Implementation of Hybrid Wetland Treatment Technology in the Northern Everglades Watershed

Task 19 Deliverable: Final Report

Chapter I: Technical Report

Sites 1-3, 5-8

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Prepared by:

Watershed Technologies LLC
Satellite Beach, FL

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List of Abbreviations

Alum - aluminum sulfate

BAT – Best Available Technology

cfs - cubic feet per second

C:N – carbon to nitrogen ratio

DO – dissolved oxygen

DOP – dissolved organic phosphorus

ET - evapotranspiration

FAV – floating aquatic vegetation

(F)DEP – (Florida) Department of Environmental Protection

FDOT – (Florida) Department of Transportation

HRT – hydraulic retention time

HWTT – Hybrid Wetland Treatment Technology

LR – limerock

Mgal – million gallons

N - nitrogen

NO_x – nitrate + nitrite nitrogen as N

NPP – Net Primary Productivity

P - phosphorus

PP – particulate phosphorus

PAC - polyaluminum chloride

SAV – submerged aquatic vegetation

SRP – soluble reactive phosphorus

TAl – total aluminum

TKN – total Kjeldahl nitrogen

TN – total nitrogen = TKN + NO_x-N

TON – total organic nitrogen = TKN – ammonia-N

TP – total phosphorus

VC – vegetated compartment

Introduction

The reduction of phosphorus (P) loads to Lake Okeechobee from the watershed represents a formidable challenge. In order to meet the lake's P load reduction targets, hundreds of tons of P inputs must be curtailed each year. Water managers propose to accomplish this reduction by deploying a combination of Best Management Practices, "Edge of Field" treatment systems, and "Regional" treatment systems. A review (SWET, 2001) of Dairy "Best Available Treatment Technologies" (BAT) concluded that chemical treatment is likely to play a key role in reducing P inputs to the lake.

Because the operating (i.e., chemical) costs for removing a significant fraction of the inflow P load to the lake will be quite high, it is extremely important to identify and implement techniques for increasing the efficiency of chemical use. The Hybrid Wetland Treatment Technology (HWTT) concept was developed with the intent of harnessing and integrating the strengths of both wetland and chemical treatment technologies. The goal of HWTT systems is to provide the effectiveness and reliability of chemical treatment systems for P removal; to utilize the wetland vegetation to the maximum extent possible to minimize chemical amendment use; to eliminate the need for off-site disposal of residual floc materials; and to facilitate the removal of nitrogen (N) species.

HWTT systems are comprised of vegetated zones (primarily with floating and/or submerged macrophytes) and non-vegetated zones that utilize internal floc recycling as well as the drying of floc material with subsequent re-introduction into the treatment train. Chemical coagulants are added to the front-end of the system, which is equipped with one or more deep zones to capture and store the resulting chemical flocs. A fundamental concept of the HWTT is that the floc material resulting from coagulant addition remains at least temporarily viable and can be "re-used" for additional P removal. Both passive and active re-use of floc material can be practiced in a HWTT. Passive re-use refers to the accumulation of viable flocs on plant roots and stems that are situated near the front-end and mid-regions of the system. Active re-use refers to the periodic re-suspension of settled floc. Re-use is achieved by exposing existing viable flocs within the system, in either an active or passive manner, to "untreated parcels" of water. Coagulants typically are dosed to

the front end of the HWTT only intermittently, such that untreated parcels of water pass through into the HWTT system at selected time intervals. The HWTT includes intellectual property represented by several US Patents.

Overview of Project Activities

This report describes the water treatment performance of seven HWTT systems, six of these located in the northern Lake Okeechobee watershed, during the 2014-2015 project period. Three of the HWTT facilities were constructed in 2008: of these, two systems are being utilized to treat tributaries (Nubbin Slough and Mosquito Creek) to Lake Okeechobee, and the third, which drains to the Indian River Lagoon, treats citrus (Ideal Grove) runoff (Watershed Technologies, 2008). In 2009, two additional HWTT systems were designed and constructed in the Lemkin Creek watershed and are being utilized to treat tributary waters from Wolff Ditch and Lemkin Creek/FDOT Ditch sub-basins. Construction of Phase I of the sixth facility, the Grassy Island HWTT system, was completed in mid-2011. Phase II construction was completed in June 2012, providing for a total of 20 cfs system capacity. Optimization of Phase II operations continued from July through October 2012. Phase III construction (pump station enhancements, and expansion of the western components to 15 cfs) spanned most of the 2012-13 project year, and was completed in June 2013. These enhancements allow for a maximum treatment capacity of 30 cfs. Early in 2015, construction of an additional HWTT facility was completed. This facility is located in Martin County, FL, and treats Bessey Creek waters prior to input into the coastal lagoon.

As part of our HWTT system performance assessments, grab samples of inflow and outflow water were collected at each of the HWTT facilities, and continuous inflow data were obtained from on-site instrumentation. Near the end of this monitoring period, we initiated floc removal/tilling at a subset of facilities. At this same time, outflow region limerock beds were installed at the Nubbin, Mosquito and Grassy facilities to improve quality of the outflow waters.

Detailed Treatment Performance of the Operational HWTT Systems

Site 1: Nubbin Slough Tributary Treatment HWTT Facility

From July 2014 through June 2015, we continued operations of the 1.55-acre Nubbin Slough HWTT system located at Davie Dairy (Figure 1). This retrofitted system had been constructed early in 2008, utilizing some of the infrastructure that previously was deployed as part of the Dairy BAT project.



Figure 1. The Nubbin Slough HWTT system looking toward the north. The mixing chamber and inflow manifold are at the northeast corner of the pond, and the outflow riser is at the southwest corner (left foreground). The inflow region limerock bed is situated to the right of the pond. Early in 2015, an additional limerock bed (not shown in this photo) was installed at the system outflow, adjacent to the outflow riser.

Alkalinity levels in the Nubbin Slough waters are low, which necessitates either the use of buffer in conjunction with alum additions or the use of a polyaluminum chloride (PAC)

compound. PAC compounds were utilized during operations of the Davie Dairy BAT chemical treatment system, but they proved ineffective for P removal in that system. During 2008 and 2009, sodium aluminate was utilized in conjunction with alum during HWTT operations; however, the aluminate compound is expensive and difficult to store and deploy. Prior to the wet season of 2010, we therefore designed and deployed a limerock bed to provide buffering prior to alum additions. Early in 2015, an additional limerock bed was deployed at the outflow region, to further buffer (increase pH and alkalinity) of system outflow waters (Figure 2).



Figure 2. The inflow region (left) and outflow region (right) limerock beds at the Nubbin Slough HWTT facility.

During the July 2014 – June 2015 reporting period the Nubbin Slough HWTT system received intermittent dosing of aluminum sulfate (alum), ranging from 75-85% of operational time. The overall average effective dosing rate was 14.7 mg Al/L, with monthly average dose ranging from 11.6 to 16.9 mg Al/L. During the May 2015 system operation was suspended (no flow) for floc removal and installation of the outflow region limerock bed. Daily system flow status is provided in the Chapter II appendices.

Grab samples of inflow water were collected for chemical analyses from the HWTT diversion weir (system inflow) while system outflow samples were collected at the HWTT pond outflow structure. Samples were analyzed for total phosphorus (TP), alkalinity, pH,

color, conductivity and turbidity on a weekly basis. Water samples were also analyzed for nitrate + nitrite N (NO_x-N) and TKN on a biweekly basis; total N (TN) was calculated as the sum of NO_x and TKN. Water chemistry data for the July 2014 – June 2015 monitoring period are presented in Figure 3 through Figure 10.

TP concentrations in the Nubbin HWTT inflow stream were extremely variable during the greater part of the monitoring period, particularly from October 2014 through June 2015 (Figure 3). Over the course of the monitoring period, inflow TP ranged from 431 to 4600 µg/L and averaged 1105 µg/L (median = 891 µg/L). Greater variability, along with a general increasing trend, was observed for inflow TP during the December – June period. The inflow TP concentration of 4600 µg/L (4.6 mg/L) measured on 6/24/15, the last sampling event of the monitoring period, was 2x the next highest TP concentration measured during the period. Outflow TP concentrations were substantially lower than inflow concentrations, on a consistent basis, and ranged from 29 to 711 µg/L, while averaging 161 µg/L (median = 125 µg/L). There was no detectable trend in outflow TP during the monitoring period.

Inflow alkalinity levels were relatively low during most of the monitoring period, although substantially higher alkalinity spikes were measured during late December and late June (Figure 4). The second, and largest, of those alkalinity spikes (400 mg/L) coincided with the high TP value measured on 6/24/15. Inflow alkalinity ranged as low as 16 mg/L, and averaged 57 mg/L over the entire monitoring period. Outflow alkalinity exhibited a temporal pattern similar to that of inflow alkalinity, although outflow levels were slightly lower than corresponding inflow concentrations. Outflow alkalinity ranged from 8 to 138 mg/L and averaged 37 mg/L over the course of the monitoring period. Inflow pH varied from 6.1 to 7.2 and averaged 6.4 during the monitoring period (Figure 5). Outflow pH was somewhat lower than inflow pH during most of the monitoring events, averaging 6.2 and ranging from 5.3 to 6.9. It should be noted that the installation of the outflow region limerock bed resulted in substantially higher outflow pH levels (6.5-6.9) during June, so we anticipate that this new system component will serve as an effective buffering mechanism for outflow waters.

Color in both inflow and outflow streams trended slightly higher during the wet season than during the dry season, but variability was relatively high during the entire monitoring period (Figure 6). Mean color concentrations at the inflow and outflow were 419 and 152 PCU, respectively. Inflow color ranged widely, from 75 to 1089 PCU, with the highest value reported for the 6/24/15 sampling event. The range of outflow color was much lower in comparison, with minimum and maximum concentrations of 37 and 322 PCU, respectively, reported during the monitoring period. Conductivity exhibited similar temporal patterns in the system inflow and outflow streams, with greater variability observed in inflow conductivity (Figure 7). Inflow conductivity ranged from 74 µS/cm in mid-October to 1990 µS/cm on June 24, the latter corresponding to the highest TP concentrations measured during the monitoring period. Mean inflow conductivity was 415 µS/cm while outflow conductivity averaged 478 µS/cm and ranged from 249 to 776 µS/cm. Inflow turbidity remained below 10 NTU during most of the monitoring period, but spiked to 33.5 NTU in late December and 47 NTU in late June, corresponding with significant pulses of TP in the inflow stream (Figure 8). Inflow turbidity averaged 4.7 NTU during the monitoring period, and ranged from 0.9 to 47 NTU. Outflow turbidity was frequently higher than inflow turbidity, ranging from 1.1 to 15.7 NTU and averaging 5.8 NTU.

TN concentrations in the inflow and outflow streams were generally higher during the dry season months, with inflow TN ranging as high as 25.6 mg/L, in conjunction with unusually high TP levels in late December (Figure 9). The minimum inflow TN concentration measured was 2.12 mg/L, while the mean value for the monitoring period was 5.13 mg/L. Outflow TN concentration varied in proportion to inflow concentrations, averaging 3.48 mg/L and ranging from 1.30 to 14.5 mg/L. Concentrations of NO_x were also higher during the dry season, and typically higher in the outflow stream than in the inflow water (Figure 10). Increasing NO_x concentrations between inflow and outflow was indicative of net nitrification within the system, which may be enhanced by the lack of a shallow vegetated zone to support denitrification at the back end of the system. On average, NO_x accounted for a relatively high proportion of TN in both inflow (15%) and outflow (39%) streams. Inflow NO_x concentrations averaged 0.751 mg N/L and ranged from ≤ 0.016 mg/L (MDL) to 2.7 mg N/L, while outflow NO_x concentration averaged 1.35 mg N/L and ranged from ≤

0.016 to 4.7 mg N/L. While a net reduction in TN concentration was observed for the Nubbin Slough HWTT system during the monitoring period, the percentage removal rate was low compared to that of the Ideal and Grassy HWTT facilities. As previously reported, the absence of a shallow vegetated zone in the Nubbin facility contributes to the poorer N removal performance at this site.

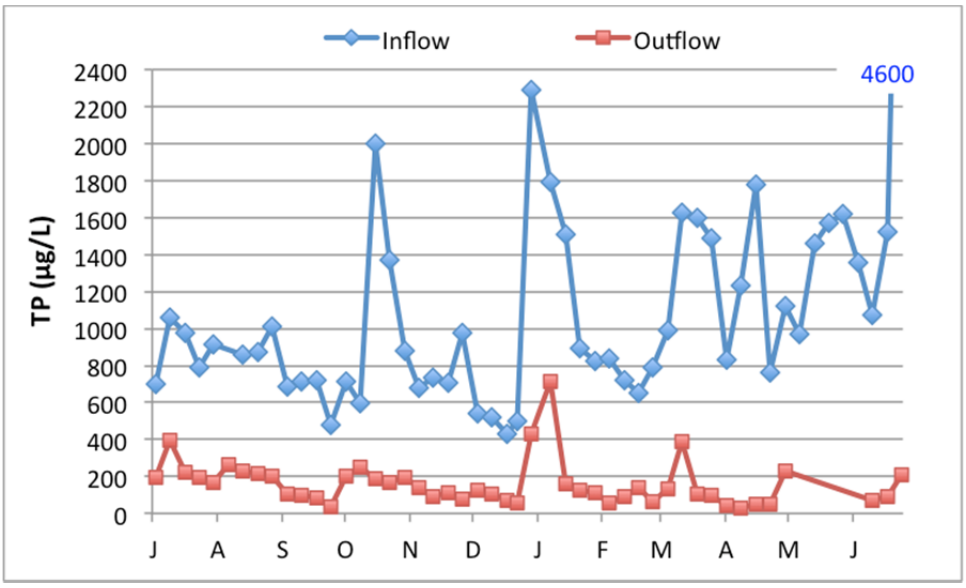


Figure 3. TP concentration in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

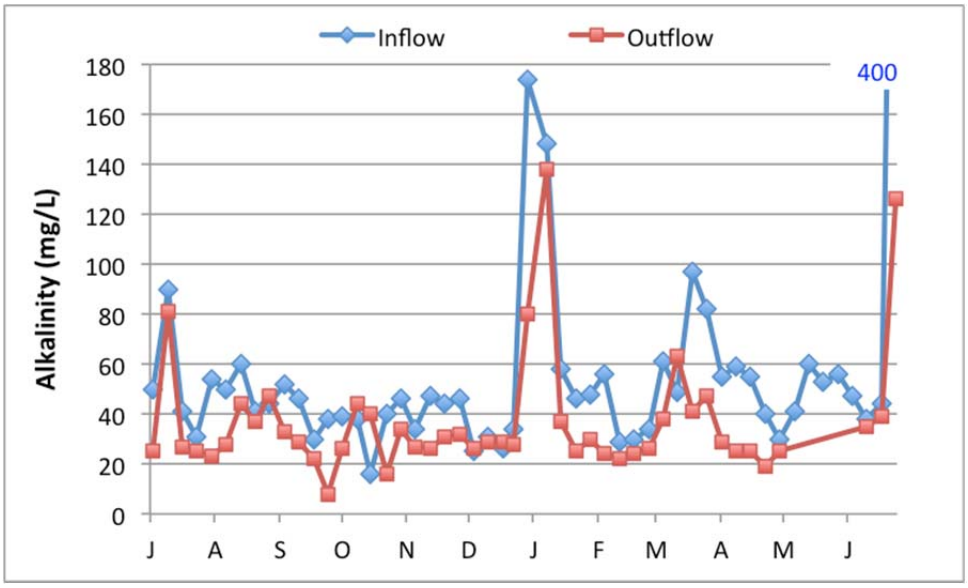


Figure 4. Alkalinity in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

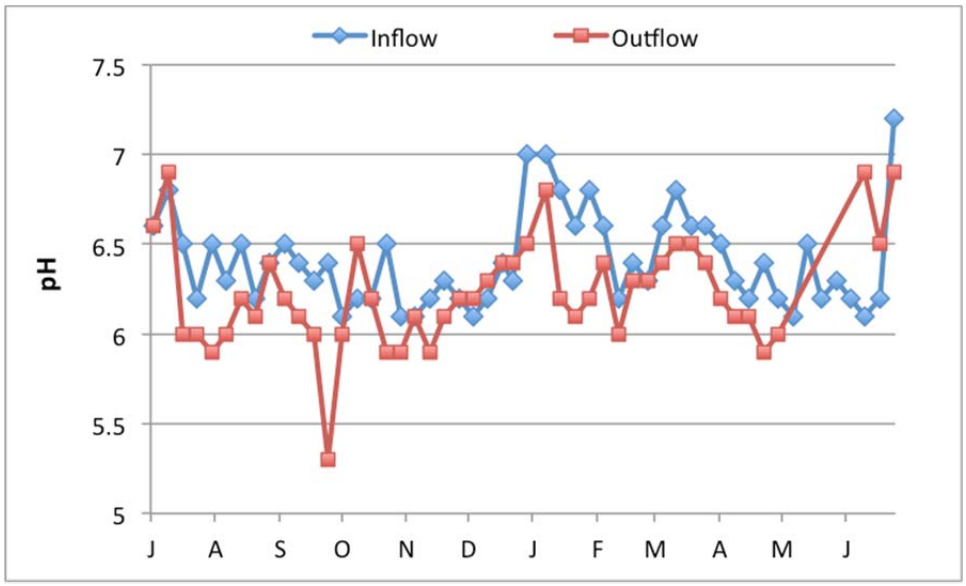


Figure 5. pH in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014– June 2015 monitoring period.

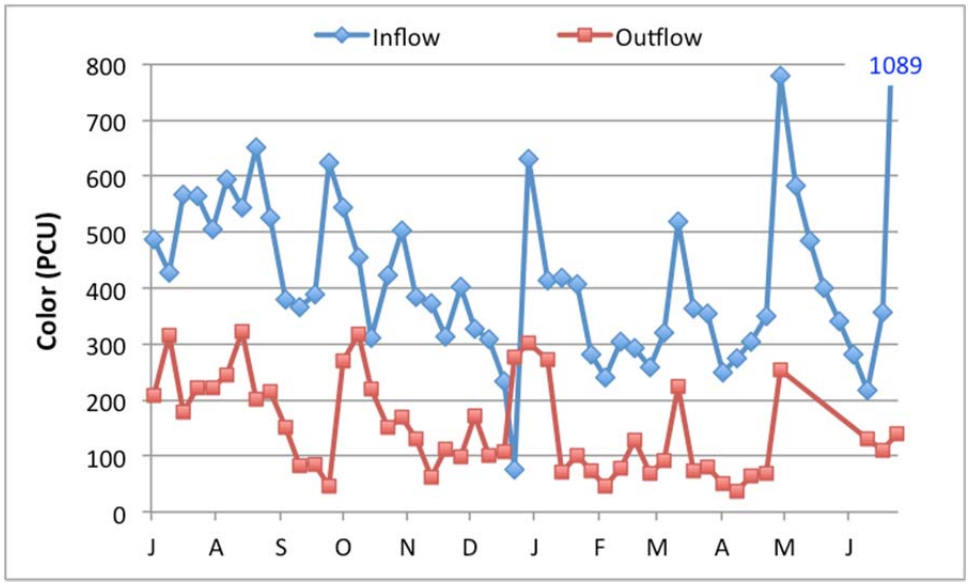


Figure 6. Color in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

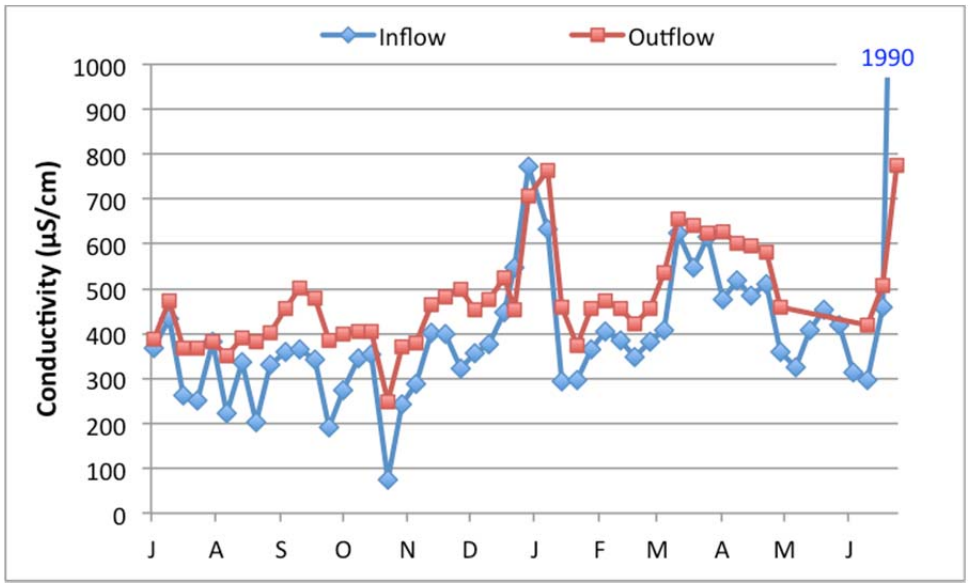


Figure 7. Conductivity in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

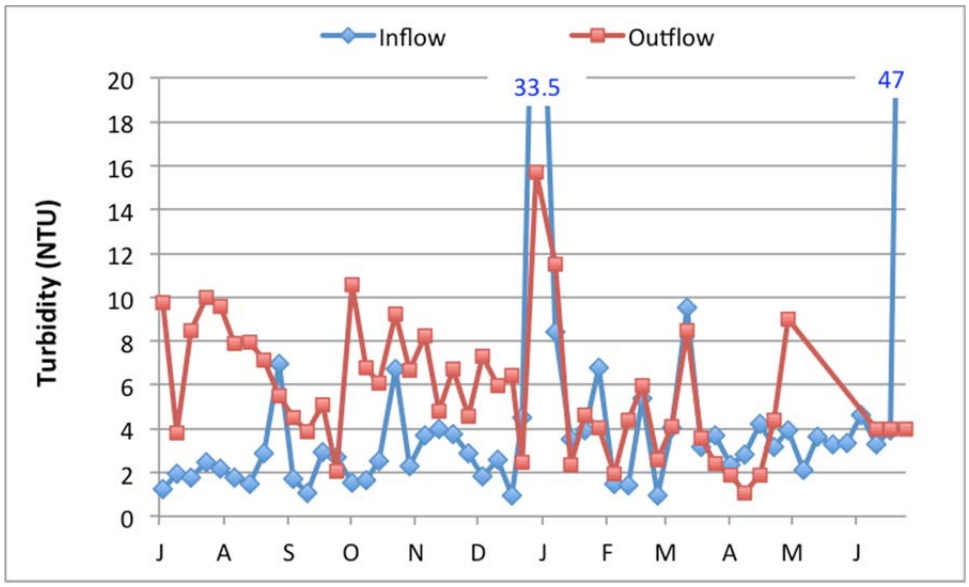


Figure 8. Turbidity in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

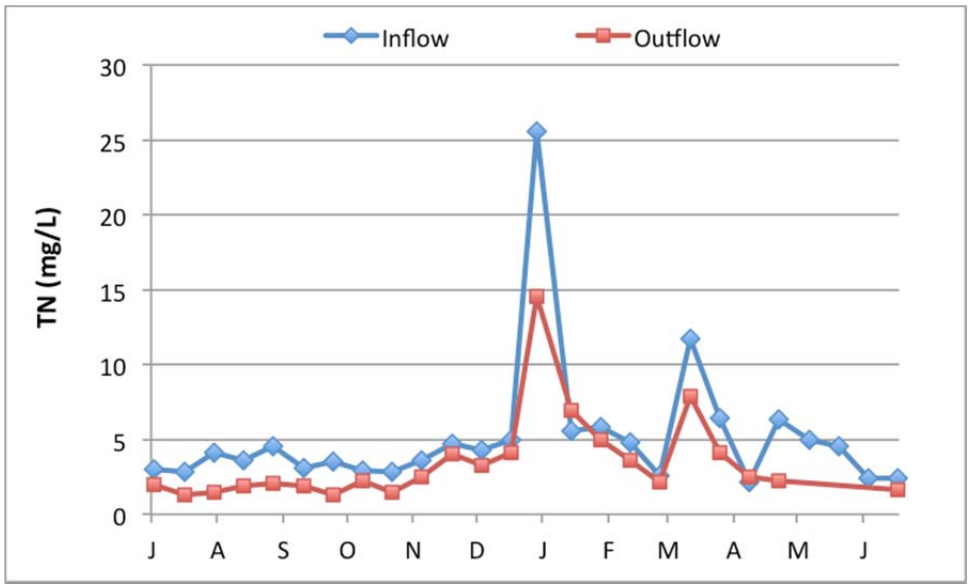


Figure 9. TN in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

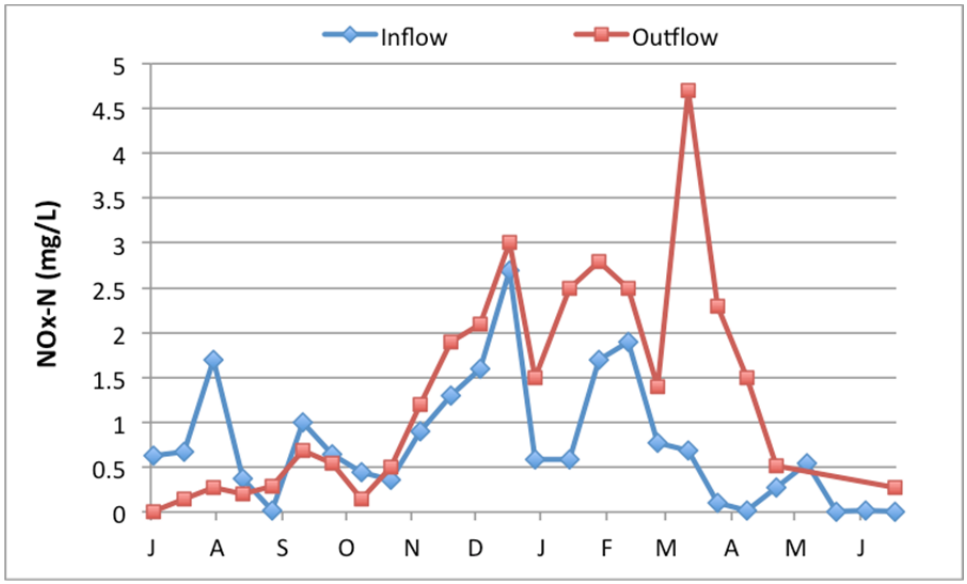


Figure 10. NO_x-N in the inflow and outflow streams at the Nubbin Slough HWTT system during the July 2014 – June 2015 monitoring period.

Monthly flow volumes treated in the Nubbin HWTT system ranged from 24.6 to 39.1 Mgal during the period July 2014-February 2015, followed by a substantial decrease during the

latter part of the dry season (Figure 11). Only minimal flow occurred during May, due in part to the limerock bed installation, but also because of very low water conditions in Nubbin Slough. Total monthly flow volumes during the entire monitoring period ranged from 1.9 million gallons (Mgal) in May 2015 to 39.1 Mgal in January 2015. Mean monthly flow volume was 24.7 Mgal, while total flow treated by the Nubbin Slough HWTT system during the period July 2014 through June 2015 was 296.0 Mgal.

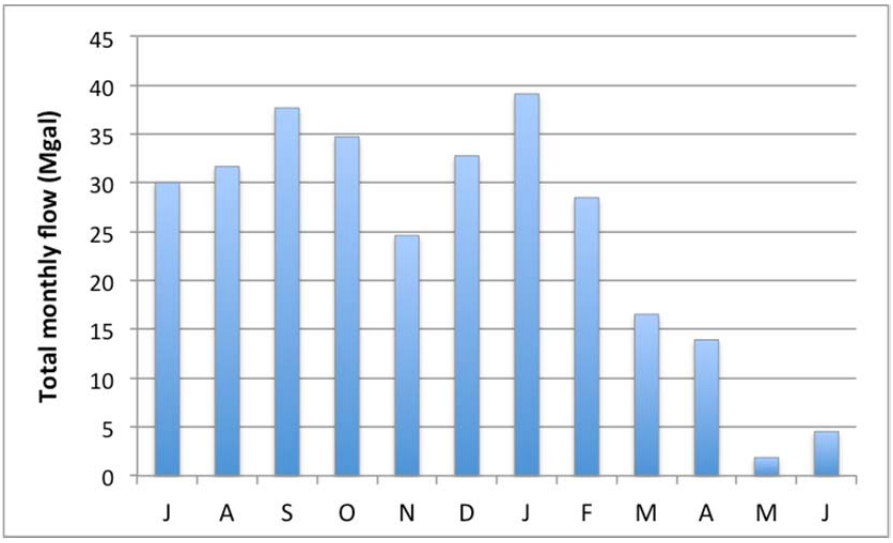


Figure 11. Total monthly flow treated by the Nubbin Slough HWTT system during the period July 2014 – June 2015.

Site 2: Ideal #2 Grove HWTT Facility

The Ideal #2 Grove HWTT site is situated within an irrigated citrus grove in western St. Lucie County. The small canal to the north of the treatment system ("North Canal") serves as a collector ditch for grove runoff and groundwater. Due to fertilizer usage in the grove, the water in the collection canals is nutrient-enriched. A large regional canal (the "Rim Ditch") immediately west of the grove site serves as a pumped supply of water to the canal that runs along the south side ("South Canal") of the treatment facility. This relatively large canal carries Rim Ditch water from west to east, and then a lateral canal flows about 0.5

miles north to a grove irrigation pump, which feeds water into drip irrigation emitters throughout the grove.

The Ideal Grove HWTT system consists of a 0.7-acre pond, equipped with both shallow and deep zones, that was initially divided into equal size parallel flow paths with a flexible boom and barrier (Figure 12). This configuration facilitated the comparative demonstration of different components of HWTT including amendment types and doses, as well as various operational schemes (e.g. different hydraulic loading rates, intermittent dosing, etc.) during the first two years of operation. The shallow zone is stocked with floating macrophytes, in this case water hyacinth (*Eichhornia crassipes*) (Figure 13 and Figure 14). The deep zones contain several species of submerged aquatic vegetation (SAV), including some that were stocked (e.g., *Najas guadalupensis*) and others (*Hydrilla verticillata*) that colonized from the adjacent inflow farm canal.



Figure 12. Aerial photo of the Ideal Grove HWTT facility.



Figure 13. The outflow region of the Ideal Grove HWTT facility.



Figure 14. Attachment of coagulant flocs to the roots of the floating plants in the shallow zone of the Ideal Grove HWTT system.

The two treatment flow paths in the Ideal HWTT system have been operated as a single (combined) flow path, beginning in April 2010. During the July 2014 – June 2015 reporting period, the combined system received intermittent (50% of operational time) dosing of alum, with the exception of a brief period (less than 2 weeks duration) of continuous dosing during November 2014. The mean effective alum dose for the monitoring period was 13.1 mg Al/L, while monthly average effective dose ranged from 8.2 to 22 mg Al/L. During the period from early October to early November the system was not operational due to a pump malfunction. Daily system flow status is provided in the Chapter II appendices.

Grab samples of water were collected for routine monitoring, from the pond inflow (pumped from the North Canal), and from the northern (A) outfow culvert. Samples were analyzed for total phosphorus (TP), alkalinity, pH, color, conductivity and turbidity on a weekly basis. Water samples were also analyzed for nitrate + nitrite N (NO_x-N) and TKN on a biweekly basis; total N (TN) was calculated as the sum of NO_x and TKN. Water chemistry data for the July 2014 – June 2015 monitoring period are presented in Figure 15 through Figure 22.

As observed in previous years, TP concentration in the Ideal HWTT inflow stream exhibited a high level of variability during the course of the monitoring period (Figure 15). Highest levels of inflow TP were observed from mid-September through mid-December 2014, during which time concentrations averaged 1644 µg/L. In contrast, inflow TP averaged 361 µg/L during the months of January through June 2015. During the entire monitoring period, inflow TP concentrations ranged nearly 100-fold, from 38 to 3730 µg/L, and averaged 810 µg/L (median = 446 µg/L). Outflow TP concentrations were characteristically low for this site, except for a short period of atypically high concentrations during mid-September through early October 2014, which coincided with extremely high inflow TP levels. During the remainder of the monitoring period, outflow TP concentration averaged 33 µg/L. The overall range for outflow TP was 10 to 529 µg/L, while the mean was 54 µg/L (median = 28 µg/L).

Inflow alkalinity was highly variable throughout the monitoring period, but was greater than 100 mg/L during all but one sampling event (Figure 16). Alkalinity concentrations ranged from 82 to 276 mg/L and averaged 163 mg/L in the inflow stream. Outflow alkalinity exhibited the greatest variability during the November-February period, and generally higher alkalinity levels were observed from March through June. For the entire monitoring period, outflow alkalinity ranged from 22 to 174 mg/L and averaged 110 mg/L. Inflow pH displayed a decreasing trend during July-October followed by an increase during November, with values largely in the 7.0-7.4 range during mid-November through the remainder of the monitoring period (Figure 17). The overall range of inflow pH was 6.2 – 7.5, while the mean value was 7.0. Outflow pH levels were generally only slightly lower than inflow pH, although substantially lower outflow pH values were reported during late July – early August and mid- to late-November. Mean outflow pH was 6.9, while the range was 6.1 to 7.3.

Color in the inflow stream was moderately correlated with inflow TP (r=0.75) (Figure 18). Inflow color ranged widely, from 66 to 1188 PCU, and averaged 283 PCU. Color in the outflow stream was consistently lower than inflow color. During the initial four months of the monitoring period, outflow color ranged from 107 to 387 PCU, but the range decreased considerably to 30 – 130 PCU during the remainder of the period. For the entire period, outflow color levels ranged from 30 to 387 PCU and averaged 110 PCU. Conductivity in both the inflow and outflow streams exhibited a quasi-seasonal trend, with highest levels generally occurring in the dry season (with the exception of high conductivity during June 2015) (Figure 19). Inflow conductivity ranged from 417 to 2060 µS/cm and averaged 1282 µS/cm, while outflow conductivity ranged from 519 to 2240 µS/cm and averaged 1327 µS/cm. Inflow turbidity was highly variable throughout the monitoring period, with extremely high levels measured during September 2014 and May 2015 (Figure 20). Inflow turbidity averaged 9.6 NTU and ranged from 1.6 to 93 NTU. Outflow turbidity was highly variable during the 2014 wet season, but much lower and less variable during the dry season. The overall range of outflow turbidity levels was 0.6 – 22.5 NTU, while the mean value was 3.3 NTU.

Inflow TN spanned a wide range of concentrations during the monitoring period, and reflected only a weak seasonal trend (Figure 21). Concentrations ranged as high as 7.42 mg/L during mid-September, and as low as 1.12 mg/L in February. For the most part, outflow TN concentrations were greatly reduced compared to inflow TN, and averaged 1.37 mg/L, compared to the mean inflow TN concentration of 3.12 mg/L. Outflow TN ranged from 0.58 to 2.52 mg/L. Inflow and outflow NO_x concentrations were relatively low during the monitoring period, accounting for less than 10 percent of TN, on average (Figure 22). Inflow NO_x concentrations ranged from <0.016 to 0.130 mg N/L and averaged 0.020 mg N/L. Outflow NO_x concentrations ranged from <0.016 to 0.026 mg N/L and averaged 0.010 mg N/L.

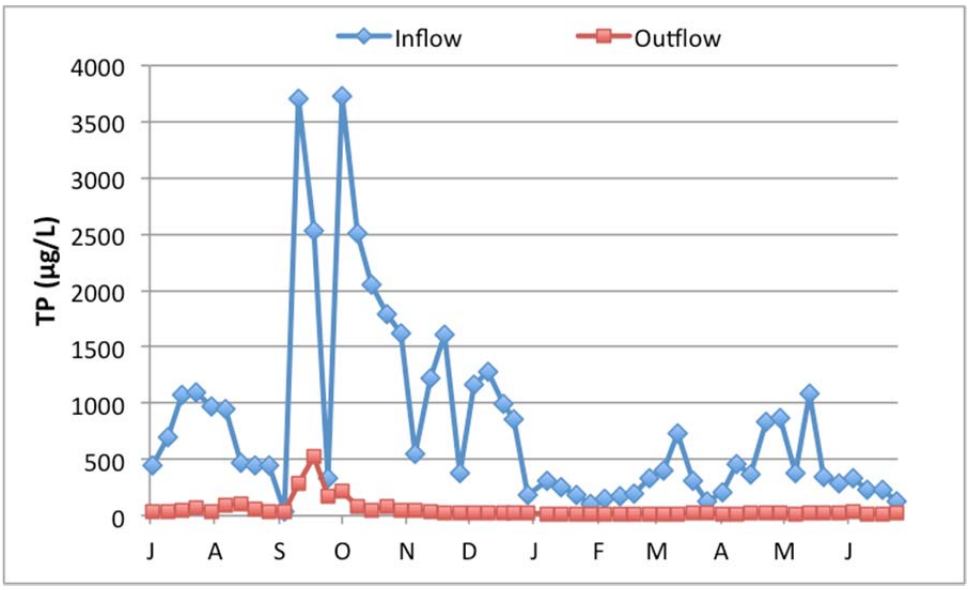


Figure 15. TP concentration in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

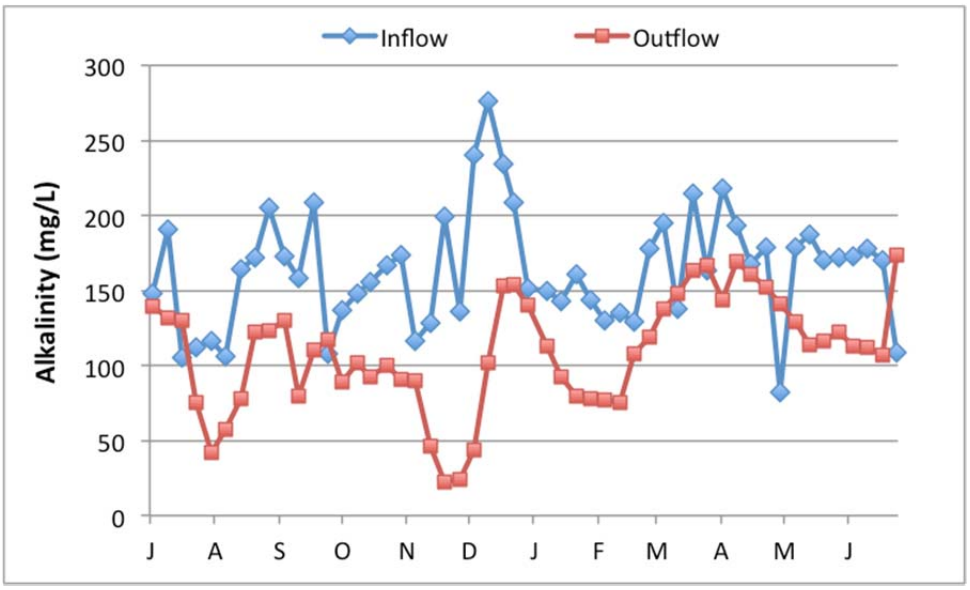


Figure 16. Alkalinity in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

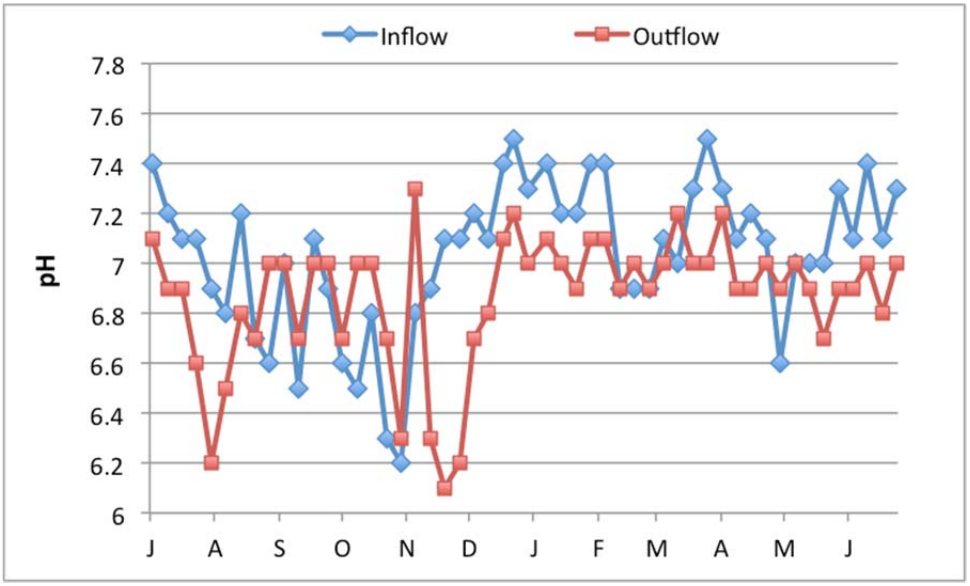


Figure 17. pH in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

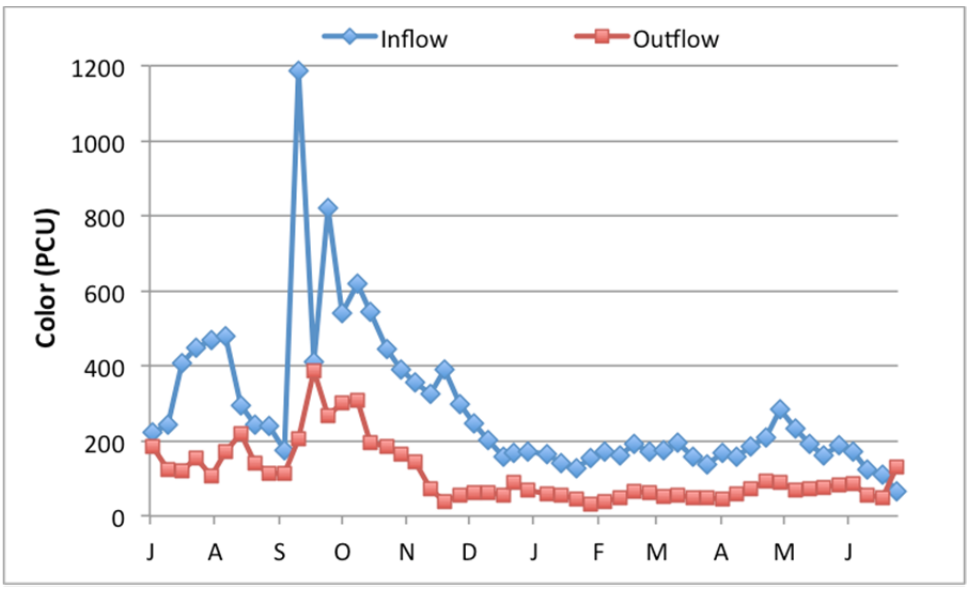


Figure 18. Color in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

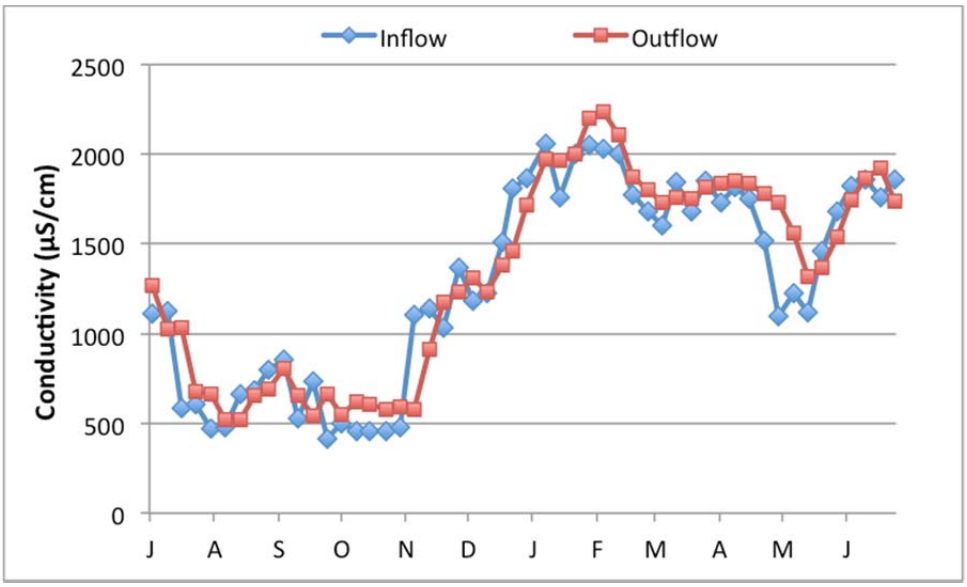


Figure 19. Conductivity in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

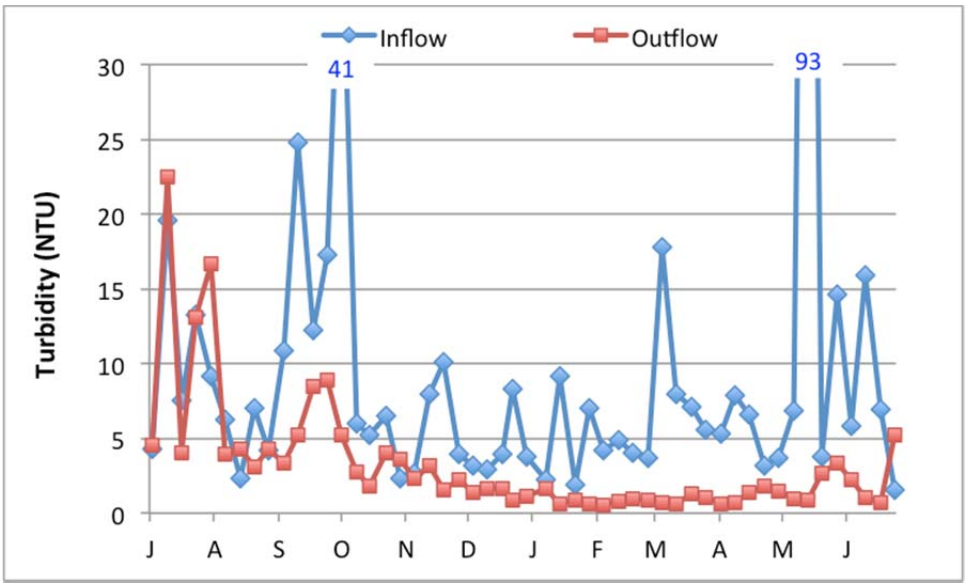


Figure 20. Turbidity in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

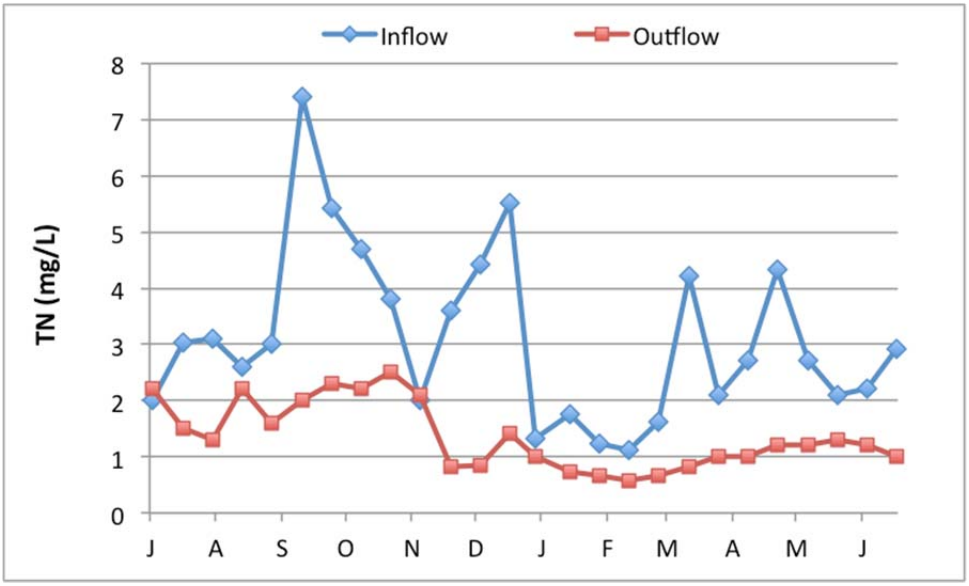


Figure 21. TN in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

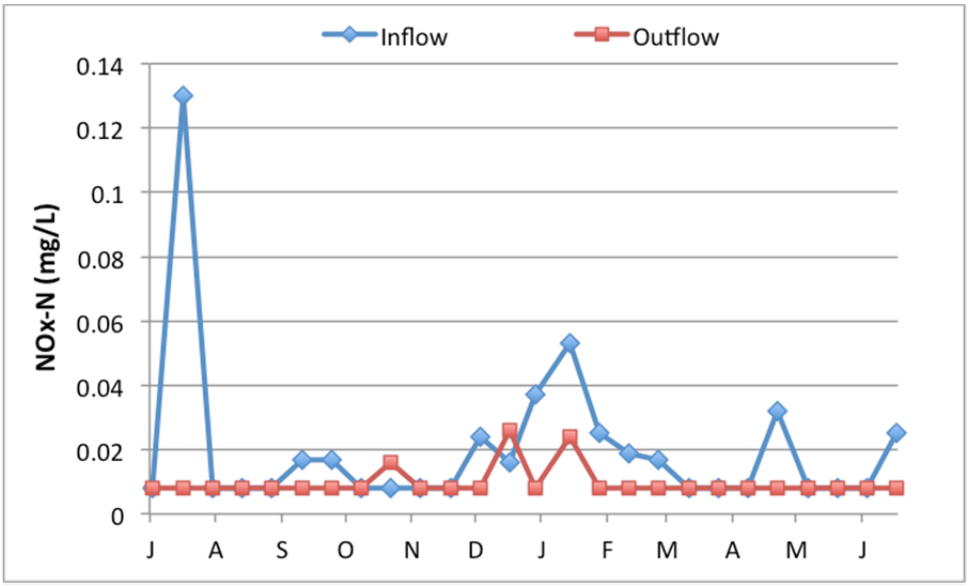


Figure 22. NO_x-N in the inflow and outflow streams at the Ideal #2 Grove HWTT system during the July 2014 – June 2015 monitoring period.

Flow volume treated in the Ideal HWTT system was highest for the month of July 2014, then decreased through September (Figure 23). The October treated flow volume was

unusually low because the system was non-operational from early October through early November, due to a pump malfunction and replacement. During the remainder of the reporting period, which included the entire dry season, monthly flows were lower in comparison to treated flow during July-September (wet season). For the entire period, monthly treated flow volumes ranged from 0.2 Mgal in October 2014 to 4.5 Mgal in July 2014. Mean monthly flow volume was 2.6 Mgal, while total flow treated during the period July 2014 through June 2015 was 31.2 Mgal.

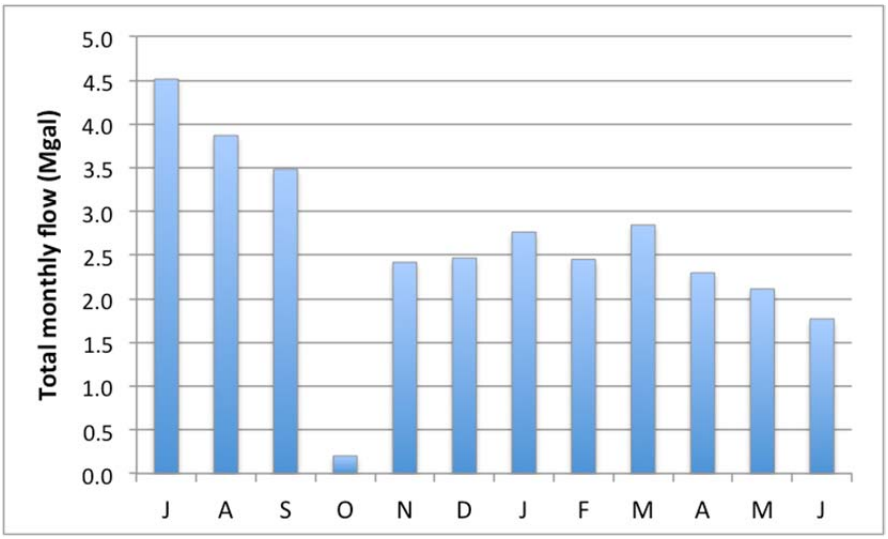


Figure 23. Total monthly flow treated by the Ideal #2 Grove HWTT system during the period July 2014 – June 2015.

Site 3: Mosquito Creek Tributary Treatment HWTT Facility

In 2008, a HWTT facility was constructed on Larson Dairy property, adjacent to Mosquito Creek. The facility consists of one large (1.3 acre) HWTT system and one small (0.44 acre) system (Figure 24). Early in 2015, a limerock bed was added to the back end of the system, to facilitate buffering of outflow waters (Figure 25).



Figure 24. Aerial photo of the HWTT facilities at Mosquito Creek.

The large HWTT facility ("large pond") was operational during the July 2014 – June 2015 project assessment period, while the small system was kept off-line. System operation was suspended due to floc removal and limerock bed installation from mid-April through mid-May.



Figure 25. Outflow region limerock bed installed at the Mosquito Creek HWTT in early 2015.

Alum was dosed on an intermittent feed basis, ranging from 50 to 85% of operational time (average of 70% of operational time). Monthly averages of effective alum dose ranged from 8.4 to 16.3 mg Al/L, while the overall mean effective alum dose was 10.8 mg Al/L. Daily system flow status is provided in the Chapter II appendices.

Grab samples of water were collected for routine monitoring at the system inflow (Mosquito Creek) and the large pond outflow. Samples were analyzed for total phosphorus (TP), alkalinity, pH, color, conductivity and turbidity on a weekly basis. Water samples were also analyzed for nitrate + nitrite N (NO_x-N) and TKN on a biweekly basis; total N (TN) was calculated as the sum of NO_x and TKN. During the period in which the system was off-line, monitoring at the pond outflow was suspended, while routine collection of

Mosquito Creek ("inflow") samples continued. Water chemistry data for the July 2014 – June 2015 monitoring period are presented in Figure 26 through Figure 33.

TP concentrations in the inflow stream were generally lower and less variable during the dry season months, although some of the higher inflow TP concentrations occurred in the latter part of April (Figure 26). The overall concentration range for inflow TP was 277 to 2420 µg/L, while concentrations averaged 639 µg/L (median = 487 µg/L) during the monitoring period. Highest outflow TP concentrations were observed during mid-August through early November, ranging from 80 to 548 µg/L and averaging 246 µg/L during that time. In comparison, from mid-November through June outflow concentrations averaged 87 µg/L and ranged from 21 to 206 µg/L. Overall, outflow TP concentrations averaged 133 µg/L (median = 97 µg/L) and ranged from 21 to 548 µg/L.

Inflow alkalinity exhibited wide fluctuations during September through early November, relative to the remainder of the monitoring period (Figure 27). Short-term variability in both inflow and outflow alkalinity was relatively low during the period January – June, while both trended upward during April through June. The overall range for inflow alkalinity was 38 to 273 mg/L, while the mean was 80 mg/L. Reduction in alkalinity levels between inflow and outflow varied considerably. Outflow alkalinity ranged from 8 to 98 mg/L and averaged 32 mg/L. Inflow pH ranged from 6.1 to 7.2 and averaged 6.7 during the monitoring period (Figure 28). Outflow pH averaged 6.2 and ranged from 5.7 to 7.2. A substantial increase in outflow pH occurred during May and June 2015, due to the incorporation of the outflow region limerock bed in the treatment train.

Color levels in the inflow stream suggested a seasonal trend, similar to that observed for inflow TP concentration (Figure 29). Spikes in color concentration during September, November and April coincided with the highest concentrations of inflow TP during the monitoring period. Inflow color ranged from 147 to 778 PCU and averaged 345 PCU. Outflow color levels varied in proportion to inflow color during the majority of the monitoring period. Color in the outflow stream ranged from 29 to 482 PCU and averaged 154 PCU. Conductivity varied considerably, most notably during the wet season months

(Figure 30). Mean inflow conductivity was 426 µS/cm, while the mean outflow conductivity was only slightly higher at 432 µS/cm. Inflow conductivity ranged from 226 to 863 µS/cm and outflow conductivity ranged from 108 to 704 µS/cm. Turbidity generally increased between the system inflow and outflow, although the difference between inflow and outflow turbidity decreased during the latter portion of the monitoring period (Figure 31). The overall range of inflow turbidity was 1.1 to 22.6 NTU, while the mean value was 3.6 NTU. Outflow turbidity ranged from 1.8 to 14.5 and averaged 8.5 NTU.

Inflow TN concentration was generally less than 4 mg/L during the monitoring period, but briefly spiked to 8.5 mg/L in September and 14.8 mg/L November (Figure 32). The overall range for inflow TN was 1.86 to 14.8 mg/L, and the mean for the monitoring period was 3.43 mg/L. The Mosquito HWTT system effectively removed TN on a consistent basis during the monitoring period. Outflow TN concentrations ranged from 1.21 to 5.00 mg/L, and averaged 2.08 mg/L. Concentrations of NO_x were similar in the inflow and outflow streams, with the exception of a relatively high spike in inflow NO_x in early November (Figure 33). NO_x concentrations ranged from <0.016 to 2.80 mg N/L in the inflow stream and <0.016 to 2.00 mg N/L in the outflow stream. Mean inflow and outflow concentrations of NO_x were 0.588 and 0.598 mg N/L, respectively. NO_x represented a relatively high proportion of TN in both the inflow (17 percent) and outflow (29 percent) streams. As previously reported, the absence of a shallow SAV zone in the Mosquito Creek facility probably serves to limit N removal performance at this site.

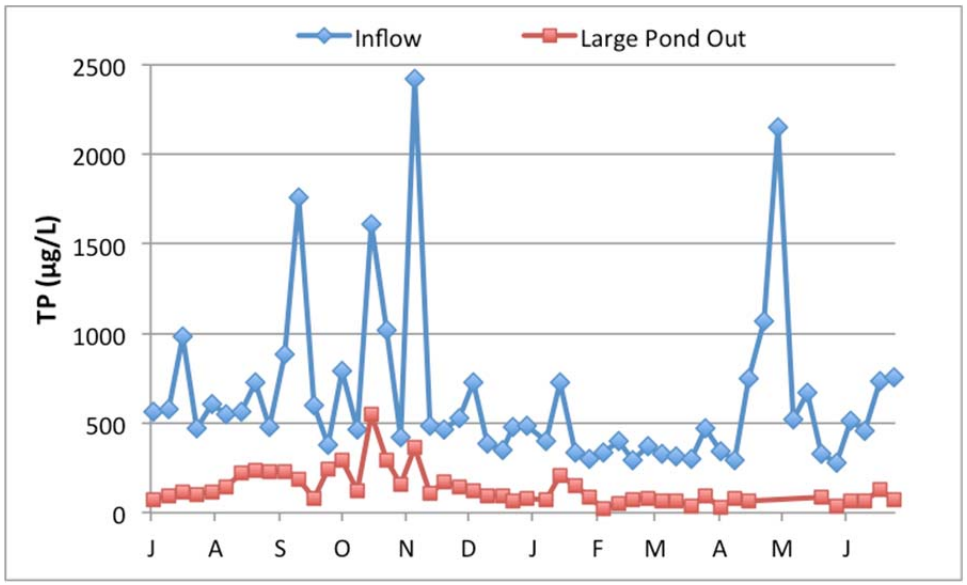


Figure 26. TP concentration in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

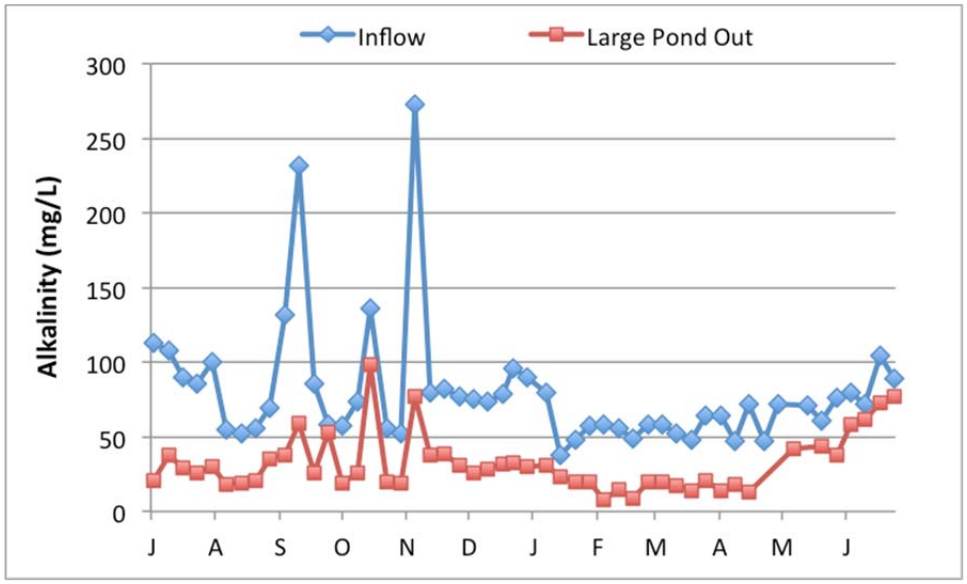


Figure 27. Alkalinity in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

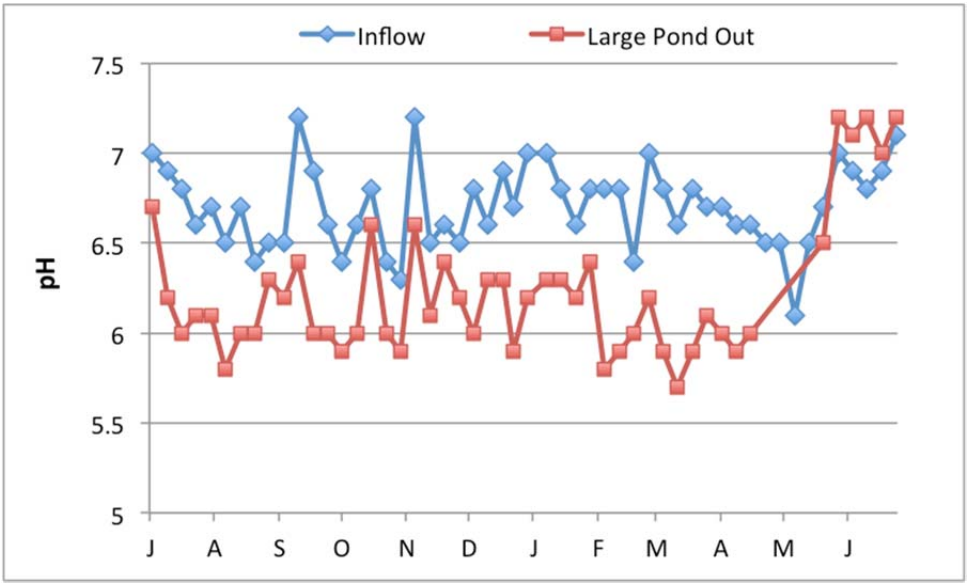


Figure 28. pH in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

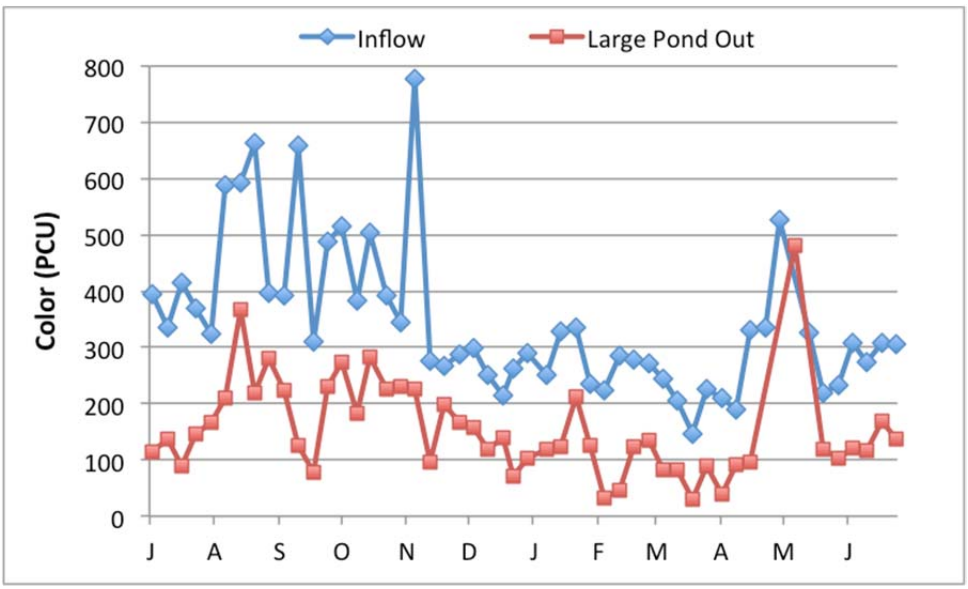


Figure 29. Color in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

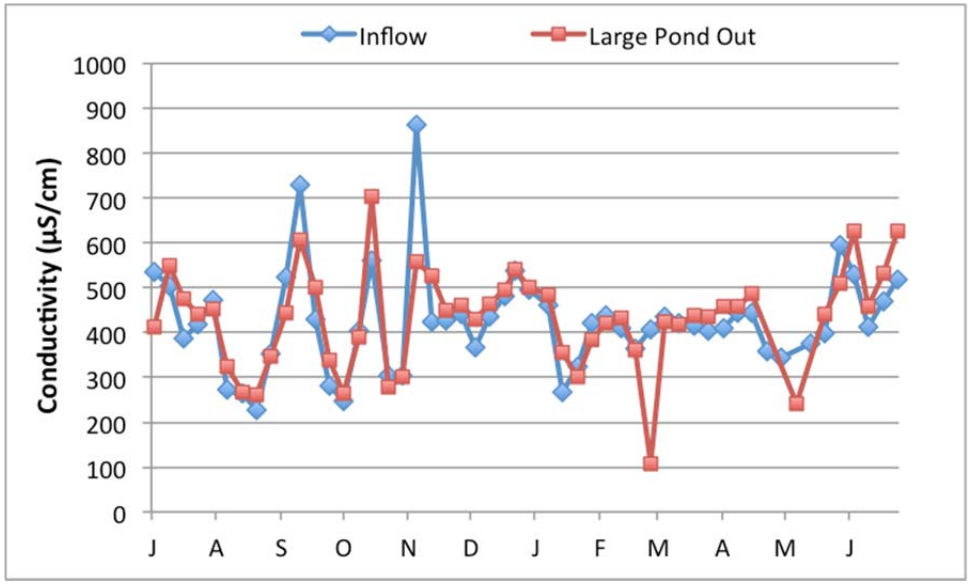


Figure 30. Conductivity in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

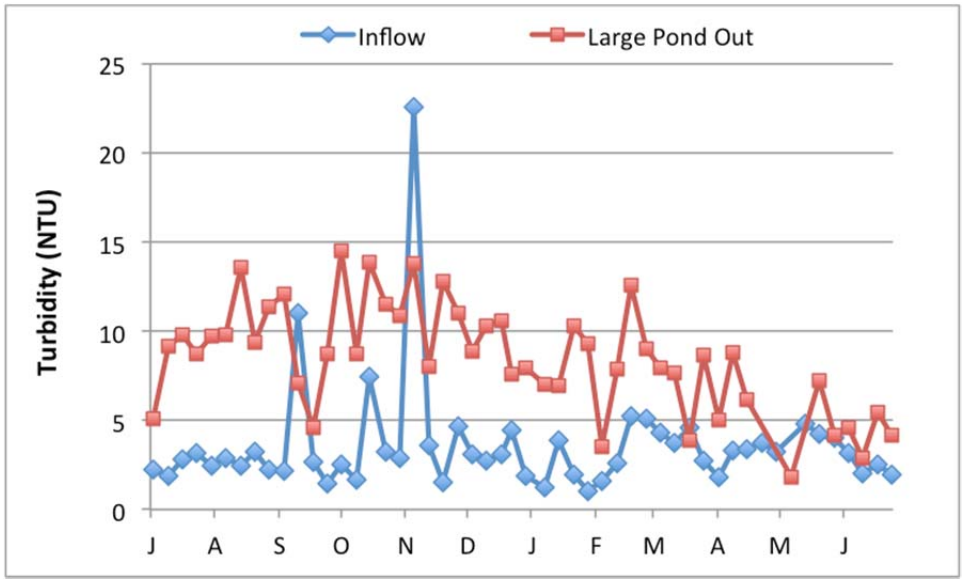


Figure 31. Turbidity in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

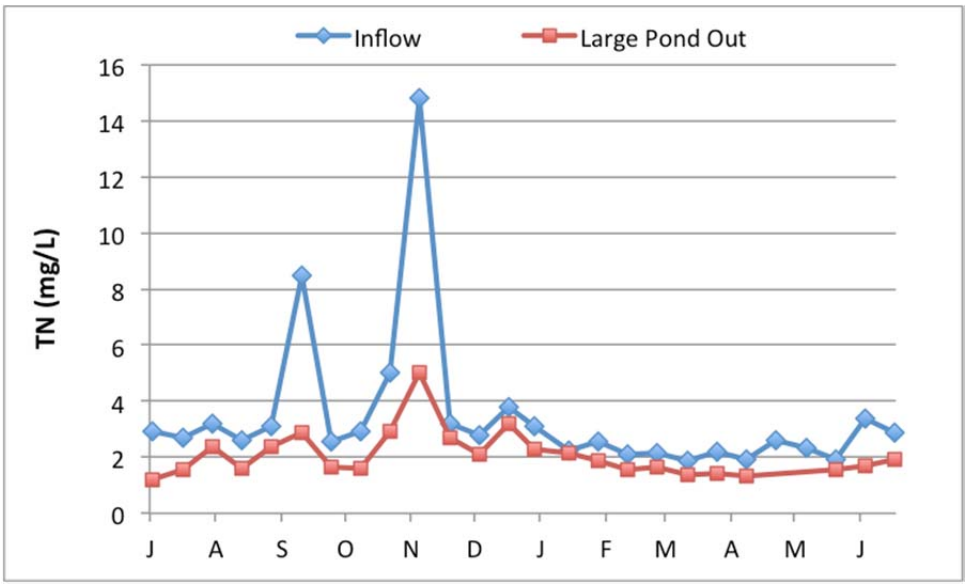


Figure 32. TN concentration in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

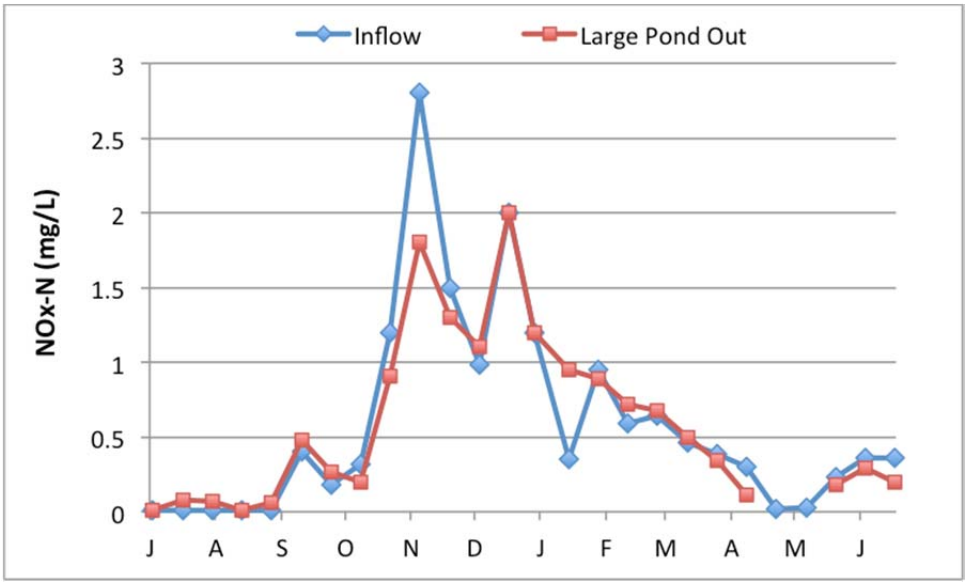


Figure 33. NO_x-N concentration in the inflow and large pond outflow streams at the Mosquito Creek Tributary Treatment HWTT system during the July 2014 – June 2015 monitoring period.

Monthly flow volume treated in the Mosquito Creek HWTT system was relatively consistent during the period July 2014 – March 2015, but was considerably lower during

April through June (Figure 34). Reduced treated volume during April and May was primarily due to suspension of system operations (mid April through mid-May) for floc removal and limerock bed installation. Subsequent low treated flow volume resulted from the extended period required for pond re-filling, due to extremely low water levels in Mosquito Creek**.** Monthly volumes ranged from 7.0 Mgal in April 2015 to 46.9 Mgal in August 2014. Mean monthly flow volume was 34.4 Mgal, while total flow treated during the period from July 2014 through June 2015 was 413 Mgal.

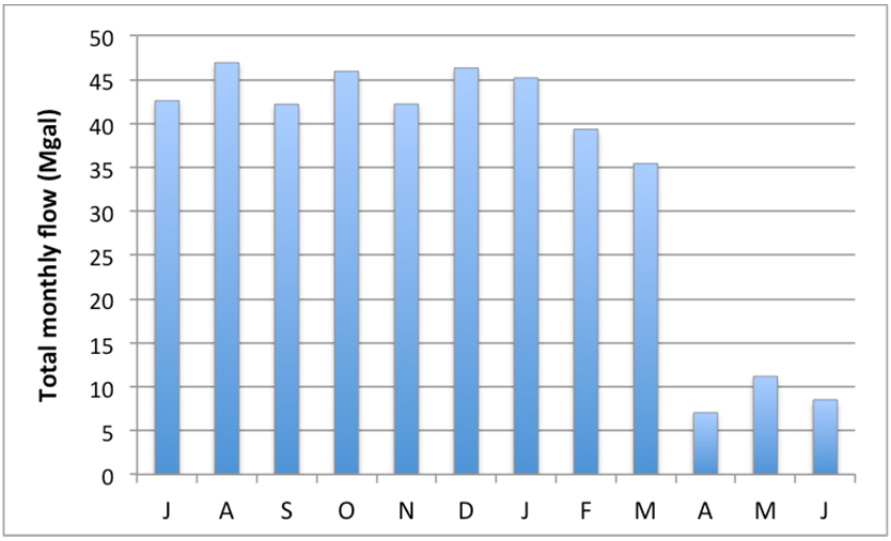


Figure 34. Total monthly flow treated by the Mosquito Creek Tributary Treatment HWTT system during the period July 2014 – June 2015.

Sites 5 and 6: Lemkin Creek and Wolff Ditch HWTT Facilities

During 2009, Watershed Technologies, LLC constructed and began operating two HWTT systems ("Lemkin and Wolff") on a District-owned parcel in Okeechobee County, Florida. The project parcel was operated as a shell rock pit for many years before being purchased by the District, and it consisted mainly of two ponds. The Site 5 HWTT facility treats water from the Lemkin Creek, and the Site 6 HWTT facility treats water from Wolff Ditch. The two HWTT systems each consist of an amendment dosing system, a deep settling region with

active and passive floc recycle, and a back-end SAV polishing pond. The Wolff HWTT system is the larger of the two facilities, with a 4.0 acre floc contact/settling pond and 1.0 acre SAV pond, and is designed to treat maximum flows of up to 20 cfs. The Lemkin system is comprised of a 2.0 acre contact/settling pond and a 0.4 acre SAV pond, with a 5 cfs maximum treatment capacity. Treated water from the SAV ponds is discharged through culverts to the 27-acre South Pond. Overflow from the South Pond discharges to the restored Isolated Wetland to the south. Effluent from the Isolated Wetland discharges to Lemkin Creek over the existing concrete weir. The general layout for the facilities is shown in Figure 35.

The 65-acre 'isolated wetland' located downstream of the Lemkin/Wolff HWTT system's 27-acre south pond is the receiving water body of the Lemkin/Wolff HWTT system. The isolated wetland is a separate wetland restoration project (permit #EE-47-0254574-001). It is not managed for treatment under the HWTT permit nor is it managed by the HWTT operator. However, sampling results from upstream (required by the Lemkin HWTT permit) and downstream (as requested by SFWMD) monitoring sites show the isolated wetland provides additional treatment of the Lemkin/Wolff system effluent.

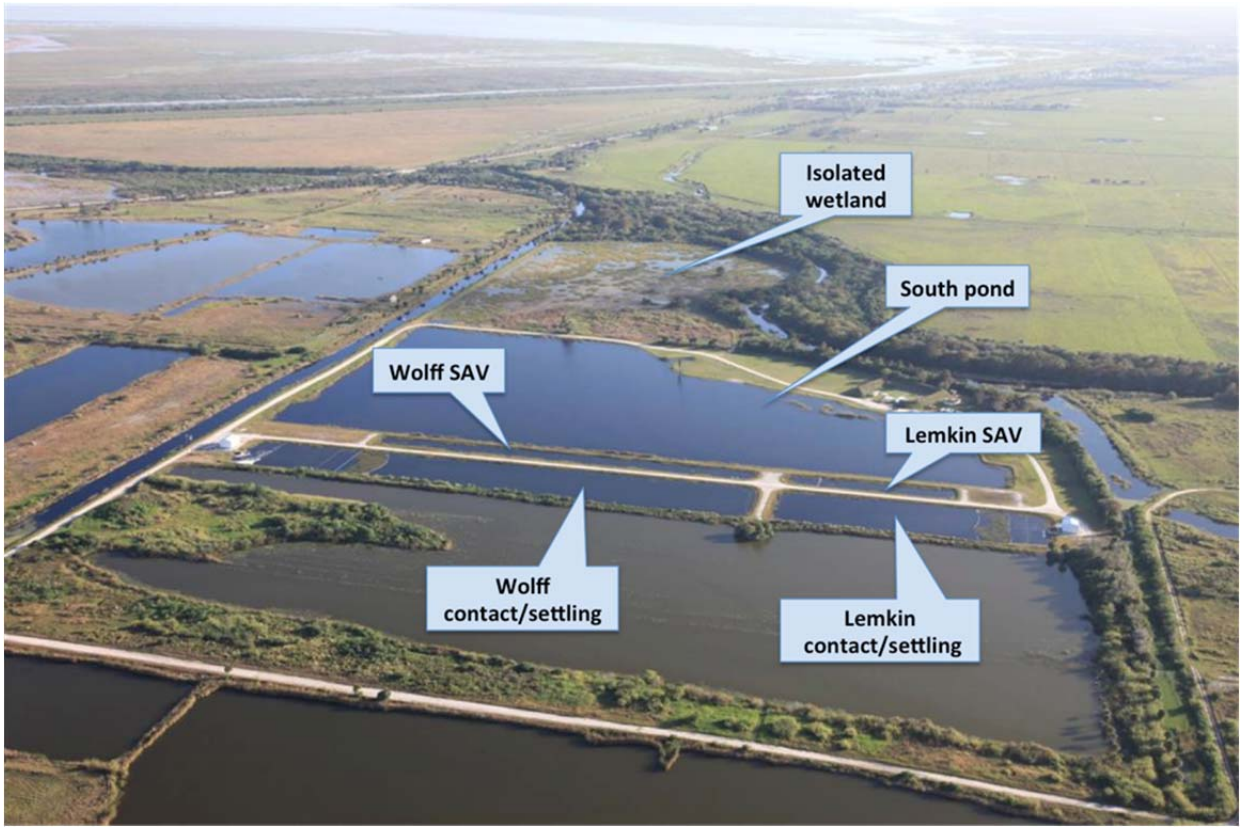


Figure 35. Aerial photo of the Lemkin (FDOT) and Wolff HWTT facilities.

Both the Lemkin and Wolff HWTT systems received alum dosing on an intermittent basis, with the alum injection cycle set to 25% of operational time, except a brief period from late August through early October, when the alum dosing frequency was set to 50%. The resulting effective alum dose for the Lemkin system ranged from 3.2 to 10.8 mg Al/L, and averaged 4.7 mg Al/L, during the monitoring period. The effective alum dose for the Wolff system ranged from 4.2 to 11.1 mg Al/L, and averaged 6.2 mg Al/L, during the monitoring period. Daily system flow status is provided in the Chapter II appendices.

Operation of the Lemkin system was interrupted for approximately 3 weeks during March 2015, due to mechanical and electrical problems.

Water chemistry monitoring at the Lemkin and Wolff facilities was conducted on a weekly or biweekly basis for the duration of the reporting period. Grab samples for routine monitoring were collected at the system inflows (Lemkin and Wolff ditch intakes) and SAV

pond outflows. In addition, routine monitoring was conducted downstream at the outflows of the South Pond and Isolated Wetland. Samples were analyzed for total phosphorus (TP) soluble reactive P (SRP), pH and conductivity on a weekly basis. Water samples were also analyzed for dissolved organic P (DOP=TSP-SRP, where TSP is total soluble P), particulate P (PP=TP-TSP), alkalinity, color, turbidity, nitrate + nitrite N (NO_x-N), ammonia-N, and TKN on a biweekly basis. Total N (TN) was calculated as the sum of NO_x-N and TKN. Total aluminum (Al) and sulfate (SO_4) also were monitored biweekly (beginning in December 2014 for SO_4), for permit compliance purposes. Routine water chemistry data for the July 2014 – June 2015 monitoring period are presented in the following sections. Additional data, related to compliance monitoring, are presented later in this report.

Routine Monitoring Site 5 (Lemkin HWTT Facility)

Inflow TP concentrations in the Lemkin system were higher and more variable during the 2014 wet season months than during the balance of the monitoring period (Figure 36). During July – October 2014, inflow TP concentrations averaged 222 µg/L, while during the balance of the monitoring period inflow TP averaged 89 µg/L. The overall mean inflow TP concentration during the monitoring period was 135 µg/L (median = 113 µg/L), while the range was 24 to 417 µg/L. Outflow TP concentrations exhibited only a slight downward trend, and much lower variability than inflow TP, during the monitoring period. During the first six months of the period (July – December), outflow TP averaged 53 µg/L, while from January through June outflow TP averaged 29 µg/L. The overall range of outflow TP concentrations was 20 - 123 µg/L, while the mean and median values were 42 and 36 µg/L, respectively.

Inflow SRP trends corresponded closely to inflow TP concentrations (r=0.95), with the highest values occurring during the first four months of the monitoring period (Figure 37). Short-term variability was relatively large, as was the overall range (7 to 305 µg/L), for inflow SRP. The overall mean inflow SRP concentration was 77 µg/L. Outflow SRP concentrations were less than 10 µg/L during all but three sampling events, and averaged 3

µg/L over the entire monitoring period. The overall range for outflow SRP was ≤2 (non-detectable) to 25 µg/L. Inflow DOP concentrations were higher and more variable during July through January than during the remainder of the monitoring period (Figure 38). Inflow DOP ranged from 11 to 50 µg/L and averaged 26 µg/L. Outflow concentrations of DOP were consistently lower than inflow concentrations and averaged 8 µg/L, while ranging from 4 to 29 µg/L. Particulate P concentration in the inflow stream exhibited considerable short-term variability, especially during the 2014 wet season months (Figure 39). Inflow PP concentrations averaged 36 µg/L and ranged from 8 to 139 µg/L. Outflow PP concentrations were comparable to inflow PP on an average basis (mean = 30 µg/L), but exhibited much lower variability. Outflow PP ranged from 7 to 60 µg/L during the monitoring period.

