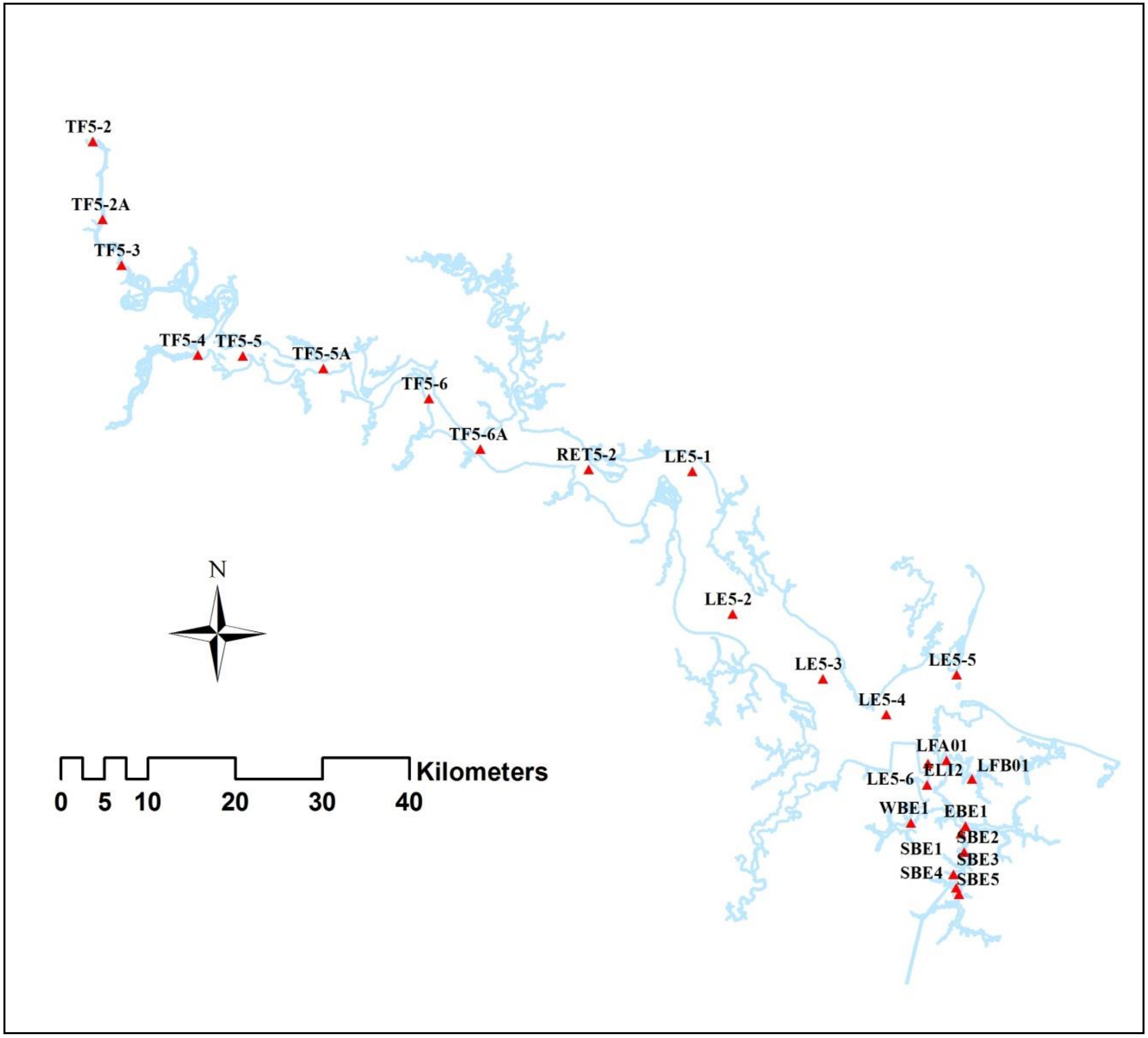
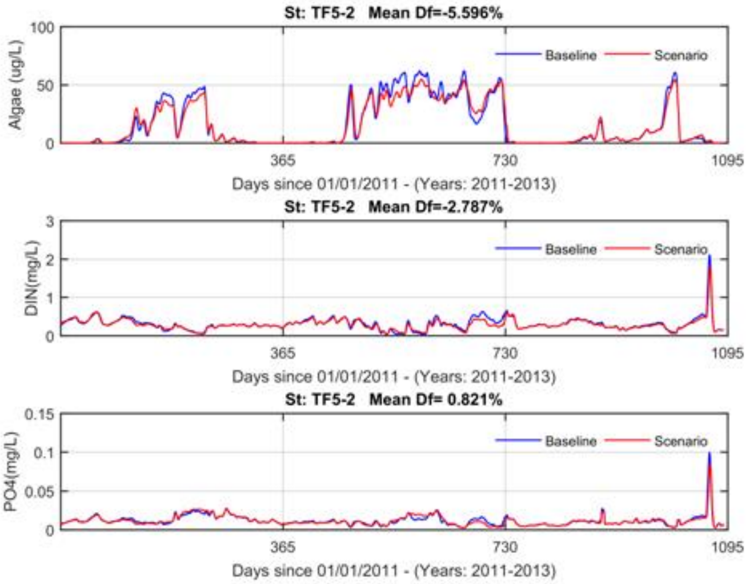
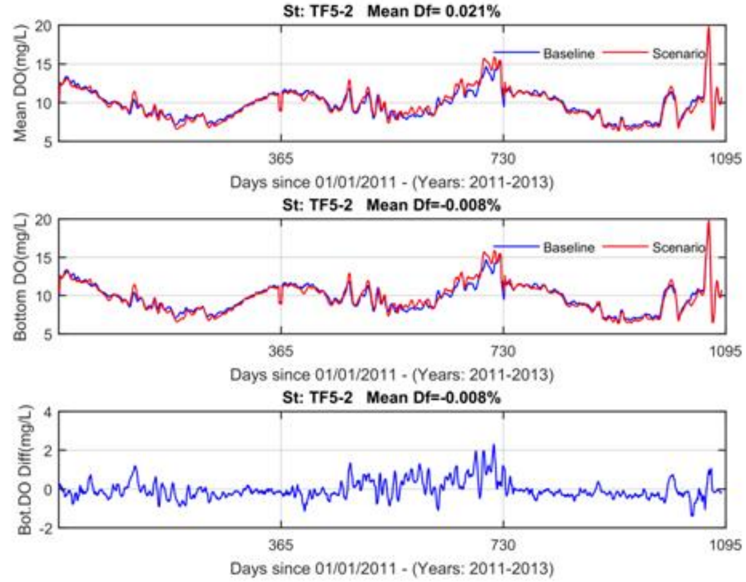
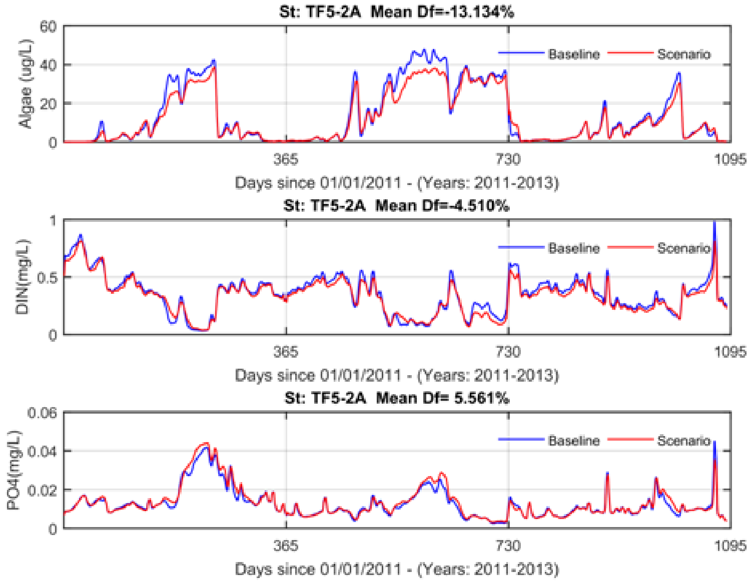


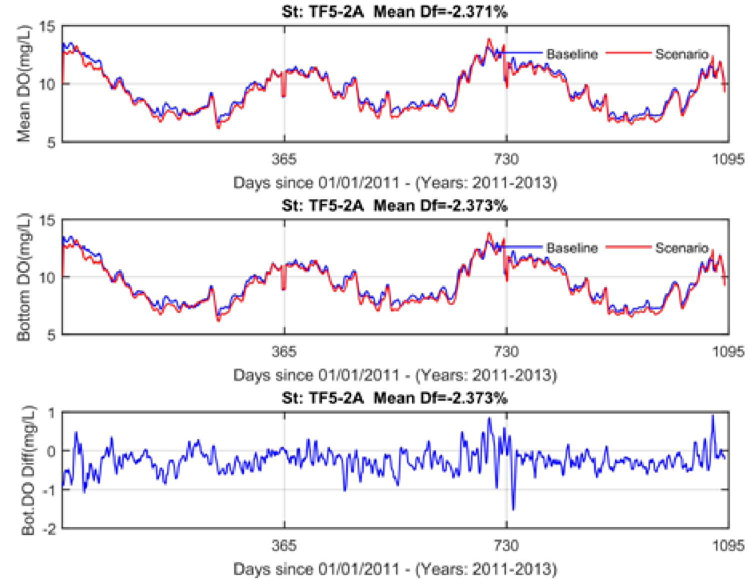
Figure A-1: Location of monitoring Stations.

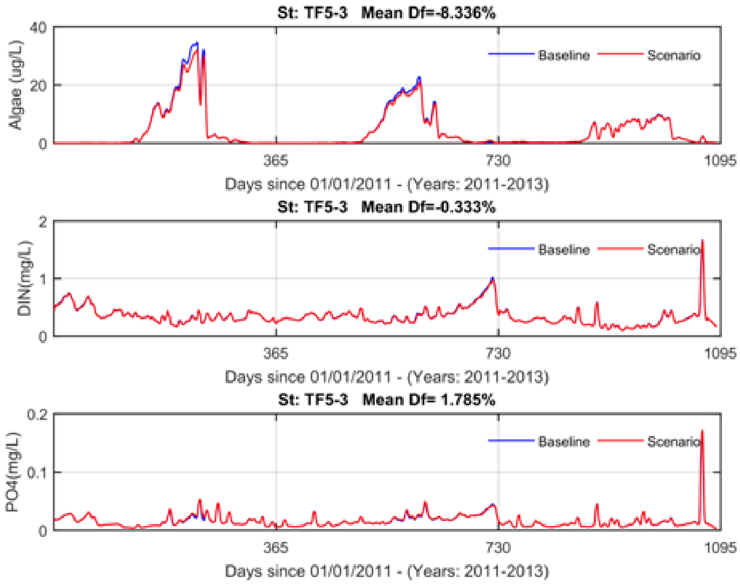
A1. Model Simulation of Baseline 2 and Baseline2-SLR


St: TF5-2 Mean Df=-5.596%
Algae (ug/L)
100
50
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-2.787%
DIN(mg/L)
3
2
1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df= 0.821%
PO4(mg/L)
0.15
0.1
0.05
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-2 Mean Df= 0.021%
Mean DO(mg/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-0.008%
Bottom DO(mg/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-0.008%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

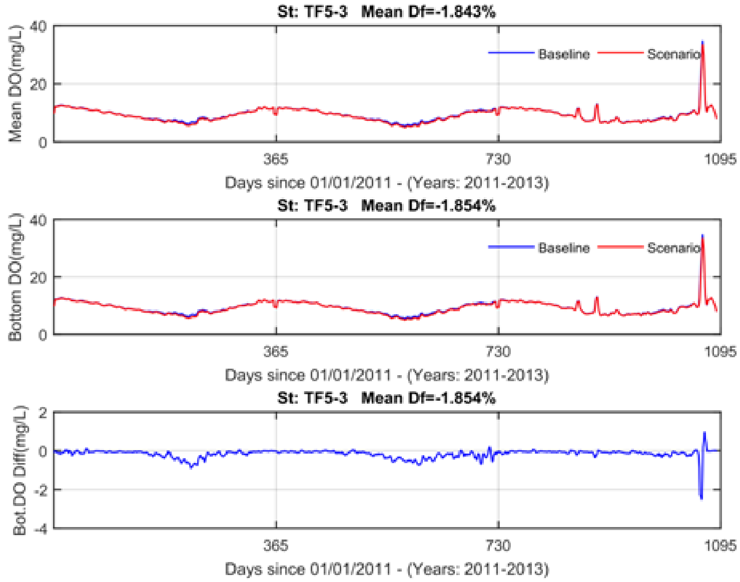

St: TF5-2A Mean Df=-13.134%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df=-4.510%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df= 5.561%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-2A Mean Df=-2.371%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df=-2.373%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df=-2.373%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-3 Mean Df=-8.336%

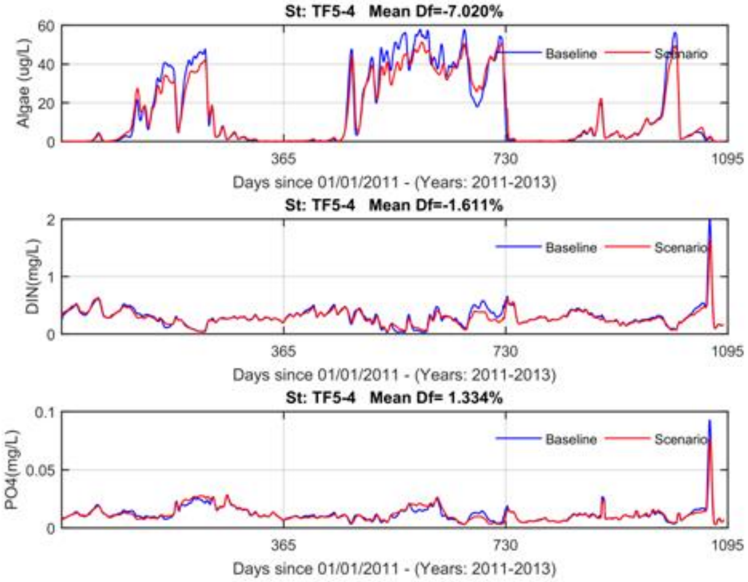
St: TF5-3 Mean Df=-0.333%

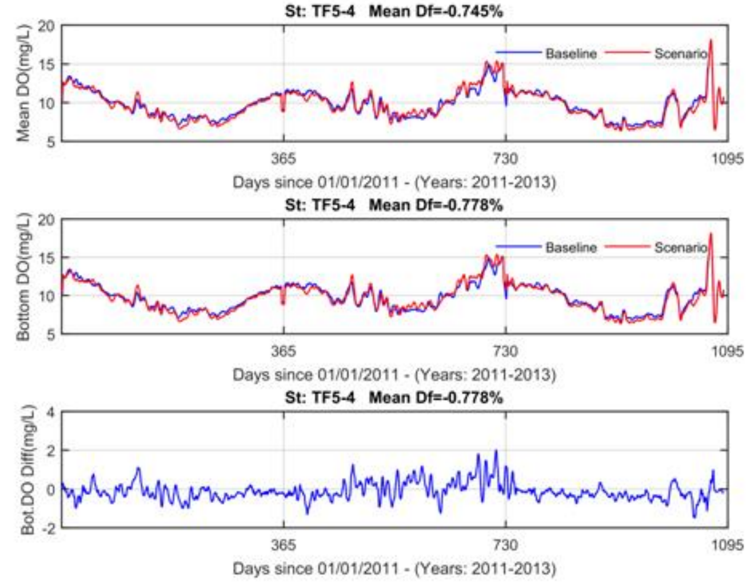
St: TF5-3 Mean Df= 1.785%

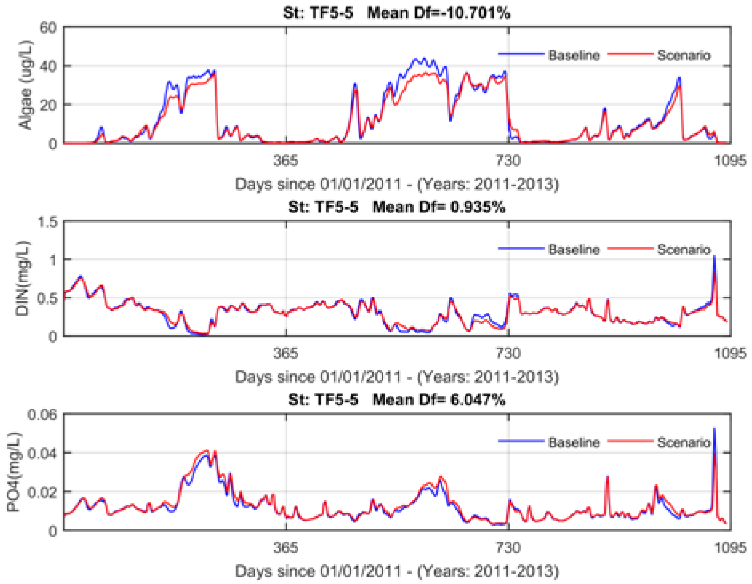

St: TF5-3 Mean Df=-1.843%

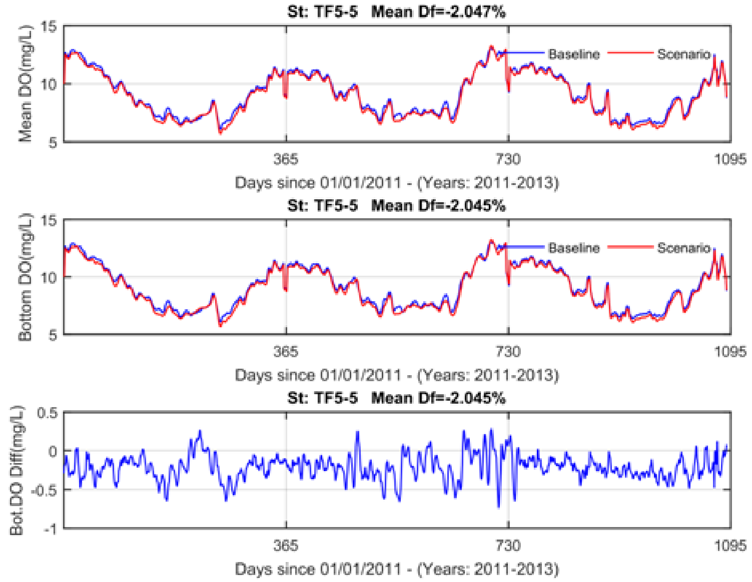
St: TF5-3 Mean Df=-1.854%

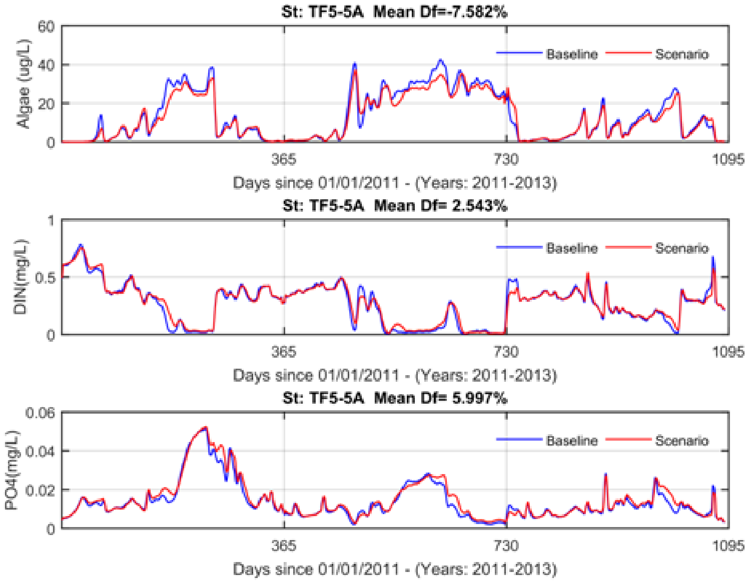
St: TF5-3 Mean Df=-1.854%

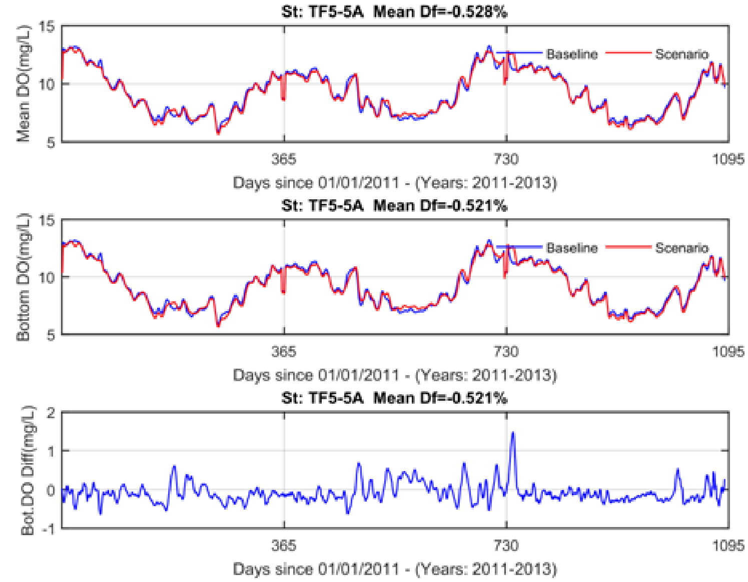

St: TF5-4 Mean Df=-7.020%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df=-1.611%
DIN(mg/L)
2
1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df= 1.334%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

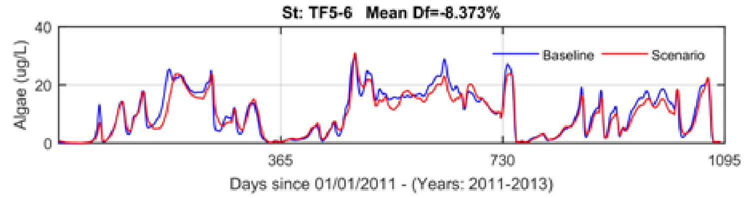

St: TF5-4 Mean Df=-0.745%
Mean DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df=-0.778%
Bottom DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df=-0.778%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

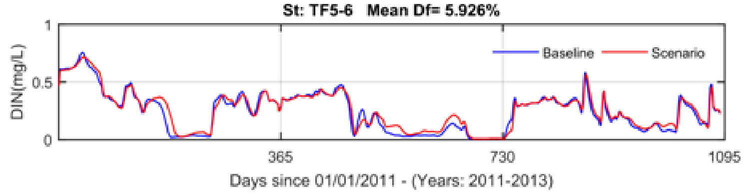

St: TF5-5 Mean Df=-10.701%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df= 0.935%
DIN(mg/L)
1.5
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df= 6.047%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

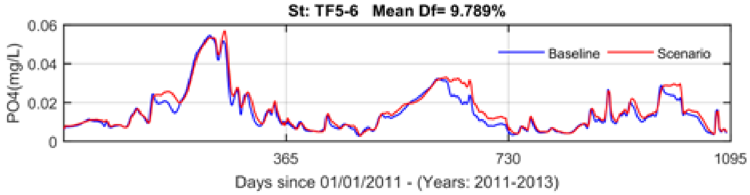

St: TF5-5 Mean Df=-2.047%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df=-2.045%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df=-2.045%
Bot.DO Diff(mg/L)
0.5
0
-0.5
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

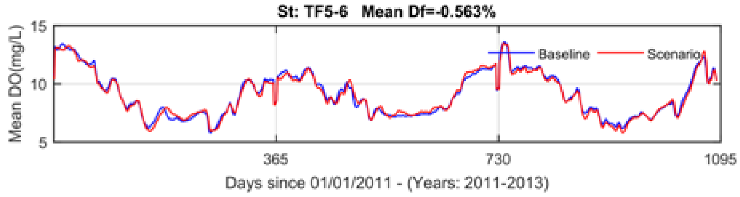

St: TF5-5A Mean Df=-7.582%
Algae (ug/L)
60
40
20
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df= 2.543%
DIN(mg/L)
1
0.5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df= 5.997%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

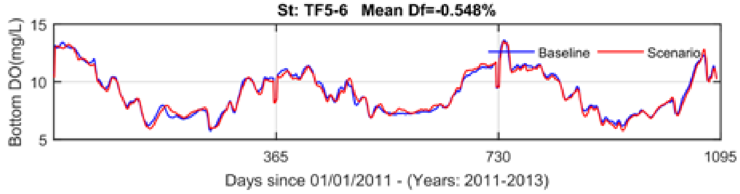

St: TF5-5A Mean Df=-0.528%
Mean DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df=-0.521%
Bottom DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df=-0.521%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

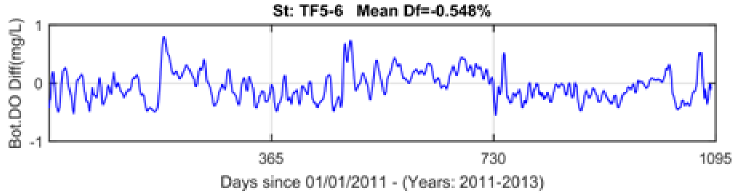

St: TF5-6 Mean Df=-8.373%

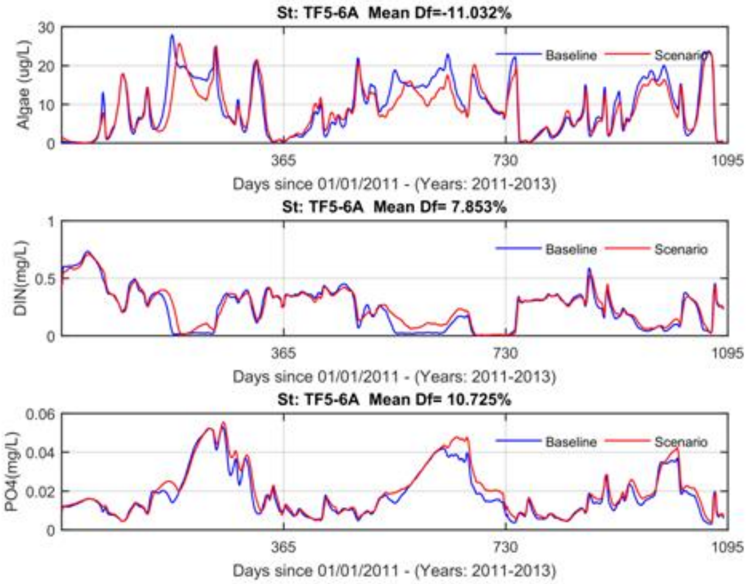

St: TF5-6 Mean Df= 5.926%

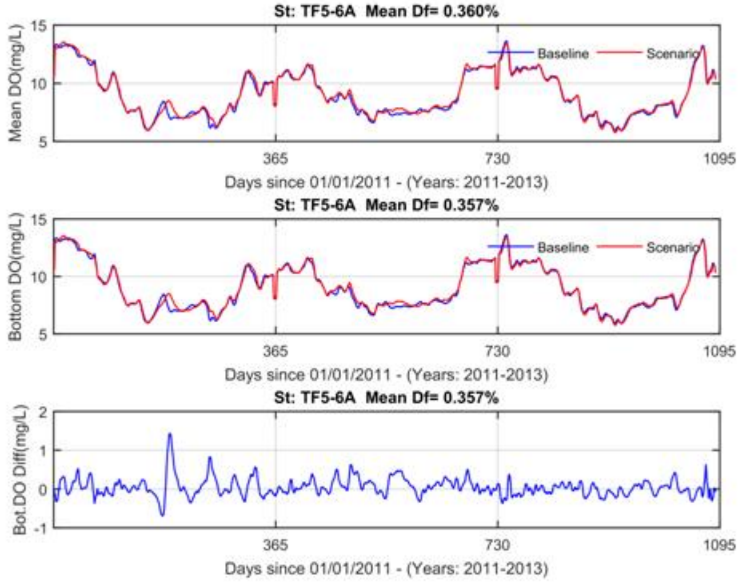

St: TF5-6 Mean Df= 9.789%

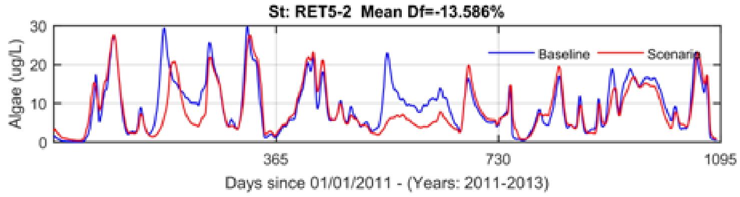

St: TF5-6 Mean Df=-0.563%

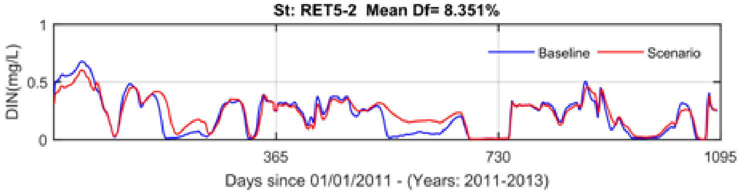

St: TF5-6 Mean Df=-0.548%

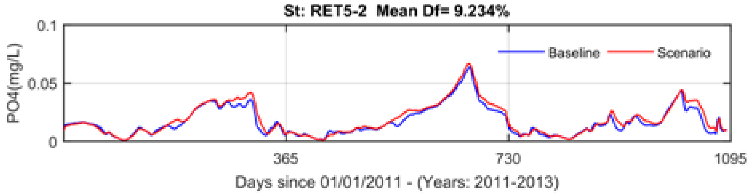

St: TF5-6 Mean Df=-0.548%

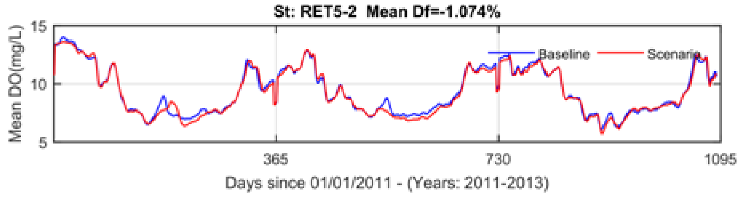

St: TF5-6A Mean Df=-11.032%
Algae (ug/L)
30
20
10
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 7.853%
DIN(mg/L)
1
0.5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 10.725%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

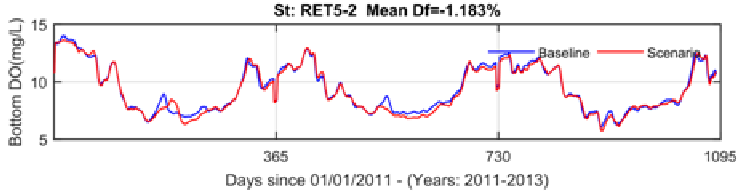

St: TF5-6A Mean Df= 0.360%
Mean DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 0.357%
Bottom DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 0.357%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

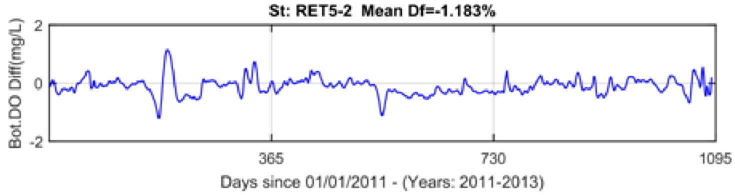

St: RET5-2 Mean Df=-13.586%
Algae (ug/L)
30
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

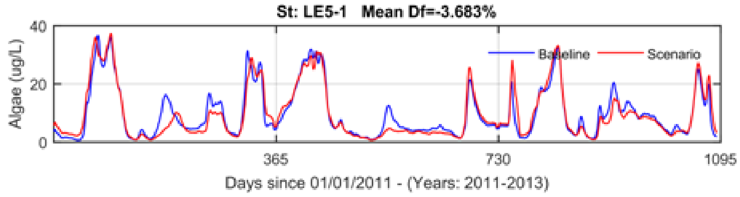

St: RET5-2 Mean Df= 8.351%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: RET5-2 Mean Df= 9.234%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

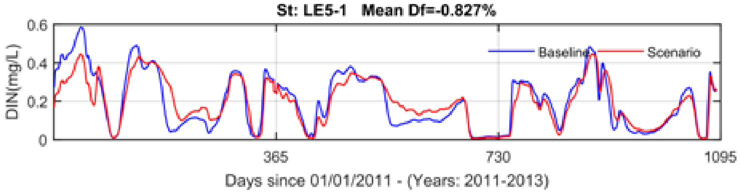

St: RET5-2 Mean Df=-1.074%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: RET5-2 Mean Df=-1.183%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

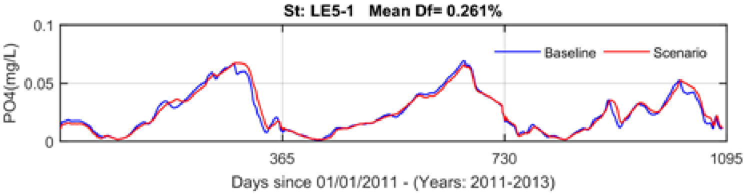

St: RET5-2 Mean Df=-1.183%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)