Alkalinity levels in the Lemkin HWTT inflow stream exhibited no detectable trend through mid-March, but subsequently trended downward through the end of the monitoring period (Figure 40). Outflow alkalinity levels were slightly lower than inflow alkalinity during the majority of the monitoring period. Inflow alkalinity averaged 198 mg/L and ranged from 136 to 244 mg/L, while outflow alkalinity averaged 168 mg/L and ranged from 124 to 208 mg/L. Inflow pH was slightly lower during the 2014 wet season than in subsequent months, ranging from 6.7 to 7.7 and averaging 7.3 during the monitoring period (Figure 41). Outflow pH was slightly higher throughout most of the period, and followed the same general temporal pattern as inflow pH. Outflow pH averaged 7.4, and ranged from 6.8 to 8.0.

Color concentration in the inflow stream was slightly higher and more variable during the first half of the monitoring period, as observed for inflow TP (Figure 42). Inflow color averaged 137 PCU and ranged from 97 to 225 PCU. Outflow color exhibited somewhat lower variability, and levels were typically lower than those in the inflow stream. Outflow color averaged 112 PCU and ranged from 80 to 182 PCU. Inflow and outflow conductivity levels were nearly identical throughout the period, exhibiting a gradual overall increase through March 2014 (Figure 43). Inflow conductivity averaged 894 µS/cm and ranged from 626 to 1190 µS/cm, while outflow conductivity averaged 882 µS/cm and ranged from 609

to 1088 µS/cm. Both inflow and outflow turbidity exhibited considerable short-term variability, with no clear seasonal trends (Figure 44). Outflow turbidity levels were somewhat greater than inflow levels, averaging 3.2 and 2.4 NTU, respectively. Outflow turbidity ranged from 1.5 to 6.6 NTU, while inflow turbidity ranged from 1.1 to 6.8 NTU.

Inflow TN concentrations were typically low in comparison to inflow TN at other HWTT sites (Figure 45). Mean inflow TN concentration was 1.70 mg/L, while concentrations ranged from 1.21 to 2.22 mg/L. TN concentrations were lower at the outflow than in the inflow stream, during the majority of the monitoring period. Outflow TN concentration averaged 1.35 mg/L and ranged from 1.02 to 1.63 mg/L. NO_x concentrations were relatively low in both inflow and outflow streams, with outflow NO_x concentrations being slightly higher than inflow during much of the period (Figure 46). Inflow NO_x concentration averaged 0.013 mg N/L and ranged from ≤0.016 to 0.055 mg N/L, and outflow concentrations averaged 0.026 mg N/L with a range of ≤0.016 to 0.120 mg N/L. Despite the net export of NO_x from the Lemkin system, NO_x accounted for only a small fraction of TN in the Lemkin HWTT inflow (0.7 percent) and outflow (1.9 percent) streams, and a net decrease in TN of ca. 20% was achieved during this period.

Total Al concentration in the Lemkin inflow stream was less than 200 µg/L during the majority of sampling events, but occasional spikes, as high as 3130 µg/L, were measured at the inflow (Figure 47). These Al spikes were traced to a short-circuit in the system flow path that caused occasional backflow of alum-treated water into the inflow stream. Repairs were made and the problem was remedied, during November 2014. The overall mean inflow TAl concentration for the current period was 288 µg/L. Outflow TAl concentrations increased during July through mid-December, but were subsequently lowered to a range of ca. 400-600 µg/L during February through June. The overall range of outflow TAl concentrations was 270 to 1150 µg/L, and the overall mean was 591 µg/L. Sulfate levels in the inflow stream varied considerably during the monitoring period (December 2014 – June 2015), ranging from 18 to 140 mg/L and averaging 98 mg/L. Sulfate in the outflow stream increased during the period, ranging from 83 to 152 mg/L and averaging 127 mg/L.

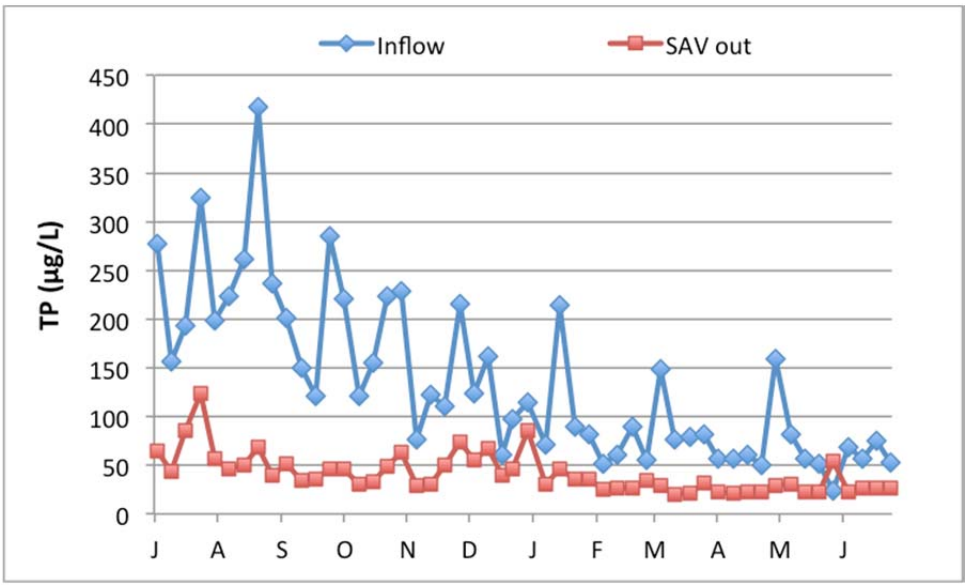


Figure 36. TP concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

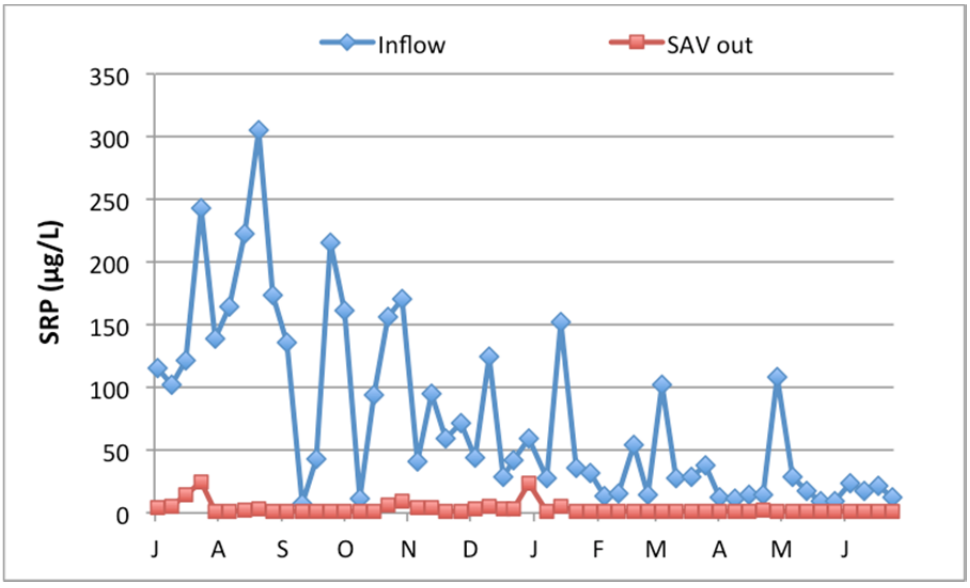


Figure 37. SRP concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

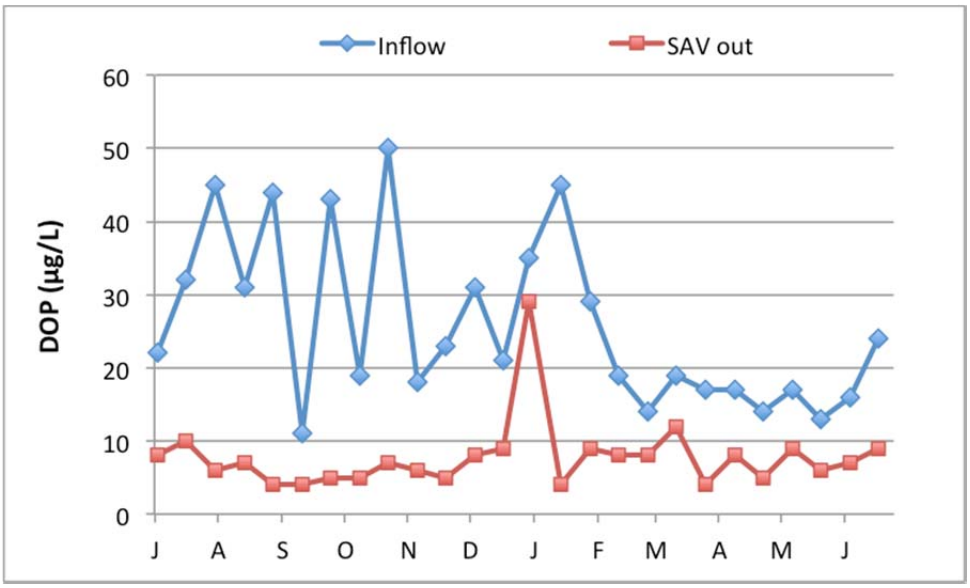


Figure 38. DOP concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

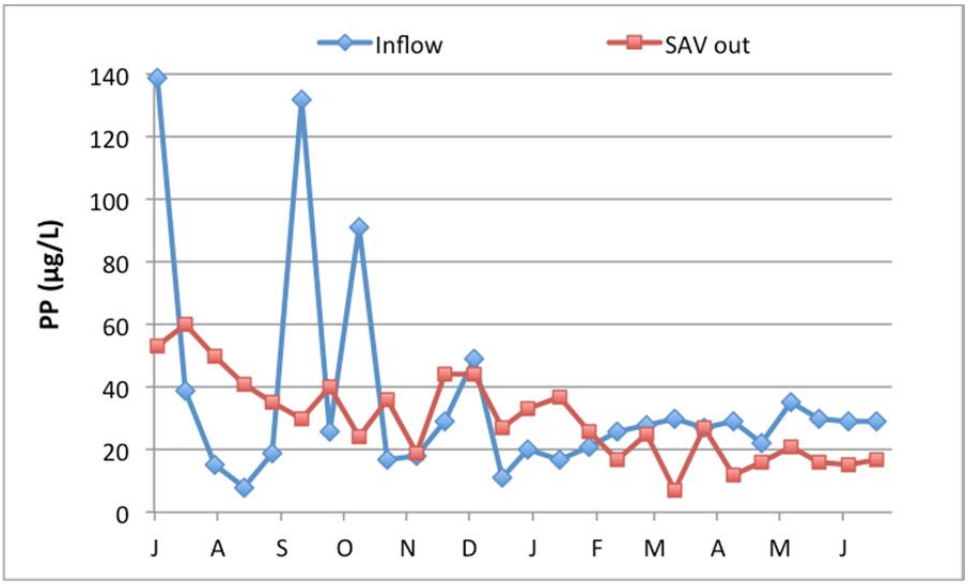


Figure 39. PP concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

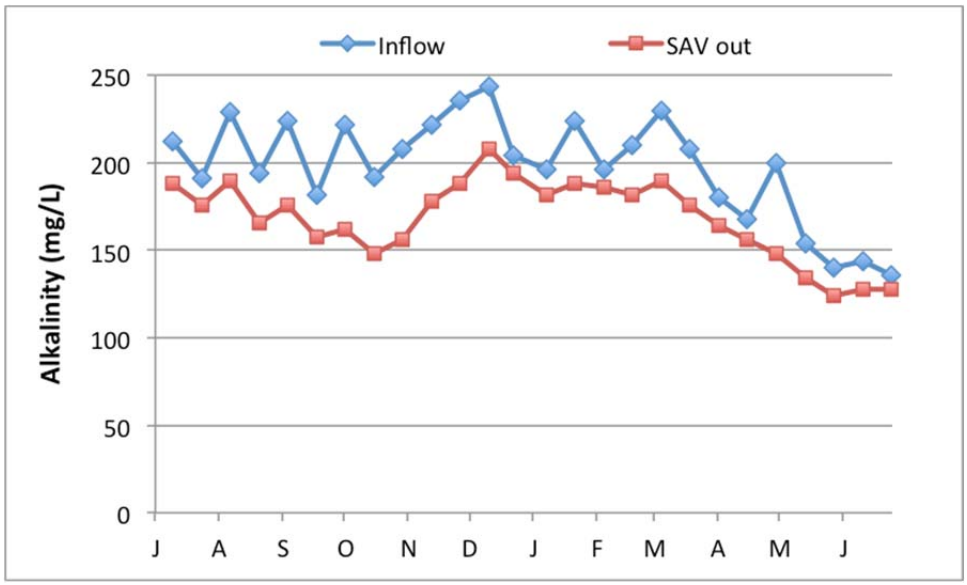


Figure 40. Alkalinity in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

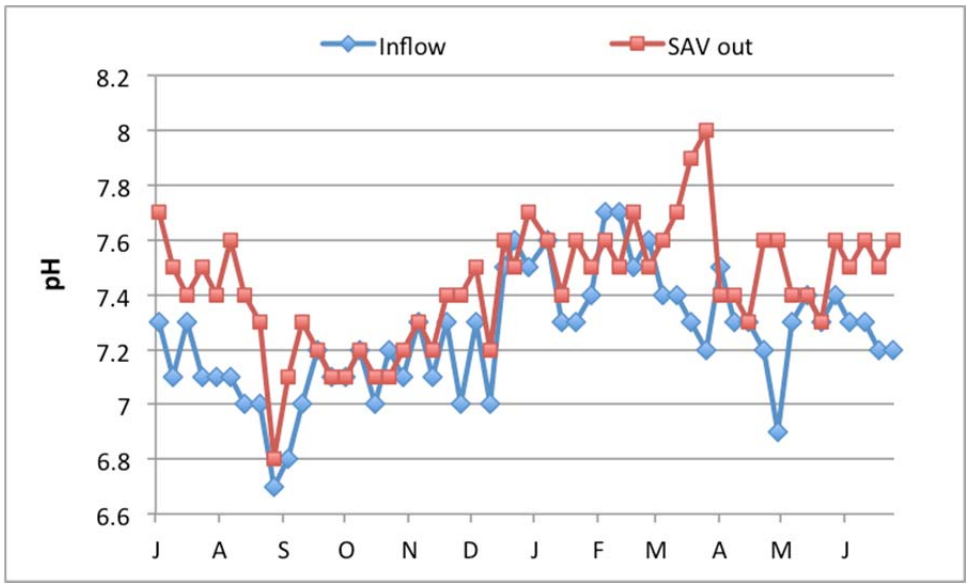


Figure 41. pH in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

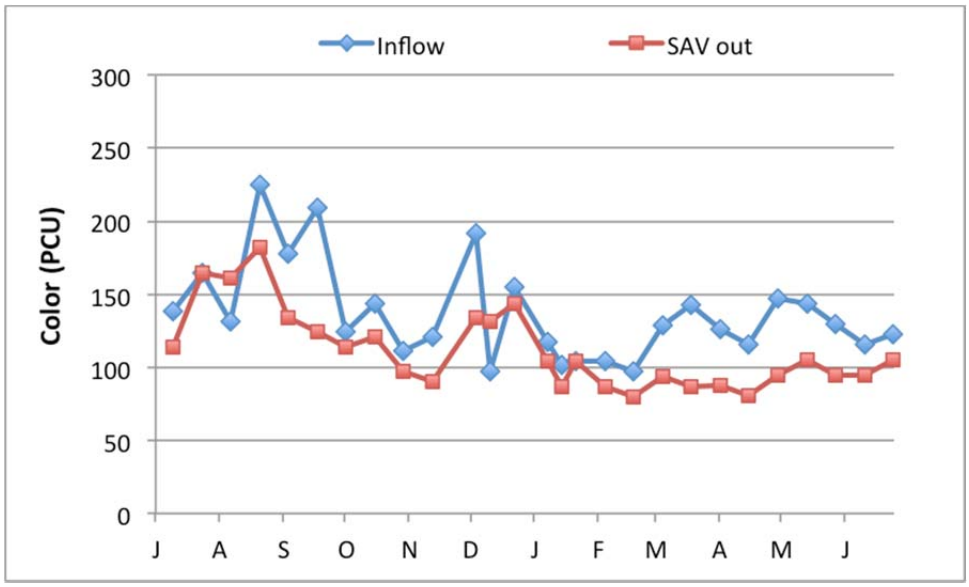


Figure 42. Color in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

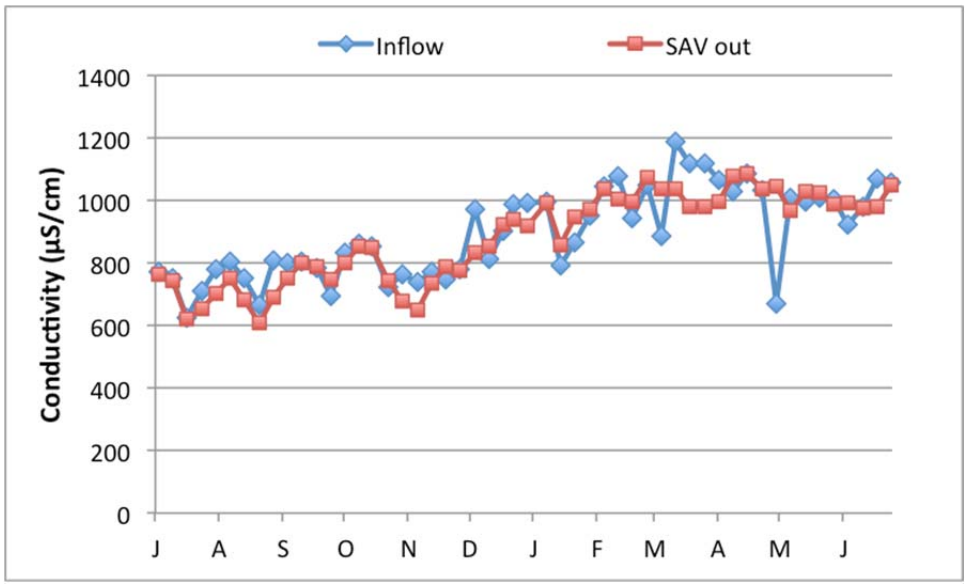


Figure 43. Conductivity in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

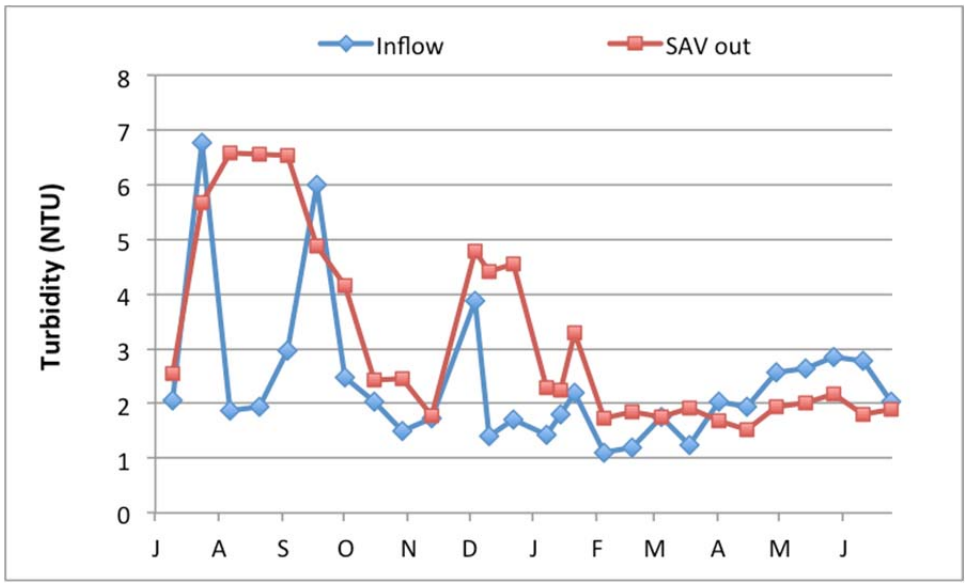


Figure 44. Turbidity in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

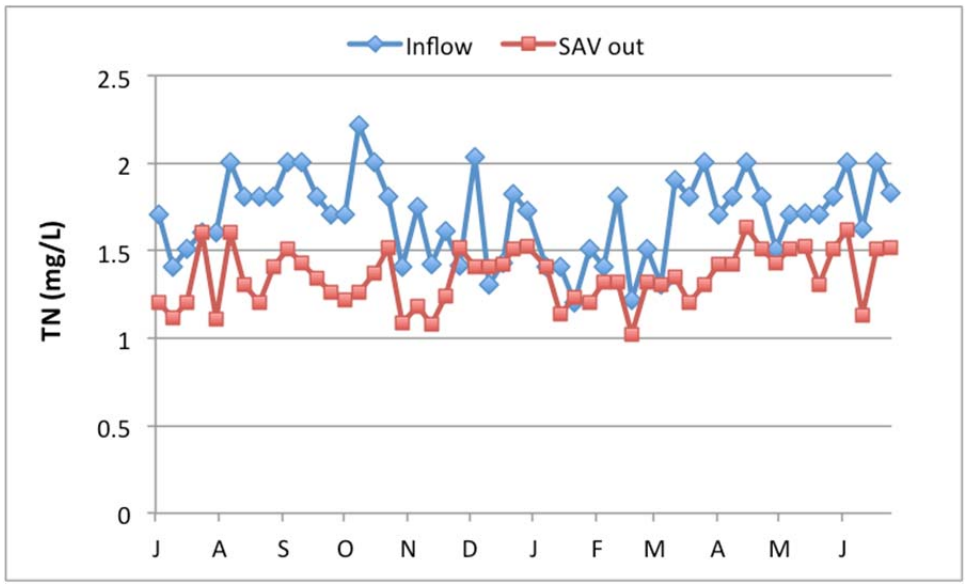


Figure 45. TN concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

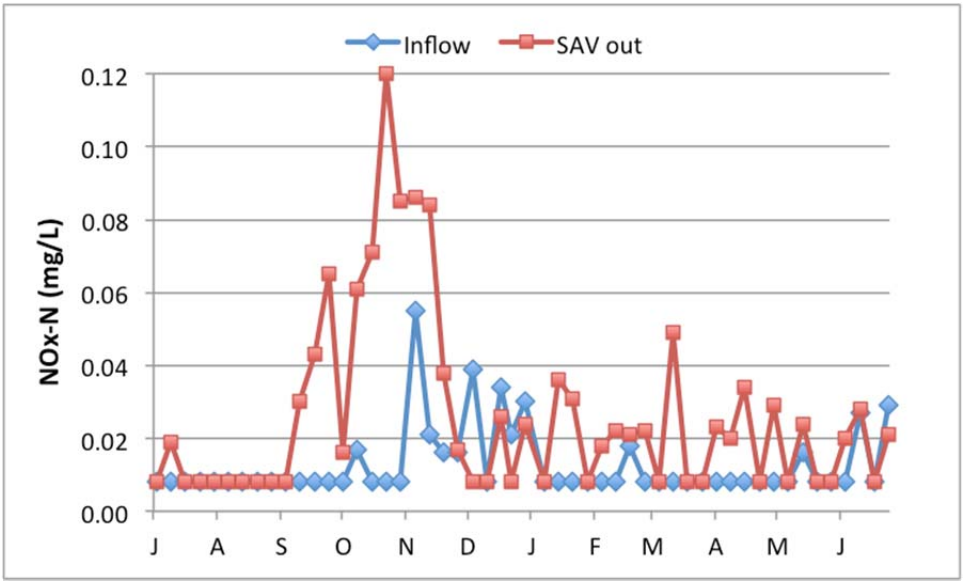


Figure 46. NO_x-N concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

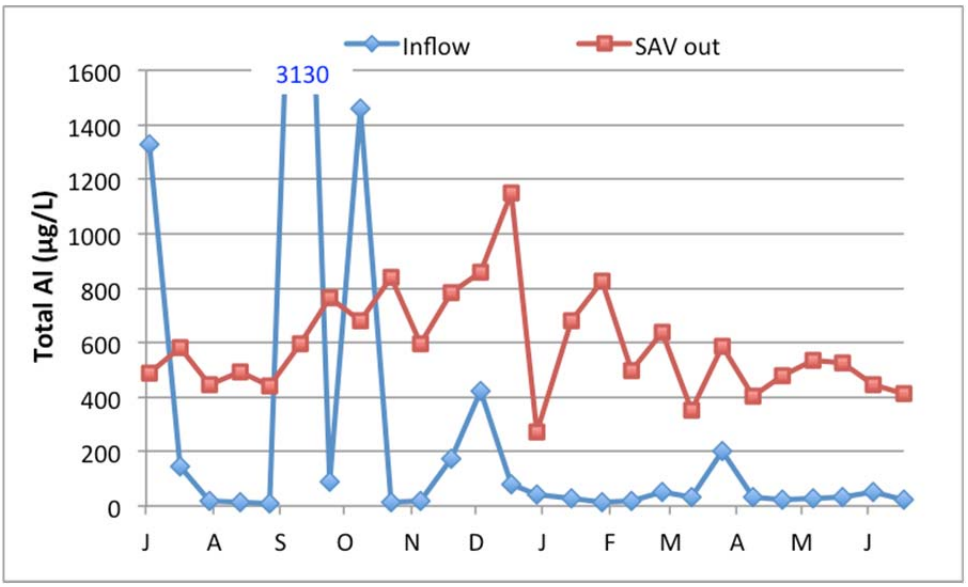


Figure 47. Total Al concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period.

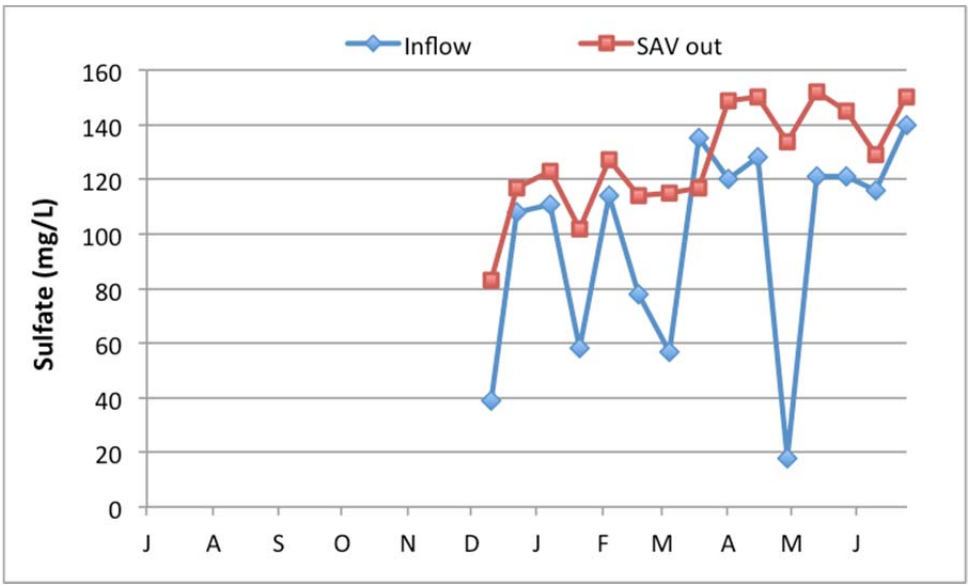


Figure 48. Sulfate concentration in the inflow stream (FDOT Ditch) and SAV outflow stream of the Site 5 HWTT system during the July 2014 – June 2015 monitoring period. Monitoring of sulfate was initiated in December 2014.

Monthly flow volume treated in the Lemkin HWTT system was relatively consistent throughout the monitoring period, with the exception of March 2015, when the system was non-operational (March 6-24) due to mechanical/electrical repairs (Figure 49). Treated volume ranged from 16.1 Mgal in March 2015 to 53.4 Mgal in December 2014. Mean monthly flow volume was 41.3 Mgal, while total flow treated during the period July 2014 – June 2015 was 495.6 Mgal.

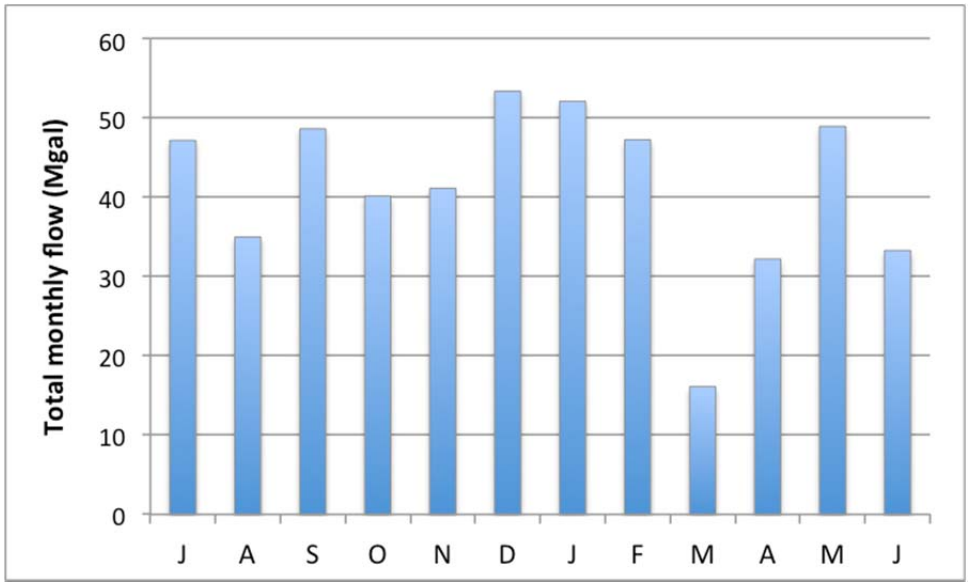


Figure 49. Total monthly flow treated by the Lemkin Creek (Site 5) HWTT system during the period July 2014 – June 2015.

Routine Monitoring Site 6 (Wolff HWTT Facility)

The highest inflow TP concentrations at the Wolff HWTT facility were measured during the 2014 wet season, but relatively low TP concentrations were also observed, reflecting the high level of variability in inflow TP during that period (Figure 50). During the latter portion of the monitoring period inflow TP concentrations exhibited a general decreasing trend, with lower variability. For the entire monitoring period, concentrations of TP at the inflow ranged from 40 to 403 µg/L and averaged 142 µg/L (median = 127 µg/L). Atypically

high outflow TP concentrations were measured during July and August, but concentrations decreased rapidly through early September and stabilized at a substantially lower concentration range. During the remainder of the monitoring period (September - June), outflow TP concentrations averaged 24 µg/L. For the entire monitoring period, outflow TP averaged 42 µg/L (median = 25 µg/L) and ranged from 16 to 205 µg/L. Inflow and outflow SRP concentrations showed nearly identical trends with respect to corresponding TP concentrations (r=0.97 and 0.98 for inflow and outflow concentrations) (Figure 51). Inflow SRP concentrations ranged widely, from ≤2 to 258 µg/L, while the overall mean value was 76 µg/L. Inflow SRP levels were particularly low (≤15 µg/L) during April-June 2015. Outflow SRP concentrations ranged as high as 75 µg/L during July and August, but remained extremely low, typically below detection (≤2 µg/L), during the remainder of the monitoring period. The overall mean concentration of SRP in the Wolff outflow was 7 µg/L.

Temporal trends of inflow and outflow DOP were similar to those for TP and SRP, characterized by decreasing concentrations and variability during the monitoring period (i.e. from wet season to dry season) (Figure 52). Inflow DOP concentrations ranged from 14 to 88 µg/L and averaged 32 µg/L during the monitoring period. Outflow DOP concentrations were highest during July and August, then subsequently decreased to levels ≤11 µg/L. The overall mean concentration of DOP at the outflow was 9 µg/L, while the range was 3 to 26 µg/L. Particulate P concentration varied considerably in the inflow stream, with a poorly-defined seasonal trend (Figure 53). Outflow PP concentrations were occasionally higher than inflow PP, primarily during July and August, but were generally lower than inflow PP concentrations. Inflow PP averaged 35 µg/L and ranged from 13 to 77 µg/L, while outflow PP concentrations averaged 25 µg/L and ranged from 9 to 90 µg/L.

Alkalinity levels in both the Wolff HWTT inflow and outflow streams exhibited a moderate seasonal trend, with highest levels occurring during the dry season (Figure 54). During July and August, inflow and outflow alkalinity levels were nearly identical, but outflow alkalinity was typically lower than inflow alkalinity during the remainder of the monitoring period. Inflow alkalinity averaged 192 mg/L and ranged from 140 to 240 mg/L, while outflow alkalinity was slightly lower overall, averaging 163 mg/L and ranging from 130 to

196 mg/L. Inflow and outflow pH exhibited a weak seasonal trend, with levels decreasing during the wet season and increasing during the dry season (Figure 55). Mean inflow pH was 7.3, while values ranged from 6.7 to 7.7. Outflow pH averaged 7.5 and ranged from 6.7 to 7.8.

Highest color levels generally occurred during the wet season months, particularly July and August, while values decreased during most of the remaining monitoring period (Figure 56). Outflow color, in particular, decreased precipitously during August and September, and remained at lower concentrations thereafter. Overall, the Wolff system achieved substantial reduction in color. Inflow color averaged 173 PCU and ranged from 119 to 336 PCU, while outflow color averaged 110 PCU and ranged from 70 to 306 PCU. Conductivity levels were similar in the inflow and outflow streams throughout the monitoring period, and exhibited an increasing trend between wet and dry seasons (Figure 57). Inflow conductivity averaged 896 µS/cm and ranged from 312 to 1084 µS/cm, while outflow conductivity averaged 936 µS/cm and ranged from 596 to 1089 µS/cm. Turbidity levels were similar in the inflow and outflow streams, with the exception of a large spike in inflow turbidity during April (Figure 58). Lowest turbidity levels occurred during January and February. Inflow turbidity ranged from 0.9 to 19.3 NTU and averaged 3.2 NTU, while outflow turbidity ranged from 1.1 to 6.2 NTU and averaged 2.2 NTU.

Total N concentrations in the inflow and outflow streams exhibited similar trends of decreasing levels during the dry season months (Figure 59). Mean inflow TN concentration was 1.56 mg/L, while concentrations ranged from 1.21 to 2.11 mg/L. Despite low inflow TN concentrations, a net reduction in TN was achieved by the Wolff system. Outflow TN concentration averaged 1.25 mg/L and ranged from 0.86 to 1.85 mg/L. NO_x concentrations were quite low in both inflow and outflow streams throughout the period (Figure 60). Inflow NO_x concentrations ranged from ≤0.016 to 0.088 mg N/L and averaged 0.019 mg N/L, while outflow NO_x ranged from ≤0.016 to 0.063 mg N/L and averaged 0.020 mg N/L, indicating no net reduction in NO_x concentrations. However, NO_x was a very minor component of TN in the Wolff system, accounting for less than two percent of TN in the inflow and outflow streams.

Concentration of total Al in the Wolff HWTT inflow stream was relatively consistent, ranging from 1 to 111 µg/L and averaged 36 µg/L (Figure 61). Outflow TAl concentration was in the 200 – 400 µg/L range during the majority of the monitoring period, but higher levels of Al were measured during the early part of the period, in July and August. Mean outflow TAl concentration was 357 µg/L, while the overall range was 181 to 931 µg/L. Sulfate concentrations in both the inflow and outflow streams exhibited moderate increases during the December-June monitoring period (Figure 62). Outflow sulfate concentrations were generally 20-30 mg/L higher than inflow sulfate concentrations. Inflow sulfate concentrations averaged 86 mg/L and ranged from 74 to 99 mg/L, while outflow sulfate averaged 115 mg/L and ranged from 102 to 130 mg/L.

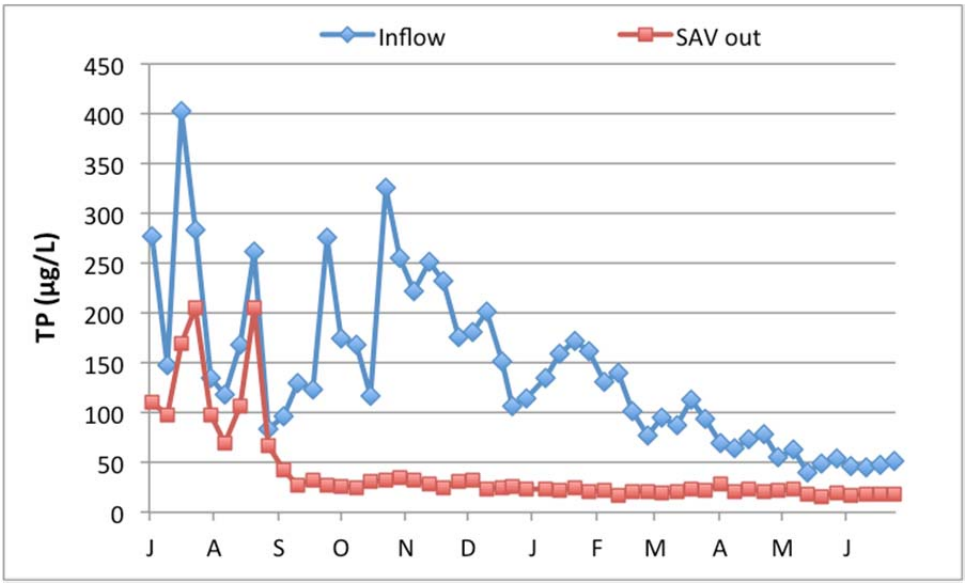


Figure 50. TP concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

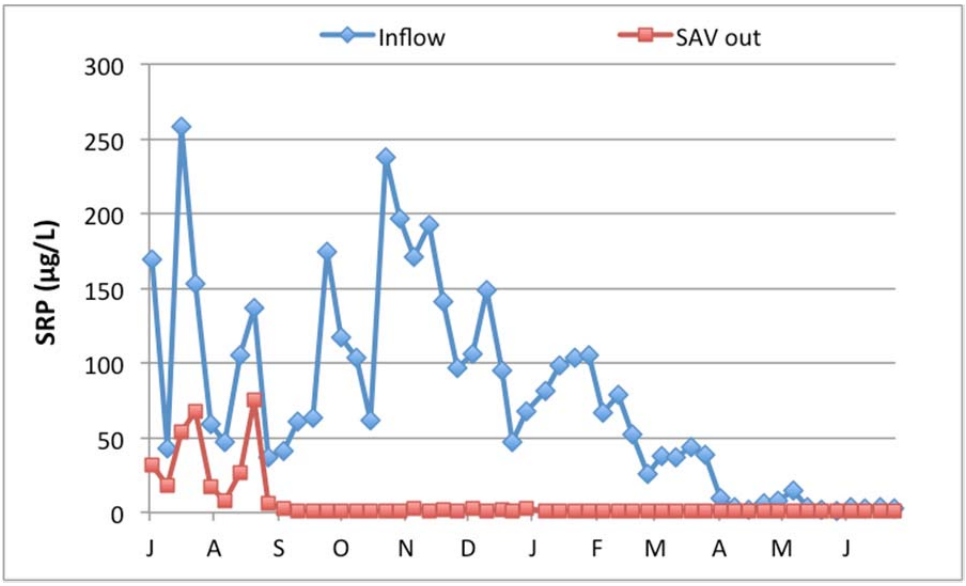


Figure 51. SRP concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

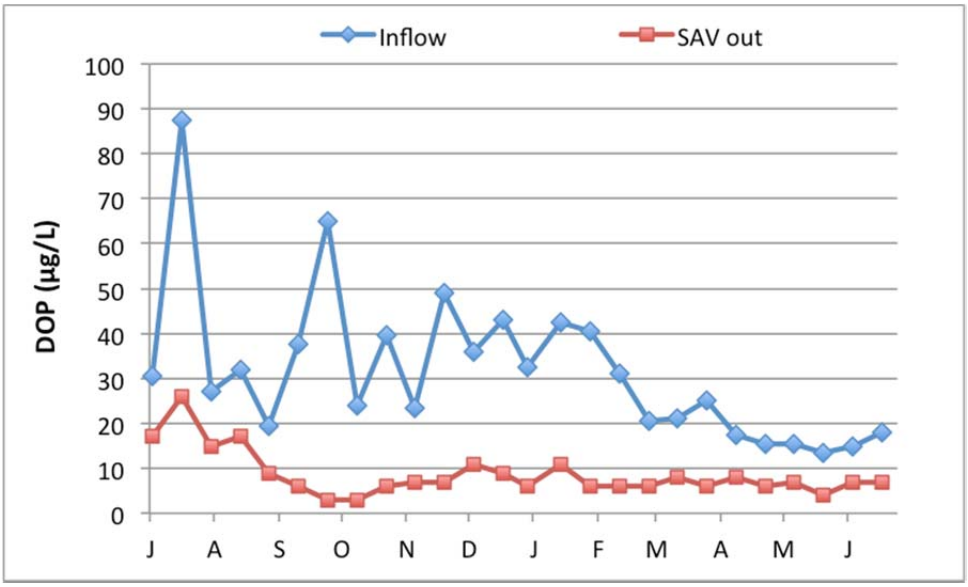


Figure 52. DOP concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

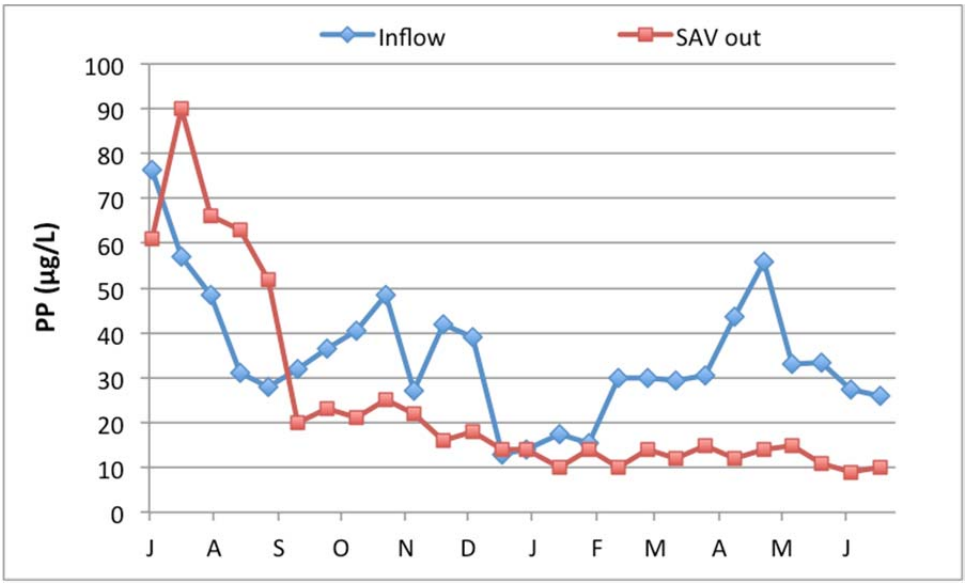


Figure 53. PP concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

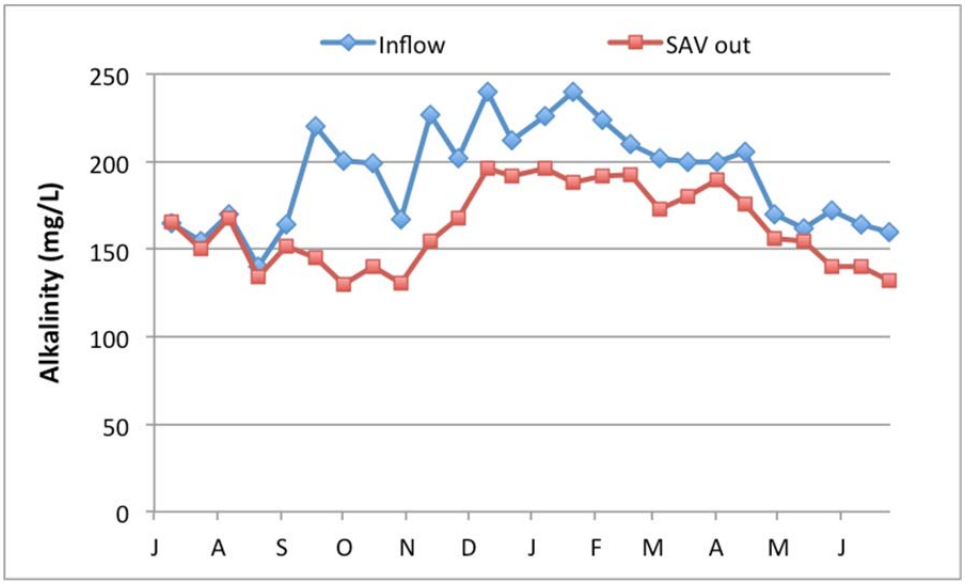


Figure 54. Alkalinity in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

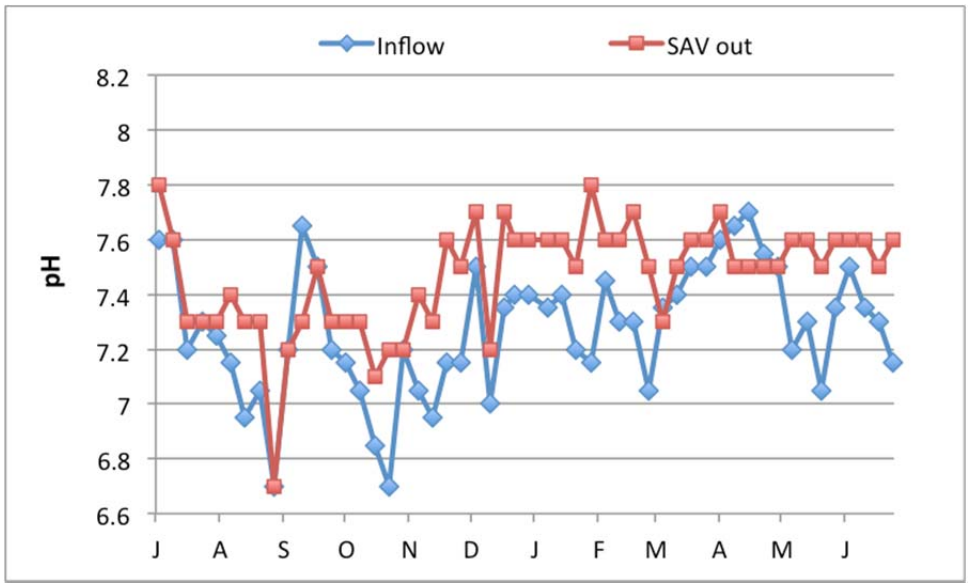


Figure 55. pH in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

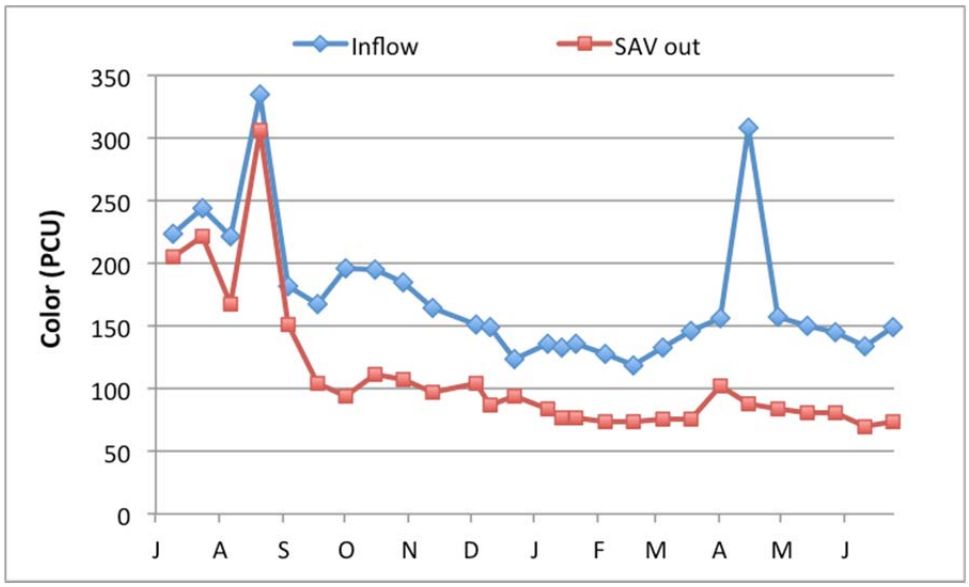


Figure 56. Color in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

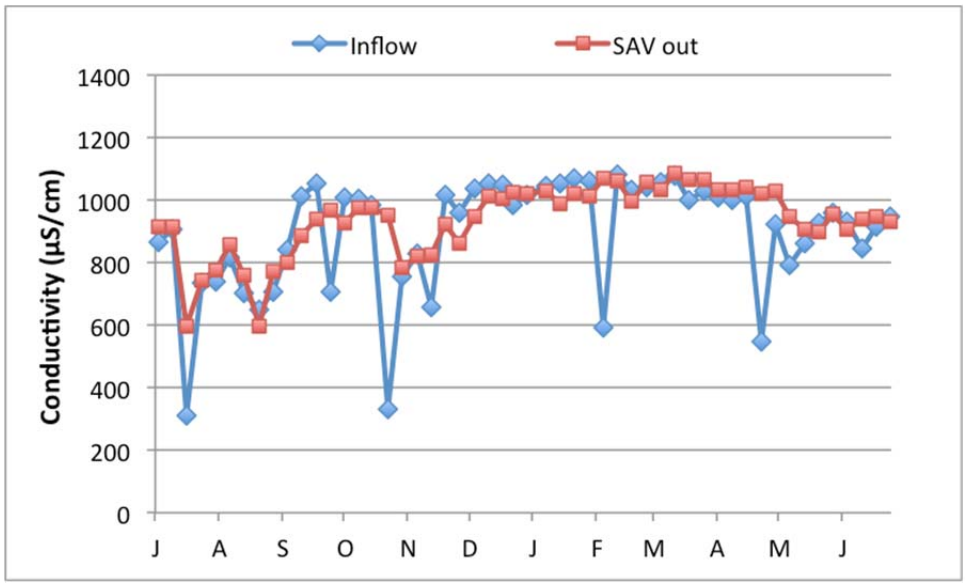


Figure 57. Conductivity in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

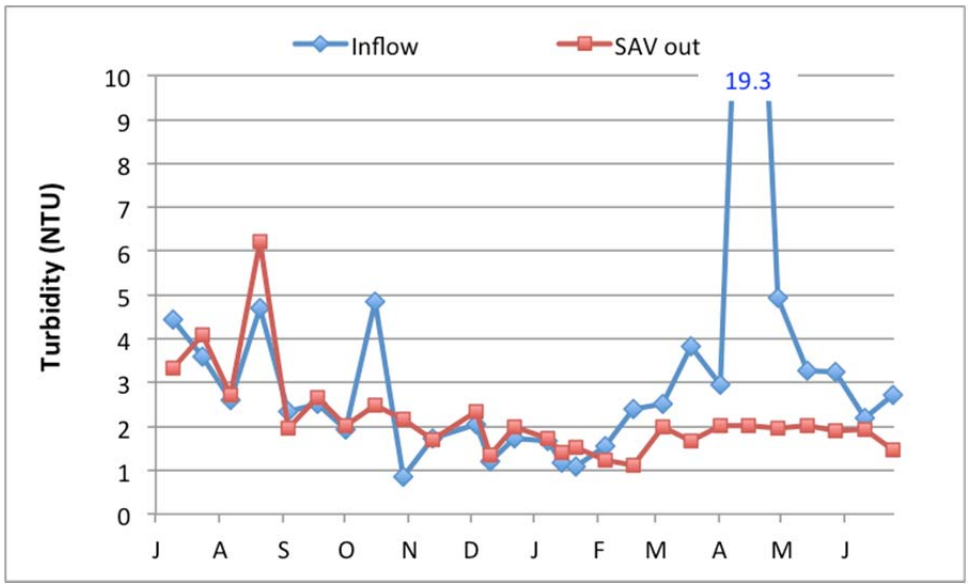


Figure 58. Turbidity in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

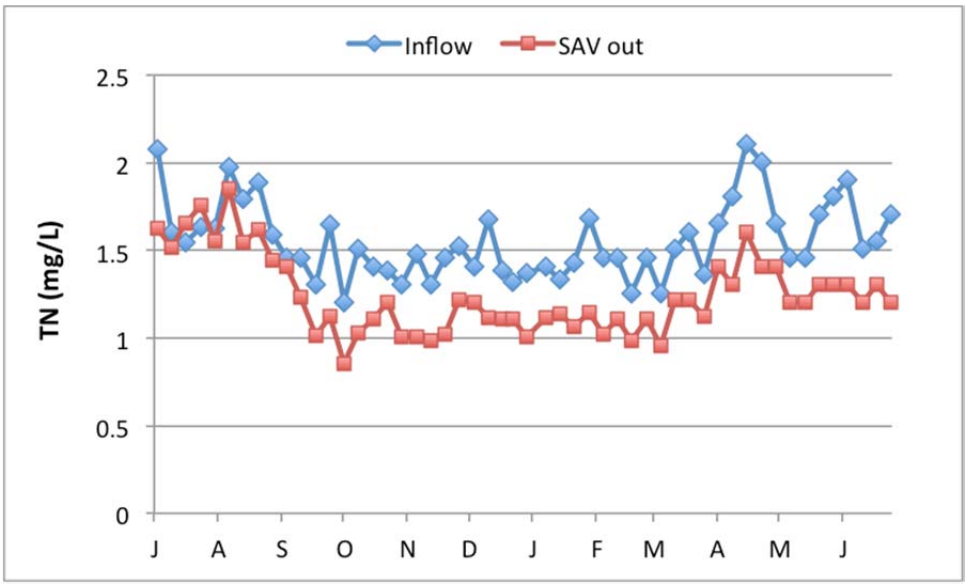


Figure 59. TN concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

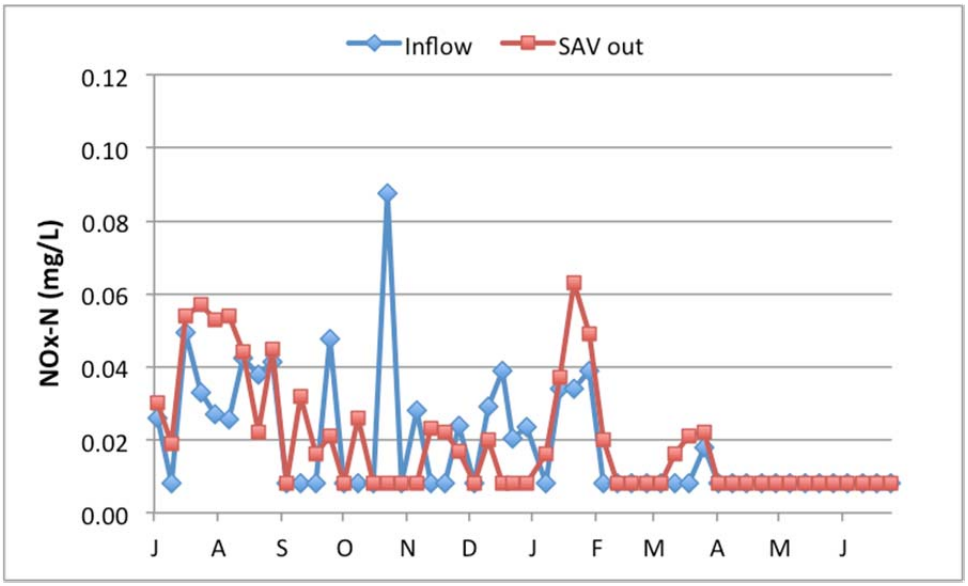


Figure 60. NO_x-N concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

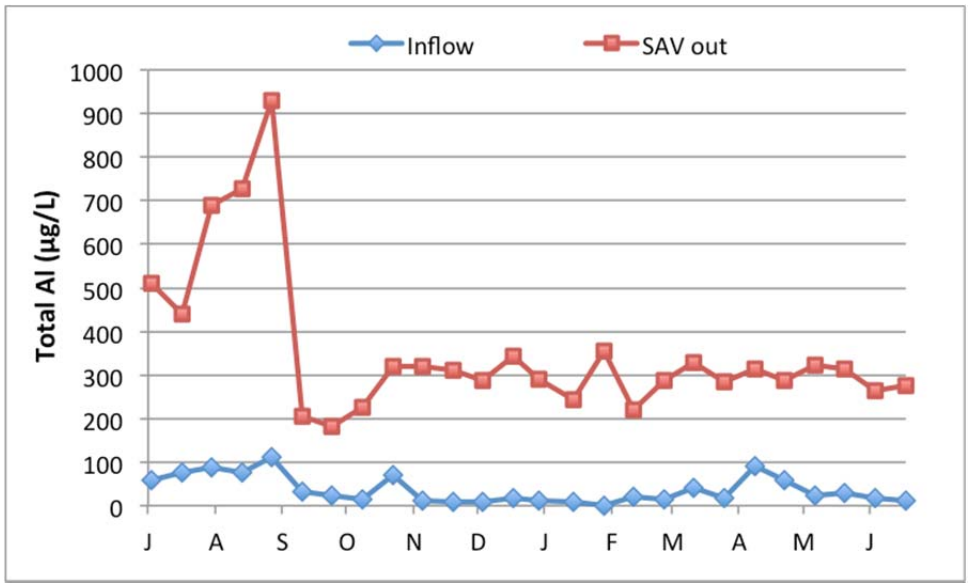


Figure 61. Total Al concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period.

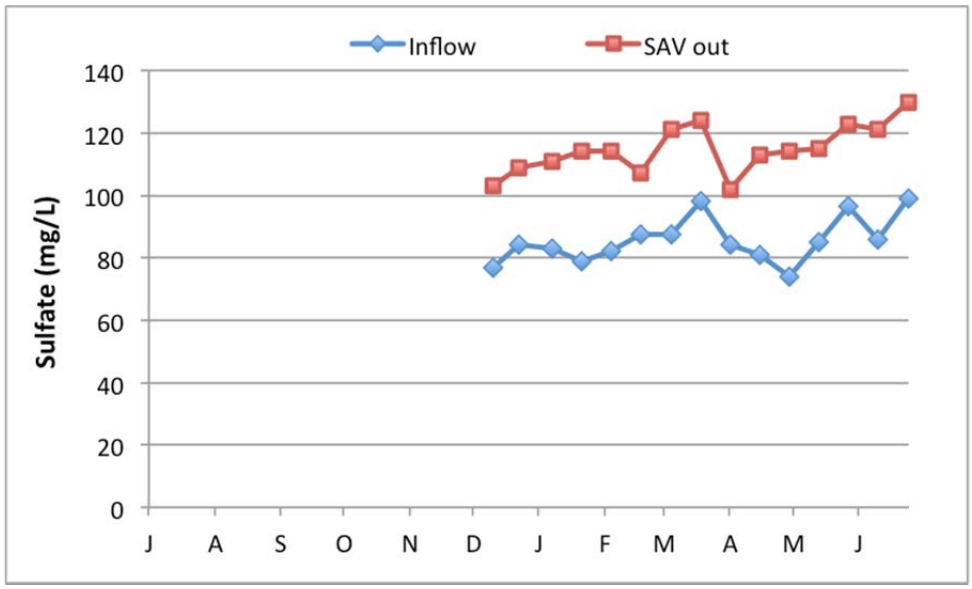


Figure 62. Sulfate concentration in the inflow stream (Wolff Ditch) and SAV outflow stream of the Site 6 HWTT system during the July 2014 – June 2015 monitoring period. Monitoring of sulfate was initiated in December 2014.

Monthly flow volume treated in the Wolff HWTT system was relatively high during July-August 2014, then decreased to monthly totals in the 30-40 Mgal range (Figure 63). Monthly treated volume ranged from 32.6 Mgal in February 2015 to 113.5 Mgal in July 2014. Mean monthly flow volume was 49.1 Mgal, while total flow treated during the period July 2014 – June 2015 was 588.9 Mgal.

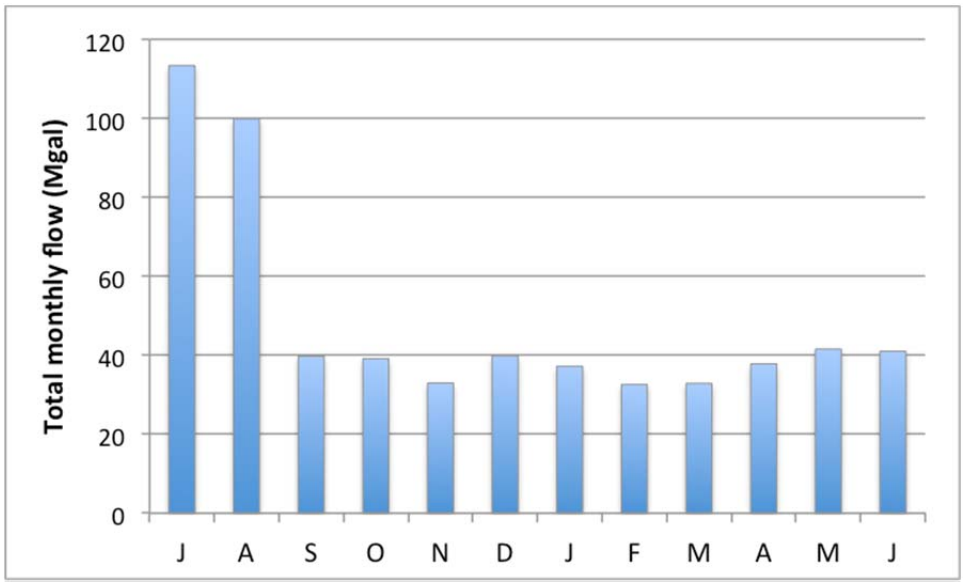


Figure 63. Total monthly flow treated by the Wolff Ditch (Site 6) HWTT system during the period July 2014 – June 2015.

Routine Monitoring at the South Pond and Isolated Wetland Outflows

Elevated TP concentrations at the south pond outflow during July and August reflect the high TP concentrations in the Wolff HWTT outflow stream during that period (Figure 64). South pond outflow TP decreased during August and September, and maintained concentrations below 30 µg/L during the remainder of the monitoring period. TP concentrations at the wetland outflow were relatively stable, and remained within the range of 10-30 µg/L for the duration of the monitoring period. Overall mean TP concentrations were 29 µg/L (median = 23 µg/L) for the south pond and 15 µg/L (median = 14 µg/L) for the isolated wetland. Concentrations ranged from 17 to 97 µg/L in the south pond and from 10 to 29 µg/L in the wetland.

SRP concentrations in both the south pond and wetland were non-detectable (≤2 µg/L) during the majority of sampling events (overall means ≤2 µg/L), although a high SRP concentration of 16 µg/L was reported for the south pond during July 2014 (Figure 65). Mean SRP concentrations at the south pond and wetland outflows were 2 and ≤2 µg/L, respectively. DOP concentrations were similar in the south pond and wetland throughout the period, ranging from ≤2 to 12 and ≤2 to 10 µg/L, respectively (Figure 66). Mean DOP concentrations during the monitoring period were 5 µg/L for both south pond and wetland. Particulate P represented the predominant fraction of TP in the south pond and wetland. Concentrations of PP in the south pond outflow showed an initial rise during July and August, followed by a decrease to concentrations in the 10-20 µg/L range, while PP concentrations at the wetland outflow were consistently lower (Figure 67). PP concentrations in the south pond averaged 23 µg/L and ranged from 11 to 59 µg/L, while PP in the wetland averaged 9 µg/L and ranged from 4 to 13 µg/L.

Alkalinity levels followed similar trends in the south pond and isolated wetland, with higher levels occurring primarily during the dry season months (Figure 68). Alkalinity was slightly lower in the wetland than in the south pond. Values ranged from 134 to 192 mg/L in the south pond, compared to a range of 116 to 200 mg/L in the isolated wetland. Mean alkalinity in the south pond was 164 mg/L, while the mean value for the wetland was 152 mg/L. pH at both the south pond and wetland outflows displayed an initial decrease prior to a general increasing trend during the balance of the monitoring period (Figure 69). pH was consistently lower in the wetland, where values ranged from 7.0 to 8.2 and averaged 7.6. In comparison, pH in the south pond ranged from 7.3 to 8.5 and averaged 8.1.

Color concentrations at both the south pond and isolated wetland outflows increased during July and August, and subsequently decreased through September, with relatively consistent levels through the remainder of the monitoring period (Figure 70). Color was consistently lower in the isolated wetland; mean color concentrations in the south pond and wetland were 127 and 83 PCU, respectively. Values ranged from 101 to 209 PCU in the south pond and 67 to 131 in the wetland. Conductivity levels tended to decrease during wet season months and increase during the dry season, in both the south pond and isolated

wetland (Figure 71). Conductivity in the south pond ranged from 678 to 1071 µS/cm and averaged 899 µS/cm, while levels in the wetland ranged from 688 to 1050 µS/cm and averaged 885 µS/cm. Turbidity in the wetland was typically lower than in the south pond, due to enhanced settling of particulates and decreased light availability for phytoplankton growth in the wetland (Figure 72). South pond turbidity ranged from 2.4 to 5.7 NTU and averaged 3.9 NTU during the course of the monitoring period. Turbidity in the isolated wetland outflow ranged from 0.7 to 2.1 NTU and averaged 1.1 NTU.

TN levels in the south pond and wetland were confined to a relatively narrow range of concentrations during the monitoring period, with concentrations being slightly lower overall in the wetland (Figure 73). TN concentrations in the south pond ranged from 1.01 to 1.71 mg/L and averaged 1.31 mg/L, compared to a range of 0.98 to 1.61 mg/L and mean of 1.22 mg/L for the isolated wetland. Concentrations of NO_x were quite low in both the south pond and wetland; levels were most often below detection (Figure 74). Maximum values of NO_x were less than 0.020 mg N/L in the south pond and wetland throughout the monitoring period.

Total Al in the south pond outflow fluctuated over a relatively wide range of concentrations, from a minimum of 114 µg/L to a maximum of 450 µg/L, with a mean value of 237 µg/L. Total Al at the wetland outflow was lower in comparison, ranging from 54 to 200 µg/L and averaging 128 µg/L during the monitoring period (Figure 75). Sulfate concentrations, measured in the south pond outflow beginning in December, showed a steady increase from 91 to 140 mg/L, with an average concentration of 115 mg/L (Figure 76).

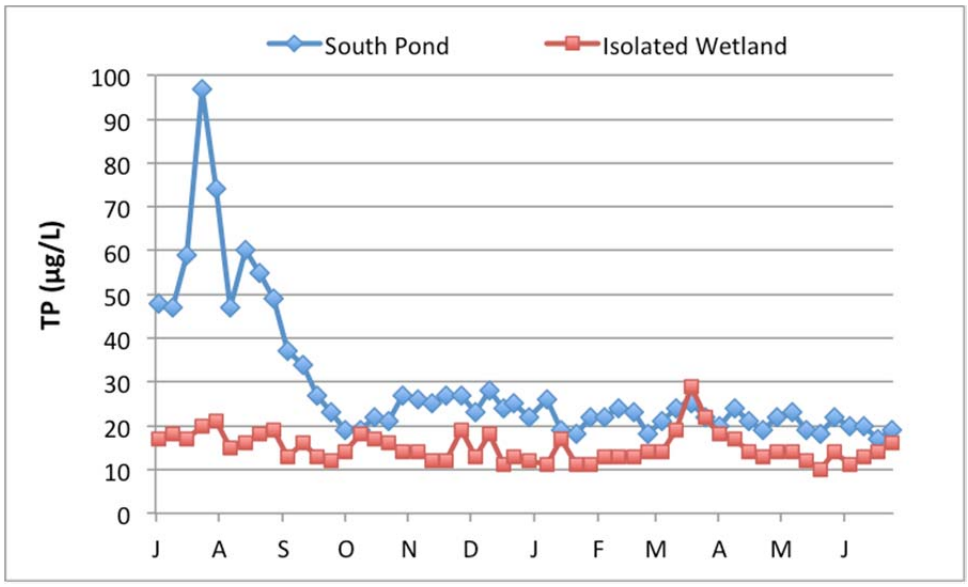


Figure 64. TP concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

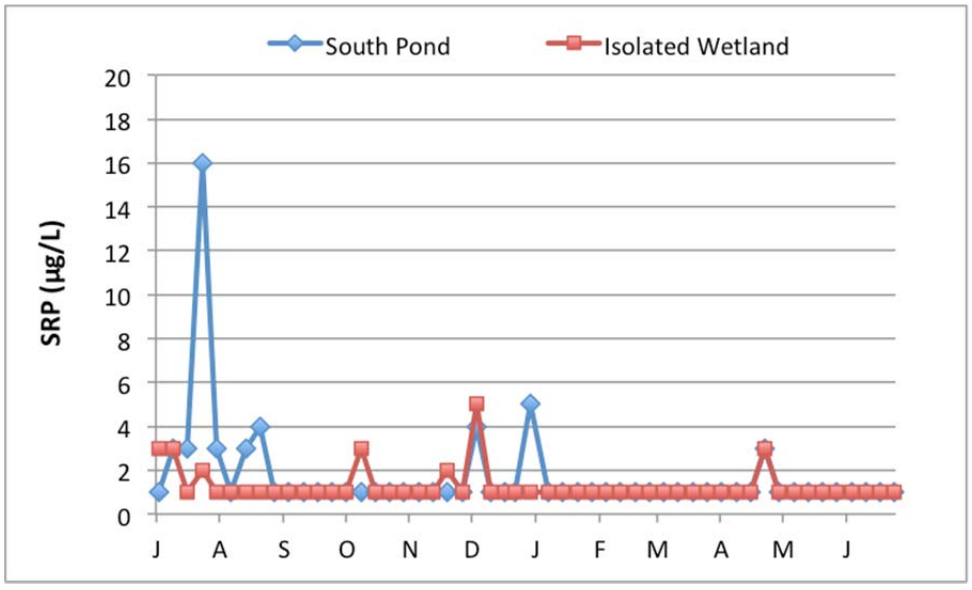


Figure 65. SRP concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

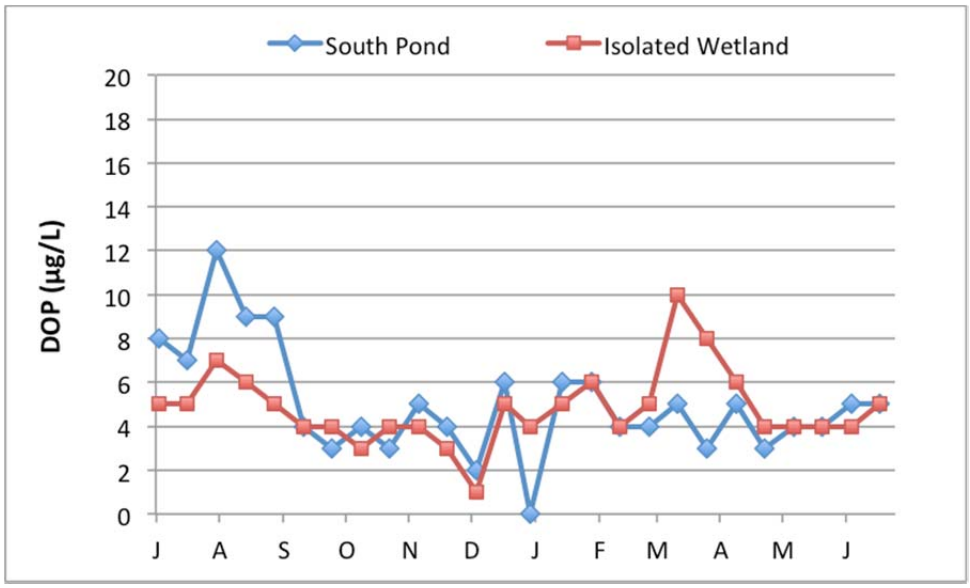


Figure 66. DOP concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

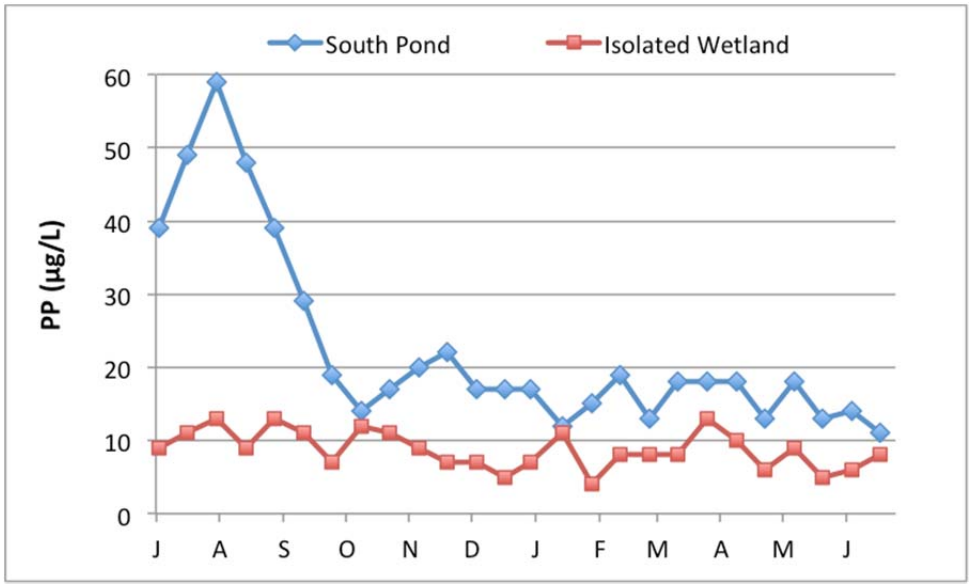


Figure 67. PP concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

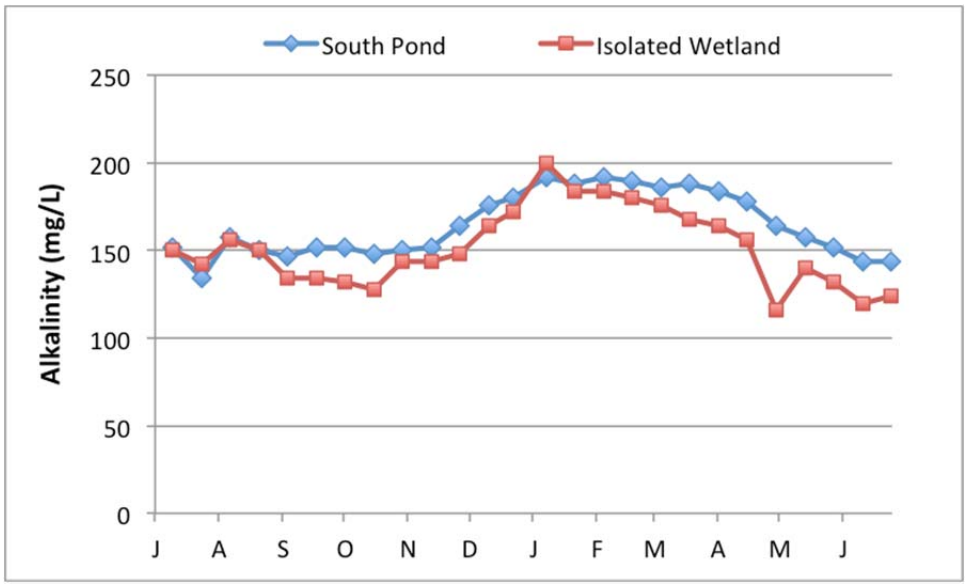


Figure 68. Alkalinity in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

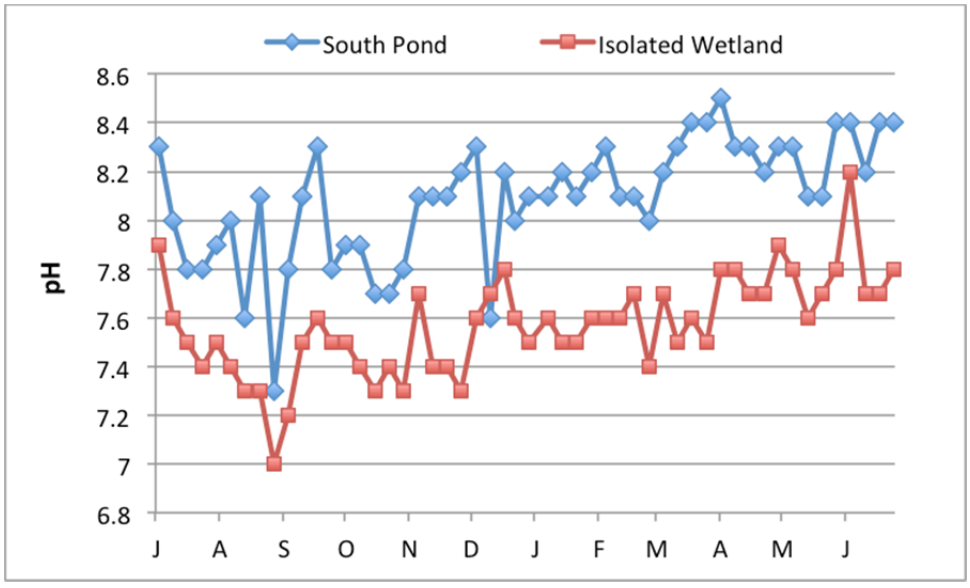


Figure 69. pH in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

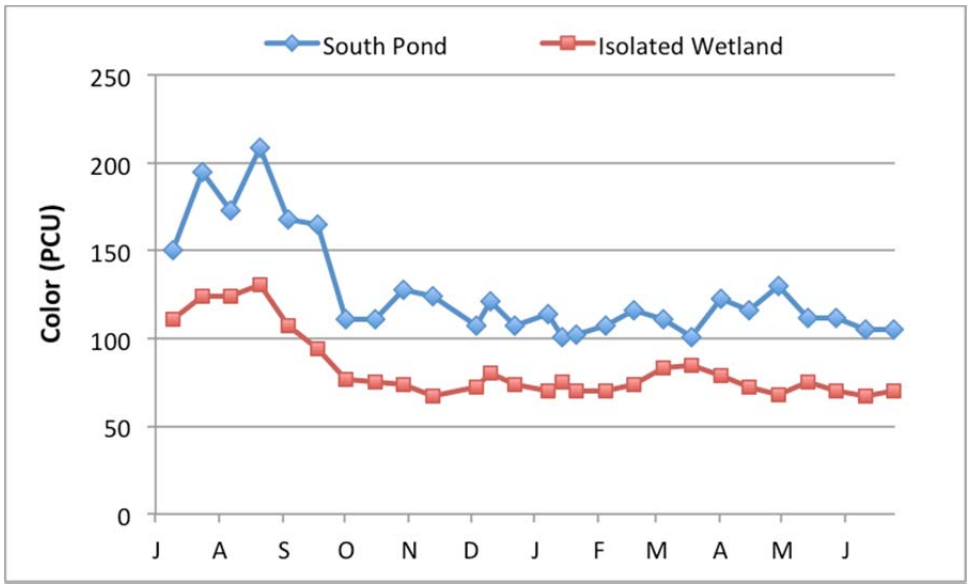


Figure 70. Color in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

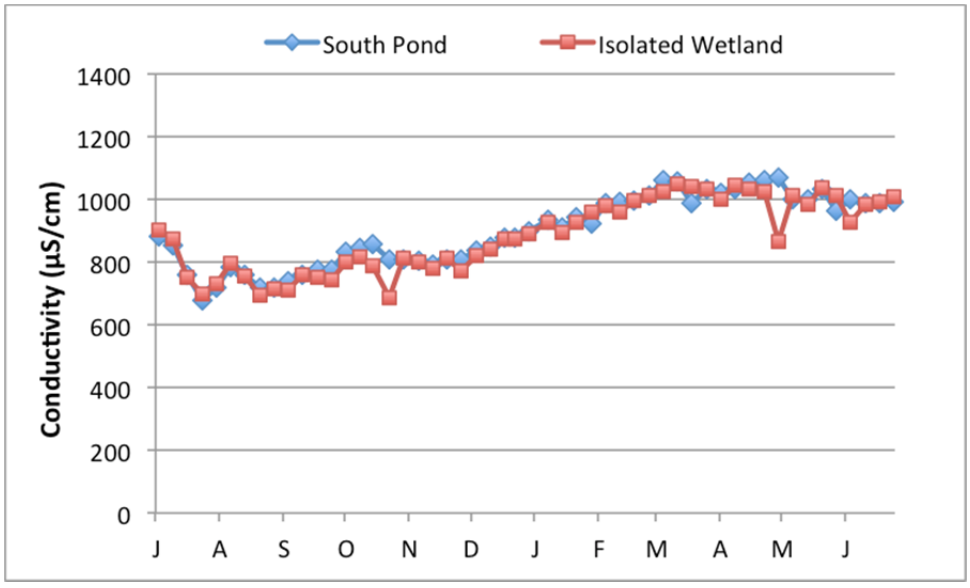


Figure 71. Conductivity in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

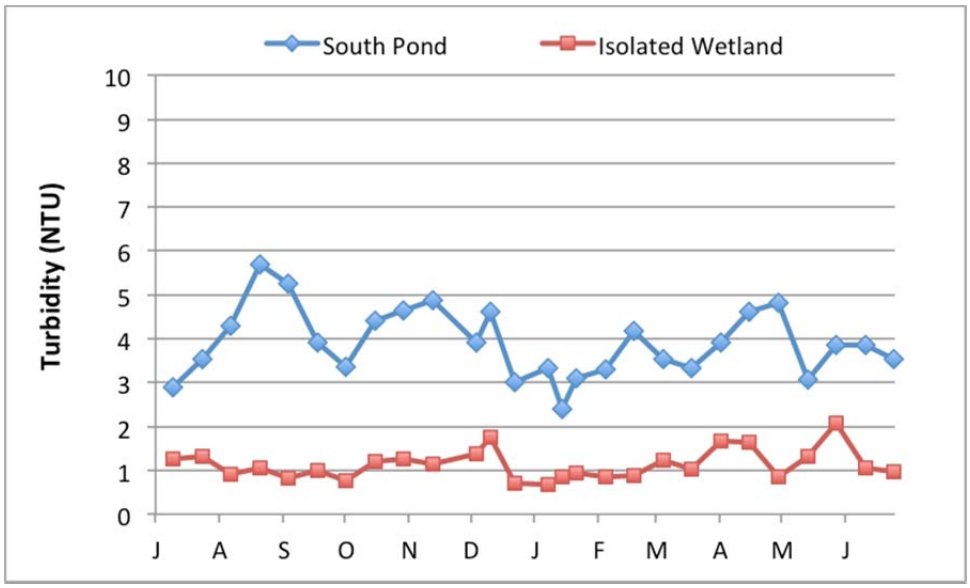


Figure 72. Turbidity in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

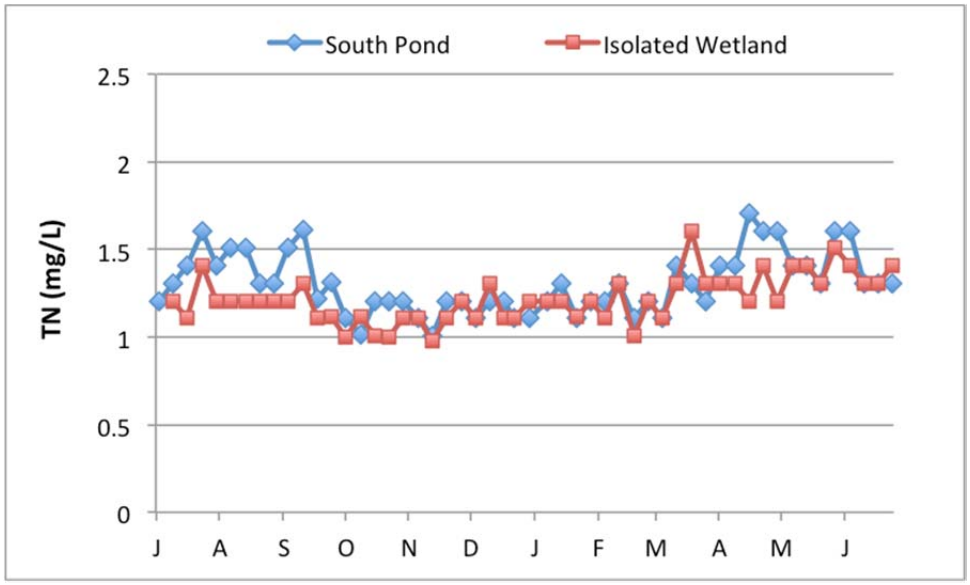


Figure 73. TN concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

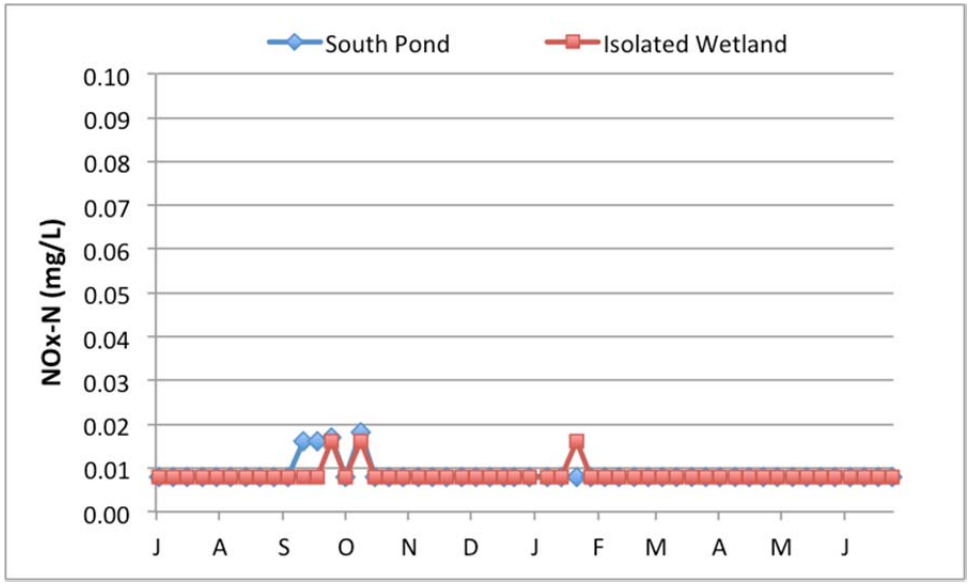


Figure 74. NO_x-N concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

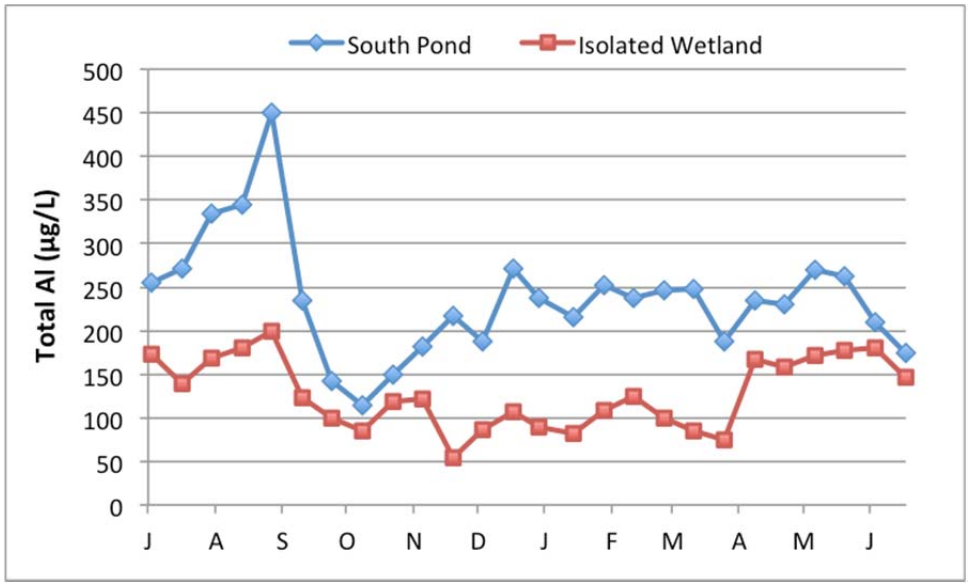


Figure 75. Total Al concentration in the outflow stream of the South Pond and Isolated Wetland, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

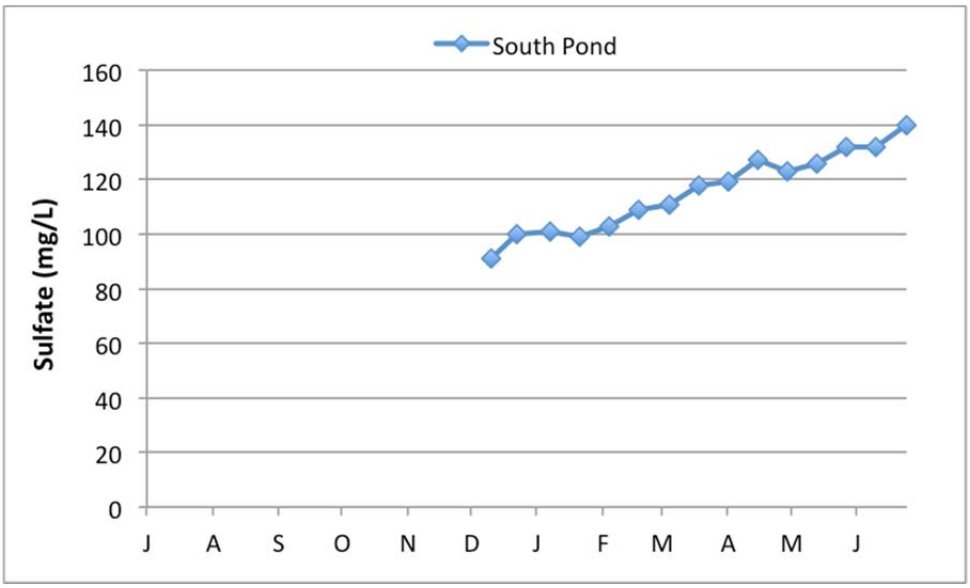


Figure 76. Sulfate concentration in the outflow stream of the South Pond, downstream from the Site 5 and Site 6 HWTT systems, during the July 2014 – June 2015 monitoring period.

Site 7: Grassy Island HWTT Facility

In 2011, we constructed a full-scale (10 cfs) Hybrid Wetland Treatment Technology (HWTT) facility on the District owned Grassy Island parcel north of the City of Okeechobee. The project site is part of a large parcel of land (see Section 20, Township 36 South, Range 35 East) adjacent to Taylor Creek, north of the location of the creek passage under US Hwy 441. An aerial photo of the Phase I HWTT facility (now designated as the "eastern flow path") is shown in Figure 77. Briefly, the design for the HWTT facility is as follows. Water pumped from Taylor Creek flows first through a limerock bed, after which it is dosed with coagulant and fed into one of three plastic-lined contact chambers. The contact chambers overflow into a settling pond, and then into an adjacent FAV pond. The final unit process is a SAV pond, which ultimately discharges back into Taylor Creek downstream of the inflow pump station location. Figure 78 through Figure 81 show the major facility components of the eastern flow path.

Phase III construction (pump station enhancements, and expansion of the western components to 15 cfs) was completed in June 2013, providing a total system capacity of 30 cfs. Early in 2015, outflow region limerock beds were installed in the eastern and western SAV ponds to provide additional system buffering. A photo of the Phase III Grassy Island HWTT facility, which includes both the eastern and western flow paths, is shown in Figure 82.

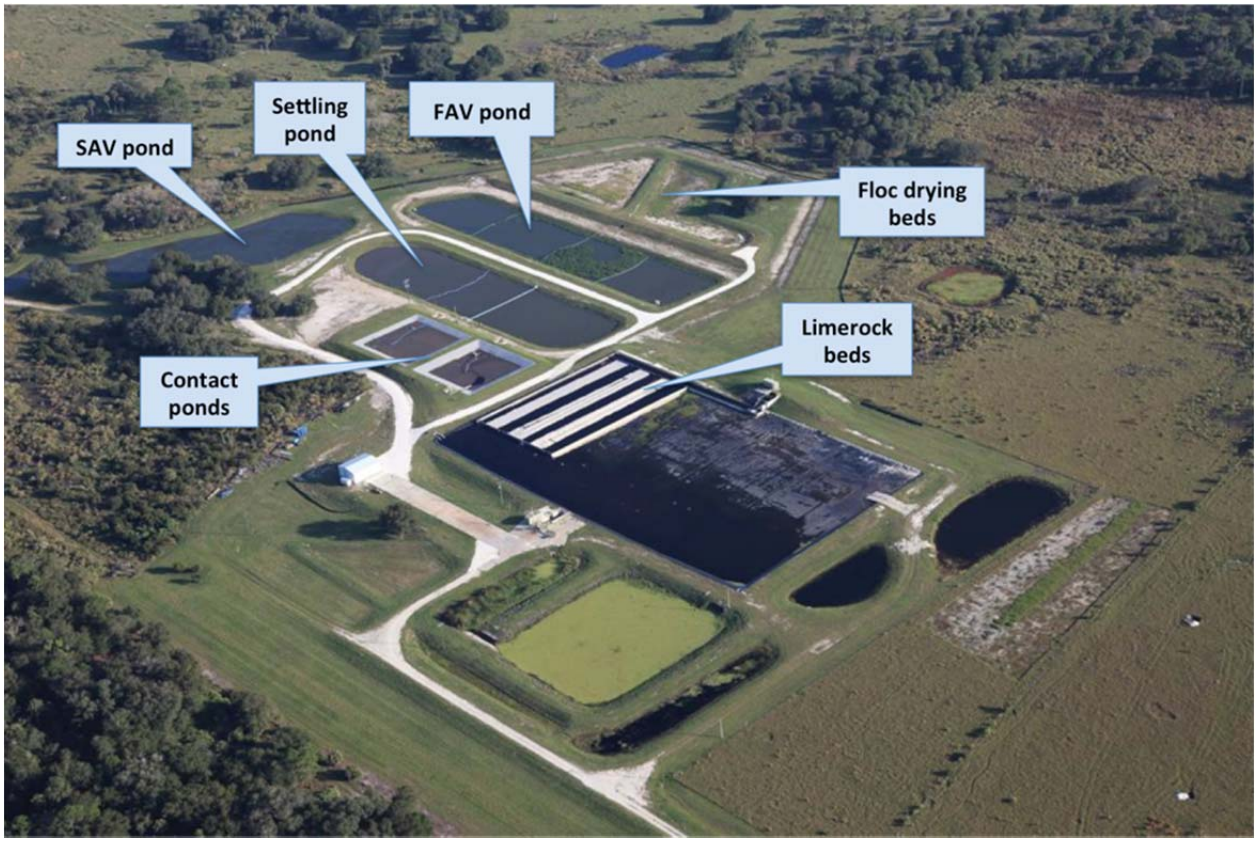


Figure 77. Aerial view of the Phase I Grassy Island HWTT facility. These components now comprise the "eastern flow path".



Figure 78. The limerock bed component of the Grassy HWTT facility.



Figure 79. The eastern Grassy HWTT settling pond, with floating "floc line" that conveys wet floc from the contact ponds to the drying bed.



Figure 80. The eastern Grassy HWTT facility FAV pond with three floating vegetation booms.



Figure 81. The eastern Grassy HWTT facility SAV pond (top), with the limerock bed (bottom) that was installed early in 2015.



Figure 82. Photo of the final build-out of the Phase III Grassy Island HWTT facility, completed in June 2013. Taylor Creek is at the bottom of the photo.

During the current period, the Grassy Island HWTT system received dosing of alum on an intermittent basis, using a dosing frequency ranging from 75 to 90% during July-December 2014, and a frequency of 85% thereafter. This provided an overall effective alum dose of 12.6 mg Al/L, and monthly means ranging from 6.5 to 15.3 mg Al/L. In addition to alum, PAC was used as a secondary coagulant via intermittent dosing (approximately 80% of operational time). This provided an effective PAC dose with an overall mean of 2.4 mg Al/L and a monthly range from 0.4 to 6.9 mg Al/L during the current period.

HWTT system inflow and outflow water samples were collected via grab sampling for chemical analyses on a weekly or biweekly basis. Samples were analyzed for total phosphorus (TP) soluble reactive P (SRP), pH and turbidity, on a weekly basis. Water samples were also analyzed for dissolved organic P (DOP=TSP-SRP, where TSP is total

soluble P), particulate P (PP=TP-TSP), alkalinity, color, conductivity, nitrate + nitrite N (NO_x-N), ammonia-N, and TKN on a biweekly basis. Total N (TN) was calculated as the sum of NO_x and TKN. Total aluminum (Al) and sulfate (SO_4) also were monitored biweekly, for permit compliance purposes. Water chemistry data for the July 2014 – June 2015 monitoring period are presented in Figure 83 through Figure 96. Additional data, related to compliance monitoring, are presented later in this report.

Inflow TP concentrations in the Grassy Island HWTT system were generally highest during the 2014 wet season, but were also quite variable throughout the monitoring period (Figure 83). Inflow TP ranged from 46 to 866 µg/L and averaged 376 µg/L (median = 366 µg/L) during the monitoring period. Outflow TP concentrations were moderately elevated during July 2014, but much lower (≤62 µg/L) and relatively stable during the remainder of the period. From August through June, outflow TP concentration averaged 19.6 µg/L. For the entire monitoring period the mean outflow TP concentration was 34 µg/L (median = 16 µg/L), while the range was 7 to 213 µg/L. Inflow SRP concentration was highly correlated (r=0.97) with inflow TP, as SRP was the predominant P fraction in the inflow stream (Figure 84). Maximum SRP concentrations were measured during July, with a slight decreasing trend thereafter. Mean inflow SRP was 275 µg/L, while concentrations ranged from 30 to 668 µg/L. Outflow SRP concentrations were frequently near or below detection; the maximum concentration measured during the monitoring period was 60 µg/L, but the mean and median values were 6 and 4 µg/L, respectively.

Inflow DOP concentrations also exhibited a temporal trend similar to that of TP, with somewhat lower concentrations measured during the dry season months (Figure 85). Outflow DOP concentrations were slightly higher during July and August, and during the remainder of the monitoring period concentrations remained below 8 µg/L. Inflow DOP concentrations ranged from 5 to 123 µg/L and averaged 52 µg/L, while outflow DOP ranged from ≤2 to 22 µg/L and averaged 6 µg/L. Inflow PP concentrations were also somewhat higher during the 2014 wet season, but considerable shorter-term variability was also present (Figure 86). Outflow PP concentrations were initially higher than inflow PP, but decreased rapidly during July and August. The overall range in inflow PP

concentration was ≤2 to 107 µg/L, compared with a range of <2 to 157 µg/L in the outflow stream. Mean PP levels were 45 and 24 µg/L at the system inflow and outflow, respectively.

Alkalinity in the inflow stream exhibited a typical seasonal trend of increasing concentrations during dry season months, along with a high degree of short-term variability (Figure 87), reflecting the rapidly changing water chemistry in Taylor Creek. Inflow alkalinity ranged from 18 to 108 mg/L and averaged 70 mg/L. Alkalinity levels were lower overall in the outflow stream, with less temporal variability, than in the inflow water. Mean outflow alkalinity was 33 mg/L, while levels ranged from 15 to 60 mg/L. Both inflow and outflow pH trended in similar fashion to inflow alkalinity, with outflow pH slightly lower in general than inflow pH (Figure 88). Inflow pH averaged 6.9 and ranged from 6.2 to 7.6, while outflow pH averaged 6.6 and ranged from 5.9 (during a single sampling event) to 7.5.

Inflow and outflow color exhibited overall trends similar to inflow and outflow TP concentrations (Figure 89). The mean inflow color concentration was 493 PCU, with values ranging from 60 to 920 PCU during the monitoring period. Outflow color levels reflected a high level of color removal by the Grassy HWTT system. Values ranged from 26 to 465 PCU and averaged 107 PCU during the course of the monitoring period. Conductivity in both the inflow and outflow streams exhibited an overall increasing trend during the monitoring period, but short-term variability was relatively high, especially for inflow conductivity (Figure 90). The sharp decrease in at the end of the monitoring period coincided with the spike in inflow TP, possibly due to a flush of stormwater runoff in upstream areas of the watershed. Mean conductivity levels were 404 and 483 µS/cm, respectively, in the inflow and outflow streams. Overall ranges for inflow and outflow conductivity were 106 to 634 and 214 to 717 µS/cm, respectively. Turbidity levels were extremely variable in the system inflow, most notably during the July-December period, while outflow turbidity levels were elevated primarily during July, but relatively low and stable during the remainder of the monitoring period (Figure 91). Mean inflow turbidity was 8.9 NTU, while values ranged from 2.1 to 72.1 NTU, while outflow turbidity averaged 2.5 NTU and ranged from 0.6 to 15.2 NTU.

Inflow TN trended slightly downward during the monitoring period, although concentrations rose considerably during January and early February (Figure 92). Outflow TN concentrations were consistently lower than inflow TN, reflecting a high level of N removal in the Grassy HWTT system. Mean TN concentrations at the inflow and outflow were 2.27 and 1.11 mg/L, respectively. Inflow TN ranged from 0.77 to 3.46 mg/L, while outflow TN ranged from 0.55 to 2.07 mg/L. Inflow and outflow NO_x concentrations were characterized by an increase through December and January, followed by a general decrease in both inflow and outflow NO_x over the remainder of the monitoring period (Figure 93). Outflow concentrations were consistently lower than inflow concentrations, suggestive of denitrification activity in the back end of the system. Inflow NO_x concentrations ranged from 0.047 to 1.20 mg N/L and averaged 0.457 mg N/L. Outflow NO_x concentrations ranged from ≤0.016 to 0.970 mg N/L and averaged 0.283 mg N/L. Ammonia-N concentrations at the inflow exhibited a slight downward trend prior to a spike in concentration during late December and early January (Figure 94). Outflow concentrations were substantially lower than inflow concentrations during the course of the monitoring period. Mean inflow and outflow ammonia-N concentrations were 0.140 and 0.022 mg N/L, respectively. Inflow concentrations ranged from 0.034 to 0.754 mg N/L, while outflow concentrations ranged from 0.004 to 0.041 mg/L.

Total Al and sulfate were monitored in the Grassy HWTT inflow and outflow streams, in association with the use of aluminum sulfate (alum) and polyaluminum chloride (PAC) as coagulants. Inflow total Al (TAl) concentrations ranged from 80 to 1330 µg/L and averaged 249 µg/L during the monitoring period (Figure 95). Outflow TAl concentrations were significantly elevated during the first month of the monitoring period due to the high color levels that tend to inhibit floc formation, but levels rapidly decreased below 1000 µg/L during August and below 500 µg/L for the duration of the monitoring period. The overall range of outflow TAl concentrations was 45 to 4930 µg/L, with a mean of 571 µg/L (median = 124 µg/L). During the 10-month period from September through June, outflow TAl ranged from 45 to 369 µg/L and averaged 140 µg/L. Sulfate concentrations in the inflow and outflow trended slightly upward, with a high degree of shorter-term variability, during the monitoring period (Figure 96). Inflow sulfate concentrations averaged 41 mg/L

and ranged from 8 to 130 mg/L. Outflow sulfate concentrations averaged 93 mg/L and ranged from 51 to 158 mg/L.

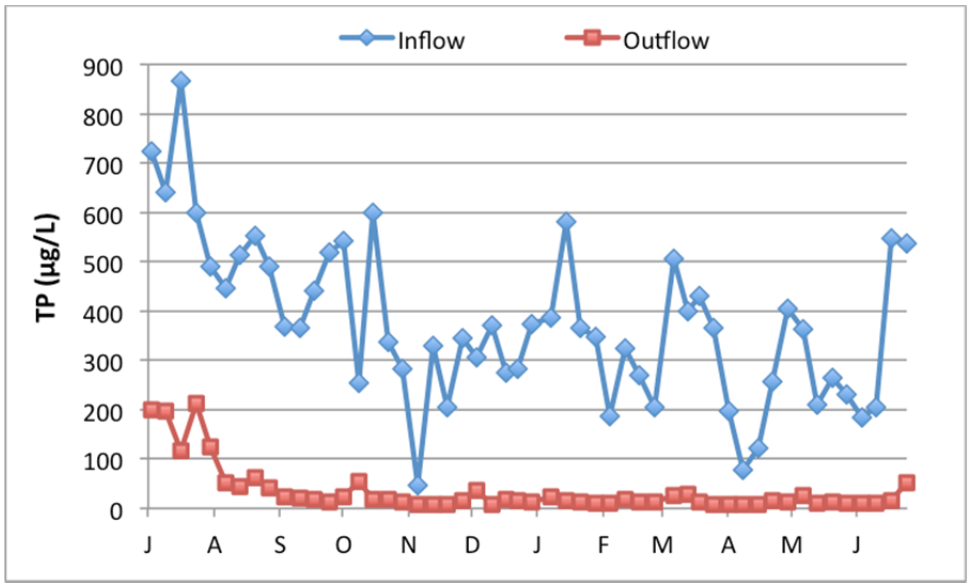


Figure 83. TP concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

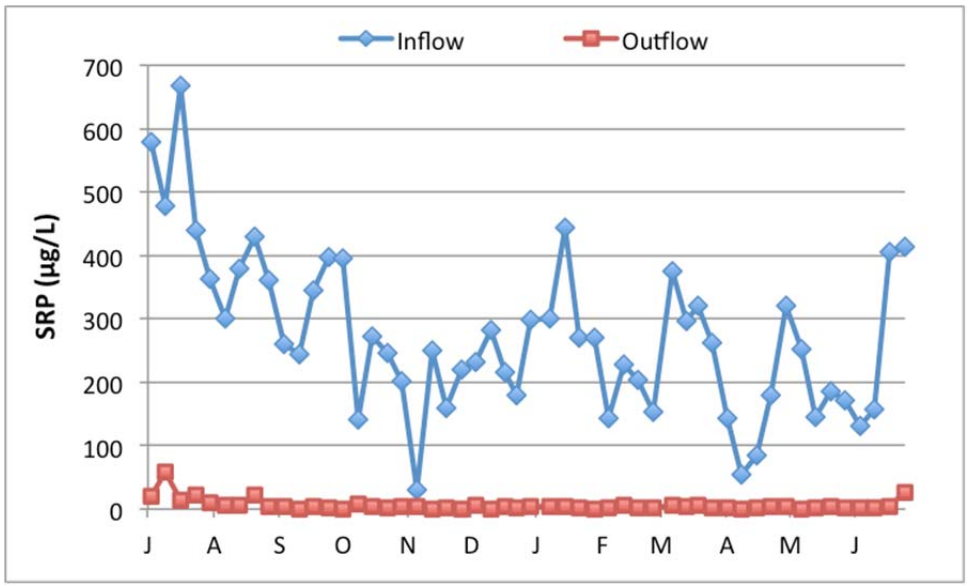


Figure 84. SRP concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

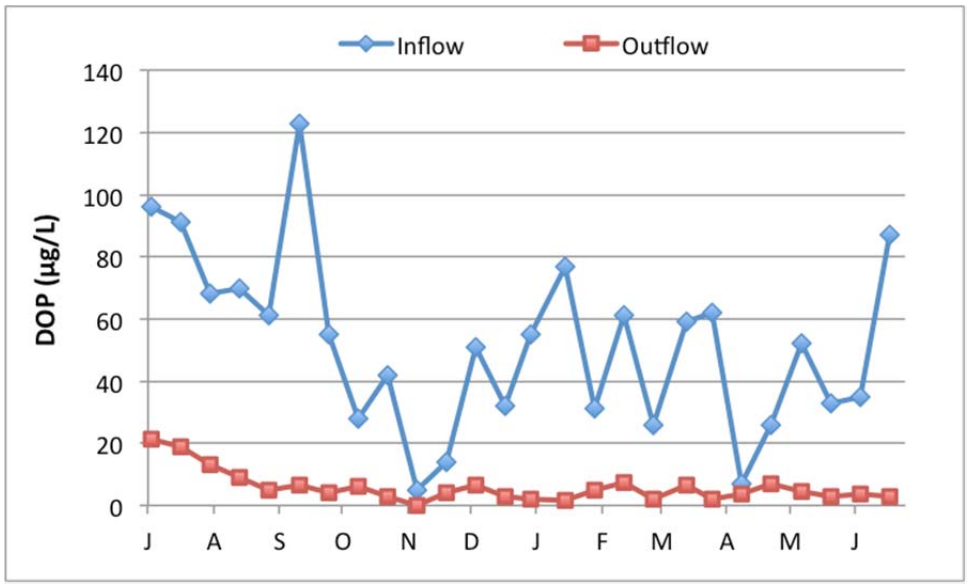


Figure 85. DOP concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

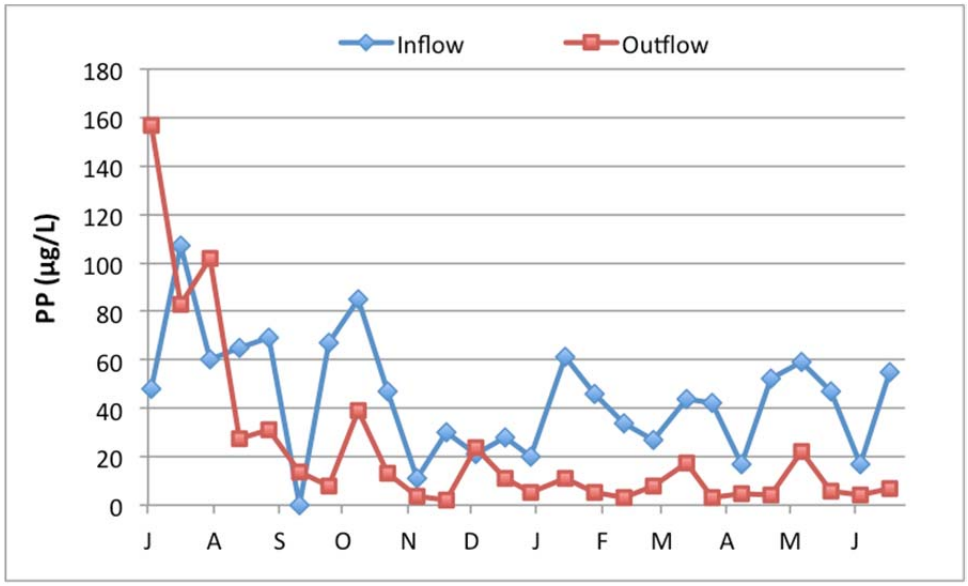


Figure 86. PP concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

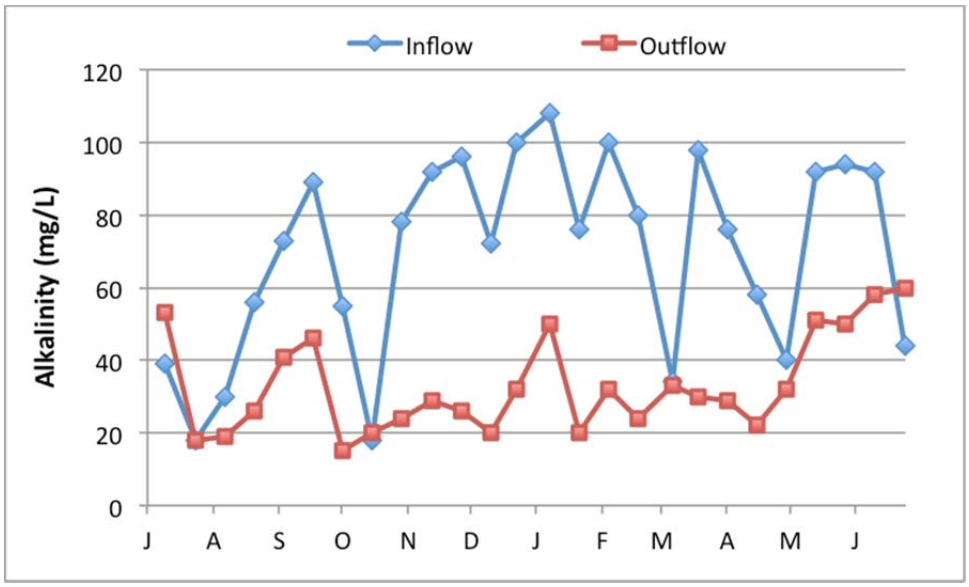


Figure 87. Alkalinity in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

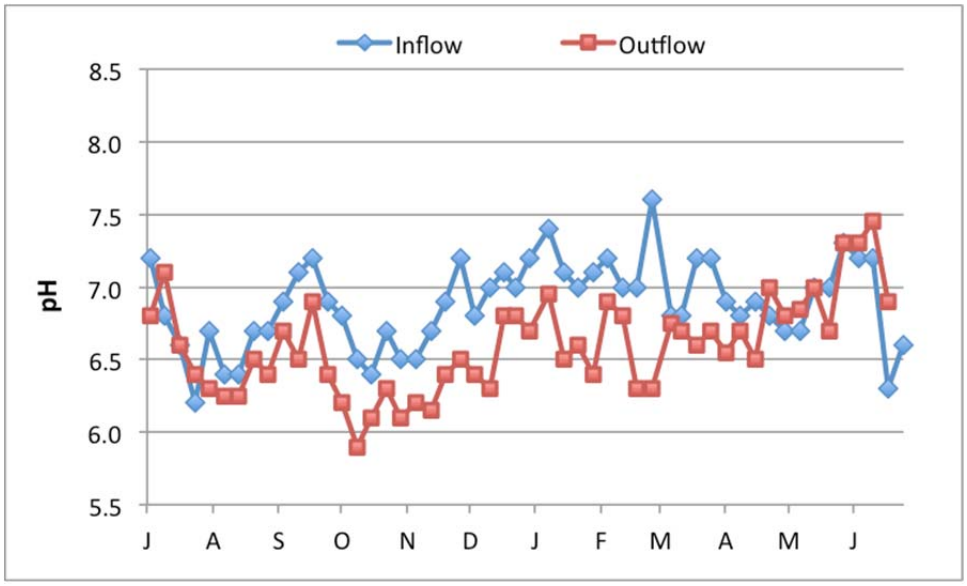


Figure 88. pH in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

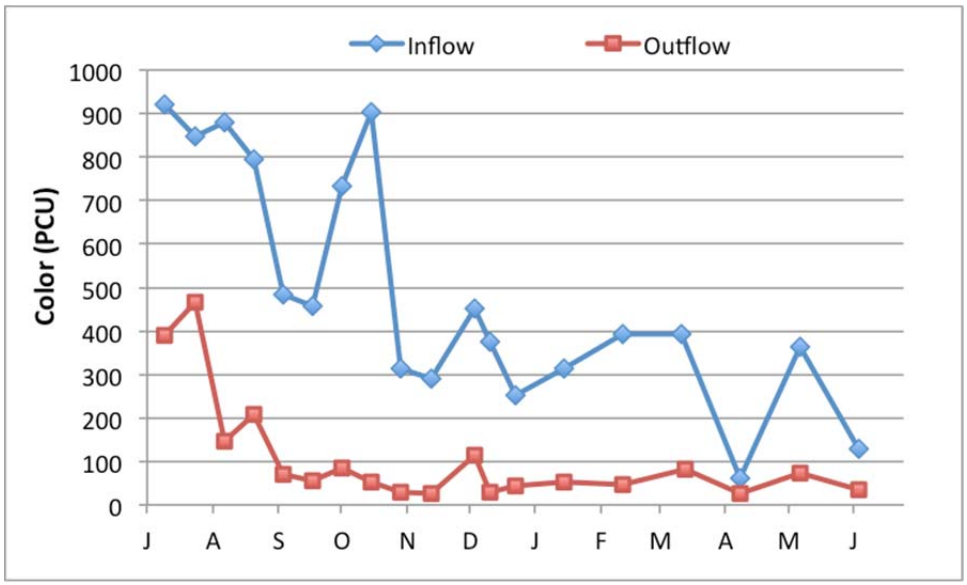


Figure 89. Color in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

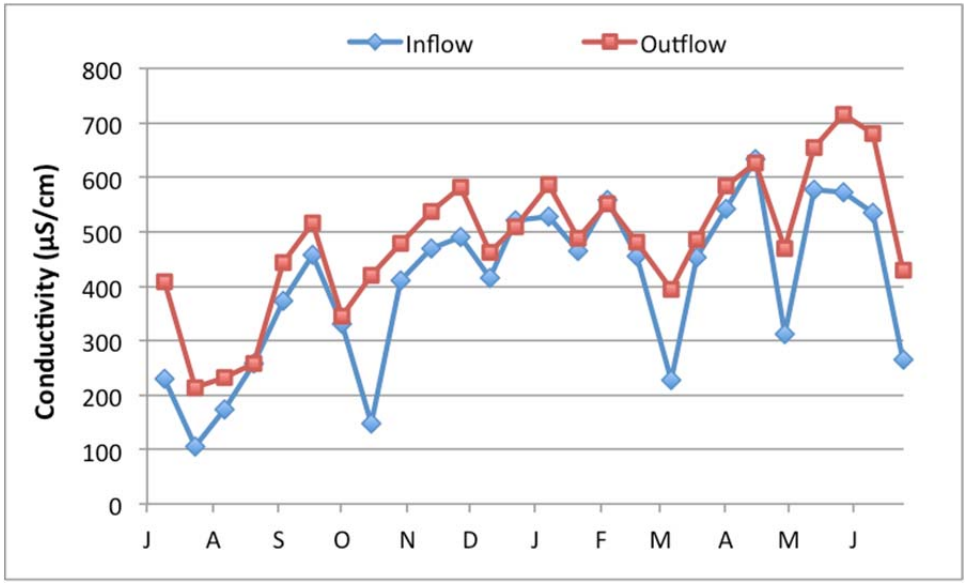


Figure 90. Conductivity in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

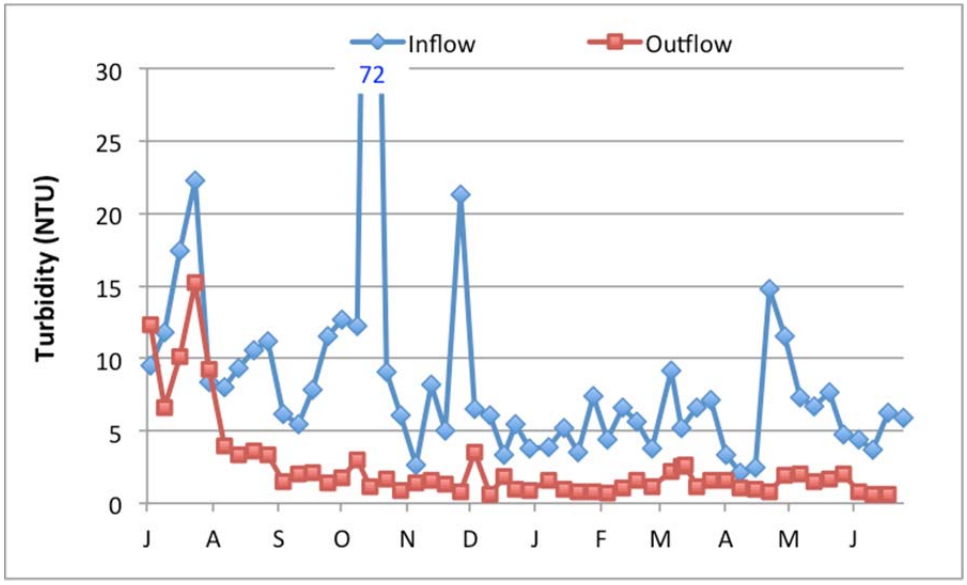


Figure 91. Turbidity in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

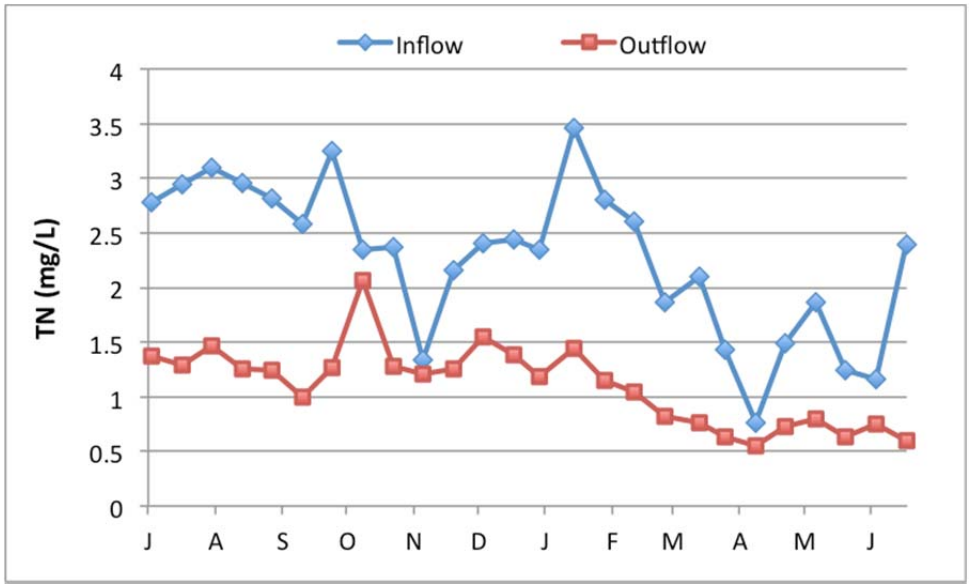


Figure 92. TN concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

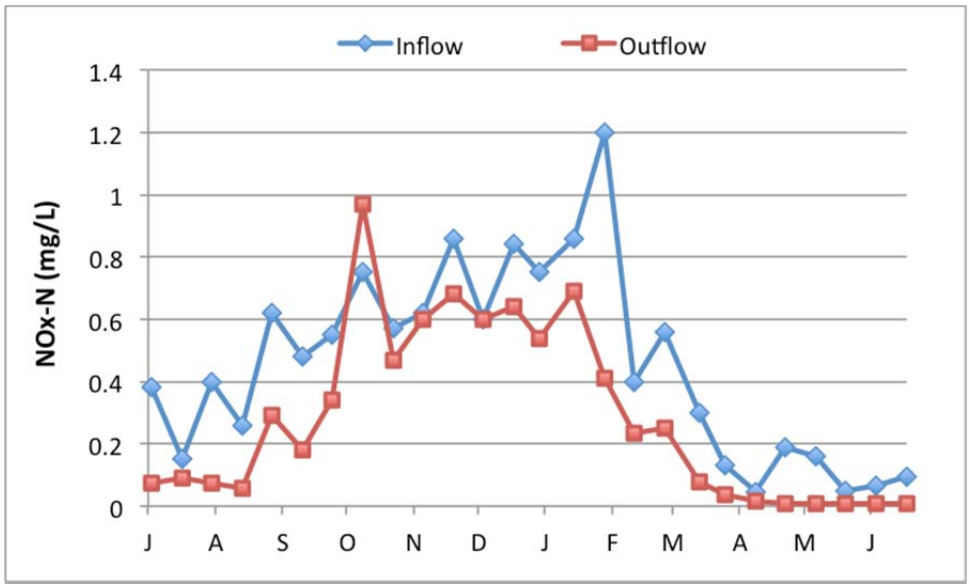


Figure 93. NO_x-N concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

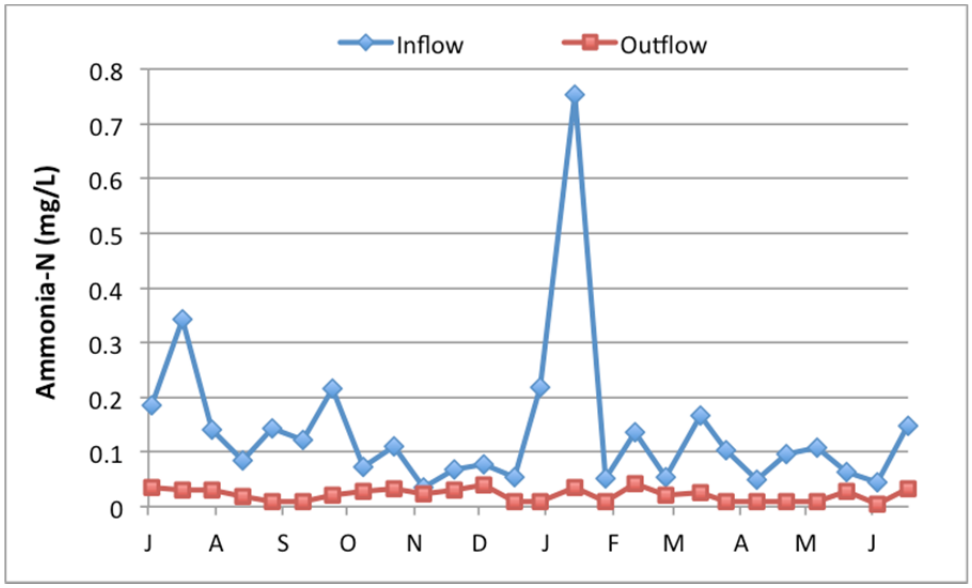


Figure 94. Ammonia-N concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

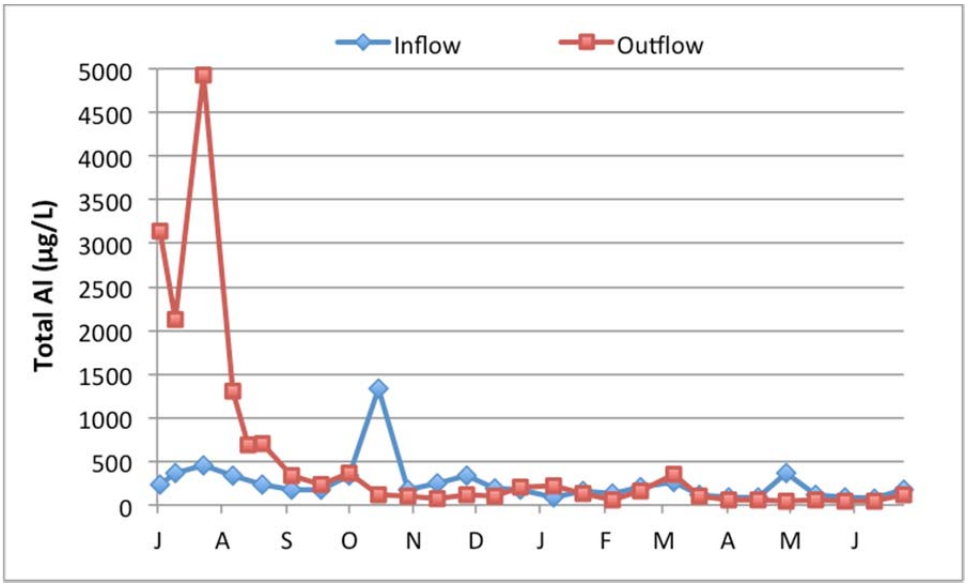


Figure 95. Total Al concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

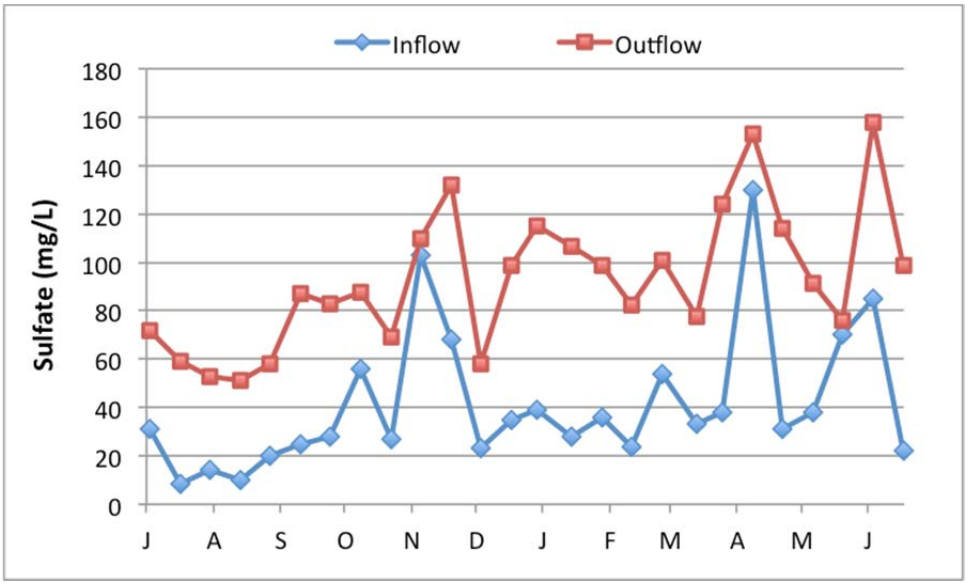


Figure 96. Sulfate concentration in the inflow and outflow streams at the Grassy Island HWTT system during the July 2014 – June 2015 monitoring period.

Monthly flow volume treated in the Grassy Island HWTT system increased during the wet season (July-October 2014) and subsequently decreased through the dry season and into June 2015 (Figure 97). Monthly volumes ranged from 36.4 Mgal in June 2015 to 325.1 Mgal in October 2014. Mean monthly flow volume was 140.2 Mgal, while total flow treated during the period July 2014 – June 2015 was 1682 Mgal.

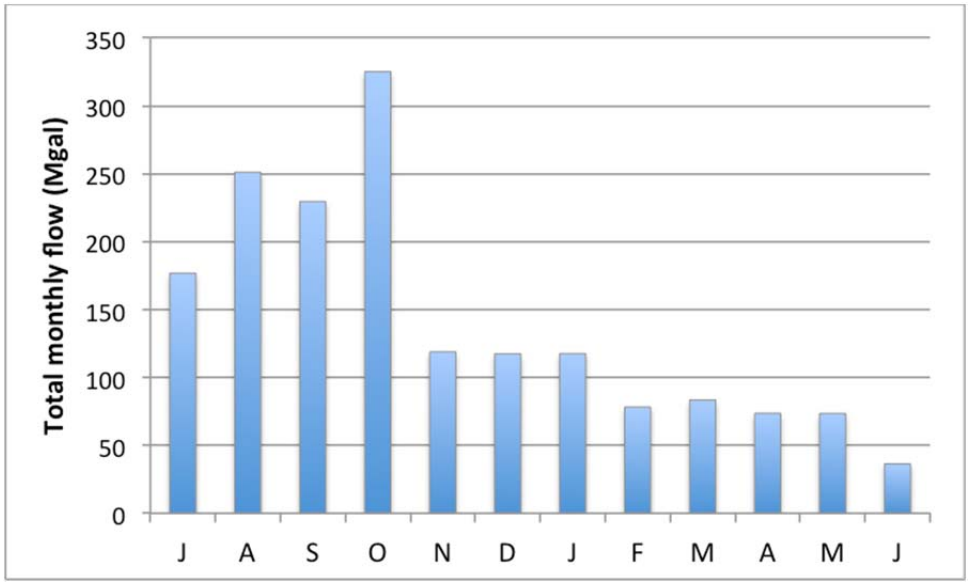


Figure 97. Total monthly flow treated by the Grassy Island (Site 7) HWTT system during the period July 2014 – June 2015.

Site 8: Bessey Creek HWTT Facility

The Bessey Creek HWTT system (Site #8) is located south of Citrus Boulevard, approximately one mile north of SR 714 in Martin County, on twenty-three acres of county owned land within Section 10, Township 38 South, Range 40 East. The HWTT system is situated within the western portion of the Western Palm City Corridor (WPCC), formally designated as a wetland treatment system serving 305 acres of the Bessey Creek Watershed. A schematic of the HWTT system layout is shown in Figure 98.

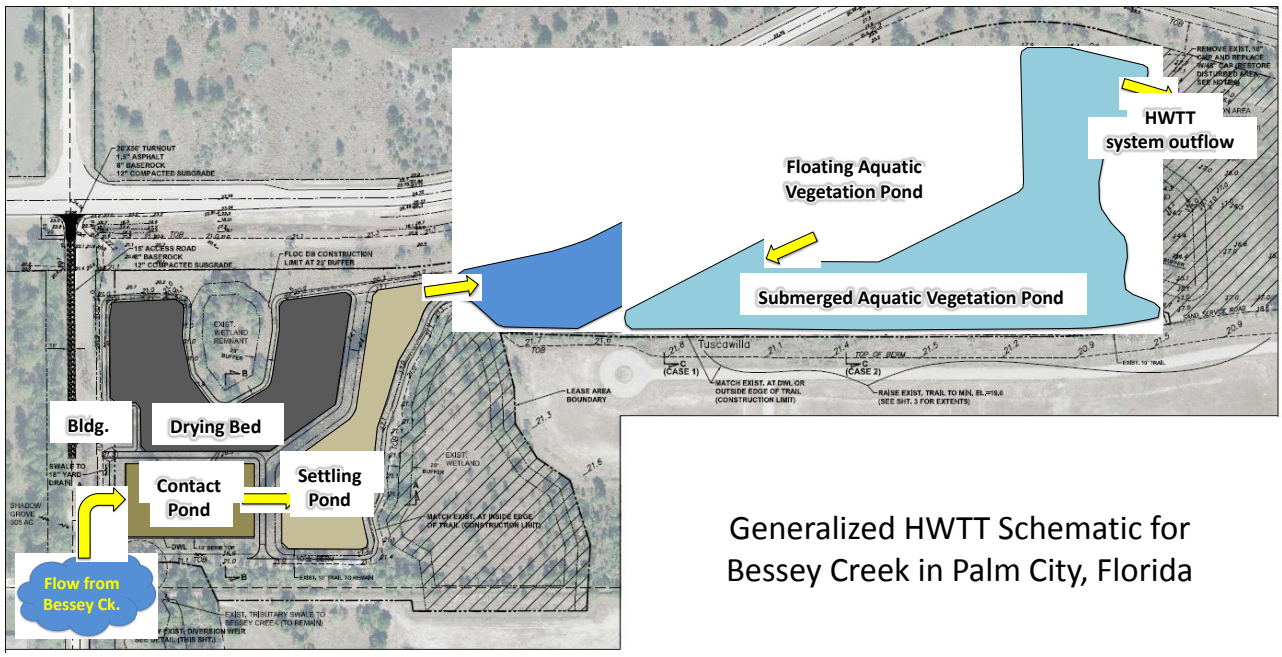


Figure 98. Schematic of the Bessey Creek HWTT facility.

The project consists of a 20 cfs pump station and conveyance connection for incoming flows, chemical storage tanks and equipment shelter with a concrete foundation, pipes, valves, fittings and appurtenances for coagulant metering and dosing. Following dosing, water passes through contact ponds, a settling pond, and back-end FAV and SAV ponds before being discharged to the downstream marsh. The system has the ability to receive water from Bessey Creek at a rate equal to or less than the real-time creek flow.

Construction of the project was completed early in 2015, and pumping and treatment of creek waters was initiated in March 2015.

During the current period (beginning in March 2015), the Bessey Creek HWTT system received dosing of alum, at monthly mean rates ranging from 13 to 16 mg Al/L, and an overall mean of 14.4 mg Al/L.

HWTT system inflow and outflow water samples were collected via grab sampling for chemical analyses on a weekly or biweekly basis. It should be noted that creek flows were extremely low during spring and early summer 2015, such that the downstream components of the system (SAV and FAV ponds) were not filled by the end of the project period (June 30, 2015). Bessey Creek waters that were pumped into the facility and treated typically kept the contact pond and settling ponds full, so "outflow" samples were collected from the outflow culverts of whichever of these two system components were flowing at that time (Figure 99).

Samples were analyzed for total phosphorus (TP), soluble reactive P (SRP), color, pH and turbidity, on a weekly basis. Dissolved organic P (DOP=TSP-SRP, where TSP is total soluble P), particulate P (PP=TP-TSP), alkalinity and conductivity were analyzed on a weekly basis through mid-April, then analyzed biweekly thereafter. Water samples were also analyzed for nitrate + nitrite N (NO_x-N), ammonia-N, and TKN on a weekly or biweekly basis. Total N (TN) was calculated as the sum of NO_x and TKN. Total aluminum (Al) and sulfate (SO_4) also were monitored biweekly, beginning in late April. Water chemistry data for the March – June 2015 monitoring period are presented in Figure 100 through Figure 113.





Figure 99. The Bessey HWTT system contact ponds (top) and settling pond (bottom).

Inflow TP concentrations at the Bessey Creek HWTT system exhibited considerable variability during March and early April 2015, but became more stable during the remainder of the current period (Figure 100). Values ranged from 103 to 432 µg/L, while the mean inflow TP concentration was 228 µg/L. Outflow TP concentrations were

substantially lower than inflow TP, with the exception of one sampling event in mid-March, a period during which chemical dosing optimization trials were just being initiated. Outflow TP ranged from 6 to 231 µg/L and averaged 37 µg/L (median = 20 µg/L) during the monitoring period. Inflow and outflow SRP concentrations varied in similar fashion to TP concentrations, but were considerably lower overall than TP (Figure 101). Inflow SRP concentrations averaged 49 µg/L and ranged from 5 to 107 µg/L, while outflow SRP averaged 4 µg/L and ranged from ≤2 to 47 µg/L.

Concentrations of DOP in the system inflow stream showed a general increase during the monitoring period, while outflow DOP concentrations decreased after an initial spike, then remained relatively low (Figure 102). Inflow DOP concentrations ranged from 13 to 76 µg/L, while outflow DOP ranged from ≤2 to 28 µg/L. Mean inflow and outflow DOP concentrations for the monitoring period were 32 and 6 µg/L, respectively. PP accounted for the largest fraction of TP in the system inflow stream (Figure 103). Inflow PP concentrations averaged 155 µg/L and ranged from 34 to 291 µg/L. Concentrations of PP were generally much lower in the outflow stream, ranging from 2 to 156 µg/L and averaging 32 µg/L.

Alkalinity levels at the system inflow showed considerable short-term variability, particularly during March, but became more stable during the latter part of the monitoring period (Figure 104). Inflow alkalinity ranged from 72 to 196 mg/L, and averaged 128 mg/L. Outflow alkalinity decreased after system startup, from a maximum concentration of 116 mg/L in mid-March to a minimum of 20 mg/L, in both early May and late June. The overall mean alkalinity at the system outflow was 65 mg/L. pH followed a similar trend to alkalinity, in both the inflow and outflow streams (Figure 105). Inflow pH ranged from 6.7 to 7.6 and averaged 7.1. Outflow pH reached a maximum of 7.3 during March, then decreased to a minimum level of 5.5 during May, before increasing to 6.5 at the end of the monitoring period. Mean outflow pH for the entire period was 6.2.

Color decreased in both the inflow and outflow streams during the monitoring period (Figure 106). Inflow color ranged from 50 to 505 PCU, while outflow color ranged from 20

to 419 PCU. Color was effectively reduced in the Bessey HWTT system, from a mean inflow level of 251 PCU to a mean outflow level of 85 PCU. Conductivity (monitoring initiated in late April) was similar at the system inflow and outflow, and increased during the monitoring period (Figure 107). Inflow conductivity ranged from 293 to 479 µS/cm and averaged 414 µS/cm while outflow conductivity ranged from 323 to 514 µS/cm and averaged 452 µS/cm. Inflow turbidity was relatively high, as suggested by high inflow PP concentrations, but was effectively reduced by the treatment system (Figure 108). Inflow turbidity averaged 10.3 NTU, compared with the mean outflow turbidity level of 4.8 NTU. Inflow turbidity ranged from7.5 to 13.7 NTU, while outflow turbidity ranged from 2.0 to 9.9 NTU.

TN concentrations were effectively reduced in the Bessey HWTT system, with the greatest reduction occurring during April-June (Figure 109). Inflow TN ranged from 0.93 to 2.25 mg/L and averaged 1.38 mg/L during the monitoring period. Outflow TN concentrations ranged from 0.38 to 1.25 mg/L, while the mean outflow concentration was 0.69 mg/L. This was comparable to the mean outflow TN concentration (0.68 mg/L) at the Grassy HWTT facility during the same March-June period. NO_x-N concentrations were generally low, and accounted for only a small fraction of TN in both the inflow and outflow streams with the exception of a relatively high NO_x peak measured during a single monitoring event in June (Figure 110). NO_x-N ranged from ≤0.016 to 0.079 mg N/L, and averaged 0.023 mg N/L, at the system inflow. Outflow NO_x-N ranged from ≤0.016 to 0.170 mg N/L and averaged 0.033 mg N/L. Ammonia-N concentrations were relatively high at the inflow and outflow during March, contributing significantly to elevated levels of TN during that time (Figure 111). During the mid-April through June period, ammonia-N concentrations in both inflow and outflow streams were an order of magnitude lower than peak levels in March. During the March-June monitoring period, inflow ammonia-N concentrations ranged from 0.01 to 0.449 mg N/L and averaged 0.107 mg N/L. Outflow ammonia-N concentrations ranged from 0.01 to 0.520 mg N/L and averaged 0.109 mg N/L.

Total Al was monitored in the Bessey HWTT inflow and outflow waters, beginning in late April (inflow) and early May (settling pond outflow). Inflow TAl concentration during the

monitoring period ranged from 67 to 327 µg/L and averaged 129 µg/L. Outflow TAL levels increased sharply during early May, but rapidly decreased to the minimum concentration (at end of June), as our chemical dosing became more optimized. Outflow TAl concentration ranged from 407 to 2470 µg/L, and averaged 1321 µg/L during the May-June monitoring period. Sulfate in the inflow stream ranged from 6 to 16 mg/L, and averaged 9 mg/L (Figure 113). Outflow sulfate concentrations increased during the May-June period, ranging from 62 to 120 mg/L and averaging 97 mg/L.

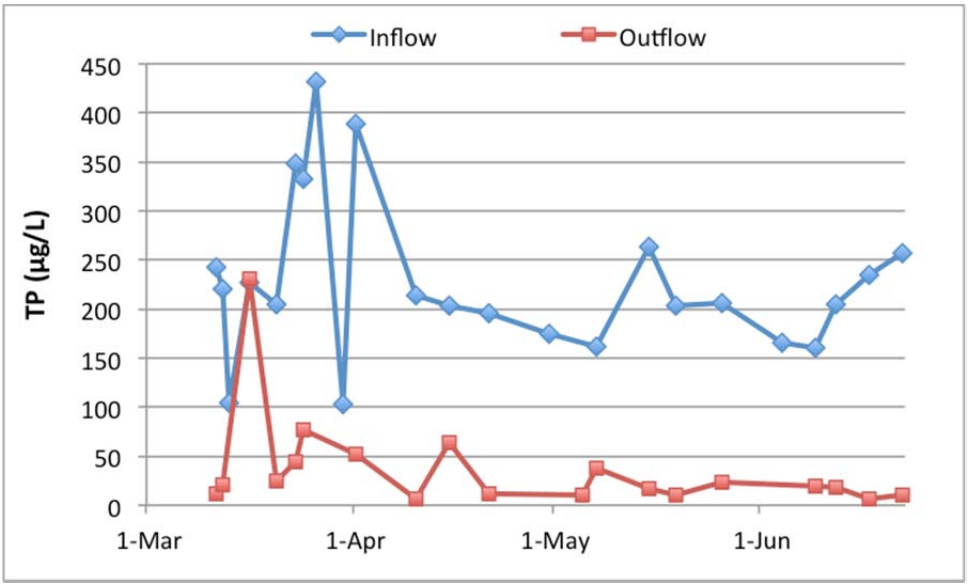


Figure 100. TP concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

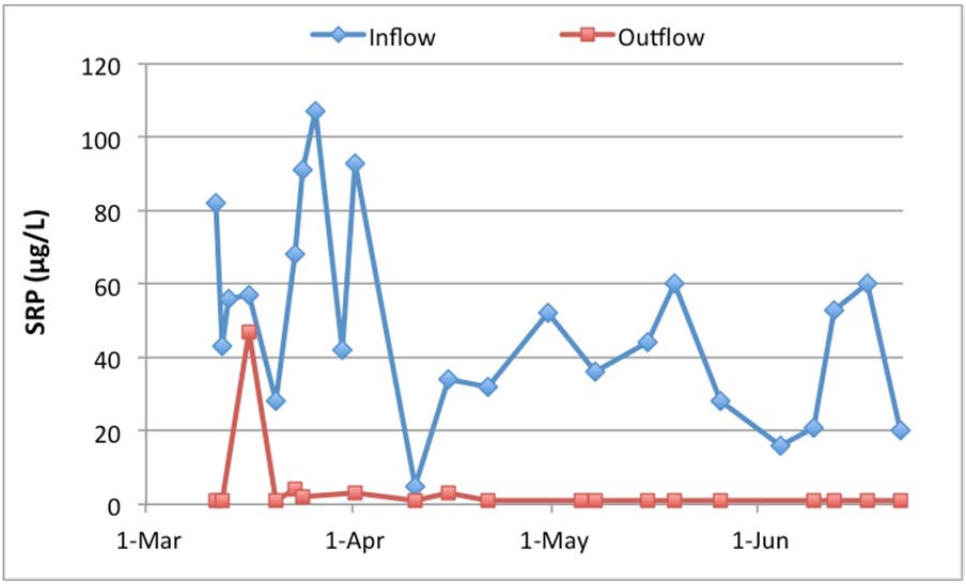


Figure 101. SRP concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

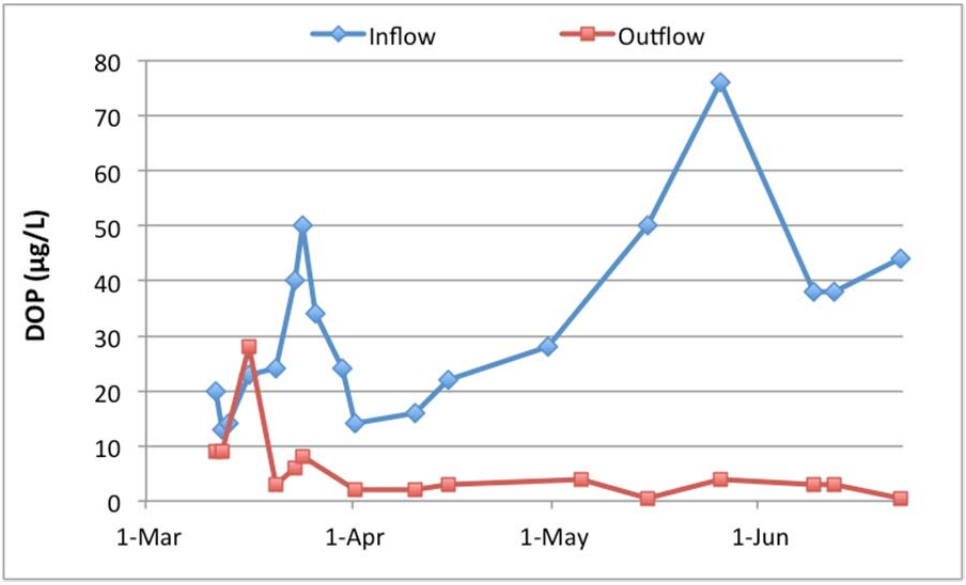


Figure 102. DOP concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

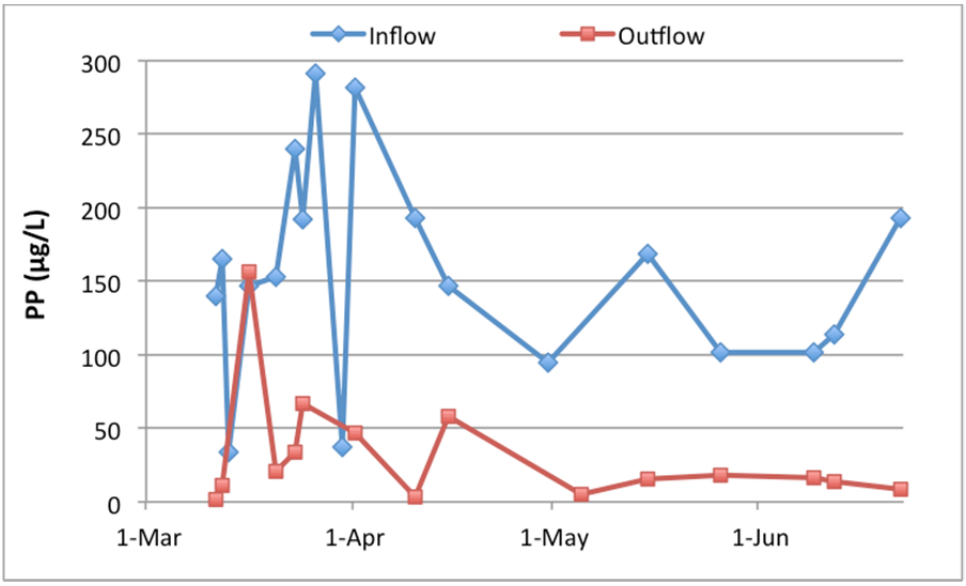


Figure 103. PP concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

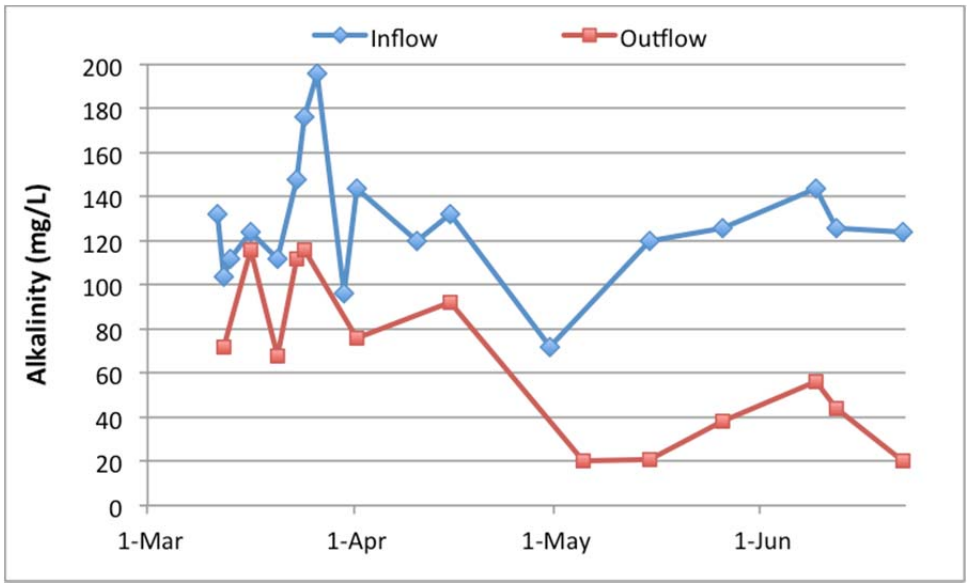


Figure 104. Alkalinity in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

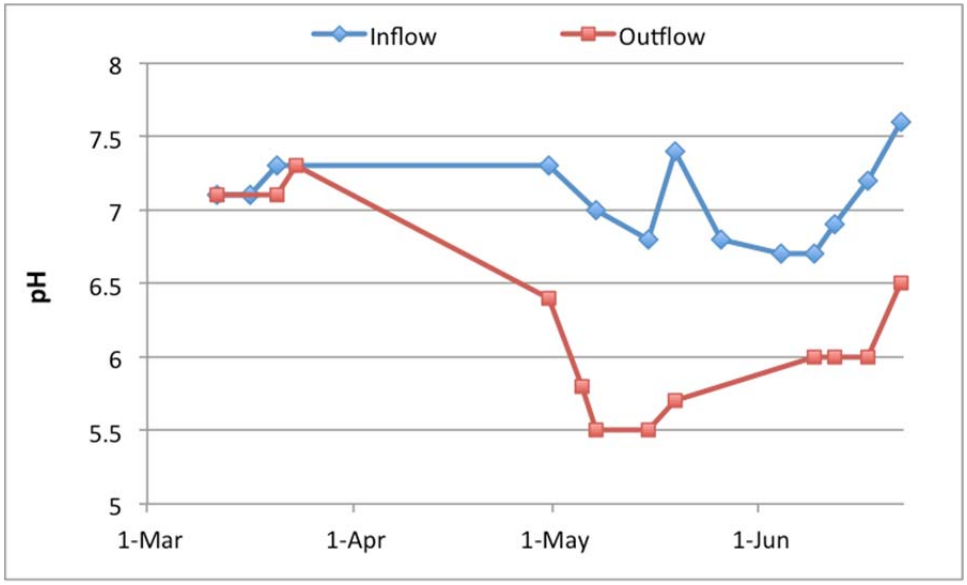


Figure 105. pH in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

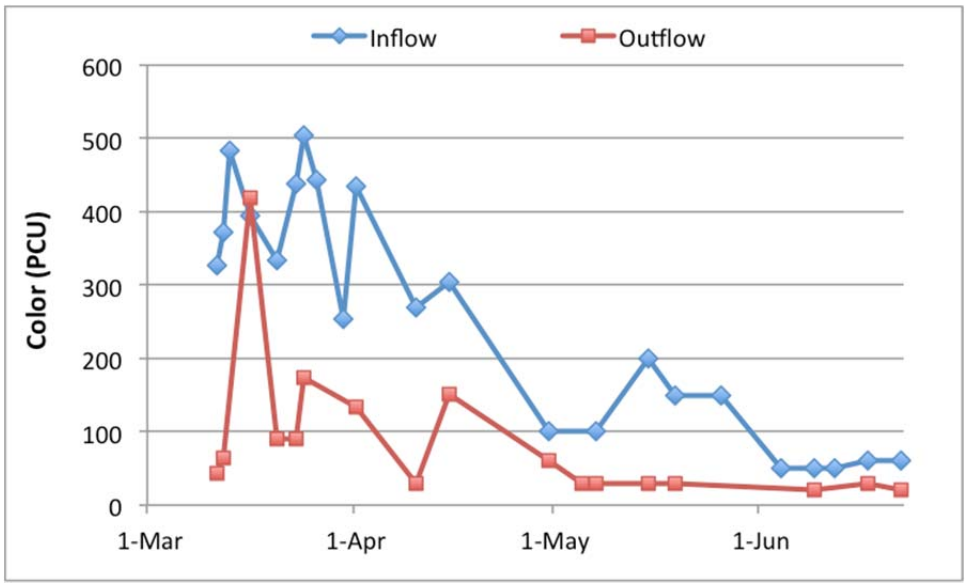


Figure 106. Color in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

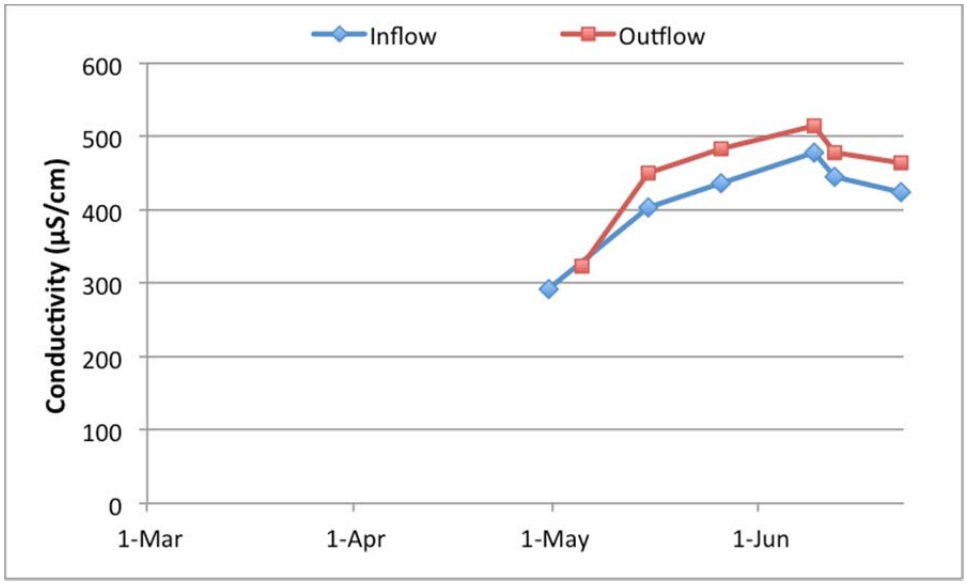


Figure 107. Conductivity in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

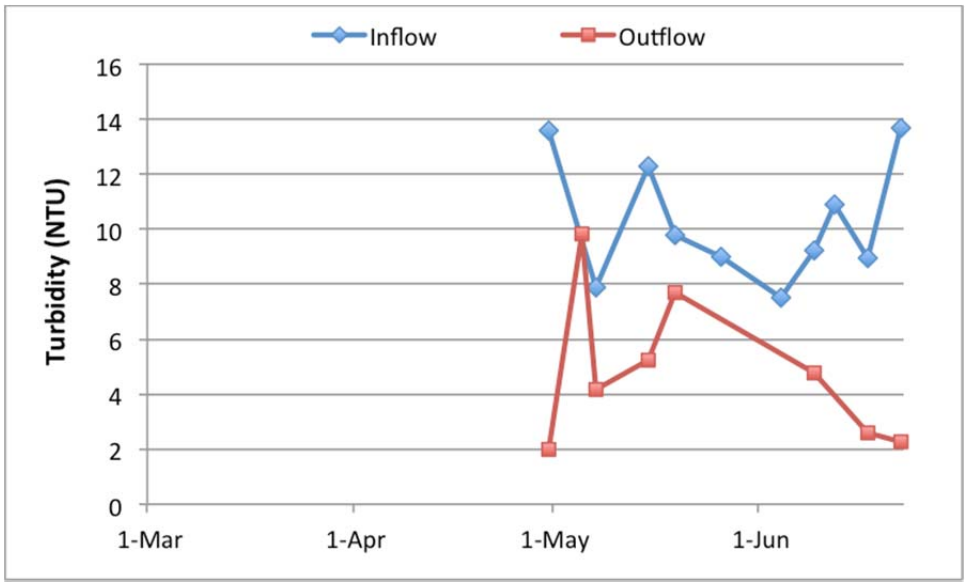


Figure 108. Turbidity in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

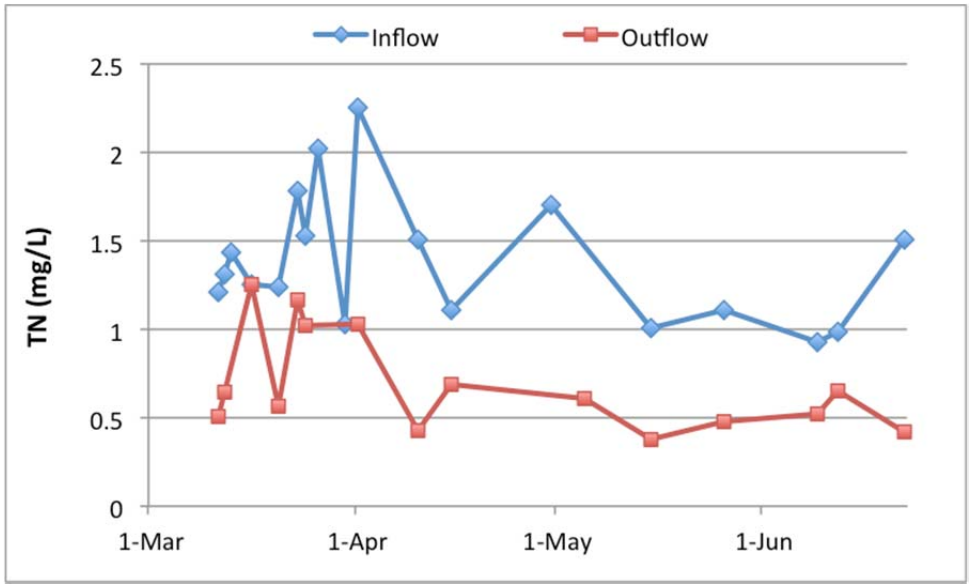


Figure 109. TN concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

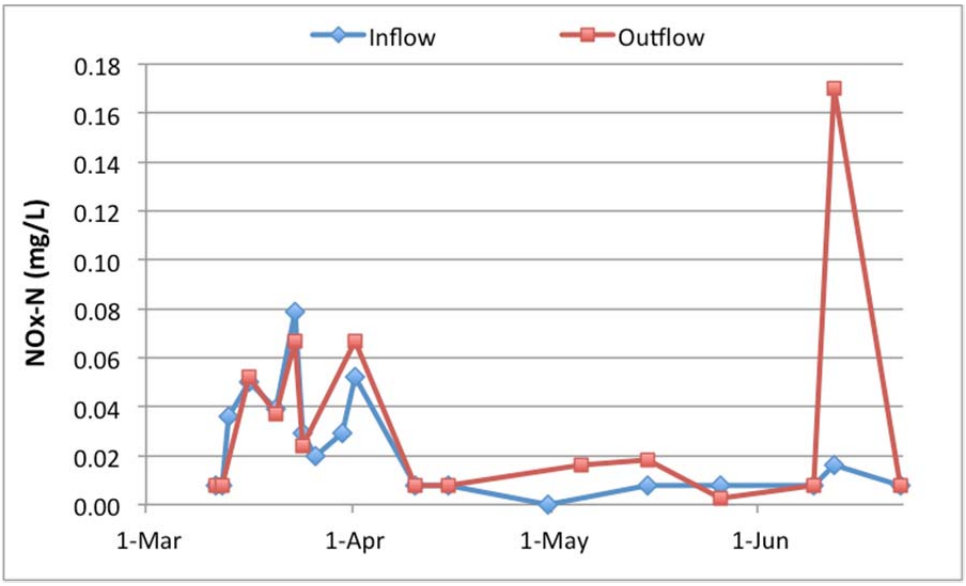


Figure 110. NO_x-N concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

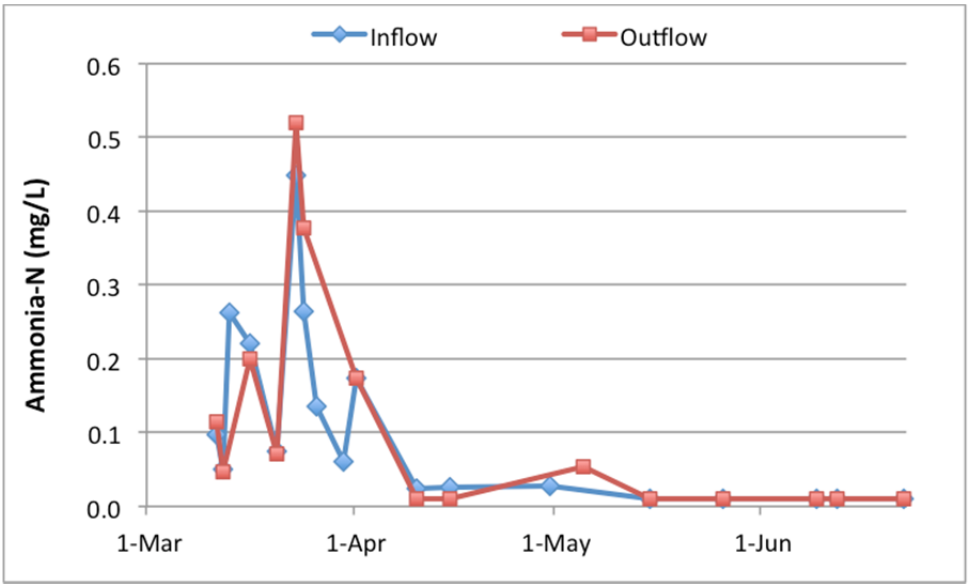


Figure 111. Ammonia-N concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

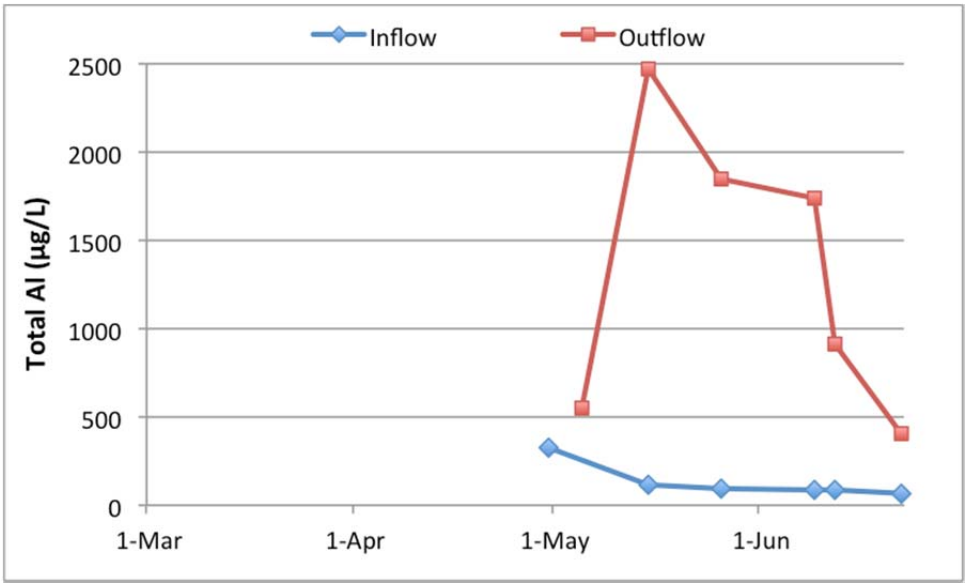


Figure 112. Total Al concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

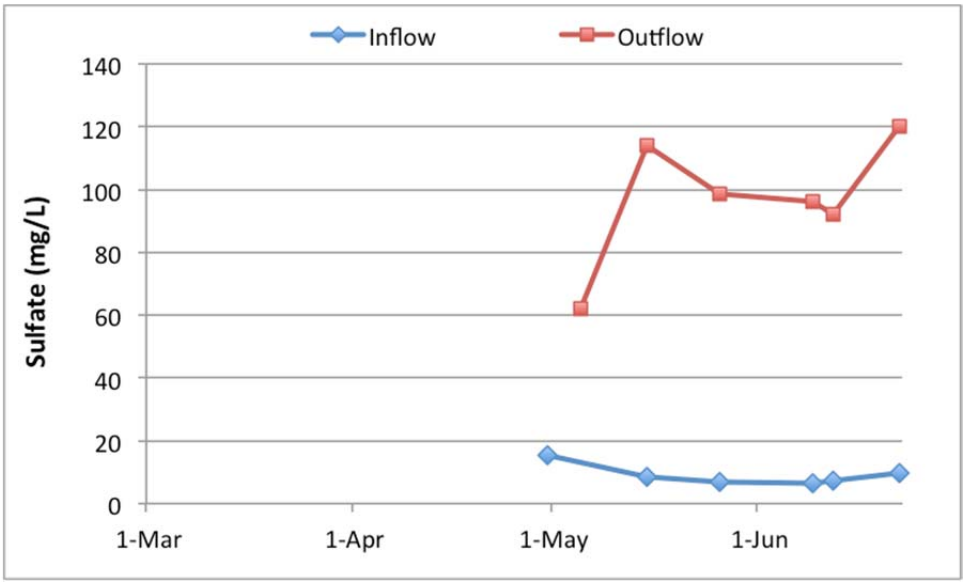


Figure 113. Sulfate concentration in the inflow and outflow streams at the Bessey Creek HWTT system during the March – June 2015 monitoring period.