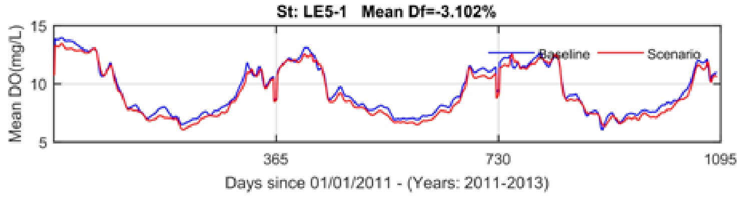
St: LE5-1 Mean Df=-3.683%



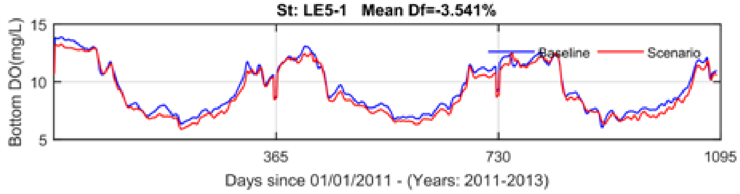
St: LE5-1 Mean Df=-0.827%



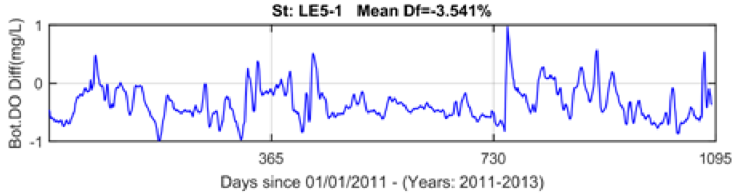
St: LE5-1 Mean Df= 0.261%



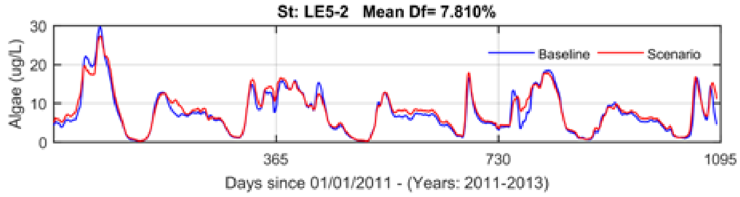
St: LE5-1 Mean Df=-3.102%



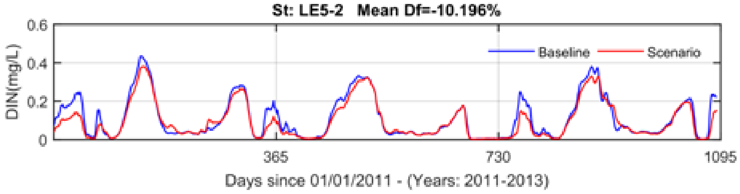
St: LE5-1 Mean Df=-3.541%



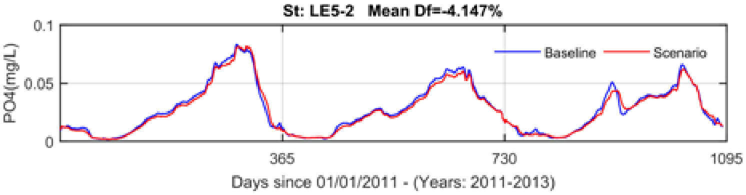
St: LE5-1 Mean Df=-3.541%



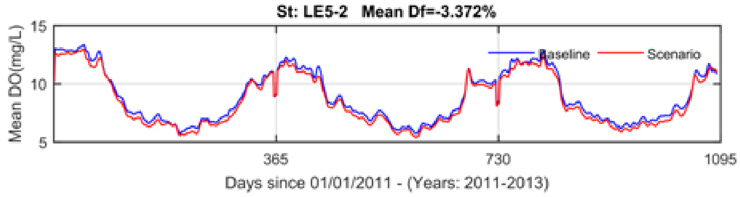
St: LE5-2 Mean Df= 7.810%



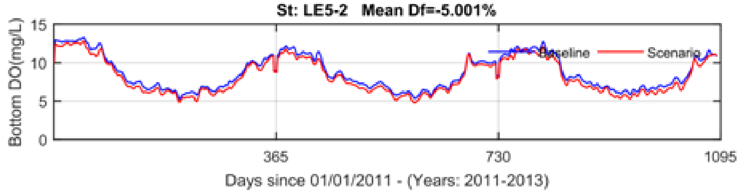
St: LE5-2 Mean Df=-10.196%



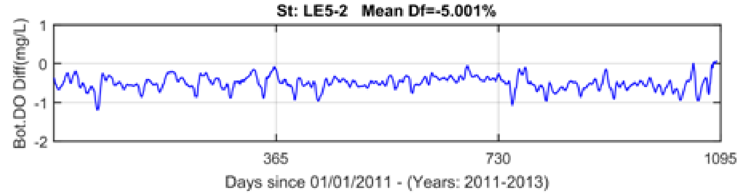
St: LE5-2 Mean Df=-4.147%



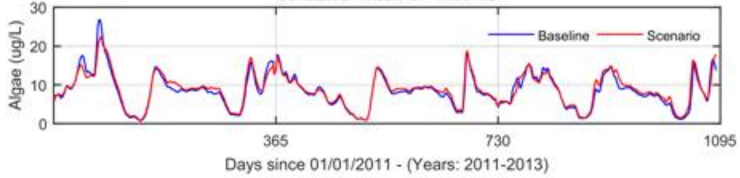
St: LE5-2 Mean Df=-3.372%

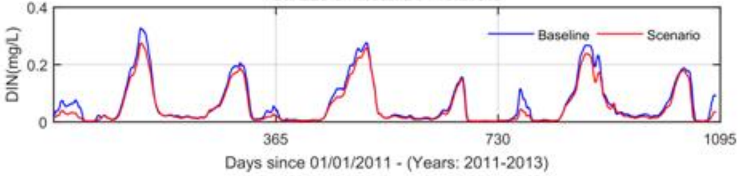


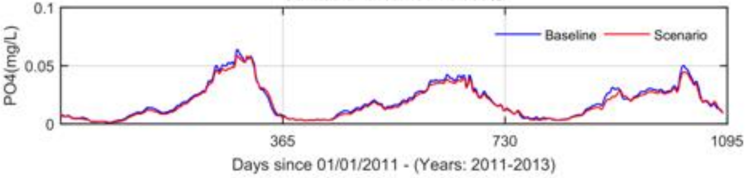
St: LE5-2 Mean Df=-5.001%

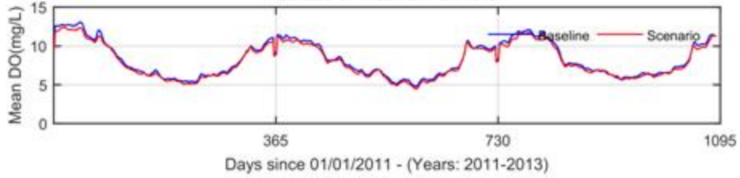


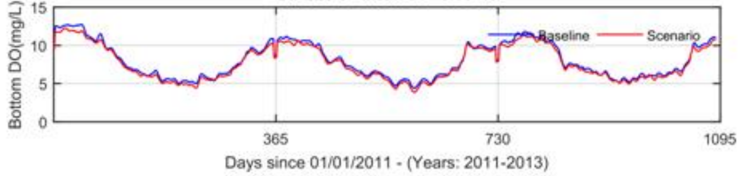
St: LE5-2 Mean Df=-5.001%

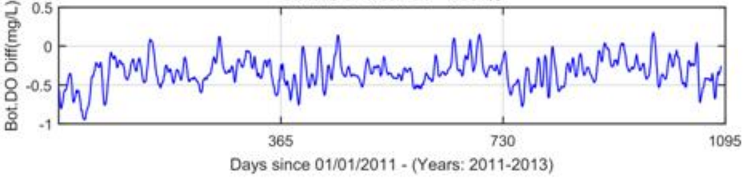

St: LE5-3 Mean Df= 4.591%

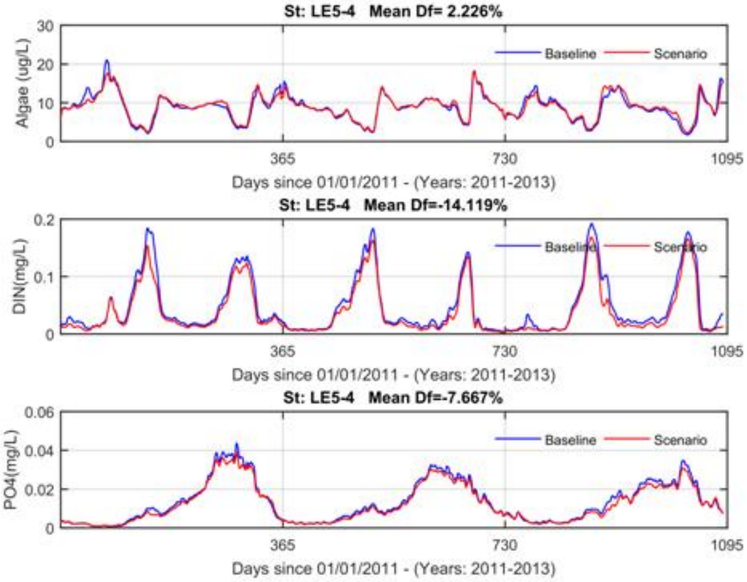

St: LE5-3 Mean Df=-13.219%

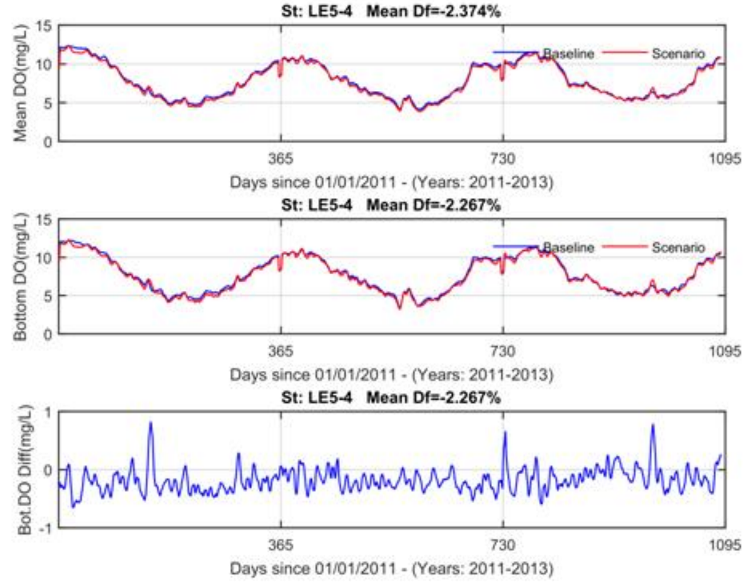

St: LE5-3 Mean Df=-6.385%

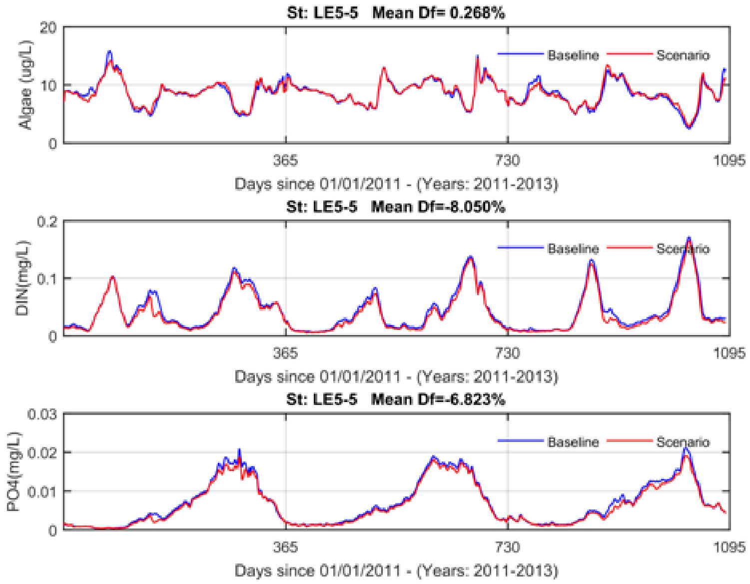

St: LE5-3 Mean Df=-2.743%

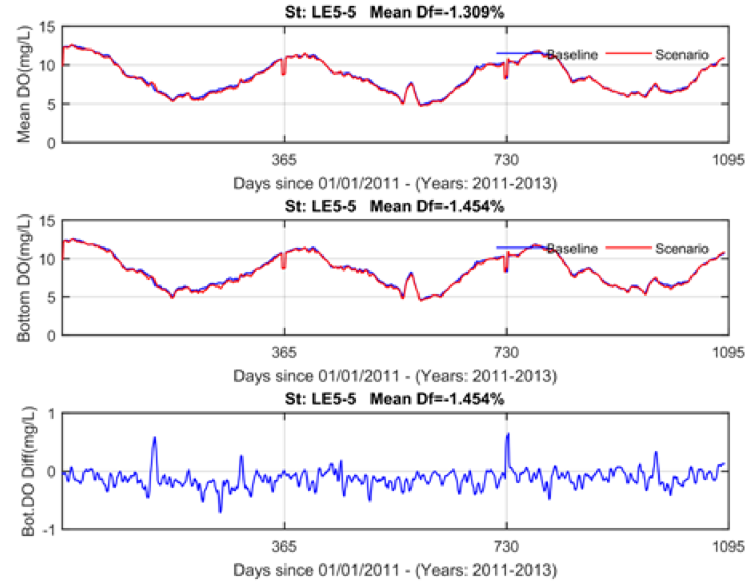

St: LE5-3 Mean Df=-3.684%

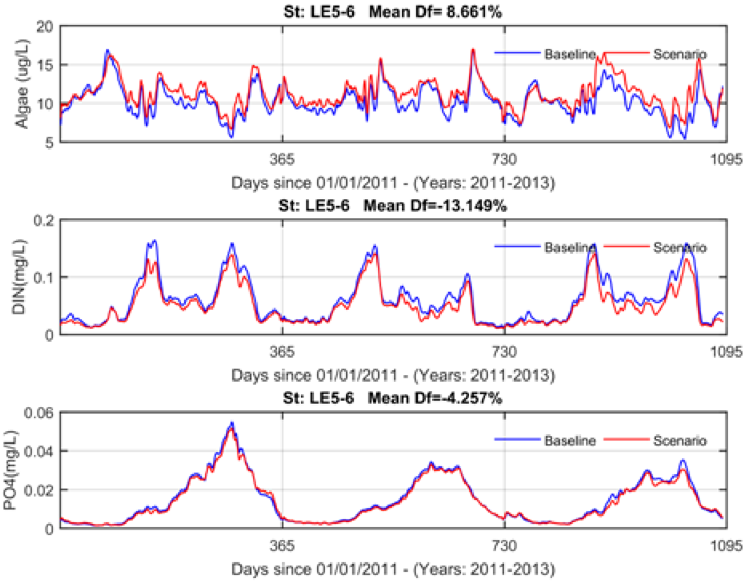

St: LE5-3 Mean Df=-3.684%

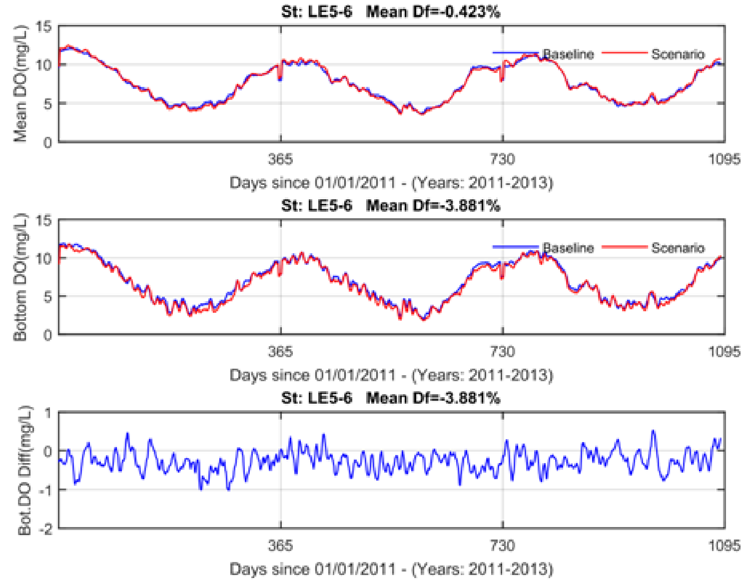

St: LE5-4 Mean Df= 2.226%
Algae (ug/L)
0
10
20
30
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-14.119%
DIN(mg/L)
0
0.1
0.2
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-7.667%
PO4(mg/L)
0
0.02
0.04
0.06
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

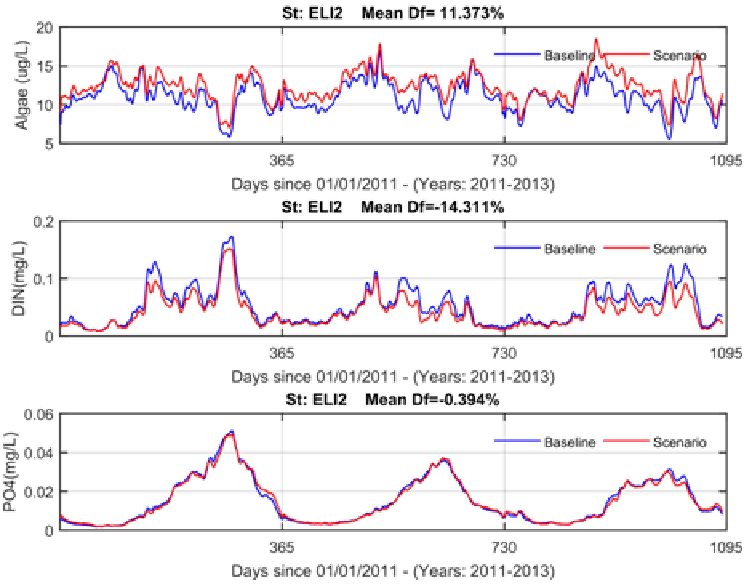

St: LE5-4 Mean Df=-2.374%
Mean DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.267%
Bottom DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.267%
Bot.DO Diff(mg/L)
-1
0
1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

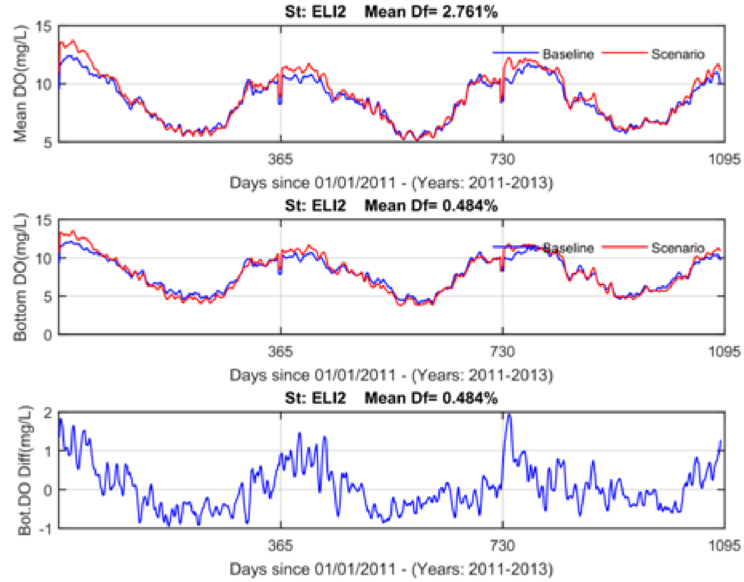

St: LE5-5 Mean Df= 0.268%
Algae (ug/L)
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-8.050%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-6.823%
PO4(mg/L)
0.03
0.02
0.01
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-5 Mean Df=-1.309%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-1.454%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-1.454%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

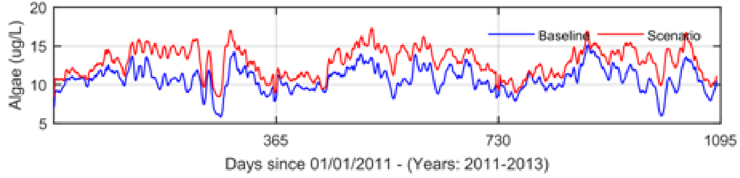

St: LE5-6 Mean Df= 8.661%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-13.149%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-4.257%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-6 Mean Df=-0.423%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-3.881%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-3.881%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

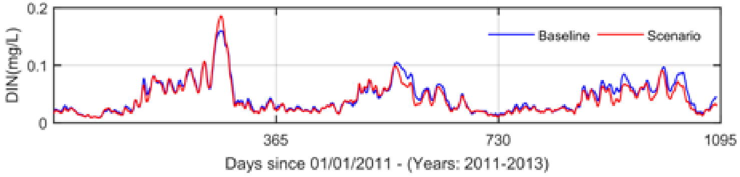

St: ELI2 Mean Df= 11.373%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: ELI2 Mean Df=-14.311%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: ELI2 Mean Df=-0.394%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: ELI2 Mean Df= 2.761%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: ELI2 Mean Df= 0.484%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: ELI2 Mean Df= 0.484%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

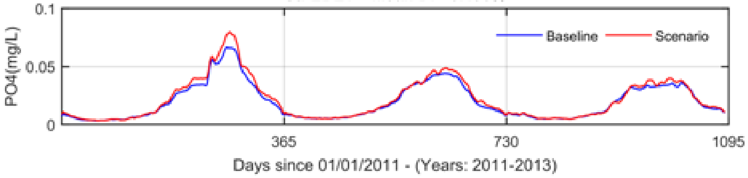
St: EBE1 Mean Df= 19.363%



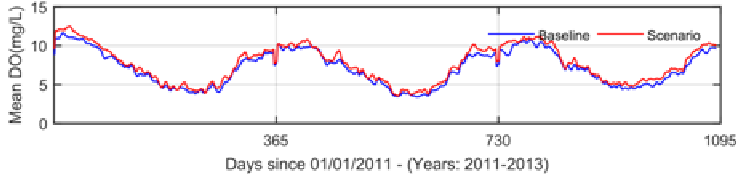
St: EBE1 Mean Df=-4.795%



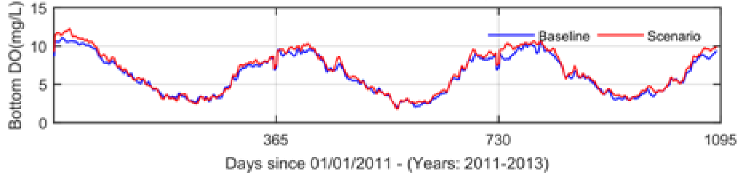
St: EBE1 Mean Df= 8.496%



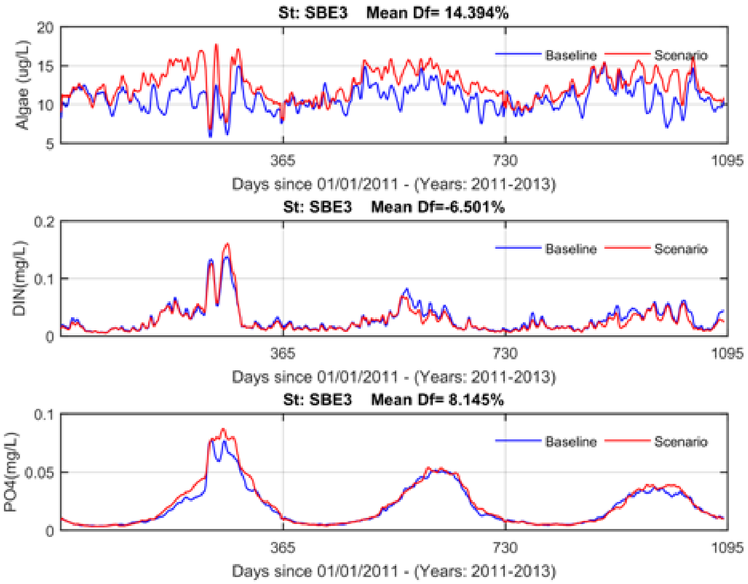
St: EBE1 Mean Df= 6.319%

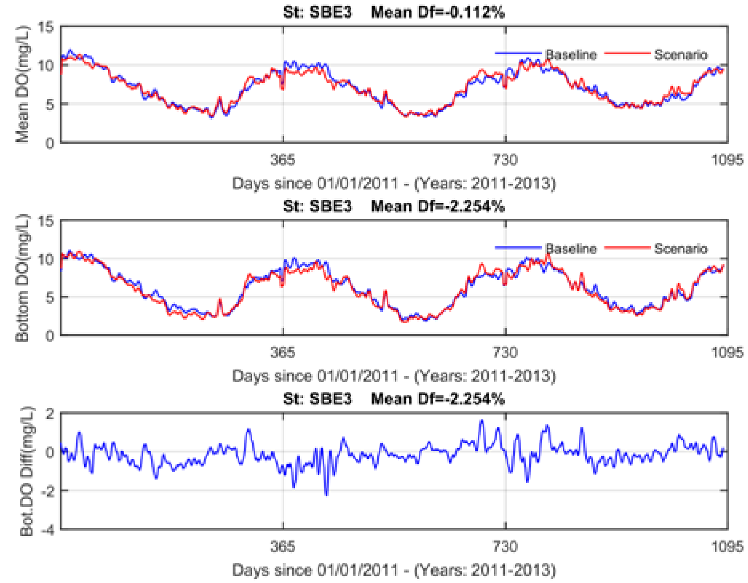


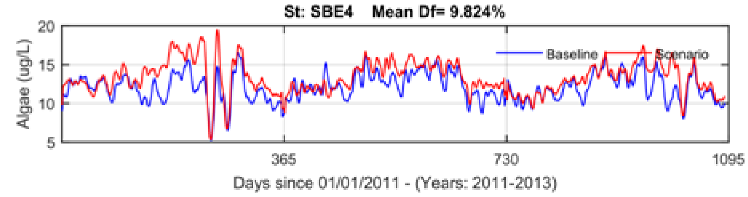
St: EBE1 Mean Df= 4.315%

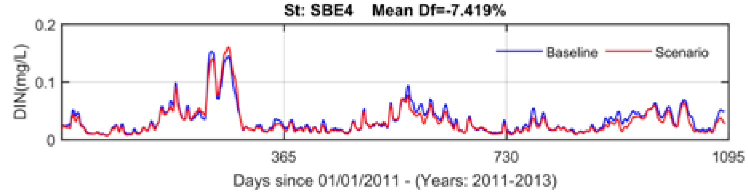


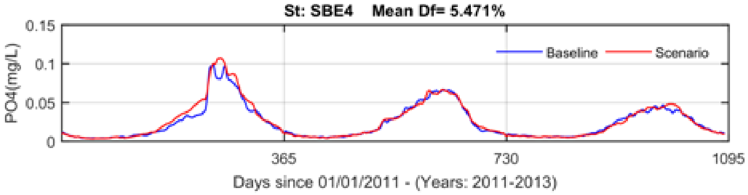
St: EBE1 Mean Df= 4.315%

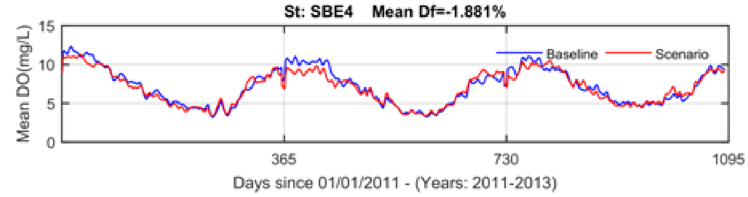

St: SBE3 Mean Df= 14.394%
Algae (ug/L)
20
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE3 Mean Df=-6.501%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE3 Mean Df= 8.145%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

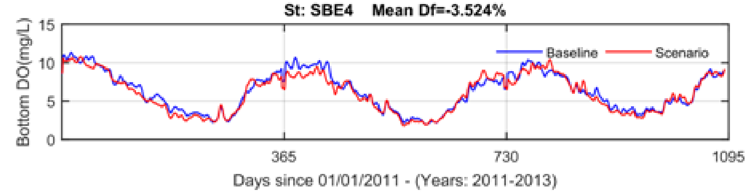

St: SBE3 Mean Df=-0.112%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE3 Mean Df=-2.254%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE3 Mean Df=-2.254%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

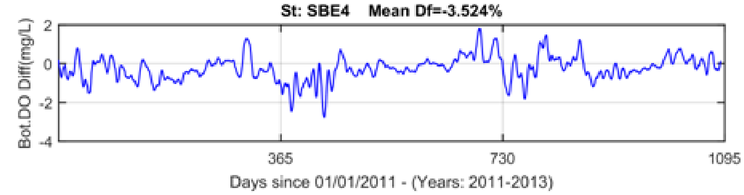

St: SBE4 Mean Df= 9.824%

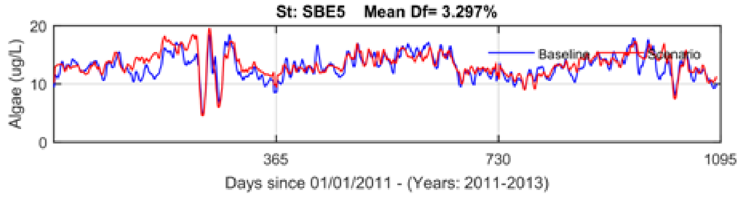

St: SBE4 Mean Df=-7.419%

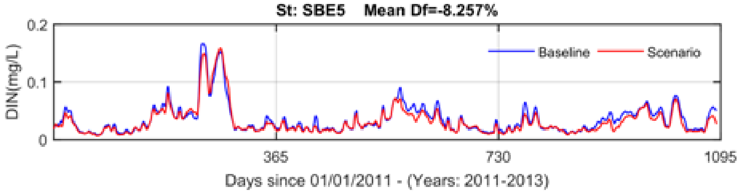

St: SBE4 Mean Df= 5.471%

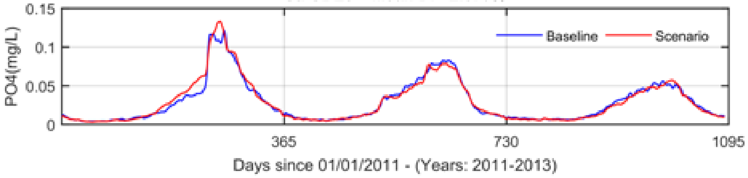

St: SBE4 Mean Df=-1.881%

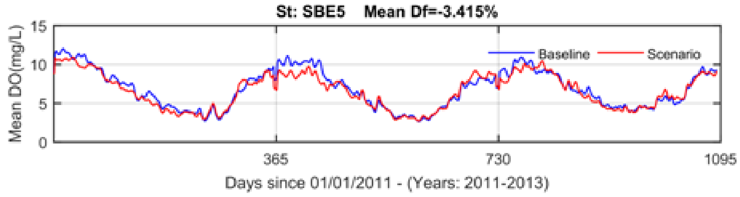

St: SBE4 Mean Df=-3.524%

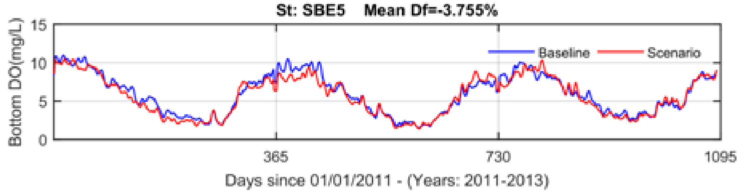

St: SBE4 Mean Df=-3.524%

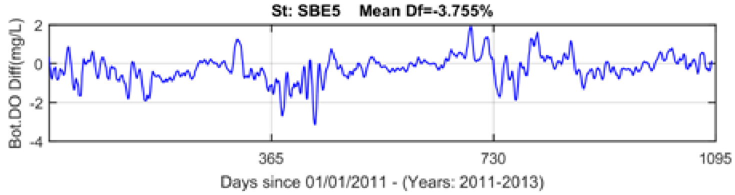

St: SBE5 Mean Df= 3.297%


St: SBE5 Mean Df=-8.257%

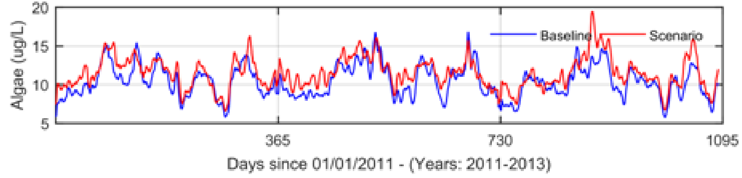

St: SBE5 Mean Df= 2.079%


St: SBE5 Mean Df=-3.415%

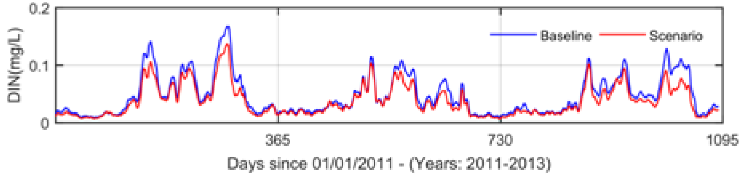

St: SBE5 Mean Df=-3.755%


St: SBE5 Mean Df=-3.755%

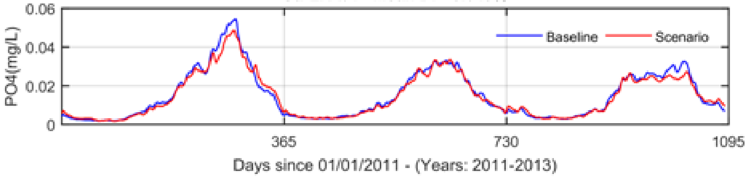
St: LFA01   Mean Df= 10.177%



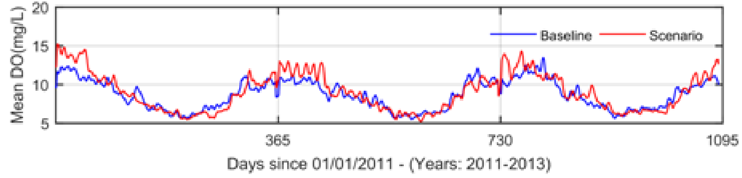
St: LFA01   Mean Df=-14.313%



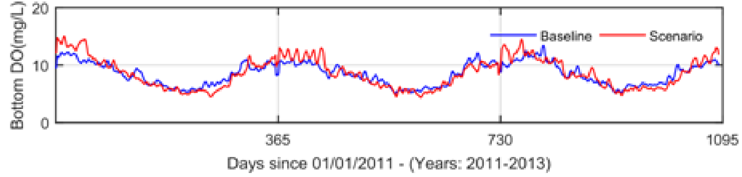
St: LFA01   Mean Df=-3.049%



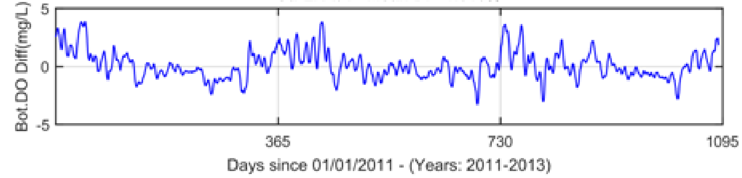
St: LFA01   Mean Df= 3.328%

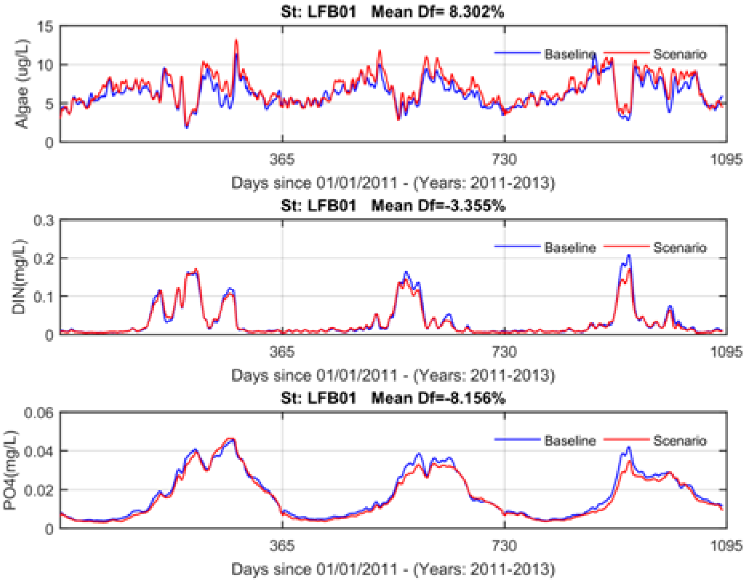


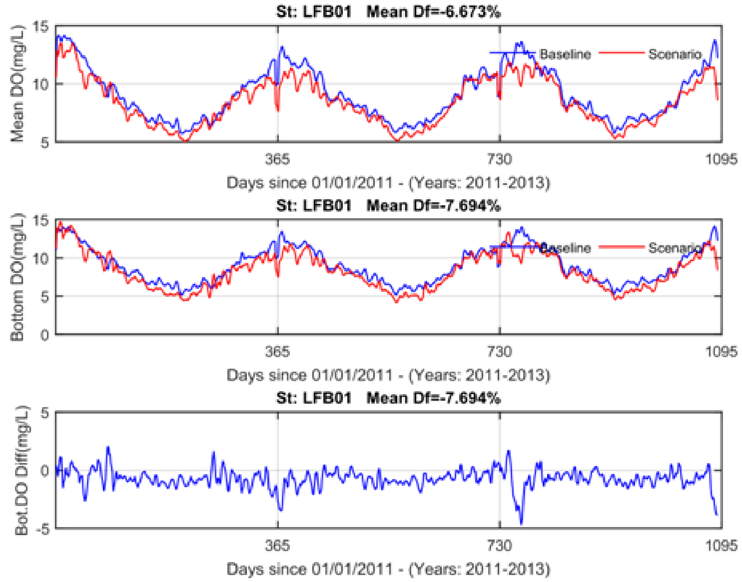
St: LFA01   Mean Df= 1.016%

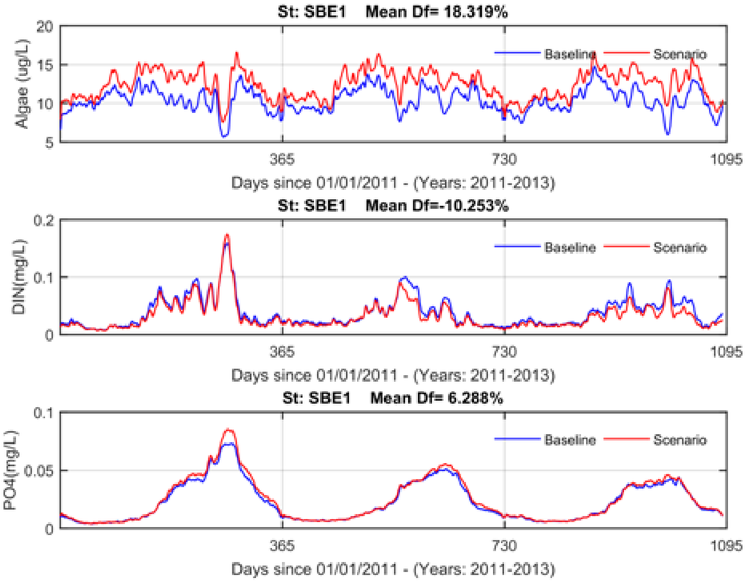


St: LFA01   Mean Df= 1.016%




St: LFB01 Mean Df= 8.302%
Algae (ug/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-3.355%
DIN(mg/L)
0.3
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-8.156%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

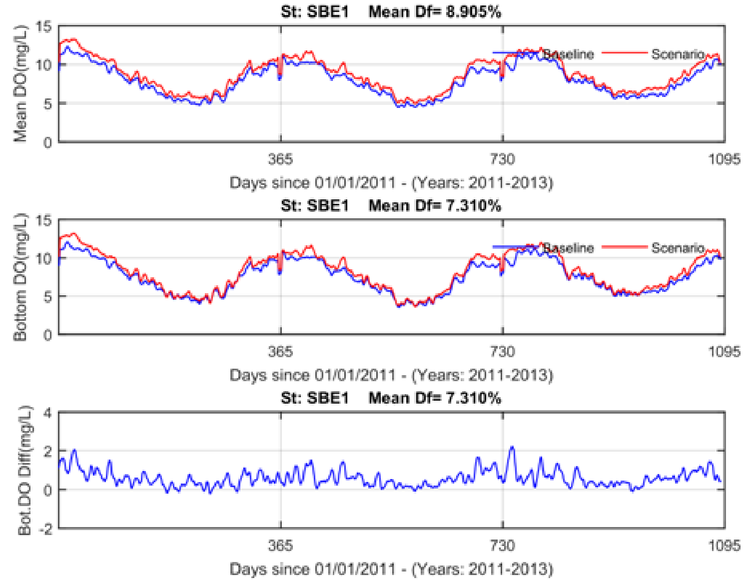

St: LFB01 Mean Df=-6.673%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-7.694%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-7.694%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)



St: SBE1 Mean Df= 18.319%

St: SBE1 Mean Df=-10.253%

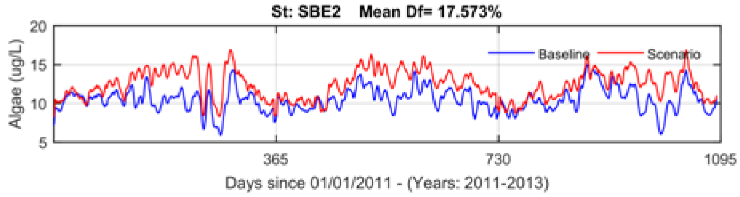
St: SBE1 Mean Df= 6.288%

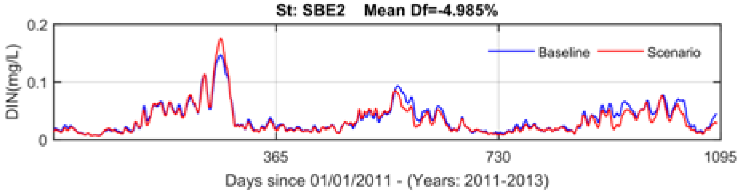


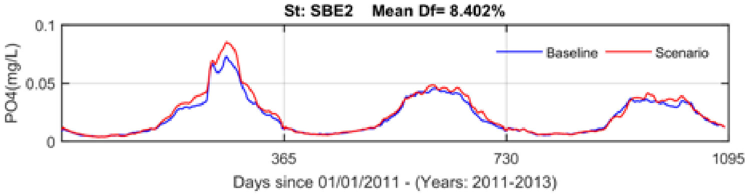
St: SBE1 Mean Df= 8.905%

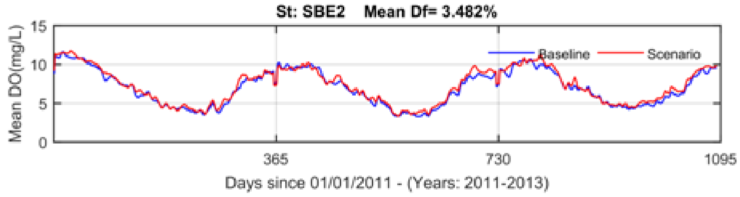
St: SBE1 Mean Df= 7.310%

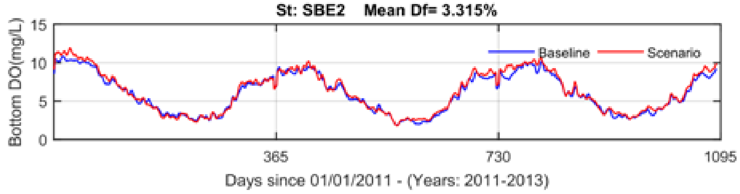
St: SBE1 Mean Df= 7.310%

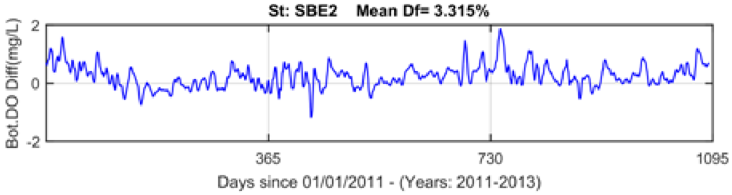

St: SBE2 Mean Df= 17.573%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

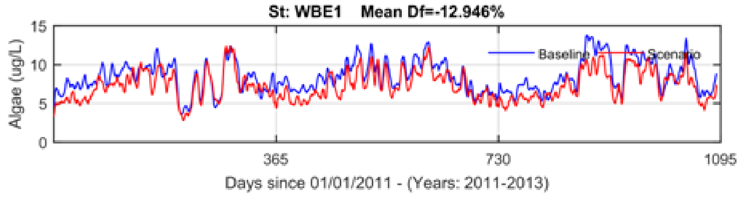

St: SBE2 Mean Df=-4.985%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

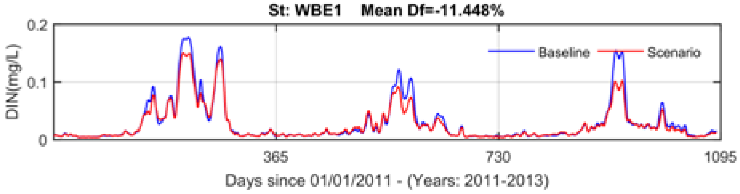

St: SBE2 Mean Df= 8.402%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

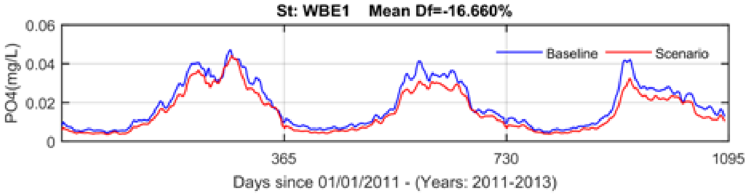

St: SBE2 Mean Df= 3.482%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

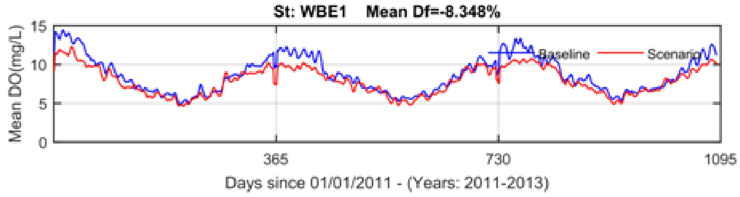

St: SBE2 Mean Df= 3.315%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

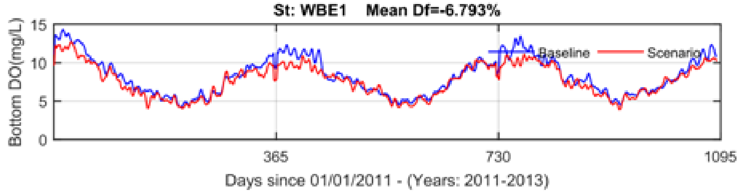

St: SBE2 Mean Df= 3.315%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

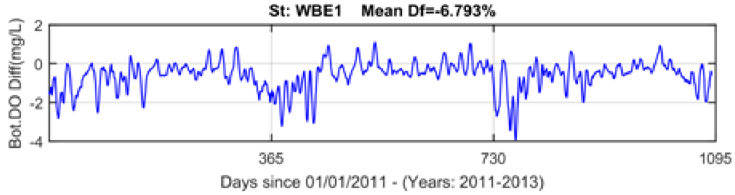

St: WBE1 Mean Df=-12.946%
Algae (ug/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: WBE1 Mean Df=-11.448%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: WBE1 Mean Df=-16.660%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