As noted previously, flows to the HWTT following system completion were constrained by the extremely dry conditions, which resulted in minimal flow conditions in Bessey Creek. Monthly flow volume treated in the Bessey Creek HWTT system increased following startup in March 2015 (Figure 97). Monthly volumes ranged from 0.5 Mgal in March to 3.6 Mgal in May 2015. Mean monthly flow volume was 2.1 Mgal (March-June only), while total flow treated during the period March – June 2015 was 8.5 Mgal.

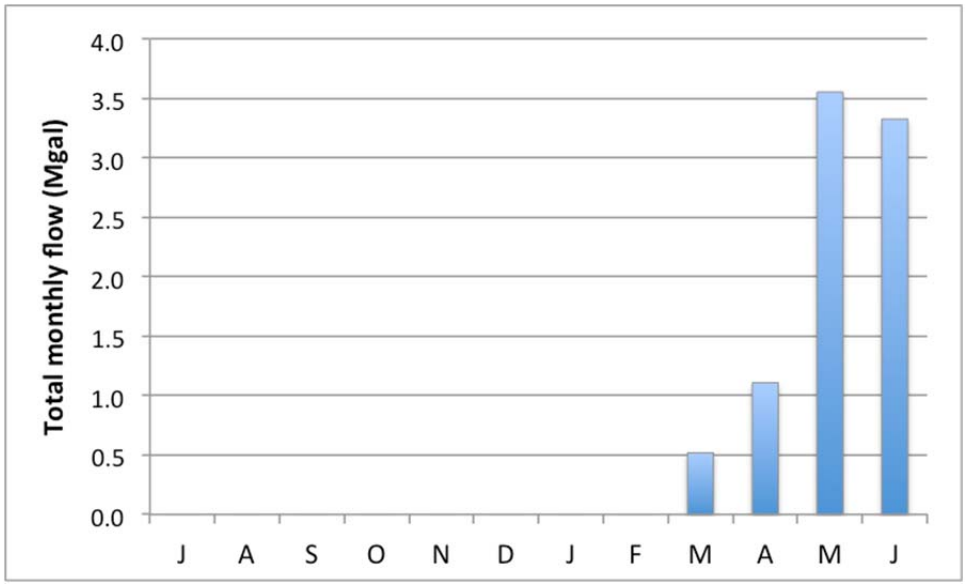


Figure 114. Total monthly flow treated by the Bessey Creek (Site 8) HWTT system during the period March – June 2015.

Permit Monitoring Data Summary

Monitoring at system inflows and outflows was conducted on a prescribed basis at the Lemkin Creek and Grassy Island HWTT sites, in compliance with FDEP permits #-0254574-004 GL (issued December 1, 2014) and #0259591-007 (issued December 1, 2014), respectively. Results of these activities are presented in the following sections.

Monitoring at Lemkin Creek HWTT Inflow and Outflow Sites

Monitoring of system inflows and outflows at the Lemkin (FDOT) and Wolff HWTT facilities for compliance with permit No. 0254574-004 was conducted during the period July 2014 – June 2015. Locations of the sampling stations included in the permit monitoring program are provided in Figure 115 and Table 1.

Data for many of the water chemistry parameters monitored for permit compliance are presented in the HWTT Treatment Performance section of this report.

Inflow and outflow summary statistics for permit monitoring parameters for which water quality standards have been developed and listed in 62-302.530 are presented in Table 2 for comparison to criteria levels.

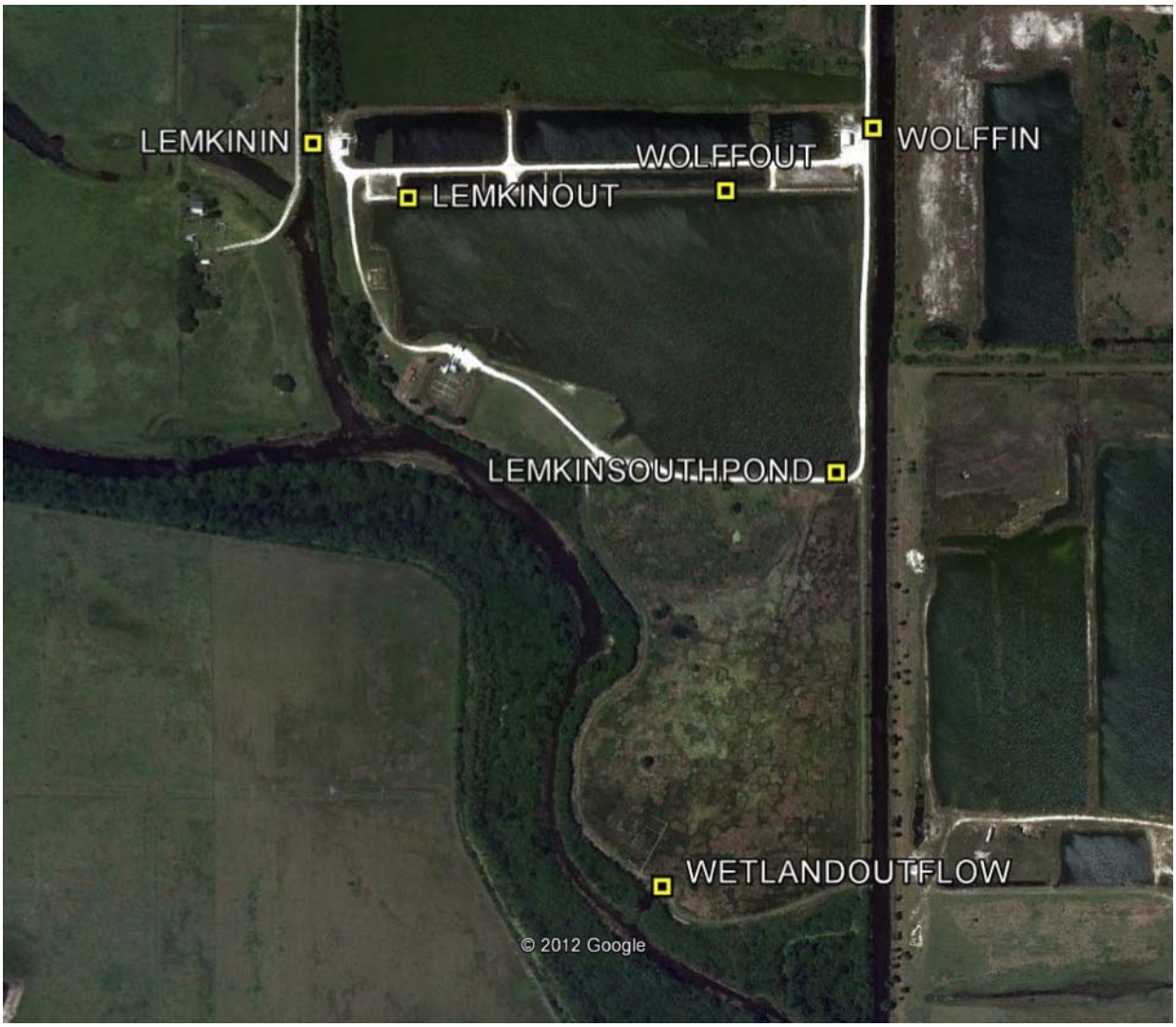


Figure 115. Map of Lemkin/Wolff HWTT sampling stations. Note that the wetland outflow is not a permit monitoring station, and its location is shown for reference only.

Table 1. Lemkin/Wolff HWTT sampling stations included in monitoring program.

Station ID	Description	Latitude[1]	Longitude[1]
WOLFFIN	Inflow to the Wolff Ditch HWTT	271155.12	805118.27
WOLFFOUT	Outflow from the Wolff Ditch HWTT	271153.03	805123.80
LEMKININ	Inflow to the Lemkin Creek HWTT	271154.61	805139.24
LEMKINOUT	Outflow from the Lemkin Creek HWTT	271152.79	805135.67
LEMKINSOUTHPOND	Inflow to the wetland downstream of HWTT	271143.65	805119.68

Note 1. Coordinates reference the WGS84 datum (in DDMMSS.SS format).

Table 2. Comparison of Lemkin/Wolff HWTT permit monitoring results with numeric water quality standards for Class III fresh waters, for the period July 1, 2014 – June 30, 2015.

Parameter	Statistic	Wolff Inflow	Wolff Outflow	Lemkin Inflow	Lemkin Outflow	South Pond	Numeric Standard (per 62-302.530 FAC)
pH	min	6.7	6.7	6.7	6.8	7.3	natural background ±1 unit, 6.0< pH <8.5
	mean	7.3	7.5	7.3	7.4	8.1	
	max	7.7	7.8	7.7	8.0	8.5	
Temperature (°C)	min	17.5	12.8	15.5	17.4	18.0	≤5 degrees above natural background
	mean	26.4	26.7	24.0	26.4	26.5	
	max	32.7	33.4	30.3	33.3	34.9	
Alkalinity (mg $CaCO_3$/L)	min	140	130	136	124	134	20 mg/L (minimum)
	mean	192	163	198	168	164	
	max	240	196	244	208	192	
Specific Conductance (µS/cm)	min	312	596	626	609	678	Greater of 50% above background or 1275
	mean	896	936	894	882	899	
	max	1084	1089	1190	1088	1071	
Turbidity (NTU)	min	0.9	1.1	1.1	1.5	2.4	≤ 29 NTU above natural background
	mean	3.2	2.2	2.4	3.2	3.9	
	max	19.4	6.2	6.8	6.6	5.7	

Monitoring at Grassy Island HWTT Inflow and Outflow Sites

Monitoring of system inflows and outflows at the Grassy Island HWTT facility for compliance with permit No. 0259591-007 was conducted during the period July 2014-June 2015. Locations of the sampling stations included in the permit monitoring program are provided in Figure 116.

Data for many of the water chemistry parameters monitored for permit compliance are presented in the HWTT Treatment Performance section of this report.

Inflow and outflow summary statistics for permit monitoring parameters for which water quality standards have been developed and listed in 62-302.530 are presented in Table 3 for comparison to criteria levels.

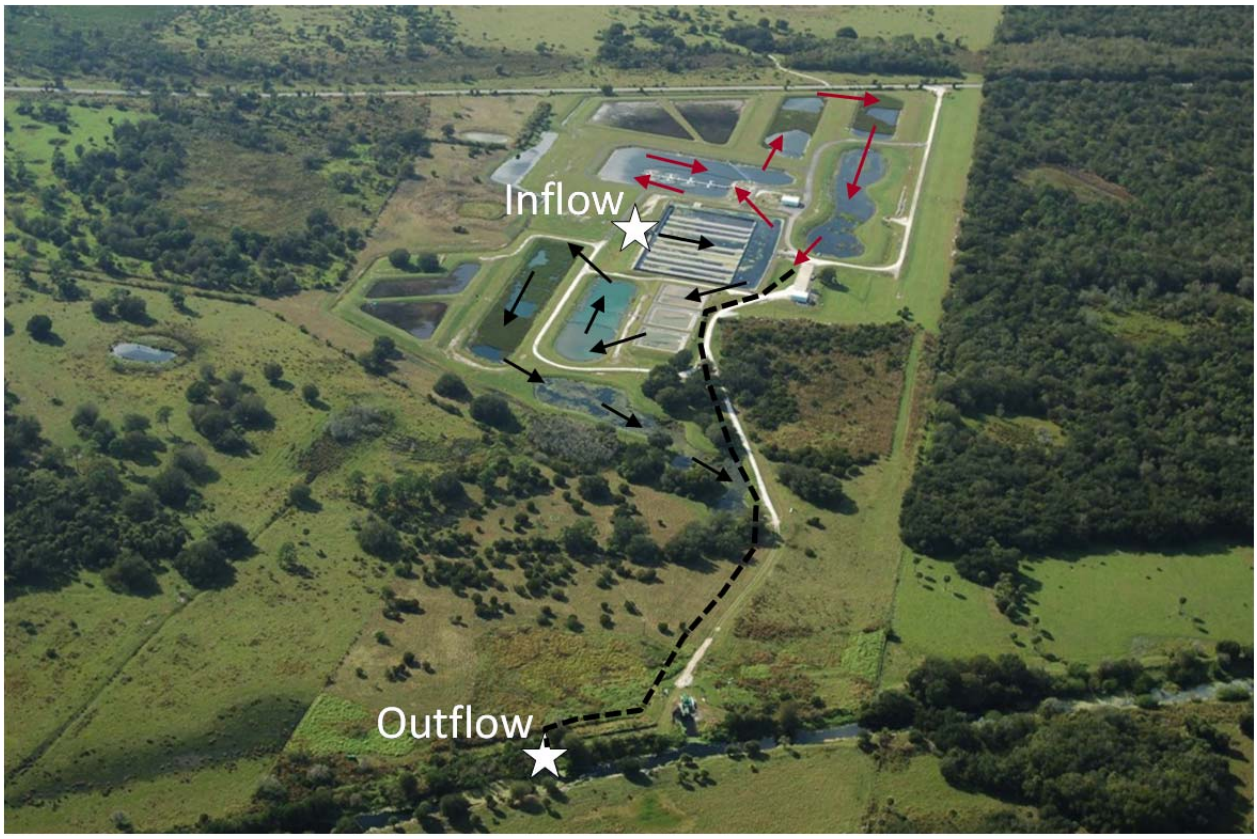


Figure 116. Aerial view of Grassy Island HWTT facility showing locations of inflow and outflow monitoring stations and water flow path (arrows).

Table 3. Comparison of Grassy HWTT permit monitoring results with numeric water quality standards for Class III fresh waters, for the period July 1, 2014 – June 30, 2015.

Parameter	Statistic	Grassy Inflow	Grassy Outflow	Numeric Standard (per 62-302.530 FAC)
pH	min	6.2	5.9	natural background ±1 unit, 6.0< pH <8.5
	mean	6.9	6.6	
	max	7.6	7.5	
Temperature (°C)	min	14.7	15.8	≤5 degrees above natural background
	mean	23.9	24.3	
	max	30.6	30.6	
Alkalinity (mg $CaCO_3$/L)	min	18	15	20 mg/L (minimum)
	mean	70	33	
	max	108	60	
Specific Conductance (µS/cm)	min	106	214	Greater of 50% above background or 1275 µS/cm
	mean	404	483	
	max	634	717	
Dissolved Oxygen (mg/L)	min	0.42	5.60	5.0 mg/L (minimum)
	mean	4.79	7.25	
	max	8.20	10.20	
Total arsenic (µg/L)	min	N.D.*	N.D.*	50 µg/L
	mean	0.67	N.D.*	
	max	1.18	0.84	

* N.D. = below method detection limit (MDL) of 0.61 µg/L

Effluent and Coagulant Toxicity Testing for the Grassy Island Facility

Chronic toxicity testing for Grassy Island HWTT effluent

Chronic effluent toxicity testing was conducted for the Grassy Island HWTT facility to demonstrate compliance with effluent limitations, as specified in Attachment 2 of FDEP Permit #0259591-007 (*Routine Monitoring of Chronic Effluent Toxicity Testing Requirements*). Testing was performed by Grove Scientific & Engineering Co. in Orlando, Florida and Marinco Bioassay Laboratory in Sarasota, FL.

Prior to the current reporting period (July 2014 – June 2015), chronic effluent toxicity testing was conducted on 14 occasions (over four reporting periods) following initiation of

full-scale operation of the Grassy HWTT facility. During the current period five additional chronic effluent toxicity tests were conducted: 8/19/14, 11/10/14, 2/10/15, 3/30/15 and 6/9/15. Results for these tests, and the prior tests presented in earlier project reports, are shown in Table 4 and Table 5.

Table 4 shows inhibition concentrations (IC25) of Grassy HWTT effluent (Grassy Out) using fathead minnow (*Pimephales promelas*) and water flea (*Ceriodaphnia dubia*) test organisms. Also included in this table are test results for samples collected at the Grassy inflow site ("Grassy In"). These samples were included in the tests for screening purposes, and are not required by the facility permit. The IC25 is defined as the concentration of toxicant that would cause a 25% reduction in mean young per female or in growth for the test population. For all tests during these monitoring periods the IC25 was greater than 100% effluent, with the exception of the 2/10/15 effluent test for fathead minnow (FM) growth. For that test period, results for the Grassy inflow sample also yielded an IC25 of <100%, hence, it is possible that growth inhibition observed for the Grassy effluent was a function of inflow water chemistry. The toxicity laboratory reported a high variability between replicates in effluent concentrations from 12.5% to 100% while the controls and the 6.25% effluent had 100% survival; indicating pathogen interference. There was also a growth observed around the organisms' gills in the affected replicates; also indication of a pathogen interference. Note that an IC25 level <100% was also determined for the Grassy inflow sample collected on 2/11/14.

Table 5 shows non-observable effects concentrations (NOEC) for the same organisms. The NOEC is defined as the highest concentration of toxicant to which organisms are exposed in a full life-cycle or partial life-cycle (short-term) test, that causes no observable adverse effects on the test organisms (i.e., the highest concentration of toxicant in which the values for the observed responses are not statistically significantly different from the controls). For all tests during these monitoring periods, there were no observable effects on the test organism population at an effluent concentration strength of 100%, that is, the NOEC was 100% effluent. The only test result showing possible adverse effects was the Grassy inflow sample collected on 2/11/14, which also resulted in an IC25 of <100%.

In summary, results of all but one (IC25 <100% on 2/10/15) of the chronic effluent toxicity tests conducted during previous monitoring periods indicated full compliance with effluent limitations specified in the Grassy Island HWTT operational permit, while IC25 <100% was reported for two tests of the influent stream (on 2/11/14 and 2/10/15).

Table 4. Inhibition concentrations (IC25) for fathead minnow and water flea test organisms as determined by chronic effluent toxicity testing of the Grassy Island HWTT facility outflow stream. "Grassy In" is a screening sample and not part of the permit requirements.

Test Date[1]	Station	FM Growth (Eff)[2]	CD Reproduction (Eff)[3]
7/26/11	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
8/23/11	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
9/20/11	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
12/13/11	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
3/6/12	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
9/18/12	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
12/4/12	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
3/12/13	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
6/25/13	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
9/17/13	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
12/10/13	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
1/14/14	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
2/11/14	Grassy In[4]	**73.5**	>100%
	Grassy Out[5]	>100%	>100%
5/28/14	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
8/19/14	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
11/10/14	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
2/10/15	Grassy In[4]	**88.1**	>100%
	Grassy Out[5]	**43.7**	>100%
3/30/15	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%
6/9/15	Grassy In[4]	>100%	>100%
	Grassy Out[5]	>100%	>100%

[1] Initial date of the seven day test.
[2] FM: *Pimephalus promelas* (fathead minnow)
[3] CD: *Ceriodaphnia dubia* (water flea)
[4] Test concentration: 0 and 100%
[5] Test concentration: 0%, 100%, 50%, 25%, 12.5%, & 6.25%

Table 5. Non-observable effects concentrations (NOEC) for fathead minnow and water flea test organisms as determined by chronic effluent toxicity testing of the Grassy Island HWTT facility outflow stream.

Test Date[1]	Station	FM Growth (Eff)[2]	CD Reproduction (Eff)[3]
7/26/11	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
8/23/11	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
9/20/11	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
12/13/11	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
3/6/12	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
9/18/12	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
12/4/12	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
3/12/13	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
6/25/13	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
9/17/13	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
12/10/13	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
1/14/14	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
2/11/14	Grassy In[4]	<100%[6]	100%
	Grassy Out[5]	100%	100%
5/28/14	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
8/19/14	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
11/10/14	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
2/10/15	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
3/30/15	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%
6/9/15	Grassy In[4]	100%	100%
	Grassy Out[5]	100%	100%

[1] Initial date of the seven day test.
[2] FM: *Pimephalus promelas* (fathead minnow)
[3] CD: *Ceriodaphnia dubia* (water flea)
[4] Test concentration: 0 and 100%
[5] Test concentration: 0%, 100%, 50%, 25%, 12.5%, & 6.25%
[6] a significant difference (P=0.05) was determined between survival, growth, reproduction, or fecundity in 100% or IWC, and control. See laboratory reports for further details.

Analysis of metals in alum floc and fish tissue in Grassy HWTT settling pond

The Grassy Island FDEP Permit #0259591-007 (Specific Condition #21) requires post-startup monitoring of the metals content of settled flocs and mosquitofish (*Gambusia holbrooki*) in the HWTT settling pond, as well as mosquitofish in Taylor Creek. As of 6/30/15, a total of 14 monitoring events have been conducted. Samples of floc and mosquitofish were collected at three locations within the settling pond, and mosquitofish were collected (triplicate samples) in Taylor Creek at one upstream and one downstream location. The "upstream" site is upstream of the system intake structure, at a location unaffected by the HWTT discharge. The "downstream" site, was recently added as of the 5/27/15 sampling event, is located within 150 meters of the outflow structure.

Although the permit specifies collection of three fish samples in Taylor Creek, fewer samples were collected on some occasions (including no samples on 8/13/12, 11/12/12 and 12/9/13) due to the scarcity of fish (possibly due to the channelized nature of the creek in this area). The floc and fish samples were analyzed for a suite of metals, which included arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), mercury (Hg) and lead (Pb). All analyses were performed by Brooks Rand Laboratories in Seattle, Washington.

Analytical results from all monitoring events through June 2015 are presented in Figure 117 and Figure 118. Metals concentrations in mosquitofish from the floc settling pond have been comparable to or less than concentrations in fish collected from Taylor Creek during the majority of the sampling events (Figure 117). Tissue concentrations of Cd and Cr were frequently below detection limits. For all sampling events, fish tissue metals concentrations in both the settling pond and Taylor Creek were substantially lower than corresponding predator protection limits recognized by USFWS (Giggleman and Lewis, 2002) (Table 6).

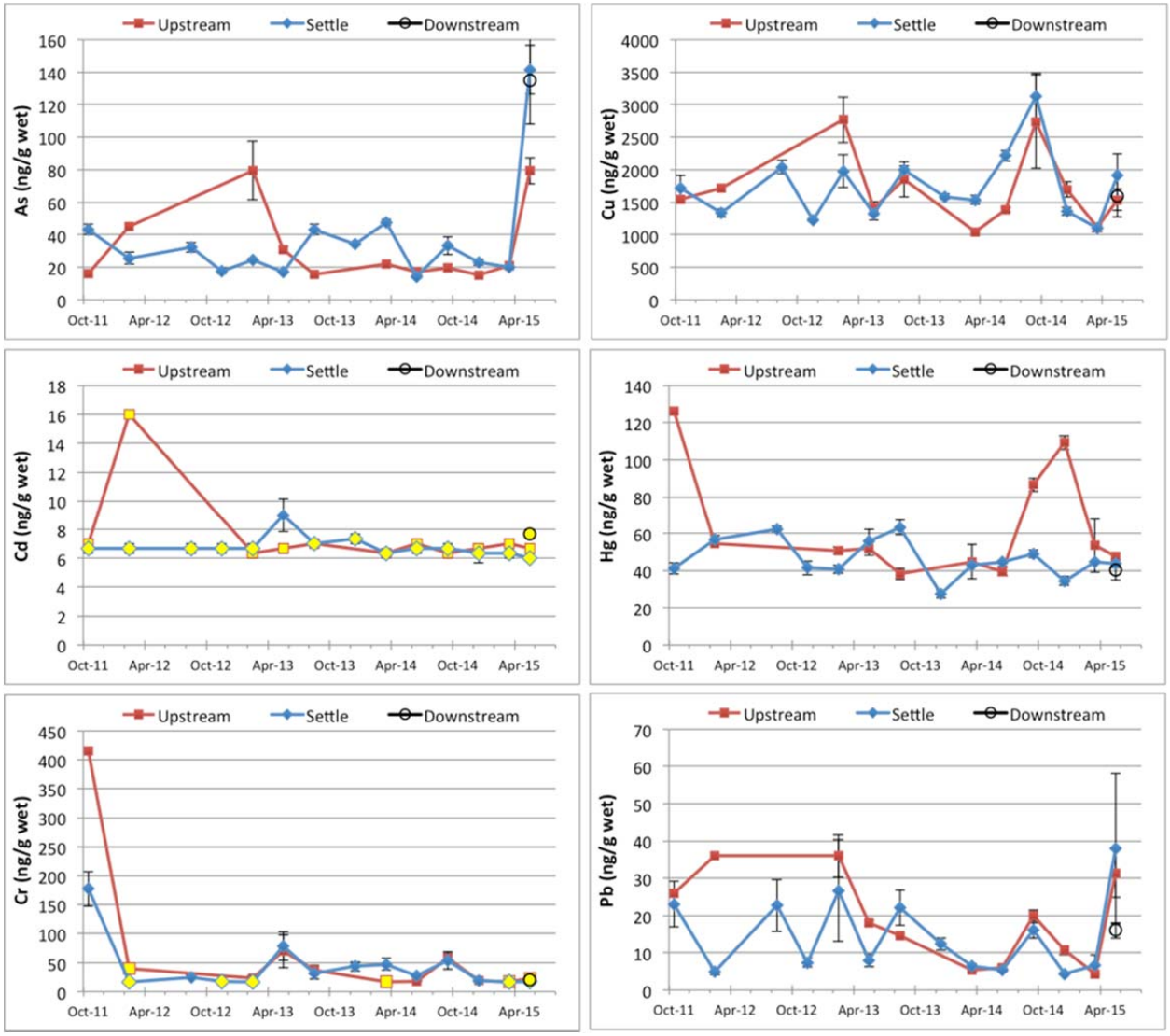


Figure 117. Total recoverable metal concentrations in *Gambusia* (ng/g wet) collected during sampling events from October 2011 – May 2015 in the Grassy HWTT settling pond and Taylor Creek, upstream and downstream of the Grassy HWTT facility.
We were unsuccessful in capturing fish from Taylor Creek during the 8/13/12, 11/12/12 and 12/9/13 sampling events. Values represent mean and SE of triplicate samples. MDL values are shown where concentrations were non-detectable (data points with yellow fill).

Table 6. Predator protection limits for tissue metal concentrations in prey fish, as cited by USFWS in Giggleman and Lewis (2002).

Analyte	Predator protection limit (ng/g wet)	Reference[1]
As	30000	Eisler (1988a)
Cd	500	Irwin (1988)
Cr	880	Eisler (1986a)[2]
Cu	300000	NRC (1980)
Hg	100	Eisler (1987)
Pb	50000	NRC (1980)

[1]References cited in Giggleman and Lewis, 2002 (USFWS).
[2]Cr guidance value of 4 mg/kg dry wt. was converted to wet wt. basis using mean total solids value of 22% for fish collected in Grassy pond.

Results of the analysis of bottom sediments (settled floc) in the Grassy HWTT settling pond (Figure 118) demonstrate that concentrations of all of the metals analyzed are consistently low relative to corresponding threshold effect (TEC) and probable effect (PEC) concentrations levels developed for sediments in Florida inland (fresh) waters (Table 7). It should be noted that apparent spikes in As, Cd and Cr during the 5th sampling event were an artifact of the relatively high MDL reported for those dates by the contract laboratory. The high MDLs, in turn, were caused by the low solids content of the submitted wet floc. For the most part, As and Cd concentrations have been below laboratory detection limits, while concentrations of Cr, Cu, Hg and Pb have been measureable, but considerably lower than TEC levels.

Overall, the analysis of metals in alum floc in the Grassy settling pond provides clear evidence that the use of alum coagulant in the HWTT system has not resulted in accumulation of harmful levels of As, Cd, Cr, Cu Hg or Pb in residual floc and sediments. Furthermore, analysis of metals in *Gambusia* tissue shows no indication of significant bioaccumulation of these metals relative to predator protection limits reported by USFWS.

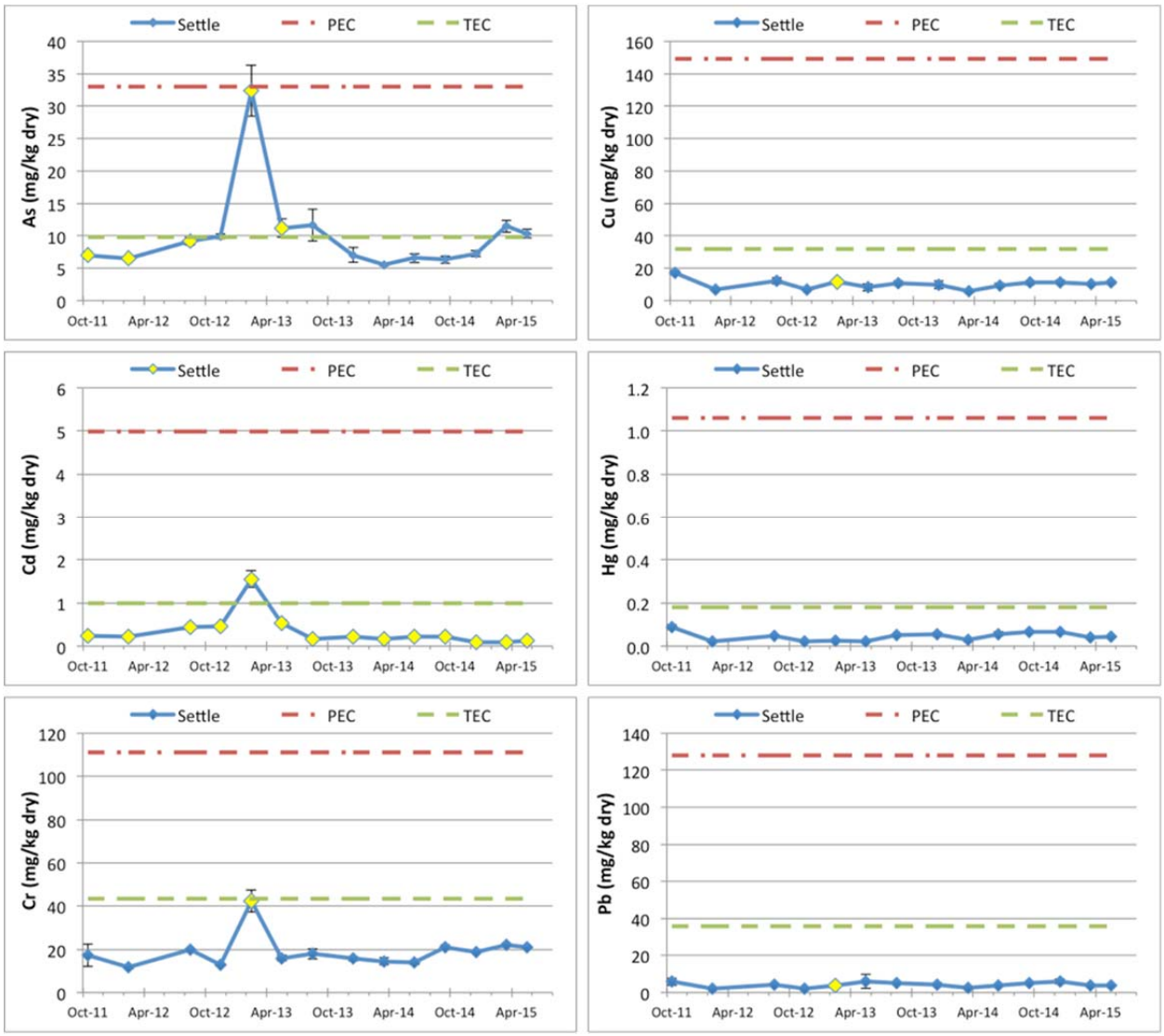


Figure 118. Total recoverable metal concentrations in floc (mg/kg dry) collected during sampling events from October 2011 – May 2015 in the Grassy HWTT settling pond.
Values represent mean and SE of triplicate samples. MDL values are shown where concentrations were non-detectable (data points with yellow fill).

Table 7. Numerical sediment quality assessment guidelines (mg/kg dry wt.) for selected metals in Florida inland waters (MacDonald et al., 2003). TEC = threshold effect concentration; PEC = probable effect concentration.

Metal	PEC	TEC
As	33	9.79
Cd	4.98	0.99
Cr	111	43.4
Cu	149	31.6
Hg	1.06	0.18
Pb	128	35.8

Effluent and Coagulant Toxicity Testing for the Lemkin Creek Facility

Chronic toxicity testing for Lemkin Creek HWTT effluent

The Lemkin HWTT facility has undergone three quarterly chronic testing events (January, March and June 2015) using *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow). For all events, the LC50 test met permit requirements for both species; however, the IC25 test did not meet the requirements for *C. dubia* in January and March, and for *P. promelas* in March. The appropriate follow-up tests for each event were performed.

It should be noted that several of the tests performed incorporate one or two additional screening sites (designated as 'In' or 'SAV-In'). Because these stations were not required as part of the permit, the tests therefore were performed on dilutions of only 0 and 100%. The tests performed at the outflow station (designated as 'SAV Out' or 'Out') underwent the full test in accordance with the permit.

A summary of the test results is provided below.

January 2015

The January 2015 chronic toxicity test was performed on Lemkin HWTT inflow and outflow waters beginning 1/12/15. The results of this test passed at both locations except the IC25 using *C. dubia* on the outflow waters (Table 8). Per permit requirements, two additional IC25 tests using *C. dubia* were performed. For the two additional tests a third sampling location (SAV-In) was added to potentially help isolate the source of the toxicity. The SAV-In station is located downstream of the chemical dosing location but upstream of the HWTT discharge (outflow) (Figure 119).

The IC25 *C. dubia* results of the first follow-up test, initiated on 2/2/15, passed for the Inflow and SAV-In locations but failed at the Outflow location. The results of the second test, initiated on 2/9/15, passed for all locations (Table 8).

All of the laboratory reports for the chronic toxicity test described have previously been submitted to FDEP.

March 2015

The March 2015 chronic toxicity test was performed at the Lemkin HWTT facility on March 30, 2015 (Figure 119). While the LC50 passed at all locations, the passing requirements for IC25 were not met for either species at the outflow location (Table 8). Per permit requirements, two follow-up IC25 tests using *C. dubia* and *P. promelas* were performed. In addition to the standard follow-up testing, at the suggestion of the toxicity testing laboratory, two additional tests also were performed to further investigate the possible reasons for failure. The first is an algal ID test that was performed on the inflow waters to identify the presence of cyanobacteria that could potentially be toxic, affecting the survival of the *C. dubia*. The second test was a Pathogen Interference Reduction (PIR) test to help determine if a pathogen was affecting the survival of *P. promelas*. Both of these additional tests were performed on the first follow-up test only. For the second follow-up test the intermediate sampling location (SAV-In) was added to help isolate the source of the toxicity (Figure 119).

The IC25 *C. dubia* results of the first follow-up test, initiated on 4/20/15, passed for the Inflow but failed at the Outflow location. The results of the second test, initiated on 4/27/15, passed for Inflow but failed at the SAV In and Outflow locations (Table 8). The Algal ID test, performed on inflow and outflow waters collected on 4/20/15, indicated the presence of potentially toxic cyanobacteria in both waters. At the inflow, the total cell count was 9,788 cells/mL, with the dominant group consisting of Cyanobacteria (89%). The total cell count at the outflow location was 21,170 cells/ml with the dominant group consisting of Cyanobacteria (52%) and Chlorophyta (46%). Total numbers of potentially toxic cyanobacteria were 37 and 23% of the total cell count at the inflow and outflow waters, respectively .

The IC25 *P. promelas* tests passed the requirements for both follow-up tests (Table 8). In addition, during these follow-up tests, the toxicity testing laboratory did not observe any of the previous indicators that a pathogen interference was detected (i.e, fuzzy cotton-like growth observed on the dead organisms in the affected replicates; and high variability between replicates).

June 2015

The June 2015 chronic toxicity test was performed at the Lemkin HWTT facility on June 9, 2015 (Figure 119). The permit requirements for both LC50 and IC25 were met for both species at the outflow location (Table 8). Note that one of the screening stations (SAV In) reported IC25<100% for *C. dubia*.

All of the laboratory reports for the chronic toxicity test described have previously been submitted to FDEP.

Discussion

It appears that the cause of failure for the *P. promelas* species may be attributable to pathogen interference, as indicated by the laboratory observations. This interference seemed to be no longer present during both April and June tests.

The failure of the IC25 test at the Lemkin facility using the *C. dubia* species may be due to a toxic alga present within the SAV pond. This is supported by the following observations:

- During the January and February events dense mats of filamentous algae were observed at the outflow of the SAV pond (Figure 120).
- The results of the algal ID test, although not conclusive, indicate the presence of potentially toxic cyanobacteria within both the inflow and outflow waters.
- The chronic toxicity results for outflow waters from the adjacent Wolff HWTT facility, operated in a similar fashion to the Lemkin HWTT facility, have passed the toxicity testing requirements (see next section).
- The IC25 using *C. dubia* passed at the outflow location during the June 2015 test

Chronic toxicity testing for Wolff HWTT Facility

Similar to the Lemkin HWTT described in the previous section, the Wolff HWTT facility has undergone three quarterly chronic testing events (December 2014 and March and June 2015) using *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow) (Figure 119). For all events, the LC50 and IC25 test met permit requirements for both

species (Table 9). However, it should be noted that the location 'Wolff In' (a screening location) did not pass the *C. dubia* IC25 test during the March event (Table 9).

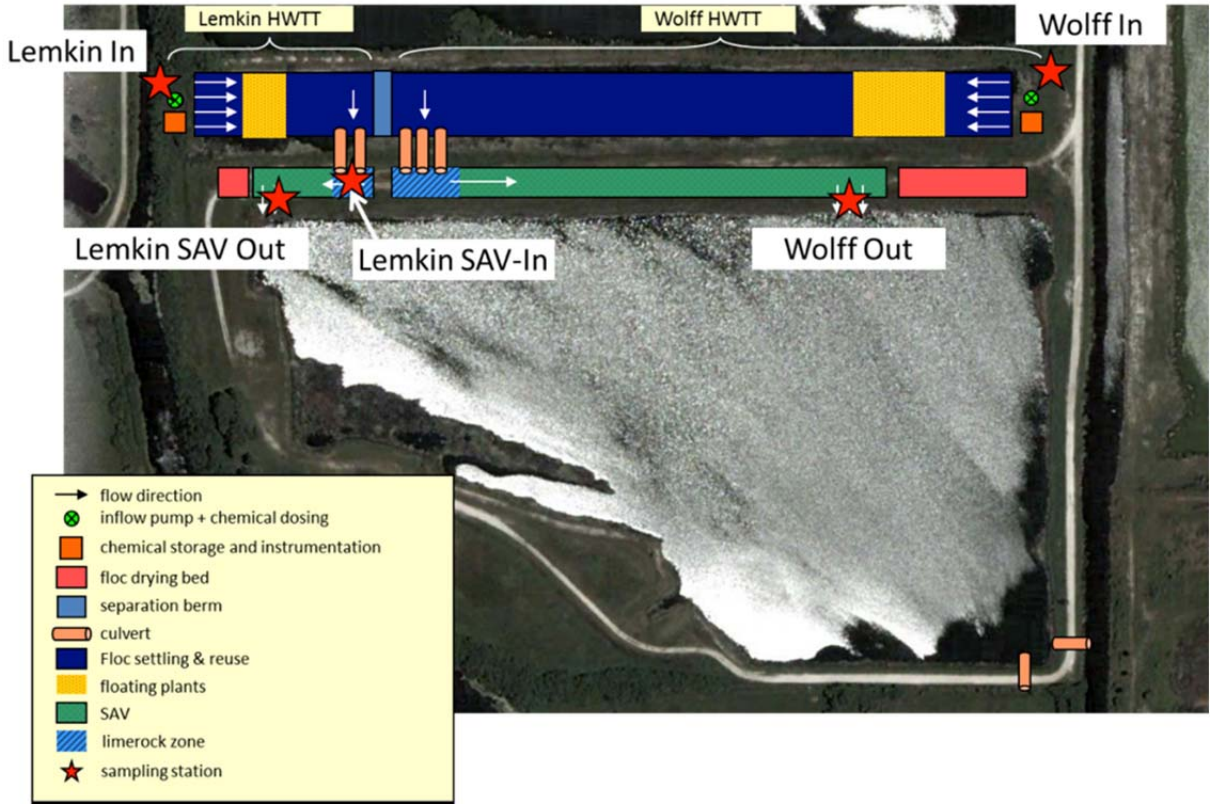


Figure 119. Map depicting the locations (red stars) of the chronic toxicity testing locations at both the Lemkin and Wolff HWTT facilities.

Table 8. Results from the IC25 chronic toxicity test for C. dubia and P. promelas on waters collected at the Lemkin HWTT facility during January through June 2015. Screening sites, not required by permit, are designated with an "*".

Date	Station ID	*C. dubia*	*P. promelas*	*P. promelas (PIR)*
January 12, 2015	Lemkin In*	>100%	>100%	NA
	Lemkin SAV Out	11.1%	>100%	NA
February 2, 2015	Lemkin In*	>100%	NA	NA
"follow-up test"	Lemkin SAV In*	>100%	NA	NA
	Lemkin SAV Out	83.0%	NA	NA
February 9, 2015	Lemkin In*	>100%	NA	NA
"follow-up test"	Lemkin SAV In*	>100%	NA	NA
	Lemkin SAV Out	>100%	NA	NA
March 30, 2015	Lemkin In*	>100%	>100%	NA
	Lemkin SAV In*	77.3%	NA	NA
	Lemkin SAV Out	89.5%	50.2%	NA
April 20, 2015	Lemkin In*	>100%	>100%	>100%
"follow-up test"	Lemkin SAV Out	56.7%	>100%	>100%
April 27, 2015	Lemkin In*	>100%	>100%	NA
"follow-up test"	Lemkin SAV In*	72.7%	>100%	NA
	Lemkin SAV Out	85.8%	>100%	NA
June 9, 2015	Lemkin In*	>100%	>100%	NA
	Lemkin SAV In*	66.0%	>100%	NA
	Lemkin SAV Out	>100%	>100%	NA

Table 9. Results from the IC25 chronic toxicity test for C. dubia and P. promelas on waters collected at the Wolff HWTT facility during December 2014, March 2015 and June 2015. Screening sites, not required by permit, are designated with an "*".

Date	Station ID	*C. dubia*	*P. promelas*
December 8, 2014	Wolff In*	>100%	>100%
	Wolff Out	>100%	>100%
March 30, 2015	Wolff In*	84.4%	>100%
	Wolff SAV Out	>100%	>100%
June 9, 2015	Wolff In*	>100%	>100%
	Wolff SAV Out	>100%	>100%



Figure 120. Photo depicting filamentous algae in the outflow region of the Lemkin SAV pond.

Analysis of metals in alum floc and fish tissue in Lemkin and Wolff settling ponds

The Lemkin Creek FDEP Permit No. 0254574-004 requires post-startup monitoring of the metals content of settled flocs and mosquitofish (*Gambusia holbrooki*) in the Lemkin and Wolff HWTT settling ponds, as well as mosquitofish in upstream and downstream locations. As of 6/30/15, two monitoring events have been conducted, in February and May 2015. Samples of floc and mosquitofish were collected at three locations within the Lemkin and Wolff settling ponds, and mosquitofish were collected (triplicate samples) at one upstream and one downstream location for each facility. For the Lemkin facility, the upstream and downstream stations are FDOT Ditch (system inflow) and the Lemkin system outflow, while for the Wolff facility, the stations are Wolff Ditch and the Wolff system outflow. The floc and fish samples were analyzed for a suite of metals, which included arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), mercury (Hg) and lead (Pb). All analyses were performed by Brooks Rand Laboratories in Seattle, Washington.

Analytical results from monitoring events through June 2015 are presented in Figure 121 through Figure 124. Results to date indicate that metals concentrations in mosquitofish in the Lemkin and Wolff floc settling ponds and downstream stations have been comparable to or less than concentrations in fish collected from FDOT Ditch and Wolff Ditch, respectively, with the exception of elevated levels of As and Pb in the settling ponds during one event (Figure 121 and Figure 122). Tissue concentrations of Cd and Cr were frequently below detection limits. For all sampling events, fish tissue metals concentrations in the Lemkin and Wolff floc settling ponds and downstream stations were substantially lower than corresponding predator protection limits recognized by USFWS (Giggleman and Lewis, 2002) (Table 6).

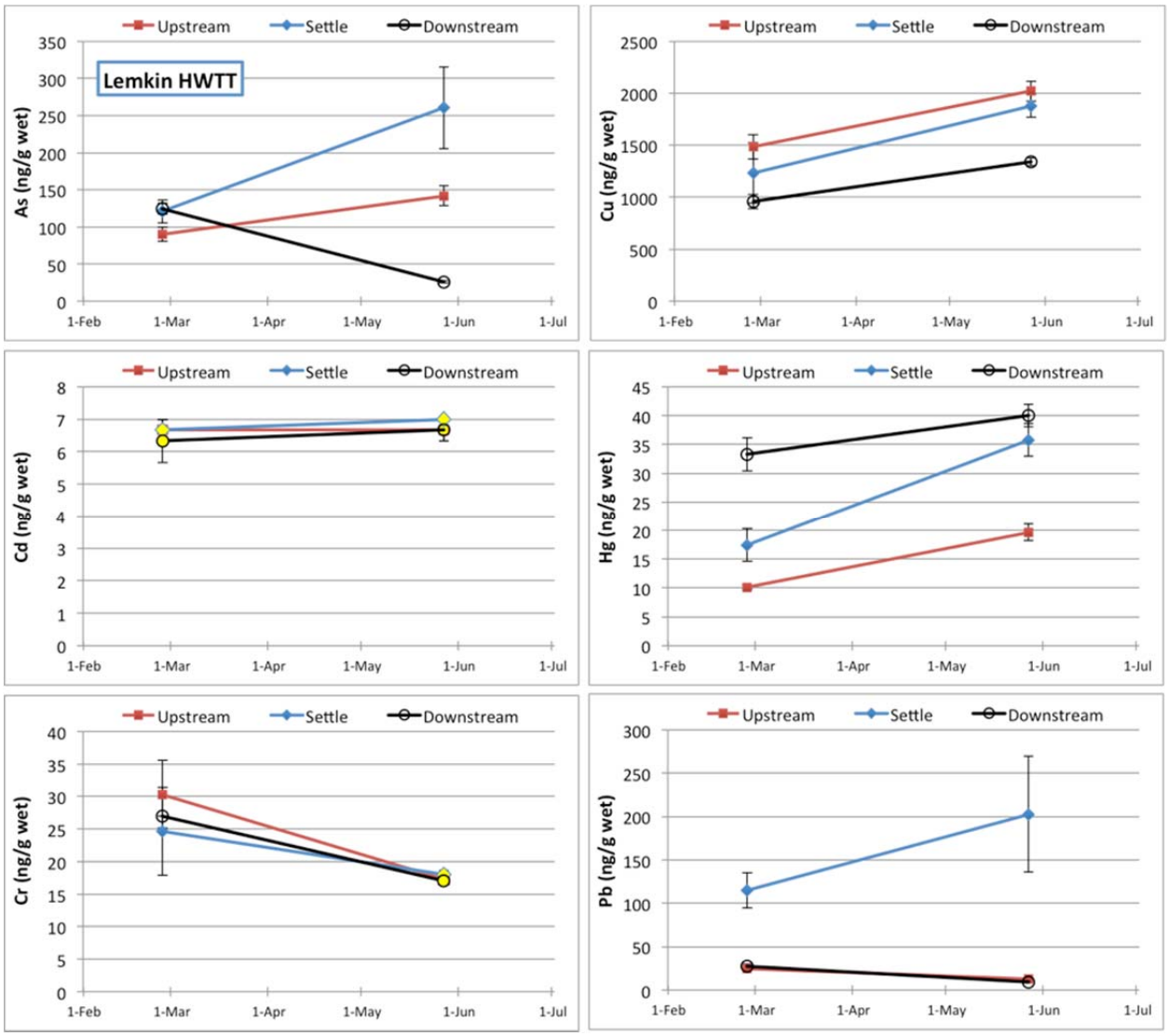


Figure 121. Total recoverable metal concentrations in *Gambusia* (ng/g wet) collected in the Lemkin HWTT settling pond, as well as upstream (FDOT Ditch) and downstream (Lemkin outflow) locations, during sampling events beginning in February and May 2015.
Values represent mean and SE of triplicate samples. MDL values are shown where concentrations were non-detectable (data points with yellow fill).

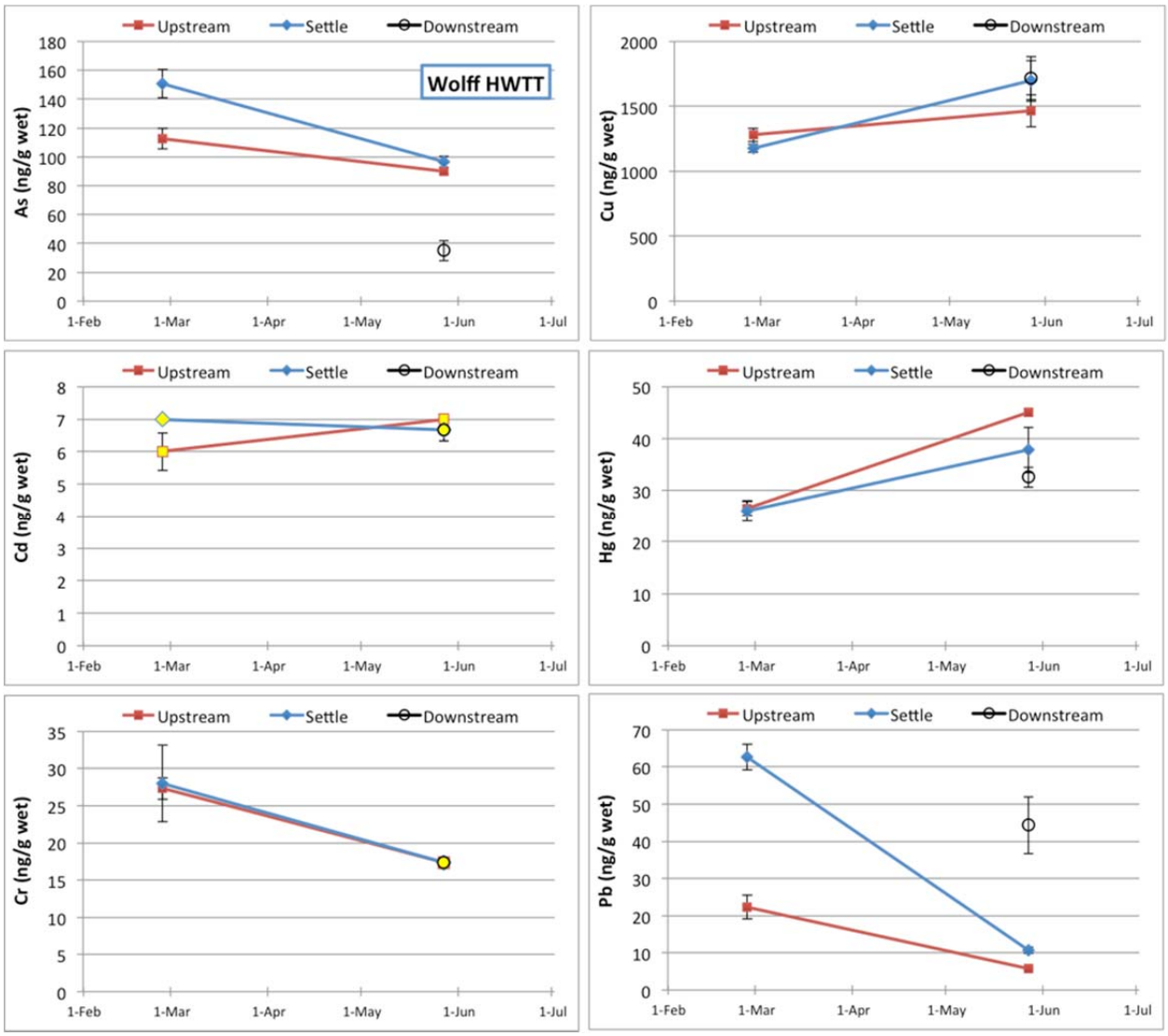


Figure 122. Total recoverable metal concentrations in *Gambusia* (ng/g wet) collected in the Wolff HWTT settling pond, as well as upstream (Wolff Ditch) and downstream (Wolff outflow) locations, during sampling events beginning in February and May 2015.
Values represent mean and SE of triplicate samples. MDL values are shown where concentrations were non-detectable (data points with yellow fill).

Results of the analysis of bottom sediments (settled floc) in the Lemkin and Wolff HWTT settling ponds (Figure 123 and Figure 124) demonstrate that concentrations of the analyzed metals are consistently less than, or equal to (only for As in the Wolff settling pond), corresponding threshold effect (TEC) and probable effect (PEC) concentrations levels developed for sediments in Florida inland (fresh) waters (Table 7). Result to date show that Cd concentrations have been below laboratory detection limits while concentrations of the remaining metals have been measureable, but considerably lower than TEC levels.

Overall, the analysis of metals in alum floc in the Lemkin and Wolff settling ponds provides clear evidence that the use of alum coagulant in the HWTT system has not resulted in accumulation of harmful levels of As, Cd, Cr, Cu Hg or Pb in residual floc and sediments. Furthermore, analysis of metals in *Gambusia* tissue shows no indication of significant bioaccumulation of these metals relative to predator protection limits reported by USFWS.

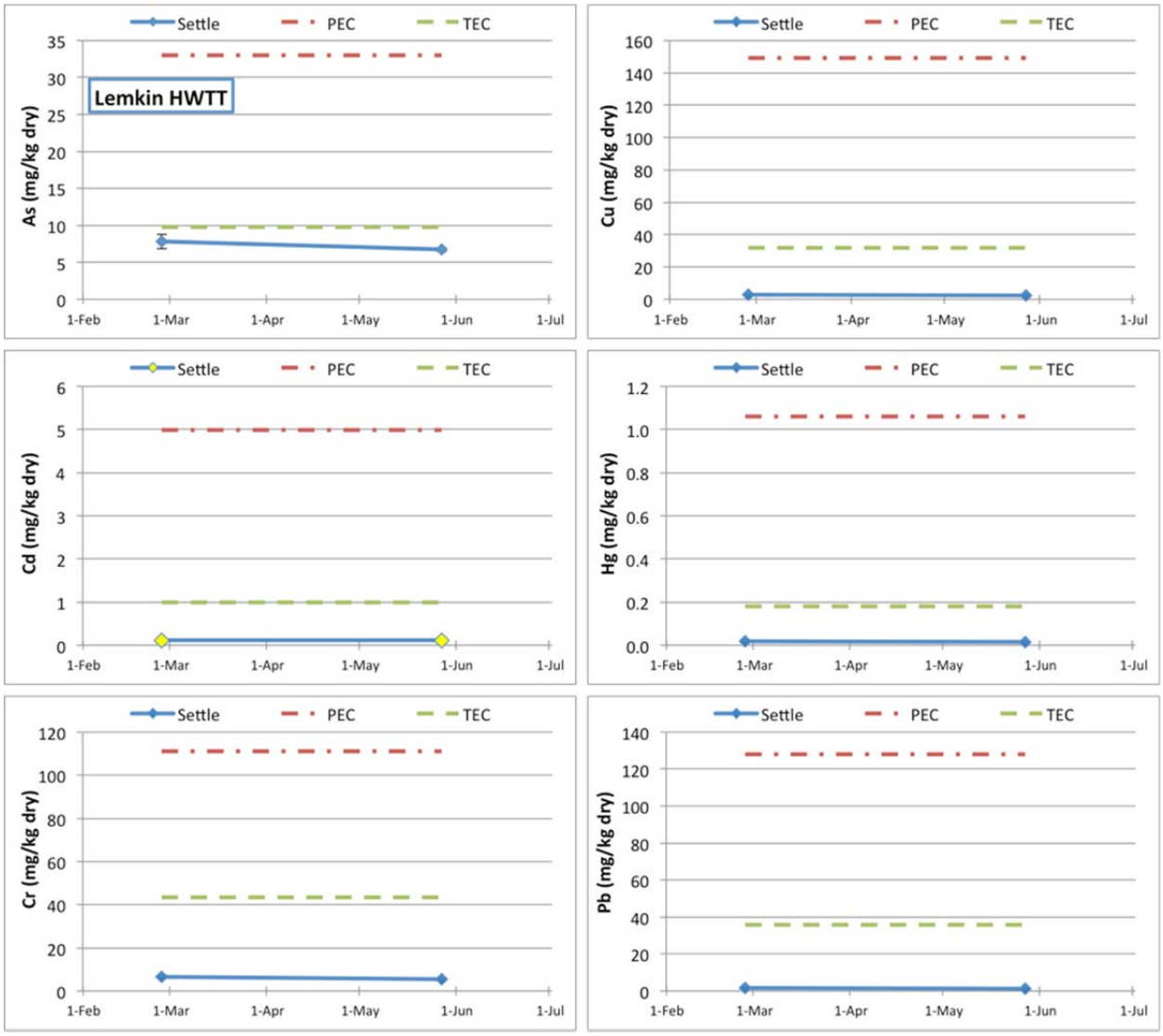


Figure 123. Total recoverable metal concentrations in floc (mg/kg dry) collected in the Lemkin HWTT settling pond during sampling events in February and May 2015. Also shown are threshold effect (TEC) and probable effect (PEC) concentrations proposed for Florida inland waters by MacDonald et al. (2003).
Values represent mean and SE of triplicate samples. MDL values are shown where concentrations were non-detectable (data points with yellow fill).

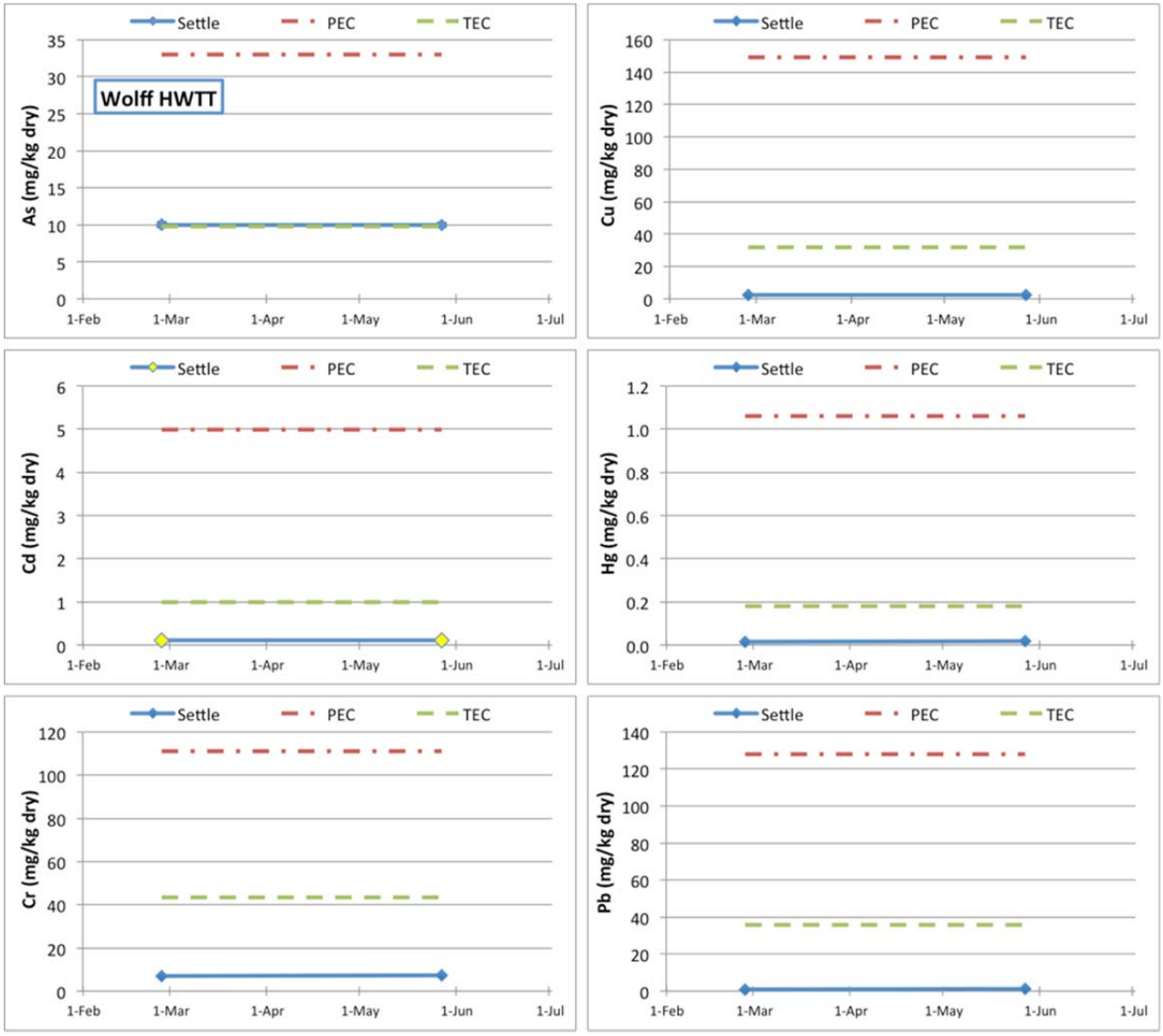


Figure 124. Total recoverable metal concentrations in floc (mg/kg dry) collected in the Wolff HWTT settling pond during sampling events in February and May 2015. Also shown are threshold effect (TEC) and probable effect (PEC) concentrations proposed for Florida inland waters by MacDonald et al. (2003).
Values represent mean and SE of triplicate samples. MDL values are shown where concentrations were non-detectable (data points with yellow fill).

Discussion

For decades, chemical treatment systems and treatment wetlands have been utilized independently for treating wastewaters and surface waters. Due to their low land area requirements, chemical treatment systems often are utilized in urban settings. However, these systems have moderate to high operating costs due to their continuous consumption of chemicals (i.e., coagulant, buffers, coagulant aids). In chemical treatment systems the pollutant removal efficiency (and outflow concentration) is controlled largely by inflow pollutant concentrations, chemical characteristics of the water (alkalinity, color, turbidity) and the coagulant dose. In these systems, pollutants are removed from the water column by adsorption to, or incorporation into, a chemical floc that settles to the bottom of a pond or clarifier. The floc is periodically removed from the system, dried, and typically transported to another site for land application or disposal, often at a relatively high cost. While extremely effective for removing many water pollutants such as P, chemical treatment is less effective for removing other constituents, such as dissolved inorganic nitrogen (N) species.

In contrast to chemical treatment systems, treatment wetlands occupy a much larger area (footprint), and differ markedly with respect to contaminant removal efficiencies. For example, wetlands are quite effective (on an areal basis) at removing inorganic N species, but require large amounts of land for effective P removal (DeBusk et al., 2005). Pollutant removal in treatment wetlands is usually controlled by manipulating system hydraulic residence time (HRT) (i.e., footprint) (Kadlec and Wallace, 2009), and to a lesser extent, the type(s) of dominant vegetation. Unlike chemical treatment systems, pollutant removal in treatment wetlands is accomplished through both transformations and sequestration. For example, constituents such as N and carbon (C) typically are transformed within treatment wetlands, with a portion liberated as gaseous forms and the remainder sequestered in the sediments. Other constituents, such as P and heavy metals, rely solely on sediment sequestration (burial) as an ultimate removal mechanism. Extremely large treatment wetlands, termed Stormwater Treatment Areas (STAs), have been constructed throughout

south Florida for reducing P levels in runoff. Depending on environmental conditions, P in wetland sediments that is associated with either recalcitrant organic matter, or bound to metal (iron, calcium and particularly, aluminum) compounds in the sediments, can remain permanently sequestered. Environmental perturbations, such as system drydown and reflooding, can result in the release of sediment P associated with organic matter, thereby impairing the long-term removal efficiency.

The HWTT concept was developed with the intent of harnessing and integrating the strengths of both wetland and chemical treatment technologies. HWTT systems are comprised of vegetated zones (primarily with floating and/or submerged macrophytes) and non-vegetated zones, and utilize internal floc recycling as well as the drying of floc material with subsequent re-introduction into the treatment train. Chemical coagulants are added to the front-end of the system, which is equipped with one or more deep zones to capture and store the resulting chemical flocs. A fundamental concept of the HWTT is that the floc material resulting from coagulant addition remains at least temporarily viable, and can be "re-used" for additional P removal. Findings from the present study demonstrate that the HWTT configuration offers a superior alternative to conventional chemical treatment systems and STAs for treatment of Northern Everglades runoff. Key attributes of this technology, as demonstrated by current and previous investigations, are as follows:

- HWTT systems can achieve low outflow TP concentrations
- HWTT systems provide effective nitrogen removal
- HWTT systems provide efficient floc management alternatives
- HWTT systems are economical, and further minimization of coagulant use may be attainable for Northern Everglades sub-basins

The optimization plan for HWTT system operations is intended to maximize phosphorus removal in the most cost effective manner. Since chemical coagulant (aluminum sulfate or alum) accounts for a significant portion of operational costs, many strategies for minimizing its use (thereby limiting excessive aluminum outflow concentrations) have been incorporated into the design and operation of HWTT systems, such as:

- optimization of the chemical coagulant dosage
- active reuse of flocculants in the contact pond
- passive reuse of flocculants in the floating aquatic vegetation pond

Monitoring results from the most recent reporting period (July 1, 2014 through June 30, 2015) reflect the high efficiency of HWTT systems for treatment of waters with widely varying chemical characteristics and P loads. In addition, these results provide clear evidence of the sustainability and long-term P removal capacity of these systems.

All of the HWTT systems continued to provide effective removal of TP during the July 2014-June 2015 monitoring period. In particular, the Ideal Grove and Grassy Island systems were exemplary in this regard, despite extremely variable inflow TP concentrations at these sites. Flow-weighted mean inflow TP concentrations were reduced from 1011 to 179 µg/L (82% reduction) at the Nubbin facility, 814 to 56 µg/L (93% reduction) at Ideal, 621 to 142 µg/L (77% reduction) at Mosquito, 132 to 42 µg/L (68% reduction) at Lemkin, 156 to 62 µg/L (61% reduction) at Wolff, and 411 to 40 µg/L (90% reduction) at the Grassy facility. The Bessey Creek facility, which was brought on line in March 2015, achieved an 84% reduction in TP concentration (not flow-weighted), from a mean inflow concentration of 228 µg/L to a mean of 37 µg/L at the outflow. This high level of TP reduction was achieved primarily during dry season months, thus longer-term TP removal rates may differ somewhat.

Total N concentration was effectively reduced in all of the HWTT systems during the monitoring period. Mean inflow TN concentration ranged from 1.56 mg/L at the Wolff HWTT facility to 5.13 mg/L at the Nubbin Slough facility. Among the facilities operated from July 2014 – June 2015 (i.e., Sites 1-3, 5-7), the lowest mean outflow TN concentration (1.11 mg/L) was observed at the Grassy Island HWTT system, which achieved an average reduction in TN concentration of 51 percent. N removal in this system appears to be enhanced by the shallow SAV zone, which provides an extended HRT in the back end of the system. The Ideal Grove HWTT system, which also incorporates a back-end SAV zone, achieved an average TN reduction of 56 percent, from a mean concentration of 3.12 mg/L

at the inflow to 1.37 mg/L in the outflow stream. Lower percent reduction of TN was observed at the Lemkin and Wolff HWTT facilities (21 and 20 percent, respectively), owing to the relatively low inflow concentration at both sites. Outflow TN concentrations at both Lemkin and Wolff (1.35 and 1.25 mg/L, respectively), however, were comparable to outflow TN at the Ideal and Grassy facilities. Mean outflow TN concentrations were highest for Nubbin Slough (3.48 mg/L) and Mosquito Creek (2.08 mg/L), the two HWTT systems lacking a shallow vegetated zone. Nevertheless, reductions in mean TN concentrations were favorable at both sites: 32 and 39 percent at Nubbin and Mosquito Creek, respectively. The recently constructed Bessey HWTT system achieved both a relatively high reduction in TN concentration (50%) and a very low mean outflow concentration of TN (0.69 mg/L). As previously noted, this system was operational primarily during the dry season, with a relatively low mean inflow TN concentration of 1.38 mg/L, thus the observed levels of TN reduction may vary during the wet season.

Inflow water chemistry at several of the HWTT sites exhibited a typically high degree of variability during the reporting period, due to both seasonal trends and short-term fluctuations. Short-term temporal changes in inflow water chemistry are likely caused by a combination of interrelated factors. These may include dilution of dissolved constituents from rainfall and resulting increases in streamflow, increased particulate load during major rain events, variable loading of P and other constituents in the watershed, accelerated transport (flushing) of these constituents from watershed soils to receiving streams during rain events (counteracting dilution effects), and antecedent rainfall levels.

Wide fluctuations in water chemistry in this watershed have presented a challenge to maintaining a consistently high level of TP removal, and have adversely affected the efficiency of the coagulation process, and subsequently the export of total Al (as “micro-flocs”) from the system. For example, high levels of color (indicative of dissolved organic matter) tend to create problems with floc formation. Sharp fluctuations in color were periodically observed, particularly under high stream flow conditions, at Nubbin, Ideal and Grassy HWTT inflows during the monitoring period, with maximum levels reaching the 900 – 1200 PCU range at these sites.

Elevated outflow Al concentrations at the Grassy Island HWTT facility during the first 1.5 months of the current period may have been associated with high levels of color in the inflow stream (Figure 89). However, as previously noted, other chemical parameters in the Taylor Creek inflow water can potentially interfere with floc formation. As commonly observed during the operation of the Grassy HWTT system, increased flow in Taylor Creek, and in the Grassy HWTT system, during the wet season is often accompanied by increases in inflow water TP and color, and a substantial drop in alkalinity, all of which are detrimental to the effectiveness of the HWTT system alum coagulation process. It is important to note that the increased flow *per se* does not present a problem for the HWTT process (for example, outflow TAl concentration at Grassy decreased as flow increased during the latter part of the 2014 wet season [Figure 125]) but rather, some of the changes in water chemistry that accompany the seasonal flow increases, particularly at the onset of the wet season.

At the Grassy facility the inflow alkalinity averaged 47 mg/L during the July-October 2014 (wet season), and increased to a mean of 81 mg/L during November 2014 – May 2015 (dry season) (Figure 126). In addition, inflow color and TP concentrations were substantially higher during the wet season months than during the dry season. Inflow color concentrations averaged 753 PCU during July-October, compared with an average of 303 PCU during November-May. Total P concentration in the Grassy inflow stream averaged 515 µg/L during July-October, and 300 µg/L during November-May. These chemical interferences result in the formation of poorly settling "microflocs", which in turn result in elevated total Al and particulate P levels in the system outflow.

Early in 2015, outflow region limerock beds were installed at several of the HWTT facilities (Nubbin, Mosquito and Grassy), and initial data (i.e., from June 2015 samples) suggest that they are providing effective outflow region buffering. These beds should prove to be important system components, for several reasons. First, the outflow region limerock beds add alkalinity to the water and moderate the pH, two constituents that at times are reduced in the upstream coagulant addition process. Second, the back end buffering affords more flexibility to the upstream coagulant dosing protocols, an operational feature that is needed

during periods in which inflow waters are highly colored, since waters with high color concentrations often require slightly more acidic conditions to achieve successful coagulation and flocculation. HWTT optimization efforts during the upcoming year will focus on incorporating operations and management of the outflow region limerock beds into the overall process management schemes at these facilities.

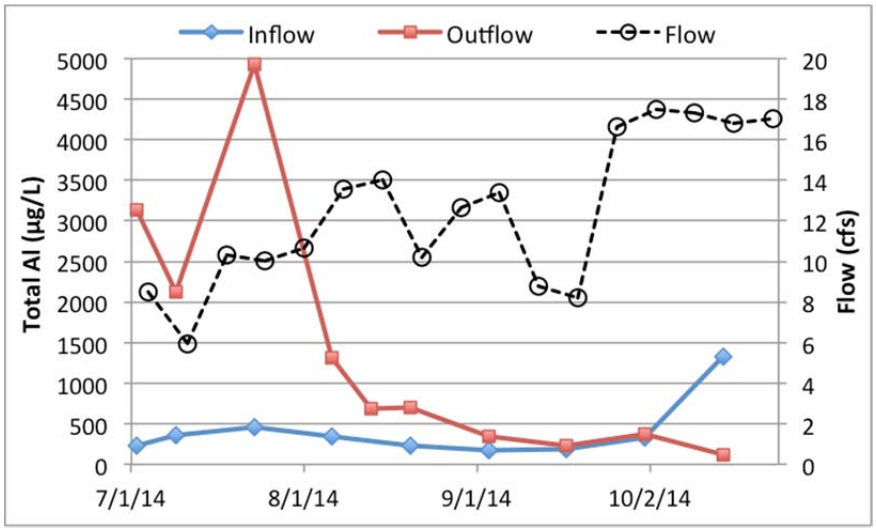


Figure 125. Total Al concentration in the Grassy HWTT inflow and outflow streams during the wet season period of July-October 2014. Also shown is the system flow rate (weekly averages of daily mean flow rate).

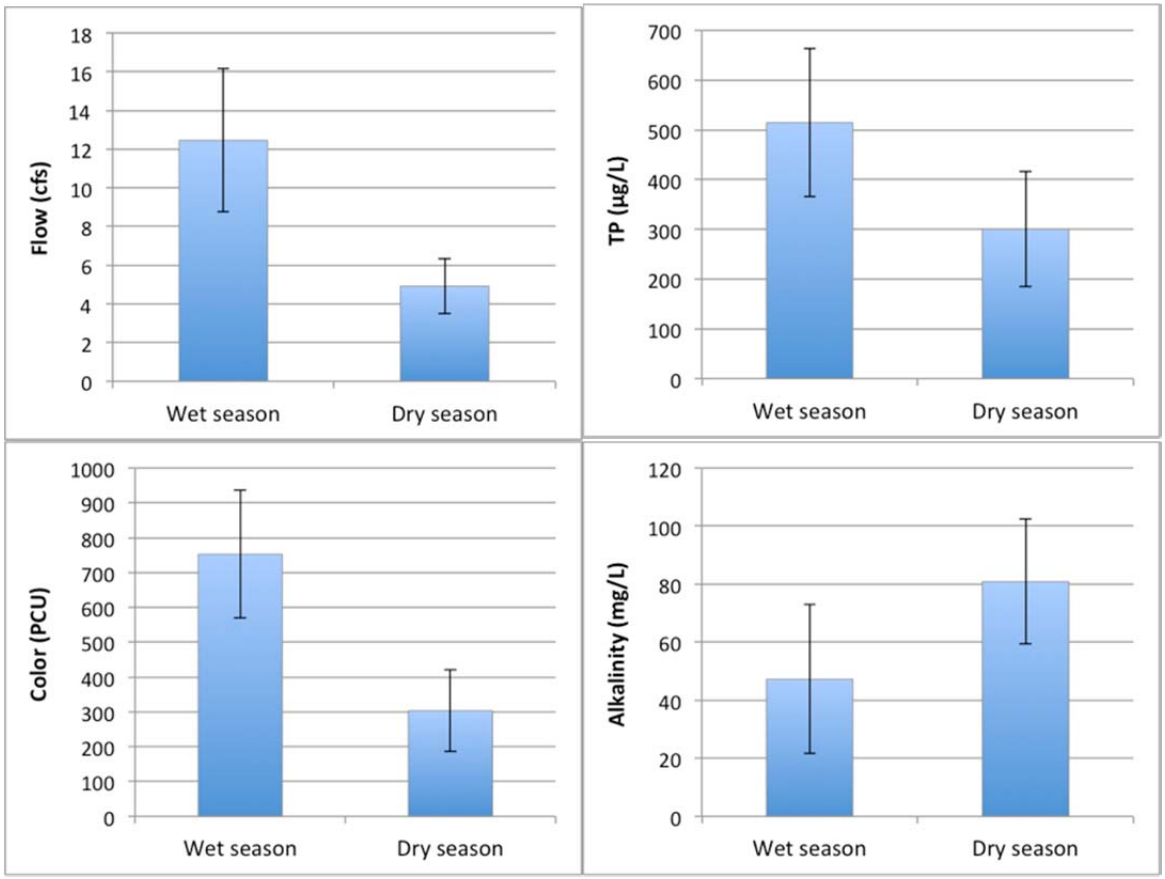


Figure 126. Mean (±1 standard deviation) system inflow rate and concentrations of alkalinity, color and TP in the Grassy HWTT system inflow during the periods July-October 2014 (wet season) and November 2014 – May 2015 (dry season).

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Implementation of Hybrid Wetland Treatment Technology in the Northern Everglades Watershed

Task 19 Deliverable: Final Report

Chapter II: Performance Measures
Phosphorus & Nitrogen Removal, Economic Analyses, and Environmental & Ancillary Benefits
Sites 1-3, 5-8

Prepared for:
Florida Department of Agriculture and Consumer Services (FDACS)

August 18, 2015
Revised August 31, 2015

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Glossary of Acronyms

Al:	Aluminum
ATS:	Algal Turf Scrubber
cfs:	Cubic Feet per Second
EOF:	Edge of Farm
FAV:	Floating Aquatic Vegetation
FDEP:	Florida Department of Environmental Protection
FT:	foot
FWM:	Flow Weighted Mean
GFI:	gound-fault interrupter
gpm:	gallons per minute
hp:	horsepower
HWTT:	Hybrid Wetland Treatment Technology
HRT:	Hydraulic Retention Time
lbs:	Pounds
µg/L:	Micrograms per Liter
mg/L:	Milligrams per Liter
NO_x	Nitrate + Nitrite
N:	Nitrogen
O&M:	Operations and Maintenance
P:	Phosphorus
PAC:	Polyaluminum Chloride
PP:	Particulate Phosphorus
POR:	Period of Record
PV:	Present Value
SAV:	Submerged Aquatic Vegetation
SFWMD:	South Florida Water Management District
STA's:	Stormwater Treatment Areas
TMDL:	Total Maximum Daily Load
TN:	Total Nitrogen
TP:	Total Phosphorus
VFD:	Variable Frequency Drive

Executive Summary Chapter II

Table 1 provides a comparative summary of key parameters for the Hybrid Wetland Treatment Technology (HWTT) operational systems. The Table is linked to an Excel Spreadsheet, which can be accessed by double clicking on the image. The data is stored in a table format, and the drop down menus can be used to sort by specific parameters to perform both horizontal and vertical analyses over time for all sites. Additional data is available in the Parameter menu.

The Cost/Benefit values improved at Nubbin Slough, Mosquito Creek, and Wolff Ditch compared to the previous period. Nubbin Slough had the lowest Cost/Benefit calculation, paired against a 27% increase in the total phosphorus (TP) flow weighted mean (FWM) inflow concentration at the site during the period of record (POR). Both flows and TP mass inflow were lower at Grassy Island, the largest facility, as compared to the relatively high prior period. The percent reduction in the TP FWM inflow concentration versus the FWM outflow concentration improved or remained relatively stable at all sites excluding Lemkin Creek and Wolff Ditch. Combined TP removal during the period was 10,030 pounds (lbs.) (9,965 lbs. prior period), and the total flow treated was 3,507 million gallons (3,421 million gallons prior period). The cumulative TP removal rates for all operational periods range from 93% at Ideal Grove to 75% at Lemkin Creek (South Pond) (Figure 8). The percent reduction in total nitrogen (TN) mass was 52% (calculated for Grassy Island only commencing in the current POR) for a total of 17,954 lbs.

Lemkin Creek and Wolff Ditch projects were sited in large part to hydrate a downstream wetland. During the current period, the Cost/Benefit of TP removal was calculated for these side-by-side facilities, taking into consideration the cost avoidance, or cost savings, associated with providing needed low nutrient water to the wetland. The values show improvement after recognizing the economic benefits of the social goal of wetland restoration.

In a report prepared by Hazen and Sawyer (Hazen and Sawyer, 2014), Cost/Benefit values were tabulated for water remediation projects in St. Lucie and Martin Counties, and the data has been compared to the HWTT statistics in this Final Report. Performance

measurements for the HWTT systems are considerably lower than the Cost/Benefit values for St. Lucie and Martin Counties, including median and high and low calculations for TP, TN, and TP and TN combined (Figure 81 through Figure 83). (Cost/Benefit calculations for nitrogen (N) removal effectiveness were calculated for the Grassy Island facility only.)

The locations of the HWTT systems are depicted in Figure 1, together with area Rain Stations and Regional and HWTT watersheds. The associated thirty-year average regional rainfall and the current contract period data are presented in Table 2, as compared to HWTT site capacity and TP removal. Rainfall for the current POR ranged from a low of 91% at Ideal Grove to a high of 119% at Grassy Island versus the thirty-year average. Although rainfall for the POR was above the historical average for Grassy Island, the percent rainfall relative to the historical average decreased from 131% in the previous year to 119% in the current period. TP removal and treated flow likewise fell compared to the previous year. Conversely, flow and TP removal at Nubbin Slough increased significantly during the current POR, while the percent rainfall declined slightly. The difference in the expected relationship (i.e., direct correlation) between rainfall and treated flow/TP performance was likely due to the substantial increase in the TP FWM inflow concentrations at the site during the current period (799 micrograms per Liter [µg/L] prior POR to 1,011 µg/L current POR). Watershed basin run-off into HWTT water sources is not necessarily proportional to rainfall for any given period, as various factors affect the relationship, including the duration of the rain event and availability of associated detention systems.

Table 1. Key Parameters Sites 1-3, 5-7.

Double click image to open Excel Spreadsheet File. Use drop-down menus to select sort by site and/or desired parameters. Please note that additional data are available in the Parameter drop-down menu.