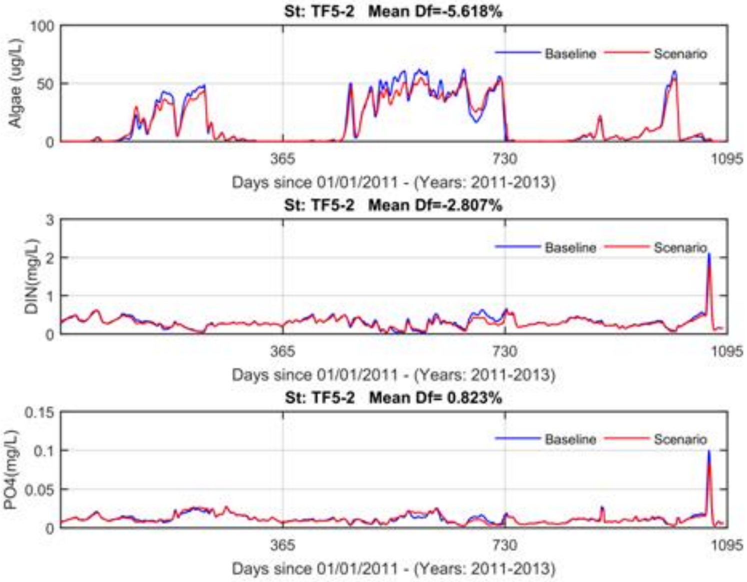

St: WBE1 Mean Df=-8.348%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

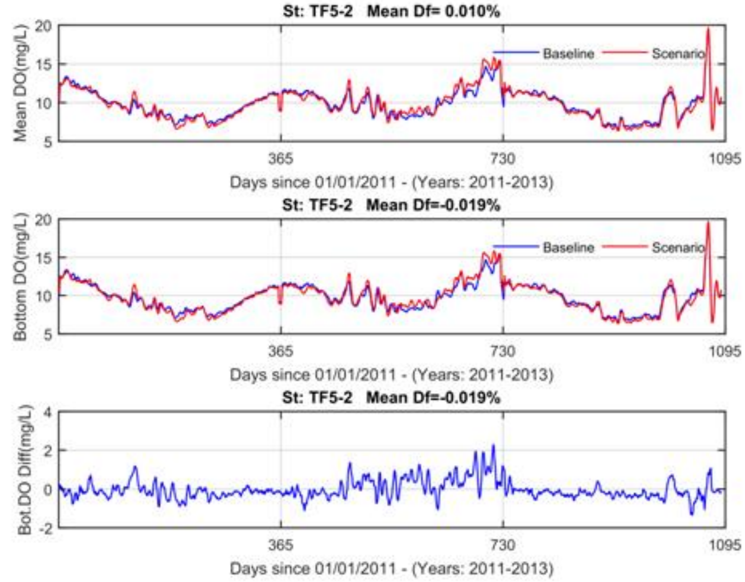

St: WBE1 Mean Df=-6.793%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

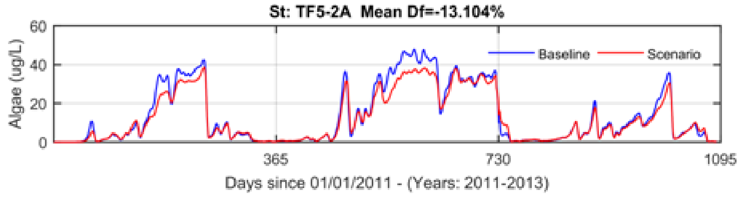

St: WBE1 Mean Df=-6.793%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

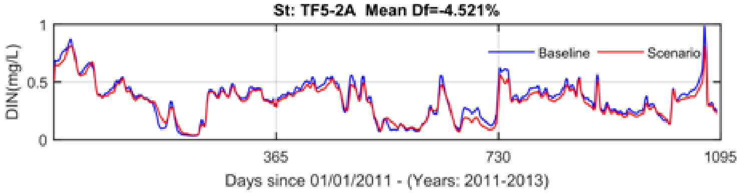
Model Simulation Scenario 3-2 and Scenario 3-2-SLR

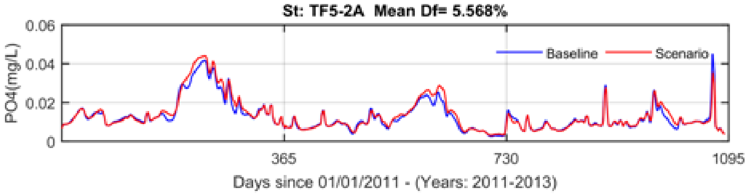
In the following plots, the baseline is the result of Scenario 3-2 and Scenario is Scenario 3-2-SLR

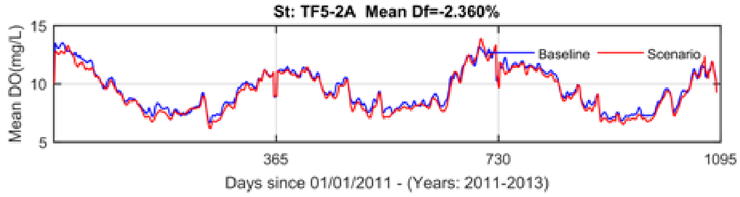

St: TF5-2 Mean Df=-5.618%
Algae (ug/L)
100
50
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-2.807%
DIN(mg/L)
3
2
1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df= 0.823%
PO4(mg/L)
0.15
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

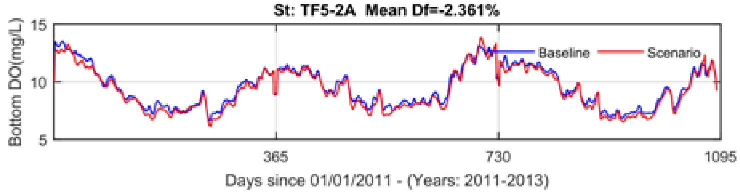

St: TF5-2 Mean Df= 0.010%
Mean DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-0.019%
Bottom DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-0.019%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

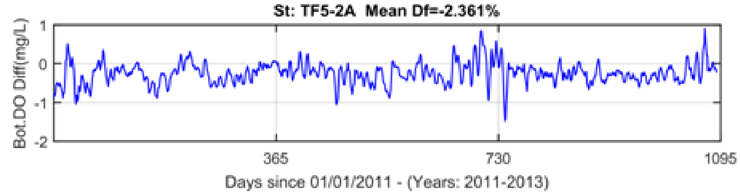

St: TF5-2A Mean Df=-13.104%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

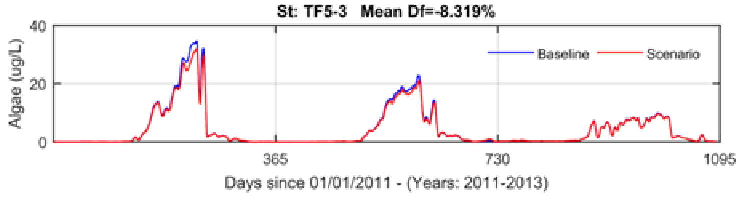

St: TF5-2A Mean Df=-4.521%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

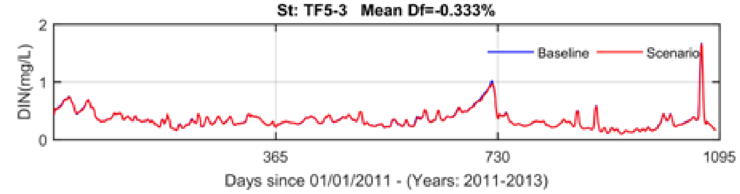

St: TF5-2A Mean Df= 5.568%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

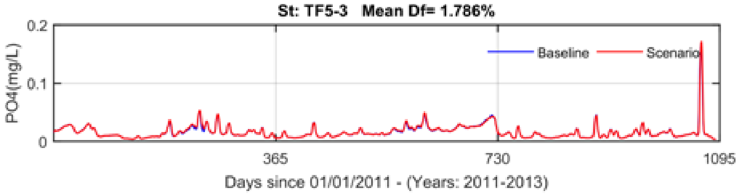

St: TF5-2A Mean Df=-2.360%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

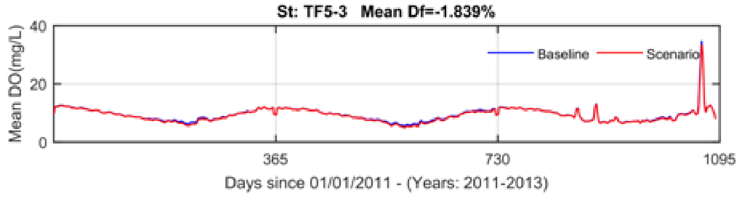

St: TF5-2A Mean Df=-2.361%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

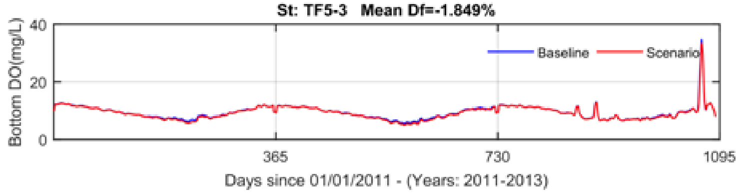

St: TF5-2A Mean Df=-2.361%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

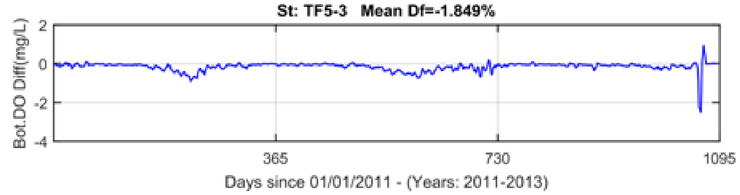

St: TF5-3 Mean Df=-8.319%
Algae (ug/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

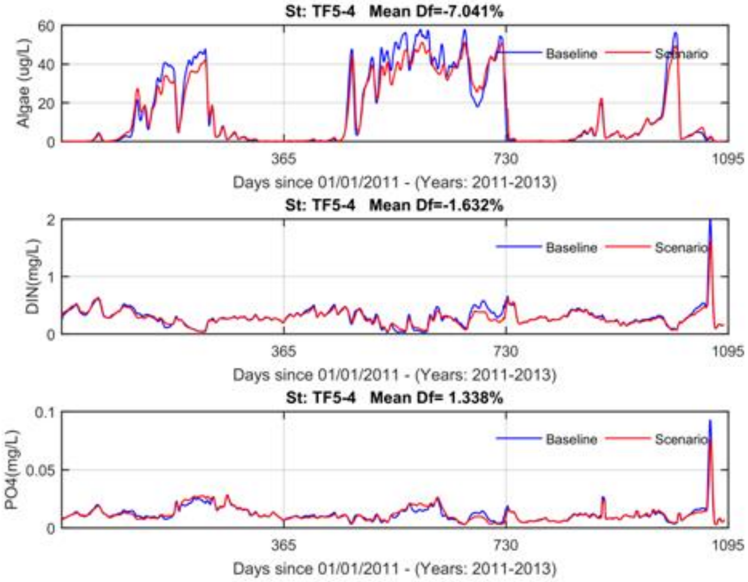

St: TF5-3 Mean Df=-0.333%
DIN(mg/L)
2
1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

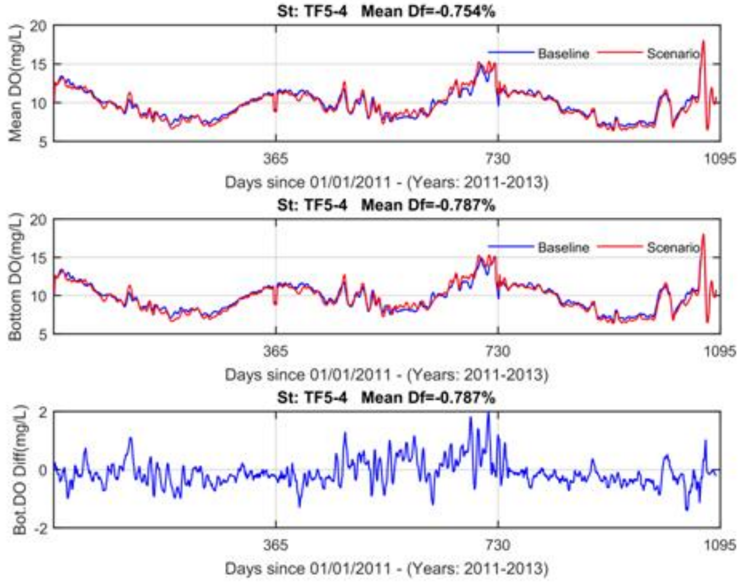

St: TF5-3 Mean Df= 1.786%
PO4(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

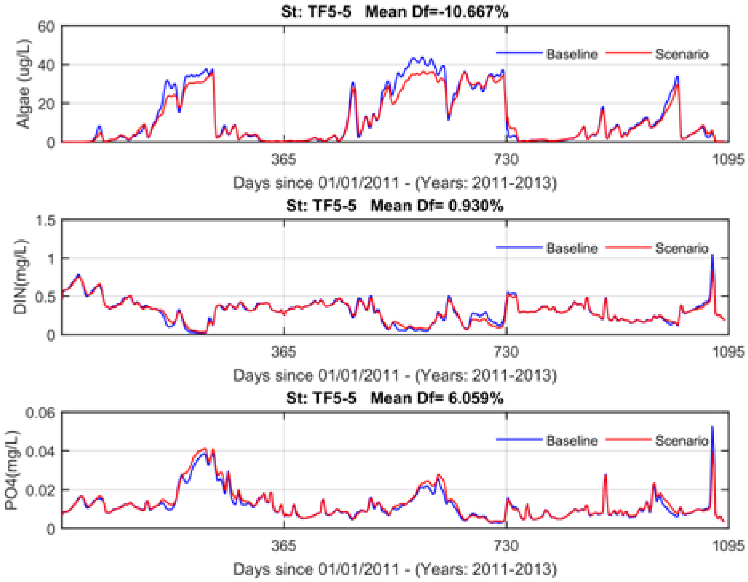

St: TF5-3 Mean Df=-1.839%
Mean DO(mg/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-3 Mean Df=-1.849%
Bottom DO(mg/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-3 Mean Df=-1.849%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

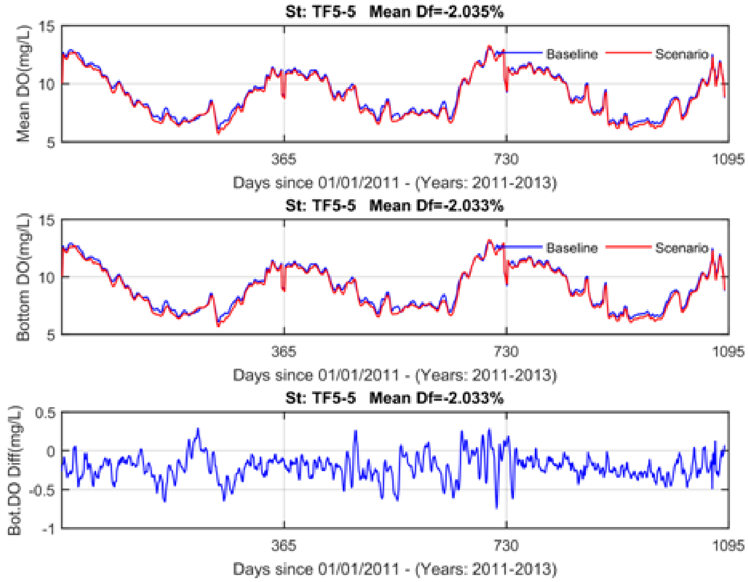

St: TF5-4 Mean Df=-7.041%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df=-1.632%
DIN(mg/L)
2
1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df= 1.338%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-4 Mean Df=-0.754%
Mean DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df=-0.787%
Bottom DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-4 Mean Df=-0.787%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-5 Mean Df=-10.667%

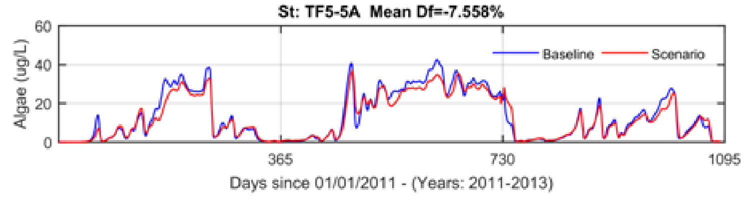
St: TF5-5 Mean Df= 0.930%

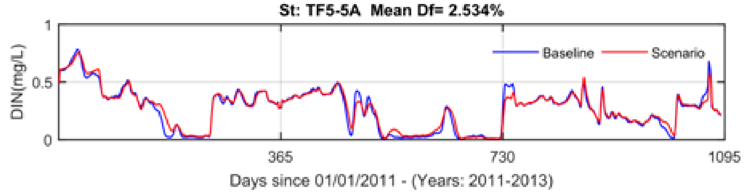
St: TF5-5 Mean Df= 6.059%

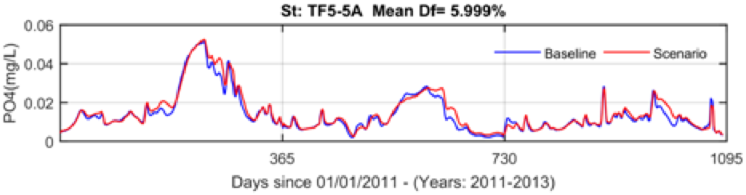

St: TF5-5 Mean Df=-2.035%

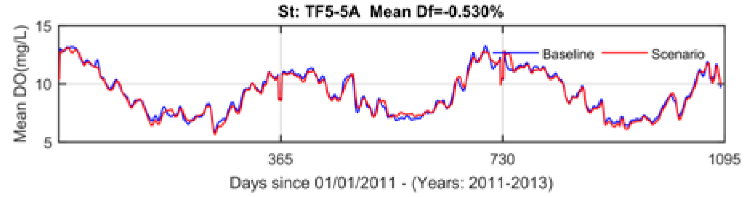
St: TF5-5 Mean Df=-2.033%

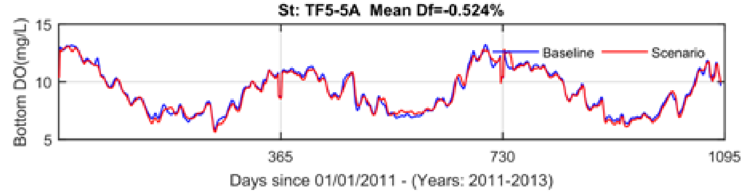
St: TF5-5 Mean Df=-2.033%

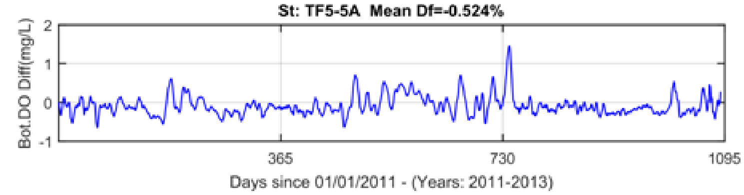

St: TF5-5A Mean Df=-7.558%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-5A Mean Df= 2.534%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

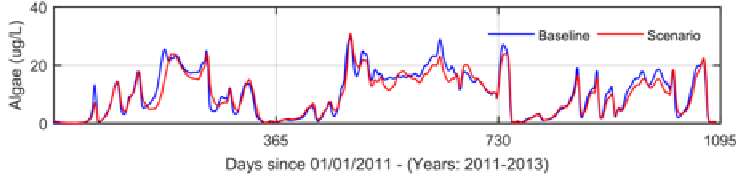

St: TF5-5A Mean Df= 5.999%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-5A Mean Df=-0.530%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

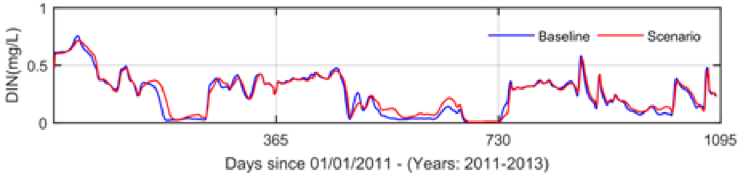

St: TF5-5A Mean Df=-0.524%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-5A Mean Df=-0.524%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

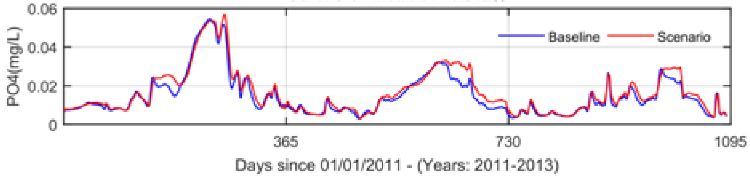
St: TF5-6 Mean Df=-8.565%



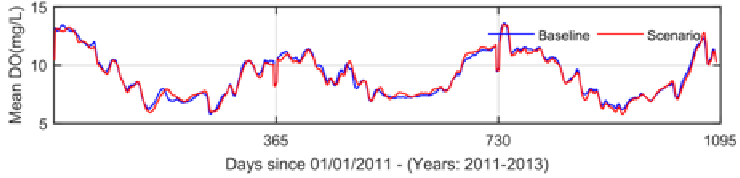
St: TF5-6 Mean Df= 6.067%



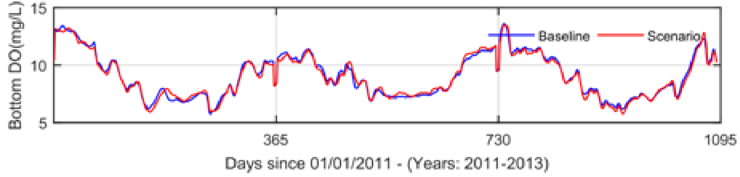
St: TF5-6 Mean Df= 9.912%



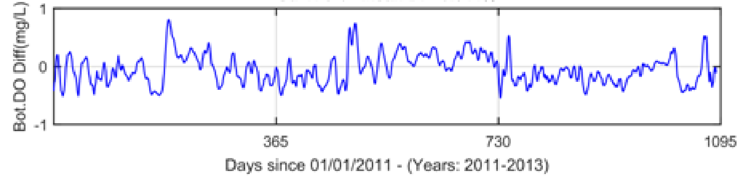
St: TF5-6 Mean Df=-0.559%

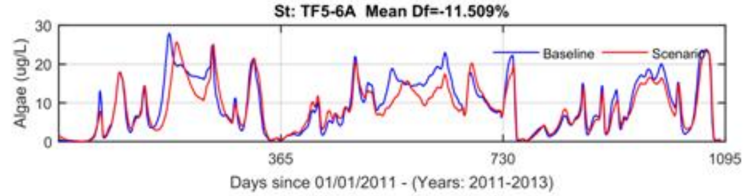


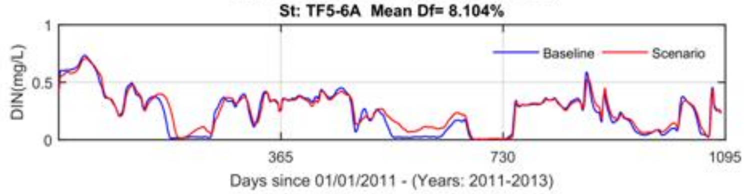
St: TF5-6 Mean Df=-0.544%

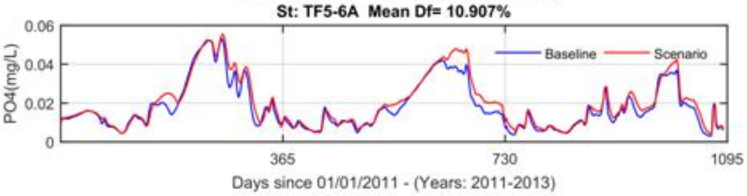


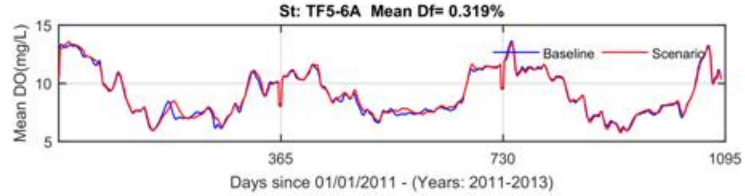
St: TF5-6 Mean Df=-0.544%

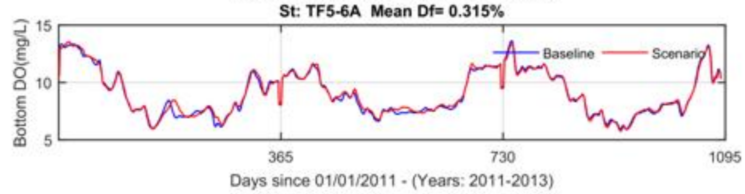


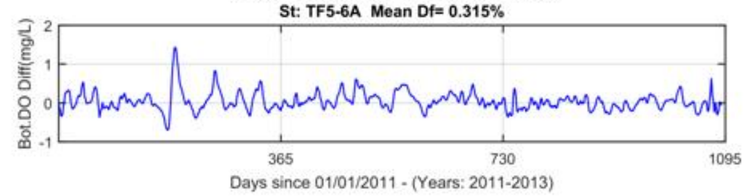

St: TF5-6A Mean Df=-11.509%

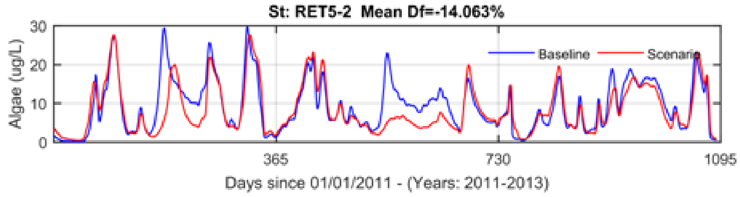

St: TF5-6A Mean Df= 8.104%

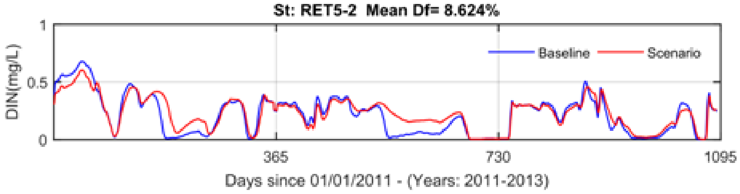

St: TF5-6A Mean Df= 10.907%

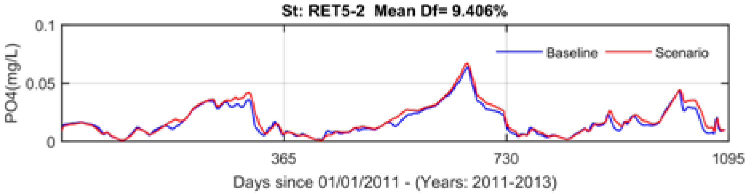

St: TF5-6A Mean Df= 0.319%

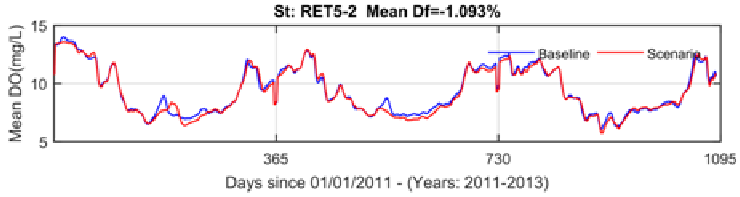

St: TF5-6A Mean Df= 0.315%

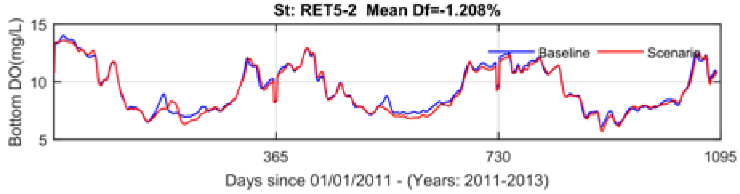

St: TF5-6A Mean Df= 0.315%

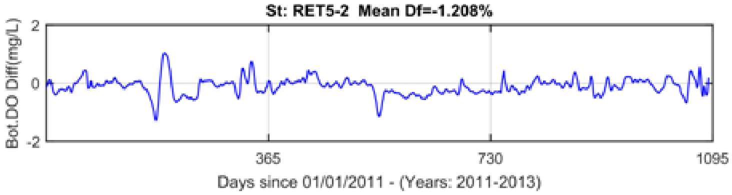

St: RET5-2 Mean Df=-14.063%

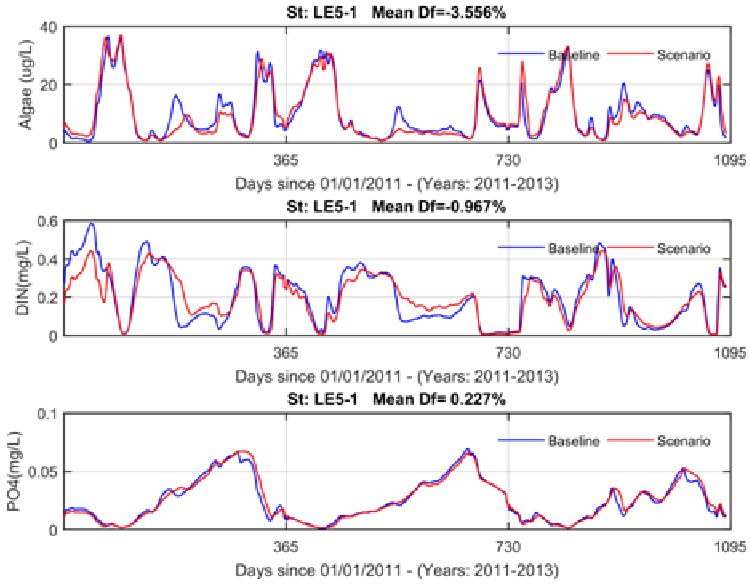

St: RET5-2 Mean Df= 8.624%

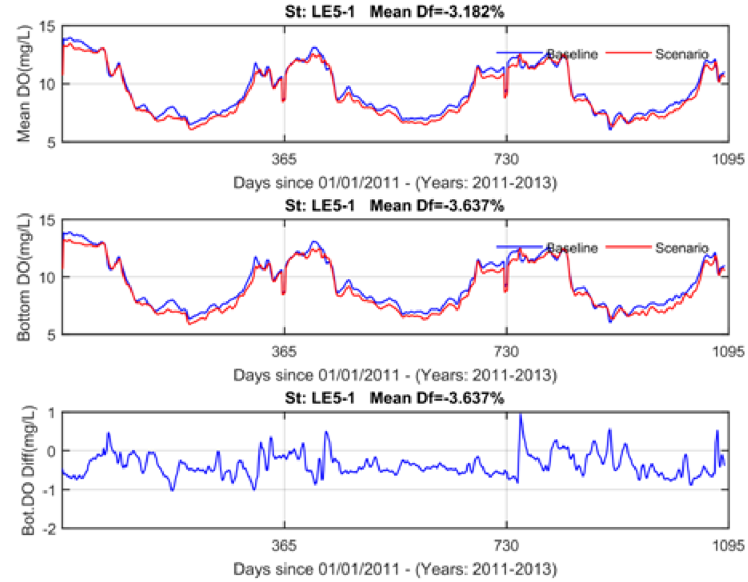

St: RET5-2 Mean Df= 9.406%

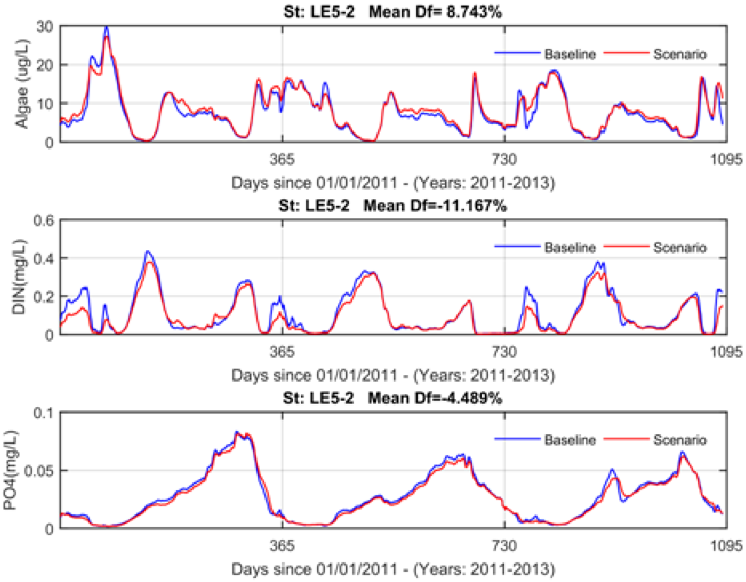

St: RET5-2 Mean Df=-1.093%

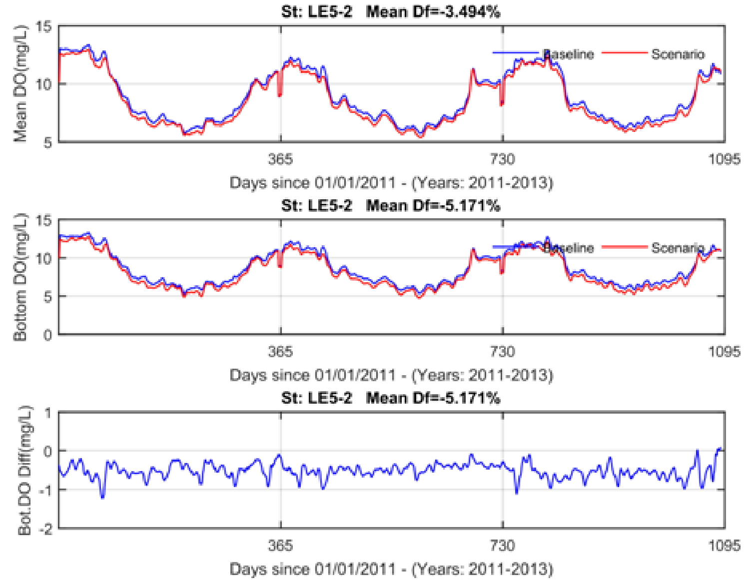

St: RET5-2 Mean Df=-1.208%

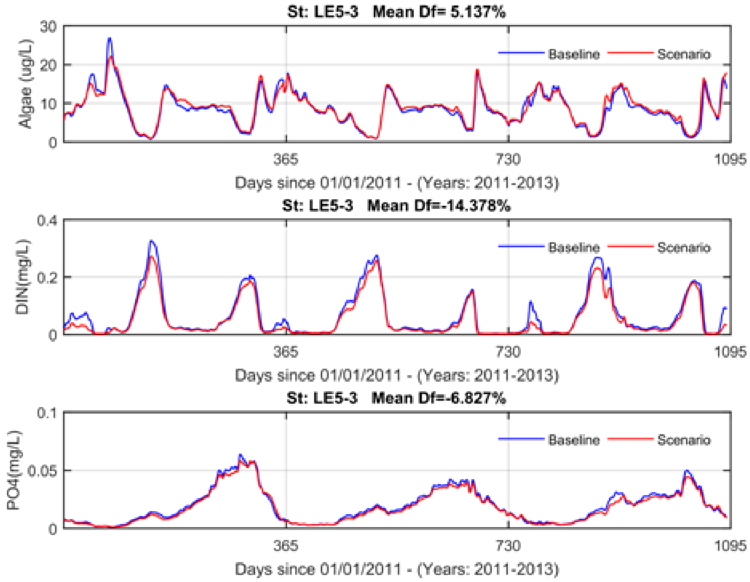

St: RET5-2 Mean Df=-1.208%

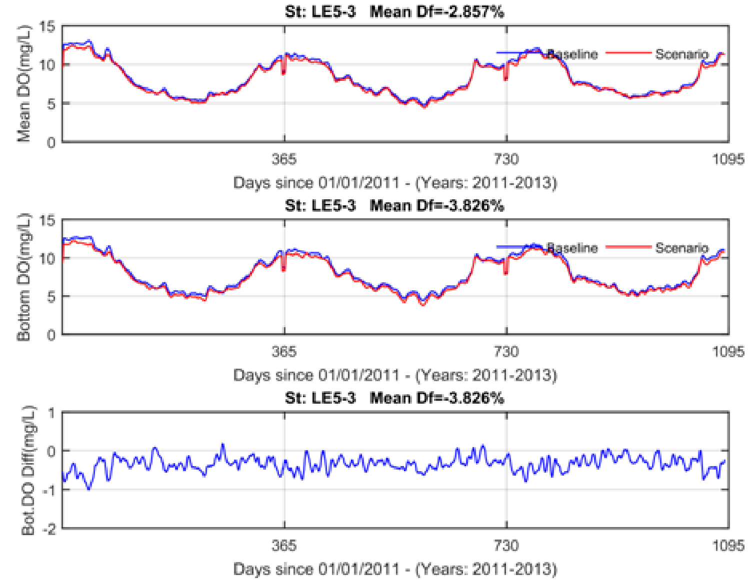

St: LE5-1   Mean Df=-3.556%
Algae (ug/L)
40
20
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1   Mean Df=-0.967%
DIN(mg/L)
0.6
0.4
0.2
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1   Mean Df= 0.227%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