Key Parameters Sites 1-3, 5-7
Periods 1-7 (See Notes & Assumptions)
***Projected Full Capacity Utilization**

Site	Parameter	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Nubbin Slough	Cost/Benefit $/lb. PV*	$51	$33	$30	$ 30	$ 34	$ 72	$ 24
Nubbin Slough	FWM TP Conc. In µg/L	905	794	792	819	775	799	1,011
Nubbin Slough	FWM TP Conc. Out µg/L	274	73	109	231	169	247	179
Nubbin Slough	% Change TP Conc. In vs. Out	70%	91%	86%	72%	78%	69%	82%
Ideal Grove	Cost/Benefit $/lb. PV*	$191	$85	$108	$ 163	$ 67	$ 67	$ 79
Ideal Grove	FWM TP Conc. In µg/L	N/A	258	347	421	623	862	814
Ideal Grove	FWM TP Conc. Out µg/L	N/A	16	50	19	24	48	56
Ideal Grove	% Change TP Conc. In vs. Out	N/A	94%	86%	96%	96%	94%	93%
Mosquito Creek	Cost/Benefit $/lb. PV*	$54	$69	$80	$ 98	$ 123	$ 88	$ 58
Mosquito Creek	FWM TP Conc. In µg/L	N/A	345	506	435	541	640	621
Mosquito Creek	FWM TP Conc. Out µg/L	N/A	61	149	85	118	150	142
Mosquito Creek	% Change TP Conc. In vs. Out	N/A	82%	70%	81%	78%	77%	77%
Lemkin Creek	Cost/Benefit $/lb. PV So. Pond*					$ 264	$ 145	$ 203
Lemkin Creek	Cost/Benefit $/lb. PV So. Pond Cost Avoidance*							$ 191
Lemkin Creek	FWM TP Conc. In µg/L		85	76	87	85	101	132
Lemkin Creek	FWM TP Conc. Out µg/L So. Pond					20	$ 17	$ 28
Lemkin Creek	% Change TP In vs. Out So. Pond					76%	83%	79%
Wolff Ditch	Cost/Benefit $/lb. PV So. Pond*					$ 82	$ 109	$ 75
Wolff Ditch	Cost/Benefit $/lb. PV So. Pond Cost Avoidance*							$ 65
Wolff Ditch	FWM TP Conc. In µg/L		114	44	95	156	146	156
Wolff Ditch	FWM TP Conc. Out µg/L So. Pond					23	$ 17	$ 36
Wolff Ditch	% Change TP In vs. Out So. Pond					85%	88%	77%
Grassy Island	Cost/Benefit $/lb. PV*			$91	$ 90	$ 61	$ 59	$ 71
Grassy Island	FWM TP Conc. In µg/L			575	327	442	490	411
Grassy Island	FWM TP Conc. Out µg/L			165	27	50	93	40
Grassy Island	% Change TP Conc. In vs. Out			71%	92%	89%	81%	90%
Grassy Island	Cost/Benefit $/lb. PV* N							$ 21
Grassy Island	FWM TN Conc. In mg/L							2.438
Grassy Island	FWM TN Conc. Out mg/L							1.273
Grassy Island	% Change TN Conc. In vs. Out							48%
St. Lucie/Martin	Cost/Benefit $/lb. TP Median All Systems							$ 952
St. Lucie/Martin	Cost/Benefit $/lb. TP High Wet with Alum							$ 2,950
St. Lucie/Martin	Cost/Benefit $/lb. TP Low Wet with Alum							$ 488
St. Lucie/Martin	Cost/Benefit $/lb. TN Median All Systems							$ 327
St. Lucie/Martin	Cost/Benefit $/lb. TN High Wet with Alum							$ 1,217
St. Lucie/Martin	Cost/Benefit $/lb. TN Low Wet with Alum							$ 187
St. Lucie/Martin	Cost/Benefit $/lb. TP+TN Median All Systems							$ 240
St. Lucie/Martin	Cost/Benefit $/lb. TP+TN High Wet with Alum							$ 862
St. Lucie/Martin	Cost/Benefit $/lb. TP+TN Low Wet with Alum							$ 126

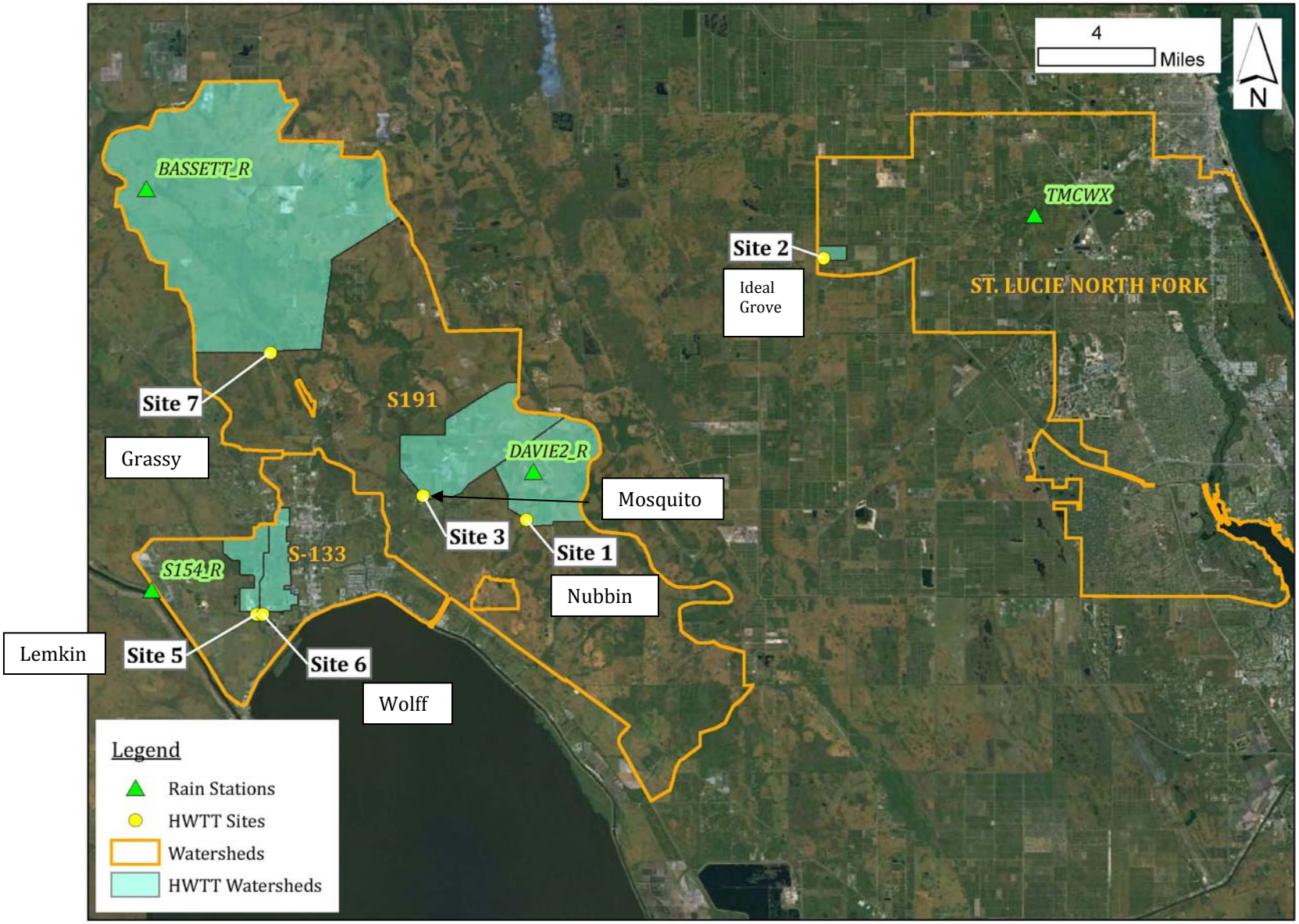


Figure 1. Project Site Map including Rain Stations and Watersheds.

Table 2. Average and POR Regional Rainfall and HWTT Site Capacity and TP Removal.

Site No.	Site Name	Rain Station Note 1	Historical Annual Average Rainfall (in) Note 2	POR Average Rainfall (in) Note 3	POR Rainfall as % of Historical	HWTT - Design Capacity cubic feet per second Note 4	HWTT - % Capacity Utilization for POR	HWTT - TP Removed for POR (lbs.)
1	Nubbin Slough	Davie2 R	44.19	50.41	114.1%	7.4	19%	2,088
2	Ideal Grove	TMCWX	54.16	49.31	91.0%	1.3	12%	195
3	Mosquito Creek	Davie2 R	44.19	50.41	114.1%	6	32%	1,653
5	Lemkin Creek*	S154 R	44.19	42.97	97.2%	5	45%	591
6	Wolff Ditch*	S154 R	44.19	42.97	97.2%	20	13%	466
7	Grassy Island	Bassett R	44.19	52.39	118.6%	26	28%	5,248
Notes:	1. Rain stations are monitored and maintained by SFWMD.							
	2. Historical annual average rainfall based on 30 years (1981-2010) as reported by SFWMD for Lake Okeechobee and Martin/St. Lucie regions.							
	3. POR: 7/1/14-6/30/15; Total rainfall for period of record obtained via SFWMD's Dbhydro database.							
	4.Average permitted capacity for Grassy Island for POR.							
	*Includes South Pond.							

Operating Data and Performance

HWTT is a complete system that integrates the best aspects of chemical and wetland treatment technologies. A primary means of analyzing the technical capabilities of this system is through study of its effectiveness in removing P and N. A complete discussion of detailed operating conditions and sampling results of other water quality characteristics is contained within the Chapter I Technical Section of this Final Report.

Covered Sites, Data Period, Methodology, & Records

Chapter II of this Final Report covers the following operational HWTT sites: Nubbin Slough (Site 1), Ideal Grove (Site 2), Mosquito Creek (Site 3), Lemkin Creek (Site 5), Wolff Ditch (Site 6), and Grassy Island (Site 7). These six facilities are referred to as "operational sites or operational systems". An analysis of data collected during the initialization, grow-in, and commencement of optimization phases for Bessey Island (Site 8) is presented under the Site Specific Data Section of this Chapter; however, as the facility is in the preliminary start-up period, comparative data is not included within the Overview.

The information presented relates to the POR from 07/01/14 through 06/30/15 (365 days) for Sites 1-3, 5-7 and from 03/08/15 through 06/30/15 for Site 8 (also referred to as Period 7). References to the covered period will be assumed unless specified otherwise. Flow is measured and recorded daily for operational days; phosphorus (P) concentrations, both in and out, are sampled in accordance with the Operations & Maintenance (O&M) Plan and linearly interpolated for daily estimates. Detailed daily records and activities are included by site in the accompanying Appendices. Data from previous contracts are also presented; however, comparisons to other periods may be skewed due to differences in the length of the periods and changes in capacity.

Operating Statistics

Table 3 provides a comparative summary of operating performance statistics for the HWTT systems for Period 7. (Comparable schedules from previous Final Reports have been compiled in an Excel table for information purposes in Appendix I. Drop down menus are available for horizontal and vertical analyses.) All sites met the Tributary TMDL except

Nubbin Slough and Mosquito Creek, based on the interpolated FWM outflow concentrations for the period. The Grassy Island facility attained the more stringent Lake Okeechobee TMDL for the period. (References in this document to "average flow-weighted" are equivalent to FWM.) The physical configuration at Nubbin Slough is a factor in performance for that site. The chart also includes a summary of several operational day statistics defined as follows:

1. # Days in Period – represents the days covered in the reporting period or POR.

2. # Days On-Line – represents the days the facility was on-line and available to operate regardless of flow capacity.

3. # Days On-Line Flow > 0 – represents the days included in Item 2 above in which flow was available to treat.

4. # Days in Period Flow >0 less Non-Controllable Downtime – represents the days covered in the period (Item 1 above) where flow was available to treat, less days the system was not operating for reasons outside the control of Watershed Technologies. Specific examples of non-controllable downtime include construction of limerock beds and power outages. Conversely, floc removal is considered to be a controllable occurrence since it is part of the HWTT process.

5. % Days On-Line vs. Available Days – Item 3 divided by Item 4 above.

Each of the data categories enumerated in the table provides varying means of analyzing operations during the period. All sites except Nubbin Slough were on-line and available to treat 100% of the time when flow was available, excluding any non-controllable down-time. (Nubbin Slough was taken off-line for floc removal.) The percentage calculation does not measure capacity utilization, as there is no consideration for the actual quantity or level of flow.

Table 3. Comparative Performance Statistics for Operational Sites Period 7 POR July 1, 2014 – June 30, 2015.

SUMMARY TP PERFORMANCE & COMPARISON Sites 1-3, 5-7												
Site	**Average Daily Flow gpm****	**Average Inflow Conc.***	**Average Outflow Conc.***	**lbs. of TP Removed per Day****	**Facility Size cfs******	**% Capacity Utilization Based on Flow**	**Facility Purpose**	**# Days in Period**	**# Days On-Line**	**# Days On-Line Flow > 0.0000**	**# Days in *Period* Flow > 0.0000 Less Non-Controllable Down Time**	**% Days On-Line vs. Available Days *** **
Nubbin Slough	619	1011	179	6.29	7.40	19%	Remove P & N in cost-effective & environmentally sound manner.	365	332	332	347	96%
Ideal Grove	69	814	56	0.62	1.30	12%	Remove P & N in cost-effective & environmentally sound manner.	365	313	313	313	100%
Mosquito Creek	864	621	142	4.98	6.00	32%	Remove P & N in cost-effective & environmentally sound manner.	365	332	332	332	100%
Lemkin Creek	1003	132	42	1.11	5.00	45%	Remove P & N in cost-effective & environmentally sound manner; provide flow to downstream wetlands.	365	343	343	343	100%
Wolff Ditch	1149	156	62	1.31	20.00	13%	Remove P & N in cost-effective & environmentally sound manner; provide flow to downstream wetlands.	365	356	356	356	100%
Grassy Island	3244	411	40	14.58	25.81	28%	Remove P & N in cost-effective & environmentally sound manner & provide lower input concentrations to downstream waters.	365	360	360	360	100%
Tributary TMDL		113	113									
Lake Inflow TMDL		40	40									
Notes:	*Flow Weighted in µg/L		**Average per on-line flow day		*** Excl. No Flow Days & Non-Controllable Downtime					****Ave. Grassy 20 to 30cfs 12/1/14		

Phosphorus Removal Effectiveness

HWTT can achieve low mean outflow TP concentrations in Northern Everglades' sub-basins. There are presently two numeric total TP limits for Lake Okeechobee and its watershed (Sites 1-3, 5-7) and a separate TP criterion for Bessey Creek (Site 8). The first Total Maximum Daily Load (TMDL) for all Class III tributary waters in the Lake Okeechobee Basin is 113 µg/L; the second limit for all combined surface waters entering Lake Okeechobee is 105 metric tons (functionally equivalent to approximately 40 µg/L TP Lake inflow concentration). The target TMDL limit for Bessey Creek is 81 µg/L based on the State TMDL for the St. Lucie Basin.

Total Phosphorus Total Maximum Daily Load

Table 4 compares the percentage of TP FWM inflow concentration on an interpolated daily basis meeting the TMDL versus the percentage of TP FWM outflow concentration on an interpolated basis attaining the TMDL after HWTT processing. (Comparable schedules from previous Final Reports have been compiled in an Excel table for information purposes in Appendix II. Drop down menus are available for horizontal and vertical analyses.) Both Grassy Island and Lemkin Creek met the Tributary TMDL 93% of the time; Wolff Ditch and Ideal Grove 86%; Mosquito Creek 52%; and Nubbin Slough 43%. TP average inflow concentration levels ranged from 1,011 µg/L to 132 µg/L. Nubbin Slough had the highest TP FWM inflow concentration (1,011 µg/L); Ideal Grove averaged the second highest (814 µg/L) and Mosquito Creek levels were the third highest (621 µg/L). Nubbin Slough inflow concentrations were above the Tributary TMDL for 100% of the samples during the period; Grassy Island exceeded the limit 97% of the time; Mosquito Creek was above the limit 94% of the time; Ideal Grove inflow levels exceeded the limit 92% of the time; Wolff Ditch exceeded the limit 58% of the time; and Lemkin Creek exceeded the limit for 52% of the samples. TMDL performance measures from previous periods are also shown in Appendix I for information purposes.

The HWTT system P outflow levels have previously been described to be far lower than those attained by Stormwater Treatment Areas (STA's) or other technologies north of Lake Okeechobee. A detailed comparison would require examination of numerous factors at all

sites, which is beyond the scope of this Report. In addition to higher outflow TP levels, the percentage removal efficiencies for the wetland and algal technologies were markedly lower than those of the HWTT systems. Further, the percentage TP removal efficiencies of HWTT exceeded those of the conventional chemical technologies, despite the coagulant minimization techniques incorporated in the HWTT systems.

Table 4. Percent of Inflow & Outflow Concentration Attaining TMDL's Period 7.

% of Interpolated Data Attaining TMDL (See Note)							
Site	**On-Line Flow Days>0 (184 Day Period)**	**Flow Weighted Average Inflow Concentration in µg/L**	**Flow Weighted Average Outflow Concentration in µg/L**	**Tributary TMDL (113 in µg/L) Met for Average Outflow Concentration**	**Lake TMDL (40 in µg/L) Met for Average Outflow Concentration**	**% Data Points Inflow Concentration Meeting Tributary TMDL**	**% Data Points Outflow Concentration Meeting Tributary TMDL**
Nubbin Slough	332	1,011	179	NO	NO	0%	43%
Ideal Grove	313	814	56	YES	NO	8%	86%
Mosquito Creek	332	621	142	NO	NO	6%	52%
Lemkin Creek	343	132	42	YES	NO	48%	93%
Wolff Ditch	356	156	62	YES	NO	42%	86%
Grassy Island	360	411	40	YES	YES	3%	93%
Note: Includes Linear Interpolation between Actual Measurements for On-Line Flow Days.							

Water Quality Characteristics & HWTT Components

Values of other water quality characteristics, which can have a significant impact on P removal, are summarized in Table 5 together with TP and flow. Please refer to Chapter I for a complete discussion of the effect of these parameters on the results of operations. The HWTT components installed at the individual sites, which may be constrained due to pre-existing conditions and other factors, likewise influence the P removal effectiveness; a listing of the components is shown in Table 6.

During the current POR, net export of nitrate + nitrite (NOx) occurred at Nubbin Slough and, to a lesser extent, at Mosquito Creek, Lemkin Creek, and Wolff Ditch. Nubbin Slough and Mosquito Creek are the two facilities that lack a shallow vegetated zone at the back end of the system, and arithmetic mean outflow NOx concentrations were highest at those sites (arithmetic mean concentrations of 1.35 and 0.60 milligrams (mg) N/L, respectively). Although there was a net export of NOx at the Lemkin and Wolff facilities, both of which include a shallow vegetated zone, the difference in concentration between inflow and outflow was quite small, i.e. less than 0.015 mg N/L on average, and arithmetic mean outflow NOx concentrations were less than 0.03 mg N/L, representing only a small fraction of TN. All of the systems achieved a net reduction of TN, with arithmetic mean inflow concentrations ranging from 1.56 mg/L at Wolff Ditch to 5.13 mg/L at Nubbin Slough and arithmetic mean outflow concentrations ranging from 1.11 mg/L at Grassy Island to 3.48 mg/L at Nubbin Slough. (Arithmetic means and FWM values will differ for the same set of data.)

Table 5. Summary of Water Quality Characteristics.
TP FWM all sites; TN FWM Grassy Island; mean inflow and outflow all other parameters; refer to text for complete discussion.

Mean Inflow & Outflow Water Quality Characteristics - All Sites									
	Site 1 Nubbin Slough			Site 2 Ideal Grove			Site 3 Mosquito Creek		
Period Presented	7/1/14 - 6/30/15			7/1/14 - 6/30/15			7/1/14 - 6/30/15		
	Inflow	Outflow	% Change	Inflow	Outflow	% Change	Inflow	Outflow	% Change
TP (µg/L) FWM	1011	179	-82%	814	56	-93%	621	142	-77%
pH	6.4	6.2	-3%	7.0	6.9	-1%	6.7	6.2	-7%
Alkalinity (mg/L)	57	37	-35%	163	110	-33%	80	32	-60%
Color (PCU)	419	152	-64%	283	110	-61%	345	154	-55%
Turbidity (NTU)	4.7	5.8	23%	9.6	3.3	-66%	3.6	8.5	136%
Conductivity (µS/cm)	415	478	15%	1282	1327	4%	426	432	1%
TKN (mg/L)	4.38	2.14	-51%	3.10	1.36	-56%	2.85	1.49	-48%
NOx (mg/L)	0.751	1.347	79%	0.020	0.010	-50%	0.588	0.598	2%
TN (mg/L)	5.13	3.48	-32%	3.12	1.37	-56%	3.43	2.08	-39%
Treatment Volume (MG)		296			31.0			413.0	
	Site 5 Lemkin Creek			Site 6 Wolff Ditch			Site 7 Grassy Island		
Period Presented	7/1/14 - 6/30/15			7/1/14 - 6/30/15			7/1/14 - 6/30/15		
	Inflow	Outflow	% Change	Inflow	Outflow	% Change	Inflow	Outflow	% Change
TP (µg/L) FWM	132	42	-68%	156	62	-61%	411	40	-90%
SRP (µg/L)	77	3	-96%	76	7	-91%	275	6	-98%
DOP (µg/L)	26	8	-69%	32	9	-72%	52	6	-88%
PP (µg/L)	36	30	-17%	35	25	-29%	45	24	-47%
pH	7.3	7.4	1%	7.3	7.5	3%	6.9	6.6	-4%
Alkalinity (mg/L)	198	168	-15%	192	163	-15%	70	33	-53%
Color (PCU)	137	112	-18%	173	110	-36%	493	107	-78%
Turbidity (NTU)	2.4	3.2	33%	3.2	2.2	-31%	8.9	2.5	-72%
Conductivity (µS/cm)	894	882	-1%	896	936	4%	404	483	20%
TKN (mg/L)	1.68	1.33	-21%	1.54	1.23	-20%	1.81	0.82	-55%
NOx (mg/L)	0.013	0.026	100%	0.017	0.020	18%	0.457	0.283	-38%
TN (mg/L)*	1.70	1.35	-21%	1.56	1.25	-20%	2.44	1.27	-48%
Total Al (µg/L)	288	591	105%	36	357	892%	249	571	129%
Treatment Volume (MG)		495.6			588.9			1681.9	
*TN FWM Grassy Island									

Table 6. Installed HWTT Components & Coagulants by System.

HWTT	Site 1 Nubbin Slough	Site 2 Ideal Grove	Site 3 Mosquito Creek	Site 5 Lemkin Creek	Site 6 Wolff Ditch	Site 7 Grassy Island
Components Installed						
Buffering: Limerock Front End	Y	N	Y	N	N	Y
Buffering: Chemical	N	N	Y	N	N	Y
Mixing Chamber	Y	Y	Y	Y	Y	Y
Mixing Chamber *in situ*	N	N	N	N	N	Partial
Intermittent Dosing	N	Y	N	Y	Y	Y
Wet-Floc Recycling	Y	Y	Y	Y	Y	Y
Dry Floc Recycling	N	N	N	N	N	N
Wet-Floc Settling Area	Y	Y	Y	Y	Y	Y
Floc Drying Bed	Y	N	Partial	Y	Y	Y
Floc Disposal via Tilling	N	Y	Y	N	N	N
FAV Pond	Y	Y	Y	Y	Y	Y
Buffering: Limerock Back End	Y	N	Y	Y	Y	Y
SAV Pond	N	Y	N	Y	Y	Y
Coagulants						
Alum	Y	Y	Y	Y	Y	Y
Polyaluminum chloride	N	N	N	N	N	Y

Total Phosphorus Mass Removal

The current POR includes 365 days from July 1, 2014 through June 30, 2015; the prior contract covered 365 days for all operational facilities. Figure 2 depicts the reduction in TP lbs. per day for the six HWTT operational facilities. (Note that capacity increased at Grassy Island compared to the prior contract period.) All operational systems experienced sustained flows for the POR, with flow levels generally declining during the second half of the period. Overall, inflow TP mass was highest from July through November, 2014, with peaks occurring at all sites. Load reduction (reported as interpolated lbs. per day) was as follows: Nubbin Slough was 6.3 (3.2 prior contract period); Ideal Grove was 0.6 (0.5 prior contract period); Mosquito Creek was 5.0 (4.5 prior contract period); Lemkin Creek was 1.1 (0.7 prior contract period); Wolff Ditch was 1.3 (1.1 prior contract period); and Grassy Island was 14.6 (18.4 prior contract period). Figure 3 shows the interpolated total lbs. of P removed, which was higher for the POR at all sites and in total except for Grassy Island, as

compared to the prior 365 day period. The values are as follows: Nubbin Slough – 2,088 lbs. (1,097 prior contract period); Ideal Grove – 195 lbs. (183 prior contract period); Mosquito Creek – 1,653 lbs. (1,357 prior contract period); Lemkin Creek - 380 lbs. (254 prior contract period); Wolff Ditch - 466 lbs. (405 prior contract period); and Grassy Island – 5,248 lbs. (6,670 lbs. prior contract period). Reduced flows and TP FWM inflow concentrations compared to the relatively elevated levels experienced in the prior POR were the primary factors in the lower TP removal. The current removal rate for all systems combined was 10,030 lbs. (9,965 lbs. prior contract period), as shown in Figure 4.

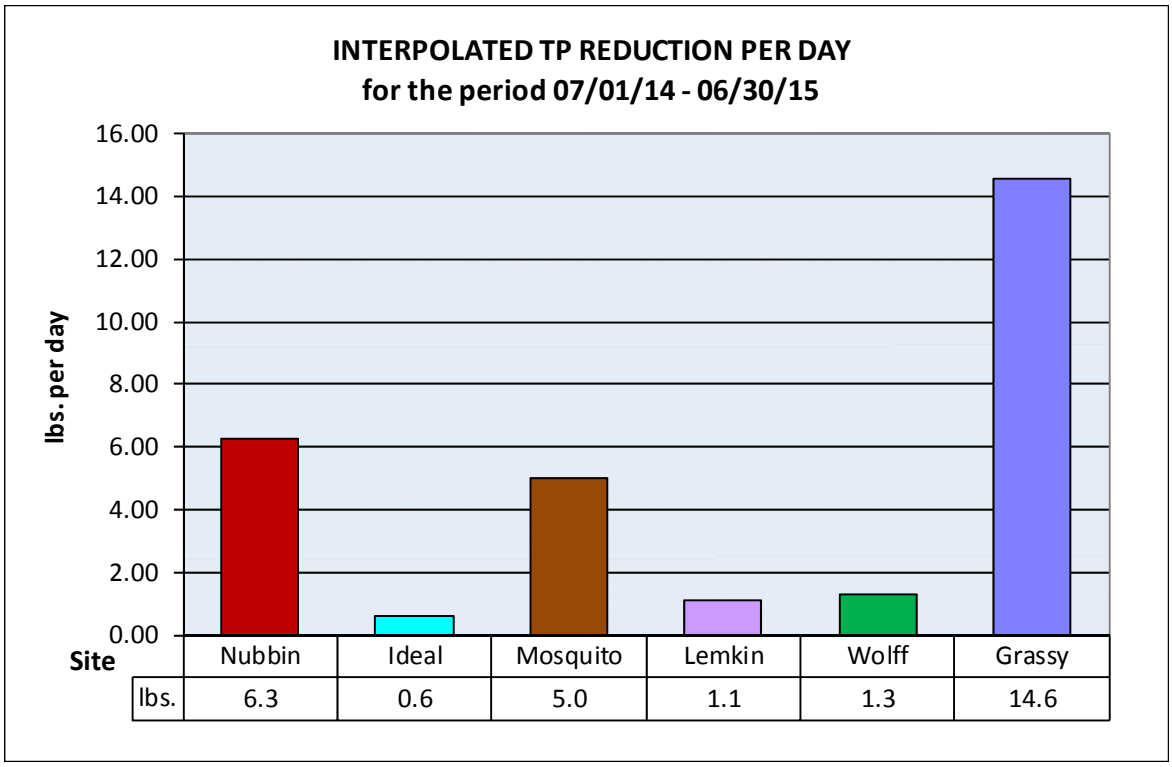


Figure 2. Load Reduction by Site per day.

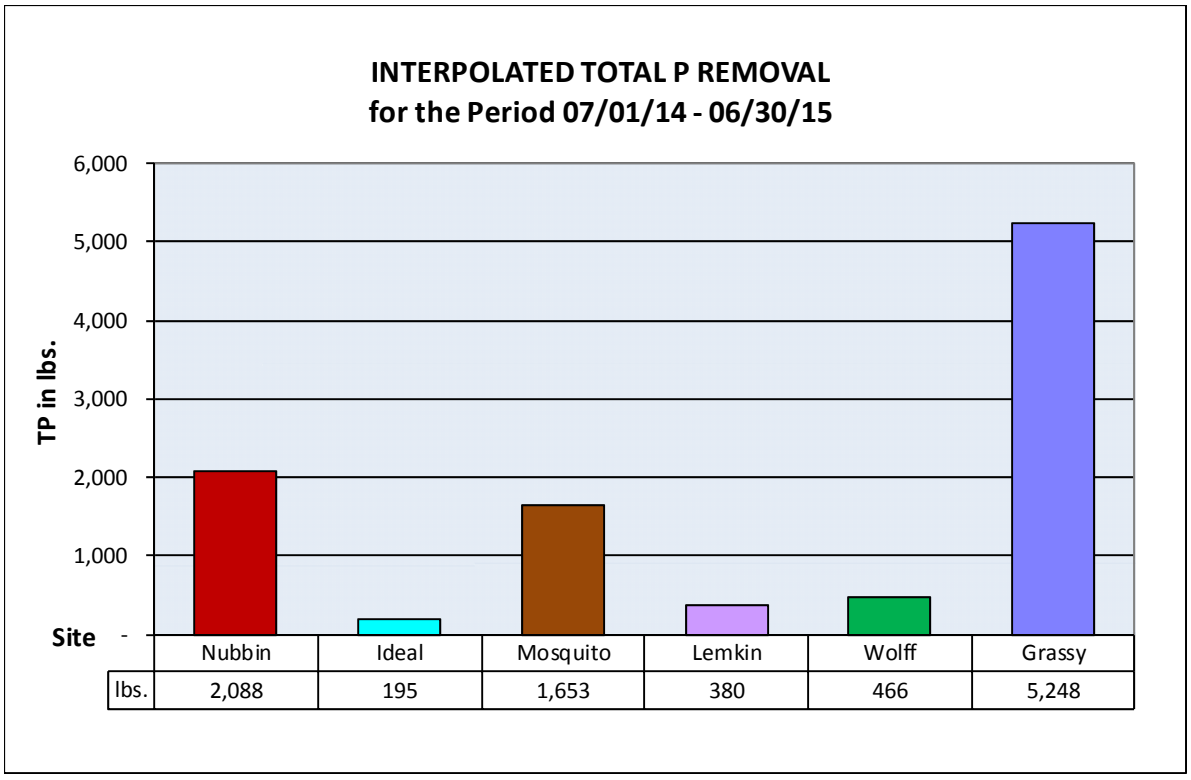


Figure 3. Total P Load Reduction by Site.

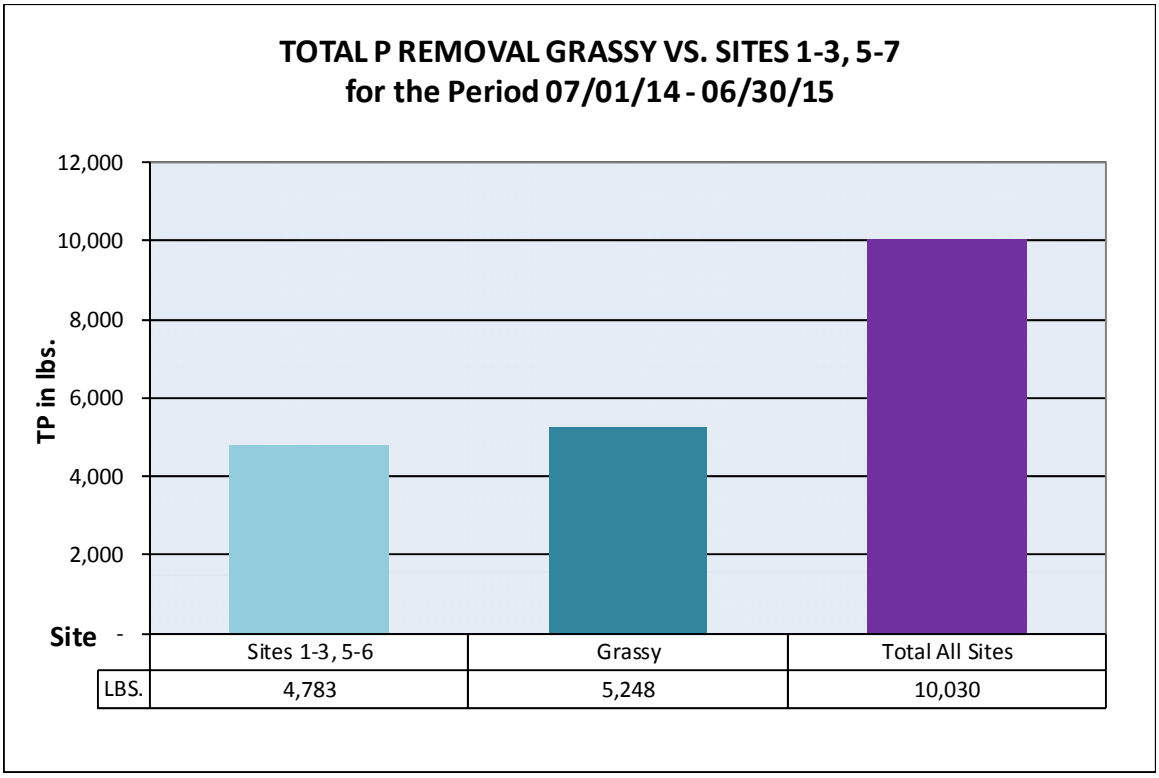


Figure 4. Total P Load Reduction Sites 1-3, 5-6, Grassy and all sites combined.

Interpolated TP mass inflow versus outflow and percent reduction by site for the period is illustrated in Figure 5. Nubbin Slough produced an 83% reduction between TP mass inflow and outflow (69% prior contract period); Ideal Grove resulted in a 93% reduction (and 94% prior contract period); Mosquito Creek operated at a 77% reduction (76% prior contract period); Lemkin Creek experienced a 68% reduction (72% prior contract period); TP was reduced by 60% at Wolff Ditch (84% prior contract period); and Grassy Island TP reduction was 91% (81% prior contract period). The Nubbin HWTT facility P removal effectiveness is influenced by the lack of mid-region or outflow region shallow zones that limit the proliferation and/or particle filtration effectiveness of back-end vegetation communities.

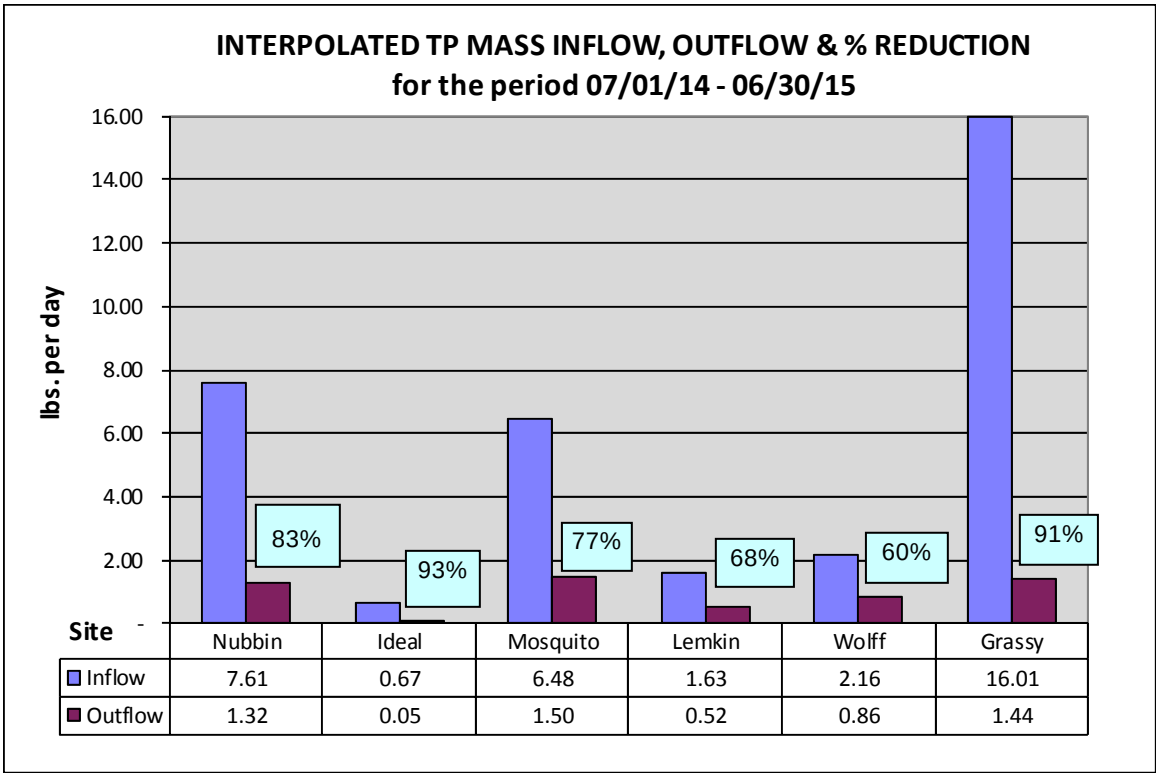


Figure 5. TP Mass Inflow & Outflow and % Load Reduction by Site.

Total Phosphorus Flow-Weighted Mean Concentrations

TP FWM concentration reductions (Figure 6) were the same as the TP mass removal percentages with the exception of Nubbin Slough (82% versus 83%), Wolff Ditch (61% versus 60%), and Grassy Island (90% versus 91%). A number of factors affect P removal and the relative performance differences among sites, including TP inflow levels. During the higher flows in the wet season, HWTT system TP mass removal effectiveness is highly influenced by the inflow TP concentration levels. The Grassy Island facility with mid-range TP FWM inflow TP levels of 411 μg/L produced the second highest TP FWM concentration removal percentage (90%). Ideal Grove presented the second highest TP inflow levels of 814 μg/L and highest removal rate (93%). The lowest TP inflow levels were at Lemkin Creek and Wolff Ditch with TP FWM inflow concentrations of 132 and 156 μg/L and the lowest removal rates of 68% and 61%, respectively. Mosquito Creek measured the third greatest TP FWM inflow concentration at 621 μg/L and a HWTT mid-range removal rate of 77%. Nubbin Slough presented the highest TP FWM inflow concentration at 1,011 μg/L and an 82% removal rate; the physical configuration at this site is also a factor in performance (see Site Discussion below - additional information regarding system attributes, operations and performance, as well as in-depth site discussions included in Chapter I of this Final Report.). All TP statistics are interpolated from sample measurements. The Bessey Creek facility was initialized on March 8, 2015 and was in the grow-in and initial optimization phases through June 30, 2015. During this time, TP FWM concentrations were 213 μg/L and TP FWM outflow concentrations were 20 μg/L, for a 91% reduction.

Figure 7 depicts reductions in TP FWM concentrations incorporating the South Pond P data samples for Lemkin Creek and Wolff Ditch outflow volumes. (It is not possible to separate the South Pond P data between Lemkin Creek and Wolff Ditch; the input data for the two sites are not combined to maintain the individual system integrities. The method employed provides a rough comparison of the impact of the South Pond on performance). These two facilities were sited primarily to supply needed hydration for the downstream wetland via the South Pond, a factor which provides a significant cost benefit that has been quantified and reflected in supplementary Cost/Benefit values for the two side-by-side facilities

within the Cost Avoidance Lemkin Creek & Wolff Ditch Section of this Chapter. During construction, Watershed Technologies made several material improvements to the South Pond, including weir relocation, elevation adjustments, piping additions, and general maintenance. Weekly grab samples are taken and laboratory analyses are prepared and tabulated, together with inflow measurements to the adjacent wetland. The submerged aquatic vegetation (SAV) community from the dual HWTT facilities has expanded into the South pond shallow zone, providing additional filtration. Using data from the South Pond for Lemkin Creek and Wolff Ditch, the removal performance improves significantly. Lemkin TP FWM concentration outflow decreased from 42 to 28 µg/L and Wolff Ditch declined from 62 to 36 µg/L, representing a 79% and 77% reduction in TP levels at Lemkin Creek and Wolff Ditch, respectively.

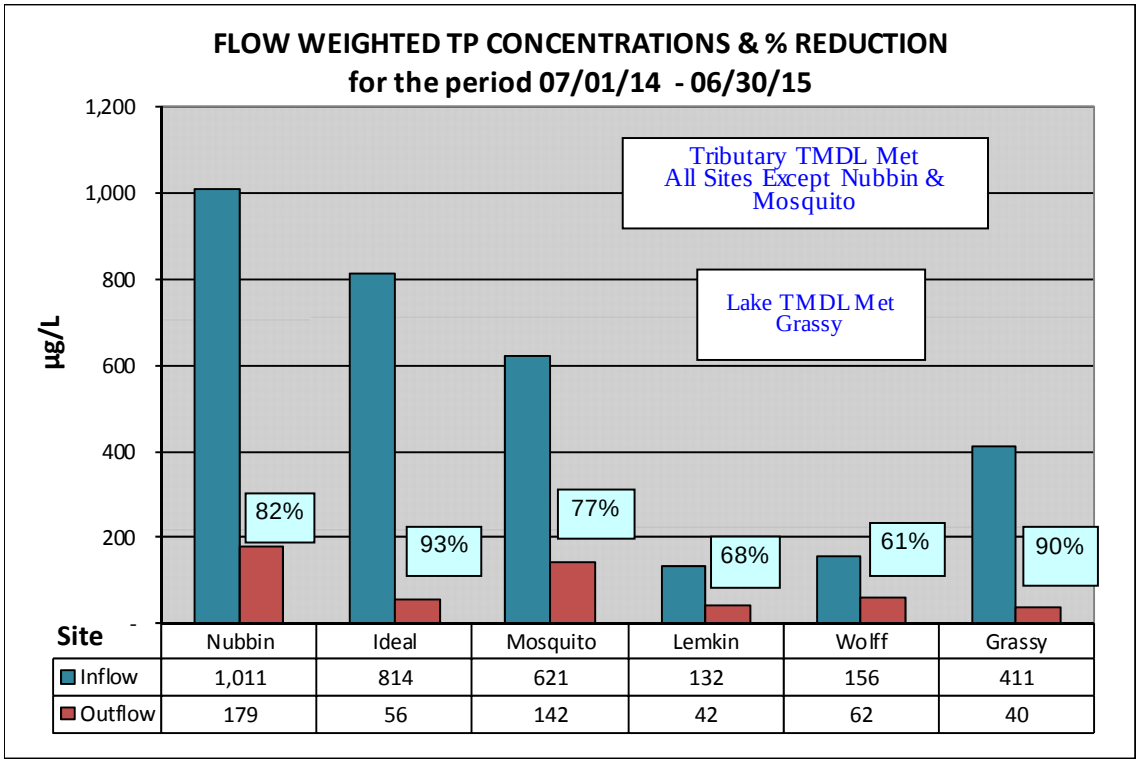


Figure 6. TP FWM Concentrations and % Reduction by Site.

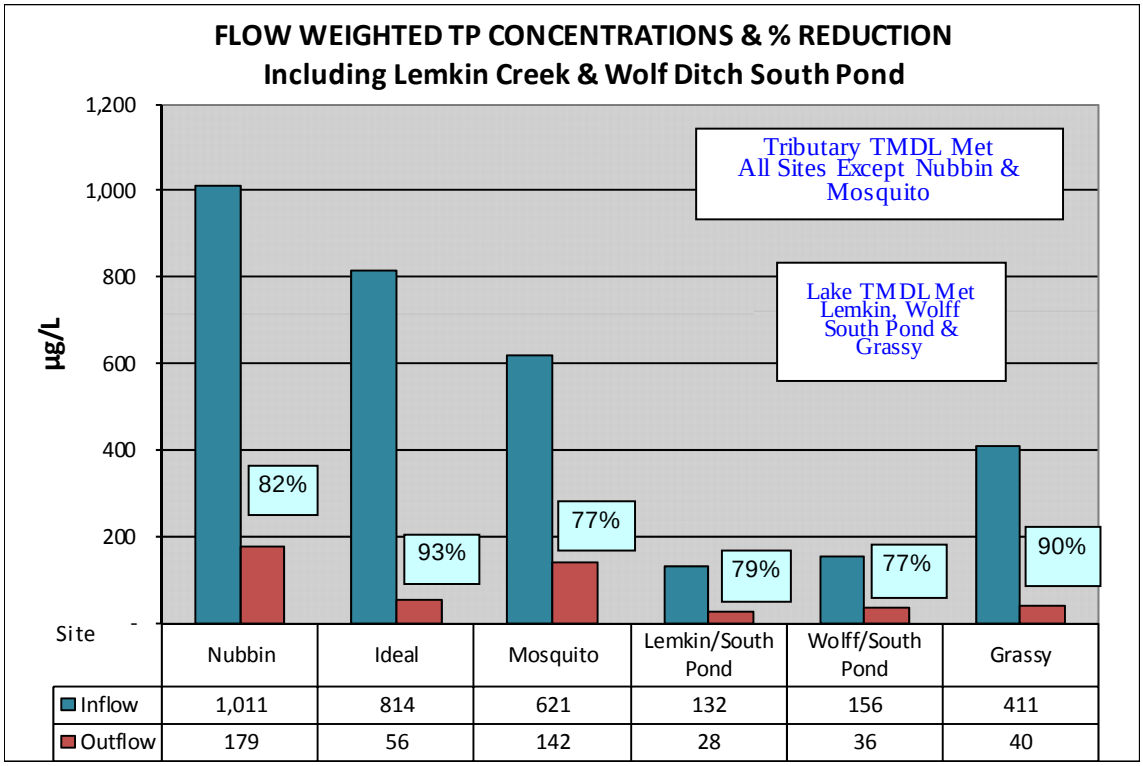


Figure 7. TP FWM Concentrations and % Reduction by Site including South Pond at Lemkin Creek and Wolff Ditch.

Figure 8 illustrates the cumulative TP FWM concentrations and percent reductions for each of the six operational systems. The periods of record vary according to start date and other activities as noted in the table below. Certain data has been excluded due to changes in flow configurations, early demonstration projects, and availability of measurements between contract periods. Grassy Island includes the optimization period. The average percentage reductions in concentrations improved for Nubbin Slough; remained constant for Ideal Grove; and Grassy Island and Mosquito Creek declined slightly. The South Pond outflow concentration data has been used for Lemkin Creek and Wolff Ditch values, commencing July 1, 2012.

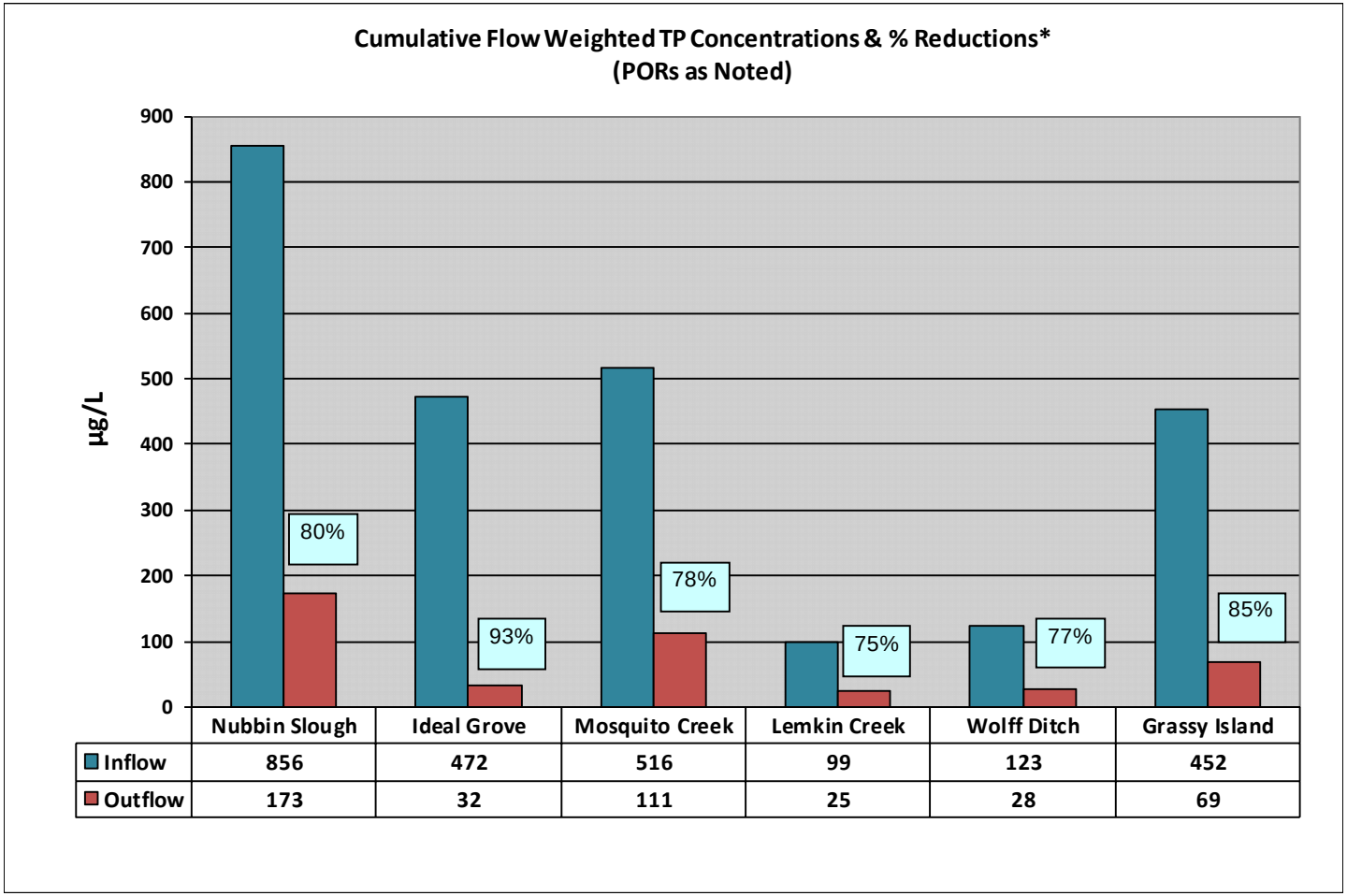


Figure 8. Cumulative TP FWM Concentrations and % Reductions by Site with PORs as noted. See text for assumptions.

*South Pond outflow concentrations included as of 07/01/12
POR: Start date corresponds to commencement of HWTT optimization or operational periods.
11/21/08 – 06/30/15 Nubbin Slough, Ideal Grove & Mosquito Creek
03/09/10 – 06/30/15 Lemkin Creek & Wolff Ditch
07/11/11 – 06/30/15 Grassy Island (Off-Line for Construction 03/15/12 - 07/01/12 & 05/13)

Nitrogen Removal Effectiveness

HWTT can achieve low mean outflow TN concentrations in Northern Everglades' sub-basins. As cited in 62-302.531 Florida Administrative Code (FAC) (Numeric Interpretations of Narrative Nutrient Criteria) (FAC, 2013), the TN threshold for streams in Peninsular Florida (e.g., Taylor Creek) is 1.54 mg/L. To demonstrate the HWTT effectiveness of N removal and meeting the criteria, N data has been summarized and Cost/Benefit values (shown under Projected Cost/Benefit Values Section of this Chapter) have been calculated for Grassy Island Period 7.

The amount of N removal at Grassy Island for the POR was 17,954 lbs. (Figure 9). The HWTT process produced a 52% reduction in interpolated TN average daily mass inflow and outflow (Figure 10) and a 48% reduction in the interpolated FWM inflow concentrations versus outflow concentrations (Figure 11) at the facility. The interpolated FWM inflow concentration for the POR was 2.4 mg/L and the outflow concentration was 1.3 mg/L. Twenty-four % of the TN FWM inflow concentrations met the FAC nutrient limit; whereas, 96% of the TN FWM outflow concentrations were below the limit.

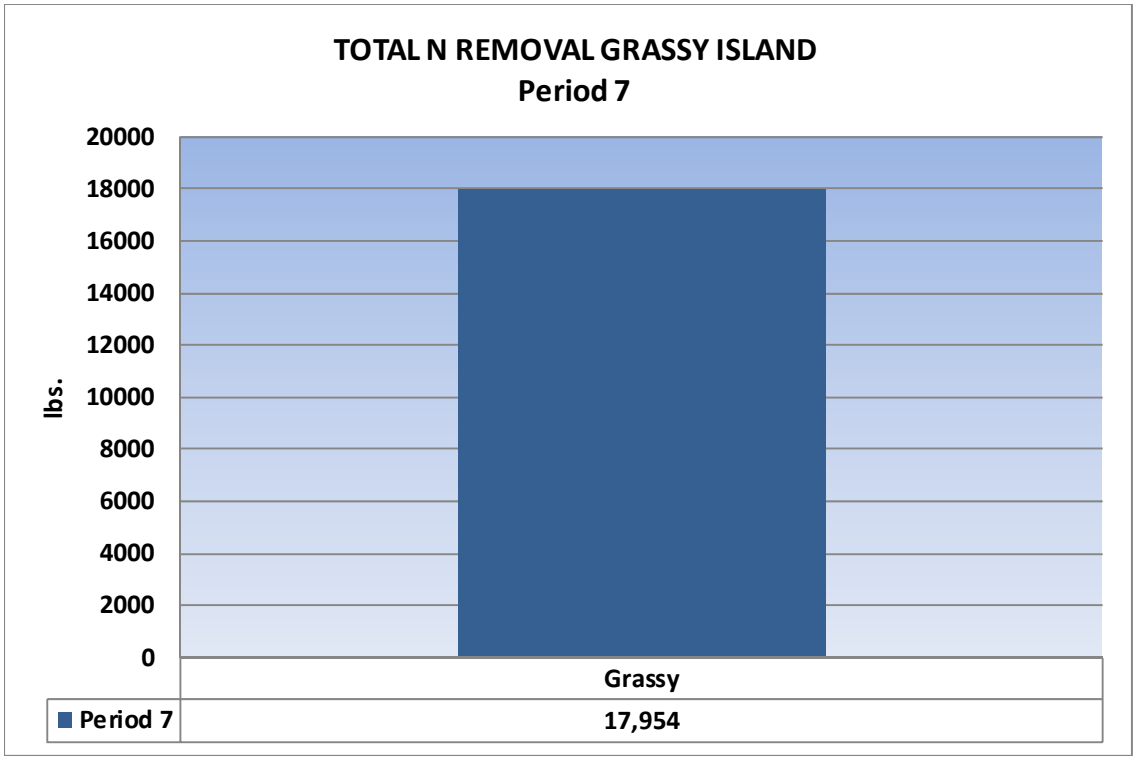


Figure 9. Total N Removal Grassy Island.

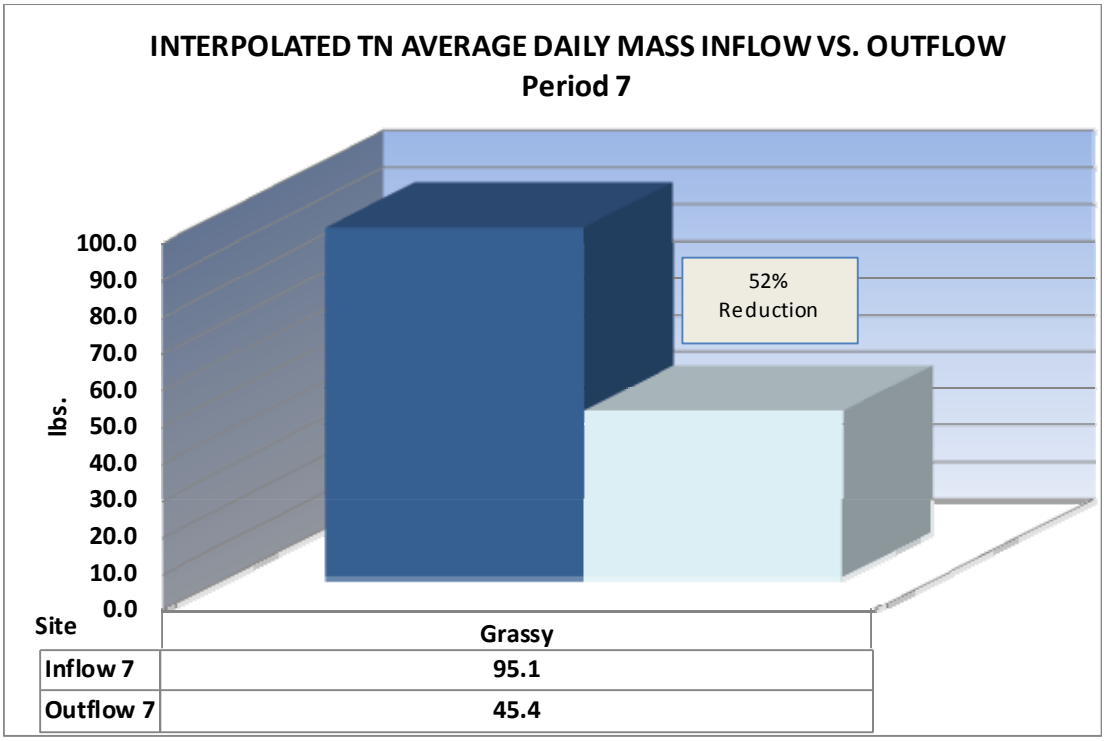


Figure 10. TN Mass Inflow & Outflow and % Load Reduction Grassy Island.

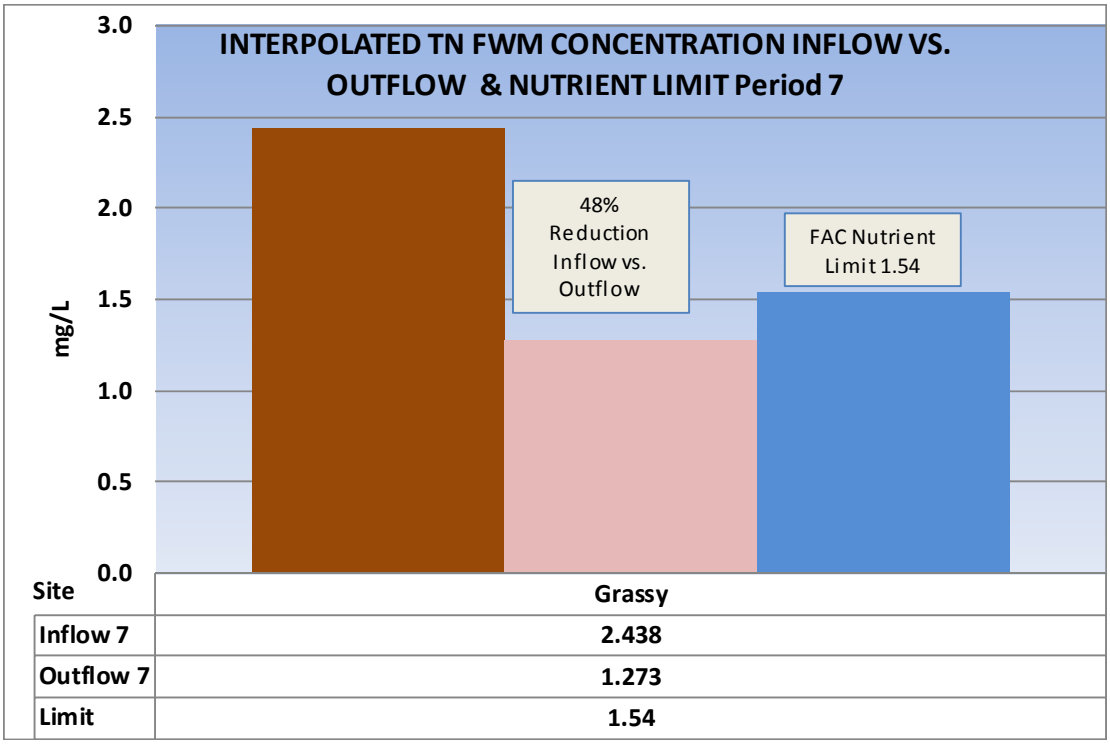


Figure 11. TN FWM Concentrations and % Reduction Grassy Island.

TN concentration was effectively reduced in all of the HWTT systems during the monitoring period. Arithmetic mean inflow TN concentration ranged from 1.56 mg/L at the Wolff Ditch HWTT facility to 5.13 mg/L at the Nubbin Slough facility. The lowest mean outflow TN concentration was observed at the Grassy Island HWTT system. N removal in this system appears to be enhanced by the shallow SAV zone, which provides an extended hydraulic retention time (HRT) in the back end of the system. The Ideal Grove system, which also incorporates a back-end SAV zone, achieved an average TN reduction of 56%, from an arithmetic mean concentration of 3.12 mg/L at the inflow to 1.37 mg/L in the outflow stream. Lower percent reduction of TN was observed at the Lemkin and Wolff HWTT facilities (21% and 20%, respectively), owing to the relatively low inflow concentration at both sites. Outflow TN concentrations at both Lemkin and Wolff (1.35 and 1.25 mg/L, respectively), however, were comparable to outflow TN at the Ideal and Grassy facilities. Arithmetic mean outflow TN concentrations were highest for Nubbin Slough (3.48 mg/L) and Mosquito Creek (2.08 mg/L), the two HWTT systems lacking a shallow vegetated zone. Nevertheless, reductions in arithmetic mean TN concentrations were favorable at both sites: 32% and 39% at Nubbin and Mosquito Creek, respectively.

Capacity Utilization & Flow Availability

Capacity utilization ranged from a low of 12% (Ideal Grove) to a high of 45% (Lemkin Creek) during the POR (Figure 12), with flows generally available at all sites for the period. Although low water levels may allow for system operations, they were sufficiently below plant treatment capacities for the majority of the POR, so as to adversely impact overall TP removal. Flows are depicted graphically in Figure 13 (daily in cubic feet per second {cfs}) and Figure 14 (total). The values represent inflow measurements to the HWTT facilities, which are not necessarily indicative of flow levels in the treated water bodies. Grassy Island presented the highest flows for the six systems, followed by the Wolff Ditch, Lemkin Creek, and Mosquito Creek facilities. Daily average flows compared to facility capacity are shown in the Site Specific Data Section of this Chapter.

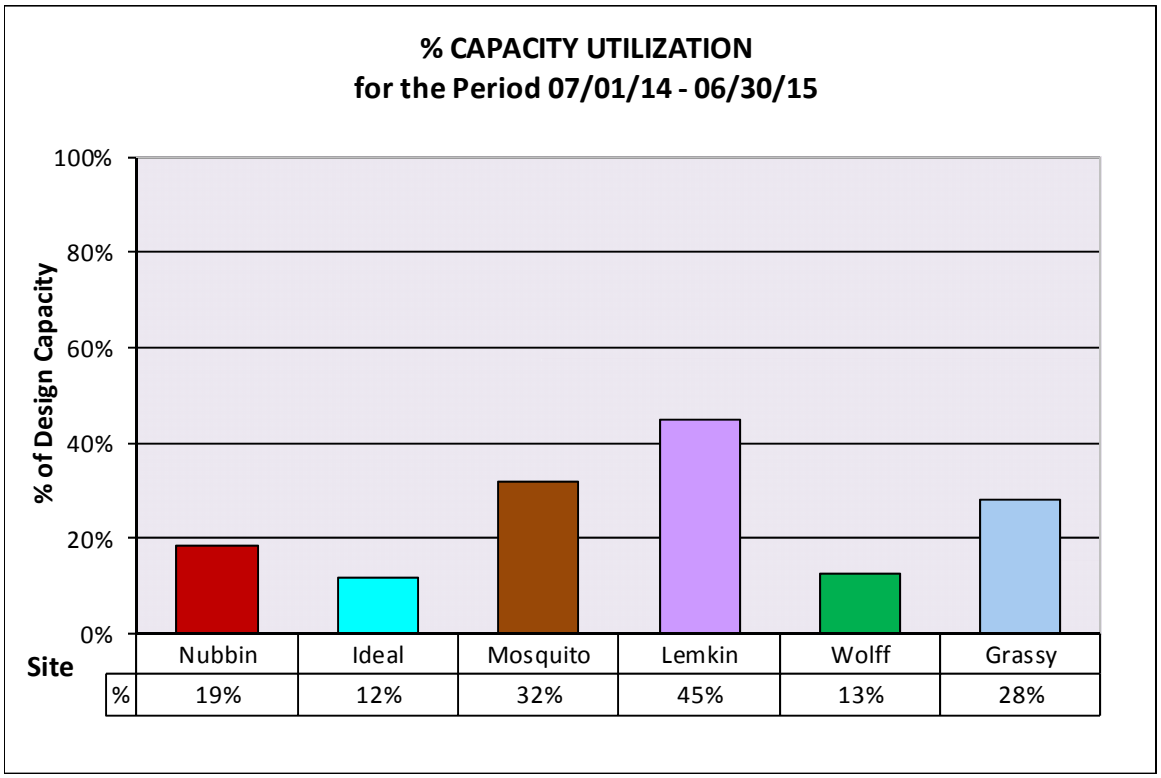


Figure 12. Utilization of facility capacity by Site.

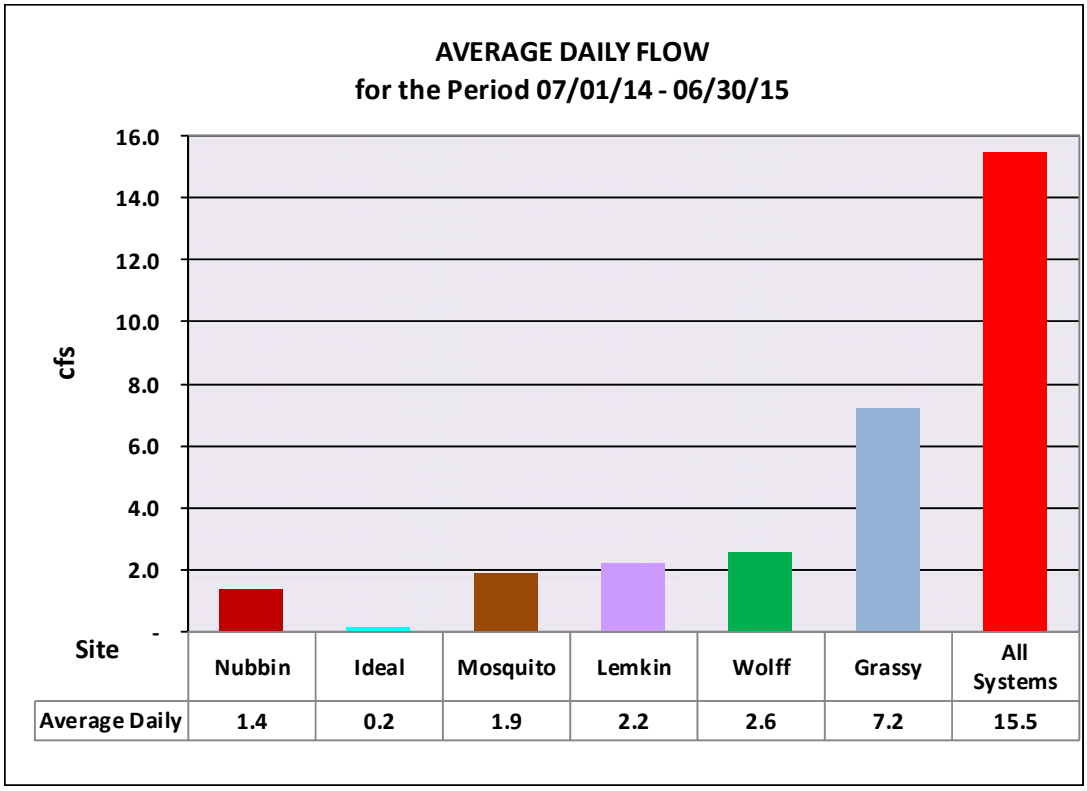


Figure 13. Average daily flow by Site and total daily all HWTT systems.

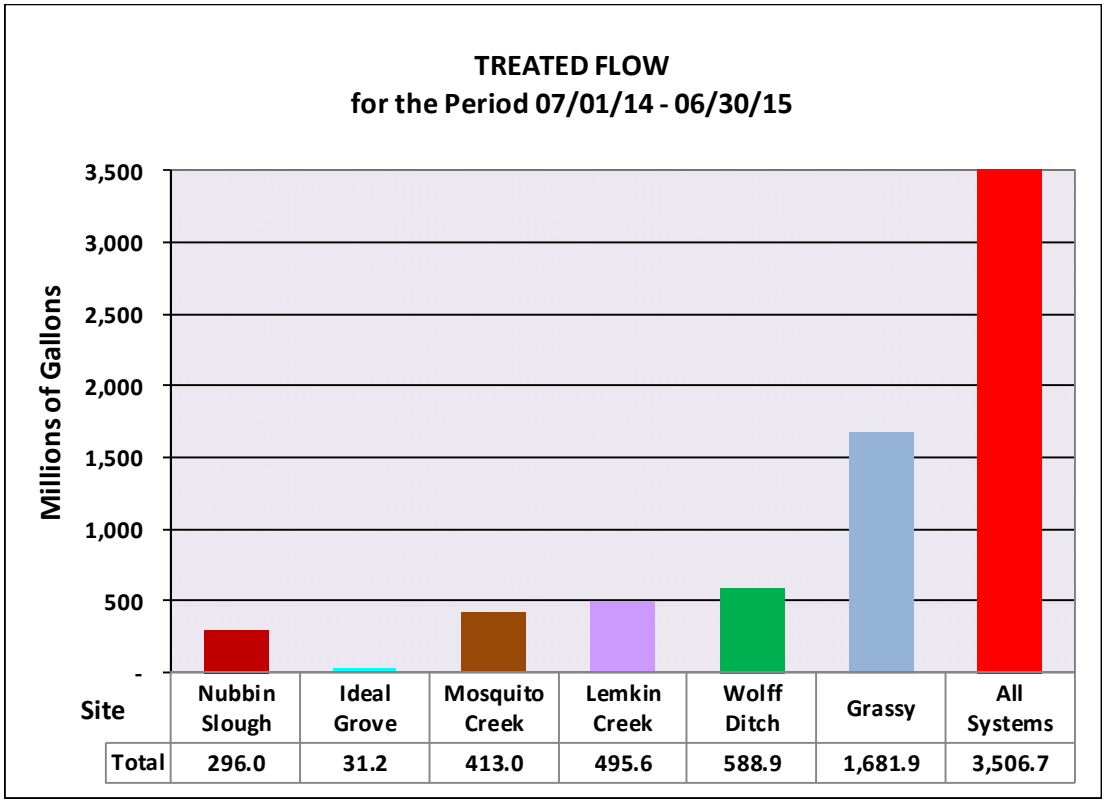


Figure 14. Total treated flow by Site and total all HWTT systems.

Comparisons Periods 1 – 7 Operational Facilities

Nubbin Slough, Ideal Grove, and Mosquito Creek facilities have operated for approximately seven years. The first operational contract spanned the period from November 21, 2008 through November 20, 2009 (Period 1 – construction is considered to be Period 0); the second contract encompassed the time from March 9, 2010 through March 8, 2011 (Period 2); the third POR was March 9, 2011 through September 30, 2011 (Period 3); the fourth POR covered October 1, 2011 through June 30, 2012 for Systems 1-3, 5-6 and November 13, 2011 through June 30, 2012 for System 7 (Period 4); the fifth POR was July 1, 2012 through June 30, 2013 (Period 5); and sixth POR is July 1, 2013 through June 30, 2014 (Period 6); and the seventh POR is July 1, 2014 through June 30, 2015 (Period 7). Lemkin Creek and Wolff Ditch commenced operational status at the beginning of Period 2. Optimization and Monitoring was conducted at the Grassy Island facility during Period 3 and operations began during Period 4. Grassy Island was also off-line from March 15, 2012 through June 30, 2012 for construction activities and again in May 2013. Operational improvements were made at all sites during Period 7 except Ideal Grove. Comparisons are relevant but are limited by changes in flow paths/configurations during Period 1, capital additions during Period 2 – 5, changes in plant capacity, and, most importantly, truncated time for both Periods 3 and 4. Data related to varying lengths of time will likely be skewed for purposes of comparisons with earlier analyses, particularly depending upon inclusion or exclusion of the wet season. The statistics presented do not include the operational results related to the intervening time between contracts, specifically, from November 21, 2009 through March 8, 2010.

Total Phosphorus Mass Removal

Figure 15 through Figure 21 compare interpolated TP mass inflow to outflow in lbs. per day and percent reduction rates for the seven operating periods for the six sites, as applicable, and indicate sustained TP removal performance. Each site requires separate review, as various factors, both controllable and non-controllable, affect TP percentage removal rates. For example, Nubbin Slough TP percentage removal was 70%, 91%, 86%, 72%, 78%, 69%, and 83%, respectively for the seven periods. The data shows that the TP mass inflow levels were elevated in Periods 3 and 7 (8.16 and 7.61 lbs. per day,

respectively), lowest in Period 2 (2.13 lbs. per day) and relatively mid-range in Periods 1, 4, 5 and 6 (5.79, 6.54, 4.63, and 4.56). Although the greatest percent reduction rates occurred during the highest and lowest mass inflow rates, generally, the % removal corresponds to the comparative TP levels for this site over time, the configuration of Nubbin Slough affecting TP performance rates. The Ideal Grove percentage TP reduction rate remained high during the current period at 93%, (45%, 94%, 86%. 96%, 96%, and 94% for the previous six periods), while TP mass inflow was 0.40, 0.35, 0.36, 0.28, .36 lbs. per day for Periods 1 – 5, with substantial increases in Periods 6 and 7 to .53 and .67 lbs. per day, respectively. Mosquito Creek percentage removal performance remained relatively consistent, even as inflow levels continued to increase. The Lemkin Creek percentage removal rate declined slightly, while TP inflow levels increased during the POR. Conversely, the percentage reduction declined from 83% to 60% for Wolff Ditch as average TP mass inflow increased (1.33 versus 2.16 lbs. per day). Grassy Island TP removal performance improved in the current period (81% versus 91%), while average mass inflow declined from 22.74 to 16.01 lbs. per day. Installation of a back-end limerock bed during Period 7 is a factor in performance at the site.

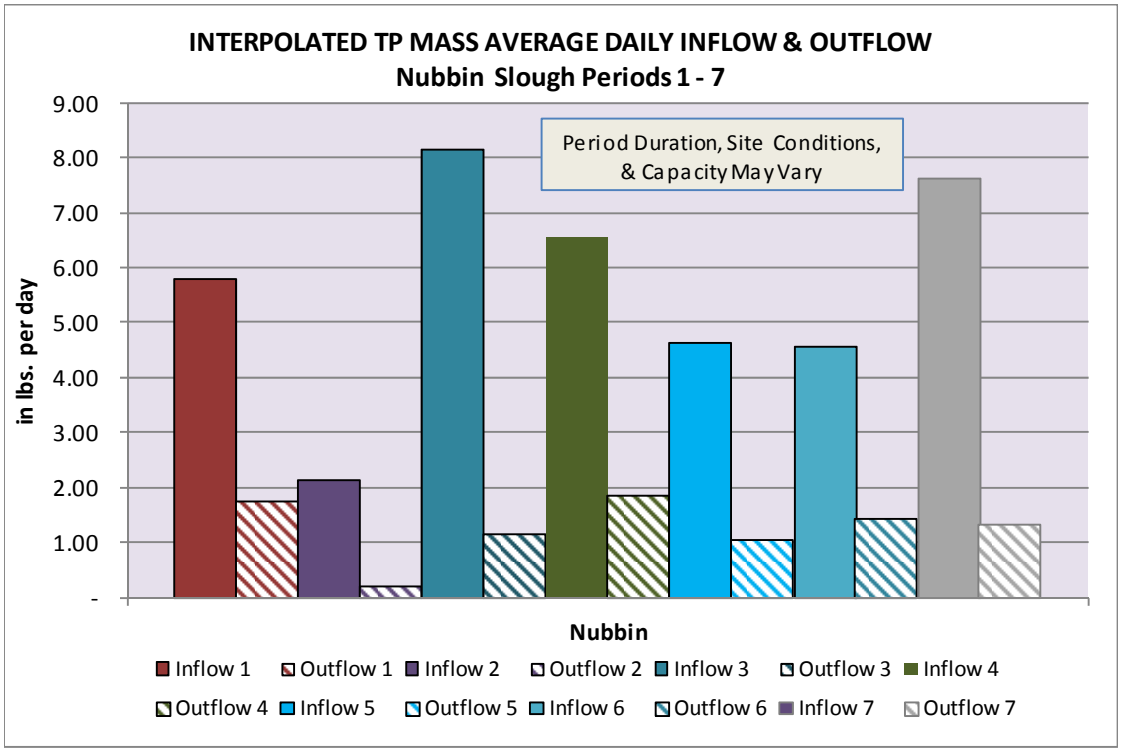


Figure 15. Interpolated TP Mass Inflow vs. Outflow Periods 1-7 Nubbin Slough.

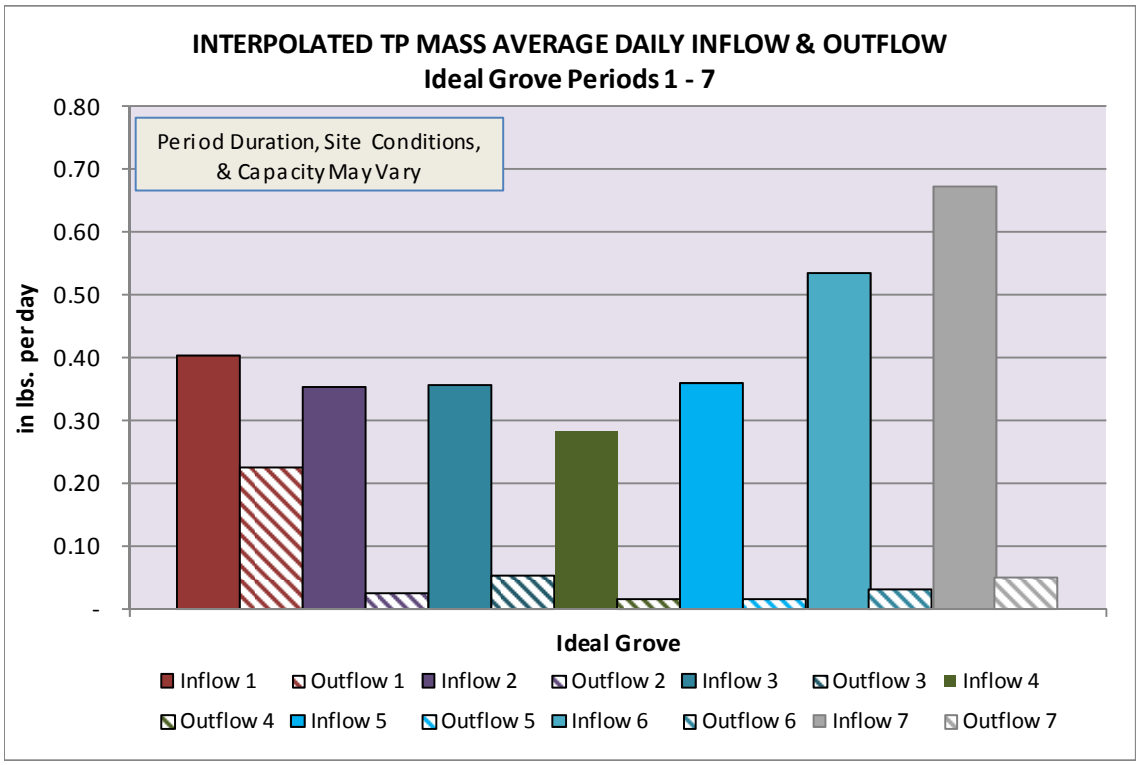


Figure 16. Interpolated TP Mass Inflow vs. Outflow Periods 1-7 Ideal Grove.

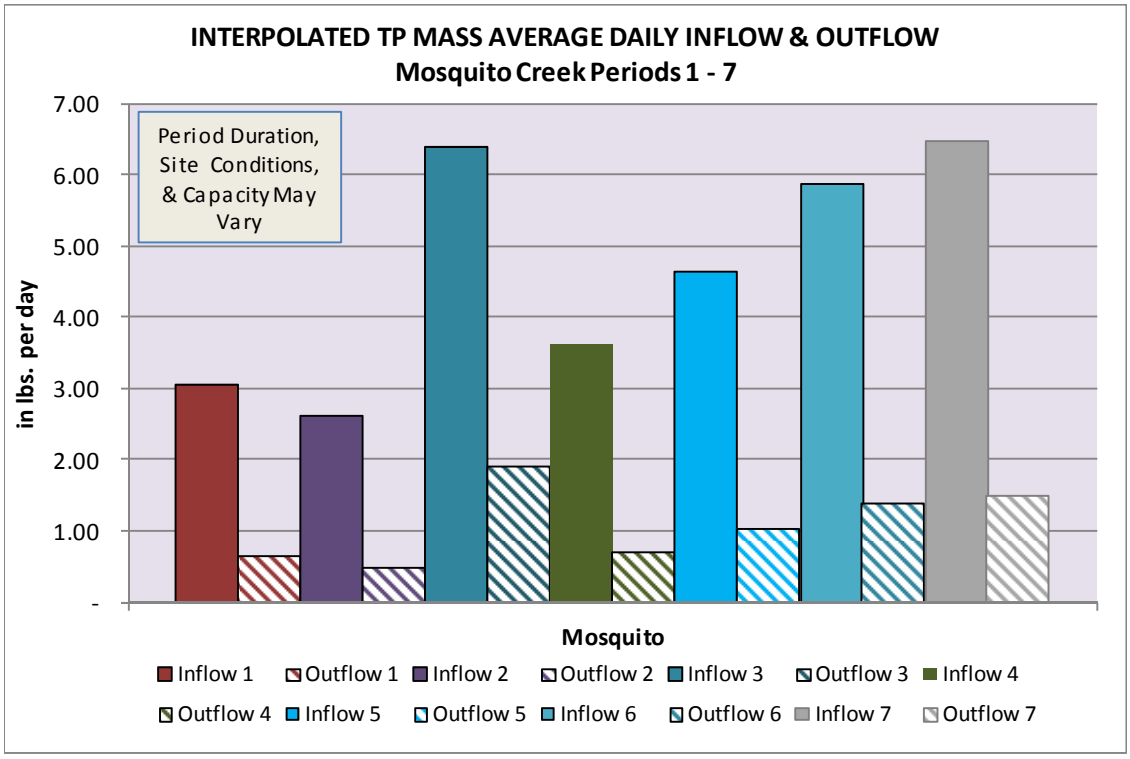


Figure 17. Interpolated TP Mass Inflow vs. Outflow Periods 1-7 Mosquito Creek.

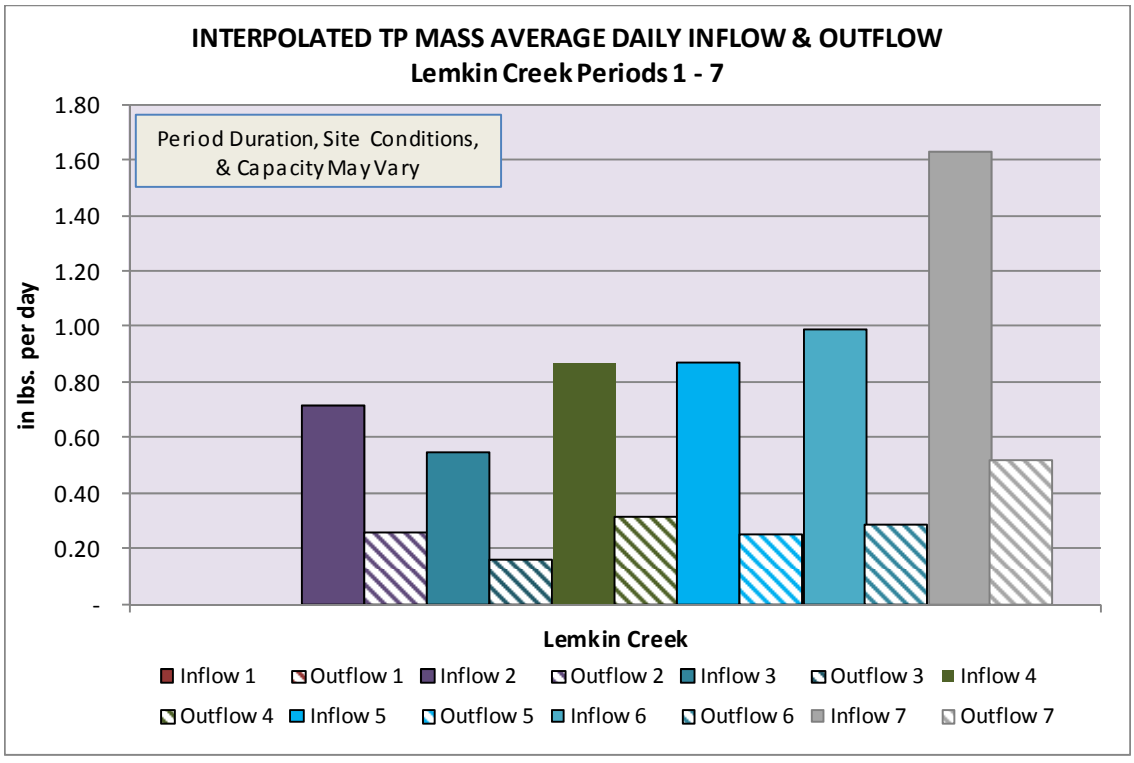


Figure 18. Interpolated TP mass Inflow vs. Outflow Periods 1-7 Lemkin Creek.

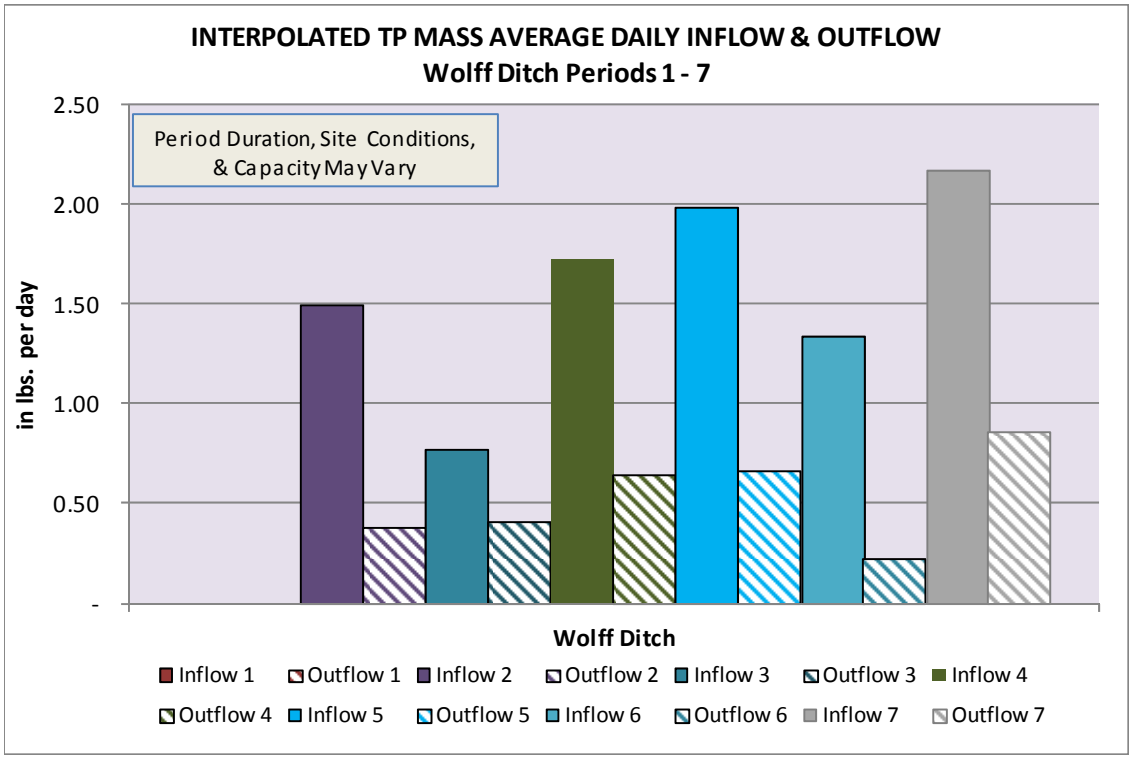


Figure 19. Interpolated TP mass Inflow vs. Outflow Periods 1-7 Wolff Ditch.

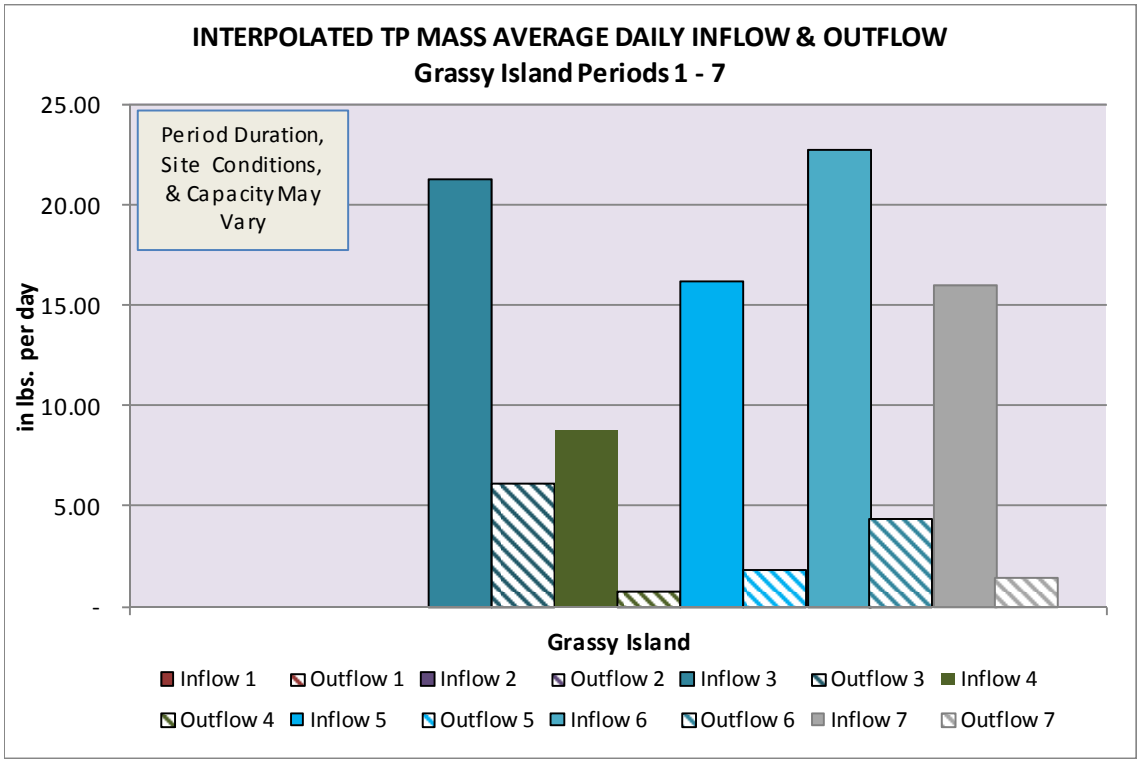
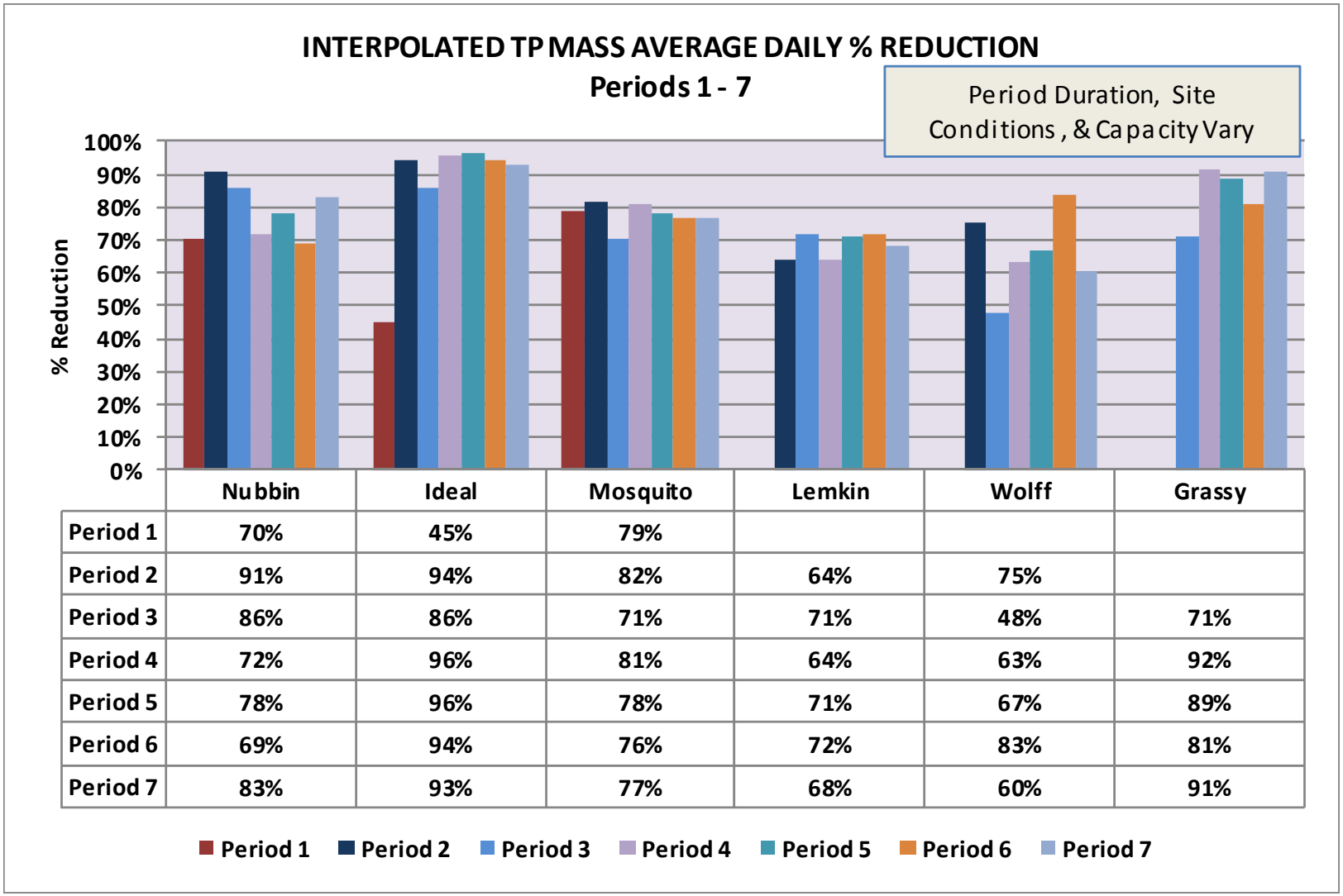


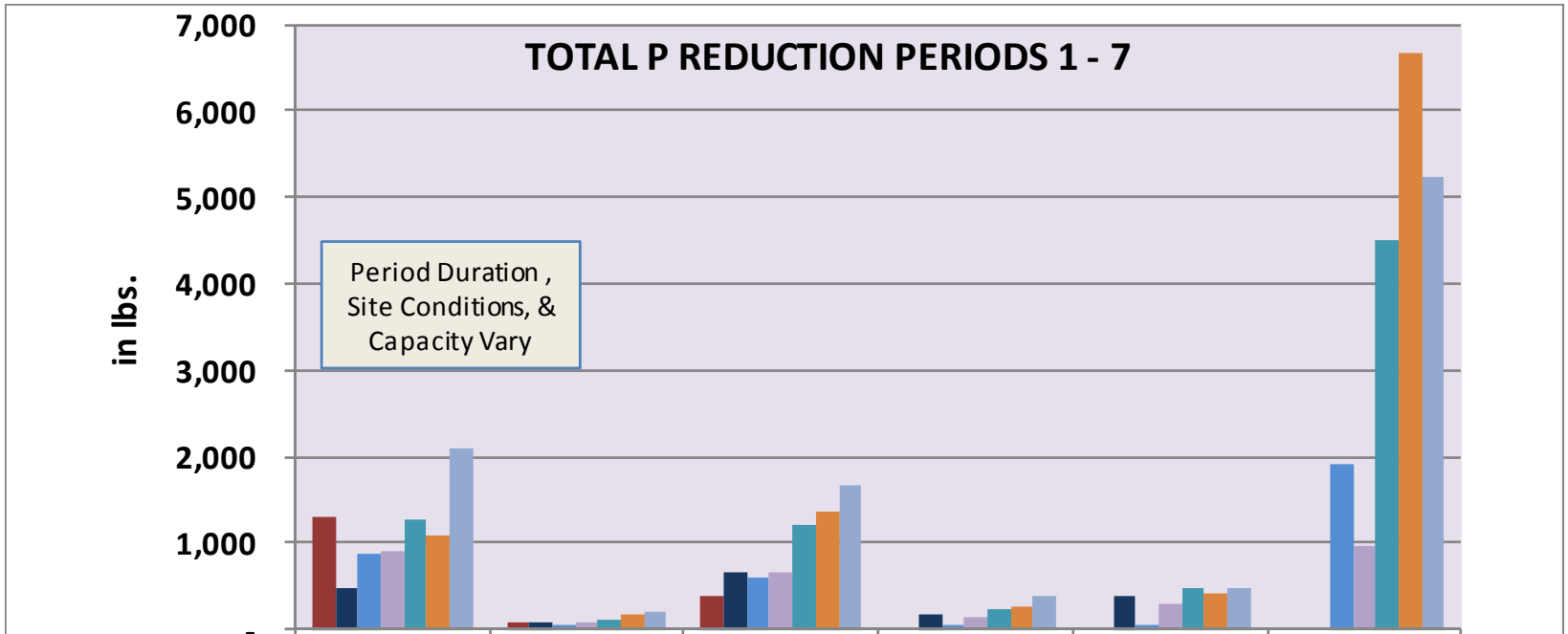
Figure 20. Interpolated TP mass Inflow vs. Outflow Periods 1-7 Grassy Island.



	Nubbin	Ideal	Mosquito	Lemkin	Wolff	Grassy
Period 1	70%	45%	79%			
Period 2	91%	94%	82%	64%	75%	
Period 3	86%	86%	71%	71%	48%	71%
Period 4	72%	96%	81%	64%	63%	92%
Period 5	78%	96%	78%	71%	67%	89%
Period 6	69%	94%	76%	72%	83%	81%
Period 7	83%	93%	77%	68%	60%	91%

Figure 21. Interpolated TP Mass Average Daily % Reduction Periods 1-7.

Figure 22 depicts the TP removal during each of the seven operational periods, calculated from interpolated samples. P reduction during the shorter time frames in the third and fourth periods cannot be compared from a performance basis to the prior 365 day period, while deployment of additional capacity at Grassy Island is also an important factor affecting TP comparisons. Extrapolations of removal performance are also not necessarily valid due to the uncertainty of the availability of flow.

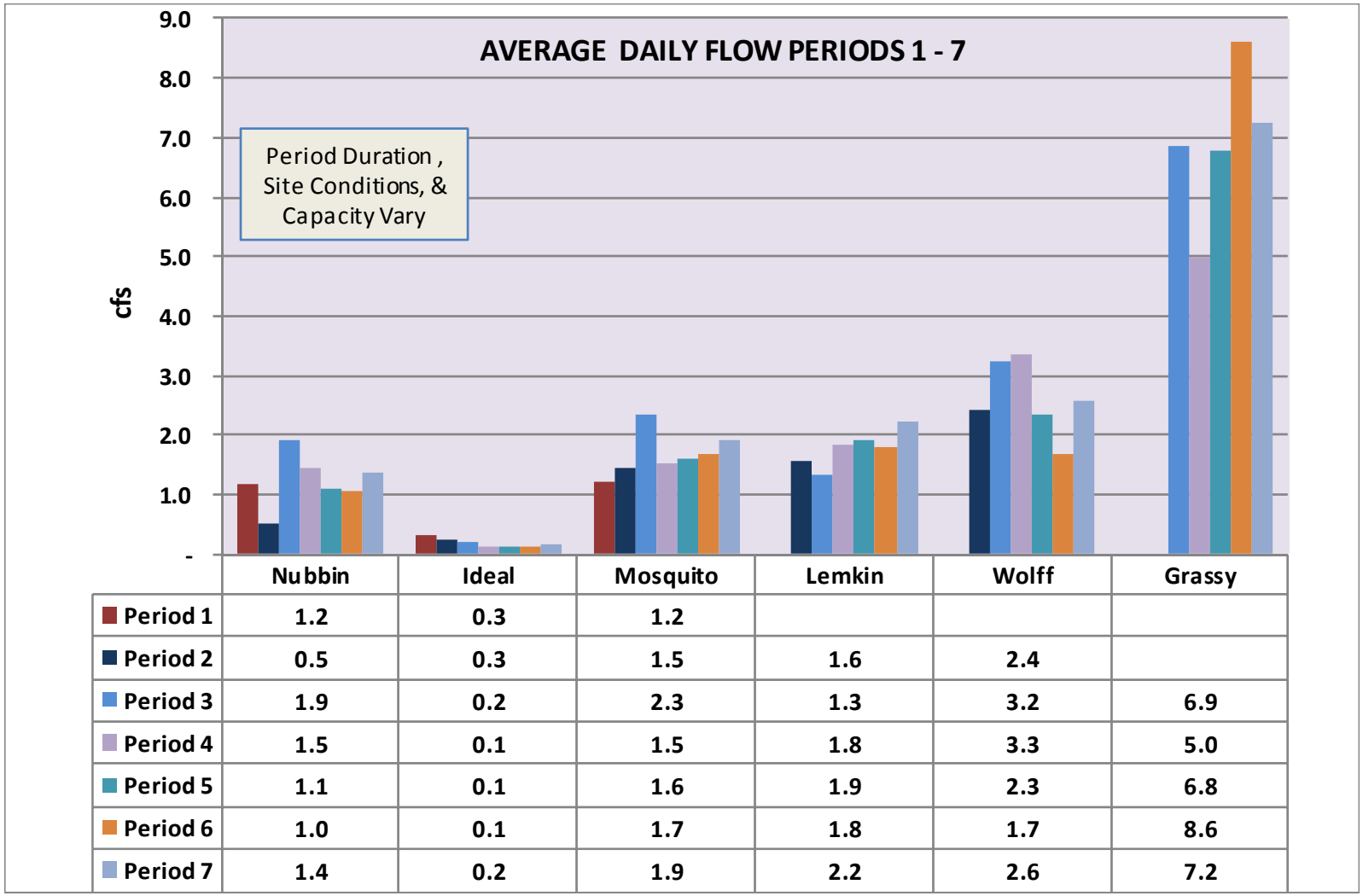


	Nubbin	Ideal	Mosquito	Lemkin	Wolff	Grassy
Per. 1-365 days	1,299	83	373			
Per. 2-365 days	466	84	664	155	393	
Per. 3-206 days	879	45	591	50	57	1,897
Per. 4-274 days	914	71	669	149	285	971
Per. 5-365 Days	1,280	117	1,214	223	472	4,493
Per. 6-365 Days	1,097	183	1,357	254	405	6,670
Per. 7-365 Days	2,088	195	1,653	380	466	5,248

Figure 22. Total P Reduction by Site Periods 1-7.

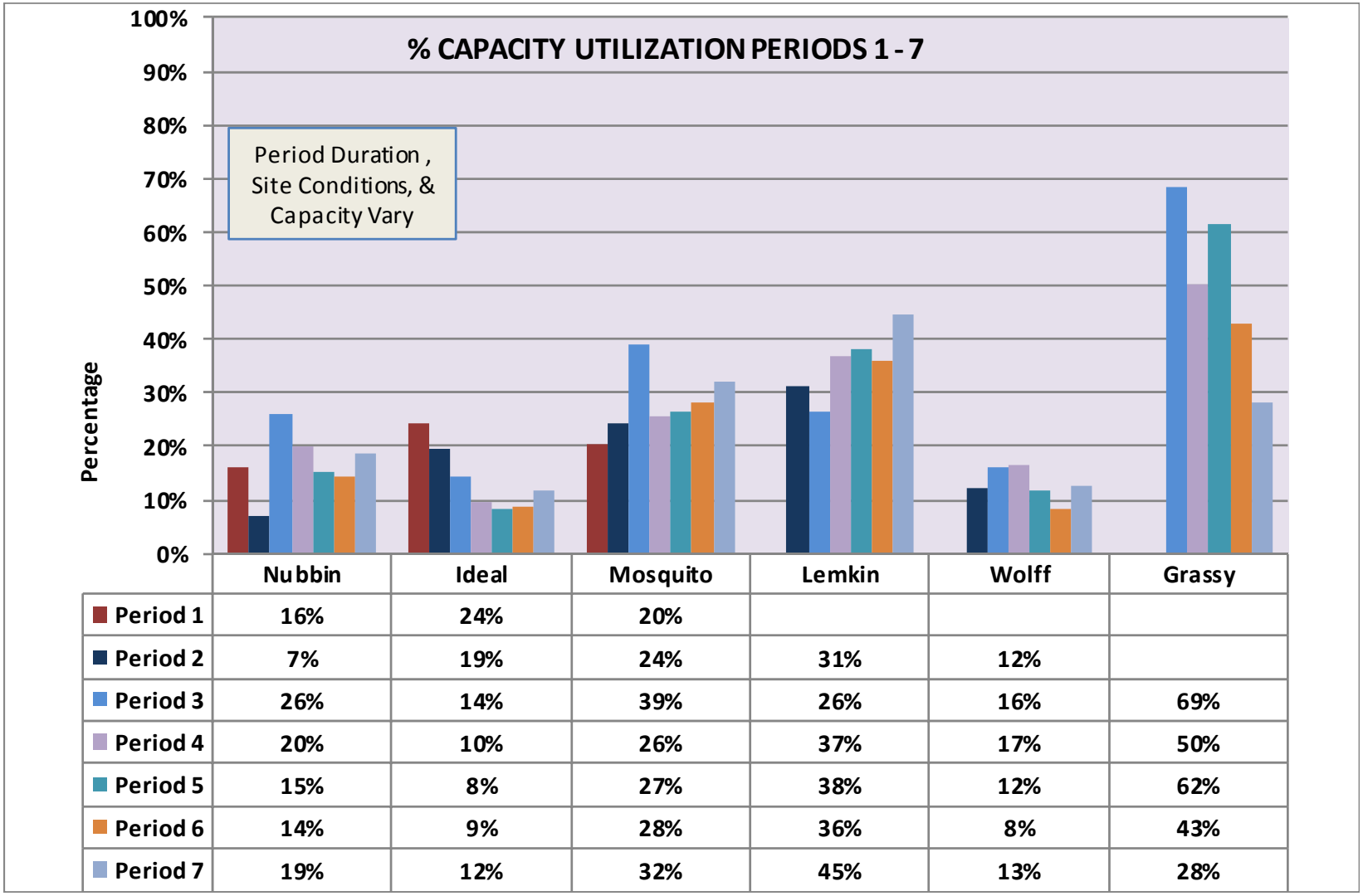
Flow and Capacity Utilization

Figure 23 and Figure 24 are comparative graphs showing average daily flow and percent capacity utilization for periods 1 – 7, respectively. All systems were available for treatment during the entire period (Table 3) with the exception of Nubbin Slough at 96% due primarily to down-time for floc removal. Average daily flow is highest for Grassy Island, across all systems. For Grassy Island, flows declined as permitted capacity increased during the POR, resulting in a significant reduction in capacity utilization.



	Nubbin	Ideal	Mosquito	Lemkin	Wolff	Grassy
Period 1	1.2	0.3	1.2			
Period 2	0.5	0.3	1.5	1.6	2.4	
Period 3	1.9	0.2	2.3	1.3	3.2	6.9
Period 4	1.5	0.1	1.5	1.8	3.3	5.0
Period 5	1.1	0.1	1.6	1.9	2.3	6.8
Period 6	1.0	0.1	1.7	1.8	1.7	8.6
Period 7	1.4	0.2	1.9	2.2	2.6	7.2

Figure 23. Average Daily Flow by Site Periods 1-7.



	Nubbin	Ideal	Mosquito	Lemkin	Wolff	Grassy
Period 1	16%	24%	20%			
Period 2	7%	19%	24%	31%	12%	
Period 3	26%	14%	39%	26%	16%	69%
Period 4	20%	10%	26%	37%	17%	50%
Period 5	15%	8%	27%	38%	12%	62%
Period 6	14%	9%	28%	36%	8%	43%
Period 7	19%	12%	32%	45%	13%	28%

Figure 24. % Capacity Utilization by Site Periods 1- 7.

Site Specific Data

Detailed performance and operating conditions are maintained for the individual HWTT facilities. The following discussion highlights significant activities and events during the POR including specific operating conditions, effective coagulant dosing, vegetation status, TP performance, TN performance (Grassy Island), and site specific temporal graphs for both the six operating facilities (Sites 1-3, 5-7) and Site 8, which is in the preliminary optimization phase.

TP and TN mass removal, TP and TN mass inflow versus outflow, and TP and TN concentrations are based upon sample points and linearly interpolated data. For those days in which the HWTT systems are off-line and/or for no-flow days, daily TP and TN concentrations are shown as gaps in the line plot to clarify that the concentrations are not zero. Mass removal remains plotted as "0" values, however, as no P or N are removed when flow is zero or the system is not operating.

Nubbin Slough (Site 1)

Nubbin HWTT was retrofitted from a prior conventional chemical treatment system and consists of a uniformly deep pond. The lack of a shallow vegetated zone at the Nubbin HWTT system impairs particulate phosphorus (PP) filtration/settling downstream of the contact zone, thereby resulting in relatively higher outflow TP levels. At the Nubbin site, HWTT mesocosms (2008 – 2010) equipped with a shallow vegetated region were able to reduce settling zone outflow TP levels of 114 μg/L down to a final discharge concentration of 30 μg/L.

Nubbin Slough operated mostly continuously during the POR with some down-time due to equipment and electrical malfunctions; floc removal and operational improvements were also completed in the latter part of the period. Flows were moderate with fluctuations through April and then declined. Site 1 had the highest interpolated TP FWM inflow concentration (1,011 μg/L) of the six HWTT operating facilities. The interpolated TP FWM outflow was 179 μg/L, an 82% reduction for the period. The effective dosing of alum ranged from 10.5 to 18.7 mg/L, and the average effective dosing of alum was 14.7 mg/L as Aluminum (Al) for the period. The effective dose was selected to accommodate pH, alkalinity, and color characteristics of the inflow slough waters and other site conditions. TP levels are interpolated from approximately weekly samples.

During the POR, several maintenance, operational improvements, and floc-related activities to enhance performance were completed at the Nubbin Slough site. Periods 1 and 2 saw the excavation for and installation of a new flow meter in the system main inflow pipe. A circuit board on the meter subsequently failed and was replaced during Period 3. To monitor the floc with greater precision, a floc camera system was initiated during Period 4 and completed in a later month. An evaluation of hydraulic conductivity of the previously refurbished limerock bed was performed during Period 5, which indicated that no further maintenance was required. Floc depth measurements were performed during Period 6 in anticipation of the process of floc removal to the adjacent drying beds during the upcoming months. Low water conditions allowed completion of routine maintenance activities

around the inflow structure in Period 7. During Period 8, a floating plant mat became colonized by an invasive terrestrial vine (*Commelina* sp.), which was controlled during the floc removal efforts in spring 2015.

To increase the pH and alkalinity of discharge waters, efforts related to the siting and layout of a back-end limerock bed were initiated during Period 9. During Period 10, the pond water levels were drawn down and an outflow limerock bed buffering system was installed at the Nubbin Slough HWTT facility. Wet floc was also removed from the pond and pumped into the adjacent drying bed in conjunction with the draw-down. During Period 11, the system was restarted; however, the water levels in the pond increased quite slowly due to limited water availability in Nubbin Slough, which persisted through Period 12 due to lack of rainfall. The floc drying areas were inspected during Period 12 to assess the condition of the wet floc that was pumped to the beds during the prior two periods.

Interpolated TP mass removal over time is depicted graphically in Figure 25 together with percent daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 26. Interpolated inflow and outflow TP concentration levels for the period are shown in Figure 27. Daily average flows in cfs are shown in Figure 28 compared to system capacity. The effective dosing of alum and the average for the POR is depicted in Figure 29. Detailed operating data is contained within Appendix III.

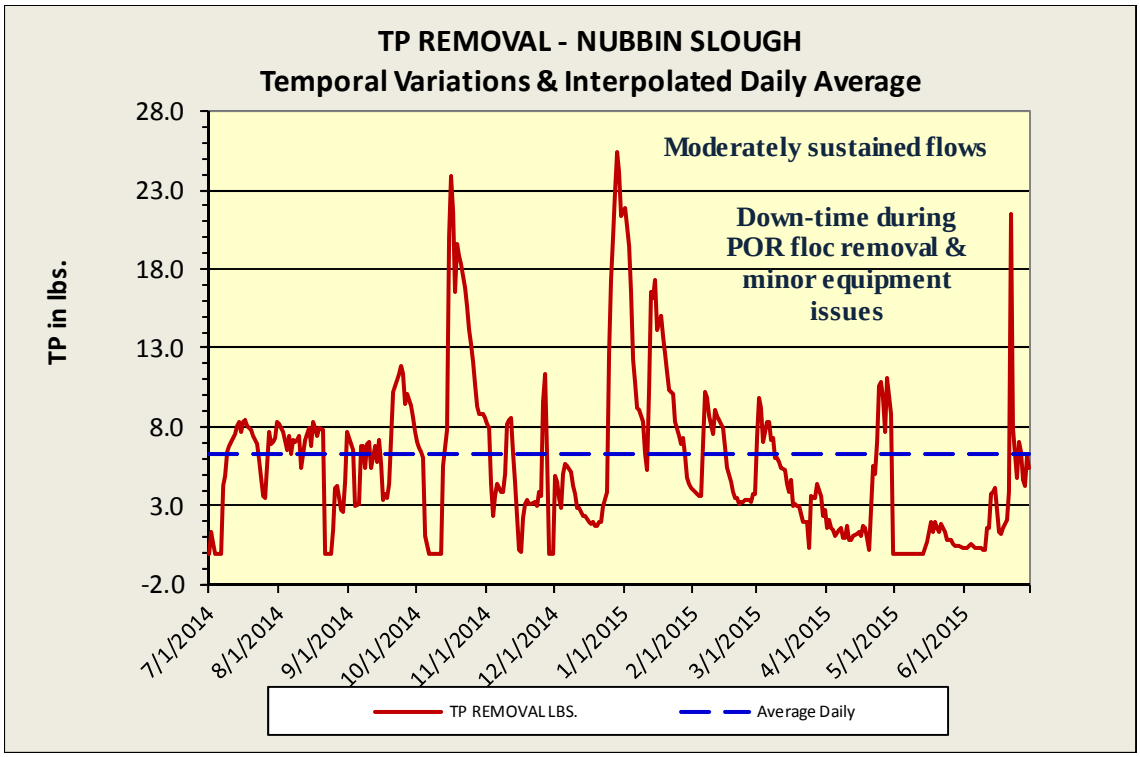


Figure 25. Interpolated TP Removal Temporal Variations & Daily Average Nubbin Slough.

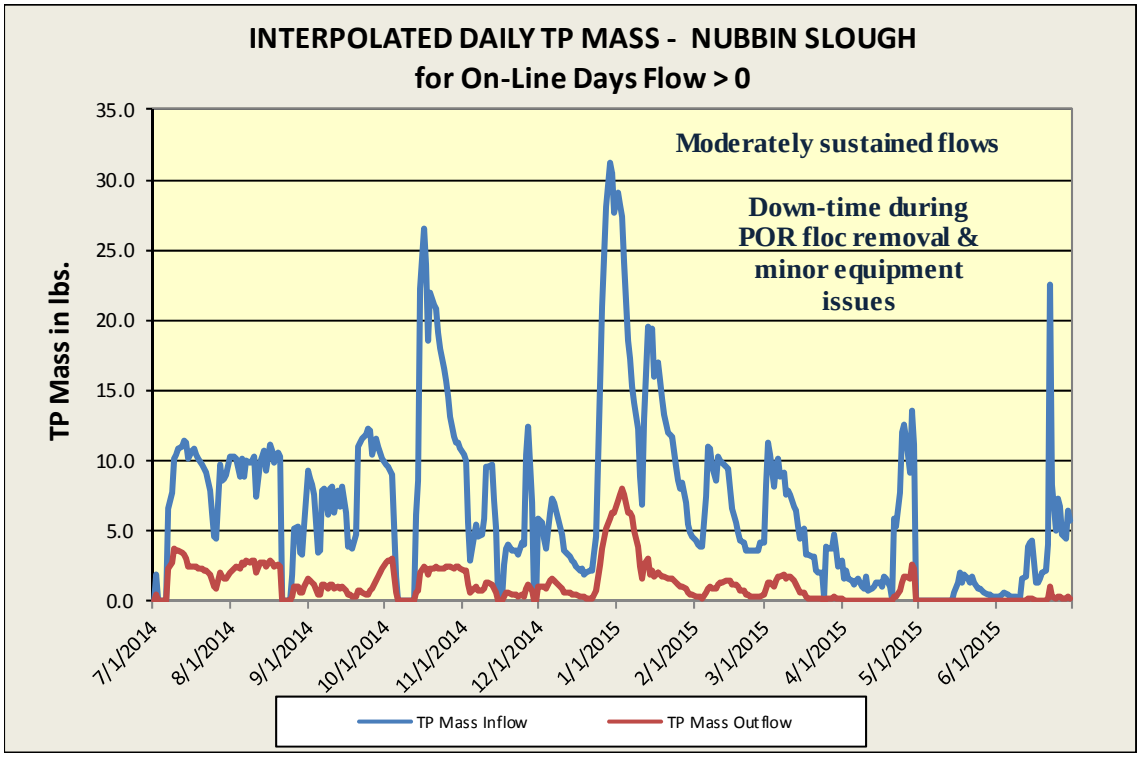


Figure 26. Interpolated Daily TP Mass Inflow versus Outflow Nubbin Slough.

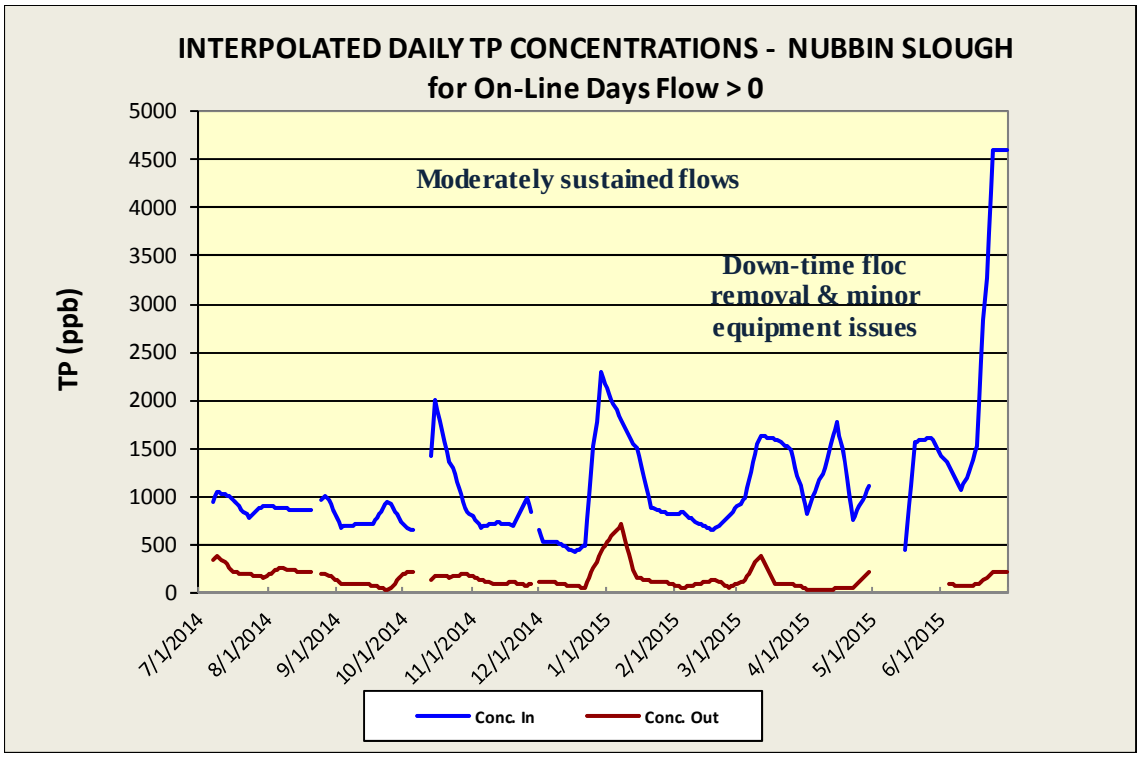


Figure 27. Interpolated Daily TP Concentrations Inflow versus Outflow Nubbin Slough.

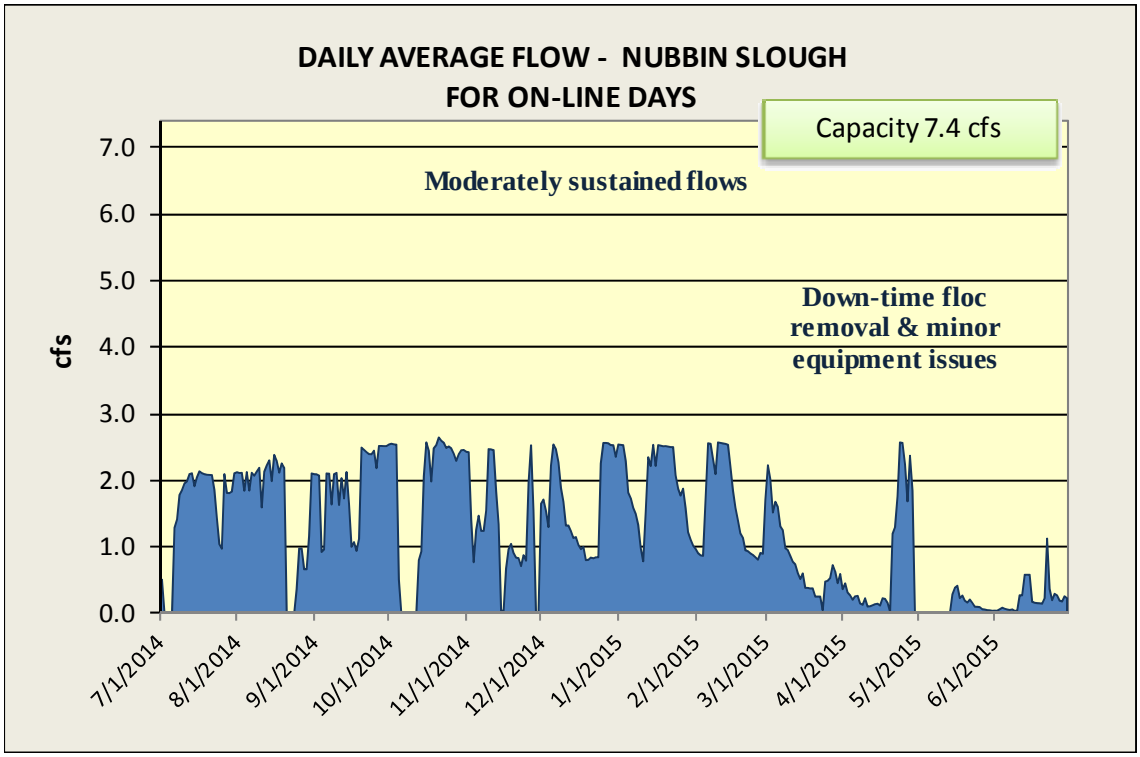


Figure 28. Daily Average Flows versus Capacity Nubbin Slough.

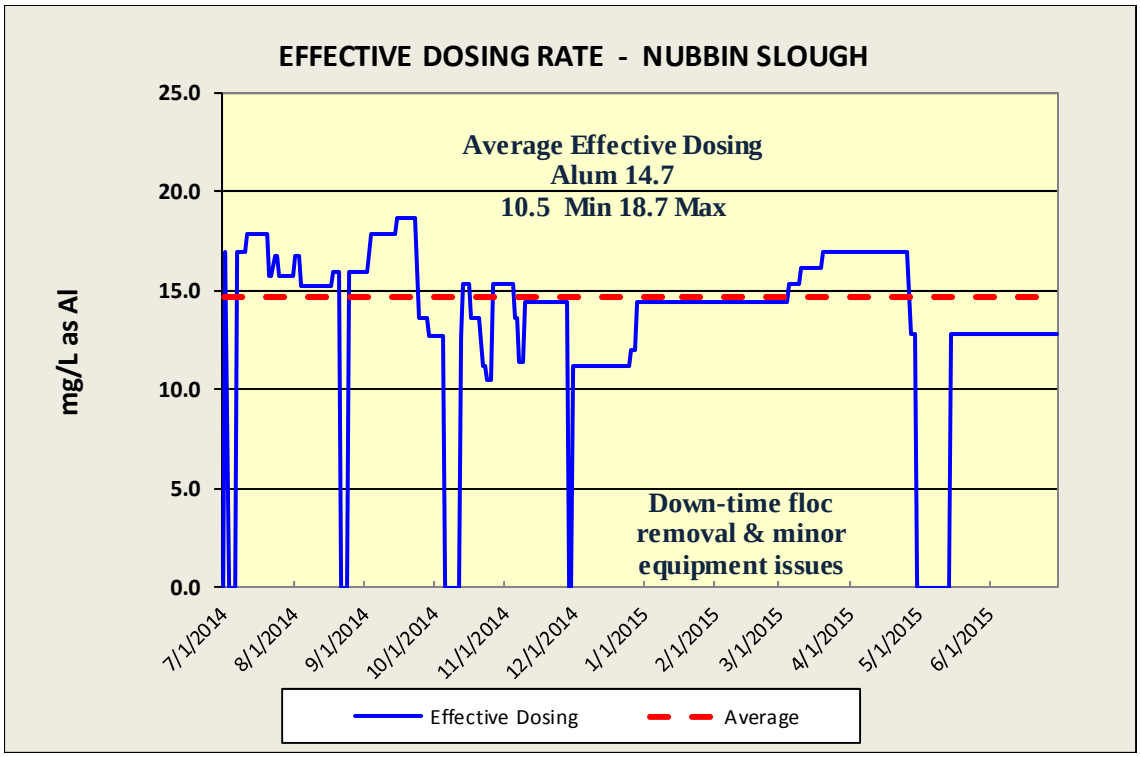


Figure 29. Daily Effective Dosing Rate and Average for the POR Nubbin Slough.

Ideal Grove (Site 2)

Operations at Ideal Grove were interrupted by flow sensor failure, pump malfunctions, and other minor issues during the POR. Flows were below capacity but sustained, declining during the latter months. Site 2 had the second highest interpolated TP FWM inflow concentrations (814 μg/L) of the six HWTT operating facilities. The interpolated TP FWM outflow concentration was 56 μg/L for the period, which represents the highest TP removal rate of 93%. The average effective dosing of alum was 12.3 mg/L as Al with a range of 7.5 to 29.0 mg/L as Al. The highest dosing occurred following downtime from the pump outage. TP levels are interpolated from approximately weekly samples.

Several notable events occurred at Ideal Grove during the POR involving aquatic flora as well as equipment malfunctions. During Period 1, *Salvinia* dramatically returned after colonizing and dying off in the front-end of the system. The submerged aquatic vegetation (SAV) *Chara* in the back end of the pond began to fill the water column and top out to the surface. Troubleshooting efforts were initiated after repeated problems were encountered with the inflow water pump when it lost its prime late in Period 2. The inflow water pump failed again during Period 3 and was removed, and a new pump was installed during Period 4. A damaged Ground-Fault Interrupter (GFI) circuit was repaired during Period 5; and a second GFI circuit was also repaired during Period 6, allowing the halted operations to resume and continue uninterrupted for the rest of the period.

Several preventive maintenance activities were performed during Period 7, including replacement of the wiring from the flow sensor to the flow monitor. During Period 8, filamentous algae mats containing very small *Pistia stratiotes* (water lettuce) plants appeared in the system inflow region, though its adaptability to this area is yet unknown. Low water conditions in the farm canal caused fouling of the system pump intake screen, (which was removed and cleaned during Period 9), and the intermittent shutdown of the inflow pump during Period 10. This intermittent pumping schedule and occasional stagnant conditions in the system, caused filamentous algae mats in the inflow region of the pond in Period 11. During Period 12, the HWTT system flow sensor began providing inaccurate readings and was subsequently removed and repaired.

Interpolated TP mass removal over time is depicted graphically in Figure 30 together with the daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 31. Interpolated inflow and outflow TP concentration levels for the period are shown in Figure 32. Daily average flows are shown in Figure 33 compared to system capacity. The effective dosing of alum and the average for the POR is depicted in Figure 34. Detailed operating data is contained within Appendix IV.

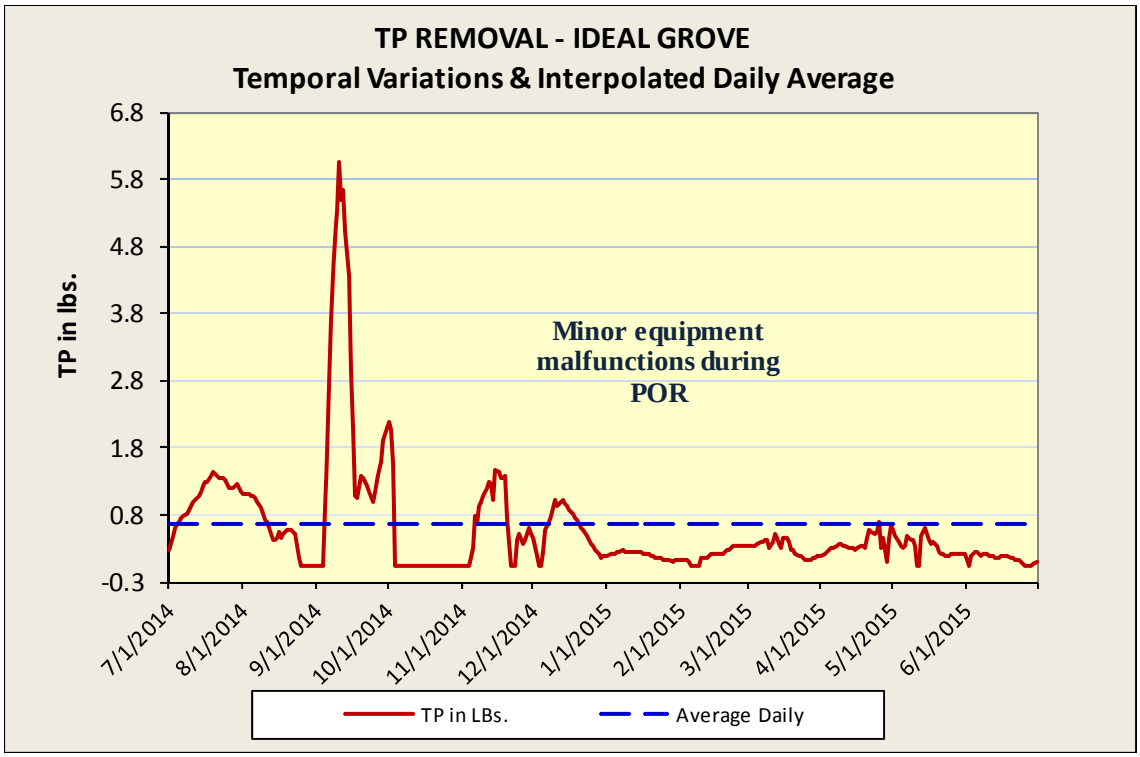


Figure 30. Interpolated TP Removal Temporal Variations & Daily Average Ideal Grove.

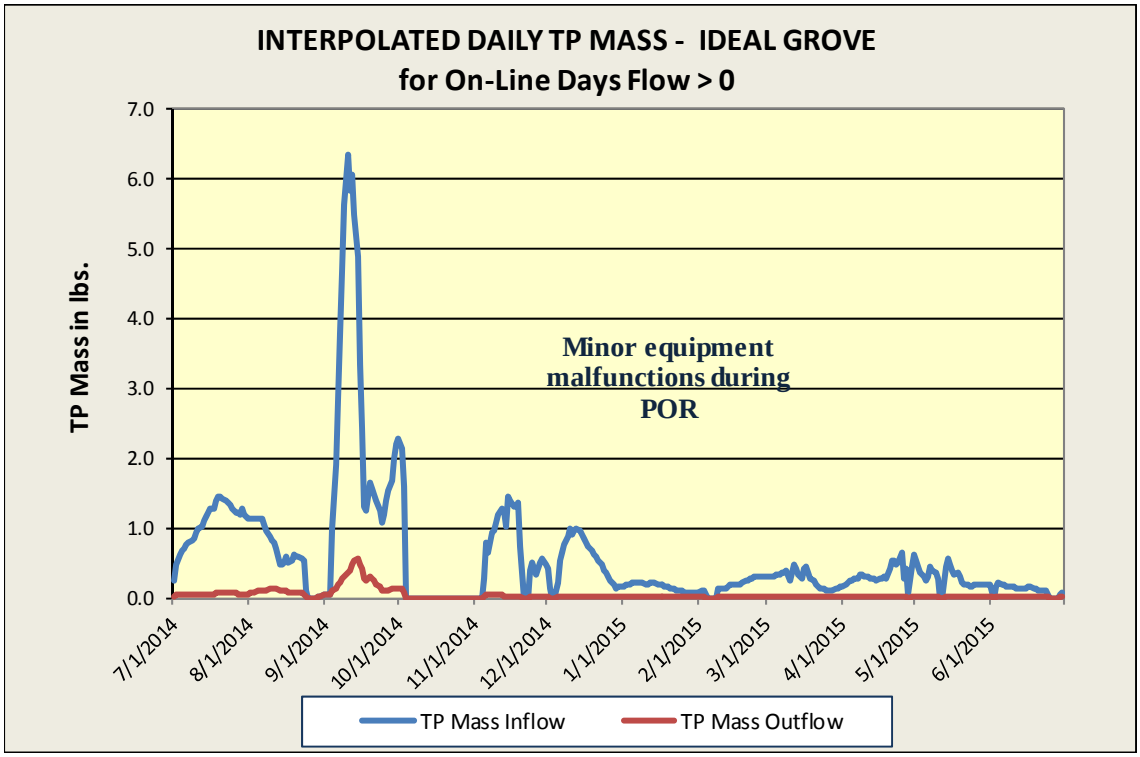


Figure 31. Interpolated Daily TP Mass Inflow versus Outflow Ideal Grove.

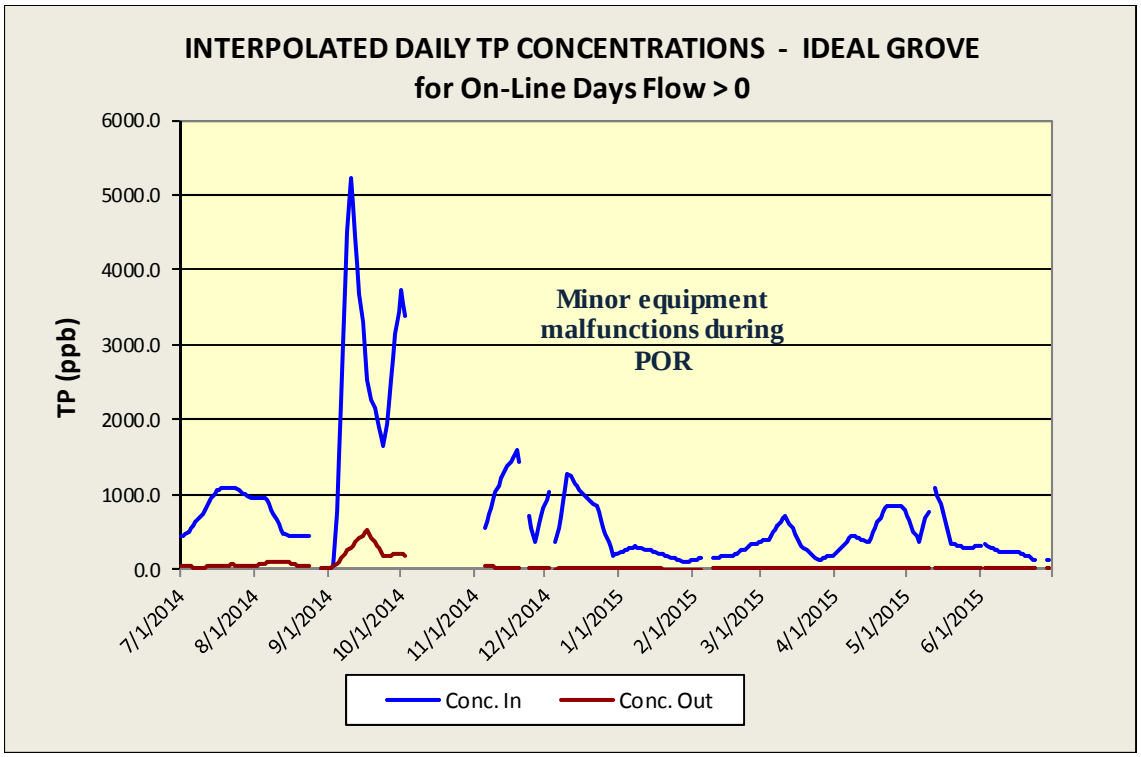


Figure 32. Interpolated Daily TP Concentrations Inflow versus Outflow Ideal Grove.

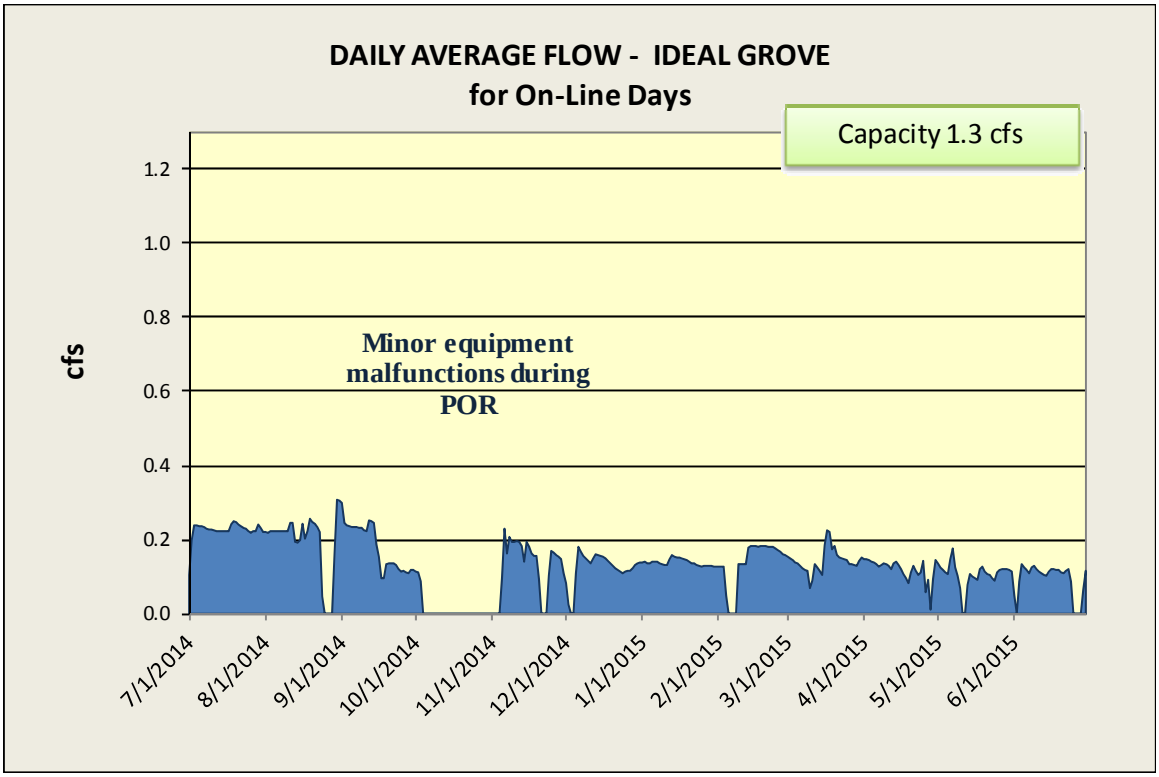


Figure 33. Daily Average Flows versus Capacity Ideal Grove.

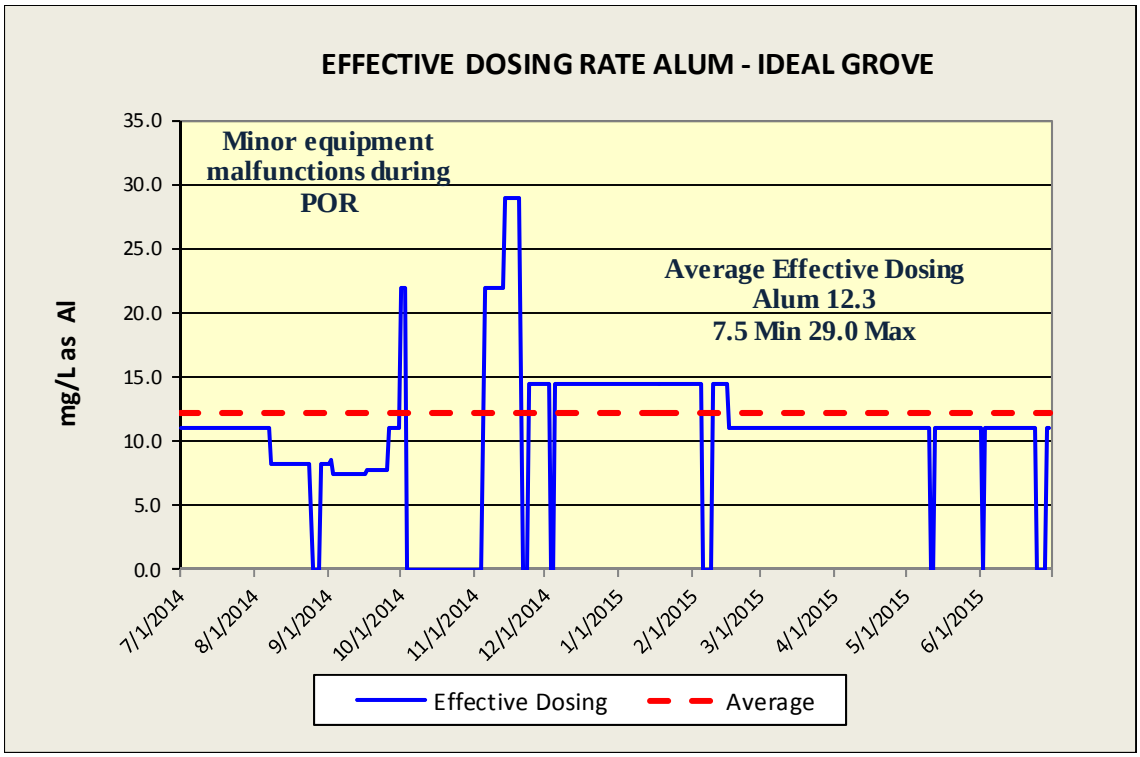


Figure 34. Daily Effective Dosing Rate and Average for the POR Ideal Grove.

Mosquito Creek (Site 3)

Mosquito Creek operated continuously during the POR with only very minor equipment issues; however, the system was taken off-line for floc removal and operational improvements during parts of April and May. Flows were very stable and sustained through March and subsequently declined. Site 3 had the third highest interpolated TP FWM inflow concentration (621 μg/L) of the six HWTT operating facilities. The interpolated TP FWM outflow was 142 μg/L, a 77% average removal for the period. The P levels were relatively high with intermittent spikes, particularly during the rainy season. The effective dosing of alum ranged from 6.0 to 21.3 mg/L, and the average was 11.0 mg/L as Al for the period. Polyaluminum chloride (PAC) was not utilized during the POR. Dosing adjustments were made as necessary based upon on-site conditions. TP levels are interpolated from approximately weekly samples.

Weather events and operational improvements were the primary factors affecting Mosquito Creek during the POR. The system flow meter and master instrumentation controller were repaired during Period 1 due to a lightning strike, resulting in operational adjustments being made to the system as a consequence of the damage. During Period 2, recalibration of the flow instrumentation and chemical pumps was continued to ensure provision of accurate dosing of coagulant, despite the earlier lightning strike. The post-coagulant dosing pH monitor was removed and replaced due to failure during Period 3. In response to an increase in alkalinity levels in Mosquito Creek during Period 4, the HWTT system intermittent coagulant dosing frequency was altered. During Period 5, floc depth measurements were performed in the inflow region in anticipation of upcoming floc removal/tilling efforts. The pH monitor that is used in conjunction with the facility's floc camera failed and subsequently was replaced during Period 6.

During Period 7, vegetation clearing from the facility's drying bed was initiated in preparation for upcoming floc removal efforts. During Period 8, design efforts were initiated for a back-end limerock bed that was to be deployed downstream of the system outflow culverts, and in Period 9, the removal of vegetation from the floc drying bed was completed. During period 10, the pond water levels were drawn down and the outflow

limerock bed buffering system was installed to increase the pH and alkalinity of discharge waters, meant to support the reduction of outflow PP and total Al levels. During Period 11, a hairline crack developed in one of the facility's coagulant storage tanks, causing a very slow alum leak. The tank subsequently was drained, and a replacement storage tank was ordered and delivered during Period 12.

Interpolated TP mass removal over time is depicted graphically in Figure 35 together with the daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 36. Interpolated concentration inflow and outflow levels for the period are shown in Figure 37. Daily average flows are shown in Figure 38 compared to system capacity. The effective dosing of alum and the average for the POR is depicted in Figure 39. Detailed operating data is contained within Appendix V.

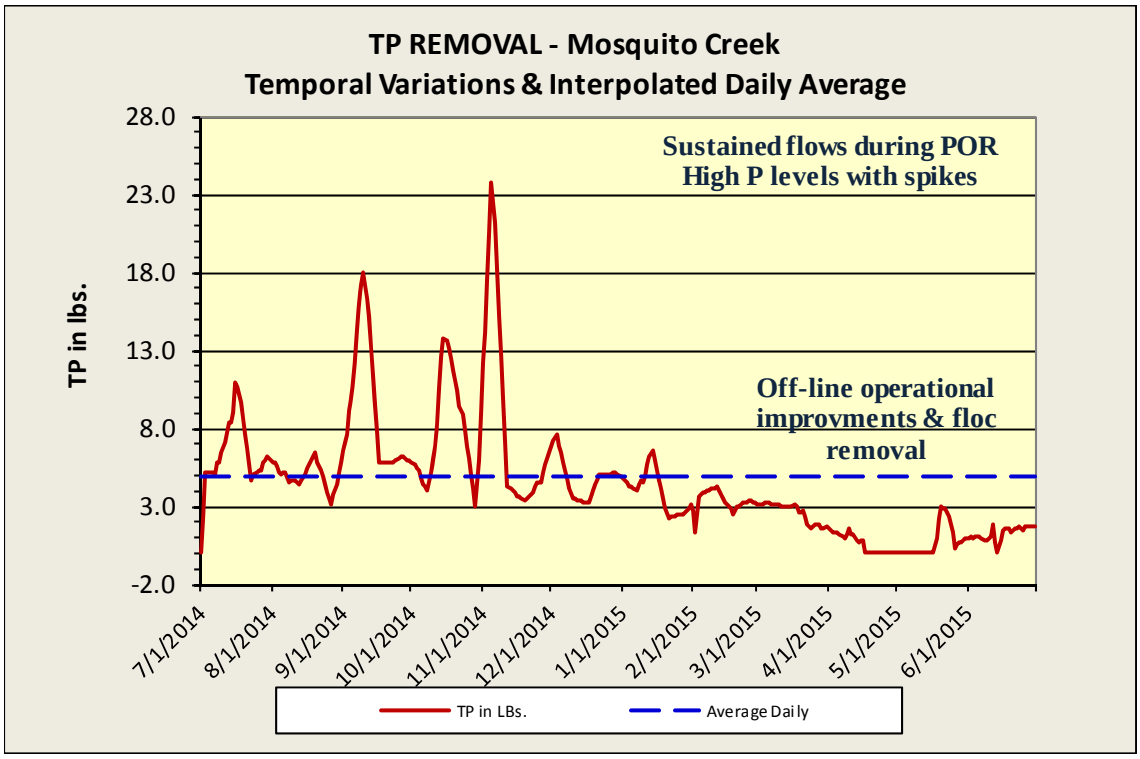


Figure 35. Interpolated TP Removal Temporal Variations & Daily Average Mosquito Creek.

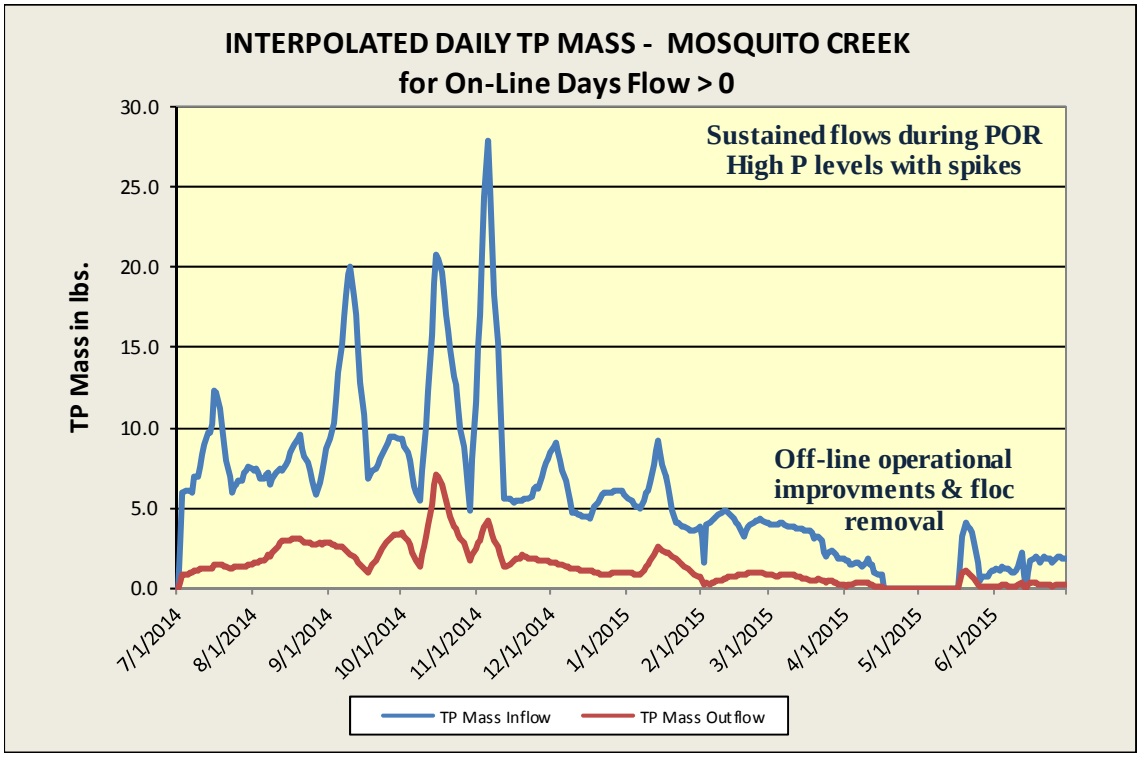


Figure 36. Interpolated Daily TP Mass Inflow versus Outflow Mosquito Creek.

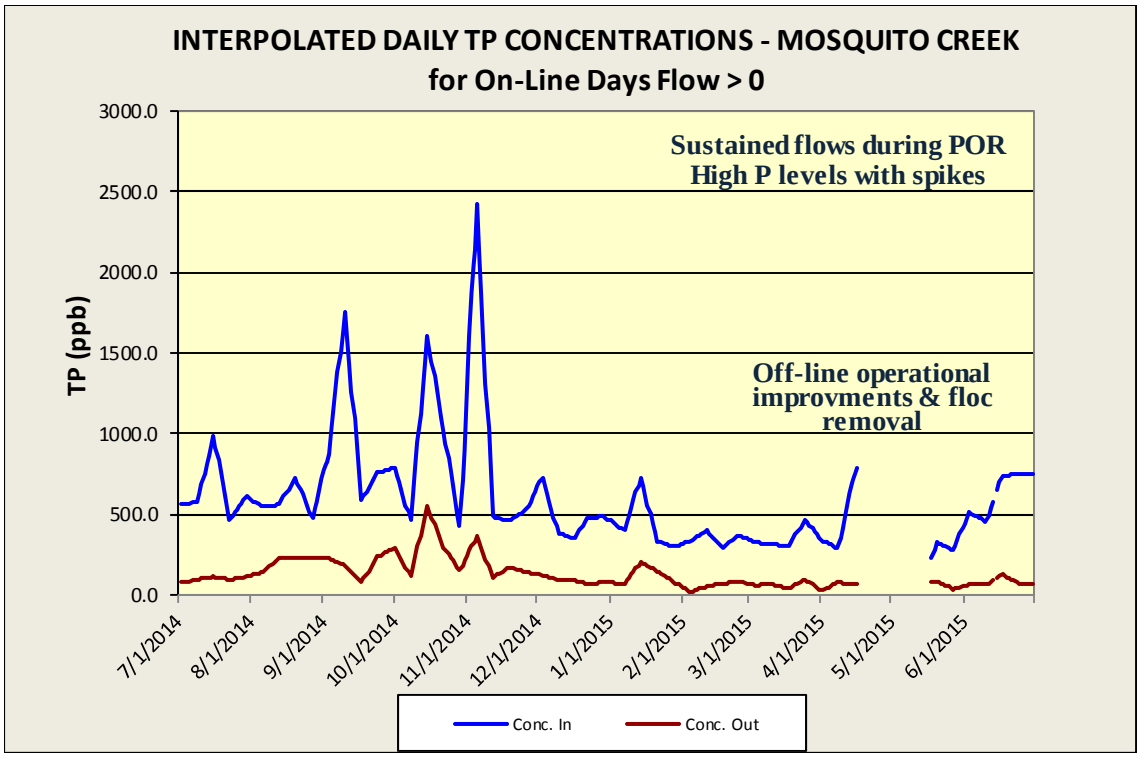


Figure 37. Interpolated Daily TP Concentrations Inflow versus Outflow Mosquito Creek.

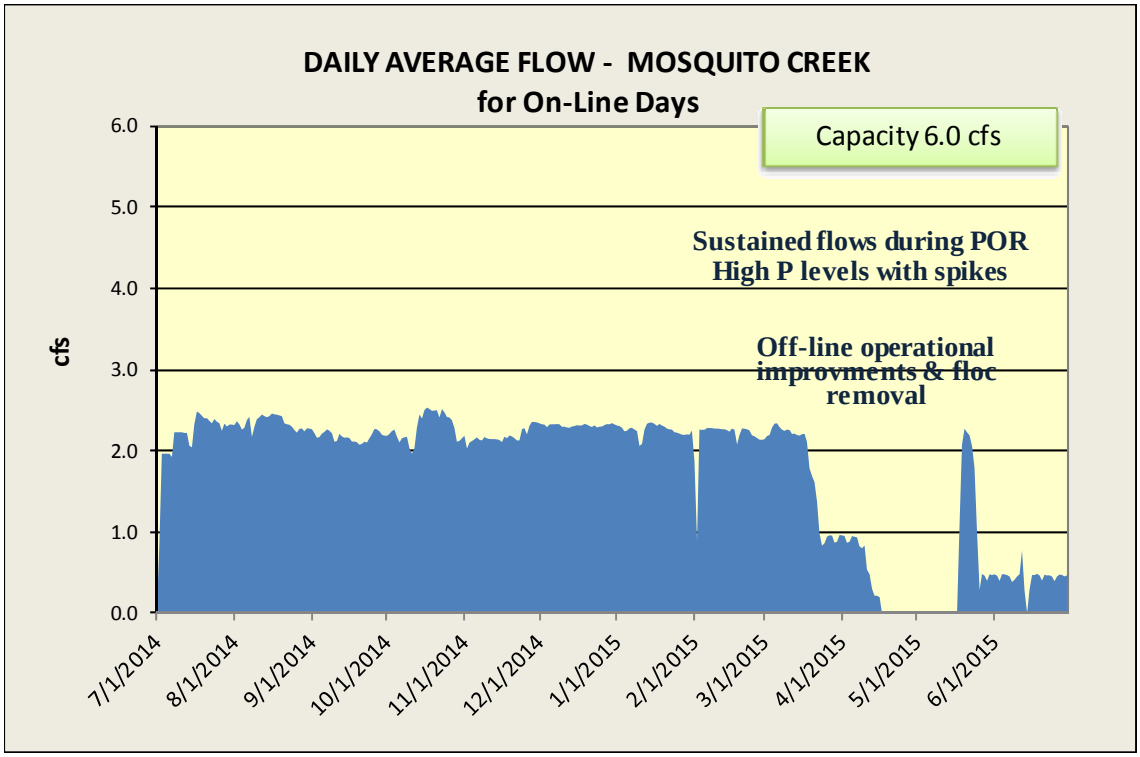


Figure 38. Daily Average Flows versus Capacity Mosquito Creek.

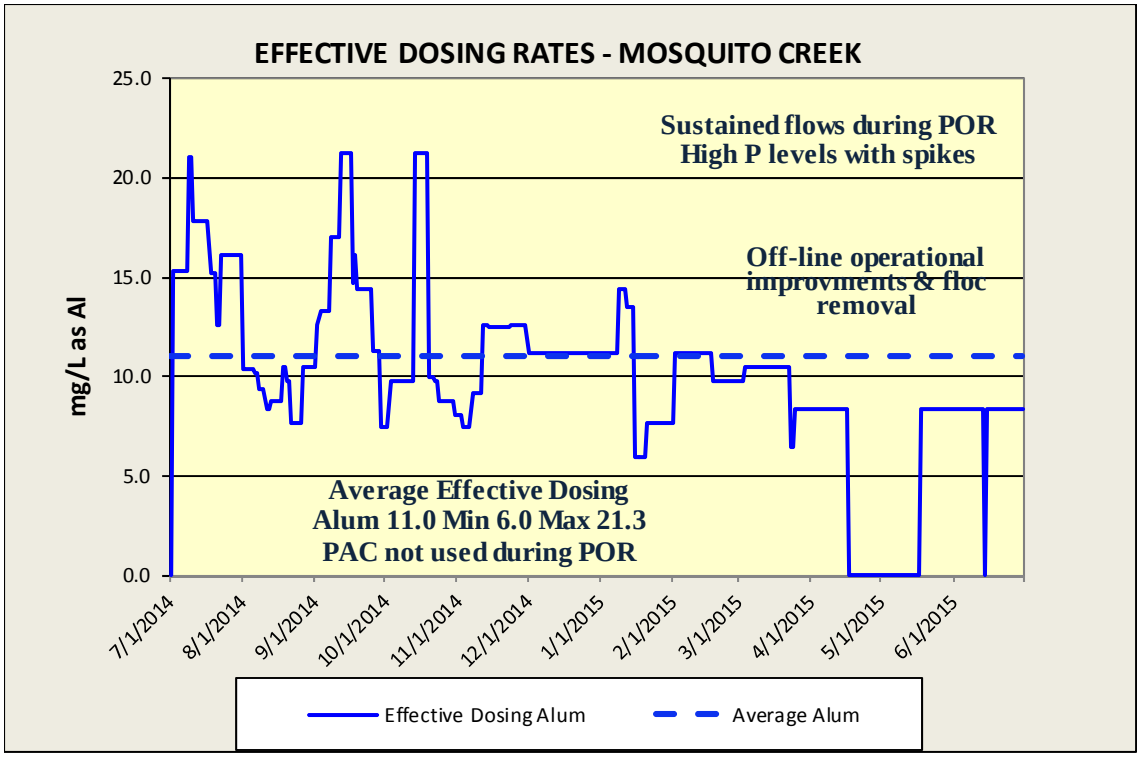


Figure 39. Daily Effective Dosing Rate and Average for the POR Mosquito Creek (excluding PAC).

Lemkin Creek (Site 5)

Lemkin Creek was off-line during March due to mechanical and electrical problems. Flows were relatively stable and sustained. Site 5 had the lowest interpolated TP FWM inflow concentration (132 μg/L) of the six HWTT operating facilities during the period. The interpolated TP FWM outflow was 42 μg/L, a 68% average reduction. The P levels were moderate with spikes, generally decreasing in the latter part of the POR. The average effective dosing of alum was 4.8 mg/L as Al for the period with a minimum dosing of 3.0 and maximum of 12.0 mg/L as Al. TP levels are interpolated from approximately weekly samples.

New permitting requirements and operational improvements highlighted the POR at the Lemkin Creek HWTT facility. Nutrient deprivation during the previous months necessitated the adjustment of coagulant dosing during Period 1. It was necessary to supply additional P to support the expansion of the floating plant standing crop, which was beginning to fail. SAV growth had not increased and remained minimal in the polishing pond. Inoculation trials were initiated with an additional SAV species (*Najas marina*) collected from south of Lake Okeechobee and continued during Periods 2 and 3. Several maintenance activities were conducted during Periods 4, 5, and 6, including calibrations of influent flow meters, the repair and reinstallation of one of the system's mechanical flow meters, and the clearing of vegetation from the facility water pump intake region.

As part of a new Florida Department of Environmental Protection (FDEP) permit requirement, quarterly routine chronic effluent toxicity testing was initiated at both the Lemkin Creek (during Period 7) and Wolff Ditch (during Period 6) HWTT facilities. This effort involved collection of several gallons of bulk water samples three times over a one-week period and subsequent transport to the contracted toxicity laboratory, where both fish (fathead minnow) and invertebrate (water flea) testing were performed. The first testing effort failed with the Lemkin system outflow waters; the toxicity lab report suggested the issue could be an algal toxin. Upon inspection of the outflow region, it was found to exhibit some filamentous algal growth. In response to a failed test, the FDEP permit requires weekly re-testing until two consecutive passing toxicity tests are

completed. During Period 8, two weeks of re-testing occurred on the Lemkin HWTT outflow waters, including additional screening tests performed on samples collected from the HWTT inflow and a sample from the outflow of the settling pond, upstream of the filamentous algae zone, to potentially help isolate the source of the toxicity. The first re-test of the waters failed again, but the settling pond outflow (upstream of the system outflow) passed, suggesting that some internally generated constituent in the SAV pond, such as an algal toxin, may indeed have been responsible for the toxic response (and not the chemical dosing process associated with the HWTT system). In the second re-test, the HWTT system outflow sample passed. No additional toxicity re-testing was required by the FDEP for the quarter. Period 8 also saw the failure of a variable frequency drive (VFD) that controls the inflow water pumps, which was subsequently replaced in Period 9.

In accordance with the new FDEP permit requirements, quarterly floc and fish sampling for metals analysis were performed during Period 8 at both the Lemkin Creek and Wolff Ditch facilities. Metals tests of the mosquito fish were submitted to FDEP, and subsequent quarterly results will be monitored for trends in metals content within fish tissue across the HWTT system and for accumulation trends within the settling pond floc.

The floating plant mat in the HWTT facility became colonized with *Scirpus cubensis* (cuban bulrush) and the second series of quarterly routine chronic effluent toxicity tests were performed during Period 9. Again, one of the chronic toxicity tests at the Lemkin HWTT outflow waters for *Pimephales promelas* (fathead minnow) failed; consequently, two weeks of re-testing were performed on the HWTT facility outflow waters during Period 10, with additional screening site samples collected at the HWTT inflow and the SAV pond inflow. An algal ID test and a pathogen interference reduction test were performed on the HWTT inflow and outflow water samples. These led to the discoveries of pathogen interference with *P. promelas* and the presence of a toxic algae in the SAV pond which affected *C. dubia*. FDEP reviewed the test results and agreed no additional re-testing was required, and that samples from the screening sites should be included during the next series of quarterly toxicity tests.

During the Period 10, additional real time sensors were deployed at the Lemkin Creek HWTT facility including a floc camera, enabling remote monitoring (and adjustment) of the quality of floc being produced in the mixing chamber. A turbidity meter was also installed that will record a continuous measurement of outflow region turbidity. Since elevated discharge levels of PP and total Al have been associated with increases in outflow turbidity, the turbidity sensor will provide for more precise monitoring and allow for a more rapid adjustment of chemical dosing rates, assisting in minimizing particle export. It should be noted that the Lemkin facility and adjacent properties have been periodically subject to vandalism; therefore, for enhanced security, these new instruments were placed in a housing situated within the chemical storage building.

During Period 11, the second floc and fish sampling for metals was conducted at the Lemkin and Wolff HWTT facilities, and during Period 12, the third quarterly series of routine chronic effluent toxicity tests were performed. Both sets of samples were submitted to contract laboratories for analyses and the results will be submitted to FDEP when available.

Interpolated TP mass removal over time is depicted graphically in Figure 40 together with the daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 41. Interpolated TP concentration inflow and outflow levels for the period are shown in Figure 42. Daily average flows are shown in Figure 43 compared to system capacity. The effective dosing of alum and the average for the POR is depicted in Figure 44. Detailed operating data is Appendix VI.

Infrastructure Modifications

Except for instrumentation improvements, there were no infrastructure modifications at Lemkin Creek HWTT facility for the POR. In April 2015, additional real time sensors were deployed including a floc camera and a turbidity meter. The floc camera enables remote monitoring (and adjustment) of the quality of floc being produced in the mixing chamber at the front end of the systems. The turbidity meter records a continuous measurement of outflow region turbidity. Since elevated discharge levels of PP and total Al have been associated with increases in outflow turbidity, the turbidity sensor will provide for more

precise monitoring and allow for a more rapid adjustment of chemical dosing rates, assisting in minimizing particle export. For security purposes, these new instruments were placed in a housing situated within the chemical storage buildings for each system.

Design Modifications

There were no design modifications at the Lemkin Creek HWTT facility for the POR, and none are currently being considered.

TP Mass Inflow and Outflow

As reported in Appendix VI, the TP mass inflow for the POR was 558 lbs., and the outflow was 177 lbs. The total mass reduction was 381 lbs. or 68%.

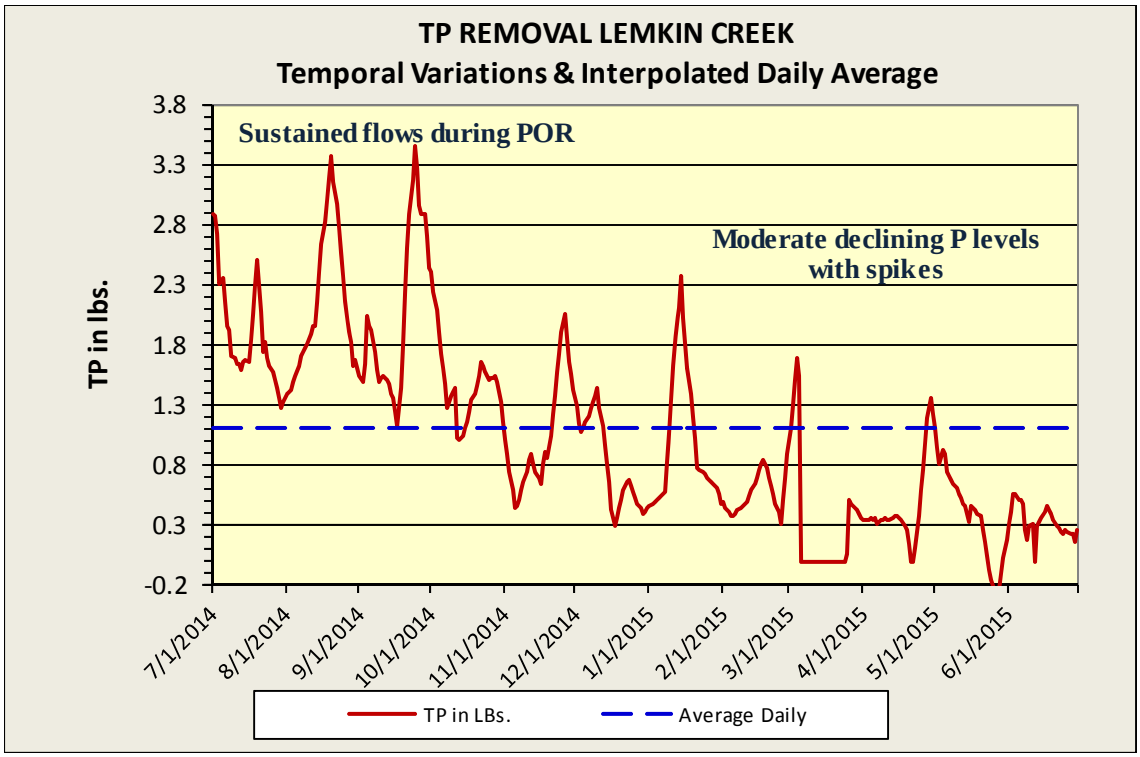


Figure 40. Interpolated TP Removal Temporal Variations & Daily Average Lemkin Creek.