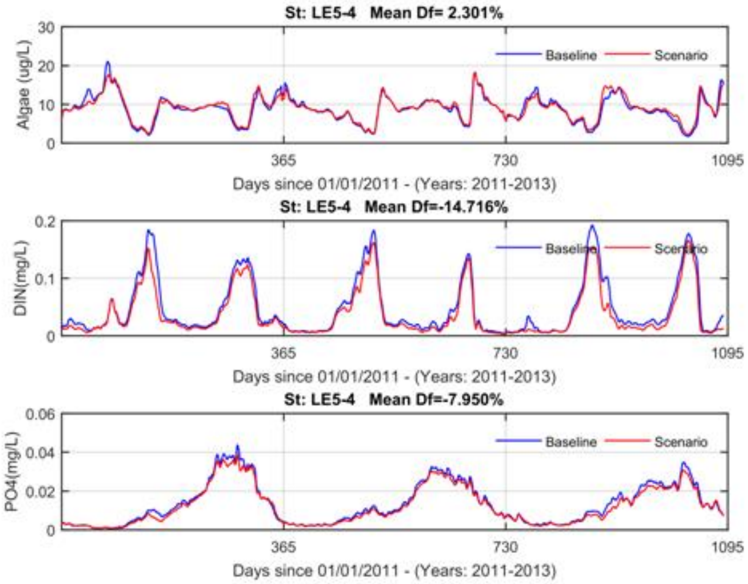

St: LE5-1   Mean Df=-3.182%
Mean DO(mg/L)
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1   Mean Df=-3.637%
Bottom DO(mg/L)
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1   Mean Df=-3.637%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

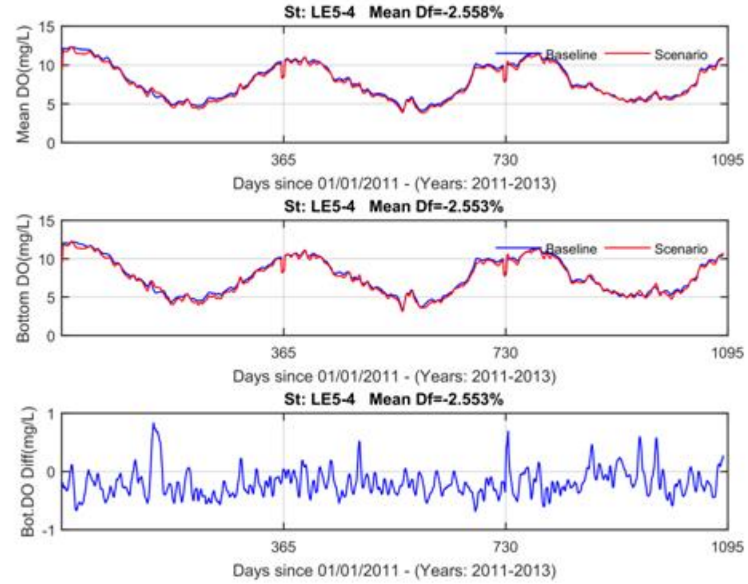

St: LE5-2 Mean Df= 8.743%
Algae (ug/L)
0
10
20
30
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-11.167%
DIN(mg/L)
0
0.2
0.4
0.6
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-4.489%
PO4(mg/L)
0
0.05
0.1
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

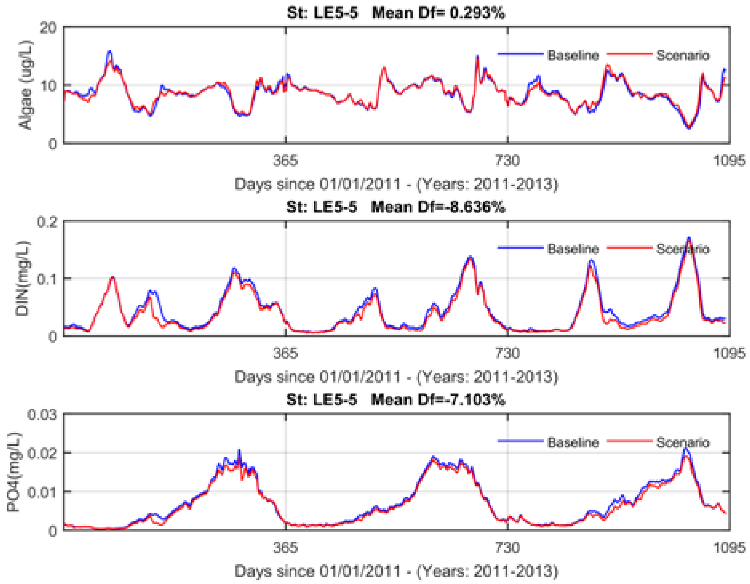

St: LE5-2 Mean Df=-3.494%
Mean DO(mg/L)
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-5.171%
Bottom DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-5.171%
Bot.DO Diff(mg/L)
-2
-1
0
1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

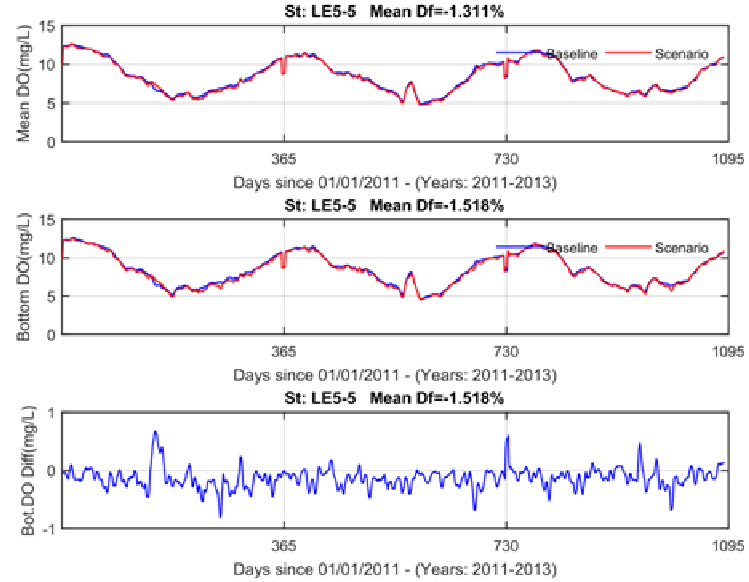

St: LE5-3 Mean Df= 5.137%
Algae (ug/L)
30
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-14.378%
DIN(mg/L)
0.4
0.2
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-6.827%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

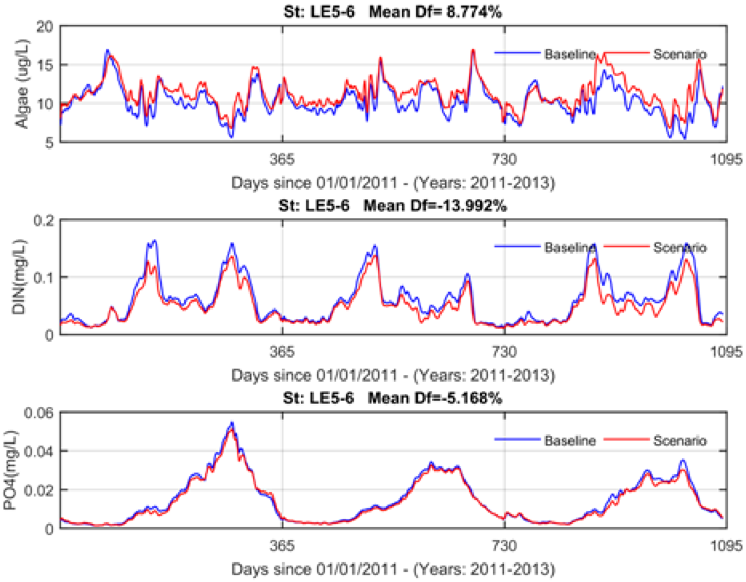

St: LE5-3 Mean Df=-2.857%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-3.826%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-3.826%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-4 Mean Df= 2.301%
Algae (ug/L)
0
10
20
30
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-14.716%
DIN(mg/L)
0
0.1
0.2
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-7.950%
PO4(mg/L)
0
0.02
0.04
0.06
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-4 Mean Df=-2.558%
Mean DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.553%
Bottom DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.553%
Bot.DO Diff(mg/L)
-1
0
1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-5 Mean Df= 0.293%
Algae (ug/L)
20
10
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-8.636%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-7.103%
PO4(mg/L)
0.03
0.02
0.01
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

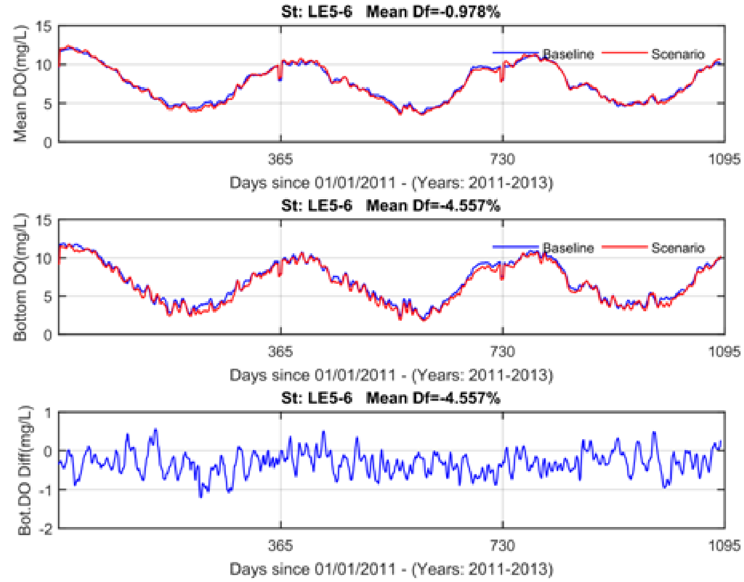

St: LE5-5 Mean Df=-1.311%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-1.518%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-5 Mean Df=-1.518%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)



St: LE5-6 Mean Df= 8.774%

St: LE5-6 Mean Df=-13.992%

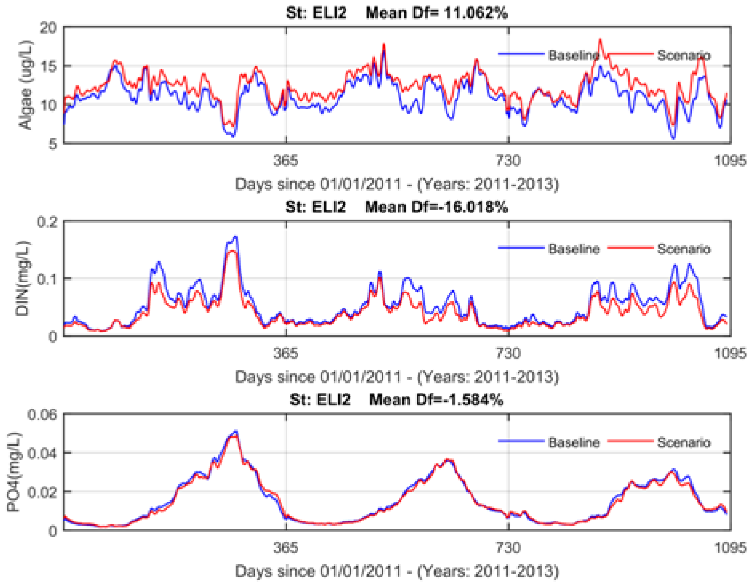
St: LE5-6 Mean Df=-5.168%

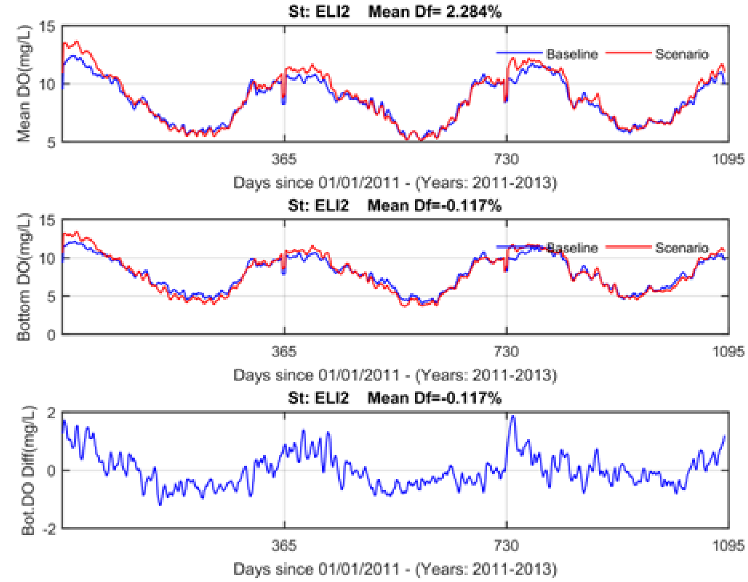


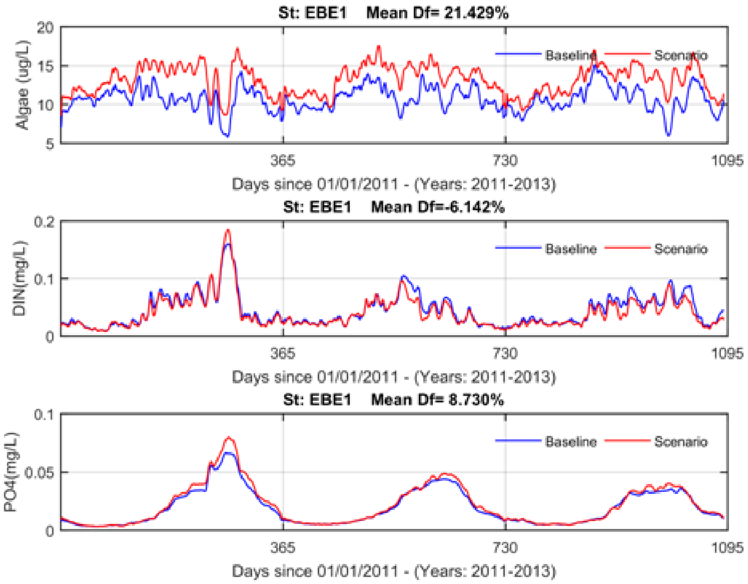
St: LE5-6 Mean Df=-0.978%

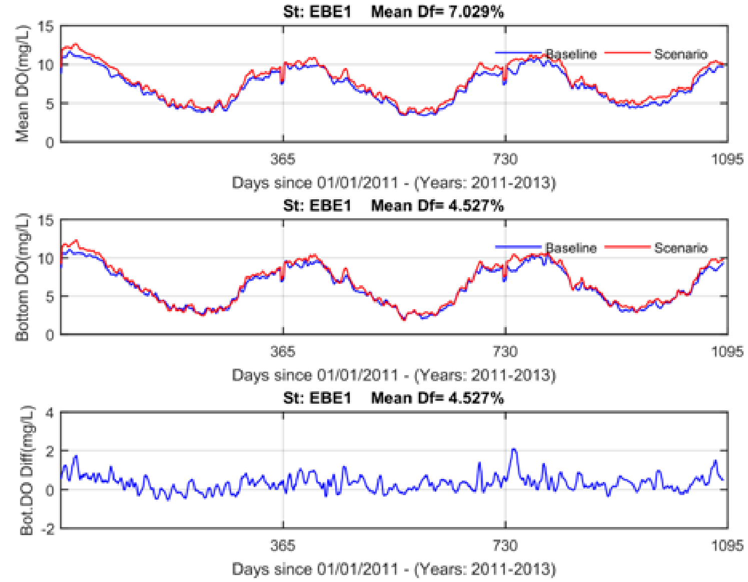
St: LE5-6 Mean Df=-4.557%

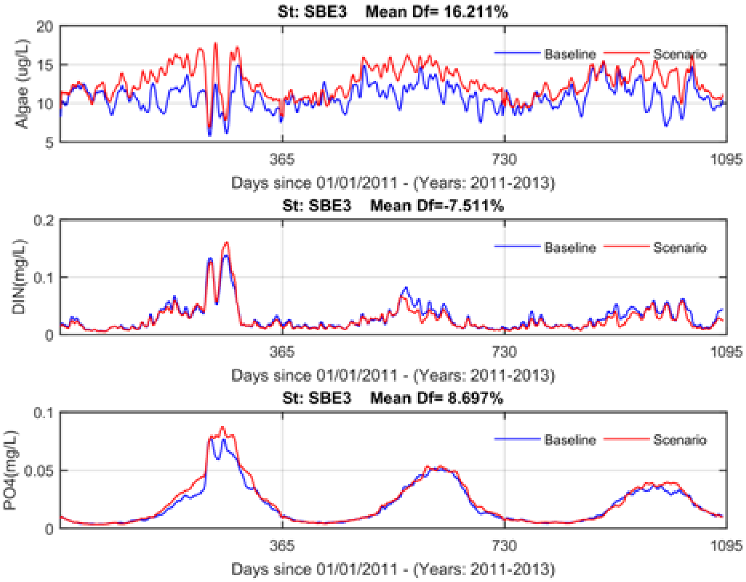
St: LE5-6 Mean Df=-4.557%

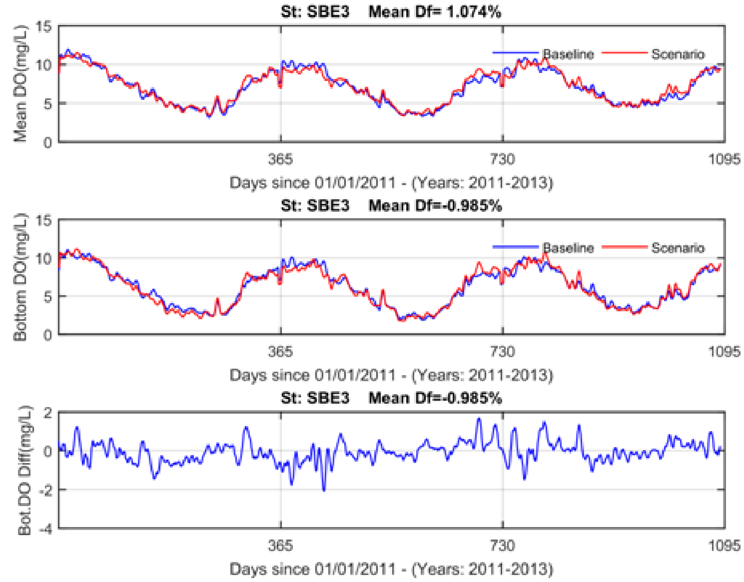

St: ELI2 Mean Df= 11.062%
Algae (ug/L)
20
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: ELI2 Mean Df=-16.018%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: ELI2 Mean Df=-1.584%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

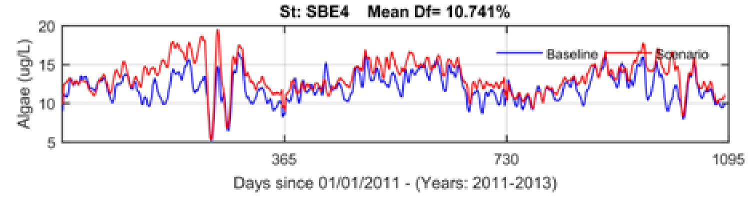

St: ELI2 Mean Df= 2.284%
Mean DO(mg/L)
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: ELI2 Mean Df=-0.117%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: ELI2 Mean Df=-0.117%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

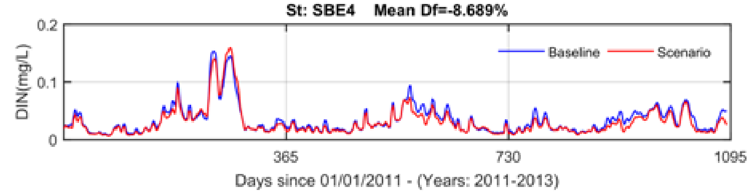

St: EBE1 Mean Df= 21.429%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df=-6.142%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df= 8.730%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

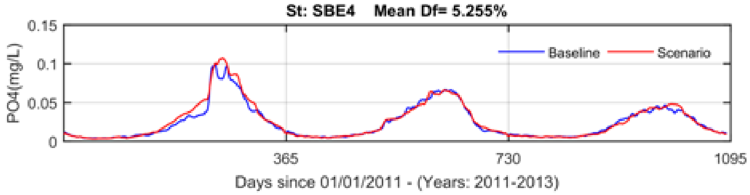

St: EBE1 Mean Df= 7.029%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df= 4.527%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df= 4.527%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

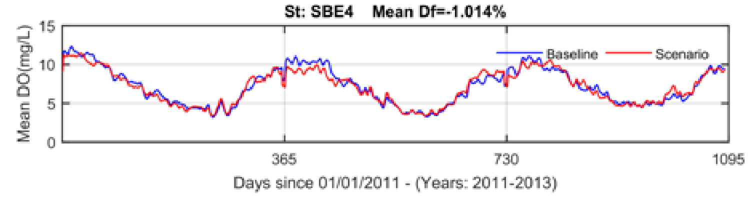

St: SBE3 Mean Df= 16.211%
Algae (ug/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df=-7.511%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df= 8.697%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

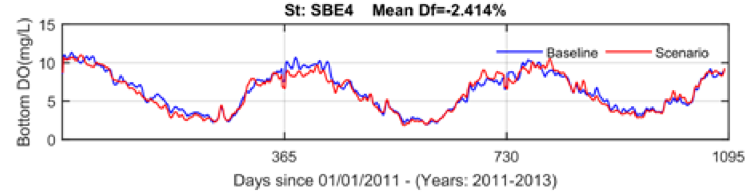

St: SBE3 Mean Df= 1.074%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df=-0.985%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df=-0.985%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

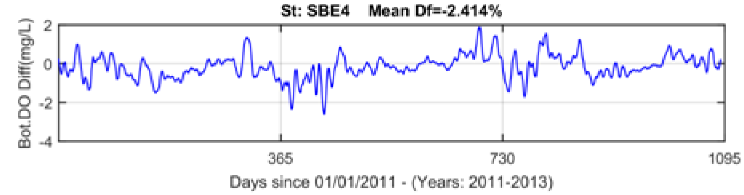

St: SBE4 Mean Df= 10.741%
Algae (ug/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

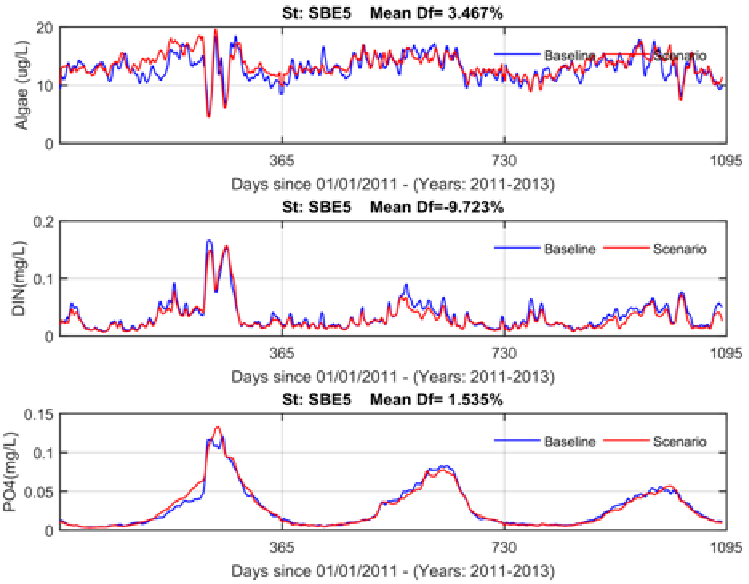

St: SBE4 Mean Df=-8.689%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

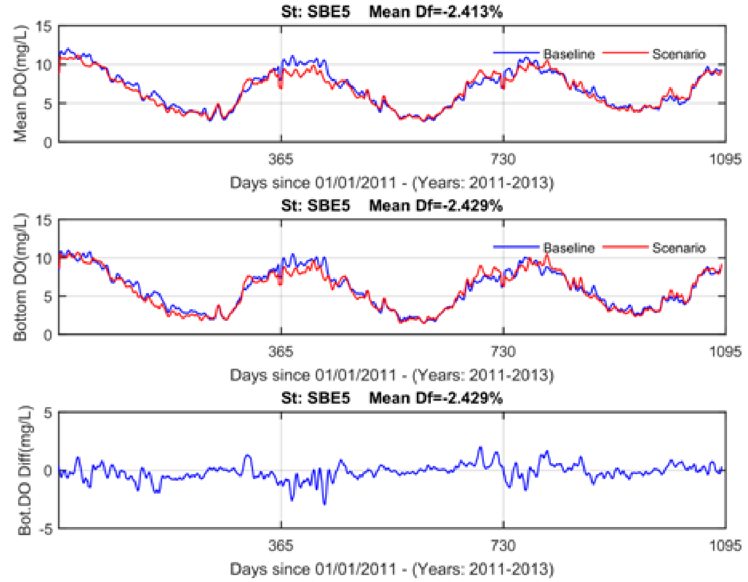

St: SBE4 Mean Df= 5.255%
PO4(mg/L)
0.15
0.1
0.05
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

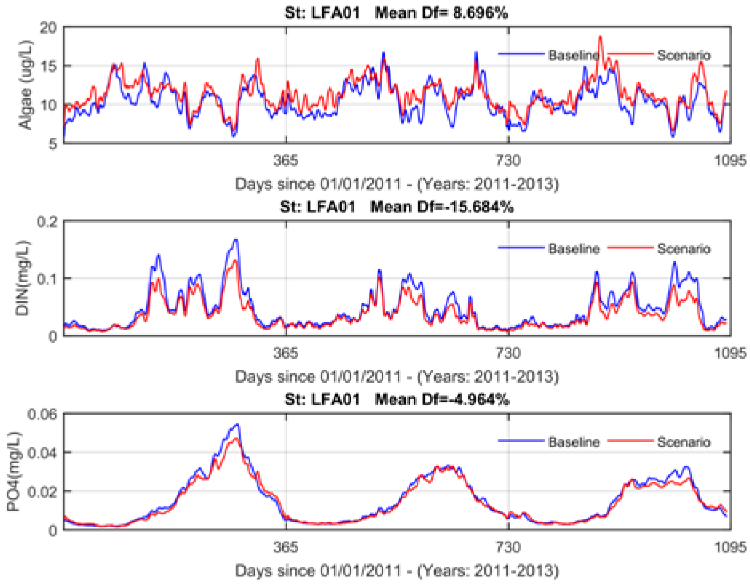

St: SBE4 Mean Df=-1.014%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

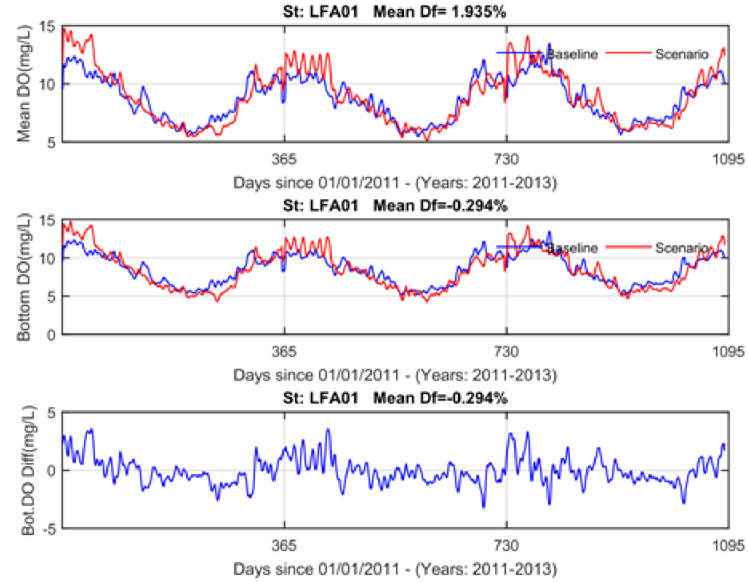

St: SBE4 Mean Df=-2.414%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

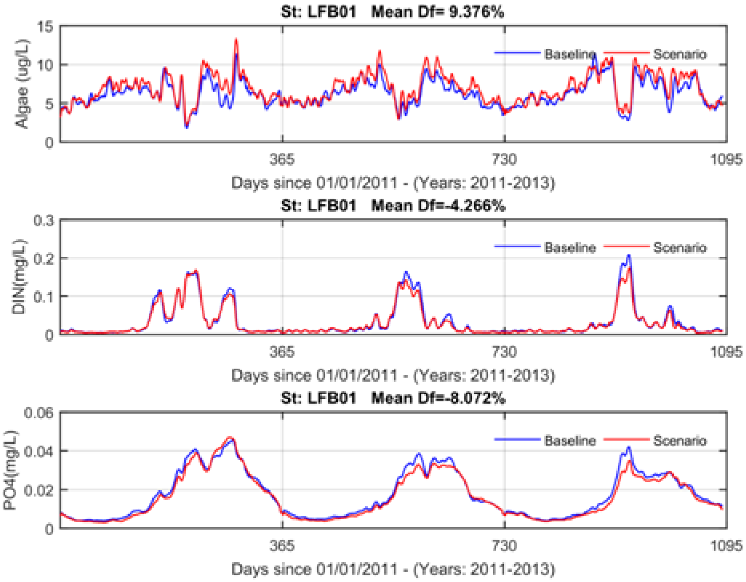

St: SBE4 Mean Df=-2.414%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

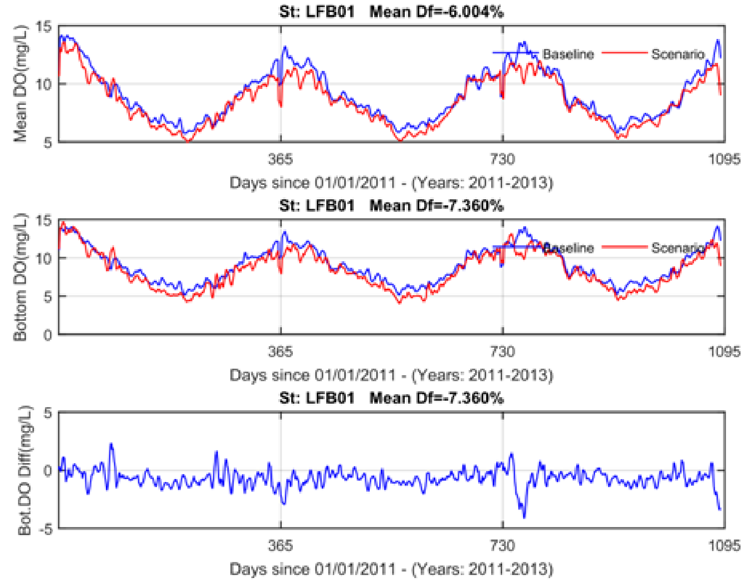

St: SBE5 Mean Df= 3.467%
Algae (ug/L)
20
10
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE5 Mean Df=-9.723%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE5 Mean Df= 1.535%
PO4(mg/L)
0.15
0.1
0.05
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

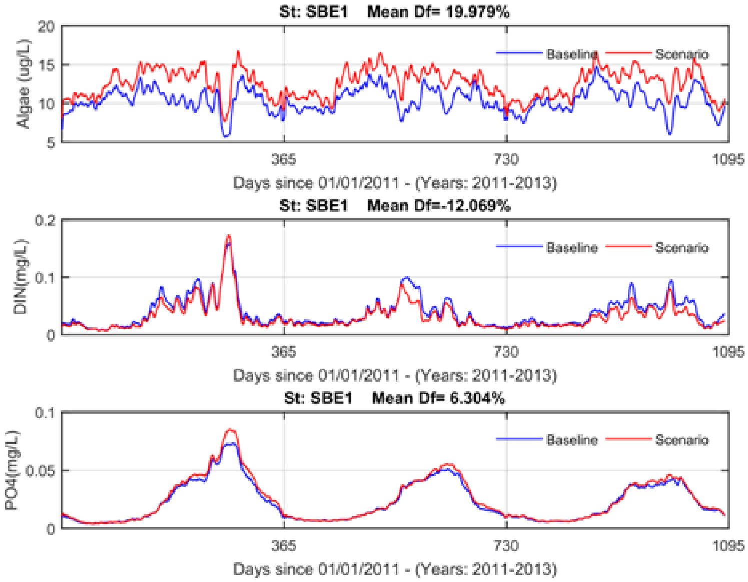

St: SBE5 Mean Df=-2.413%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE5 Mean Df=-2.429%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: SBE5 Mean Df=-2.429%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

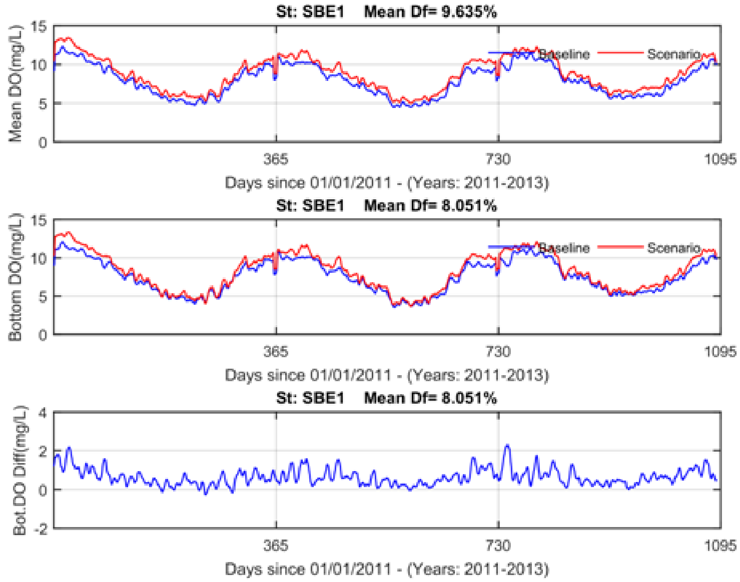

St: LFA01 Mean Df= 8.696%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-15.684%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-4.964%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

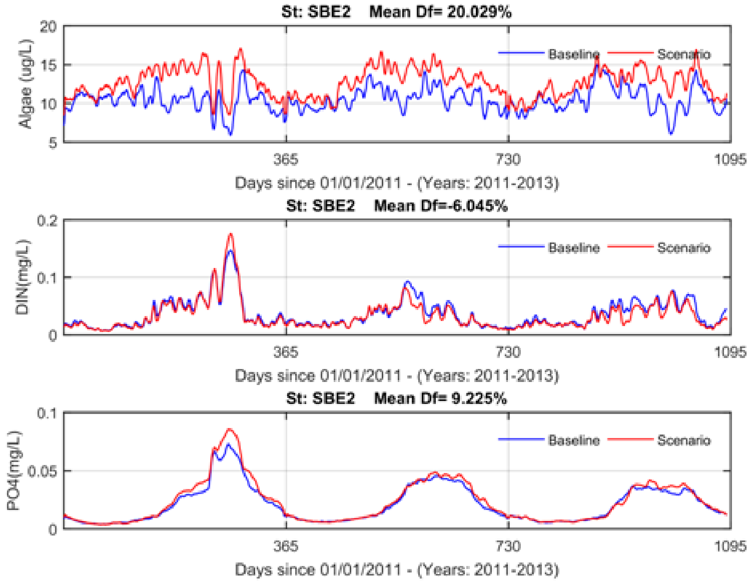

St: LFA01 Mean Df= 1.935%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-0.294%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-0.294%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

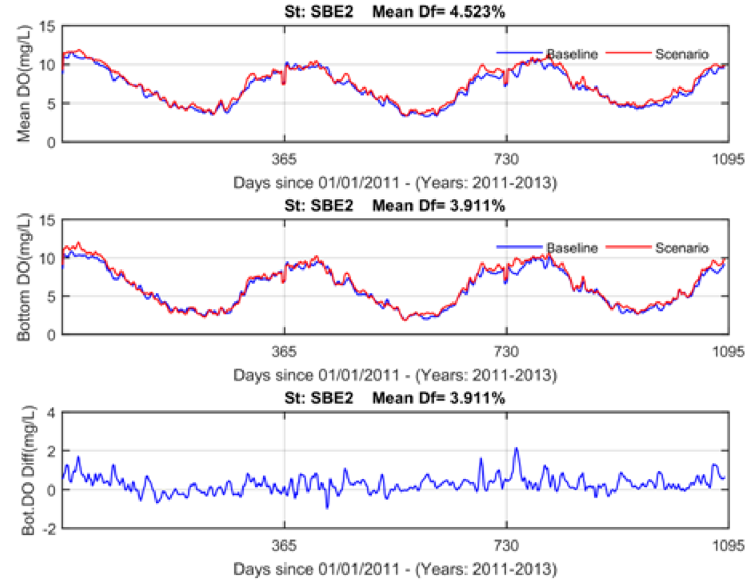

St: LFB01 Mean Df= 9.376%
Algae (ug/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-4.266%
DIN(mg/L)
0.3
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-8.072%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

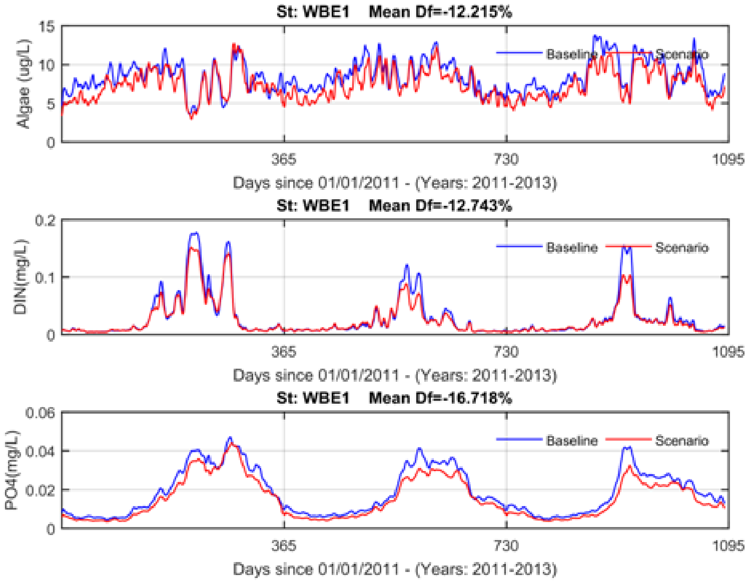

St: LFB01 Mean Df=-6.004%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-7.360%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-7.360%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

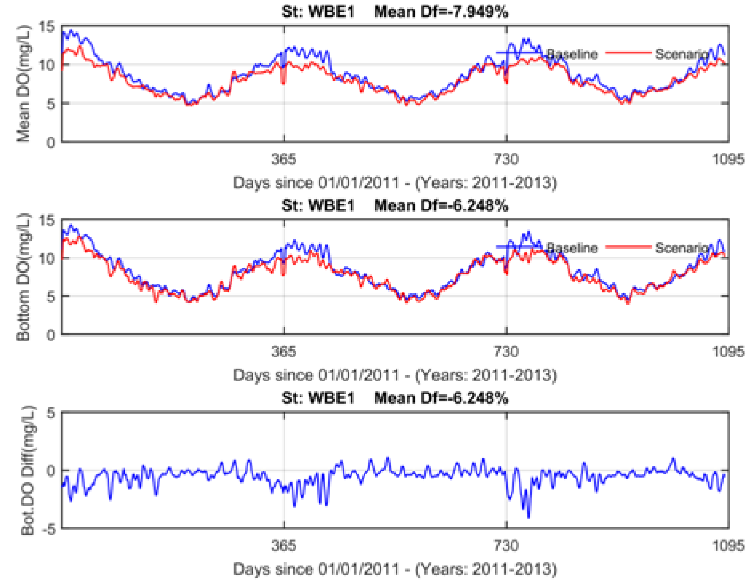

St: SBE1 Mean Df= 19.979%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df=-12.069%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df= 6.304%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: SBE1 Mean Df= 9.635%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df= 8.051%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df= 8.051%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: SBE2 Mean Df= 20.029%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df=-6.045%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 9.225%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