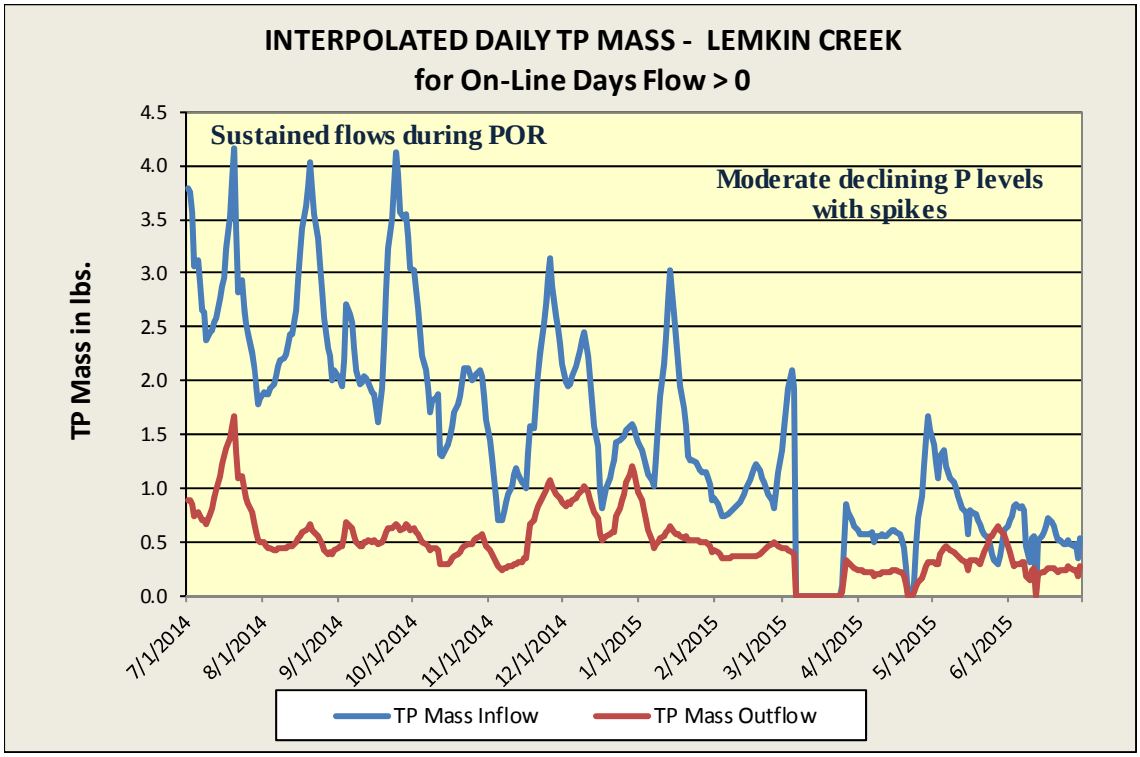


Figure 41. Interpolated Daily TP Mass Inflow versus Outflow Lemkin Creek.

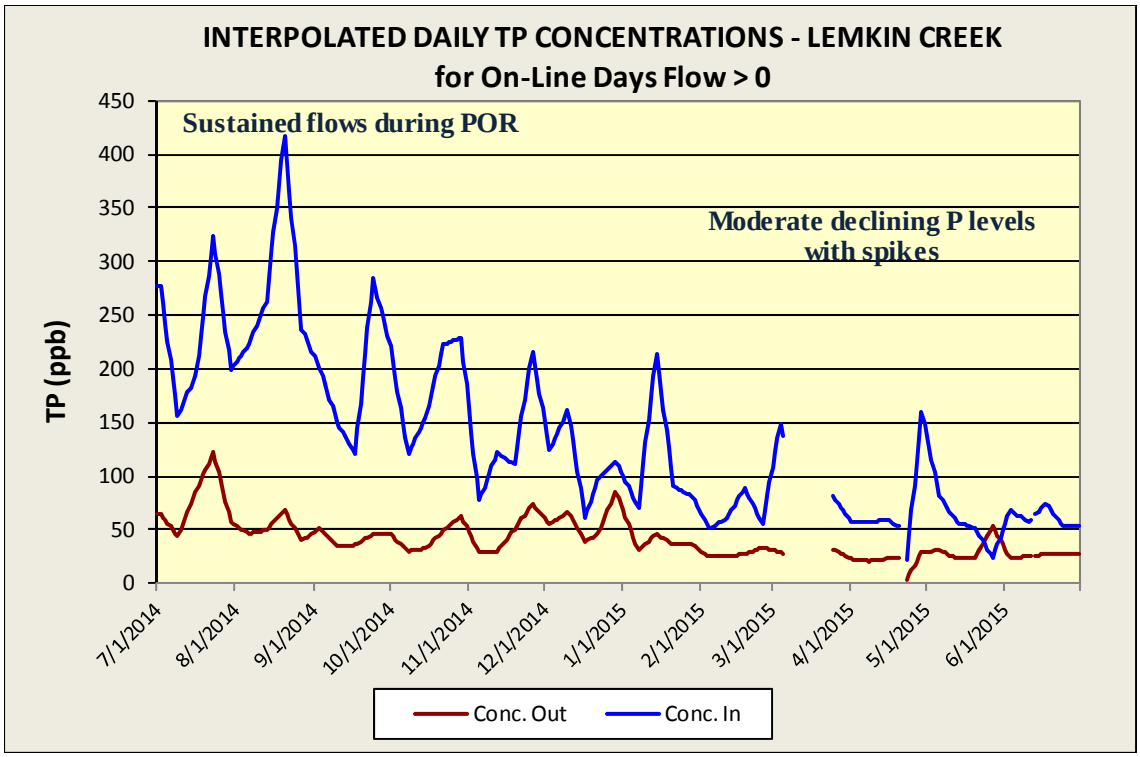


Figure 42. Interpolated Daily TP Concentrations Inflow versus Outflow Lemkin Creek.

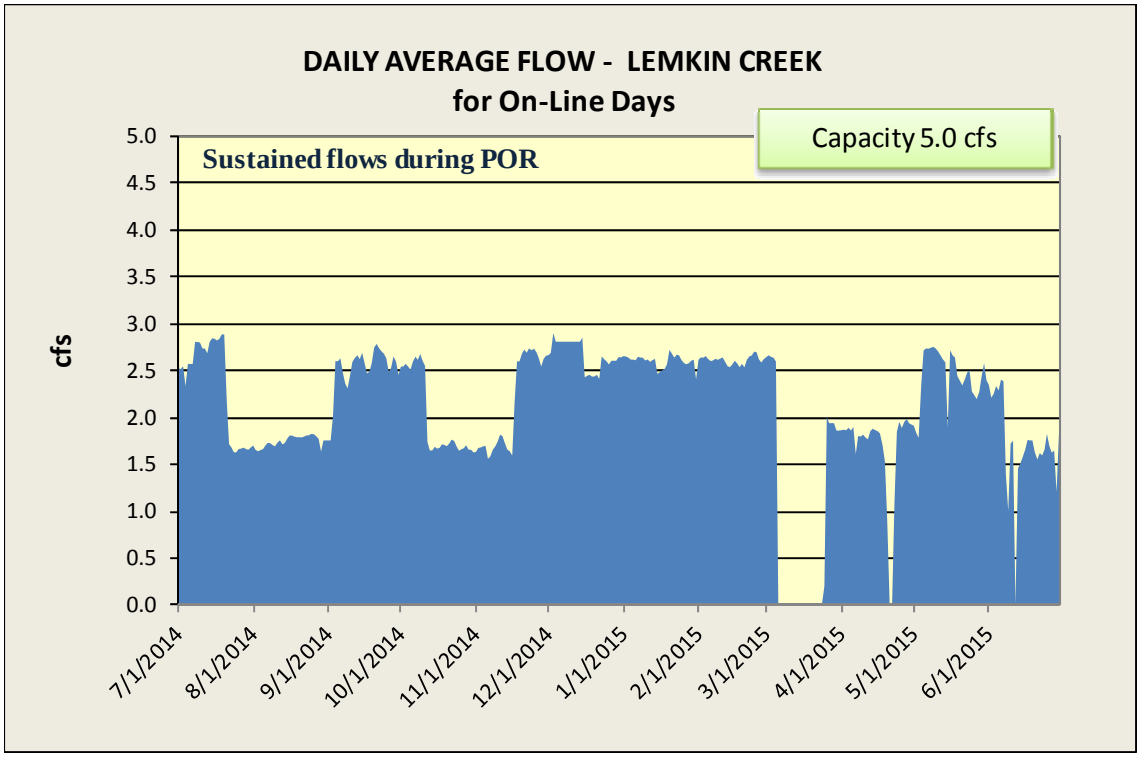


Figure 43. Daily Average Flows versus Capacity Lemkin Creek.

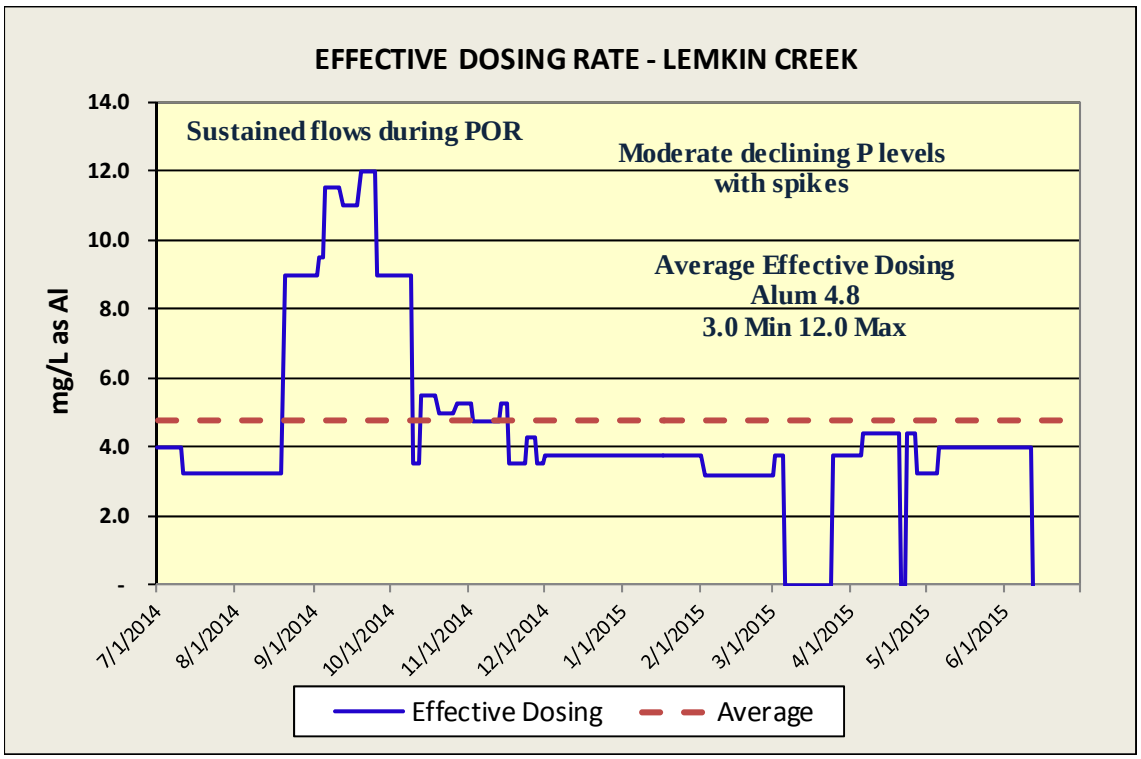


Figure 44. Daily Effective Dosing Rate and Average for the POR Lemkin Creek.

Wolff Ditch (Site 6)

Wolff Ditch operated continuously during the POR with minor down-time due to power outages and equipment failure. Flow levels were higher during July and August and slowed significantly for the remainder of the POR. Site 6 had the second lowest TP FWM inflow concentration (156 μg/L) of the six HWTT operating facilities. The interpolated TP FWM outflow was 62 μg/L, which represents a 61% average reduction for the period. The P concentration levels were marked by intermittent spikes with a gradual decline over the period. The effective dosing of alum ranged from 4.2 to 11.5 mg/L, and the average effective dosing of alum was 6.2 mg/L as Al for the period, with dosing adjustments made during the period as necessary. TP levels are interpolated from approximately weekly samples.

Operational improvements, flora, new permitting requirements, and relatively minor maintenance and electrical issues highlighted activities at the Wolff Ditch facility during the POR. Additional P was necessary to support the expansion of floating plant standing crop, and thus chemical dosing was adjusted during Period 1 and verified during Period 4. Flora continued to be an issue during Periods 2 and 3, including the encroachment of cattail onto the downstream isolated wetland outflow weir and the needed clearing of *Eleocharis* from the polishing pond, which was to serve as a future SAV inoculation site. As at the Lemkin Creek facility, the calibrations of the influent flow meters for Wolff Ditch were checked and verified during Period 4. The site's electric power was off for four days during Period 5 due to problems with one of the service provider's transformers. Also during Period 5, testing of the 20 cubic feet per second (cfs) pump revealed a problem with the drive belt tension. The belt was re-tensioned, and other maintenance activities were performed on the pump. The FAV standing crop exhibited some cold damage during Period 6; by contrast, the plants in the FAV mat in the adjacent Lemkin facility remained undamaged, presumably due to the smaller stature of plants at this site.

As noted above under the Lemkin Creek discussion, as part of a new FDEP permit requirement, quarterly toxicity testing and floc and fish metals testing were initiated at both the Lemkin and Wolff HWTT facilities. In contrast with the Lemkin findings, the

outflow waters from the Wolff facility passed all toxicity tests; the outflow region of the Wolff system, unlike that of the Lemkin facility, exhibits little filamentous algal growth. The quarterly floc and fish sampling for metals analysis was performed during Period 8. Mosquito fish samples were collected from Wolff Ditch from within the HWTT settling pond and from a downstream location; floc samples were collected from three locations in the settling pond.

Several mixing zone aeration manifold pipes failed during Period 9 and were subsequently replaced. During Period 10, additional real time sensors were deployed at the Wolff Ditch HWTT facility including a floc camera, enabling remote monitoring (and adjustment) of the quality of floc being produced in the mixing chamber. A turbidity meter was also installed that will record a continuous measurement of outflow region turbidity. Since elevated discharge levels of PP and total Al have been associated with increases in outflow turbidity, the turbidity sensor will provide for more precise monitoring and allow for a more rapid adjustment of chemical dosing rates, assisting in minimizing particle export. Alongside the Lemkin facility, this site has been periodically subject to vandalism; therefore, these instruments are housed within the chemical storage building.

During Period 11, an inverter/drive for the 40 horsepower (hp) pump failed and troubleshooting was completed early in Period 12. This effort revealed a hardware failure, perhaps due to an electrical surge, so a replacement drive was ordered. In the same period, the second quarterly floc and fish samples were collected, wet floc from the settling pond and mosquito fish from three locations: Wolff Ditch, the settling pond, and from a region in the "south pond" downstream of the system outfall. These samples were submitted to a contract laboratory for analyses of metals. The second quarterly chronic toxicity tests were performed on the HWTT facility inflow and outflow waters during Period 12. This effort involved collection of several gallons of bulk water samples three times over a one-week period and subsequent transport to the toxicity laboratory, where both fish and invertebrate testing were performed.

Interpolated TP mass removal over time is depicted graphically in Figure 45 together with the daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 46. Interpolated TP concentration inflow and outflow levels for the period are shown in Figure 47. Daily average flows are shown in Figure 48 compared to system capacity. The effective dosing of alum and the average for the POR is depicted in Figure 49. Detailed operating data is contained within Appendix VII.

Infrastructure Modifications

Except for instrumentation improvements, there were no infrastructure modifications at Wolff Ditch HWTT facility for the POR. In April 2015, additional real time sensors were deployed including a floc camera and a turbidity meter. The floc camera enables remote monitoring (and adjustment) of the quality of floc being produced in the mixing chamber at the front end of the systems. The turbidity meter records a continuous measurement of outflow region turbidity. Since elevated discharge levels of PP and total Al have been associated with increases in outflow turbidity, the turbidity sensor will provide for more precise monitoring and allow for a more rapid adjustment of chemical dosing rates, assisting in minimizing particle export. For security purposes, these new instruments were placed in a housing situated within the chemical storage buildings for each system.

Design Modifications

There were no design modifications at the Wolff Ditch HWTT facility for the POR, and none are currently being considered.

TP Mass Inflow and Outflow

As reported in Appendix VII, the TP mass inflow for the POR was 770 lbs., and the outflow was 304 lbs. The total mass reduction was 466 lbs. or 60%.

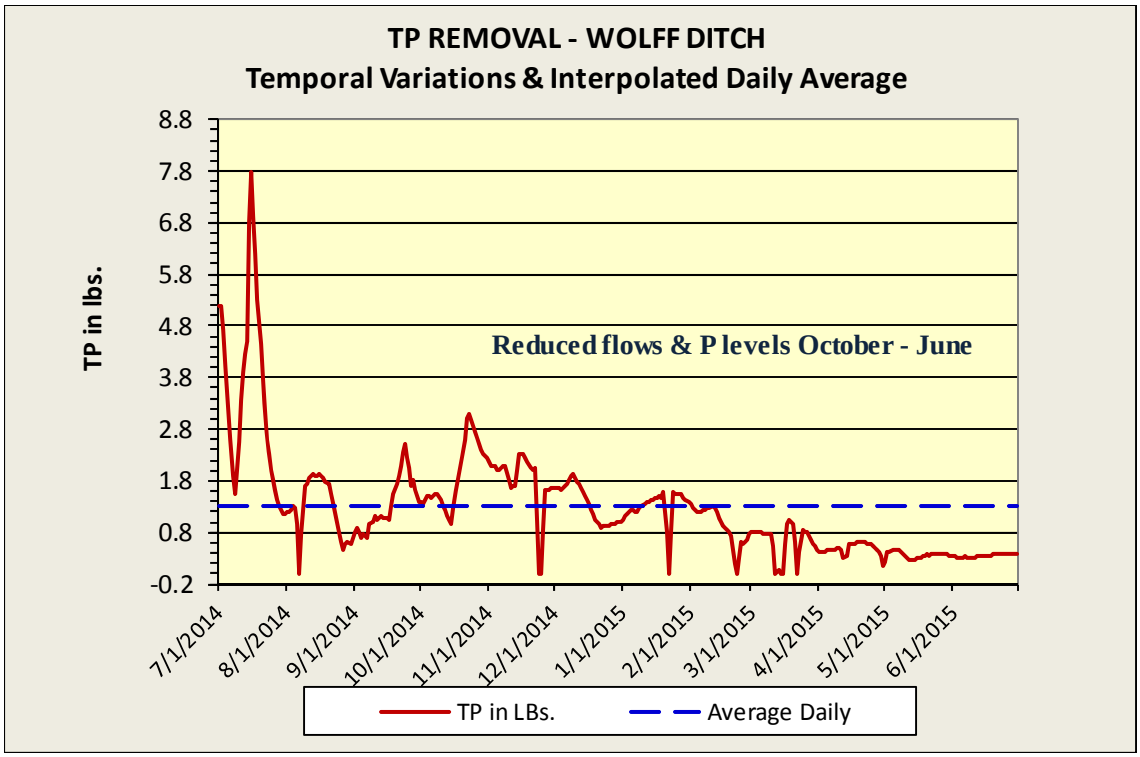


Figure 45. Interpolated TP Removal Temporal Variations & Daily Average Wolff Ditch.

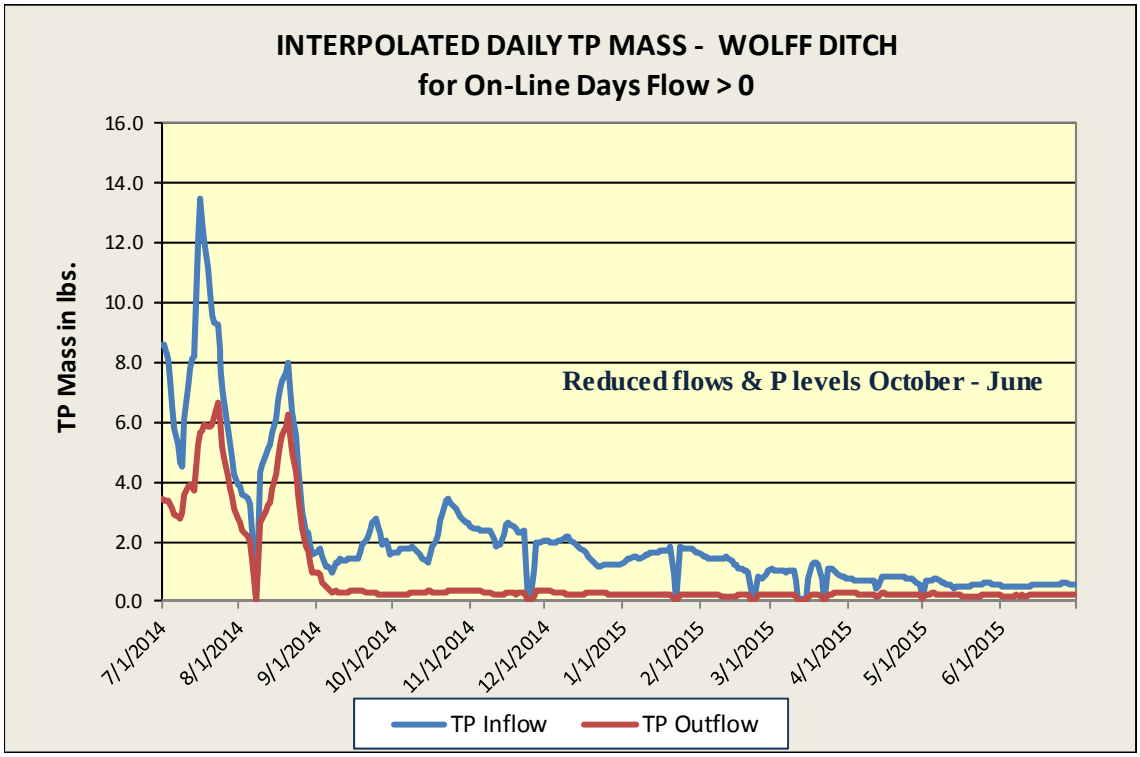


Figure 46. Interpolated Daily TP Mass Inflow versus Outflow Wolff Ditch.

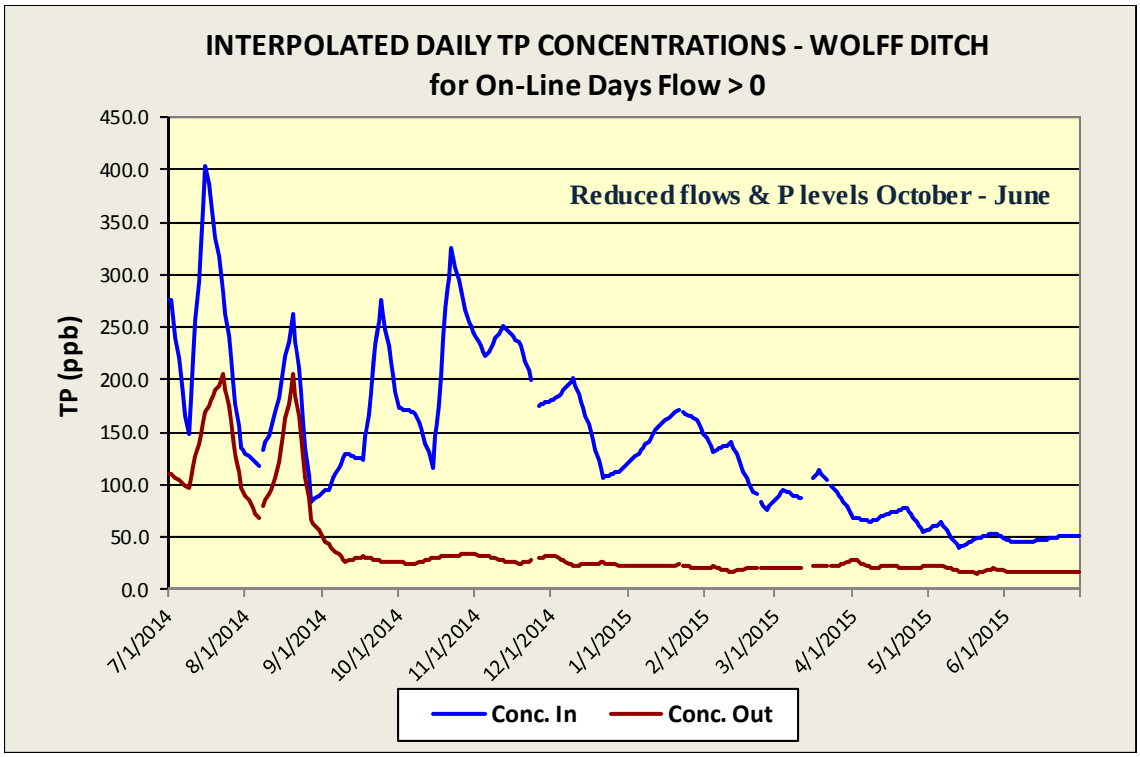


Figure 47. Interpolated Daily TP Concentrations Inflow versus Outflow Wolff Ditch.

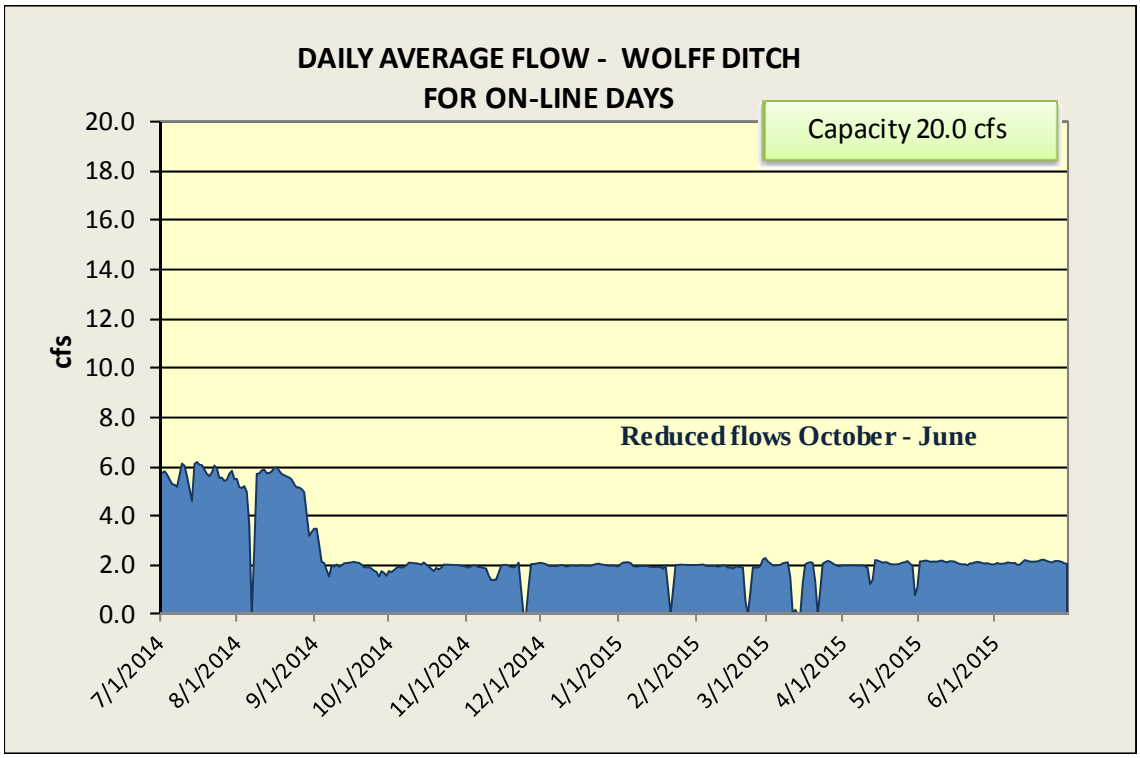


Figure 48. Daily Average Flows versus Capacity Wolff Ditch.

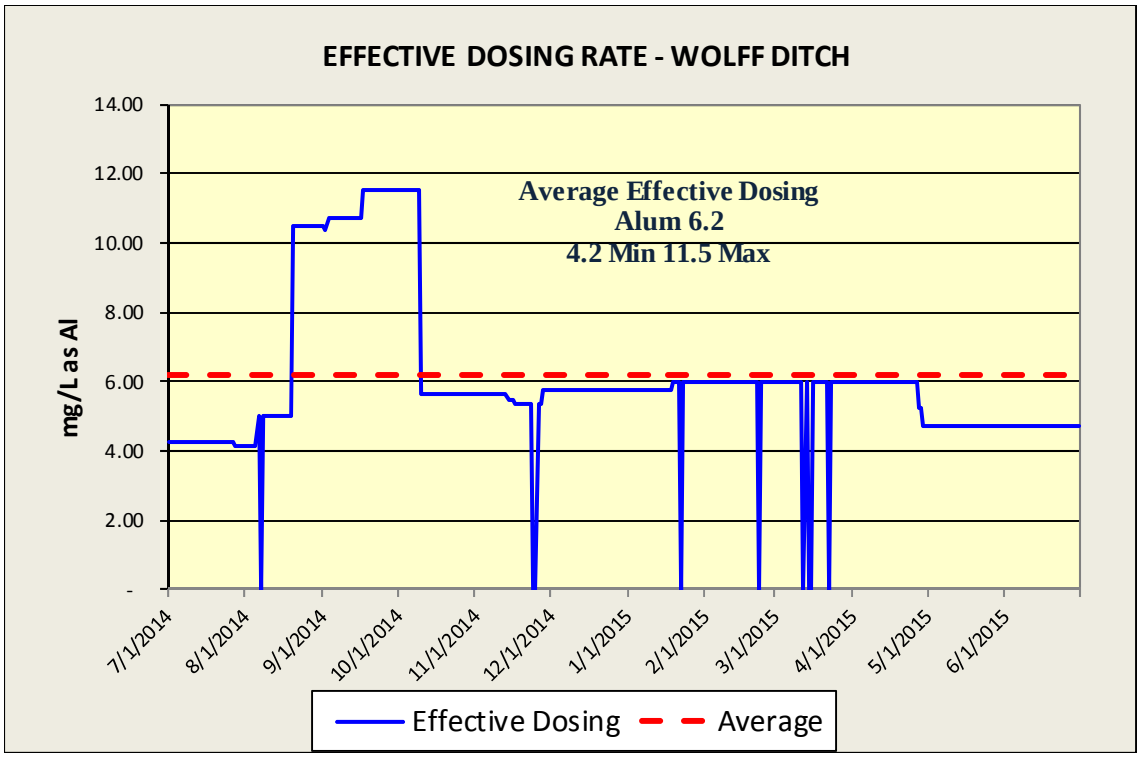


Figure 49. Daily Effective Dosing Rate and Average for the POR Wolff Ditch.

Grassy Island (Site 7)

Grassy Island operated continuously during the POR with minor down-time due to power failures. Flow levels were highest from July through October and then gradually declined, maintaining a significantly lower level for the remainder of the POR. Site 7 had the fourth highest interpolated TP FWM inflow concentration (411 µg/L) of the six HWTT operating facilities. The interpolated TP FWM outflow was 40 µg/L, a 90% average reduction for the period. The TP mass fluctuated during the POR, trending downward in November and December through June. The effective dosing of alum ranged from 4.3 to 16.2 mg/L, and the average was 12.6 mg/L as Al for the period. PAC was utilized for 234 days during the POR. The effective dosing of PAC ranged from 0.1 to 9.4 mg/L during use, and the average was 3.1 mg/L as Al. The effective dosing of PAC for the entire POR ranged from 0.0 to 9.4 mg/L, and the average was 2.0 mg/L as Al. Dosing adjustments were made as necessary based upon on-site conditions. The interpolated TN FWM inflow was 2.4 mg/L versus an interpolated TN FWM outflow of 1.3 mg/L, a 48% average reduction for the period. The TN mass fluctuated during the POR in concert with P, trending downward in November and December through June. TP and TN levels are interpolated from approximately weekly samples. (Note that for N calculations, negative values denote the concentration is below the minimum detection limit, and the amount for purposes of data analyses is ½ of the absolute value of the reported data.) The capacity at Grassy Island increased during the current POR from 20 cfs to 30 cfs as of December 1, 2014, resulting in an average available capacity of 25.8 cfs for the POR.

Flows are now measured at the inflow and outflow points and values are used to calculate P FWM concentrations both in and out. The difference between water inflow and outflow measurements (residual) has been tabulated. The average daily inflow was 7.2 cfs, while the average daily outflow was 6.5 cfs, for a net residual of 0.7 cfs.

Early in Period 1, two operational challenges occurred at the Grassy Island HWTT facility. First, inflow (Taylor Creek) water chemistry exhibited marked temporal changes. The pumped inflows were attempted to be held stable in the 10-15 cfs range, such that jar testing could be implemented under steady state flow conditions. The jar tests with highly

colored Taylor Creek waters were needed to refine coagulant dosing to maximize P removal and minimize total Al export. Second, lightning strikes caused the loss of electric power on numerous occasions. Since the strikes did not typically impact the facility, no system instrumentation was damaged. The frequent strikes impacting Glades Power transformers did, however, cause considerable downtime for our inflow pump station, resulting in average flows at the low end (~10 cfs) of our desired range for the period. During Period 2, the HWTT system continued to lose electric power due to lightning strikes on the Glades Power transformers. Power outages during this period, however, were less frequent than during Period 1.

In addition to operational challenges to the facility during Period 1, additional maintenance issues were addressed. The fabrication and installation of a concrete weir downstream of the limerock bed in the eastern flow way was performed to facilitate flow balancing between the eastern and western flow paths. A new sample extraction port was installed in the western flow path piping to facilitate floc camera operations. During Period 1, water lettuce and duckweed that had colonized the floc contact/settling chambers in the western flow path during the 2014 dry season were removed.

During Period 2, "center flow" operations were initiated with an eastern contact pond to evaluate whether changes in hydraulic conditions can improve floc settling/retention in the highly colored waters. A small limerock berm was established within the eastern SAV pond to generate additional alkalinity prior to SAV polishing and system discharge. In addition to the above mentioned activities, installation of the concrete floating boom anchors in the FAV ponds was completed. During Period 3, an empty cargo container, used for the previous technology deployed at the site (i.e., the "algal turf scrubber [ATS]"), was removed from the mound adjacent to the limerock bed. The container was combined with a second empty container on the site to create a storage/work area near the eastern coagulant storage building. Spare culvert piping and supplies from prior ATS and HWTT construction activities were collected from around the site and consolidated on a limerock storage pad. During Period 3, the region of the final polishing pond that was disrupted during the installation of the limerock berm began to recolonize with SAV.

During period 4, maintenance activities were performed on the inflow region limerock beds, including herbiciding of aquatic weeds. Comparative vegetation surveys during the period demonstrated that the prominent SAV species currently differs between the western and eastern flow paths, with *Najas guadalupensis* (southern Naiad) dominating the SAV assemblage in the former, and *Potamogeton illinoiensis* dominating in the latter. During Period 4, wet floc was pumped from the contact ponds into the eastern drying beds.

During Period 5, system inflow and outflow bulk water samples were collected on three dates and submitted to a toxicity laboratory for testing. Electric power to the eastern flow path floc pumps failed during Period 5. The problem ultimately was traced to a fuse on a transformer owned by the electric service provider and resolved. The PVC pond liner in one of the original two Phase I contact ponds, which has become brittle due to sunlight (ultraviolet radiation) degradation and damage, was replaced. The western flow path chemical dosing plumbing was off-line for two days during Period 5 due to an in-line filter clog caused by some partially solidified alum.

During Period 6, one of the two smaller 40 hp pumps at the Grassy facility began tripping an alarm panel breaker after approximately 1.5 hours of continuous run time. Troubleshooting efforts revealed a short in the float switch wiring feeding the alarm panel, which was subsequently repaired. The coagulant pump calibration column became partially clogged with gelatinous alum during Period 6. Inspection of the coagulant storage tank revealed partially solidified alum floating on the surface. This partially solidified material appeared intermittently in the system during the previous two months, so the coagulant manufacturer was contacted.

During Period 7, floc removal efforts, which involved wet floc pumping from contact chambers to the drying beds, were performed in the western flow path. The coagulant manufacturer supplied a vacuum truck to remove partially solidified “gelatinous” alum from selected storage tanks that were clogged during prior months, and in Period 8, the operation was completed. The cause for the partial solidification remains unknown, but is under investigation by the manufacturer’s chemists. During the winter months, cattails encroached into the western drying beds, and these were controlled during Period 8.

The quarterly floc and fish sampling for metals analysis was conducted at the Grassy HWTT system during Period 9. Mosquito fish samples were collected from Taylor Creek upstream of the facility, from within the HWTT settling ponds, and from a downstream Taylor Creek location. Floc samples were collected from three locations in each settling pond. An electrical short developed in one of the pump station's large motors during the same period. It was delivered to a repair facility for refurbishment of both the motor windings and bearings. The quarterly chronic toxicity tests were performed for the HWTT facility inflow and outflow waters during Periods 9 and 10. Limerock was delivered to the site for expansion of the existing limerock bed on the eastern flow path and for deployment of a new limerock bed at the inflow of the SAV pond on the western flow path. The outflow limerock bed buffering systems were installed in the eastern and western HWTT facility flow paths to increase the pH and alkalinity of discharge waters. Historically, discharge levels of pH and alkalinity have been depressed during periods when inflow alkalinity levels are low, and color levels are high; therefore, this operational improvement should moderate (increase) outflow pH and alkalinity levels, which in turn will support the reduction of PP and total Al levels in the outflow.

Water levels and flows in Taylor Creek were low during Period 11. This necessitated dropping inflow pumping rates as low as 2 cfs, at times. In the same period, quarterly samples of wet floc were collected from the settling pond, and mosquitofish were collected from three locations: upstream in Taylor Creek, the settling pond, and from a region in Taylor Creek downstream of the system outfall. These samples were submitted to a contract laboratory for analyses of metals. Wet floc removal was performed for eastern contact pond #3 during Period 11, and work was also initiated on the other two eastern contact ponds in preparation for liner replacement during Period 12. During Period 11, a vegetation survey demonstrated that *Potamogeton illinoiensis* currently is the dominant SAV species in the eastern flow path SAV pond. The plant was previously a co-dominant species with *Najas guadalupensis*.

Quarterly chronic toxicity tests were performed on the HWTT facility inflow and outflow waters during Period 12. This effort involved collection of several gallons of bulk water

samples three times over a one-week period and subsequent transport to the toxicity laboratory, where both fish and invertebrate testing were performed. Even though the Grassy Island HWTT facility was able to operate continuously, Taylor Creek flows were significantly lower than normal for most of Period 12. The creek waters were unusually clear (low in color), which decreased the coagulant demand during this period. The decreased flow conditions in Taylor Creek also resulted in lower water levels in the inflow region limerock bed complex during Period 12, a condition which allowed for the clearing of unwanted vegetation that had accumulated during previous months. During the same period, engineering and fabrication of an improved motor mount for one of the large (200 hp) electric motors in the inflow pump station commenced. The modification will help minimize vibrations during operations and should prolong motor bearing life.

Interpolated TP mass removal over time is depicted graphically in Figure 50 together with the daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 51. Interpolated TP concentration inflow and outflow levels for the period are shown in Figure 52. Daily average flows are shown in Figure 53 compared to system capacity. The effective dosing of alum, the average for the POR, and the effective dosing during the period of use is depicted in Figure 54. Daily average inflows versus outflows are plotted in Figure 55, and the residual (inflows minus outflows) is shown in Figure 56. Interpolated TN mass removal over time is depicted graphically in Figure 57 together with the daily average reduction. Temporal variations in interpolated TN mass inflow versus TN mass outflow are presented in Figure 58. Interpolated TN concentration inflow and outflow levels for the period are shown in Figure 59. Detailed TP and operating data is contained within Appendix VIII and in Appendix X for TN.

Infrastructure Modifications

Minor infrastructure modifications were made at the Grassy Island HWTT facility during the POR, including installation of back-end limerock beds and instrumentation. In April 2015, outflow limerock bed buffering systems were installed at the upstream end of the SAV ponds in the eastern and western HWTT facility flow paths to increase the pH and

alkalinity of treated water prior to discharging to Taylor Creek. Historically, these parameters have increased during periods when inflow water alkalinity levels are low, and color levels are high; therefore, this operational improvement should support the outflow reduction of PP and total Al levels. In April 2015, real time turbidity meters were installed on the SAV pond outflow structures (for both eastern and western flow paths) to record a continuous measurement of outflow region turbidity. Since elevated discharge levels of particulate P and total aluminum have been associated with increases in outflow turbidity, the turbidity sensor will provide for more precise monitoring and allow for a more rapid adjustment of chemical dosing rates, assisting in minimizing particle export.

Design Modifications

A minor internal design modification of the Grassy Island HWTT system was implemented during the POR, which consisted of adding back-end limerock bed buffering systems. The limerock beds were installed to increase the pH and alkalinity of treated water prior to discharging to Taylor Creek. No other design modifications are currently being considered.

TP Mass Inflow and Outflow

As reported in Appendix VIII, the TP mass inflow for the POR was 5,763 lbs., and the outflow was 519 lbs. The total mass reduction was 5,244 lbs. or 91%.

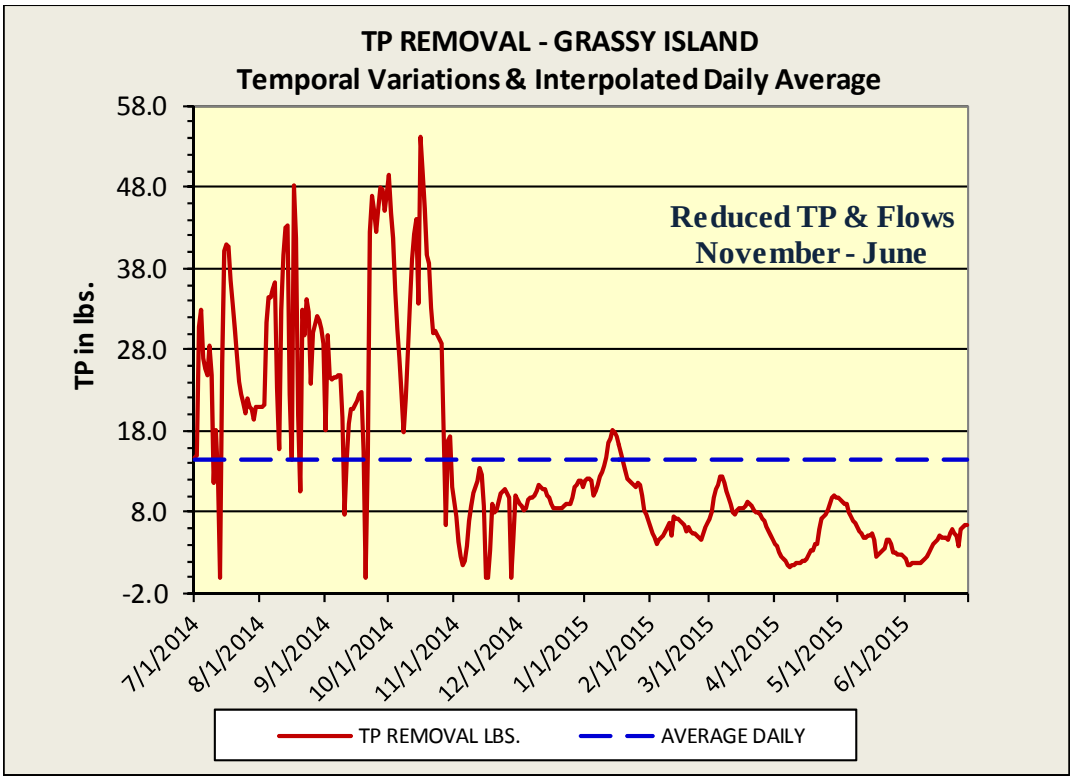


Figure 50. Interpolated TP Removal Temporal Variations & Daily Average Grassy Island.

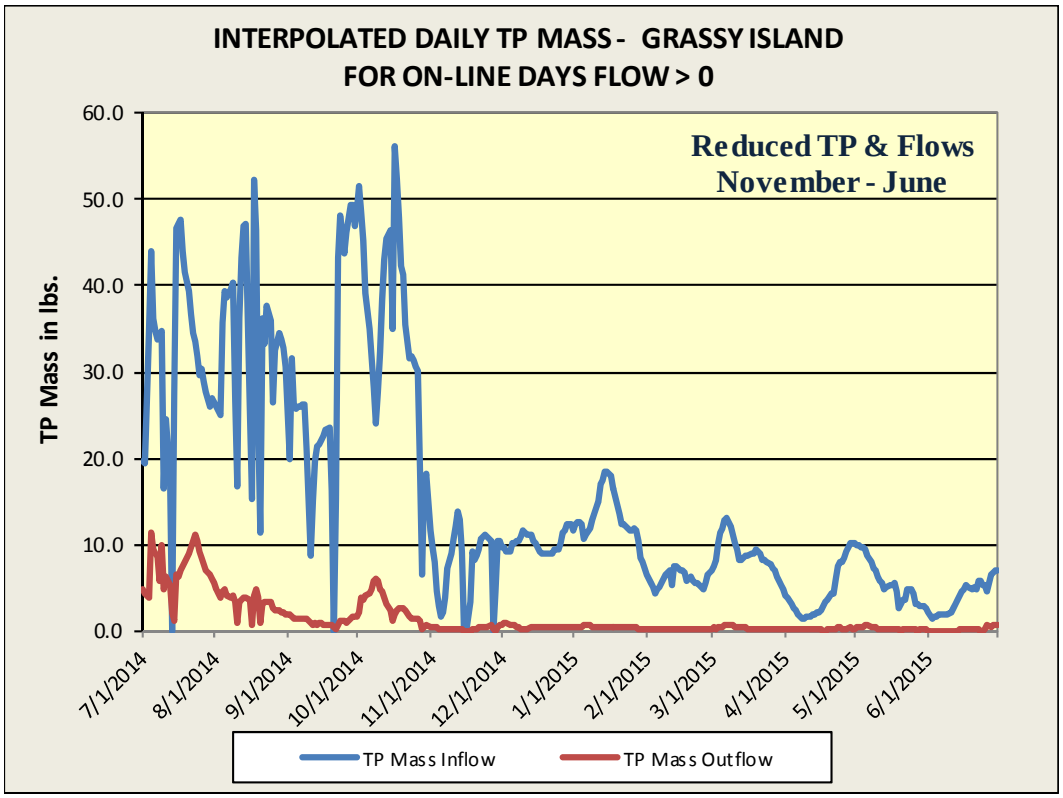


Figure 51. Interpolated Daily TP Mass Inflow versus Outflow Grassy Island.

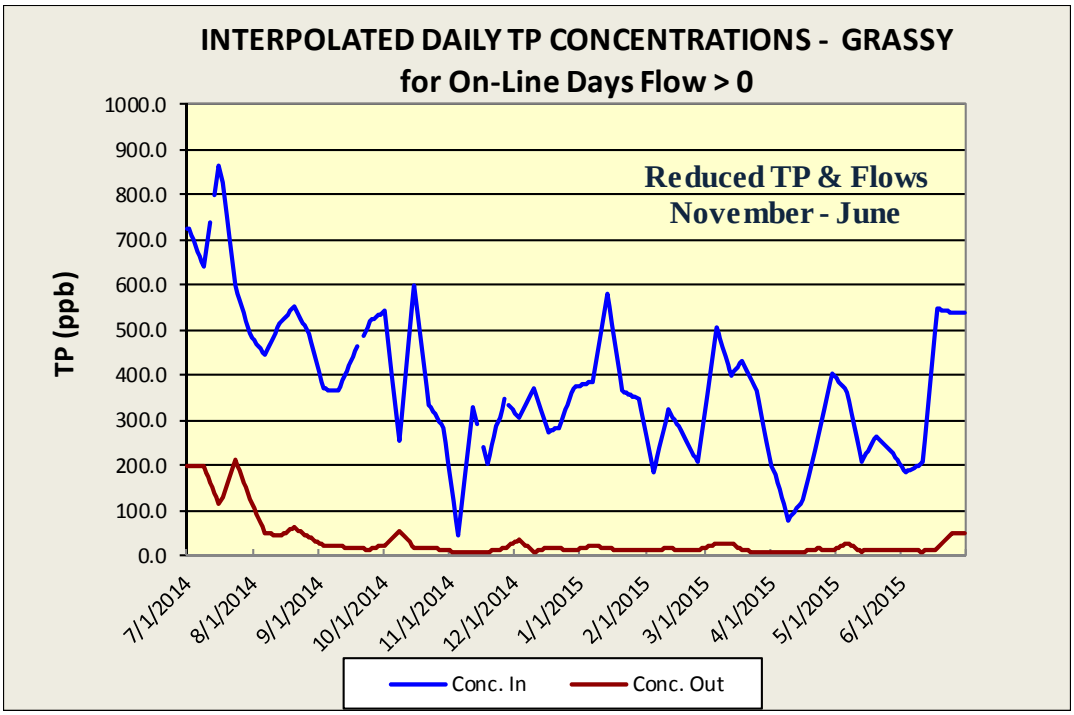


Figure 52. Interpolated Daily TP Concentrations Inflow versus Outflow Grassy Island.

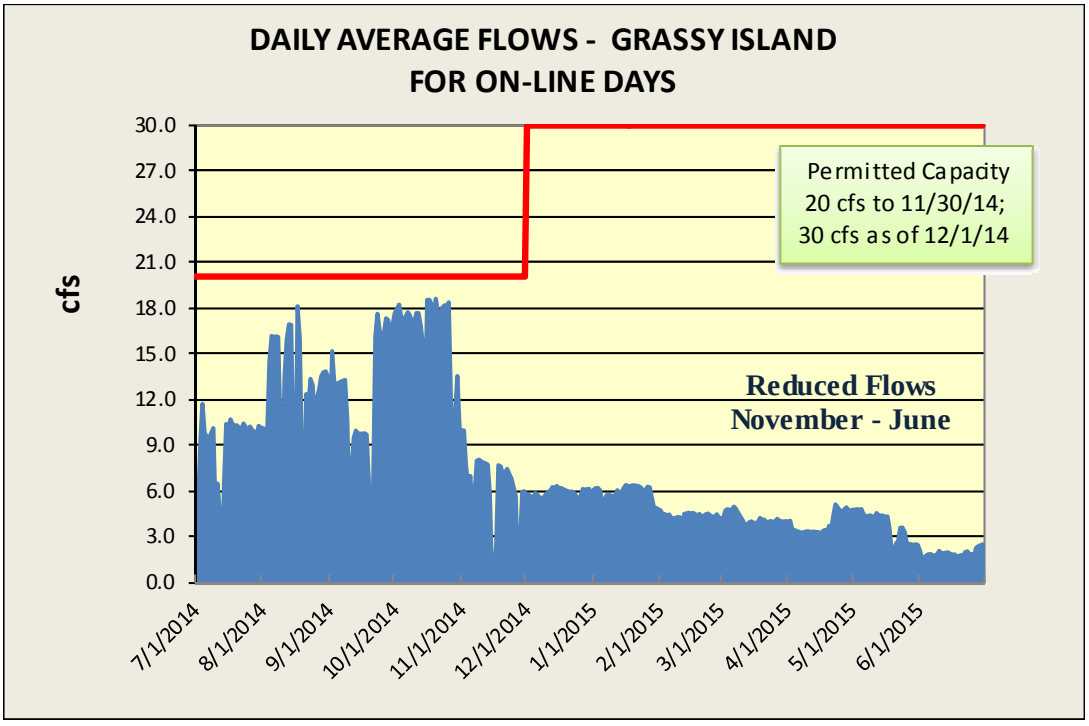


Figure 53. Daily Average Flows Grassy Island.

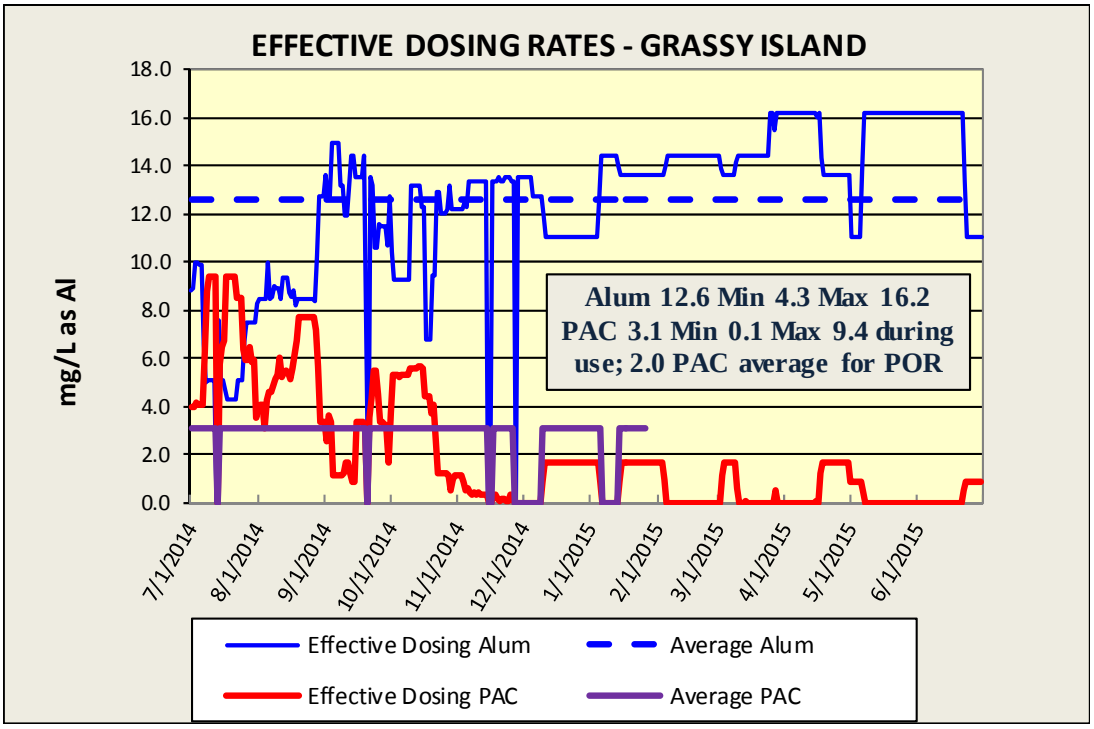


Figure 54. Daily Effective Dosing Rate and Average for the POR Grassy Island.

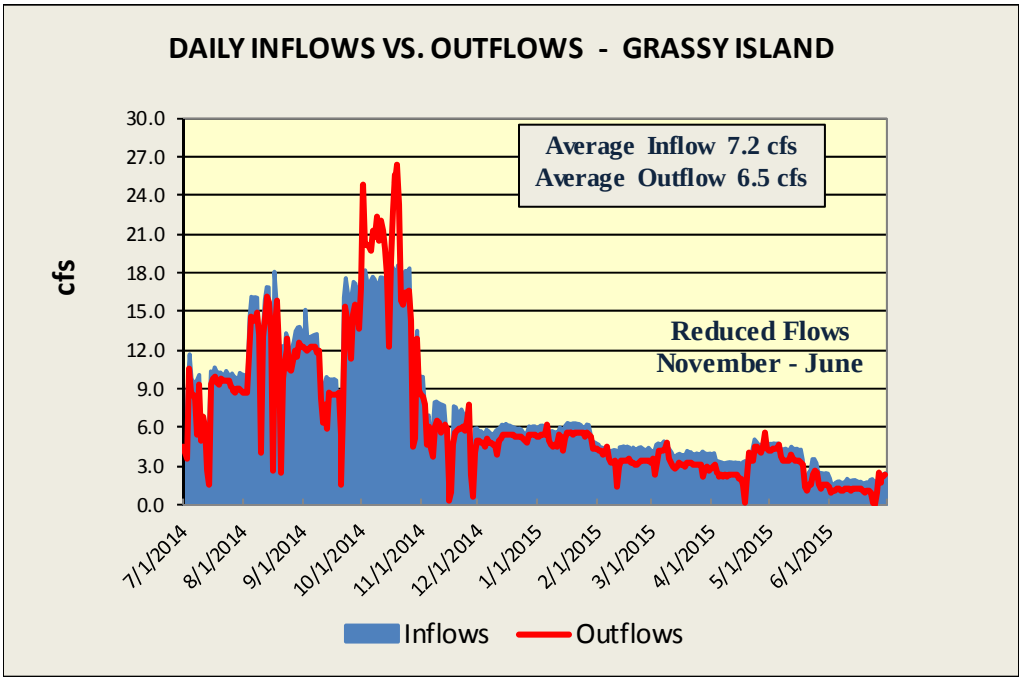


Figure 55. Daily Average Inflows versus Outflows Grassy Island.

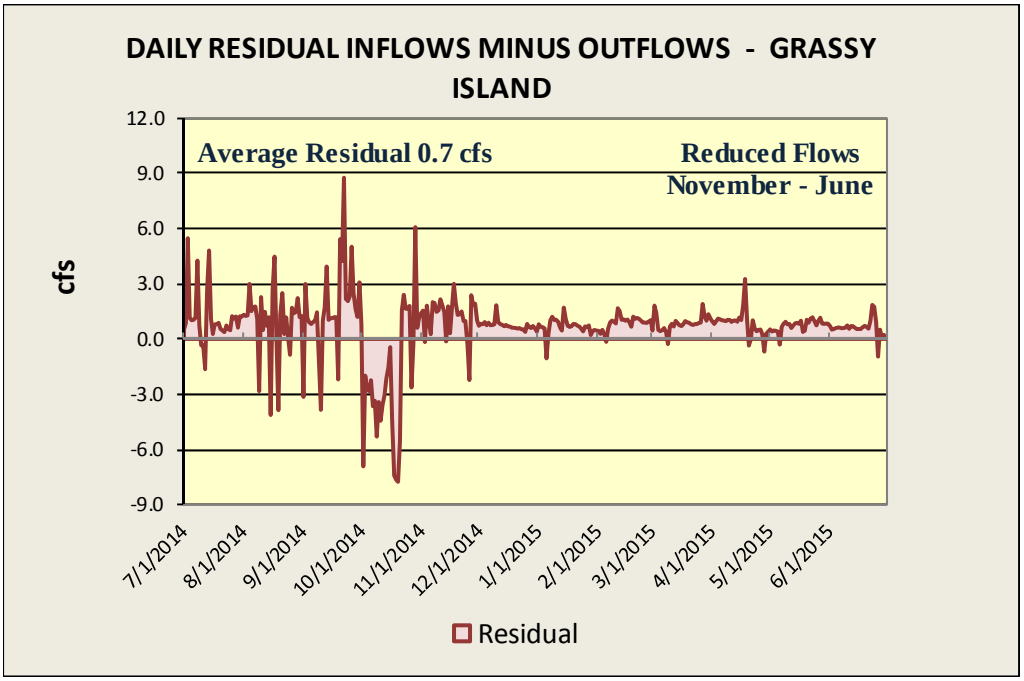


Figure 56. Daily Residual Inflows minus Outflows Grassy Island.

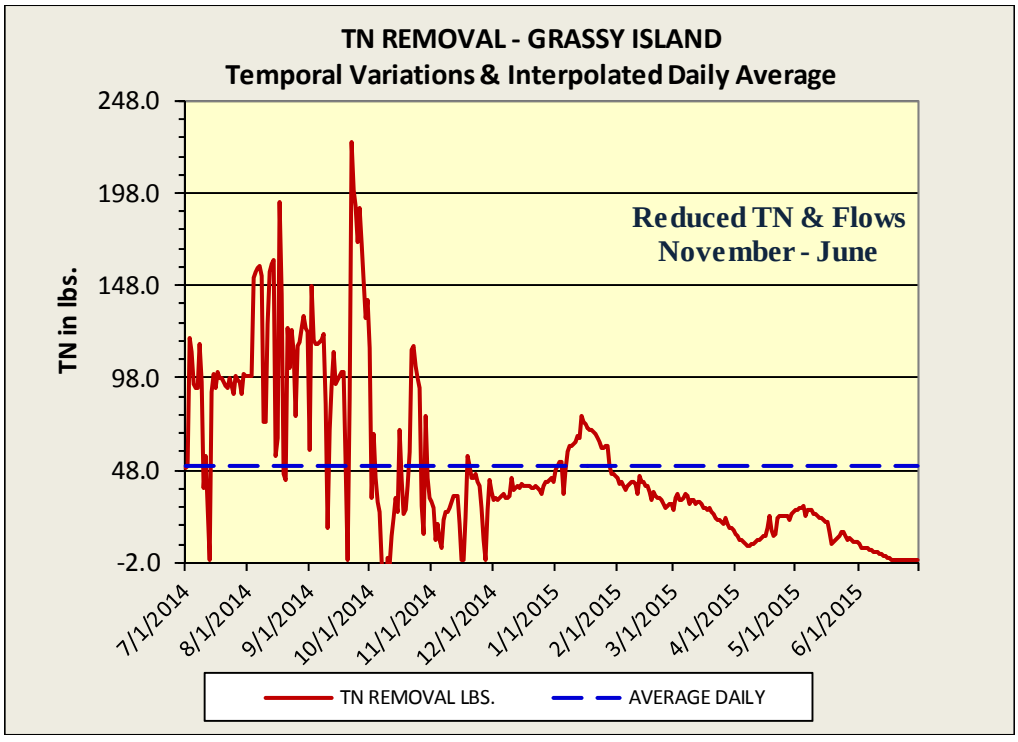


Figure 57. Interpolated TN Removal Temporal Variations & Daily Average Grassy Island.

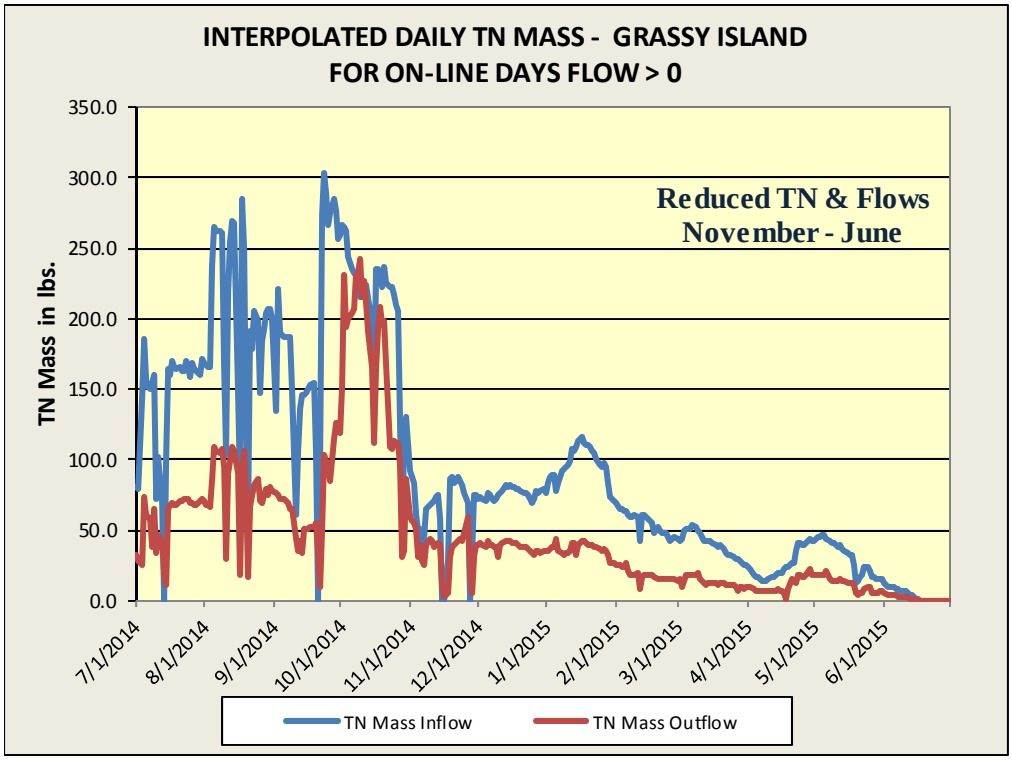


Figure 58. Interpolated Daily TN Mass Inflow versus Outflow Grassy Island.

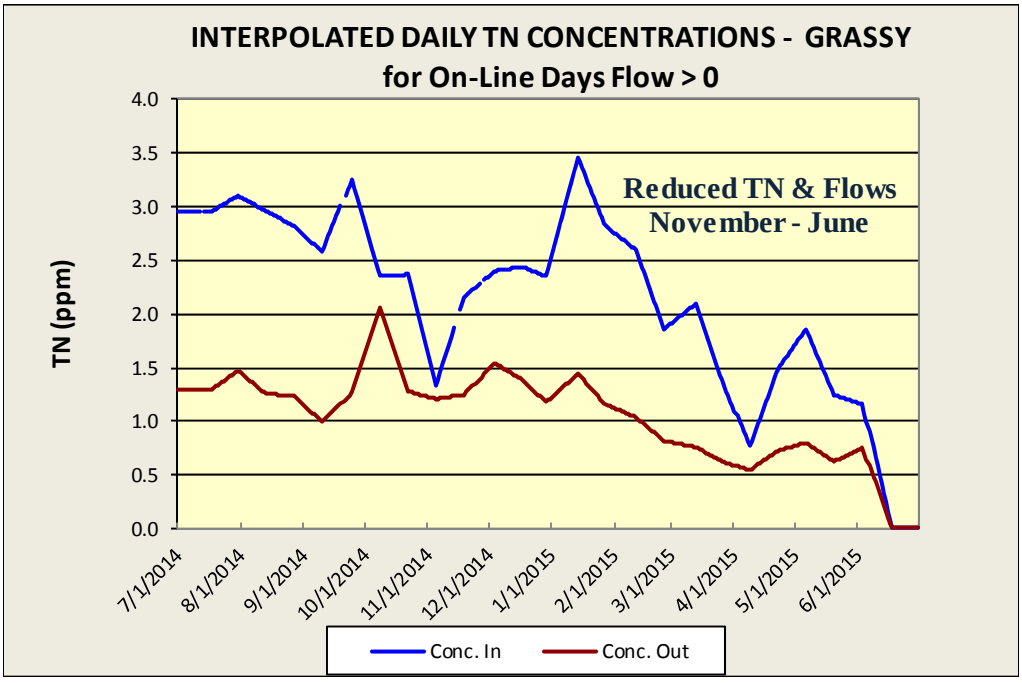


Figure 59. Interpolated Daily TN Concentrations Inflow versus Outflow Grassy Island.

Bessey Creek (Site 8)

The Bessey Creek project was deployed under the prior contract with FDACS, identified as Northern Everglades Site 8. On January 7, 2014, the Martin County Board of County Commissioners approved a lease agreement with FDACS for use of approximately 23 acres of county-owned property to implement an HWTT facility serving Bessey Creek. The design and deployment of the facility was closely coordinated with Martin County engineering. The field inspection for system functionality and site acceptance were conducted on March 30, 2015.

The Bessey Creek facility was initialized on March 8, 2015 and continued into the grow-in and preliminary optimization phases as discussed below. The interpolated flow-weighted mean TP inflow concentration during this preliminary POR from March 8, 2015 through June 30, 2015 was 213 μg/L. The interpolated flow-weighted mean TP outflow was 20 μg/L, a 90% average reduction for the period. The TP mass fluctuated during the POR, trending upward. The effective dosing of alum ranged from 13.2 to 15.9 mg/L, and the average was 14.2 mg/L as Al for the period; dosing was suspended during part of the vegetative grow-in phase, and PAC was not utilized. Performance during this initial period is not indicative of longer-term operating conditions. TP levels are interpolated from approximately weekly samples.

The purchase of mitigation credits was required to offset the use of existing preservation areas contained within the Bessey Creek project site, and during Period 8, operational improvements were made to improve performance based in part upon the quality of waters to be treated and to increase real-time data availability. Optimization and monitoring efforts began in Period 9. Temporary inflow piping was installed early in March to provide sufficient creek flow to fill the settling, FAV, and SAV ponds with alum-treated Bessey Creek waters, despite the generally low flow dry season conditions. As a result of persistent low water conditions in the FAV and SAV ponds, a mesocosm facility was deployed at a nearby site for purposes of testing various floating and submerged species for incorporation into the Bessey facility. Bessey Creek water was transported to the mesocosms periodically (typically on a weekly frequency) in a trailer-mounted tank, and

plant P uptake trials were performed on a batch basis. The mesocosm waters were exchanged periodically with fresh Bessey Creek waters, and water samples were collected to characterize changes in P chemistry over time.

It was found that *Eichhornia crassipes* (water hyacinth) is the most effective plant to incorporate into the FAV ponds of the HWTT facility, based both on its robustness and effective treatment performance. During this initiation period, three species of floating plants were grown in the mesocosms: *Limnobium spongia* (frog's-bit), *Eichhornia crassipes* (water hyacinth), and *Hydrocotyle sp*. (pennywort). Mesocosm testing was also performed with two species of SAV: *Najas guadalupensis* (southern naiad) and *Potamogeton illinoensis* (Illinois pondweed). In the mesocosm assessment, most of these FAV and SAV species under evaluation provided effective P removal from Bessey Creek waters. Based on data from the trials, we subsequently stocked the Bessey HWTT system FAV ponds with both *Hydrocotyle* and *Eichhornia*, and the SAV ponds with both *Potamogeton* and *Najas*. Also during this initialization period, an intensive water quality sampling regime was performed to fine-tune the chemical dosing.

The temporary piping system installed in March was discontinued during April, when the pump station was energized by the electric power provider. Through most of April, May, and June, however, flows into the project were again generally low due to the dry season water conditions in Bessey Creek. While sufficient flow was present to operate and dose waters in the contact pond, water levels in the downstream FAV and SAV ponds remained low. The overall range in creek stage early in Period 12 was approximately 1 foot (FT) with the high stage conditions caused by a local thunderstorm event.

Interpolated TP mass removal over time is depicted graphically in Figure 60 together with the daily average reduction. Temporal variations in interpolated TP mass inflow versus TP mass outflow are presented in Figure 61. Interpolated TP concentration inflow and outflow levels for the period are shown in Figure 62. Daily average flows are shown in Figure 63 compared to system capacity. The effective dosing of alum and the average for the POR is depicted in Figure 64. Detailed data during this initial optimization and monitoring period is contained within Appendix IX .

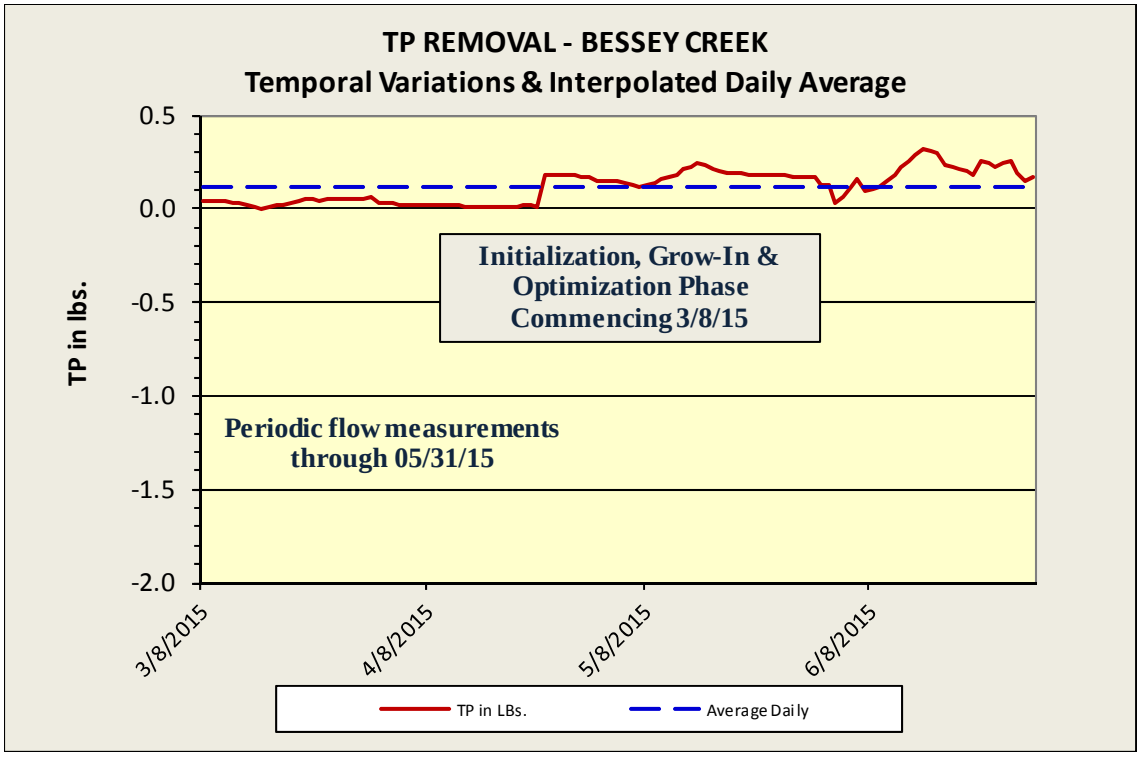


Figure 60. Interpolated TP Removal Temporal Variations & Daily Average Bessey Creek.

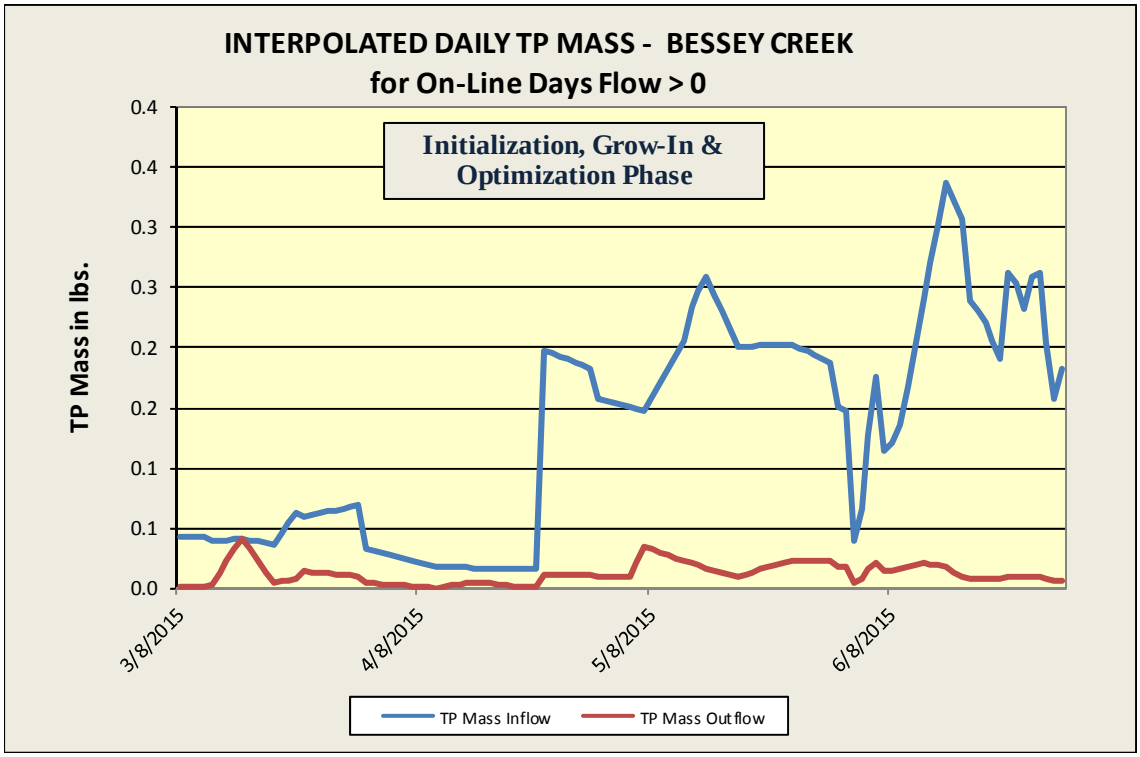


Figure 61. Interpolated Daily TP Mass Inflow versus Outflow Bessey Creek.

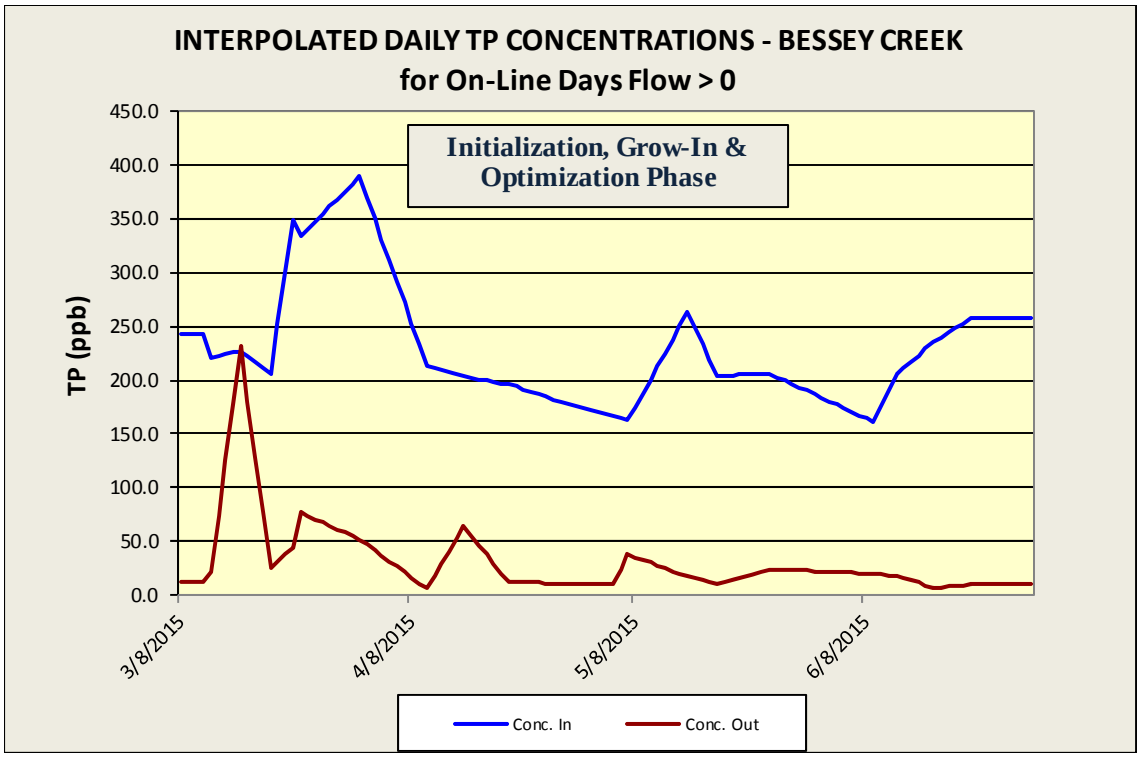


Figure 62. Interpolated Daily TP Concentrations Inflow versus Outflow Bessey Creek.

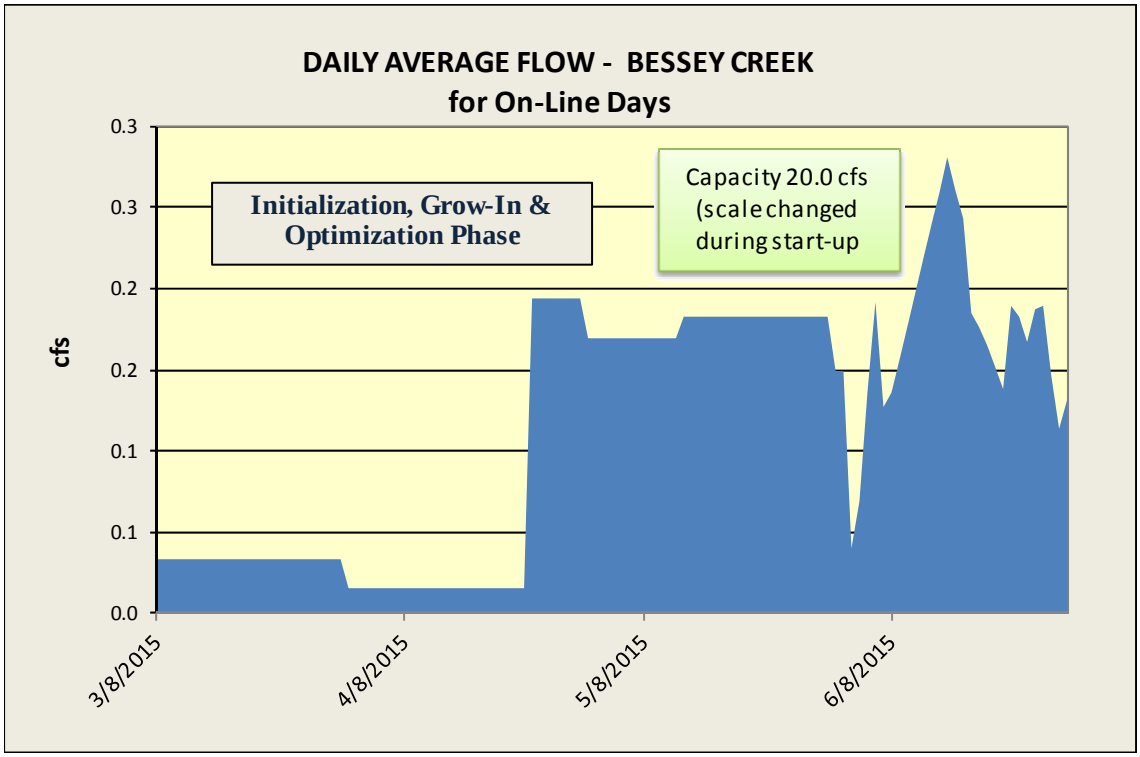


Figure 63. Daily Average Flows Bessey Creek.