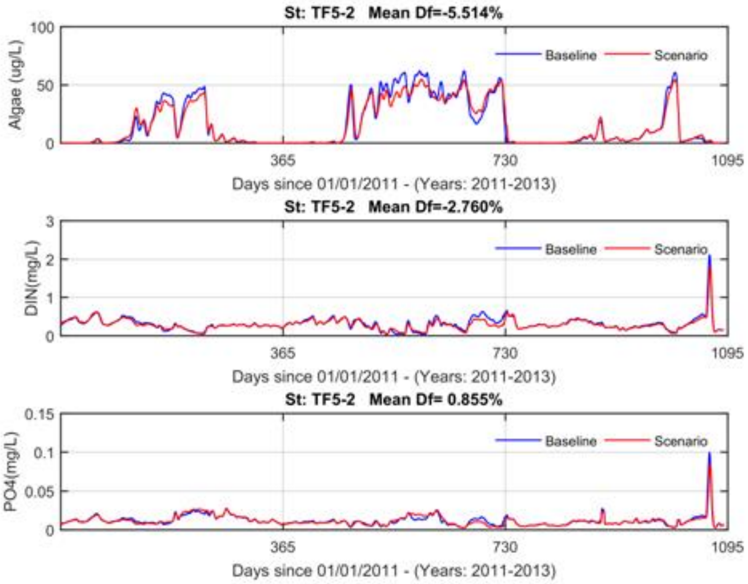

St: SBE2 Mean Df= 4.523%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 3.911%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 3.911%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: WBE1 Mean Df=-12.215%
Algae (ug/L)
0
5
10
15
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: WBE1 Mean Df=-12.743%
DIN(mg/L)
0
0.1
0.2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: WBE1 Mean Df=-16.718%
PO4(mg/L)
0
0.02
0.04
0.06
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario


St: WBE1 Mean Df=-7.949%
Mean DO(mg/L)
0
5
10
15
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: WBE1 Mean Df=-6.248%
Bottom DO(mg/L)
0
5
10
15
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: WBE1 Mean Df=-6.248%
Bot.DO Diff(mg/L)
-5
0
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

Model Simulation Scenario 4-2 and Scenario 4-2-SLR

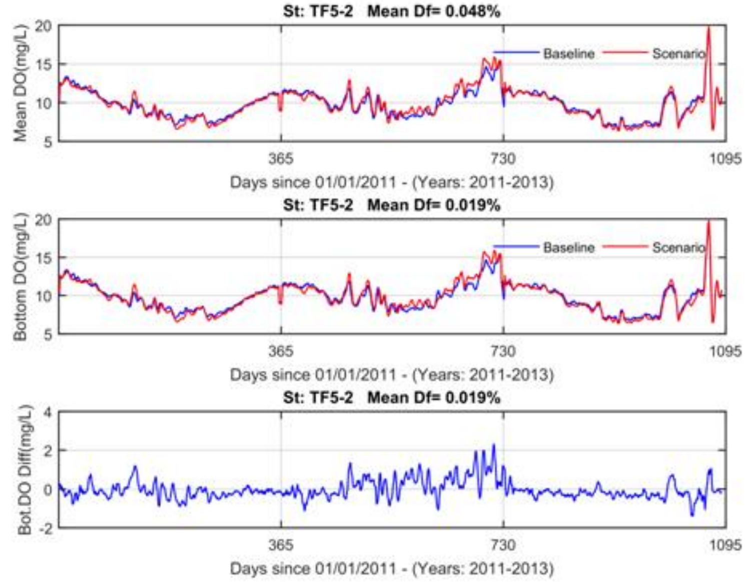
In the following plots, the baseline is the result of Scenario 4-2 and Scenario is Scenario 4-2-SLR



St: TF5-2 Mean Df=-5.514%

St: TF5-2 Mean Df=-2.760%

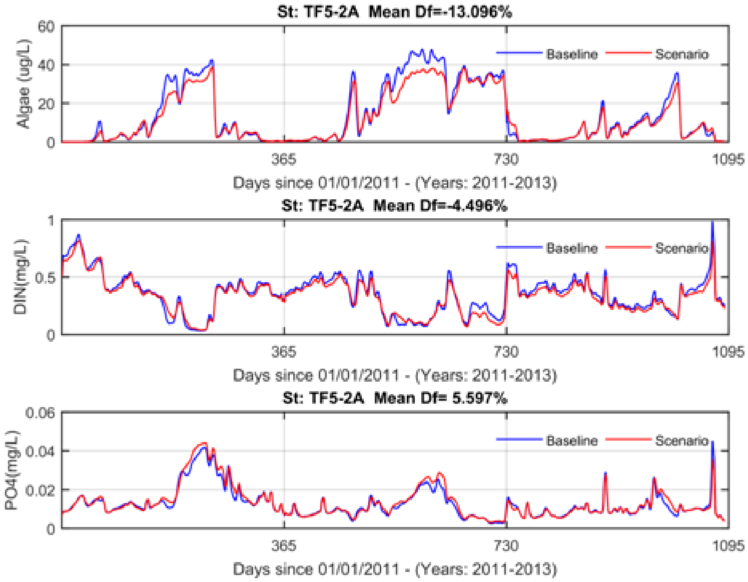
St: TF5-2 Mean Df= 0.855%

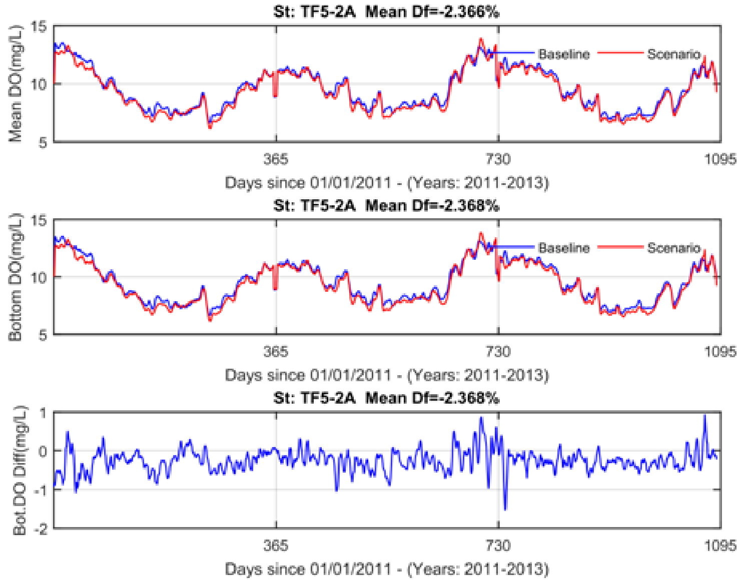


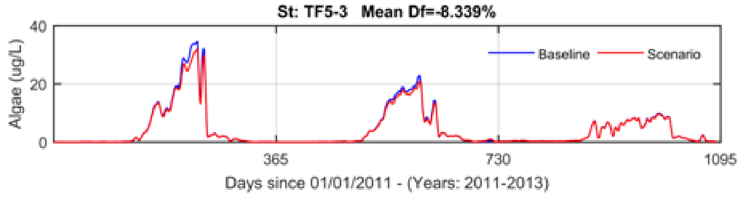
St: TF5-2 Mean Df= 0.048%

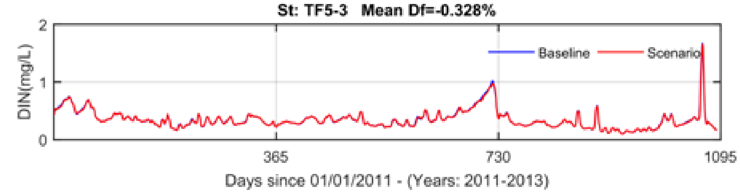
St: TF5-2 Mean Df= 0.019%

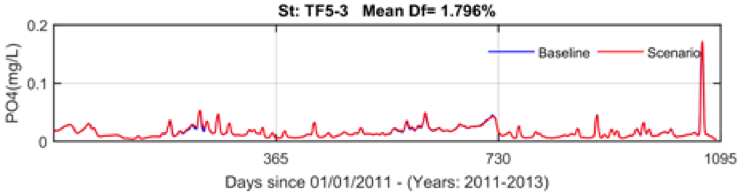
St: TF5-2 Mean Df= 0.019%

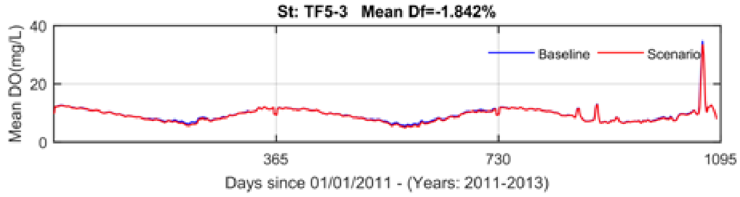

St: TF5-2A Mean Df=-13.096%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df=-4.496%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df= 5.597%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

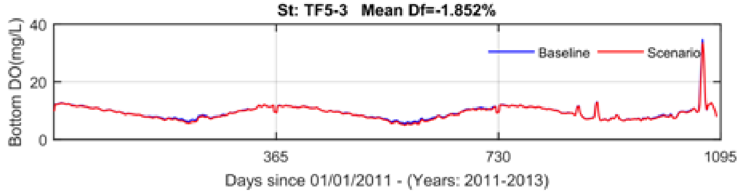

St: TF5-2A Mean Df=-2.366%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df=-2.368%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2A Mean Df=-2.368%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

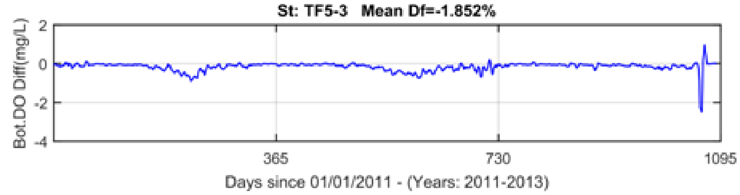

St: TF5-3 Mean Df=-8.339%
Algae (ug/L)
40
20
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-3 Mean Df=-0.328%
DIN(mg/L)
2
1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

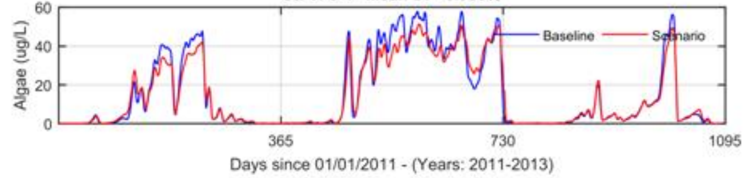

St: TF5-3 Mean Df= 1.796%
PO4(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-3 Mean Df=-1.842%
Mean DO(mg/L)
40
20
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

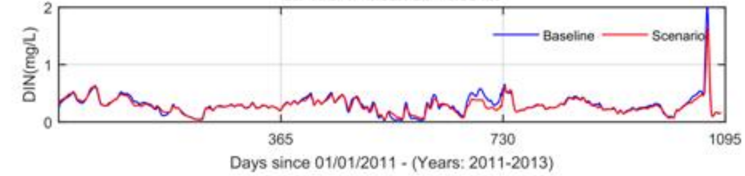

St: TF5-3 Mean Df=-1.852%
Bottom DO(mg/L)
40
20
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-3 Mean Df=-1.852%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

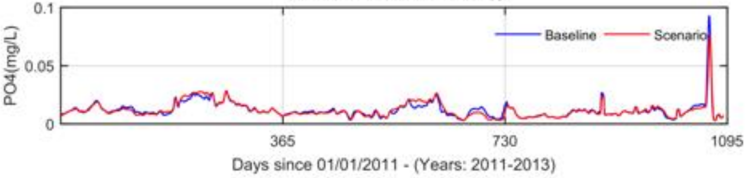
St: TF5-4 Mean Df=-6.950%



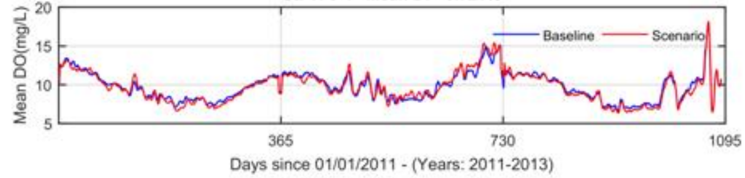
St: TF5-4 Mean Df=-1.584%



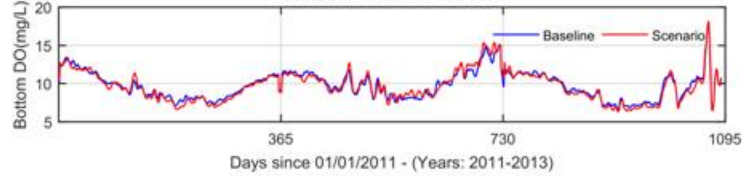
St: TF5-4 Mean Df= 1.367%



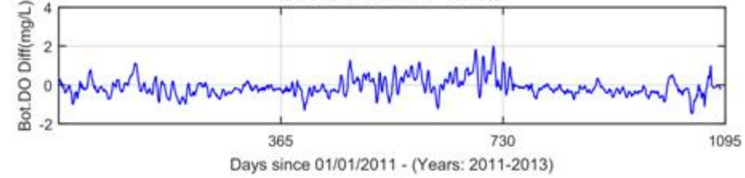
St: TF5-4 Mean Df=-0.721%

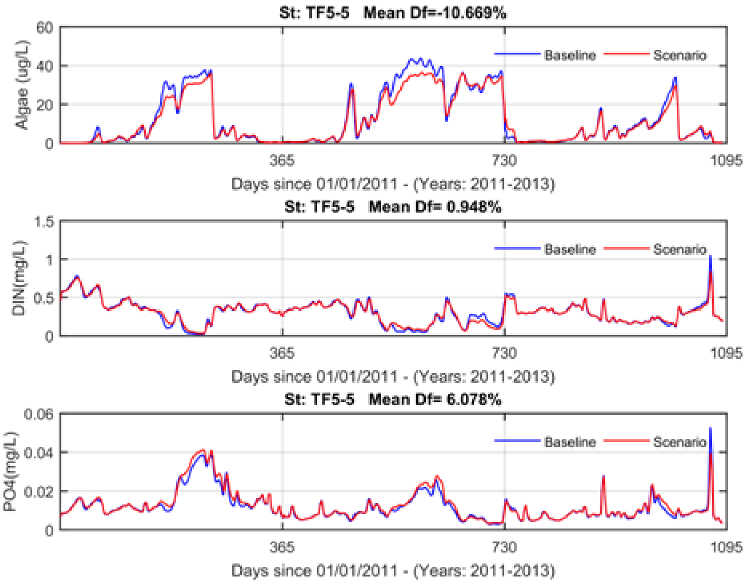


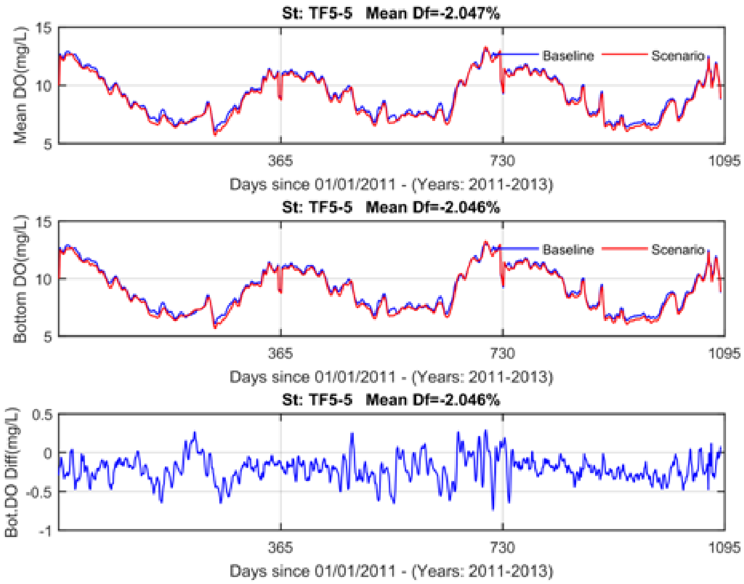
St: TF5-4 Mean Df=-0.753%

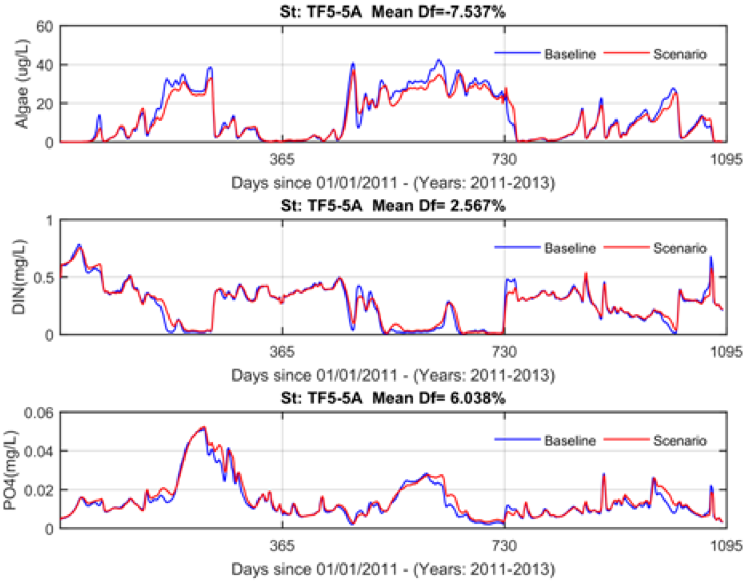


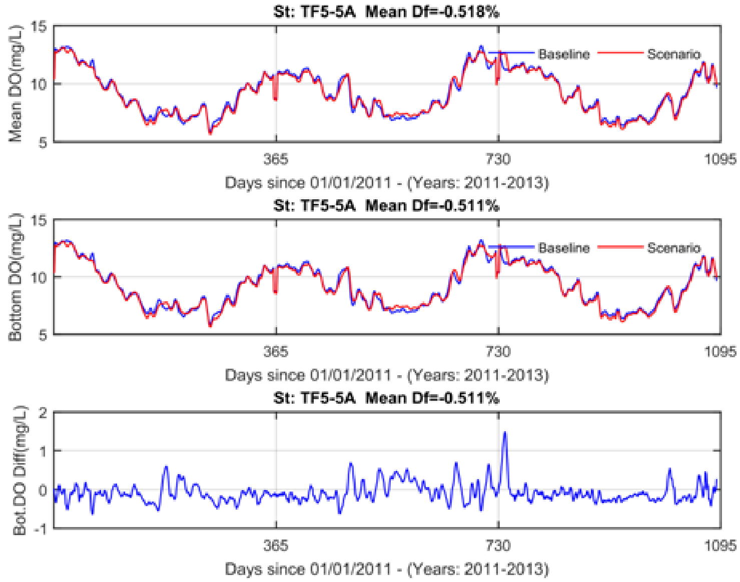
St: TF5-4 Mean Df=-0.753%

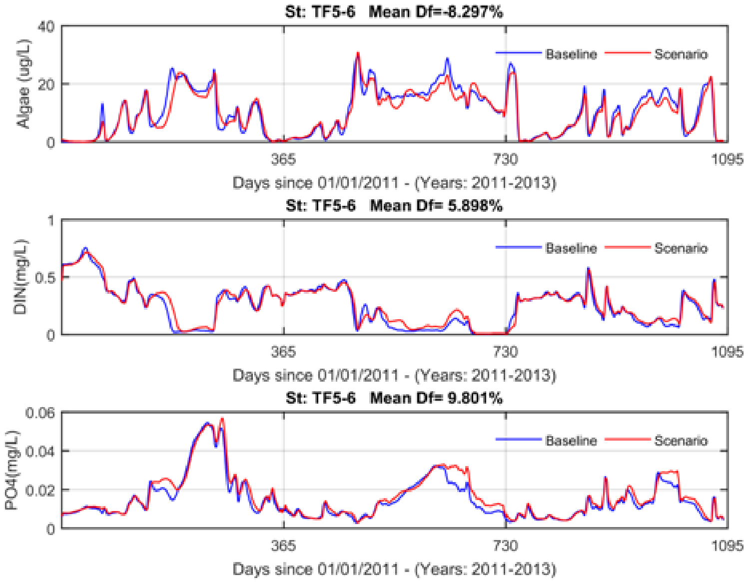


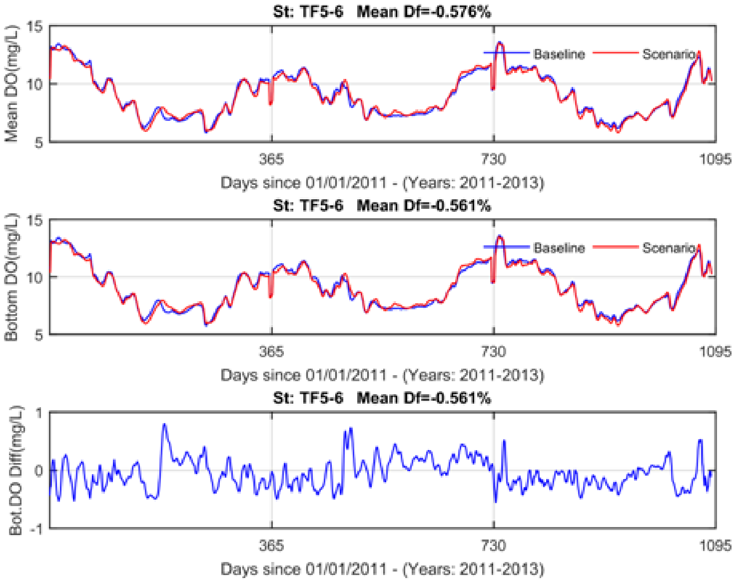

St: TF5-5 Mean Df=-10.669%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df= 0.948%
DIN(mg/L)
1.5
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df= 6.078%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

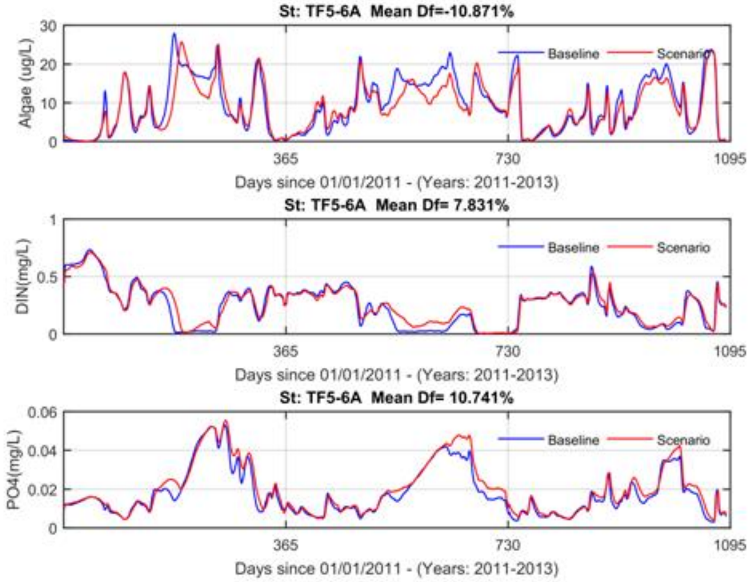

St: TF5-5 Mean Df=-2.047%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df=-2.046%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5 Mean Df=-2.046%
Bot.DO Diff(mg/L)
0.5
0
-0.5
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

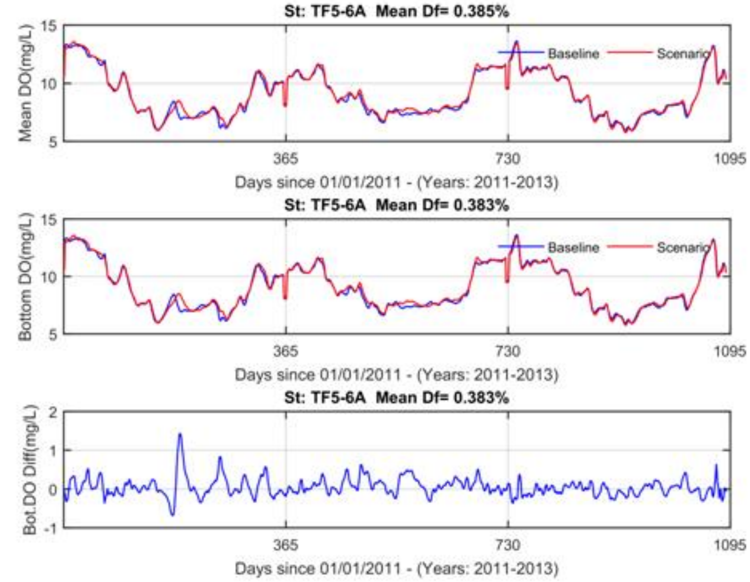

St: TF5-5A Mean Df=-7.537%
Algae (ug/L)
0
20
40
60
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df= 2.567%
DIN(mg/L)
0
0.5
1
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df= 6.038%
PO4(mg/L)
0
0.02
0.04
0.06
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

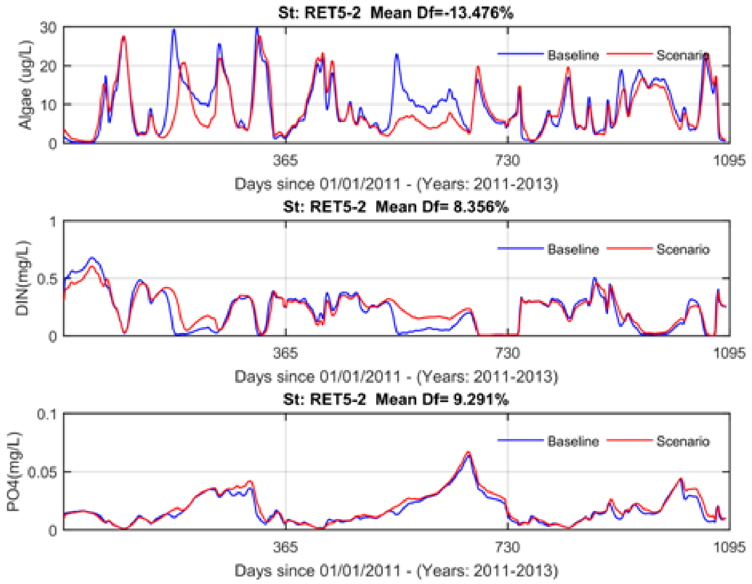

St: TF5-5A Mean Df=-0.518%
Mean DO(mg/L)
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df=-0.511%
Bottom DO(mg/L)
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df=-0.511%
Bot.DO Diff(mg/L)
-1
0
1
2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-6 Mean Df=-8.297%
Algae (ug/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df= 5.898%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df= 9.801%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-6 Mean Df=-0.576%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df=-0.561%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df=-0.561%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

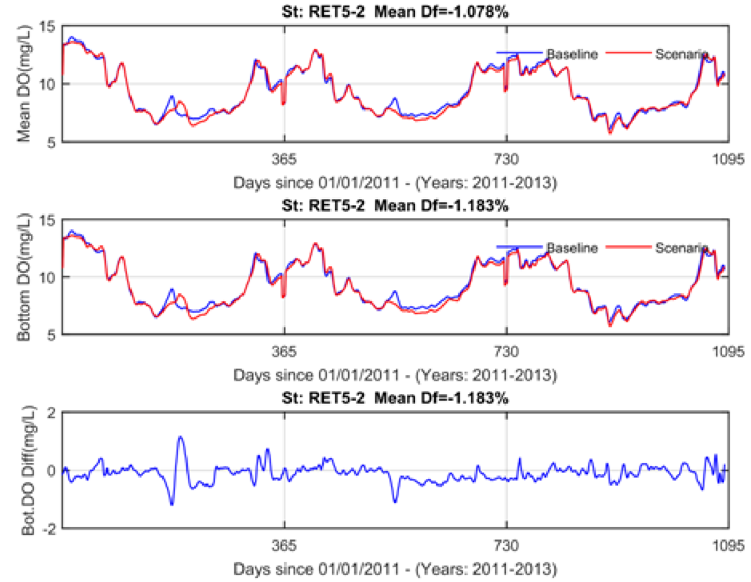

St: TF5-6A Mean Df=-10.871%
Algae (ug/L)
30
20
10
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 7.831%
DIN(mg/L)
1
0.5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 10.741%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: TF5-6A Mean Df= 0.385%
Mean DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 0.383%
Bottom DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6A Mean Df= 0.383%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: RET5-2 Mean Df=-13.476%

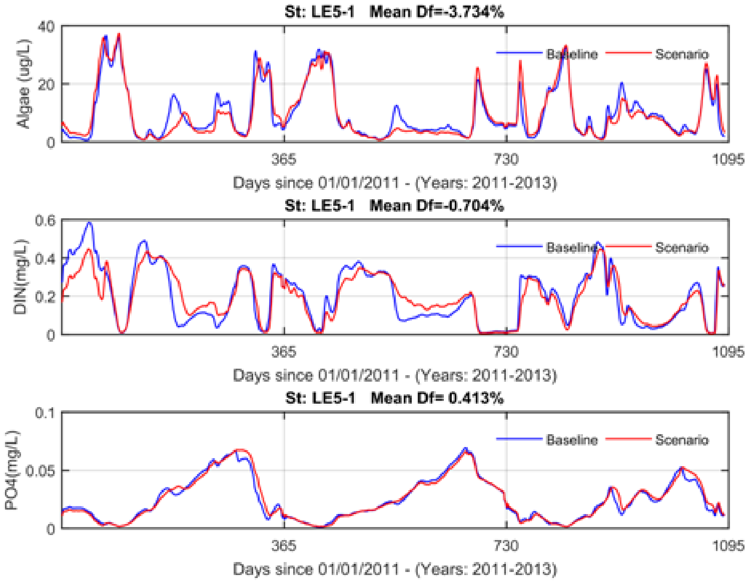
St: RET5-2 Mean Df= 8.356%

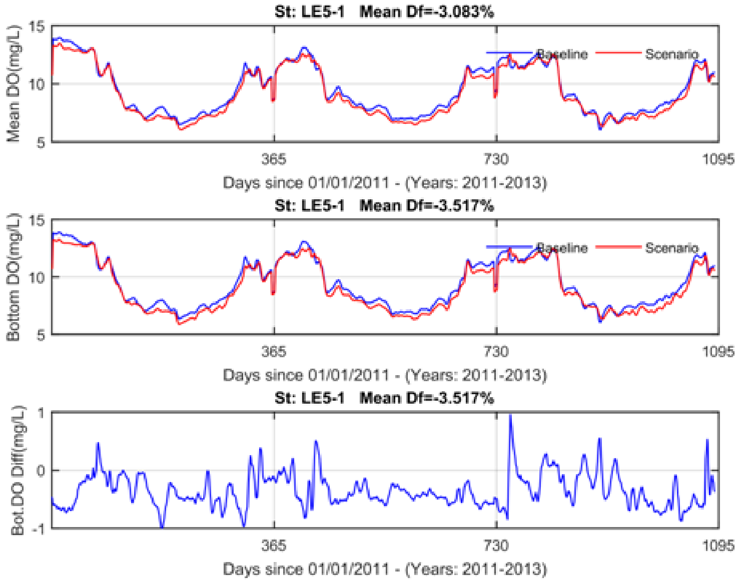
St: RET5-2 Mean Df= 9.291%

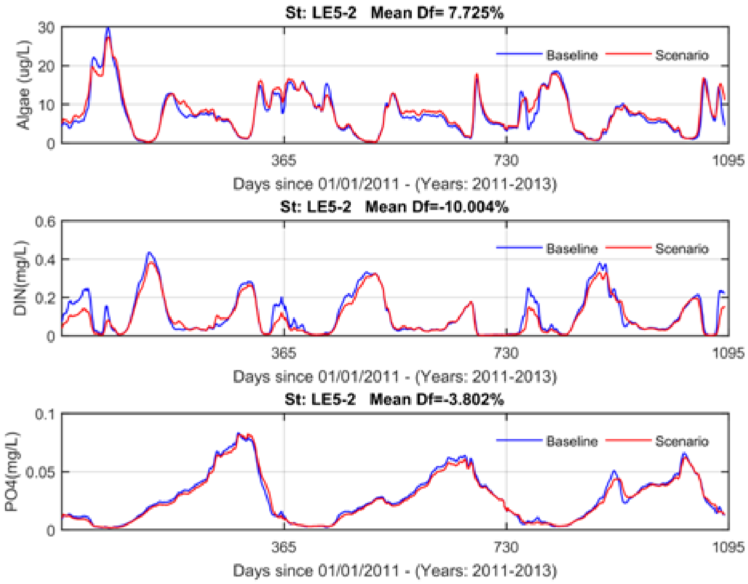

St: RET5-2 Mean Df=-1.078%

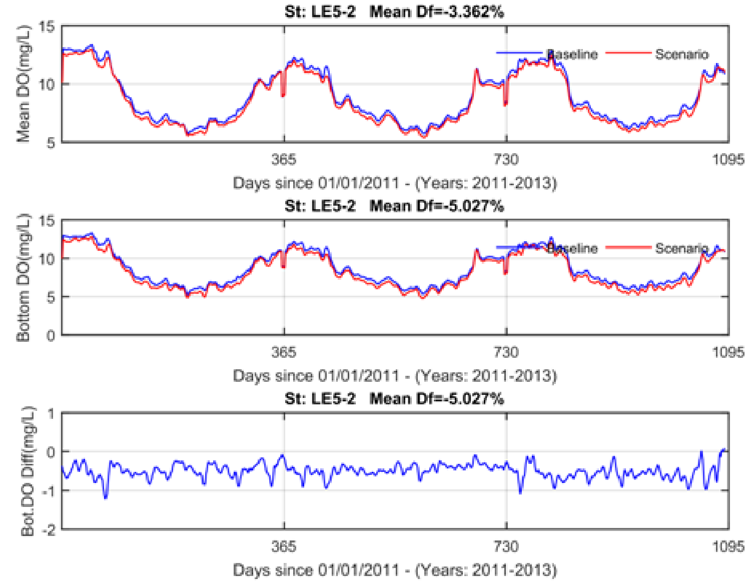
St: RET5-2 Mean Df=-1.183%

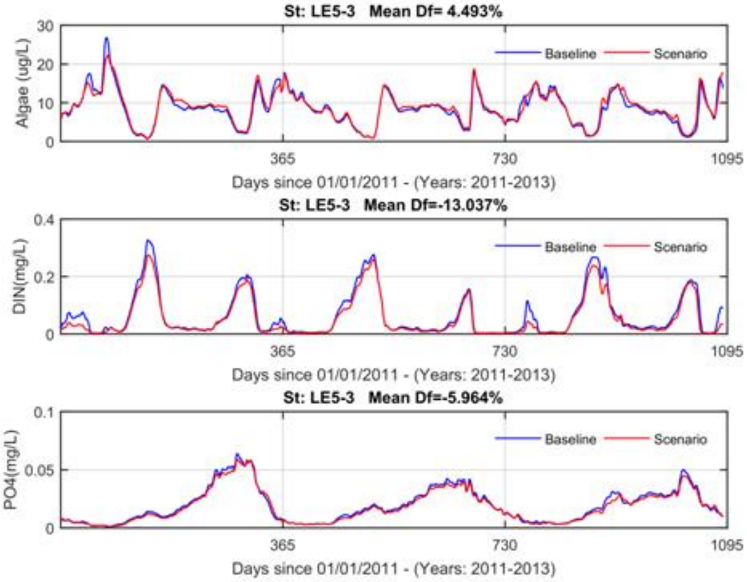
St: RET5-2 Mean Df=-1.183%

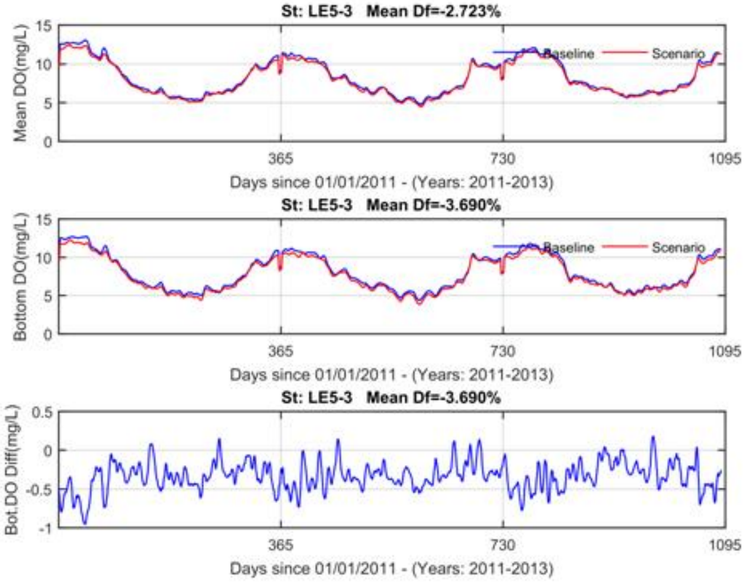

St: LE5-1 Mean Df=-3.734%
Algae (ug/L)
40
20
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1 Mean Df=-0.704%
DIN(mg/L)
0.6
0.4
0.2
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1 Mean Df= 0.413%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

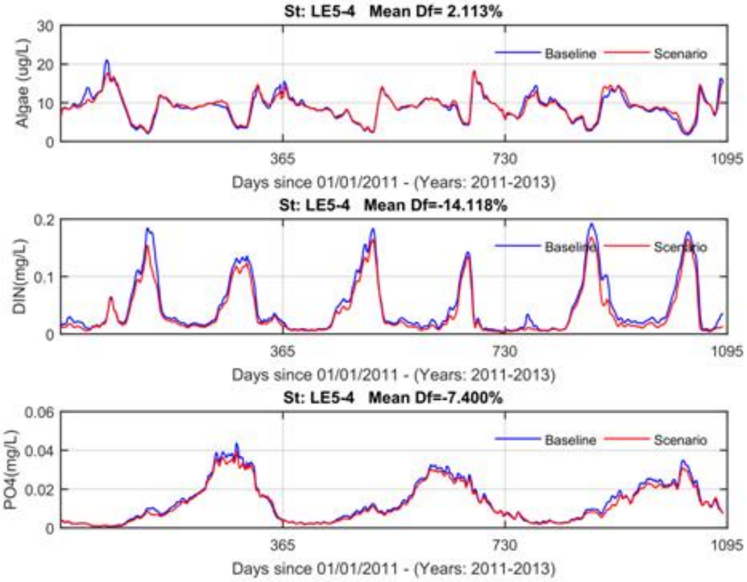

St: LE5-1 Mean Df=-3.083%
Mean DO(mg/L)
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1 Mean Df=-3.517%
Bottom DO(mg/L)
15
10
5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-1 Mean Df=-3.517%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

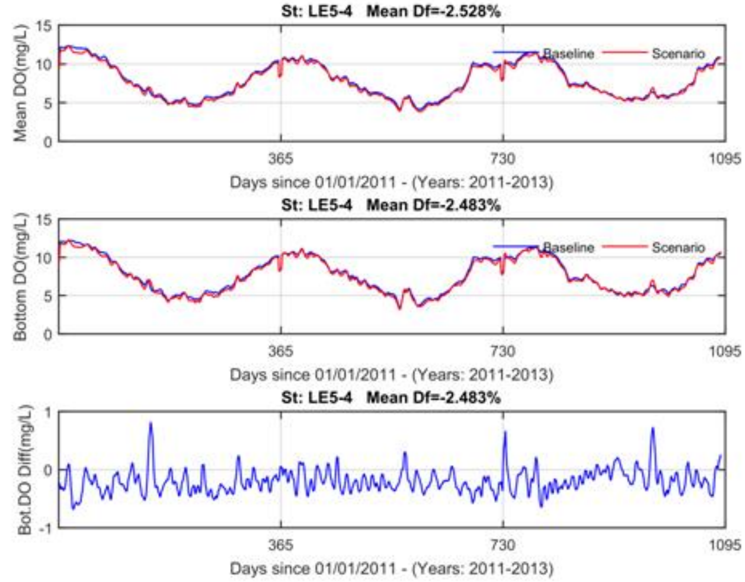

St: LE5-2 Mean Df= 7.725%
Algae (ug/L)
30
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-10.004%
DIN(mg/L)
0.6
0.4
0.2
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-3.802%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

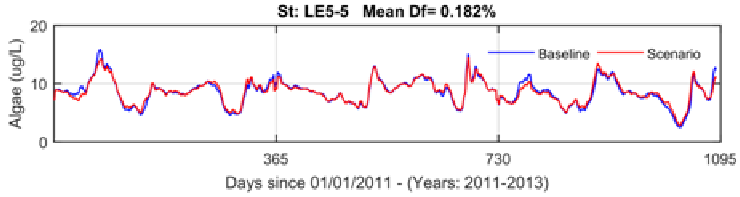

St: LE5-2 Mean Df=-3.362%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-5.027%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-2 Mean Df=-5.027%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

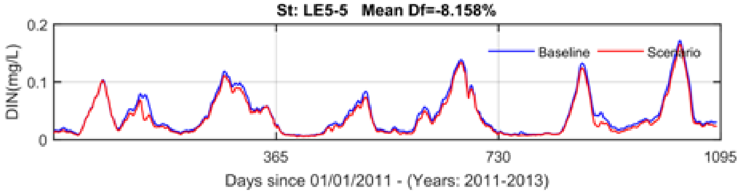

St: LE5-3 Mean Df= 4.493%
Algae (ug/L)
30
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-13.037%
DIN(mg/L)
0.4
0.2
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-5.964%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

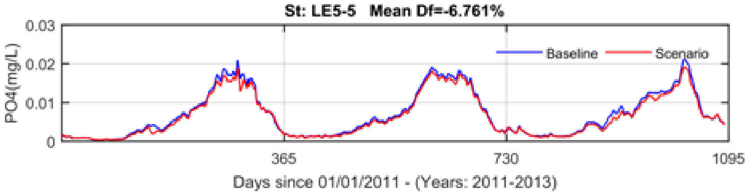

St: LE5-3 Mean Df=-2.723%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-3.690%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-3 Mean Df=-3.690%
Bot.DO Diff(mg/L)
0.5
0
-0.5
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

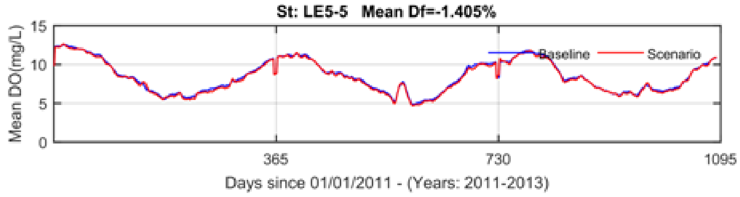

St: LE5-4 Mean Df= 2.113%
Algae (ug/L)
30
20
10
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-14.118%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-7.400%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

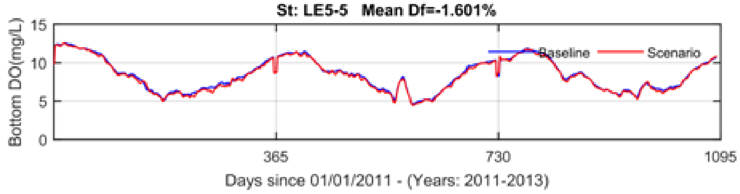

St: LE5-4 Mean Df=-2.528%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.483%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.483%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

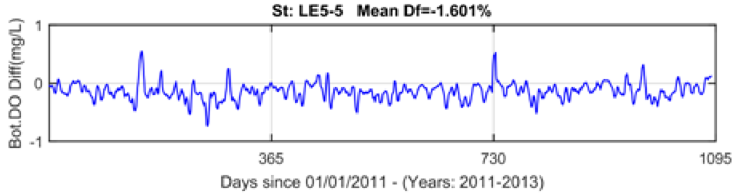

St: LE5-5 Mean Df= 0.182%
Algae (ug/L)
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

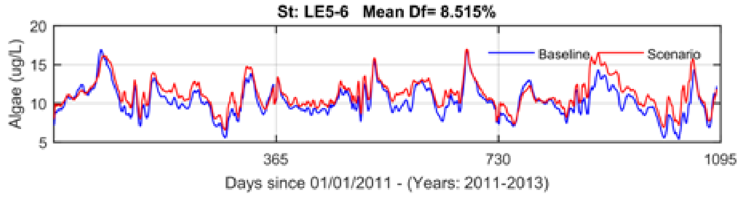

St: LE5-5 Mean Df=-8.158%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

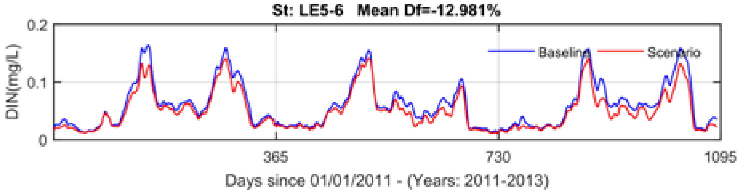

St: LE5-5 Mean Df=-6.761%
PO4(mg/L)
0.03
0.02
0.01
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

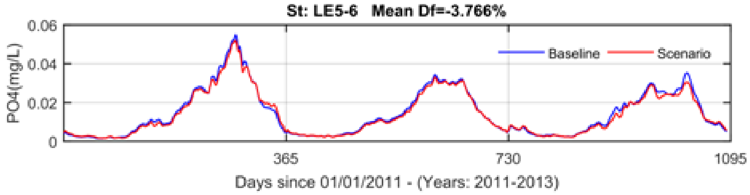

St: LE5-5 Mean Df=-1.405%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

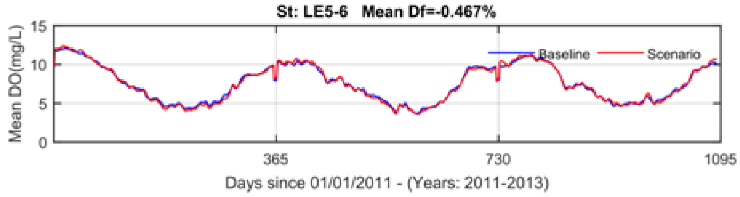

St: LE5-5 Mean Df=-1.601%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

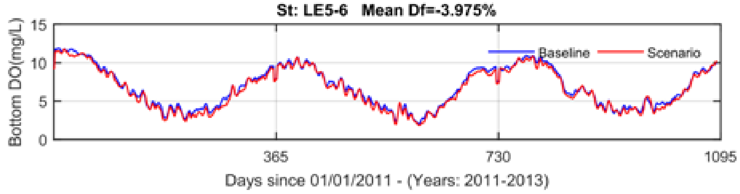

St: LE5-5 Mean Df=-1.601%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

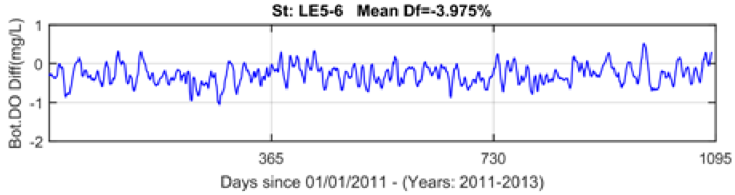

St: LE5-6 Mean Df= 8.515%
Algae (ug/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-6 Mean Df=-12.981%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

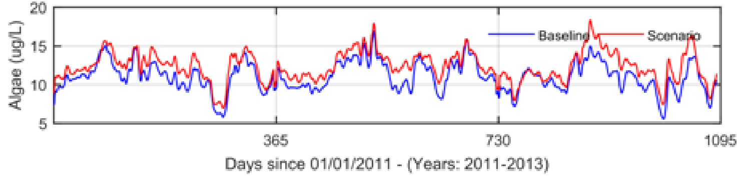

St: LE5-6 Mean Df=-3.766%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-6 Mean Df=-0.467%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

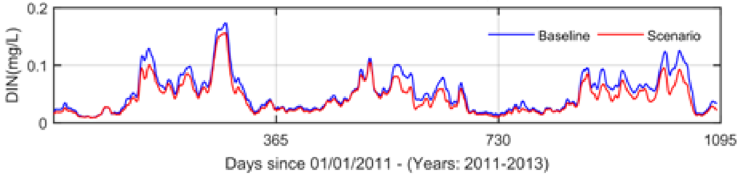

St: LE5-6 Mean Df=-3.975%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-6 Mean Df=-3.975%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

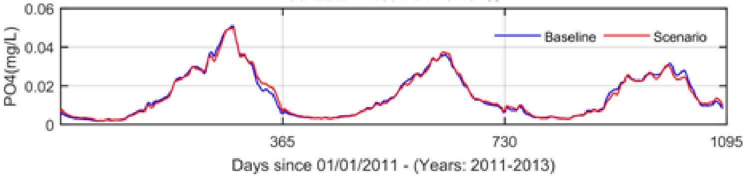
St: ELI2 Mean Df= 11.210%



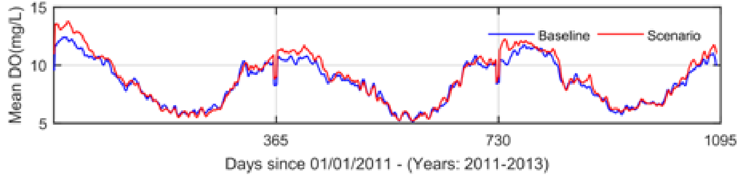
St: ELI2 Mean Df=-13.543%



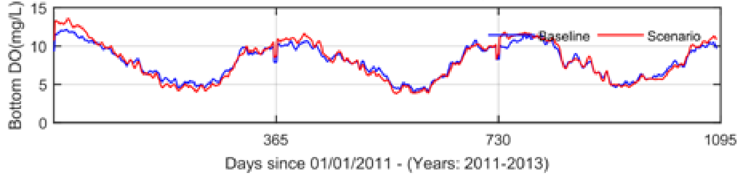
St: ELI2 Mean Df= 0.484%



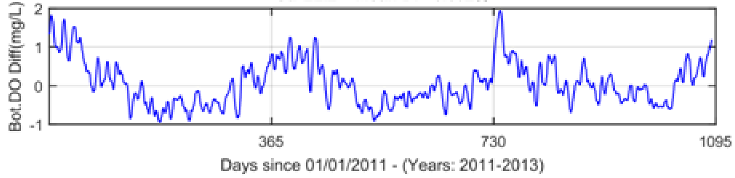
St: ELI2 Mean Df= 2.697%

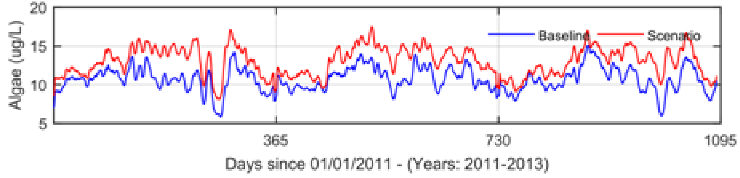


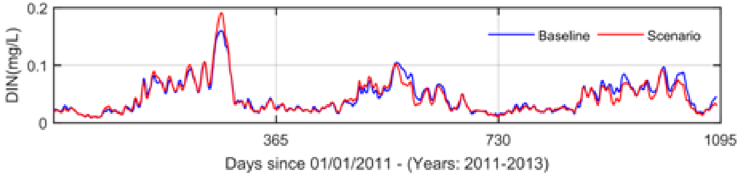
St: ELI2 Mean Df= 0.602%

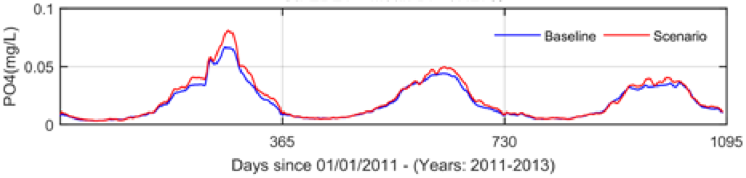


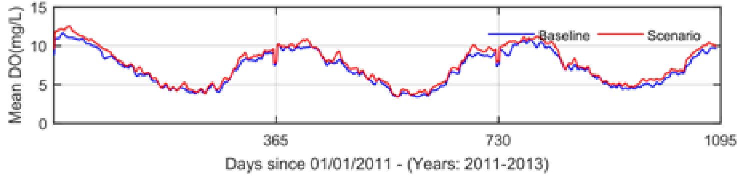
St: ELI2 Mean Df= 0.602%

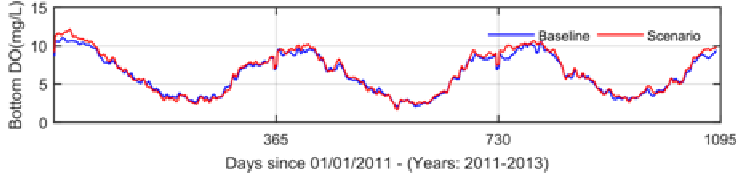


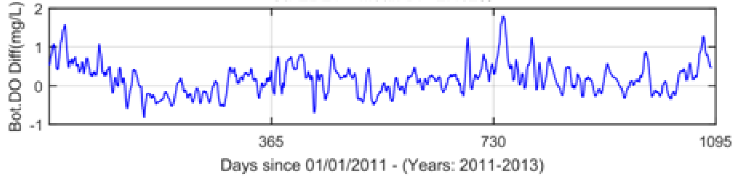

St: EBE1 Mean Df= 20.363%

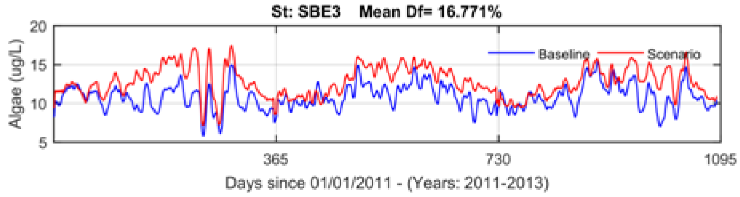

St: EBE1 Mean Df=-0.739%

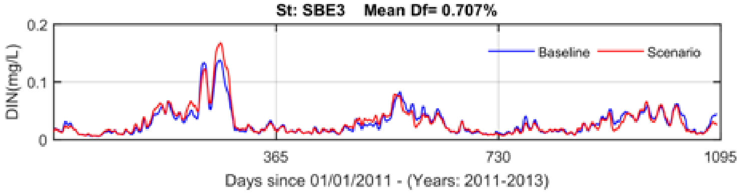

St: EBE1 Mean Df= 9.427%

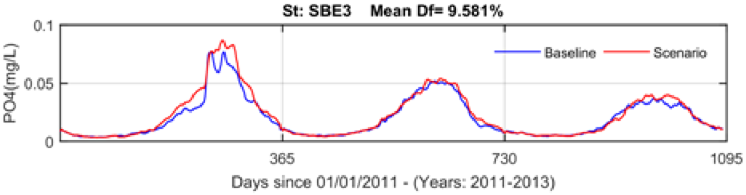

St: EBE1 Mean Df= 5.645%

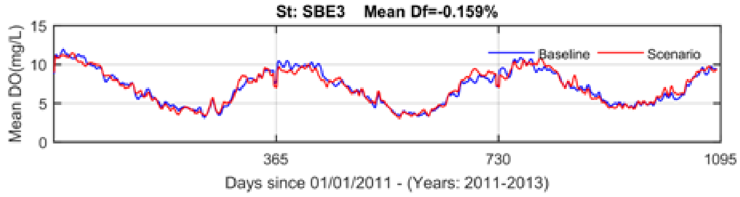

St: EBE1 Mean Df= 2.402%

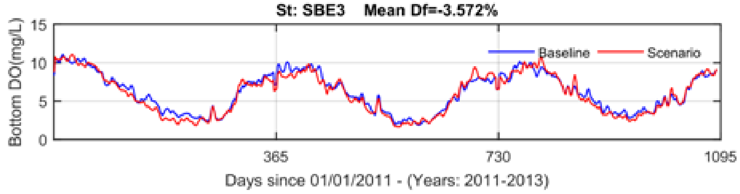

St: EBE1 Mean Df= 2.402%

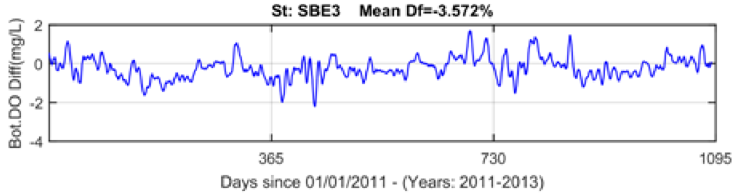

St: SBE3 Mean Df= 16.771%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

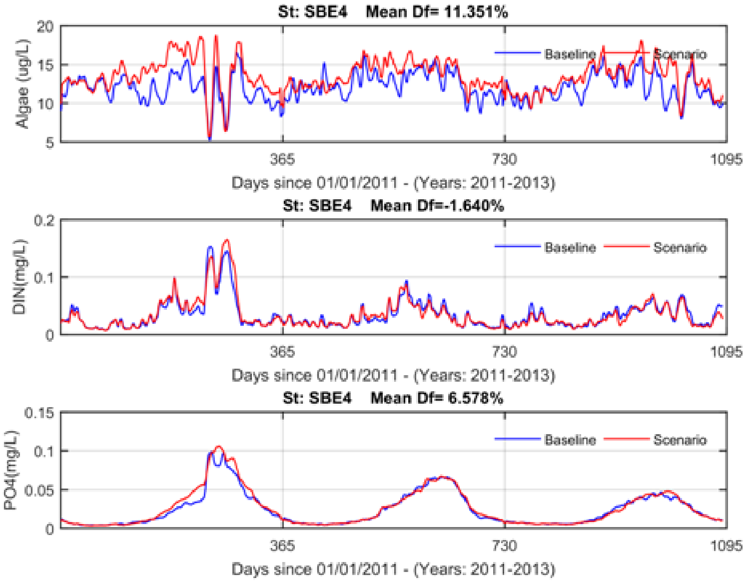

St: SBE3 Mean Df= 0.707%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

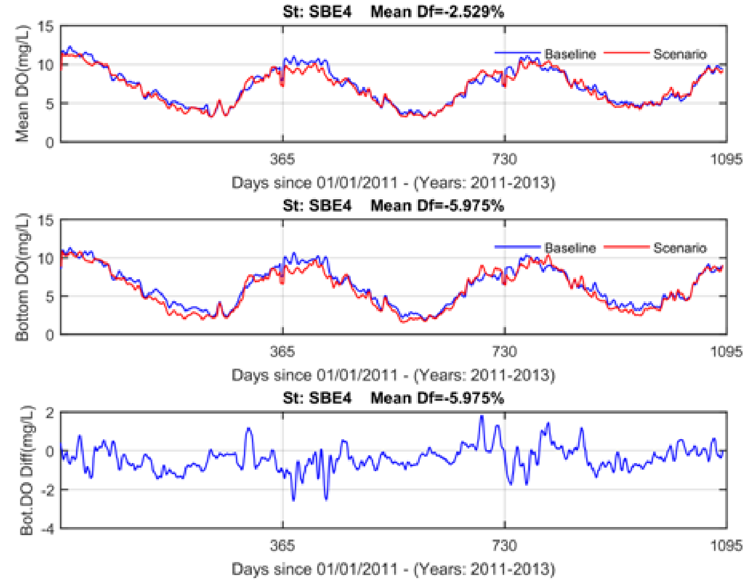

St: SBE3 Mean Df= 9.581%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

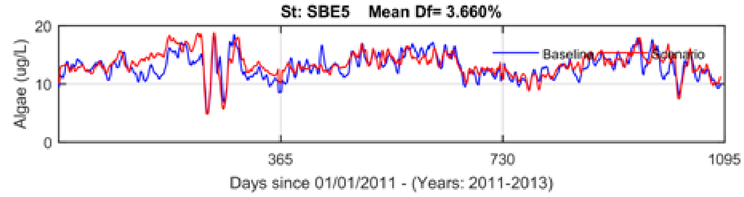

St: SBE3 Mean Df=-0.159%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

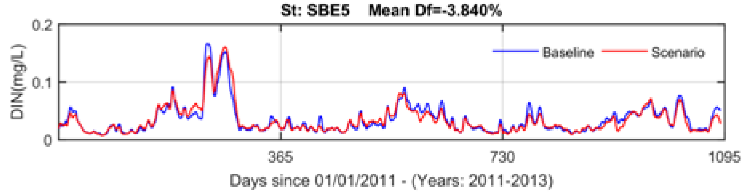

St: SBE3 Mean Df=-3.572%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

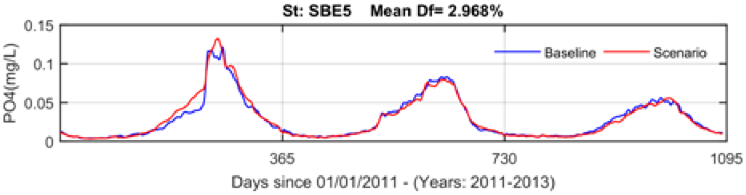

St: SBE3 Mean Df=-3.572%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

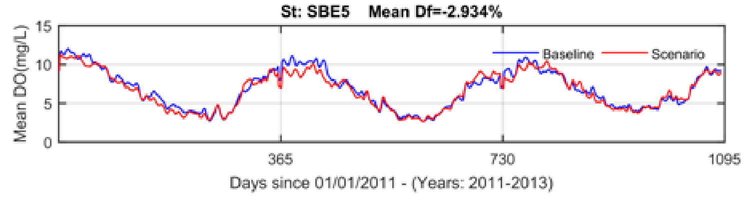

St: SBE4 Mean Df= 11.351%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE4 Mean Df=-1.640%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE4 Mean Df= 6.578%
PO4(mg/L)
0.15
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

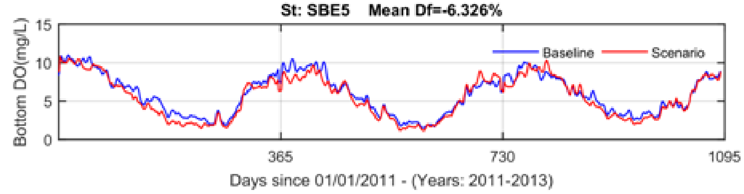

St: SBE4 Mean Df=-2.529%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE4 Mean Df=-5.975%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE4 Mean Df=-5.975%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

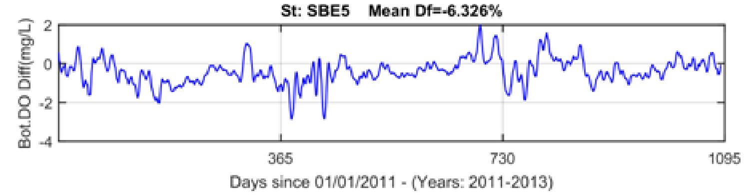

St: SBE5 Mean Df= 3.660%
Algae (ug/L)
20
10
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

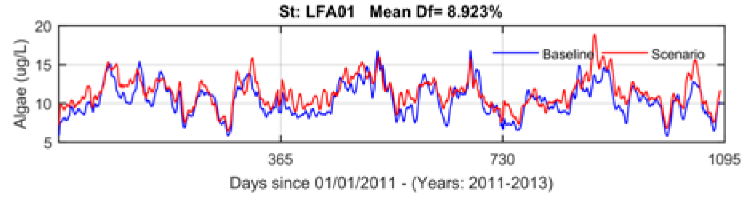

St: SBE5 Mean Df=-3.840%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

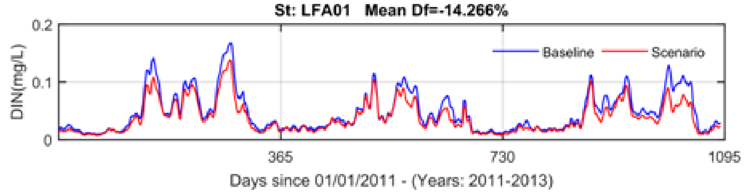

St: SBE5 Mean Df= 2.968%
PO4(mg/L)
0.15
0.1
0.05
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

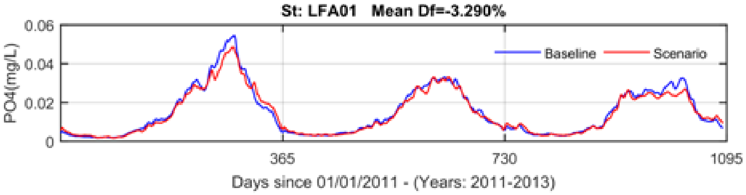

St: SBE5 Mean Df=-2.934%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

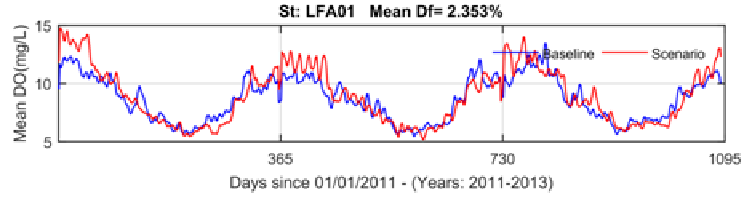

St: SBE5 Mean Df=-6.326%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

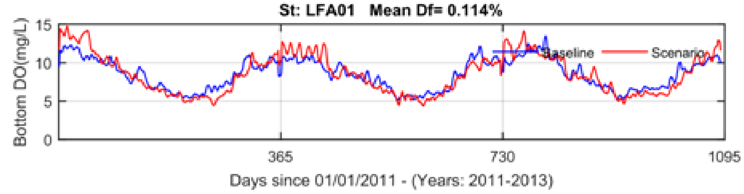

St: SBE5 Mean Df=-6.326%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

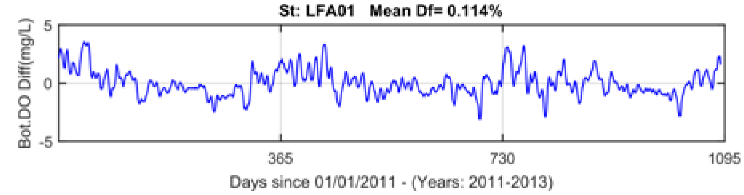

St: LFA01 Mean Df= 8.923%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

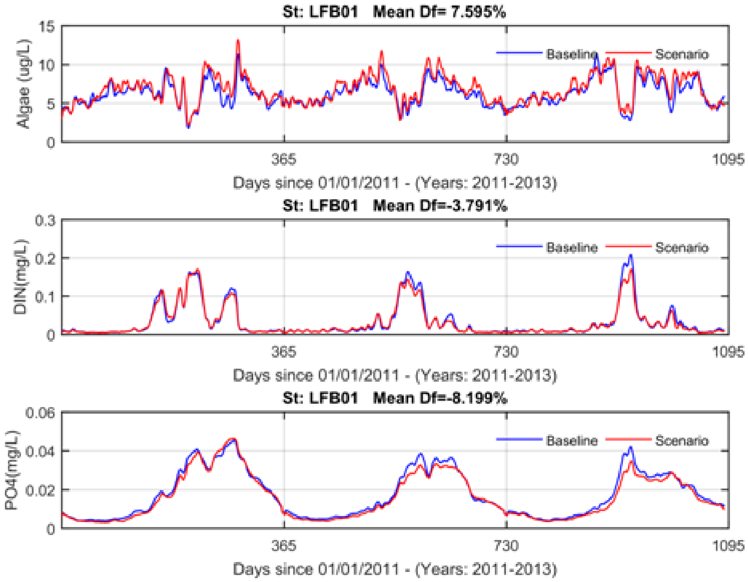

St: LFA01 Mean Df=-14.266%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

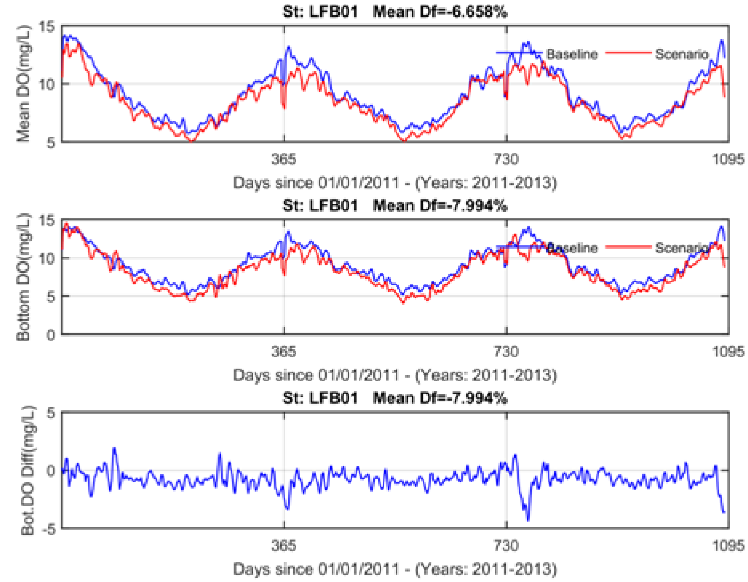

St: LFA01 Mean Df=-3.290%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LFA01 Mean Df= 2.353%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

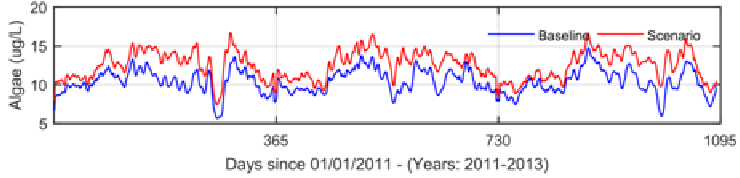

St: LFA01 Mean Df= 0.114%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LFA01 Mean Df= 0.114%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

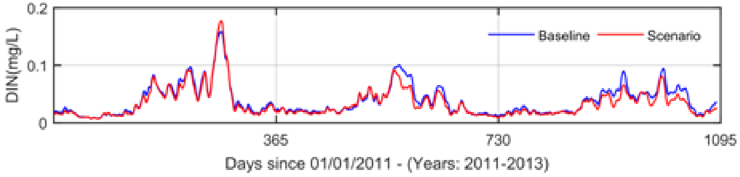

St: LFB01 Mean Df= 7.595%
Algae (ug/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-3.791%
DIN(mg/L)
0.3
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-8.199%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: LFB01 Mean Df=-6.658%
Mean DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-7.994%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: LFB01 Mean Df=-7.994%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

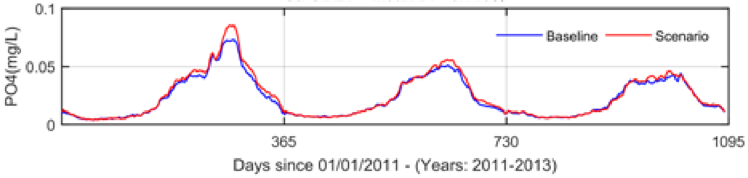
St: SBE1 Mean Df= 19.200%



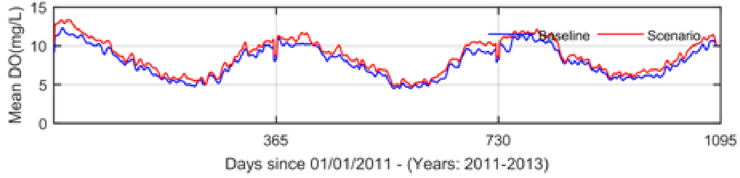
St: SBE1 Mean Df=-6.995%



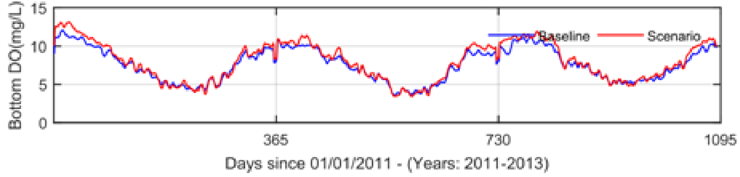
St: SBE1 Mean Df= 6.115%



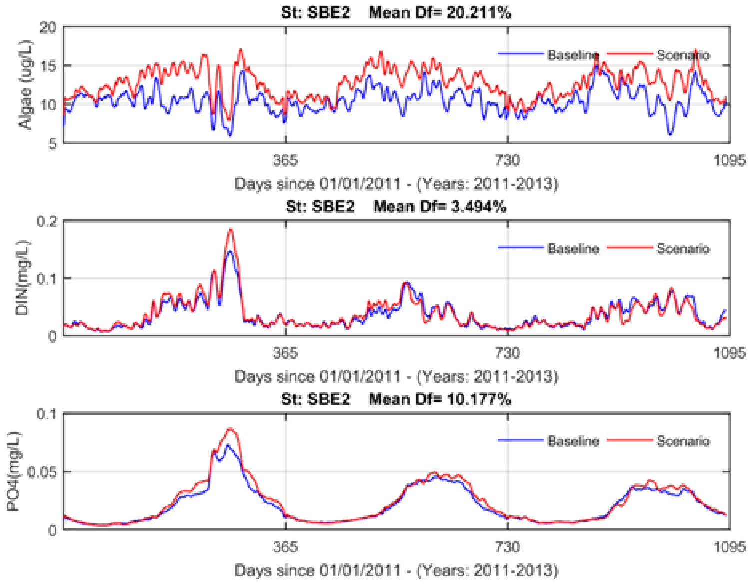
St: SBE1 Mean Df= 8.038%

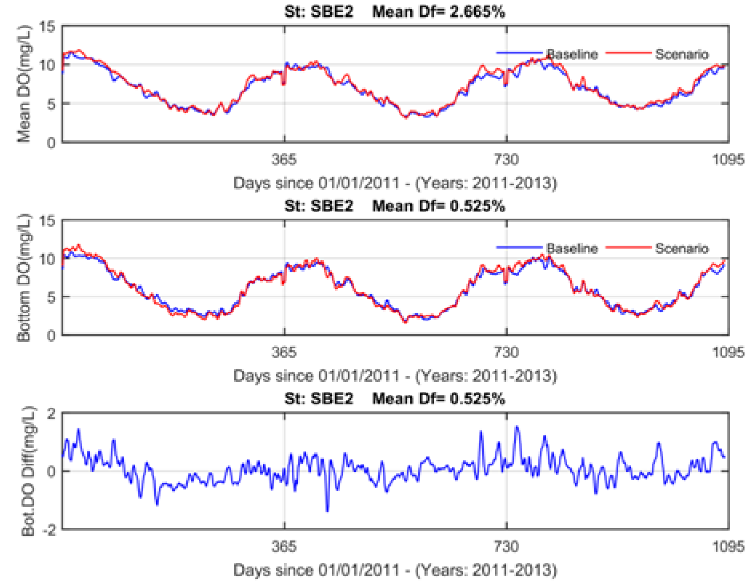


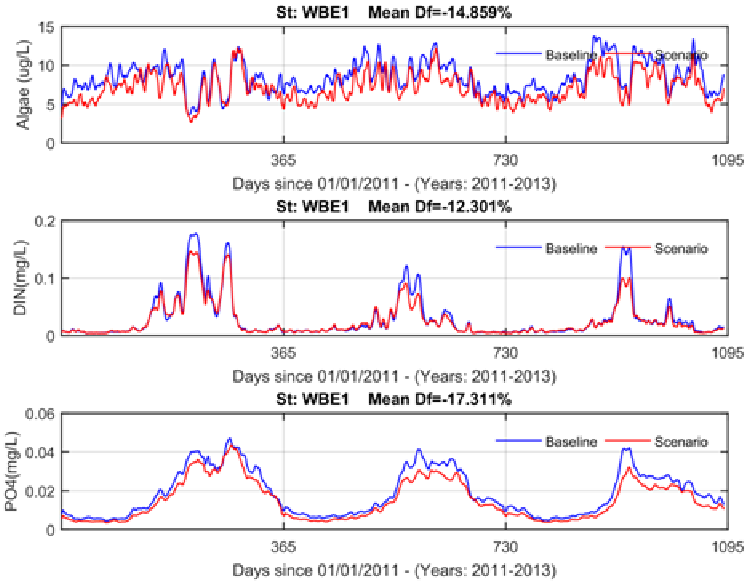
St: SBE1 Mean Df= 4.657%

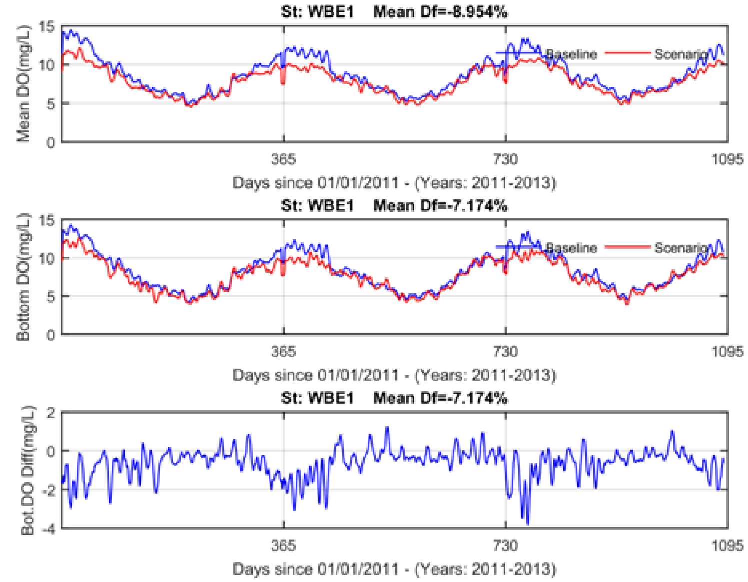


St: SBE1 Mean Df= 4.657%


St: SBE2 Mean Df= 20.211%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 3.494%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 10.177%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

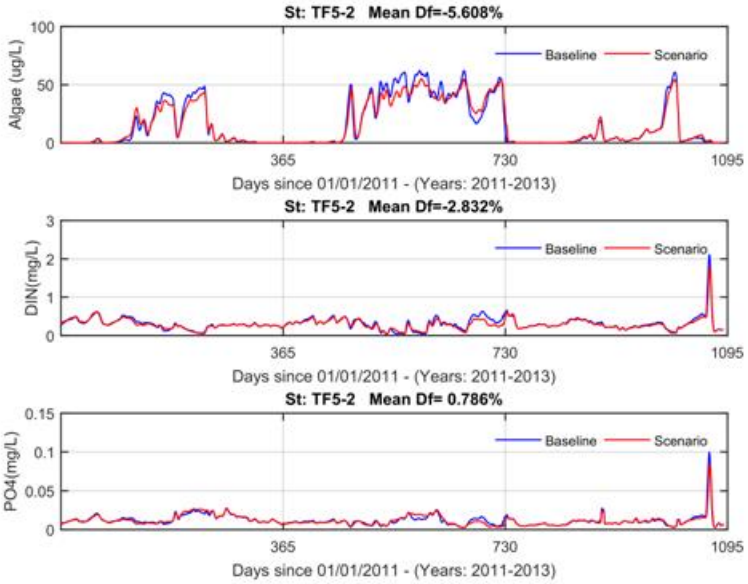

St: SBE2 Mean Df= 2.665%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 0.525%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE2 Mean Df= 0.525%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

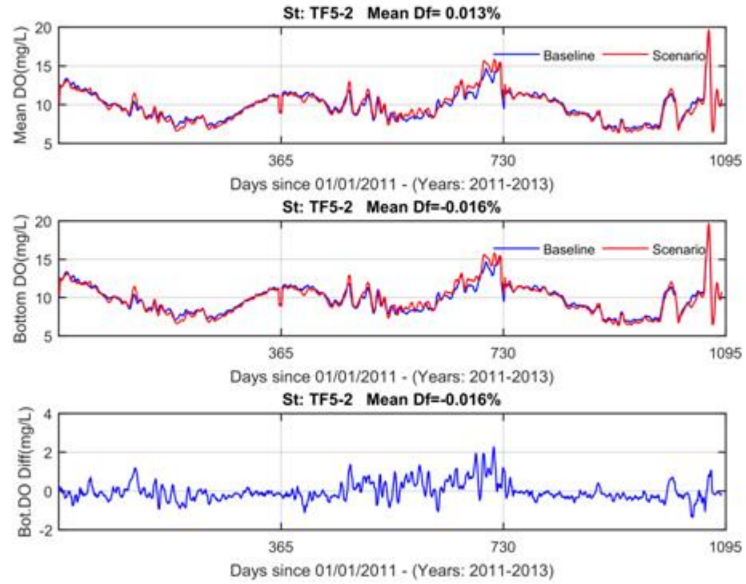

St: WBE1 Mean Df=-14.859%
Algae (ug/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-12.301%
DIN(mg/L)
0
0.1
0.2
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-17.311%
PO4(mg/L)
0
0.02
0.04
0.06
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

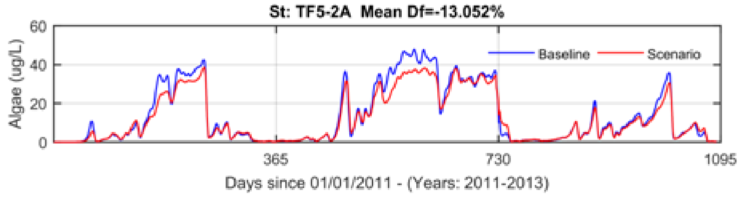

St: WBE1 Mean Df=-8.954%
Mean DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-7.174%
Bottom DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-7.174%
Bot.DO Diff(mg/L)
-4
-2
0
2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

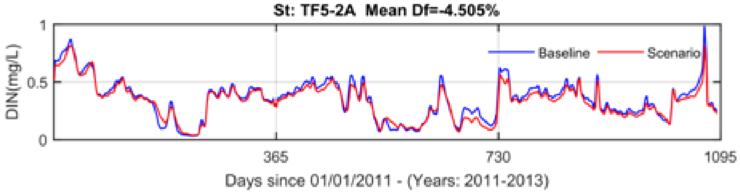
Model Simulation Scenario 5-2 and Scenario 5-2-SLR

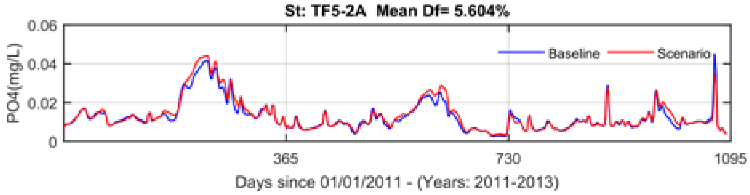
In the following plots, the baseline is the result of Scenario 5-2 and the Scenario is Scenario 5-2-SLR

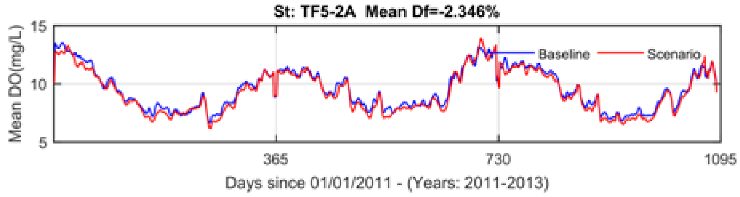

St: TF5-2 Mean Df=-5.608%
Algae (ug/L)
100
50
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-2.832%
DIN(mg/L)
3
2
1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df= 0.786%
PO4(mg/L)
0.15
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

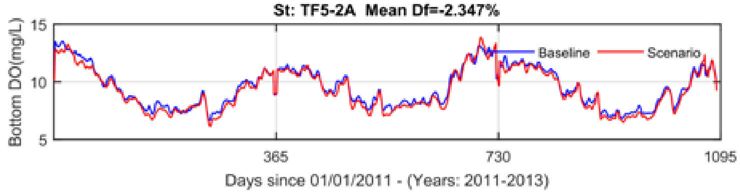

St: TF5-2 Mean Df= 0.013%
Mean DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-0.016%
Bottom DO(mg/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-2 Mean Df=-0.016%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

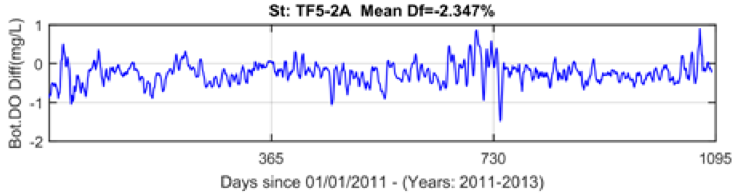

St: TF5-2A Mean Df=-13.052%

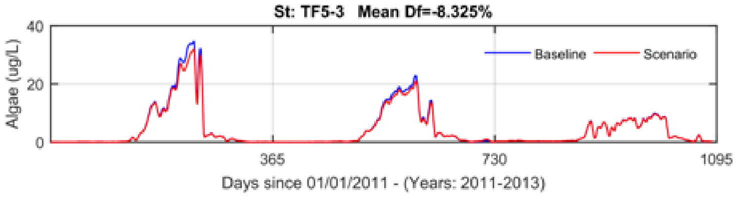

St: TF5-2A Mean Df=-4.505%

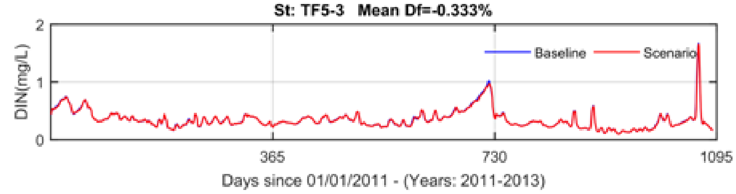

St: TF5-2A Mean Df= 5.604%

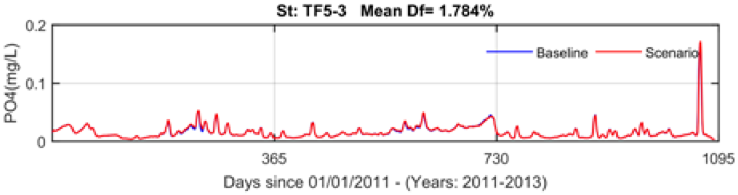

St: TF5-2A Mean Df=-2.346%

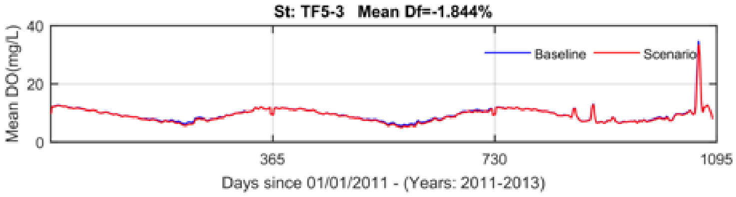

St: TF5-2A Mean Df=-2.347%

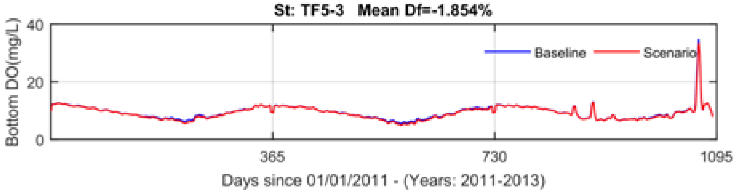

St: TF5-2A Mean Df=-2.347%

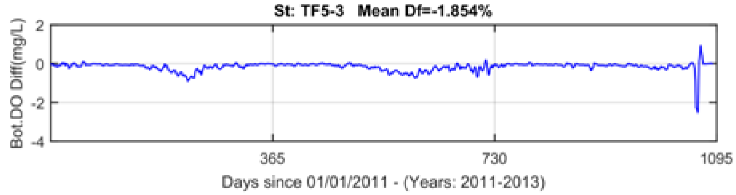

St: TF5-3 Mean Df=-8.325%
Algae (ug/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

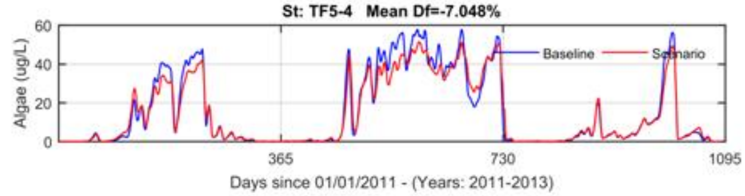

St: TF5-3 Mean Df=-0.333%
DIN(mg/L)
2
1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

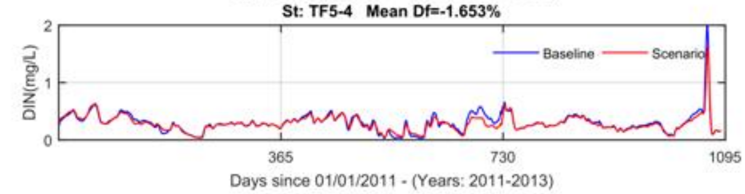

St: TF5-3 Mean Df= 1.784%
PO4(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

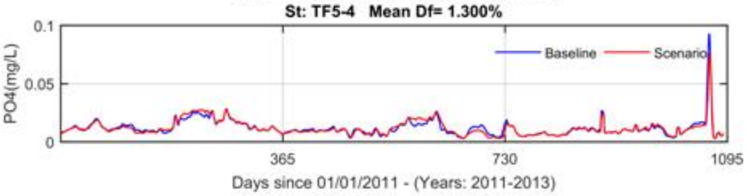

St: TF5-3 Mean Df=-1.844%
Mean DO(mg/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

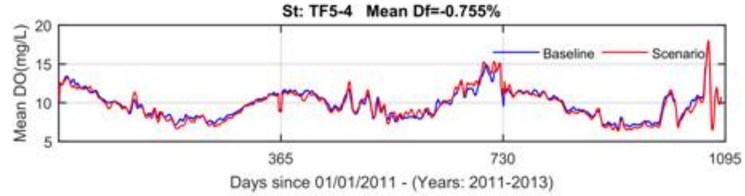

St: TF5-3 Mean Df=-1.854%
Bottom DO(mg/L)
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

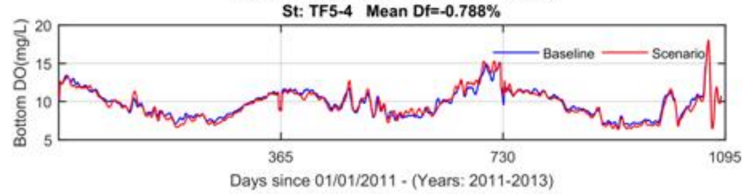

St: TF5-3 Mean Df=-1.854%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

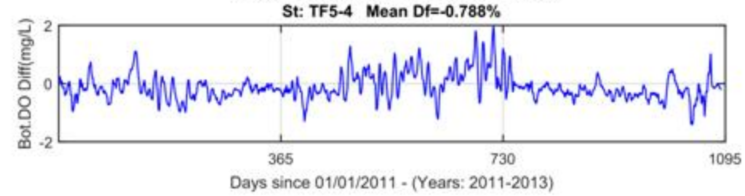

St: TF5-4 Mean Df=-7.048%
Algae (ug/L)
60
40
20
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

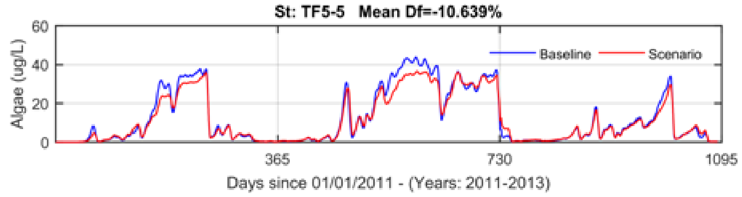

St: TF5-4 Mean Df=-1.653%
DIN(mg/L)
2
1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

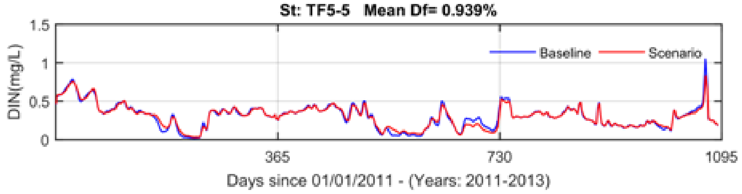

St: TF5-4 Mean Df= 1.300%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

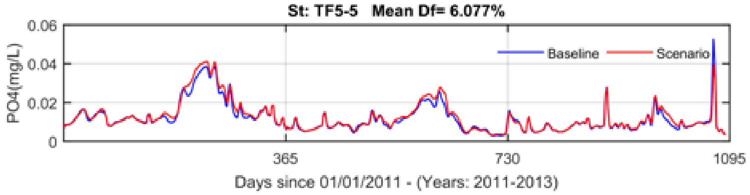

St: TF5-4 Mean Df=-0.755%
Mean DO(mg/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

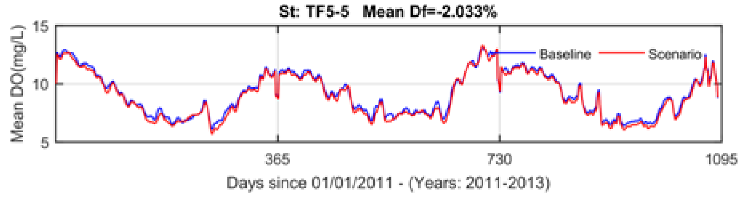

St: TF5-4 Mean Df=-0.788%
Bottom DO(mg/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

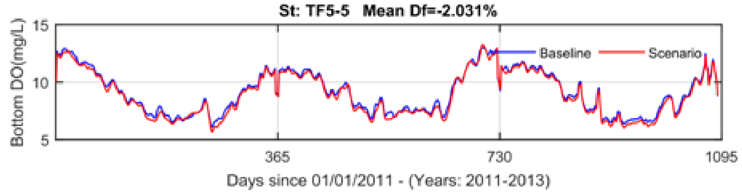

St: TF5-4 Mean Df=-0.788%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

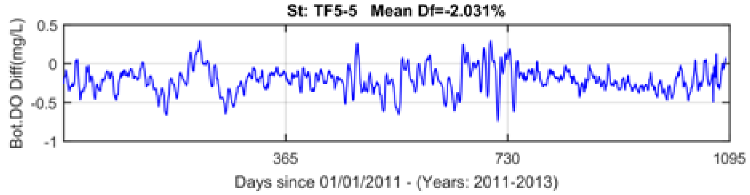

St: TF5-5 Mean Df=-10.639%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

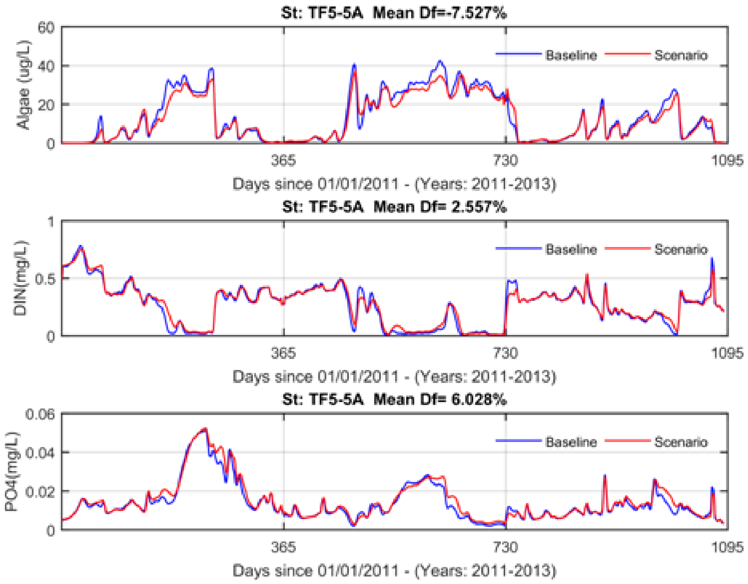

St: TF5-5 Mean Df= 0.939%
DIN(mg/L)
1.5
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

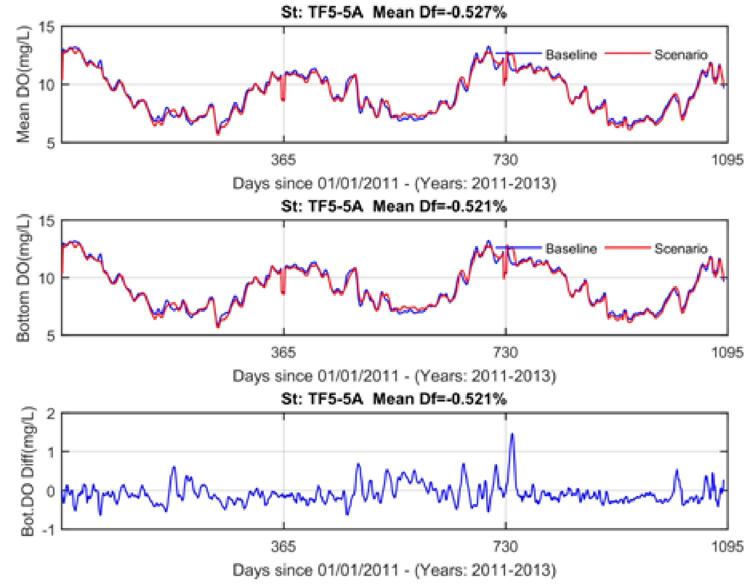

St: TF5-5 Mean Df= 6.077%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

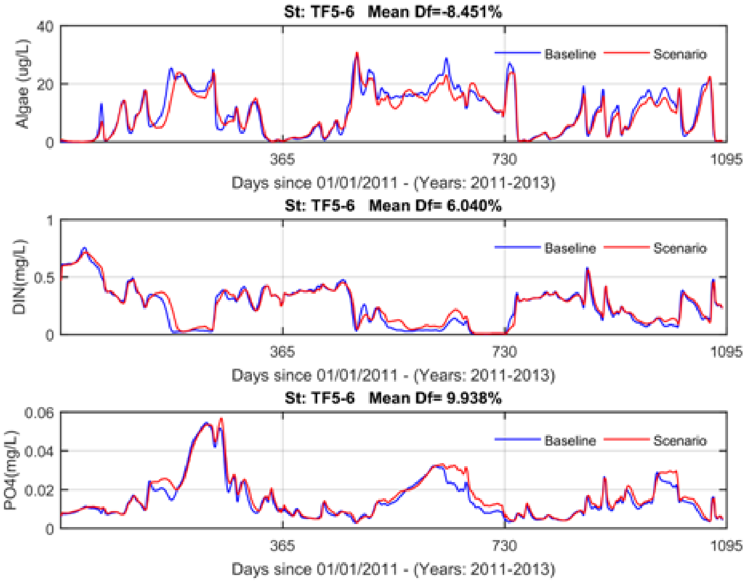

St: TF5-5 Mean Df=-2.033%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

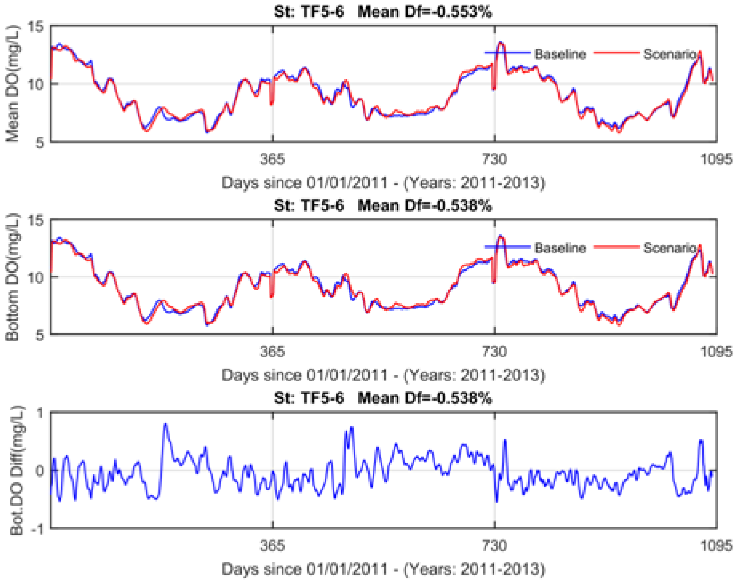

St: TF5-5 Mean Df=-2.031%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

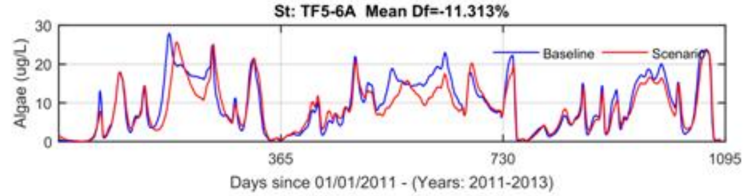

St: TF5-5 Mean Df=-2.031%
Bot.DO Diff(mg/L)
0.5
0
-0.5
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

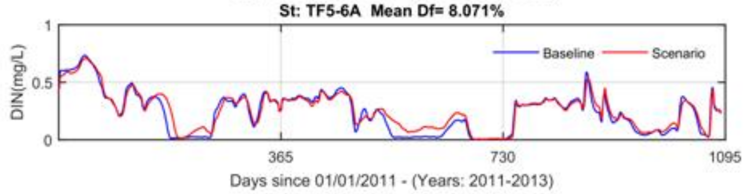

St: TF5-5A Mean Df=-7.527%
Algae (ug/L)
60
40
20
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df= 2.557%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df= 6.028%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

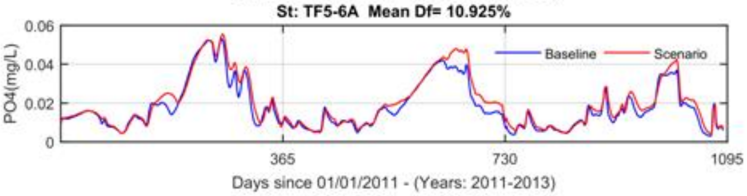

St: TF5-5A Mean Df=-0.527%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df=-0.521%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-5A Mean Df=-0.521%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

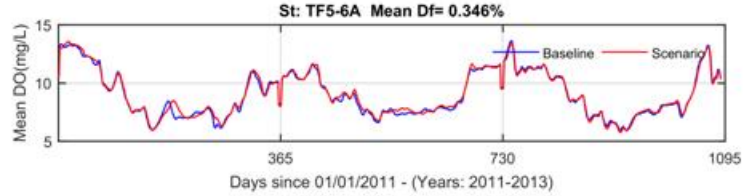

St: TF5-6 Mean Df=-8.451%
Algae (ug/L)
40
20
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df= 6.040%
DIN(mg/L)
1
0.5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df= 9.938%
PO4(mg/L)
0.06
0.04
0.02
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

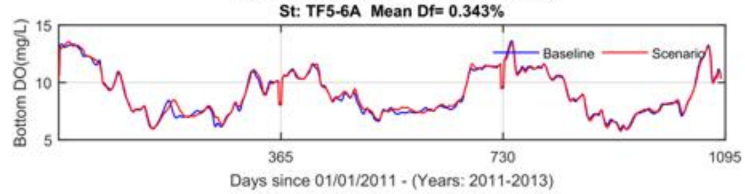

St: TF5-6 Mean Df=-0.553%
Mean DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df=-0.538%
Bottom DO(mg/L)
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: TF5-6 Mean Df=-0.538%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

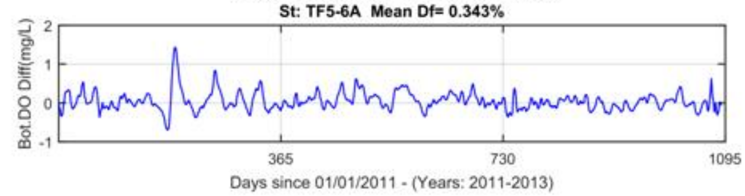

St: TF5-6A Mean Df=-11.313%

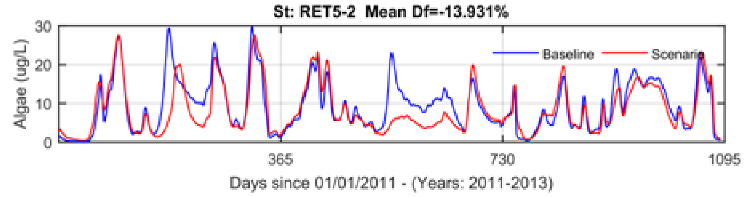

St: TF5-6A Mean Df= 8.071%

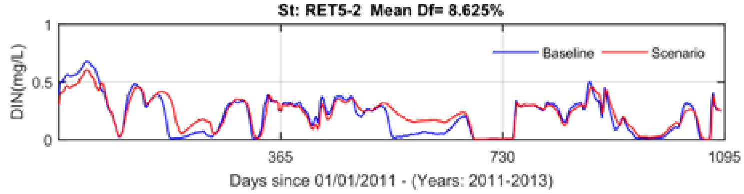

St: TF5-6A Mean Df= 10.925%

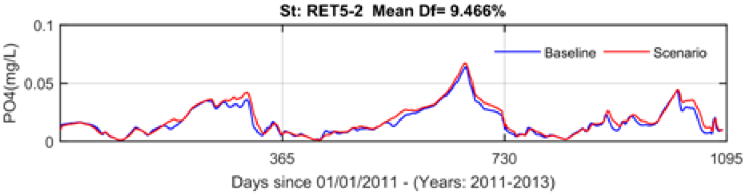

St: TF5-6A Mean Df= 0.346%

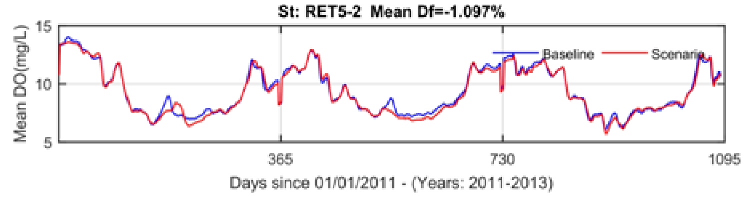

St: TF5-6A Mean Df= 0.343%

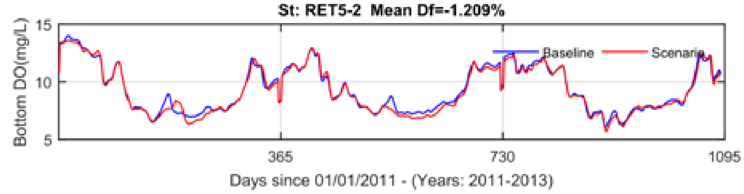

St: TF5-6A Mean Df= 0.343%

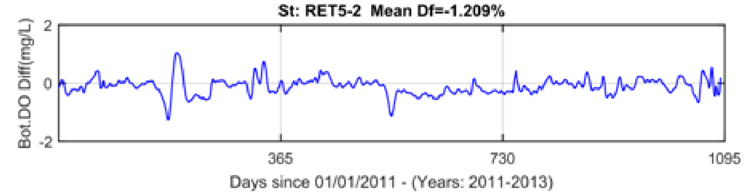

St: RET5-2 Mean Df=-13.931%
Algae (ug/L)
30
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

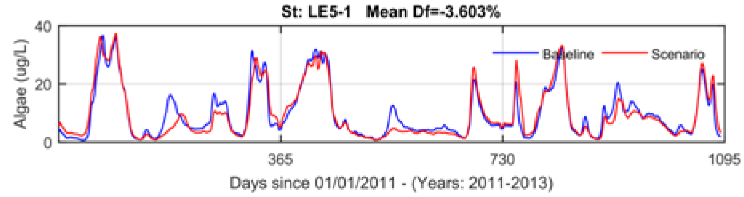

St: RET5-2 Mean Df= 8.625%
DIN(mg/L)
1
0.5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

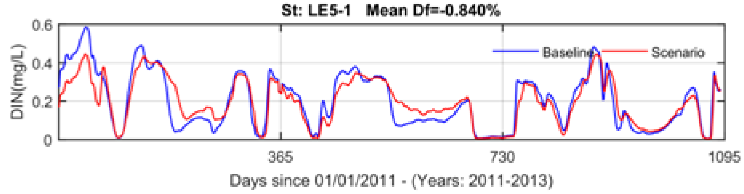

St: RET5-2 Mean Df= 9.466%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

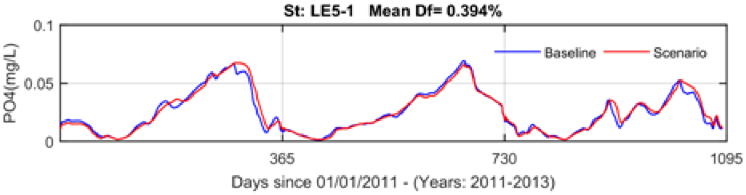

St: RET5-2 Mean Df=-1.097%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

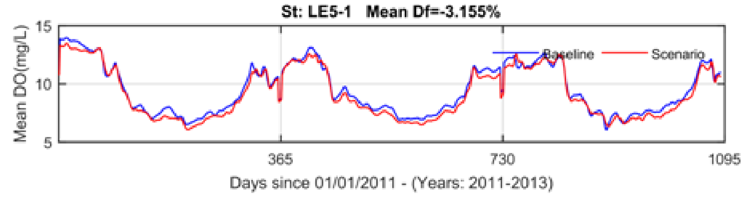

St: RET5-2 Mean Df=-1.209%
Bottom DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

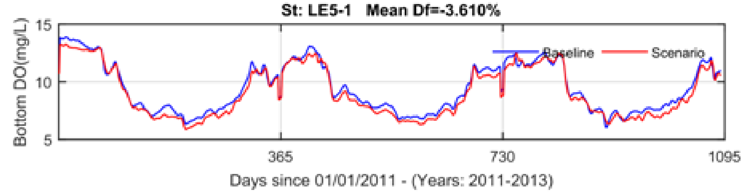

St: RET5-2 Mean Df=-1.209%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

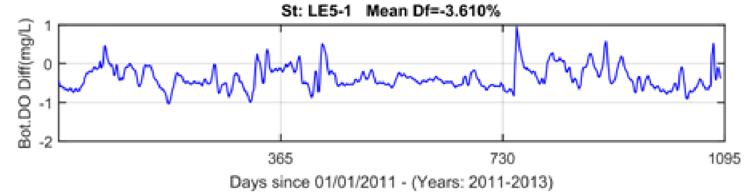

St: LE5-1 Mean Df=-3.603%

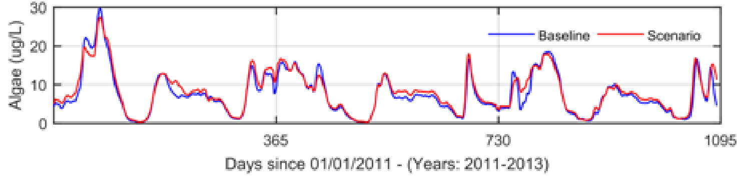

St: LE5-1 Mean Df=-0.840%

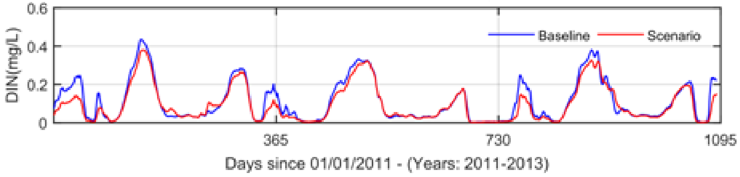

St: LE5-1 Mean Df= 0.394%

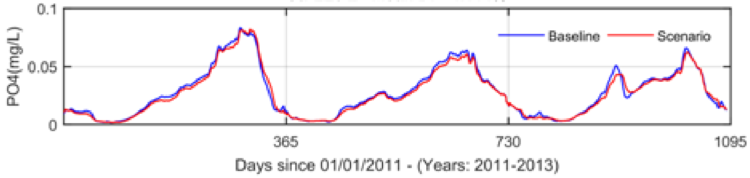

St: LE5-1 Mean Df=-3.155%

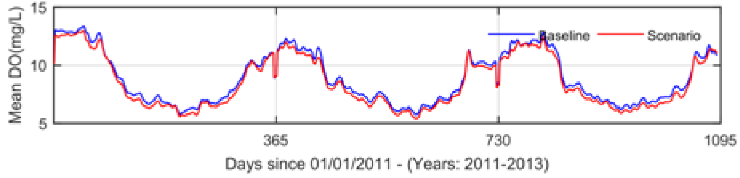

St: LE5-1 Mean Df=-3.610%

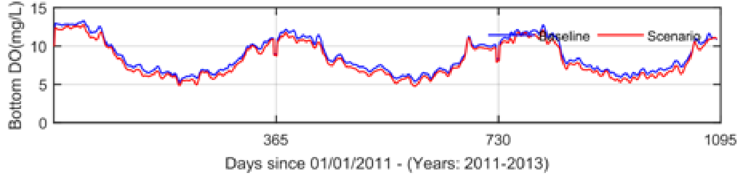

St: LE5-1 Mean Df=-3.610%


St: LE5-2 Mean Df= 8.666%

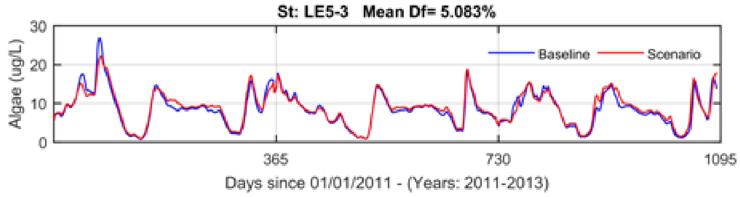

St: LE5-2 Mean Df=-10.983%

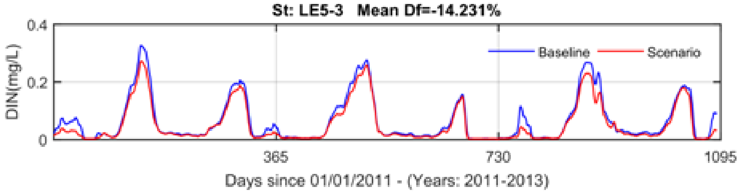

St: LE5-2 Mean Df=-4.114%

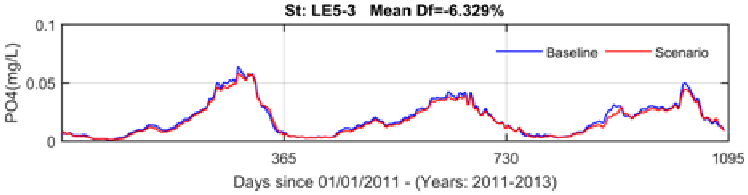

St: LE5-2 Mean Df=-3.477%

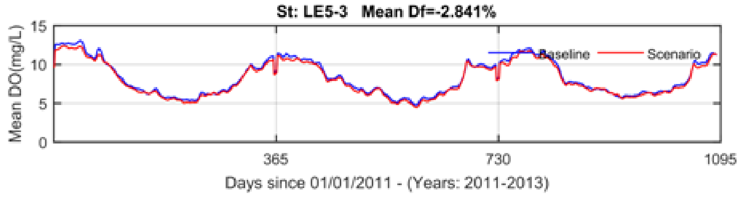

St: LE5-2 Mean Df=-5.185%

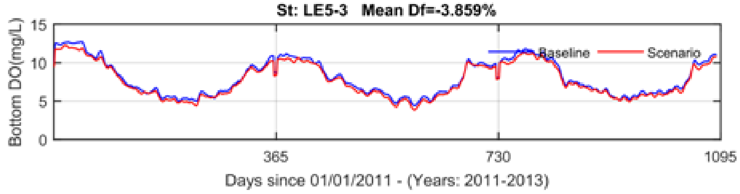

St: LE5-2 Mean Df=-5.185%

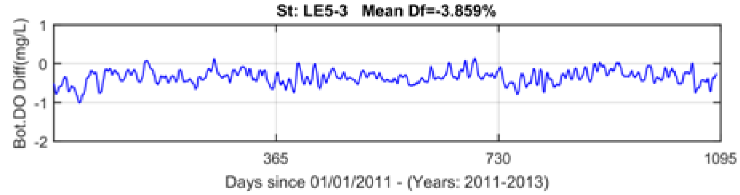

St: LE5-3 Mean Df= 5.083%
Algae (ug/L)
30
20
10
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

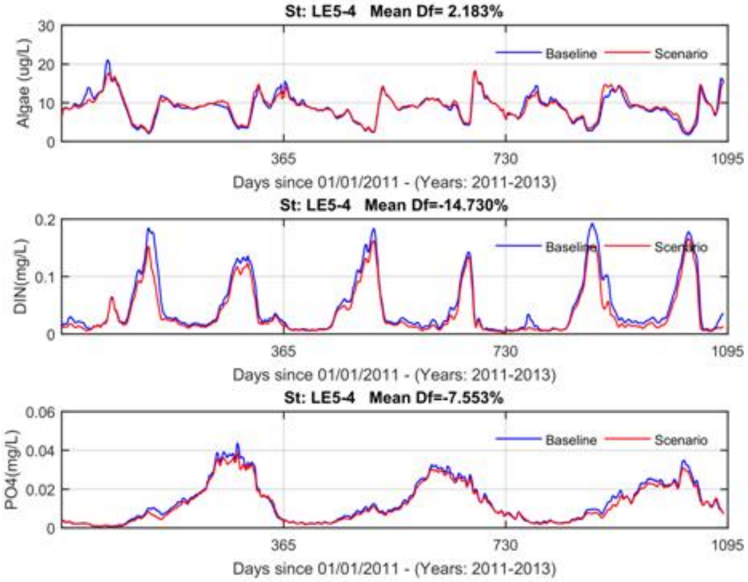

St: LE5-3 Mean Df=-14.231%
DIN(mg/L)
0.4
0.2
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

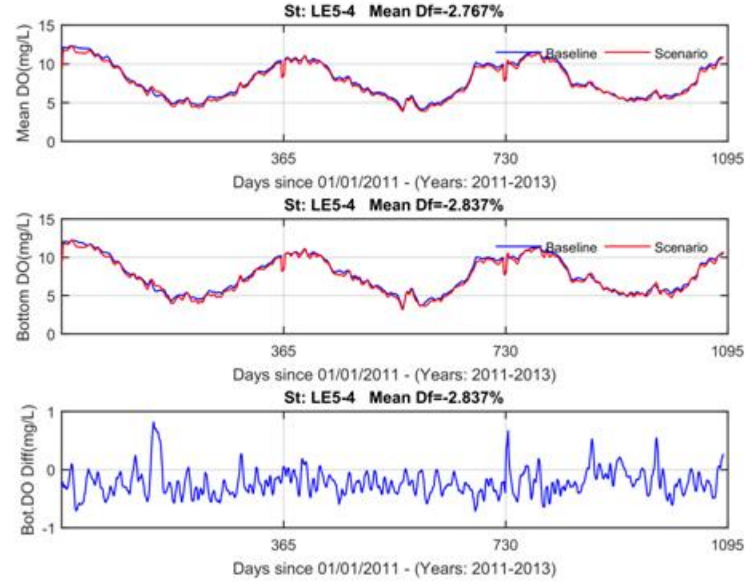

St: LE5-3 Mean Df=-6.329%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

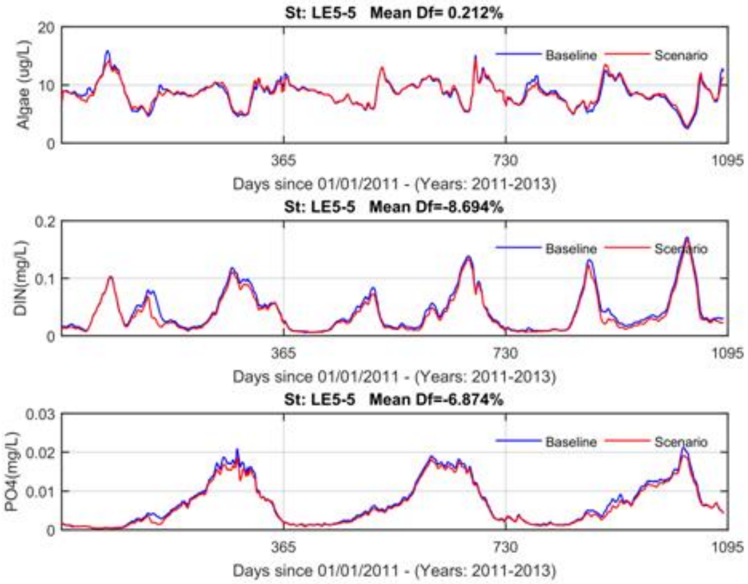

St: LE5-3 Mean Df=-2.841%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-3 Mean Df=-3.859%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

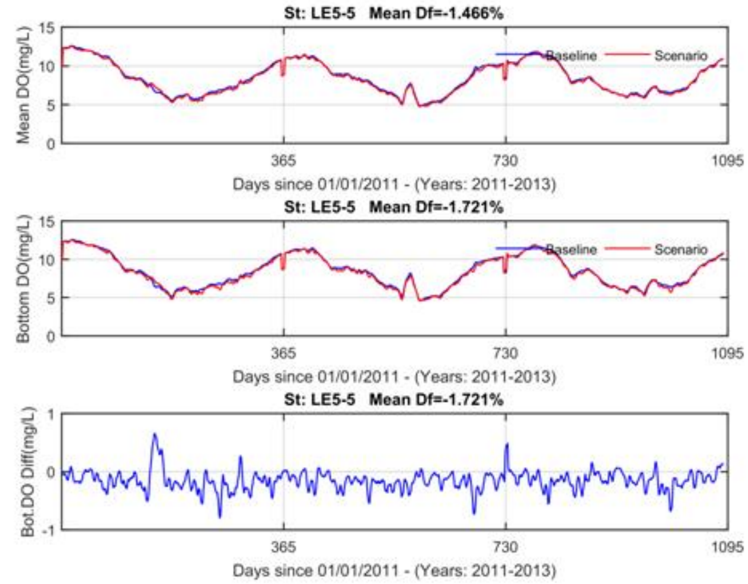

St: LE5-3 Mean Df=-3.859%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: LE5-4 Mean Df= 2.183%
Algae (ug/L)
0
10
20
30
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-14.730%
DIN(mg/L)
0
0.1
0.2
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-7.553%
PO4(mg/L)
0
0.02
0.04
0.06
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

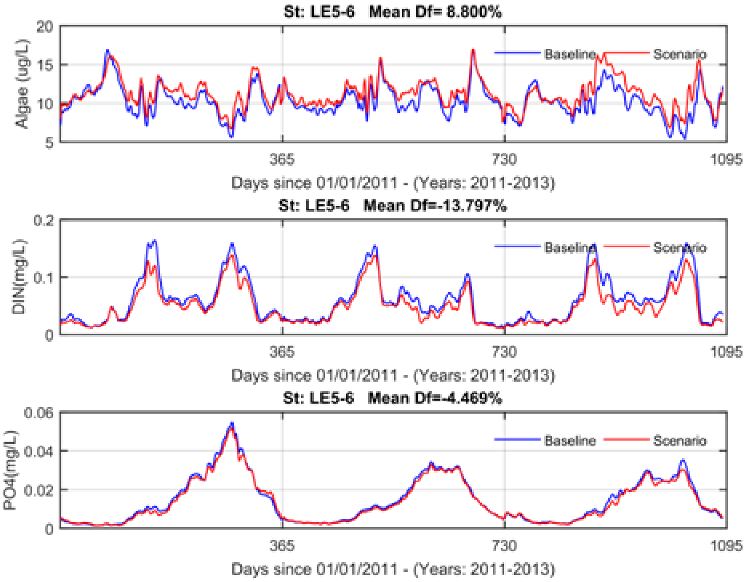

St: LE5-4 Mean Df=-2.767%
Mean DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.837%
Bottom DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-4 Mean Df=-2.837%
Bot.DO Diff(mg/L)
-1
0
1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

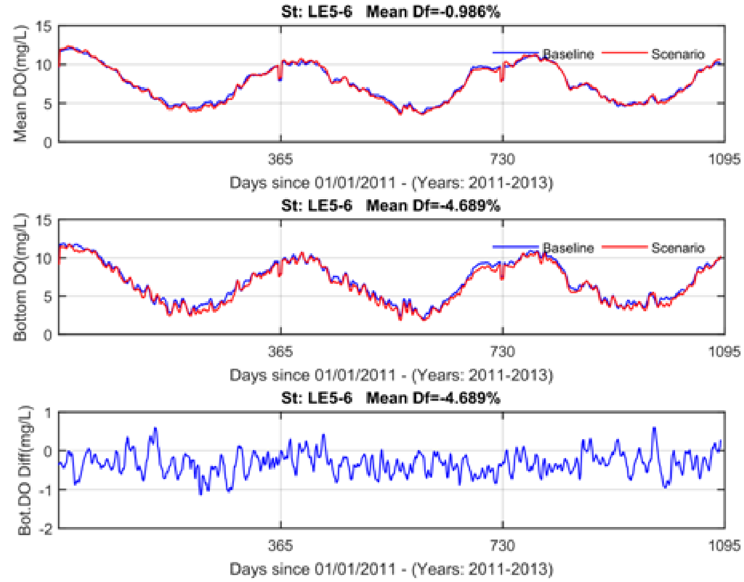


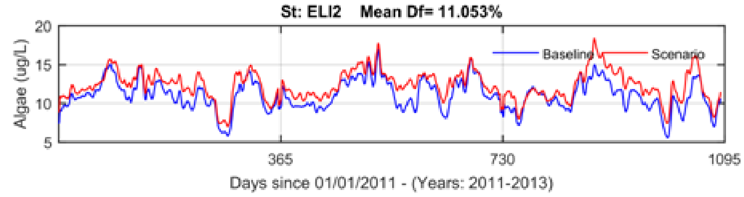
St: LE5-5 Mean Df= 0.212%
Algae (ug/L)
20
10
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-5 Mean Df=-8.694%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-5 Mean Df=-6.874%
PO4(mg/L)
0.03
0.02
0.01
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario

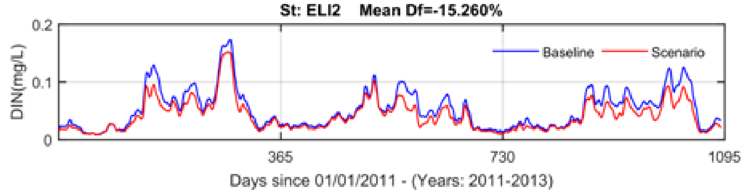


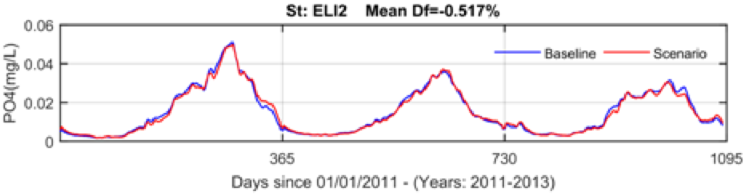
St: LE5-5 Mean Df=-1.466%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-5 Mean Df=-1.721%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
Baseline
Scenario
St: LE5-5 Mean Df=-1.721%
Bot.DO Diff(mg/L)
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

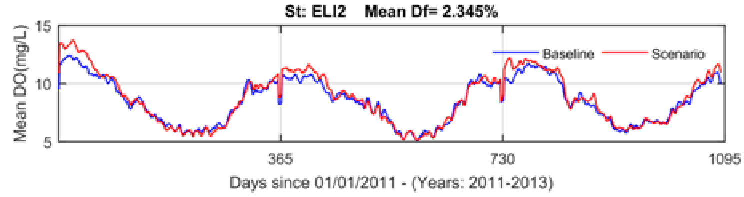

St: LE5-6 Mean Df= 8.800%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-13.797%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-4.469%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

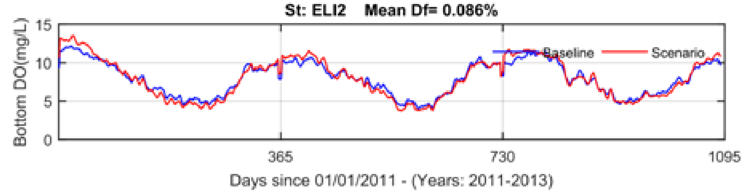

St: LE5-6 Mean Df=-0.986%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-4.689%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LE5-6 Mean Df=-4.689%
Bot.DO Diff(mg/L)
1
0
-1
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

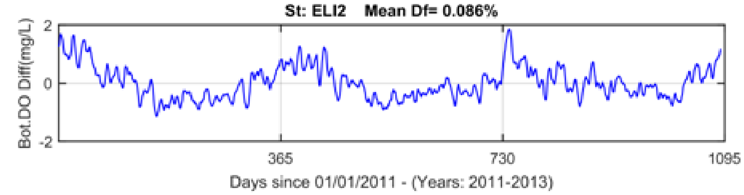

St: ELI2 Mean Df= 11.053%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

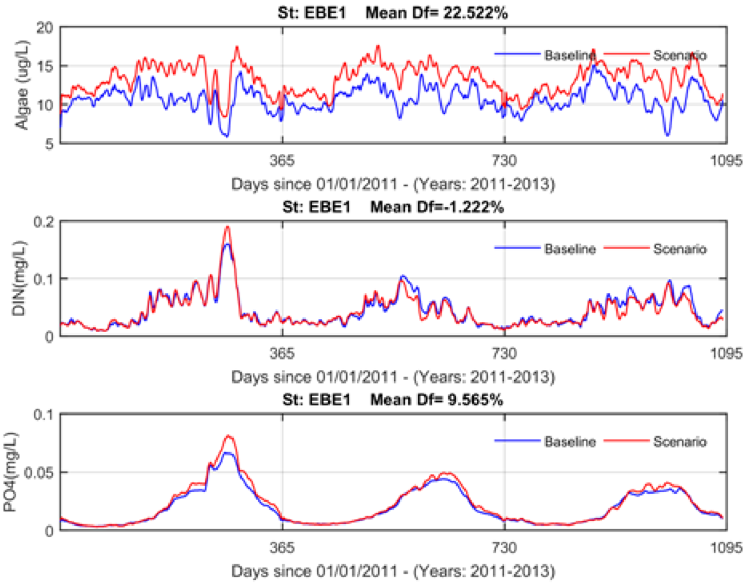

St: ELI2 Mean Df=-15.260%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

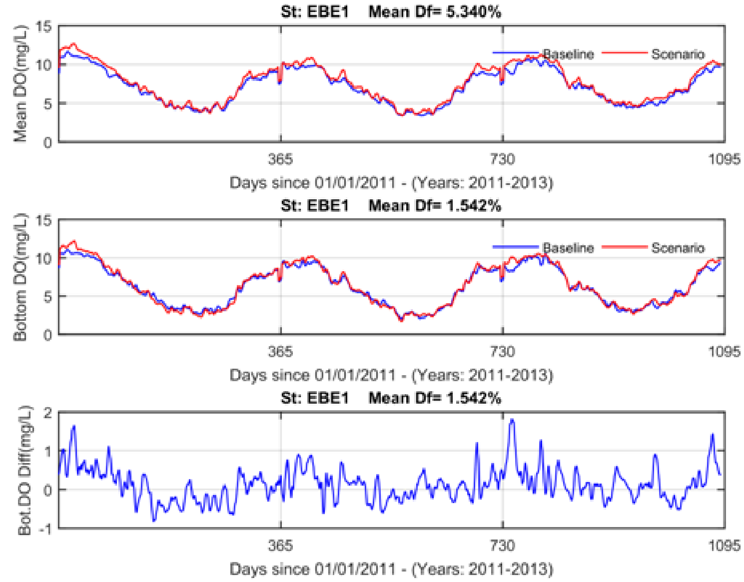

St: ELI2 Mean Df=-0.517%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

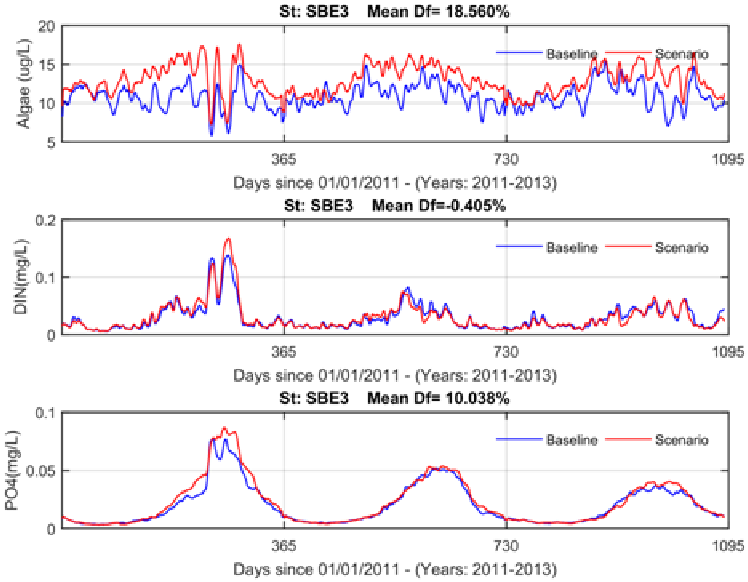

St: ELI2 Mean Df= 2.345%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

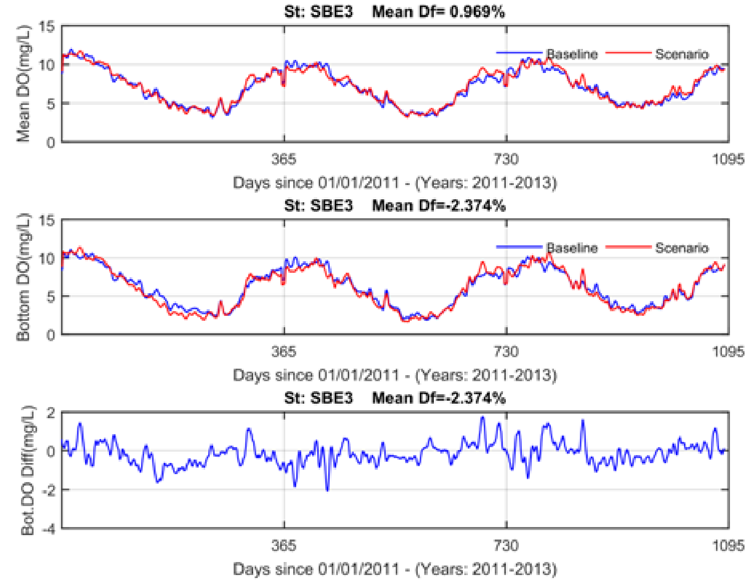

St: ELI2 Mean Df= 0.086%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

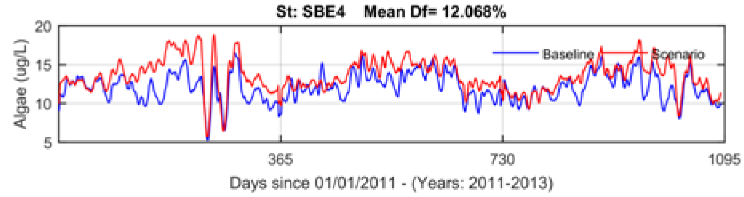

St: ELI2 Mean Df= 0.086%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

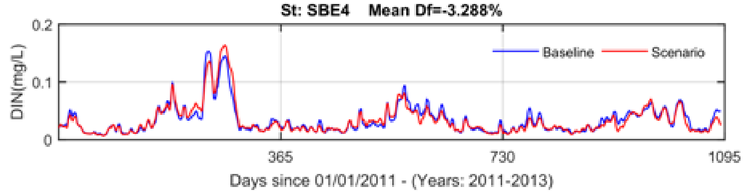

St: EBE1 Mean Df= 22.522%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df=-1.222%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df= 9.565%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

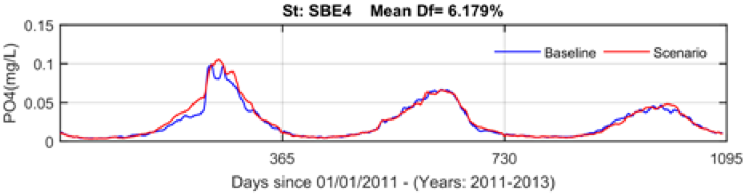

St: EBE1 Mean Df= 5.340%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df= 1.542%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: EBE1 Mean Df= 1.542%
Bot.DO Diff(mg/L)
2
1
0
-1
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

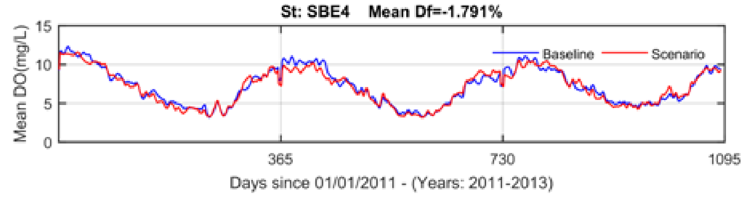

St: SBE3 Mean Df= 18.560%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df=-0.405%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df= 10.038%
PO4(mg/L)
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

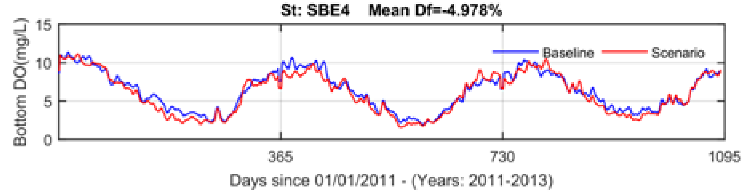

St: SBE3 Mean Df= 0.969%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df=-2.374%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE3 Mean Df=-2.374%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

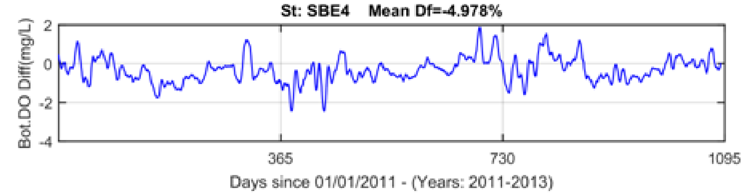

St: SBE4 Mean Df= 12.068%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

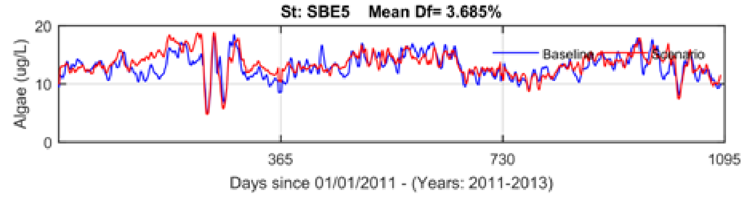

St: SBE4 Mean Df=-3.288%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

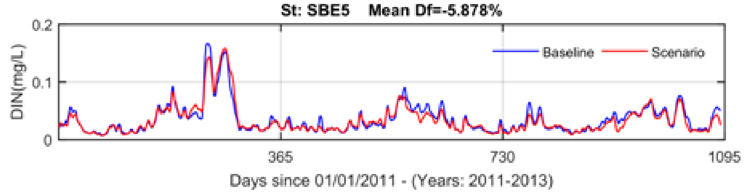

St: SBE4 Mean Df= 6.179%
PO4(mg/L)
0.15
0.1
0.05
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

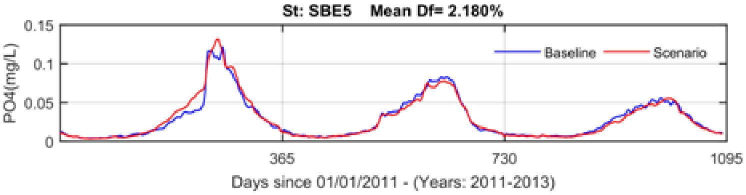

St: SBE4 Mean Df=-1.791%
Mean DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

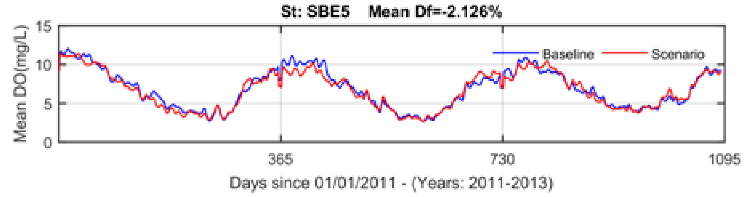

St: SBE4 Mean Df=-4.978%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

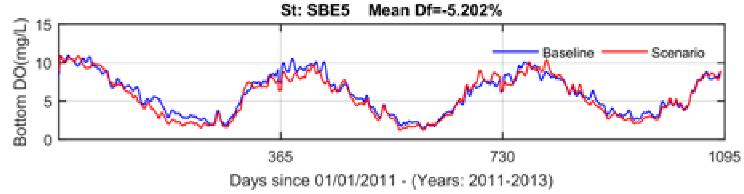

St: SBE4 Mean Df=-4.978%
Bot.DO Diff(mg/L)
2
0
-2
-4
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

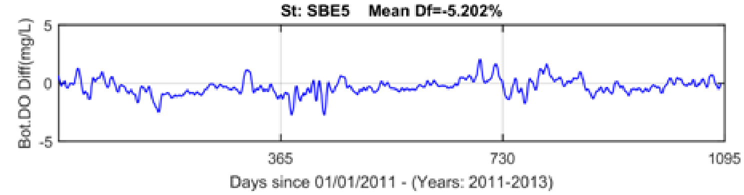

St: SBE5 Mean Df= 3.685%

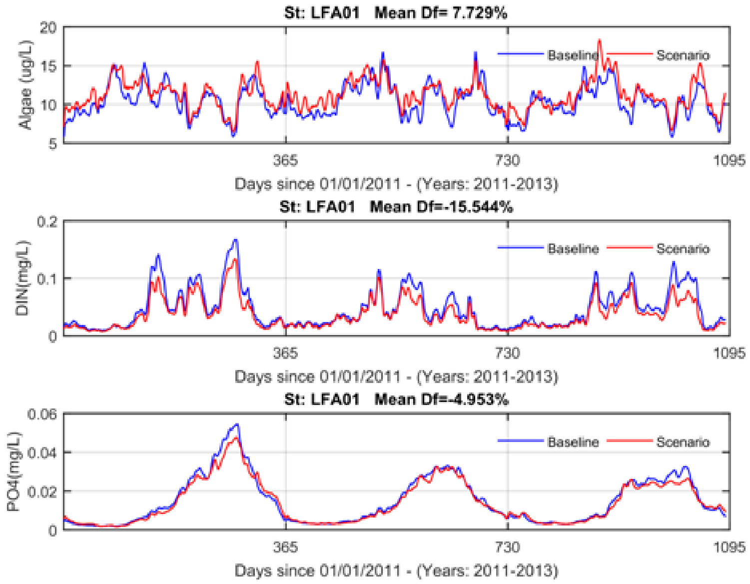

St: SBE5 Mean Df=-5.878%

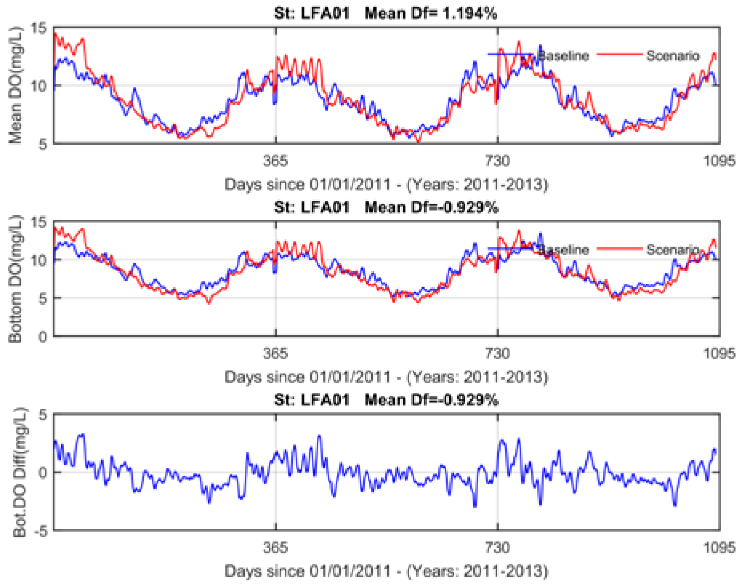

St: SBE5 Mean Df= 2.180%

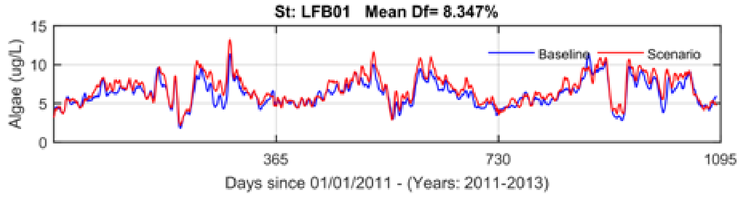

St: SBE5 Mean Df=-2.126%

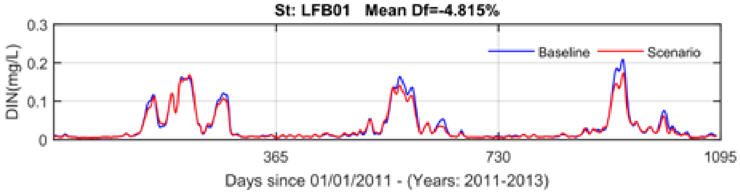

St: SBE5 Mean Df=-5.202%

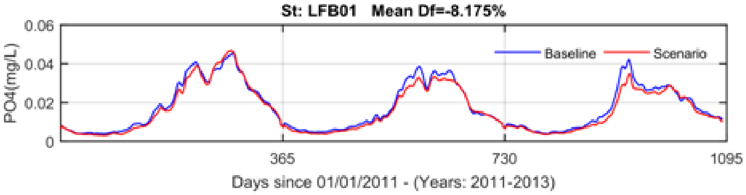

St: SBE5 Mean Df=-5.202%

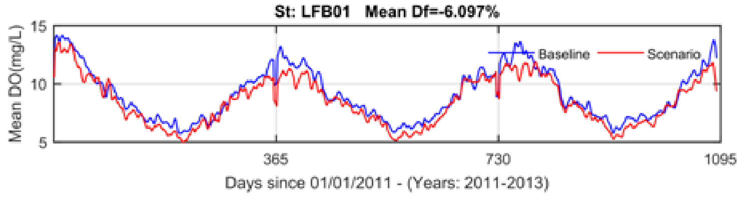

St: LFA01 Mean Df= 7.729%
Algae (ug/L)
20
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-15.544%
DIN(mg/L)
0.2
0.1
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-4.953%
PO4(mg/L)
0.06
0.04
0.02
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

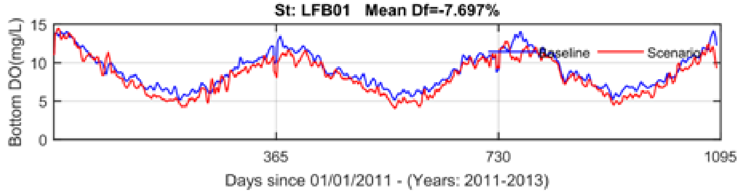

St: LFA01 Mean Df= 1.194%
Mean DO(mg/L)
15
10
5
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-0.929%
Bottom DO(mg/L)
15
10
5
0
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: LFA01 Mean Df=-0.929%
Bot.DO Diff(mg/L)
5
0
-5
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

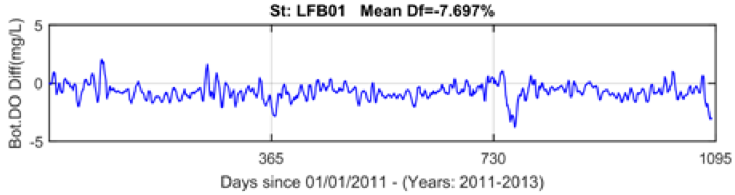

St: LFB01 Mean Df= 8.347%

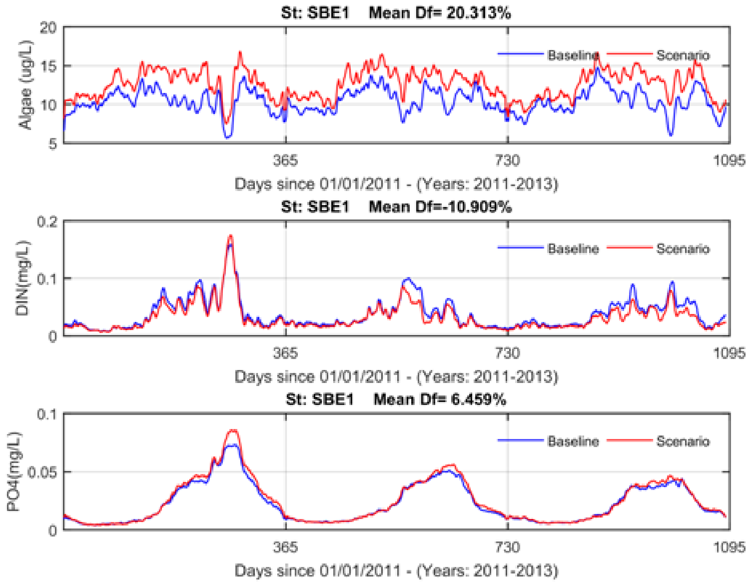

St: LFB01 Mean Df=-4.815%

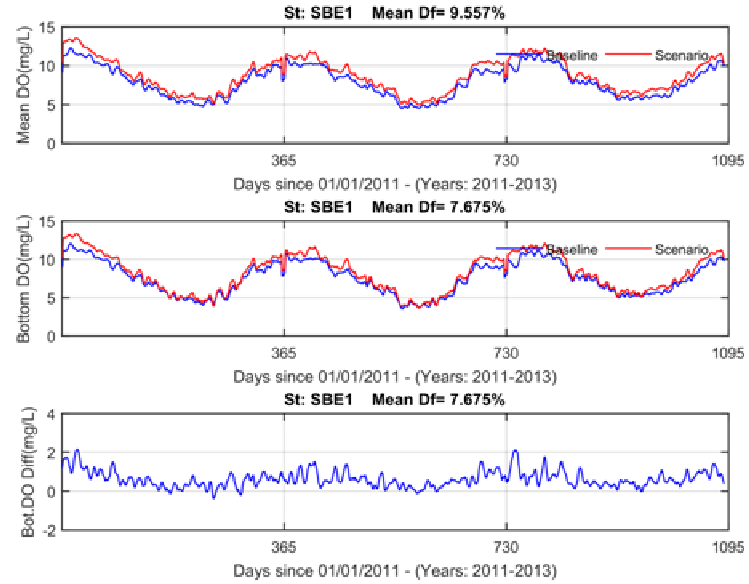

St: LFB01 Mean Df=-8.175%

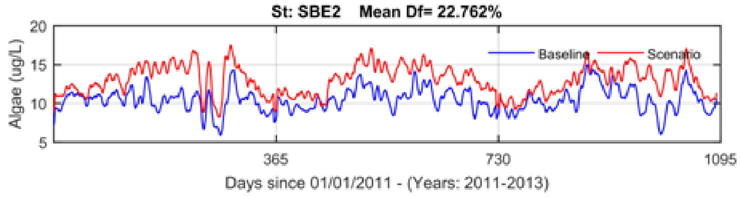

St: LFB01 Mean Df=-6.097%

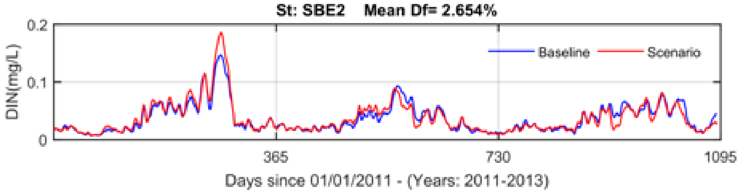

St: LFB01 Mean Df=-7.697%

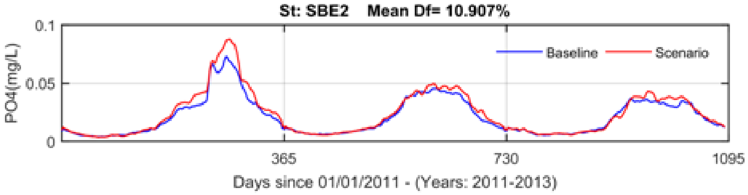

St: LFB01 Mean Df=-7.697%

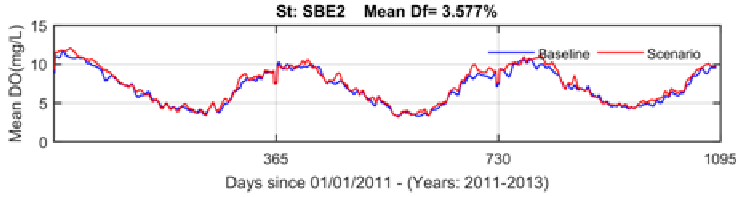

St: SBE1 Mean Df= 20.313%
Algae (ug/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df=-10.909%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df= 6.459%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

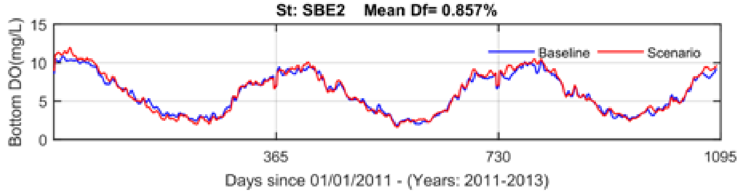

St: SBE1 Mean Df= 9.557%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df= 7.675%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)
St: SBE1 Mean Df= 7.675%
Bot.DO Diff(mg/L)
4
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)

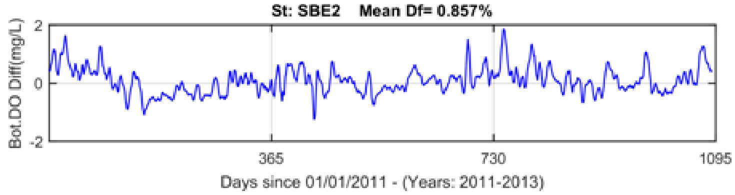

St: SBE2 Mean Df= 22.762%
Algae (ug/L)
20
15
10
5
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

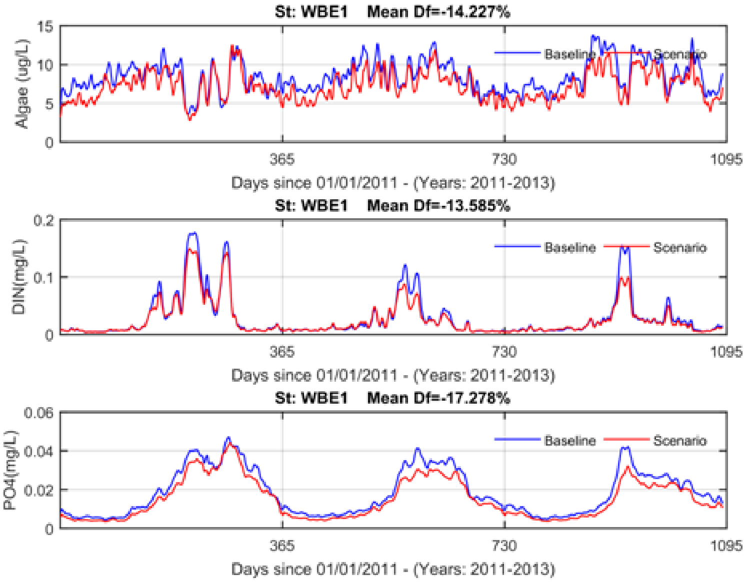

St: SBE2 Mean Df= 2.654%
DIN(mg/L)
0.2
0.1
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)

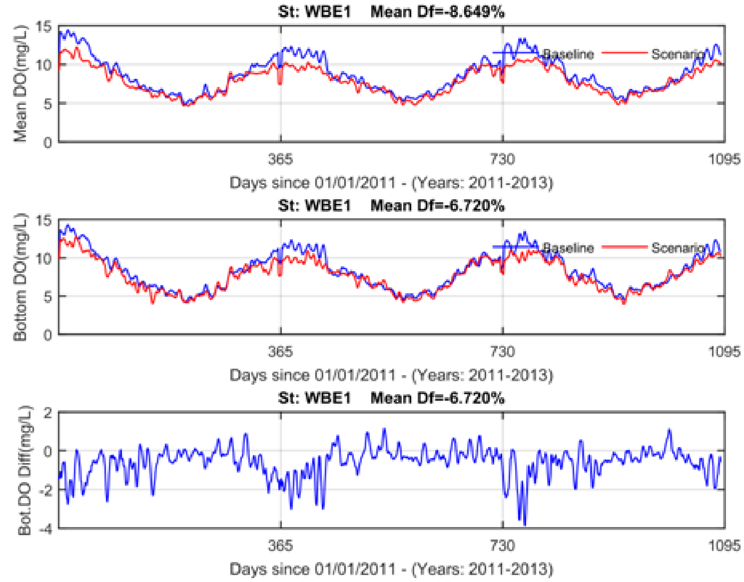

St: SBE2 Mean Df= 10.907%
PO4(mg/L)
0.1
0.05
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: SBE2 Mean Df= 3.577%
Mean DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: SBE2 Mean Df= 0.857%
Bottom DO(mg/L)
15
10
5
0
365
730
1095
Baseline
Scenario
Days since 01/01/2011 - (Years: 2011-2013)


St: SBE2 Mean Df= 0.857%
Bot.DO Diff(mg/L)
2
0
-2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: WBE1 Mean Df=-14.227%
Algae (ug/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-13.585%
DIN(mg/L)
0
0.1
0.2
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-17.278%
PO4(mg/L)
0
0.02
0.04
0.06
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)


St: WBE1 Mean Df=-8.649%
Mean DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-6.720%
Bottom DO(mg/L)
0
5
10
15
Baseline
Scenario
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)
St: WBE1 Mean Df=-6.720%
Bot.DO Diff(mg/L)
-4
-2
0
2
365
730
1095
Days since 01/01/2011 - (Years: 2011-2013)