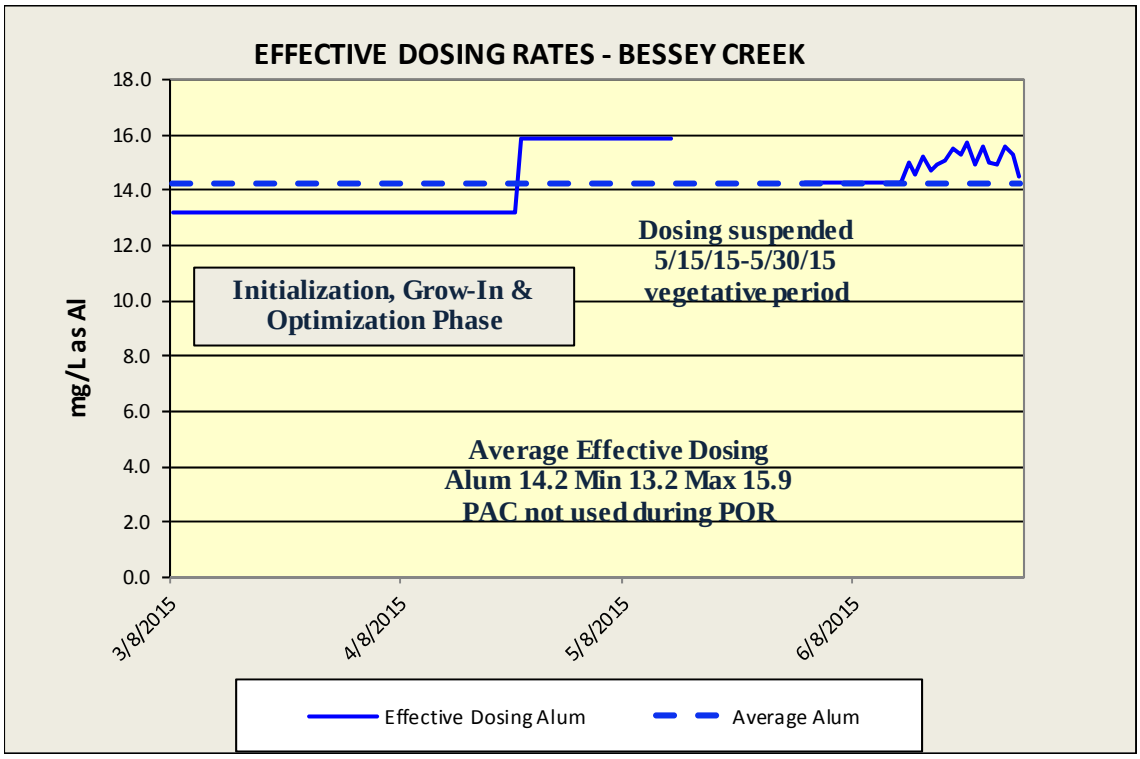


Figure 64. Daily Effective Dosing Rate and Average for the POR Bessey Creek.

Economic Analyses

The background of issues concerning Cost/Benefit calculations, assumptions and methodologies employed in this Report are discussed in the following sections. Detailed expenditures by site are presented for both infrastructure and current O&M, together with total forecasted 50 year projections. Cost/Benefit values are computed under the various methodologies presented in previous studies together with detailed operating data. Finally, factors affecting cost benefit values are explored.

Summary of Issues

Over the past several years, various reports demonstrating Cost/Benefit analysis for P removal have been prepared, for example, Brown & Caldwell, 1996; Sano et al., 2004; SFWMD, 2009. These analyses, however, often utilize different methods for comparison; include dissimilar items in the calculations; contain disparate basic assumptions; and present varying units of measurement. For example, Brown & Caldwell projected results under the Present Worth methodology over 50 years, whereas the Davie Dairy Edge of Farm (EOF) Cost/Benefit analysis (SFWMD, 2009) utilized a different approach using current year expenses plus capital cost amortized over 15 years. Conversely, the Sano Report included other economic cost offsets such as water and recreation benefits. Perhaps most importantly, much of the available Cost/Benefit data is based largely upon desktop evaluations rather than actual costs and performance observed under real world conditions. Ideally, all benefits, both tangible and intangible, should be considered and weighed against treatment alternatives whenever practicable and/or feasible. Full costs should be considered and projects should be compared using identical methodologies.

Maximizing Cost/Benefit

Several conditions have proven to be paramount in maximizing the Cost/Benefit of specific projects as follows:

1. Sufficient and consistent flow approximating design capacity.
2. Relatively high P levels available for treatment.

3. Reasonable levels of certain water quality parameters that have a significant influence on treatment, for example, low color and high alkalinity.
4. Minimization of retrofitting and/or pre-existing constraints of original sites that can add significantly to costs and degrade the performance of a technology.

All of the aforementioned factors are relevant at some or all of the HWTT operational sites, and consequently have negatively impacted performance. Site selection therefore becomes a key component of maximizing productivity and efficiency; some of the HWTT locations were chosen to accomplish important goals not directly related to maximum P removal, but nonetheless, the attendant costs impact Cost/Benefit calculations. A discussion of some of these indirect objectives is covered under the Environmental and Ancillary Benefits Section of this Chapter, and a Cost/Benefit model that incorporates the economic benefit of hydrating a downstream wetland at the Lemkin Creek and Wolff Ditch facilities has been calculated and added as supplementary information. To adequately compare and assess technologies, the inherent social goals and monetary benefits should be included.

Calculation Methodologies

The standard template for a cost benefit analysis projects the present worth of the project over the expected life, considering both capital and annual costs. As noted in the Summary of Issues above, other calculation methods have been utilized for determining the Cost/Benefit for removal of P and N. Additionally, problems that occur when moving from a "desktop" evaluation to an active project must also be taken into consideration. *Accordingly, several alternative calculations are presented to provide information that can be used for comparison with the different methods previously utilized.*

First, two basic scenarios were employed to account for differences due to lack of flow available for treatment and off-line periods during trial modes (see discussions in Chapter I Technical Report for explanation). The first presents actual costs and the second scenario provides additional managerial information for total long-term projected costs and benefits under maximum facility utilization.

A. Scenario #1 Partial Capacity Utilization: Actual full costs are utilized in calculating Cost/Benefit. This method distorts the true cost of a project if there is unused capacity (for example, lack of flow due to drought or downtime for trials/demonstrations), thereby greatly overstating per unit costs and understating potential removal of P. Cost/Benefit values are higher as fixed costs are distributed over fewer P or N removal "benefit" units. Values produced would be inconsistent with previously referenced desktop studies and would have scant value to management in projecting future costs for planning purposes. Capacity utilization by operational facility for the seven periods is depicted graphically in Figure 24. Utilization for the current POR was 19%, 12%, 32%, 45%, 13% and 28% for Nubbin Slough, Ideal Grove, Mosquito Creek, Lemkin Creek, Wolff Ditch and Grassy Island, respectively.

B. Scenario #2 Full Capacity Utilization: Full costs are utilized as above; however, variable and semi-fixed costs are extrapolated to project total costs at full capacity. TP removed is also projected based upon actual per day performance during the current period to compute the long-term Cost/Benefit. Projected total costs and projected P and N removal are demonstrated for a system that is operating close to 100% of design flow capacity; which is more comparable to desktop studies. Semi-fixed costs refer to those expenses that would change in a step-like function as capacity utilization increased, for example, certain personnel time. Economies of scale (for water treatment capacity) are realized.

Second, for each of the above scenarios, Cost/Benefit was calculated based on the two separate approaches that have been discussed, included in previous reports and/or requested by the Funding Agency. Each contract is analyzed as a stand-alone period for O&M and life cycle. Prior expenses are not adjusted to current year dollars. The two approaches are as follows:

A. Amortized Loan: An alternative calculation of Projected Cost/Benefit values which considers non-recurring costs as loan payments. Capital Improvement costs are adjusted for the time value of money by considering the non-recurring costs as loan

payments. The interest rate and life are 4% annual interest and a 50 year life. The adjusted capital expenditures are added to current year O&M costs. [Note – this approach replaces the previous "Amortized Capital + O&M" wherein infrastructure was amortized over the projected life of the project and added to current year O&M costs to determine the current year Cost/Benefit (referred to as "Amortized Capital + O&M"). The Amortized Loan approach is used starting in Period 4. Presentation of Cost/Benefit for any prior periods utilizes the "Amortized Capital + O&M" methodology.] 50 year life references are: Evaluation Methodology (SFWMD, 2002); Desktop Evaluation (Brown and Caldwell, 1996); and Economic Analysis (Sano et al., 2004).

B. Present Value: The present value (PV) of O&M with an assumed *net* discount rate of 4% (rate used in Desktop Evaluation (Brown and Caldwell, 1996) and 50 year life is added to infrastructure costs to determine the net PV of total costs and Cost/Benefit. Only the current year O&M costs are used in the analysis. No inflation adjustment is made for capital; infrastructure is therefore stated in original dollars for all sites. (Rate used in the Evaluation Methodology (SFWMD, 2002) was 3.375 %.)

Other Basic Assumptions

The following represent the major assumptions used in calculating Cost/Benefit values. Changes in any assumption will impact the Cost/Benefit calculations. A sensitivity analysis was beyond the scope of this contract and accordingly has not been performed.

1. For the five existing sites (#1-3, 5-6) only 50% of Optimization & Monitoring costs during construction have been excluded based on the estimated time that the systems were operational during construction. As noted above, infrastructure is not adjusted for inflation and assumed to be in current dollars. Exclusion of up to 100% of first year operations in calculating Cost/Benefit data is a reasonable assumption. Construction of the Grassy Island facility began under the 2010 contract, and modifications were completed under the previous period to allow for sustained operations at 10 cfs. All construction and optimization and monitoring expenses have been capitalized, as compared to only 50% of these expenditures that were

added to infrastructure for the other five facilities. Grassy Island was on-line July 11, 2011, and full-scale optimization and monitoring commenced. The following 125 day period through November 12, 2011 was shown as de facto O&M, and the corresponding TP data was tabulated to present a cost benefit calculation during this start-up optimization period in the prior contract.

Grassy Island was permitted at 10 cfs through November 29, 2012 and increased to 20 cfs through June 30, 2013 for an average of 15.8 cfs for the respective POR. Although construction for expansion to 30 cfs was completed June 13, 2013, permitting was limited to 20 cfs until approved completion of a required FDEP operating period. The permitted capacity for Grassy Island was increased during the current POR from 20 cfs to 30 cfs as of December 1, 2014, resulting in an average available capacity of 25.8 cfs for the POR. Capital costs related to an average approximate capacity of 25 cfs are therefore included in the cost benefit calculation for Partial Capacity Utilization. Conversely, all infrastructure expenditures are included in the Full Capacity Utilization calculations, since the facility is assumed to be operating at 30 cfs over its projected life.

2. Operational improvements were made at all sites during the current POR, excluding Ideal Grove. These expenditures were not capitalized, but are instead included in fixed expenses for Period 7.

3. Variable O&M costs include those costs primarily flow related including chemicals, utilities, drydown, tilling, and floc management, but do not include any associated personnel time.

4. Outstanding expenses as of the Report date are estimated and included in the calculations.

5. Land costs are excluded from the analysis due to lack of availability of data; estimation is beyond the scope of the project. Although the land has been made available at the various sites and hence a purchase price is not identified, the costs should be included in an economic analysis. These costs are relatively minor,

however, for HWTT due to the smaller footprint than *some* alternative treatment methodologies.

6. Per day amounts are used to standardize for the differences in the expense period and the sampling period. The operating costs cover the contract period plus projected outstanding expenses as of the contract end date. Operational data are noted for each site in the detailed operating reports shown as appendices. As noted above, the POR is July 1, 2014 through June 30, 2015 for all operating sites (Period 7).

7. Social and other economic benefits are excluded from the base calculations; however, as stated above, cost avoidance/savings have been recognized in a supplementary schedule for Lemkin Creek and Wolff Ditch. Consideration of all social benefits can materially change the analysis but are beyond the scope of this project. For example, these positive benefits had a significant favorable impact on Cost/Benefit values calculated in Economic Analysis (Sano et al., 2004).

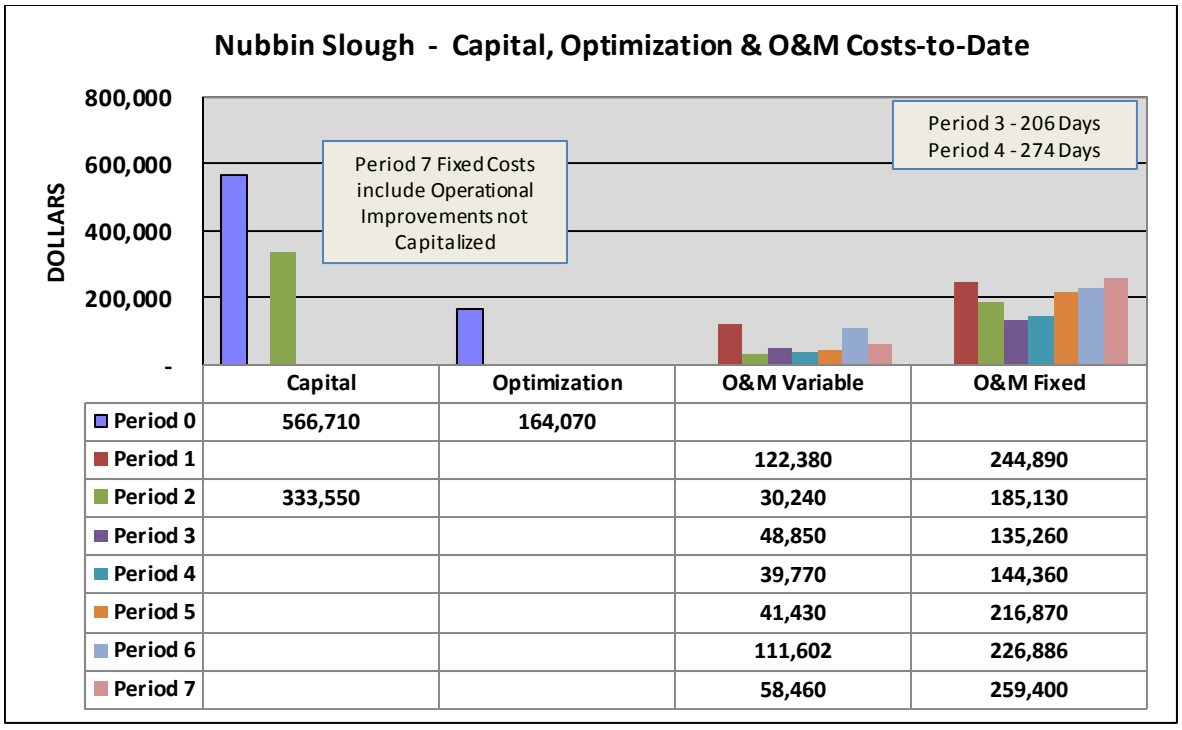
8. Rough Order of Magnitude projected replacement costs and an accompanying sensitivity analysis were prepared as part of the previous contract, upon request, and are included as Appendix XIV. Replacement costs and salvage values are beyond the scope of this project and are not considered in the 50 year projection.

9. The Contracts do not all represent 365 days; therefore, the terms are labeled as "Periods". Period 0 is the initial building of Sites 1-3. Sites 5 and 6 were constructed in Period 1, Grassy Island (Site 7) was in varying degrees of construction for Periods 2 through 5, and Bessey Creek (Site 8) was constructed under Period 6 and began optimization and monitoring during Period 7.

Expenditures – Current and Projected

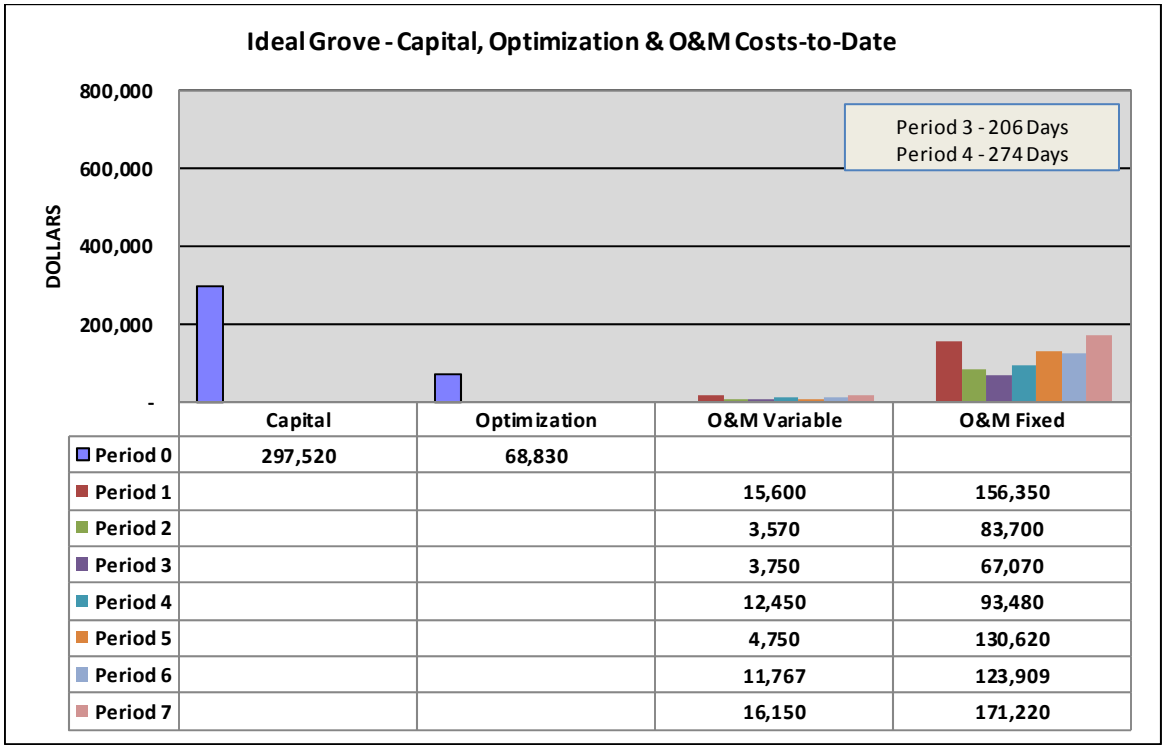
Expenditures are tracked by major expense category for each project site including capital costs and both variable and fixed O&M. Costs represent total expenditures associated with implementation, which equal contract price. As noted earlier, significant differences exist in pre-existing conditions at each facility that result in Cost/Benefit issues, for example, infrastructure, site restrictions, water quality, and land and power availability. Accurate analysis is not completely reliable in the early stages of a project due to start-up costs and optimization of performance parameters; both controllable and non-controllable variations in water quality can further distort costs and performance. Projected costs are based upon current year operations.

Figure 65 through Figure 71 represent projected expenditures by site and type, including Capital and 50% or less of Optimization & Monitoring costs as discussed above, as well as O&M expenses. The Y-axis scales have been standardized at $800,000, except for Grassy Island and Bessey Creek, to facilitate a visual relative comparison among the sites. (Infrastructure costs exceed the maximum at some sites as noted on the figures.) Period 0 corresponds to the initial contract during which Sites 1-3 were constructed and optimized. Period 1 refers to the second contract, which includes the first year of operations for the first 3 sites and construction and optimization of Sites 5 and 6. During this period, changes were made to flow pathways and configurations at Nubbin Slough, Ideal Grove, and Mosquito Creek. Nubbin Slough and Mosquito Creek have capital expenditures in Year 2 for limerock bed installation and/or pump additions. Period 3 relates to a previous contract encompassing 206 days that includes O&M for Sites 1-3, 5-6 and completion of the Phase I 10 cfs at Site 7. No major capital expenditures were incurred for sites 1-3, 5-6 during Period 4 (274 day period) or Period 5; approximately 10+ cfs was added at Grassy Island in Period 4 and an additional 10 cfs for Period 5. Site 8 was deployed under the previous contract (Period 6) and commenced initialization, grow-in, and preliminary optimization phases during Period 7. Operational improvements during Period 7 for Sites 1-3, 5-7 have not been capitalized and have been included as Fixed Operating Expenses.



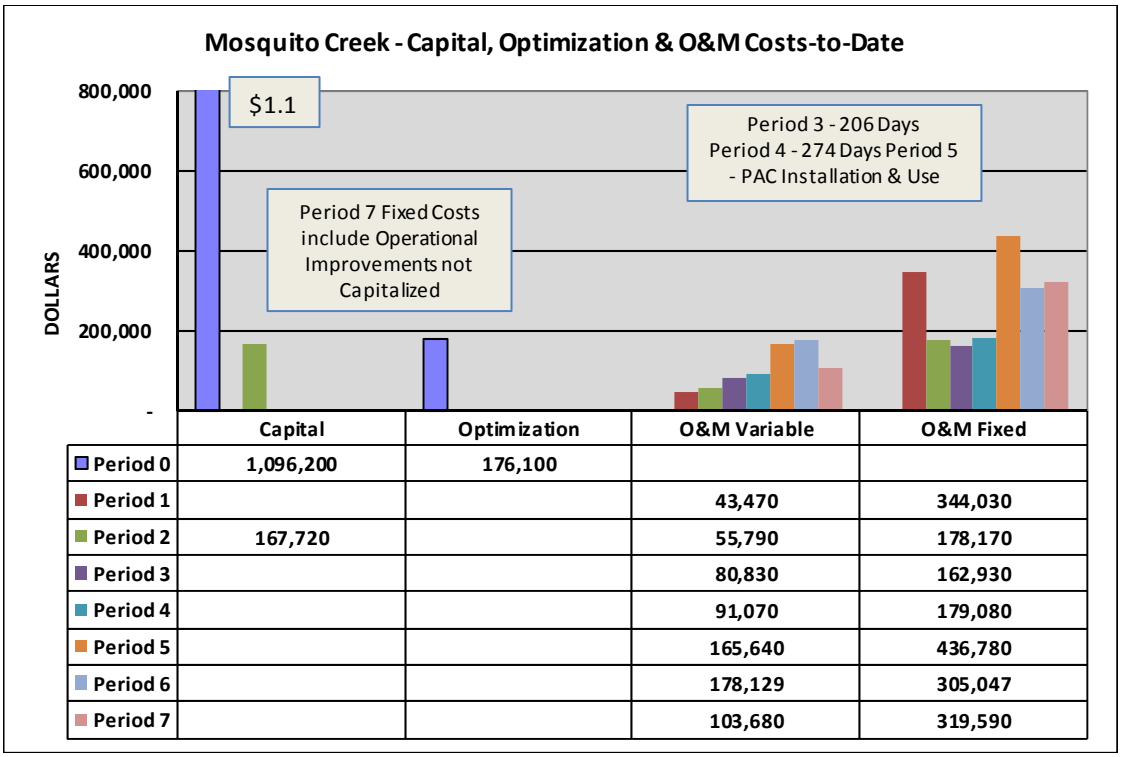
	Capital	Optimization	O&M Variable	O&M Fixed
Period 0	566,710	164,070		
Period 1			122,380	244,890
Period 2	333,550		30,240	185,130
Period 3			48,850	135,260
Period 4			39,770	144,360
Period 5			41,430	216,870
Period 6			111,602	226,886
Period 7			58,460	259,400

Figure 65. Nubbin Slough Costs-to-Date by Expenditure Type.



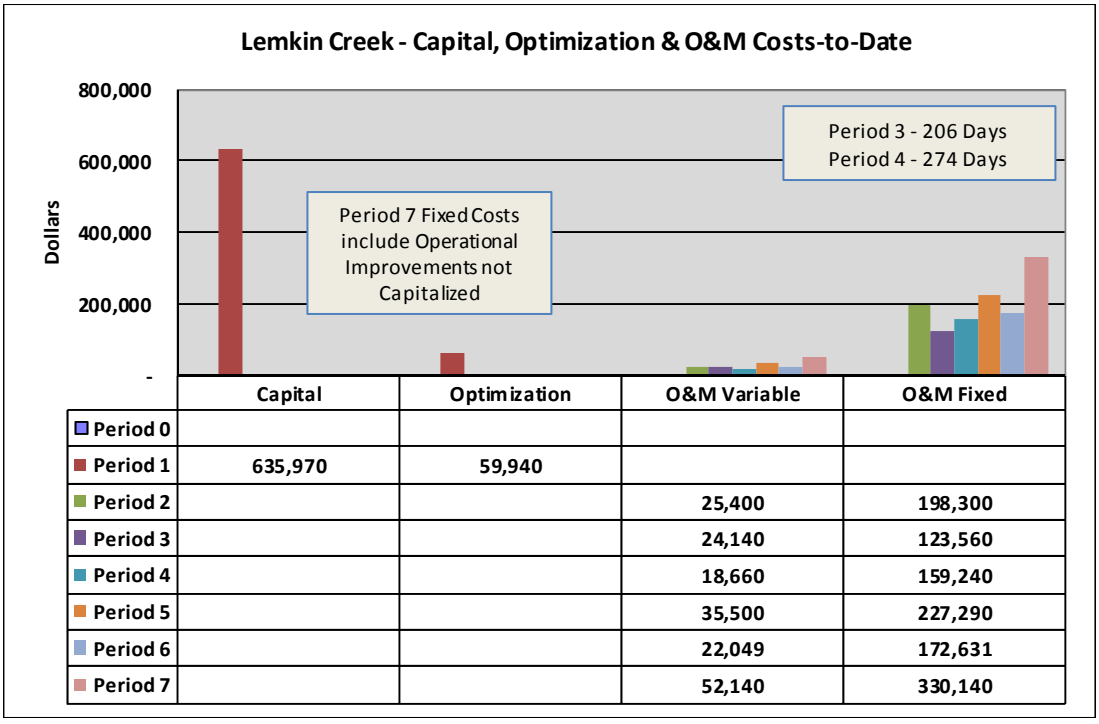
	Capital	Optimization	O&M Variable	O&M Fixed
Period 0	297,520	68,830		
Period 1			15,600	156,350
Period 2			3,570	83,700
Period 3			3,750	67,070
Period 4			12,450	93,480
Period 5			4,750	130,620
Period 6			11,767	123,909
Period 7			16,150	171,220

Figure 66. Ideal Grove Costs-to-Date by Expenditure Type.



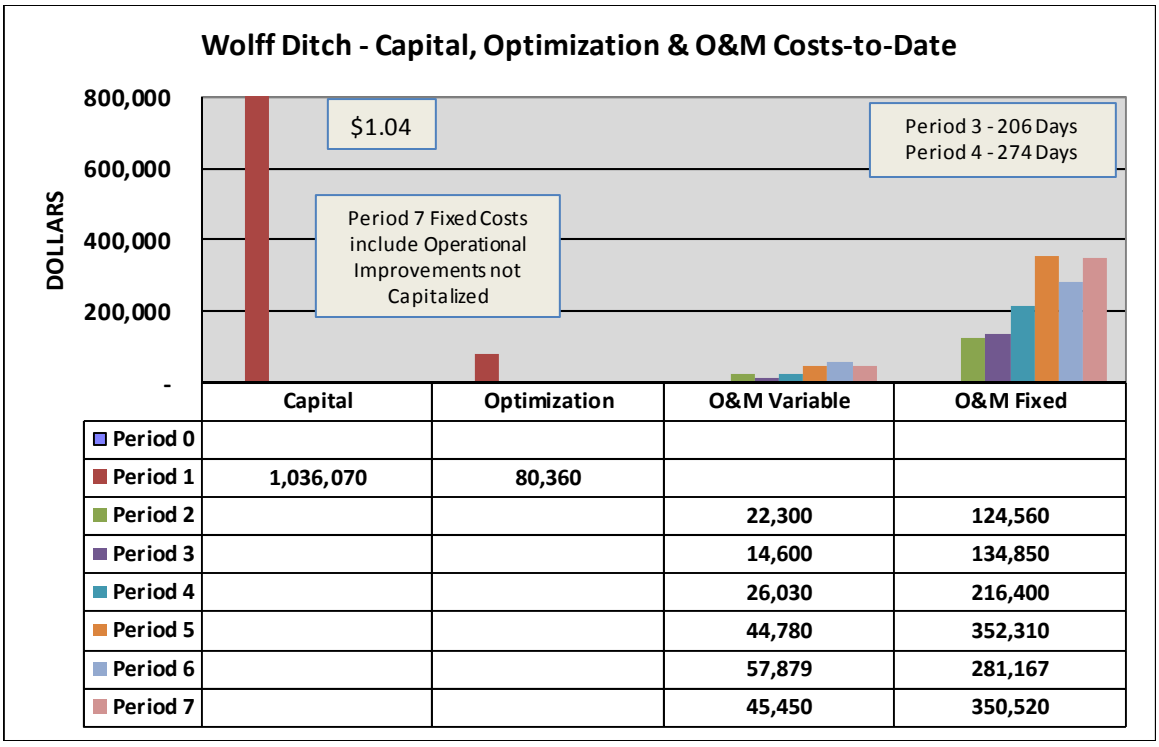
	Capital	Optimization	O&M Variable	O&M Fixed
Period 0	1,096,200	176,100		
Period 1			43,470	344,030
Period 2	167,720		55,790	178,170
Period 3			80,830	162,930
Period 4			91,070	179,080
Period 5			165,640	436,780
Period 6			178,129	305,047
Period 7			103,680	319,590

Figure 67. Mosquito Creek Costs-to-Date by Expenditure Type.



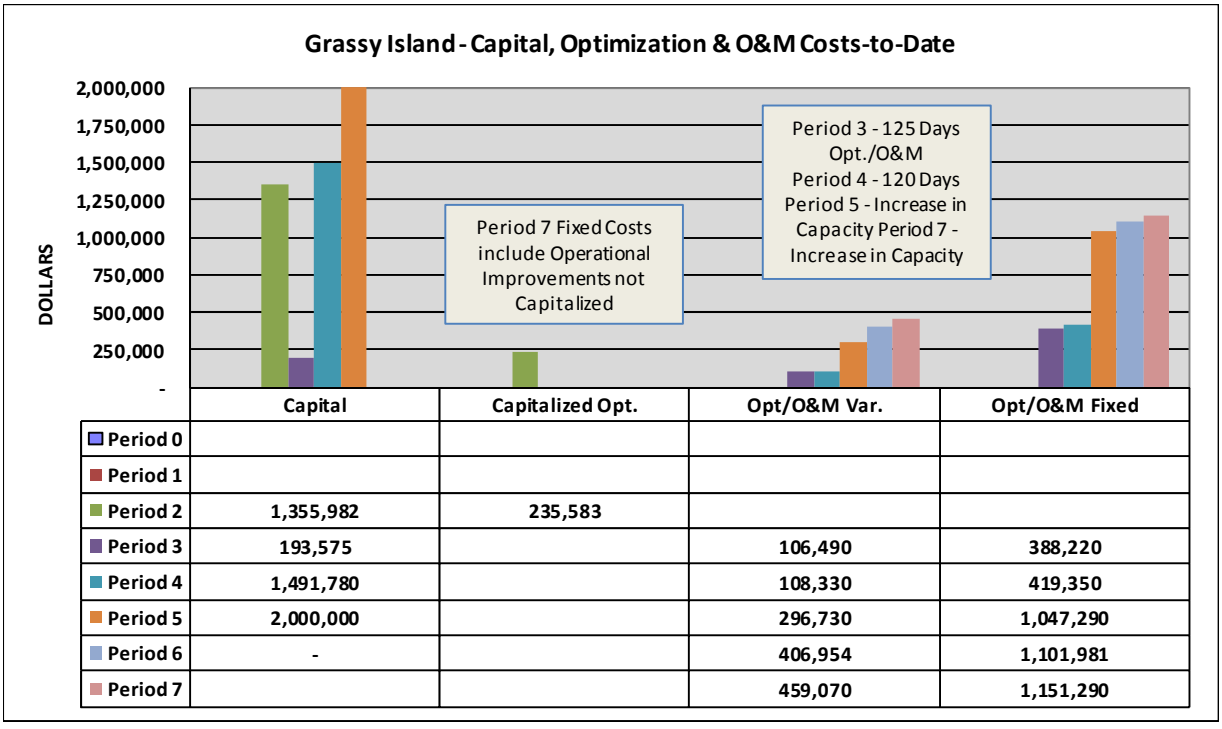
	Capital	Optimization	O&M Variable	O&M Fixed
Period 0				
Period 1	635,970	59,940		
Period 2			25,400	198,300
Period 3			24,140	123,560
Period 4			18,660	159,240
Period 5			35,500	227,290
Period 6			22,049	172,631
Period 7			52,140	330,140

Figure 68. Lemkin Creek Costs-to-Date by Expenditure Type.



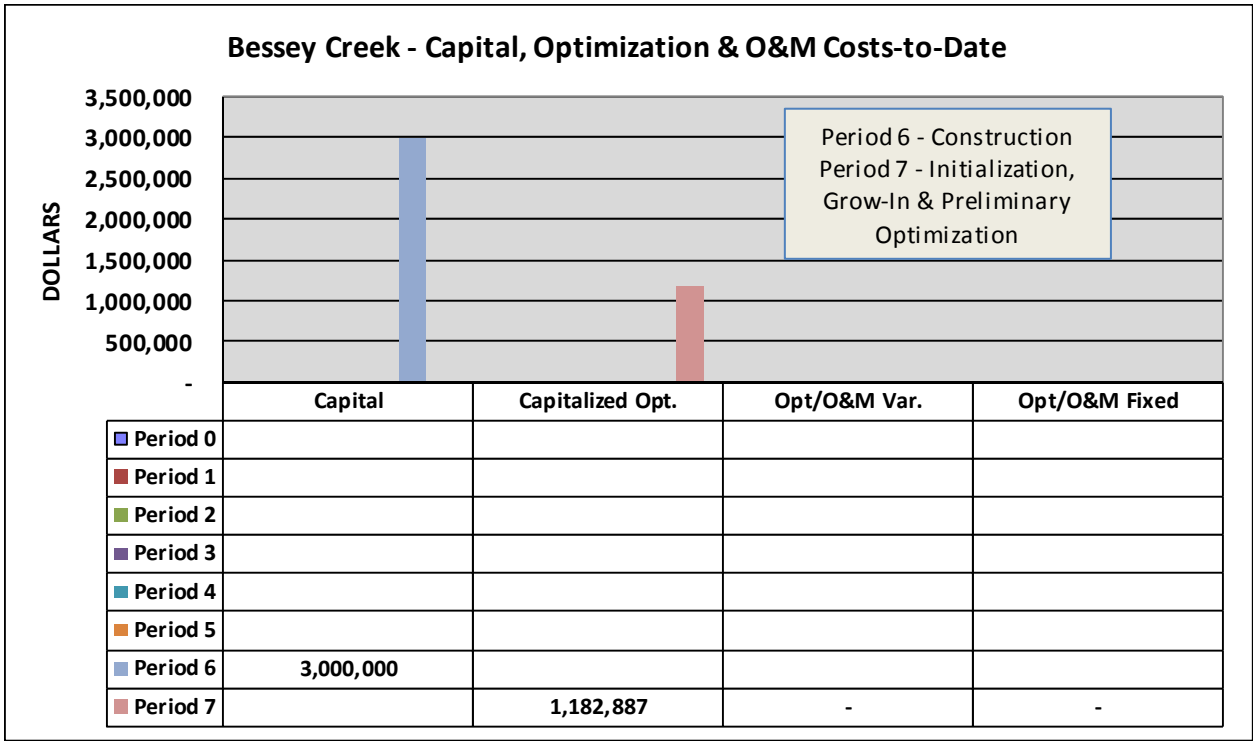
	Capital	Optimization	O&M Variable	O&M Fixed
Period 0				
Period 1	1,036,070	80,360		
Period 2			22,300	124,560
Period 3			14,600	134,850
Period 4			26,030	216,400
Period 5			44,780	352,310
Period 6			57,879	281,167
Period 7			45,450	350,520

Figure 69. Wolff Ditch Costs-to-Date by Expenditure Type.



	Capital	Capitalized Opt.	Opt/O&M Var.	Opt/O&M Fixed
Period 0				
Period 1				
Period 2	1,355,982	235,583		
Period 3	193,575		106,490	388,220
Period 4	1,491,780		108,330	419,350
Period 5	2,000,000		296,730	1,047,290
Period 6	-		406,954	1,101,981
Period 7			459,070	1,151,290

Figure 70. Grassy Island Costs-to-Date by Expenditure Type.



	Capital	Capitalized Opt.	Opt/O&M Var.	Opt/O&M Fixed
Period 0				
Period 1				
Period 2				
Period 3				
Period 4				
Period 5				
Period 6	3,000,000			
Period 7		1,182,887	-	-

Figure 71. Bessey Creek Costs-to-Date by Expenditure Type.

Variable Costs & Unit Processes

The breakdown of the O&M variable costs by process and total costs for each site is delineated in Appendix XIII, with accompanying schematics demonstrating the varying components deployed at the different facilities. Fixed costs generally cover all functions; time and material records are not accumulated by "process". The facilities are considered to be comparable to a wastewater treatment facility, with each HWTT site a division or department in and of itself (the treatment plant) and not subject to further cost breakdown.

Replacement Costs

The replacement costs of the various components of the HWTT system over the estimated useful life of the facility are not considered to be material; the preponderance of capital is excavation and embankment work (ponds), which does not degrade significantly over time. For example, in the SFWMD Desktop Evaluation of Alternative Technologies dated August 1996, Table 4.8-1 Basis of Design and Cost Information for STA – Chemical Treatment/Dissolved Air Flotation/Filtration, the replacement costs were calculated but related almost entirely to pump station costs. The values ranged from $3.43 million to $13.91 for capital costs ranging from $91.02 million to $198.21 (3-7%). A "rough" order of magnitude estimate of replacement costs for major items for Sites 1-3, 5-7 is shown in Appendix XIV, which was prepared upon request in a prior contract period. The estimates have been updated for Grassy Island construction through Phase III. The assets contained within the analysis are the significant items subject to replacement, specifically, pumps, limerock and monitoring and control equipment. Based upon the assumptions contained in this Chapter and the Schedule, these items have a net PV of approximately $1,084,000 over a 50 year life cycle for the combined six operational systems, excluding labor and overhead ($826,100 excluding equipment). Numerous capital items have already been replaced and the cost absorbed by Watershed Technologies, such as stolen computers, broken pumps, faulty flow and water quality sensors, faulty flow meters, chemical pumps, major pump station repairs and vegetation. Other than major pump or limerock replacement, the costs are generally recaptured in O&M. Sensitivity analysis for the net discount rate indicates a range from $1,102,400 at 3% to $745,600 at 5% (Appendix XIV). Calculating future values first and discounting back to the present (as opposed to a net

discount rate) results in a difference of approximately $17,000. The original costs, although incurred between 2010 and 2013, are assumed to occur within the same year for purposes of the rough estimate. Cost Benefit values are not calculated for Site 8, which is in the initial optimization phase.

Projected Cost/Benefit Values

The Cost/Benefit calculations are summarized in Figure 72 and Figure 73 for all sites for TP and in Figure 74 for TN removal at Grassy Island, under the Full Capacity Utilization (Scenario #2) using both Amortized Loan (see Calculation Methodologies) plus current O&M and the PV methods. The assumption of full capacity more accurately predicts the Cost/Benefit of the treatment process as the facilities are operated below design capacity. The underutilization is the result of lack of flow availability, facility siting, and construction activities. Detailed schedules follow (Table 7 through Table 16) which present Partial and Full Capacity scenarios, as well as current and projected capacity utilization, expenditures, TP removal, TN removal (at Grassy Island) and Cost/Benefit calculations. Detailed daily operating data for water treated, TP load inflow, TP load outflow, and load reduction by site for the operational facilities is contained in Appendix III through Appendix VIII and in Appendix IX for Bessey Creek; comparable data for TN is provided in Appendix X for Grassy Island. It is important to note that the Cost/Benefit calculations are based upon extrapolations of 50 year O&M costs. This projection is used to present a reference point for current year operations and does not necessarily provide a reasonable basis for annualizing expenses. Prior year capital expenditures have not been adjusted to current year dollars. The analyses include capital costs plus current period O&M only; calculations are forward looking and do not consider prior year O&M expenses. Please refer to the Assumptions and Notes contained herein.

Cost/Benefit calculations using the South Pond TP samples for Lemkin Creek and Wolff Ditch outflow are presented in Figure 73. The inclusion of the South Pond demonstrates a significant improvement in all performance data, with the Cost/Benefit declining for both facilities. As discussed under the Phosphorus Removal Effectiveness Section above, these two facilities were sited primarily to supply needed hydration for the downstream wetland

via the South Pond. During construction, Watershed Technologies made several material changes to the South Pond, including weir relocation, elevation adjustments, piping additions and general maintenance. The SAV community from the dual HWTT facilities has expanded into the South pond shallow zone, providing additional filtration. Weekly samples are taken and laboratory analyses are prepared and tabulated, together with inflow measurements to the adjacent wetland. Detailed Cost/Benefit calculations for TP removal for these side-by-side facilities using South Pond outflow data are shown in Table 14 and Table 15.

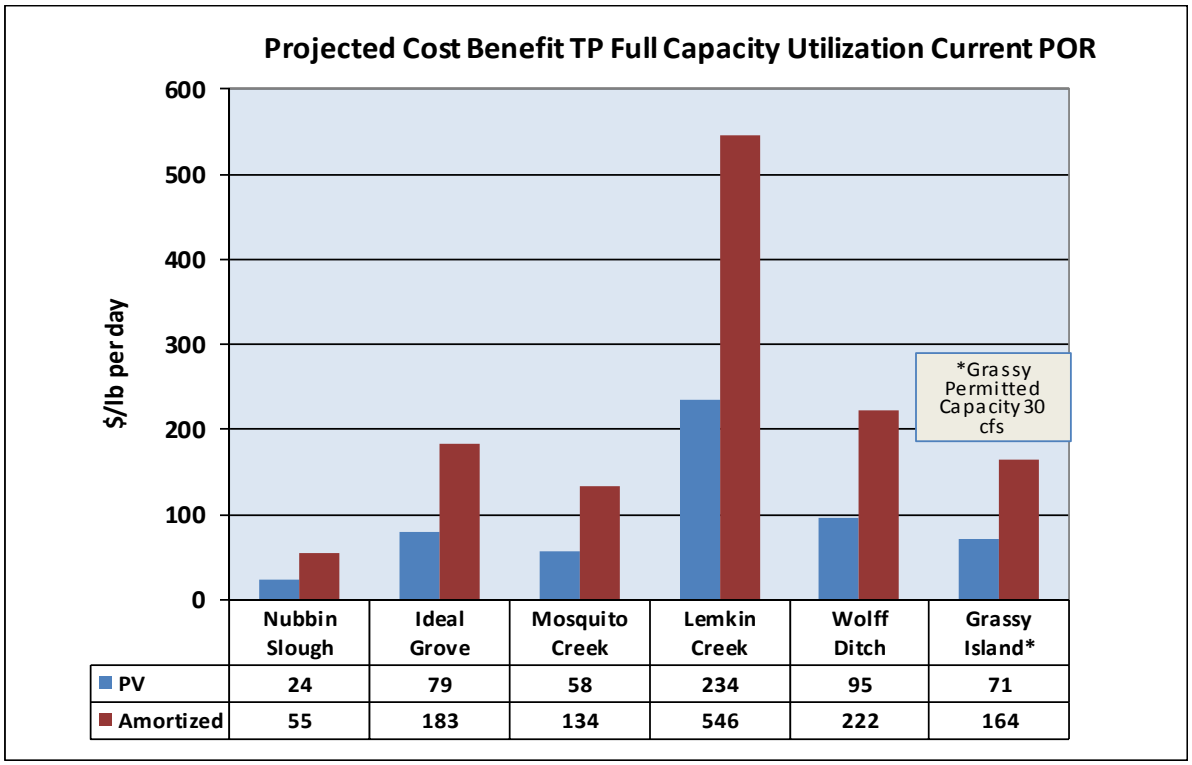


Figure 72. Projected Cost/Benefit of TP Full Capacity Present Value & Amortized Loan.

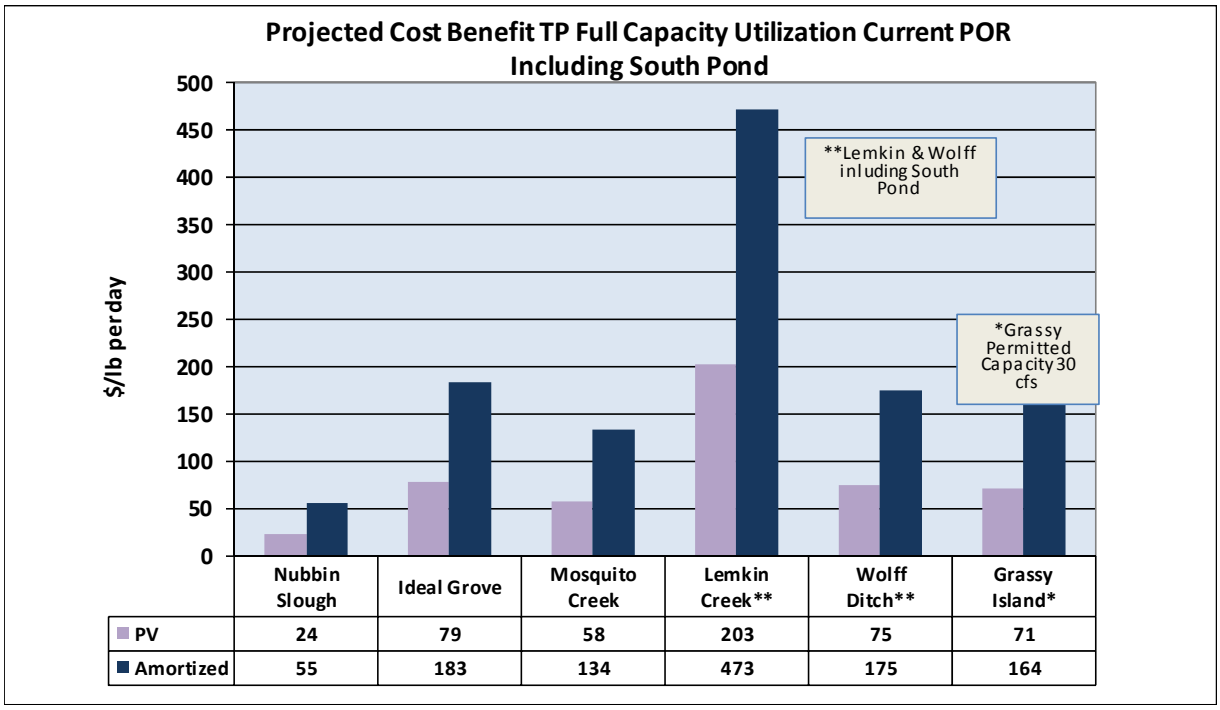


Figure 73. Projected Cost/Benefit of TP Full Capacity Present Value & Amortized Loan South Pond Data – Lemkin & Wolff Facilities.

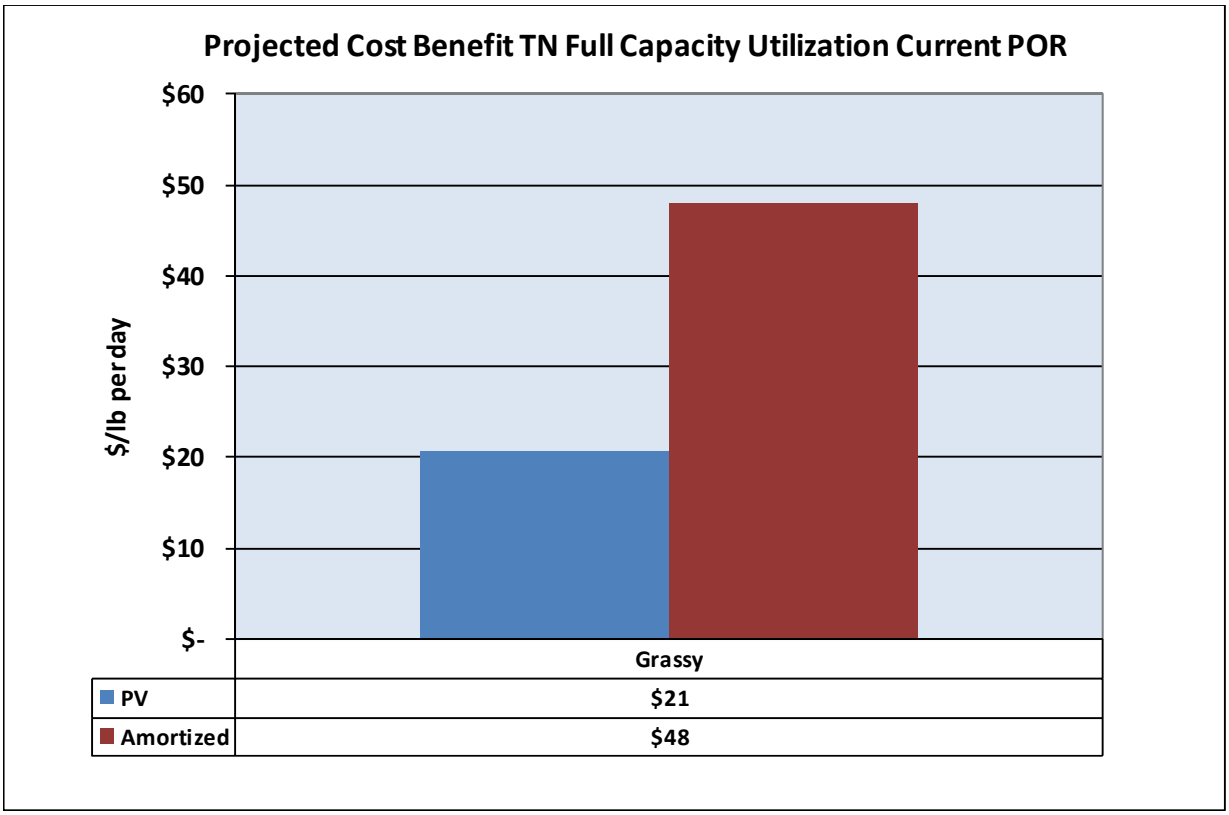


Figure 74. Projected Cost/Benefit of TN Full Capacity Present Value & Amortized Loan Grassy Island.

Table 7. TP Cost Benefit Analysis Nubbin Slough Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Nubbin Slough Site 1						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Projectd P Removal & Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs Based on Design Flow		**All Costs Based on Design Flow**	
		Total Costs	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		619.2				
Design Capacity gpm		3321.7				
% of Design Capacity		19%				
Infrastructure (Note 7)						
Infrastructure Period 0		$ 566,707				
Optimization & Monitoring (Note 1)		164,070				
Total Allocated Capital Period 0		$ 730,778	$ 730,778	$ 730,778	$ 730,778	$ 730,778
Unallocated Costs Period 0: Optimization & Monitoring (Note 1)		164,070				
Total Period 0		$ 894,848				
Estimated Life			50	50	50	50
Amortized Capital Period 0			34,018		34,018	
Infrastructure Period 2		$ 333,554	333,554	333,554	333,554	333,554
Estimated Life			50	50	50	50
Amortized Capital Period 2			15,527		15,527	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			49,545		49,545	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 58,457	$ 58,457	$ 58,457	$ 313,575	$ 313,575
O&M Fixed Costs Actual & Projected		259,403	259,403	259,403	317,336	317,336
Total Operations & Maintenance (Note 3)		$ 317,861	$ 317,861	$ 317,861	$ 630,911	$ 630,911
Present Worth O&M (Notes 4,10 & 11)				$ 6,828,344		$ 13,553,355
Annual Costs & Present Value Actual & Projected			$ 367,406	$ 7,892,676	$ 680,456	$ 14,617,686
Cost per Day (Notes 5 & 8)			$ 1,007	$ 432	$ 1,864	$ 801
P Removal lb/day (Per Data Schedule Appendix)			6.29	6.29	33.74	33.74
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 160**	**$ 69**	**$ 55**	**$ 24**

Table 8. TP Cost Benefit Analysis Ideal Grove Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Ideal Grove Site 2						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Design Flow		**Based on Design Flow**	
		Total Costs	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		69.2				
Design Capacity gpm		583.5				
% of Design Capacity		12%				
Infrastructure (Note 7)						
Infrastructure Period 0		$ 297,523				
Optimization & Monitoring (Note 1)		68,835				
Total Allocated Capital Period 0		$ 366,358	$ 366,358	$ 366,358	$ 366,358	$ 366,358
Unallocated Costs Period 0: Optimization & Monitoring (Note 1)		68,835				
Total Period 0		$ 435,193				
Estimated Life			50	50	50	50
Amortized Capital Period 0			17,054		17,054	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			17,054		17,054	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 16,153	$ 16,153	$ 16,153	$ 136,145	$ 136,145
O&M Fixed Costs Actual & Projected		171,219	171,219	171,219	198,467	198,467
Total Operations & Maintenance (Note 3)		$ 187,371	$ 187,371	$ 187,371	$ 334,612	$ 334,612
Present Worth O&M (Notes 4,10 & 11)				$ 4,025,147		$ 7,188,198
Annual Costs & Present Value Actual & Projected			$ 204,425	$ 4,391,506	$ 351,666	$ 7,554,556
Cost per Day (Notes 5 & 8)			$ 560	$ 241	$ 963	$ 414
P Removal lb/day Total (Per Data Schedule Appendix)			0.62	0.62	5.25	5.25
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 899**	**$ 386**	**$ 183**	**$ 79**

Table 9. TP Cost Benefit Analysis Mosquito Creek Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Mosquito Creek Site 3						
O&M Costs Period:	7/1/2014	through	6/30/2015			
TP Data Period	7/1/2014	through	6/30/2015			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Design Flow		**Based on Design Flow**	
		Total Costs	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		863.9				
Design Capacity gpm		2693.3				
% of Design Capacity		32%				
Infrastructure (Note 7)						
Infrastructure Period 0		$ 1,096,201				
Optimization & Monitoring (Note 1)		176,100				
Total Allocated Capital Period 0		$ 1,272,300	$ 1,272,300	$ 1,272,300	$ 1,272,300	$ 1,272,300
Unallocated Costs Period 0: Optimization & Monitoring (Note 1)		176,100				
Total Period 0		$ 1,448,400				
Estimated Life			50	50	50	50
Amortized Capital Period 0			59,226		59,226	
Infrastructure Period 2		$ 167,718	167,718	167,718	167,718	167,718
Estimated Life			50	50	50	50
Amortized Capital Period 2			7,807		7,807	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			67,033		67,033	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 103,678	$ 103,678	$ 103,678	$ 323,225	$ 323,225
O&M Fixed Costs Actual & Projected		319,589	319,589	319,589	369,444	369,444
Total Operations & Maintenance (Note 3)		$ 423,267	$ 423,267	$ 423,267	$ 692,669	$ 692,669
Present Worth O&M (Notes 4,10 & 11)				$ 9,092,695		$ 14,880,042
Annual Costs & Present Value Actual & Projected			$ 490,300	$ 10,532,714	$ 759,702	$ 16,320,061
Cost per Day (Notes 5 & 8)			$ 1,343	$ 577	$ 2,081	$ 894
P Removal lb/day Total (Per Data Schedule Appendix)			4.98	4.98	15.53	15.53
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 270**	**$ 116**	**$ 134**	**$ 58**

Table 10. TP Cost Benefit Analysis Lemkin Creek Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Lemkin Creek Site 5						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Design Flow		**Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		1003.5				
Design Capacity gpm		2244.4				
% of Design Capacity		45%				
Infrastructure (Note 7)						
Infrastructure Period 1		$ 635,973				
Optimization & Monitoring (Note 1)		59,939				
Total Allocated Capital Period 1		$ 695,911	$ 695,911	$ 695,911	$ 695,911	$ 695,911
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		59,939				
Total Period 1		$ 755,850				
Estimated Life			50	50	50	50
Amortized Capital Period 1			32,395		32,395	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			32,395		32,395	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 52,142	$ 52,142	$ 52,142	$ 116,621	$ 116,621
O&M Fixed Costs Actual & Projected		330,136	330,136	330,136	344,778	344,778
Total Operations & Maintenance (Note 3)		$ 382,278	$ 382,278	$ 382,278	$ 461,399	$ 461,399
Present Worth O&M (Notes 4,10 & 11)				$ 8,212,173		$ 9,911,858
Annual Costs & Present Value Actual & Projected			$ 414,673	$ 8,908,084	$ 493,794	$ 10,607,769
Cost per Day (Notes 5 & 8)			$ 1,136	$ 488	$ 1,353	$ 581
P Removal lb/day Total (Per Data Schedule)			1.11	1.11	2.48	2.48
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 1,025**	**$ 440**	**$ 546**	**$ 234**

Table 11. TP Cost Benefit Analysis Wolff Ditch Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Wolff Ditch Site 6						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Design Flow		**Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		1148.7				
Design Capacity gpm		8977.6				
% of Design Capacity		13%				
Infrastructure (Note 7)						
Infrastructure Period 1		$ 1,036,070				
Optimization & Monitoring (Note 1)		80,360				
Total Allocated Capital Period 1		$ 1,116,430	$ 1,116,430	$ 1,116,430	$ 1,116,430	$ 1,116,430
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		80,360				
Total Period 1		$ 1,196,790				
Estimated Life			50	50	50	50
Amortized Capital Period 1			51,970		51,970	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			51,970		51,970	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 45,452	$ 45,452	$ 45,452	$ 355,231	$ 355,231
O&M Fixed Costs Actual & Projected		350,517	350,517	350,517	420,862	420,862
Total Operations & Maintenance (Note 3)		$ 395,968	$ 395,968	$ 395,968	$ 776,093	$ 776,093
Present Worth O&M (Notes 4,10 & 11)				$ 8,506,267		$ 16,672,173
Annual Costs & Present Value Actual & Projected			$ 447,938	$ 9,622,697	$ 828,063	$ 17,788,603
Cost per Day (Notes 5 & 8)			$ 1,227	$ 527	$ 2,269	$ 975
P Removal lb/day Total (Per Data Schedule)			1.31	1.31	10.22	10.22
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 938**	**$ 403**	**$ 222**	**$ 95**

Table 12. TP Cost Benefit Analysis Grassy Island Actual & Projected.
(See Notes & Assumptions).

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Grassy Island Site 7						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Permitted Flow		**Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		3244.5				
Design Capacity gpm		13466.4				
% of Design Capacity		24%				
Infrastructure (Note 7)						
Infrastructure Periods 2 & 3		$ 1,549,557				
Optimization & Monitoring (Note 1)		235,583				
Total Allocated Capital Periods 2 & 3		$ 1,785,140	$ 1,785,140	$ 1,785,140	$ 1,785,140	$ 1,785,140
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		494,705				
Total Periods 2 & 3		$ 2,279,845				
Estimated Life			50	50	50	50
% Days @ Permitted Capacity			100%	100%	100%	100%
Capital Periods 2 & 3			83,099	1,785,140	83,099	1,785,140
Infrastructure Period 4		$ 1,491,780	1,491,780	1,491,780	1,491,780	1,491,780
Estimated Life			50	50	50	50
% Days @ Permitted Capacity			100%	100%	100%	100%
Capital Period 4			69,443	1,491,780	69,443	1,491,780
Infrastructure Period 5		$ 2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Estimated Life			50	50	50	50
% Days @ Permitted Capacity			0%	0%	100%	100%
Capital Period 5			0	0	93,100	2,000,000
Amortized Capital Current Period			152,541		245,642	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 459,075	$ 459,075	$ 459,075	$ 1,905,405	$ 1,905,405
O&M Fixed Costs Actual & Projected		1,151,293	1,151,293	1,151,293	1,479,728	1,479,728
Total Operations & Maintenance (Note 3)		$ 1,610,368	$ 1,610,368	$ 1,610,368	$ 3,385,133	$ 3,385,133
Present Worth O&M (Notes 4,10 & 11)				$ 34,594,215		$ 72,720,061
Annual Costs & Present Value Actual & Projected			$ 1,762,909	$ 37,871,136	$ 3,630,775	$ 77,996,982
Cost per Day (Notes 5 & 8)			$ 4,830	$ 2,075	$ 9,947	$ 4,274
P Removal lb/day Total (Per Data Schedule)			14.58	14.58	60.50	60.50
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 331**	**$ 142**	**$ 164**	**$ 71**

Table 13. Actual & Projected Costs Sites 1-3, 5-8.
(See Notes & Assumptions – Page 1 of 2)

WATERSHED TECHNOLOGIES, LLC.						
Projected Costs (See Notes)						
Total Sites 1-3, 5-7						
Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual Costs		**Projectd P Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs Based on Design Flow		**All Costs Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		6329.8				
Design Capacity gpm		27965.1				
% of Design Capacity		23%				
Infrastructure (Note 7)						
Infrastructure Periods 0 & 1: Sites 1-3, 5-6		$ 3,632,474				
Capitalized Optimization & Monitoring (Note 1)		549,304				
Total Allocated Capital Periods 0 & 1		$ 4,181,777	$ 4,181,777	$ 4,181,777	$ 4,181,777	$ 4,181,777
Estimated Life			50	50	50	50
Amortized Capital Periods 0 & 1			194,663		194,663	
Infrastructure & Capitalized Optimization Periods 2 & 3: Site 7 & Sites 1 & 3 Improvements		$ 2,286,413	$ 2,286,413	$ 2,286,413	$ 2,286,413	$ 2,286,413
Estimated Life			50	50	50	50
Amortized Capital Periods 2 & 3			106,433		106,433	
Infrastructure Period 4: Site 7 Phase II (Optimization Treated as O&M)		$ 1,491,780	$ 1,491,780	$ 1,491,780	$ 1,491,780	$ 1,491,780
Estimated Life			50	50	50	50
Amortized Capital Period 4			69,443		69,443	
Infrastructure Period 5: Site 7 Phase III		$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000
Estimated Life			50	50	50	50
Amortized Capital Period 5			0	0	93,100	
Amortized Capital Current Period			370,538		463,639	
Total Infrastructure & Capitalized Optimization		$ 9,959,971				
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 734,956	$ 734,956	$ 734,956	$ 3,150,202	$ 3,150,202
O&M Fixed Costs Actual & Projected		2,582,157	2,582,157	2,582,157	3,130,616	3,130,616
Total Operations & Maintenance (Note 3)		$ 3,317,113	$ 3,317,113	$ 3,317,113	$ 6,280,818	$ 6,280,818
Present Worth O&M (Notes 4,10 & 11)				$71,258,842		$134,925,686

Contract Reconciliation:
(See Notes & Assumptions – Page 2 of 2)

Total O&M Sites 1-3, 5-7 per Schedule	$ 3,317,113				
Total Optimization Bessey Creek per Schedule	$ 1,182,887				
Total Contract 021120	$ 4,500,000				
Total Capital Bessey Creek per Schedule - Contract 020210	$ 3,000,000				

Table 14. TP Cost Benefit Analysis Lemkin Creek South Pond Outflow Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Lemkin Creek Site 5 South Pond						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs Based on Design Flow		**All Costs Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		1003.5				
Design Capacity gpm		2244.4				
% of Design Capacity		45%				
Infrastructure (Note 7)						
Infrastructure Period 1		$ 635,973				
Optimization & Monitoring (Note 1)		59,939				
Total Allocated Capital Period 1		$ 695,911	$ 695,911	$ 695,911	$ 695,911	$ 695,911
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		59,939				
Total Period 1		$ 755,850				
Estimated Life			50	50	50	50
Amortized Capital Period 1			32,395		32,395	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			32,395		32,395	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 52,142	$ 52,142	$ 52,142	$ 116,621	$ 116,621
O&M Fixed Costs Actual & Projected		330,136	330,136	330,136	344,778	344,778
Total Operations & Maintenance (Note 3)		$ 382,278	$ 382,278	$ 382,278	$ 461,399	$ 461,399
Present Worth O&M (Notes 4,10 & 11)				$ 8,212,173		$ 9,911,858
Annual Costs & Present Value Actual & Projected			$ 414,673	$ 8,908,084	$ 493,794	$ 10,607,769
Cost per Day (Notes 5 & 8)			$ 1,136	$ 488	$ 1,353	$ 581
P Removal lb/day Total (Per Data Schedule)			1.28	1.28	2.86	2.86
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 888**	**$ 381**	**$ 473**	**$ 203**

Table 15. TP Cost Benefit Analysis Wolff Ditch South Pond Outflow Actual & Projected.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Wolff Ditch Site 6 South Pond						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Design Flow		**Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		1148.7				
Design Capacity gpm		8977.6				
% of Design Capacity		13%				
Infrastructure (Note 7)						
Infrastructure Period 1		$ 1,036,070				
Optimization & Monitoring (Note 1)		80,360				
Total Allocated Capital Period 1		$ 1,116,430	$ 1,116,430	$ 1,116,430	$ 1,116,430	$ 1,116,430
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		80,360				
Total Period 1		$ 1,196,790				
Estimated Life			50	50	50	50
Amortized Capital Period 1			51,970		51,970	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			51,970		51,970	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 45,452	$ 45,452	$ 45,452	$ 355,231	$ 355,231
O&M Fixed Costs Actual & Projected		350,517	350,517	350,517	420,862	420,862
Total Operations & Maintenance (Note 3)		$ 395,968	$ 395,968	$ 395,968	$ 776,093	$ 776,093
Present Worth O&M (Notes 4,10 & 11)				$ 8,506,267		$ 16,672,173
Annual Costs & Present Value Actual & Projected			$ 447,938	$ 9,622,697	$ 828,063	$ 17,788,603
Cost per Day (Notes 5 & 8)			$ 1,227	$ 527	$ 2,269	$ 975
P Removal lb/day Total (Per Data Schedule)			1.66	1.66	12.97	12.97
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 739**	**$ 318**	**$ 175**	**$ 75**

Table 16. TN Cost Benefit Analysis Grassy Island Actual & Projected.
(See Notes and Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Grassy Island Site 7						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TN Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual N Removal & Costs		**Projectd N Removal & Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs Based on Permitted Flow		**All Costs Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		3244.5				
Design Capacity gpm		13466.4				
% of Design Capacity		24%				
Infrastructure (Note 7)						
Infrastructure Periods 2 & 3		$ 1,549,557				
Optimization & Monitoring (Note 1)		235,583				
Total Allocated Capital Periods 2 & 3		$ 1,785,140	$ 1,785,140	$ 1,785,140	$ 1,785,140	$ 1,785,140
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		494,705				
Total Periods 2 & 3		$ 2,279,845				
Estimated Life			50	50	50	50
% Days @ Permitted Capacity			100%	100%	100%	100%
Capital Periods 2 & 3			83,099	1,785,140	83,099	1,785,140
Infrastructure Period 4		$ 1,491,780	1,491,780	1,491,780	1,491,780	1,491,780
Estimated Life			50	50	50	50
% Days @ Permitted Capacity			100%	100%	100%	100%
Capital Period 4			69,443	1,491,780	69,443	1,491,780
Infrastructure Period 5		$ 2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Estimated Life			50	50	50	50
% Days @ Permitted Capacity			0%	0%	100%	100%
Capital Period 5			0	0	93,100	2,000,000
Amortized Capital Current Period			152,541		245,642	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 459,075	$ 459,075	$ 459,075	$ 1,905,405	$ 1,905,405
O&M Fixed Costs Actual & Projected		1,151,293	1,151,293	1,151,293	1,479,728	1,479,728
Total Operations & Maintenance (Note 3)		$ 1,610,368	$ 1,610,368	$ 1,610,368	$ 3,385,133	$ 3,385,133
Present Worth O&M (Notes 4,10 & 11)				$ 34,594,215		$ 72,720,061
Annual Costs & Present Value Actual & Projected			$ 1,762,909	$ 37,871,136	$ 3,630,775	$ 77,996,982
Cost per Day (Notes 5 & 8)			$ 4,830	$ 2,075	$ 9,947	$ 4,274
N Removal lb/day Total (Per Data Schedule)			49.9	49.9	207.0	207.0
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 97**	**$ 42**	**$ 48**	**$ 21**

Notes (See Chapter II discussions regarding methodologies & other assumptions):							
1. Optimization & Monitoring Costs have been allocated to Capital based as follows:							
System 1-3, 5-6: 50% during initial start-up; System 7: 100% of Period 2; Period 3 Optimization treated as O&M expense;							
Systems 1,2,3-7 2015 Operational Improvements included in Fixed Costs - not capitalized; Site 8 excluded - Optimization Phase.							
2. Variable Costs include those costs primarily related to flow including chemicals, utilities, drydown, tilling, floc management.							
3. Outstanding expenses as of Report submission date estimated and included in the analysis.							
4. PV Calculated at Net discount rate of	4%	Life	50				
5. Amortized Capital + O&M = Total Costs Actual to Date + Projected / # Days in Expense Period; Capital costs are considered to							
be a loan payment and therefore adjusted for the cost of money or internal rate of return; O&M are current year dollars.							
Present Value = Present Worth / Estimated Life / 365			days per year				
6. Days in Period:	Nubbin Slough	Ideal Grove	Mosquito Creek	Lemkin Creek	Wolff Ditch	Grassy Island	
# Days in Expense Period	365	365	365	365	365	365	
# Days in Flow Period	365	365	365	365	365	365	
# Days On-Line Flow > 0.0000	332	313	332	343	356	360	
# Days in Period Flow > 0.0000	347	313	332	343	356	360	
See Text for explanation.							
7. Excludes land costs; these costs are relatively minor for HWTT & estimates are beyond scope of project.							
Replacement costs and salvage values not included in the analysis; supplemental Appendix provided.							
8. Per day amounts are used to standardize for the differences in contract days vs. operational days.							
9. Excludes social and other benefits which have been included in some previous reports and can be significant.							
10.Prior year Capital expenditures have not been adjusted to current year dollars. Analysis includes Capital costs plus current							
period O&M only; calculations are forward looking and do not consider prior year O&M costs.							
11.O&M expenses have been extrapolated for a 365 day period.							
12. Assumes Contract 018907 improvements for Grassy relate to 10 cfs.							
* The Amortized Loan Method has been revised to reflect the cost of capital for capital improvements. (See Note 5)							

Cost/Benefit Comparisons

Comparative TP Cost/Benefit calculations across periods are shown graphically in Figure 75 through Figure 78. (The Amortized Loan methodology has replaced the previous straight-line amortization commencing with Period 4.) The current period Present Value Cost/Benefit values (in dollars per pound TP removed) under Full Capacity Utilization (Scenario #2 above) for Nubbin Slough, Ideal Grove, Mosquito Creek, Lemkin Creek, Wolff Ditch and Grassy Island, respectively, are $24, $79, $58, $234, $95, and $71 (values were $72, $67, $88, $169, $115, and $59 for Period 6); values for Lemkin Creek and Wolff Ditch South Pond are $203 and $75, respectively. The current period Amortized Loan plus current O&M are $55, $183, $134, $546, $222 and $164 (values were $166, $156, $206, $393, $268 and $136 for Period 6); values for Lemkin Creek and Wolff Ditch South Pond are $473 and $175, respectively. The present value method is one of the standard methods of comparing projects for decision-making purposes. Lemkin Creek and Wolff Ditch commenced operations during Period 2; Grassy construction for Phase I – III occurred during Period 3 - 5.

The TP Cost/Benefit values are higher under Partial Capacity Utilization (Scenario #1 above), which does not account for the aforementioned factors contributing to lower utilization of the facilities. Desktop studies generally calculate projections under more favorable operating conditions, where greater benefits can accrue from use of the treatment process as fixed costs are "amortized" over a significantly large number of "benefit" units of TP removed. The resulting lower per unit costs are due to economies of scale wherein the treatment capacity is closer to full utilization. The current period Present Value Cost/Benefit values (in dollars per pound TP removed) under Partial Capacity Utilization for Nubbin Slough, Ideal Grove, Mosquito Creek, Lemkin Creek and Wolff Ditch, and Grassy Island, respectively, are $69, $386, $116, $440, $403, and $142 (values were $145, $356, $144, $377, $414 and $106 for Period 6); values for Lemkin Creek and Wolff Ditch South Pond are $381 and $318, respectively. The current period Amortized Loan Cost/Benefit values are $160, $899, $270, $1,025, $938, and $331 (values were $337, $829, $335, $878, $963 and $247 for Period 6); values for Lemkin Creek and Wolff Ditch South Pond are $888 and $739, respectively.

Cost/Benefit calculations per lb. of N removed was calculated for Grassy Island for the current POR (historical data has not been tabulated). The values under Full Capacity Utilization are $21 for the Present Value methodology and $48 for the Amortized Loan; values under Partial Capacity Utilization are $42 for the Present Value methodology and $97 for the Amortized Loan (Figure 74).

HWTT Horizontal and Vertical Analyses

Changes in Cost/Benefit values are a function of several variables, with the most relevant being TP and TN inflow levels, costs, flow, capacity utilization, P or N removal rates, water quality conditions, capital improvements, and site conditions. Although a detailed analysis must consider all of these factors and their interrelationships, certain trends can be identified. Horizontal (period to period) and vertical (across sites) analyses for HWTT are somewhat hindered by variances in length of the cycles and down-time for expansions, as noted on the graphs, and large differences in site conditions. (A summary of Projected Present Value Cost/Benefit calculations under Full Capacity Utilization and other key operating parameters are included in Table 1.) The following references to Cost/Benefit relate to the Full Capacity Cost/Benefit Calculations under the Present Value Method (Amortized Loan commenced in Year 4). The initial year (Period 1) included trials and demonstration projects requested by the SFWMD for Sites 1-3. Ideal Grove was also segmented into two separate flow paths and Mosquito Creek was divided into large and small ponds, making a reasonable collection of data invalid.

Nubbin Slough Cost/Benefit values have ranged from a high of $72 to a current year low of $24, which is the lowest value to date. Average P removal has varied from 91% to 69%. A moderate decline in the current year costs coupled with a 90% increase in the quantity of P removed over the prior year contributed to the reduction in cost per unit. During the current period, there was a 25% increase in flow at Nubbin and a 26% increase in TP FWM inflow concentration levels to 1,011 µg/L. The latter represented the highest for both Nubbin Slough and for all systems for all operating periods. The increased flow and elevated P levels resulted in effective treatment capabilities. The average effective dosing of alum for the current period was 14.7 versus 15.6 for the prior period.

Average P reduction has been significant and relatively consistent over the five periods at Ideal Grove (ranging from 96% to 86%), while Costs/Benefit values have varied from $191 to $67. While P levels and performance remain high compared to the other HWTT facilities, flow availability at this site is low.

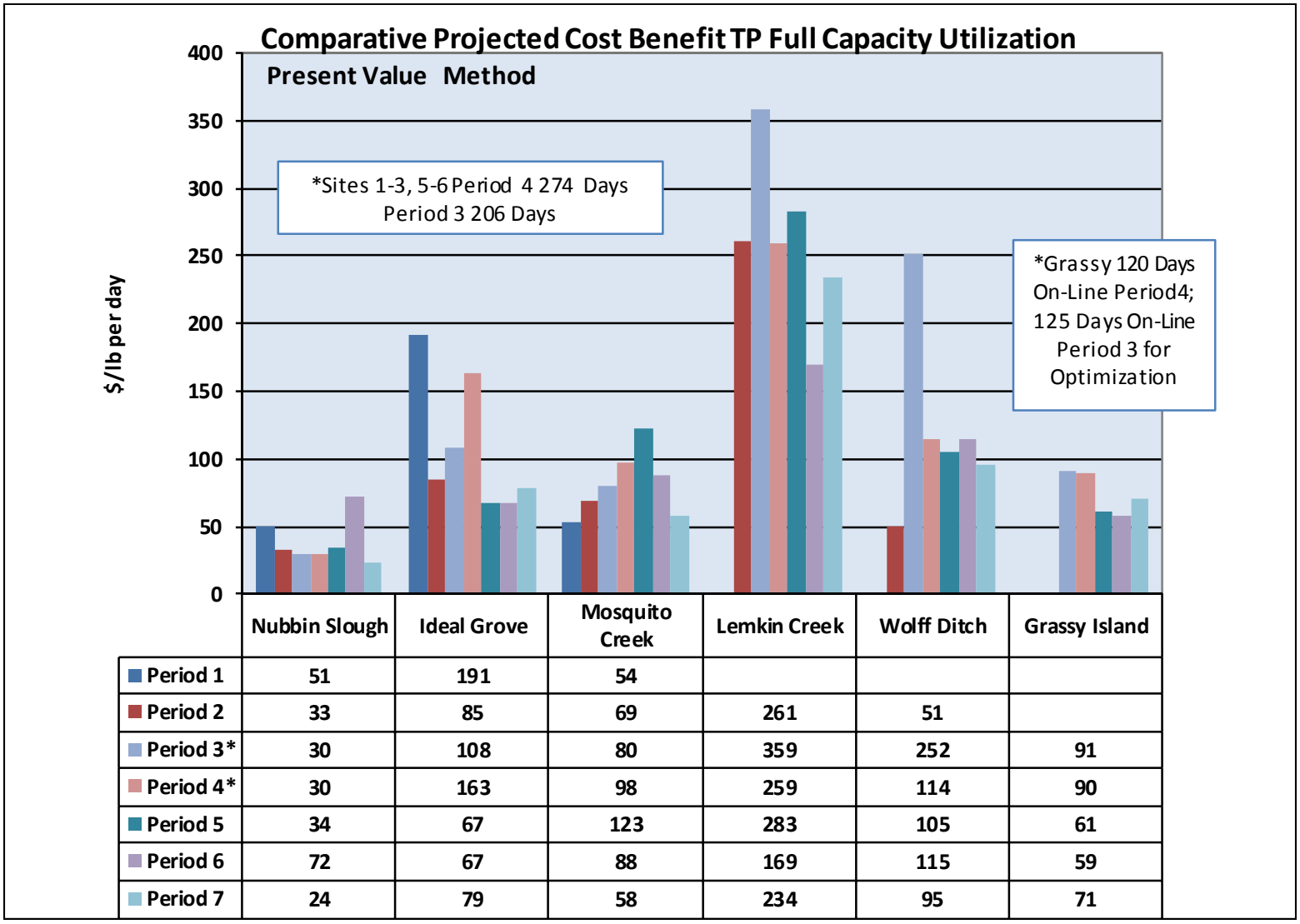
Mosquito Creek exhibited a substantial decrease in the Cost/Benefit ratio during the current POR, as costs declined and the quantity of P removed increased to its highest level. The TP FWM inflow concentration remained high at 621 μg/L, compared to a low of 345 μg/L in Period 1. TP removal, however, remained relatively high and consistent for the site at 77%. The facility has the third highest TP FWM inflow concentrations among the sites. Mosquito was taken off-line for approximately 30 days during the latter part of the POR due to floc removal and installation of operational improvements.

Although the quantity of P removed for the POR increased by approximately 50% for Lemkin Creek, the Cost/Benefit values increased over the prior year low; however, the metric remained below its historical level. The primary influence on the Cost/Benefit calculation was additional costs resulting mainly from operational improvements (items not capitalized) and laboratory fees associated with new regulatory requirements. Wolff Ditch Cost/Benefit values declined significantly, primarily due to an increase in the quantity of P removed. While laboratory costs and operational improvements were greater during the POR at the site, the regulatory issues were not as significant as with Lemkin Creek. The Cost/Benefit at these side-by-side facilities is impacted by the treatment utilization. The basis for the size of both Lemkin Creek and Wolff Ditch was inclusion of flow resulting from the planned improvements by Okeechobee City to increase their stormwater drainage. The project would utilize the District's property on the eastern side of Wolff Ditch. The additional capacity at Lemkin/Wolff was needed to accommodate treatment of the additional stormwater, per SFWMD recommendations. The capacity and design were reviewed and approved by the District, which was a proponent to capture peak flows. Wolff Ditch has operated at a maximum of 11 cfs of the 20 cfs available capacity since operations commenced. Using the South Pond outflow TP values for the two facilities, the current Cost/Benefit improves significantly.

Grassy Island has a low Cost/Benefit ratio, mainly resulting from comparatively high flow and moderately high TP levels. Current year costs also increased from operational improvements that were not capitalized, while TP concentration inflow declined. For Grassy Island (and all systems), both Periods 3 and 4 were partial periods, which can

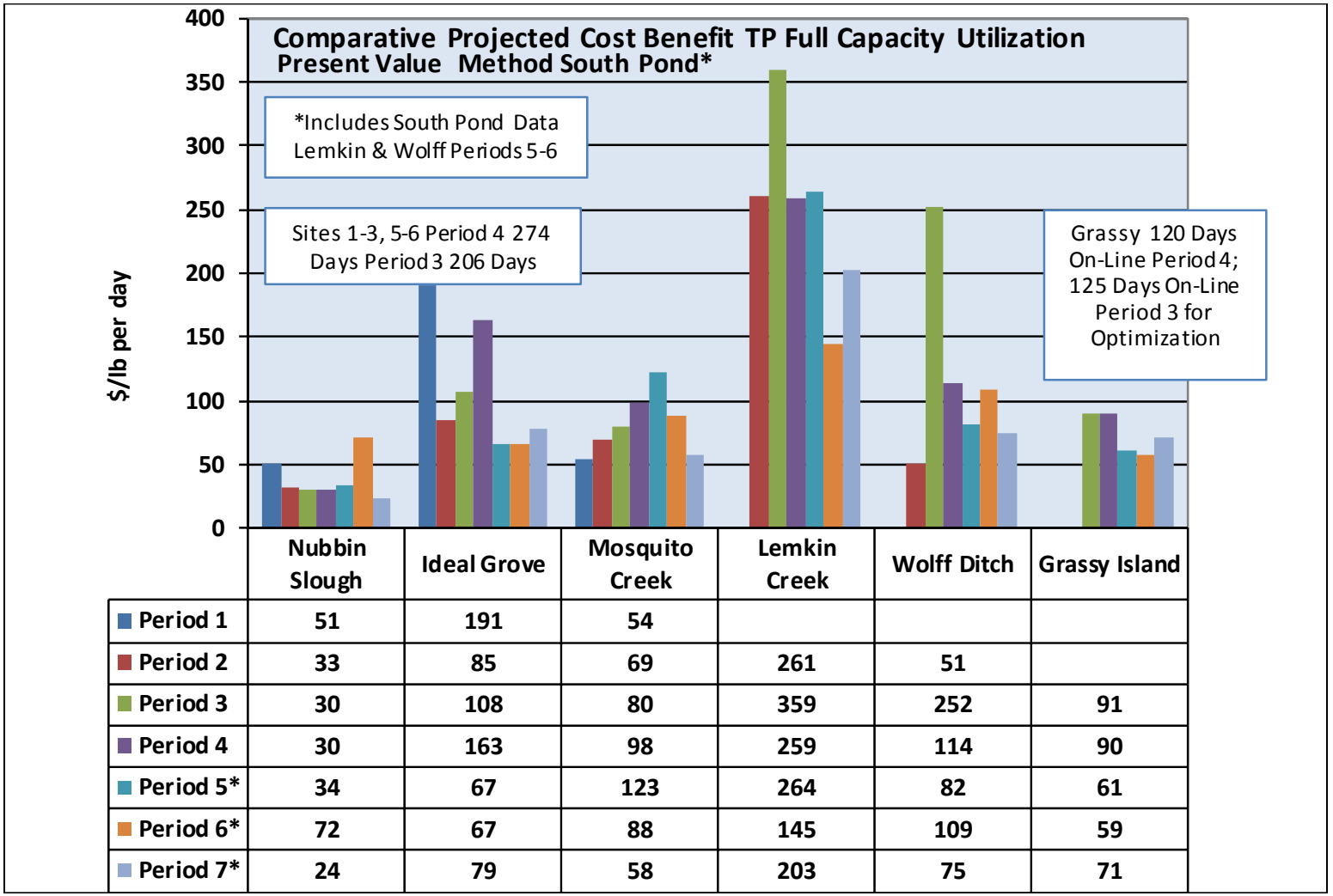
impact performance depending on wet and dry seasons. Construction and associated downtime has also been an important factor at Grassy Island, affecting availability for treatment and performance.

Cost/Benefit values under Partial Capacity utilization decreased at Nubbin Slough, Mosquito Creek, and Wolff Ditch, and increased at the other facilities, for both the PV and Amortized Loan methodologies. The causative factors discussed above apply.



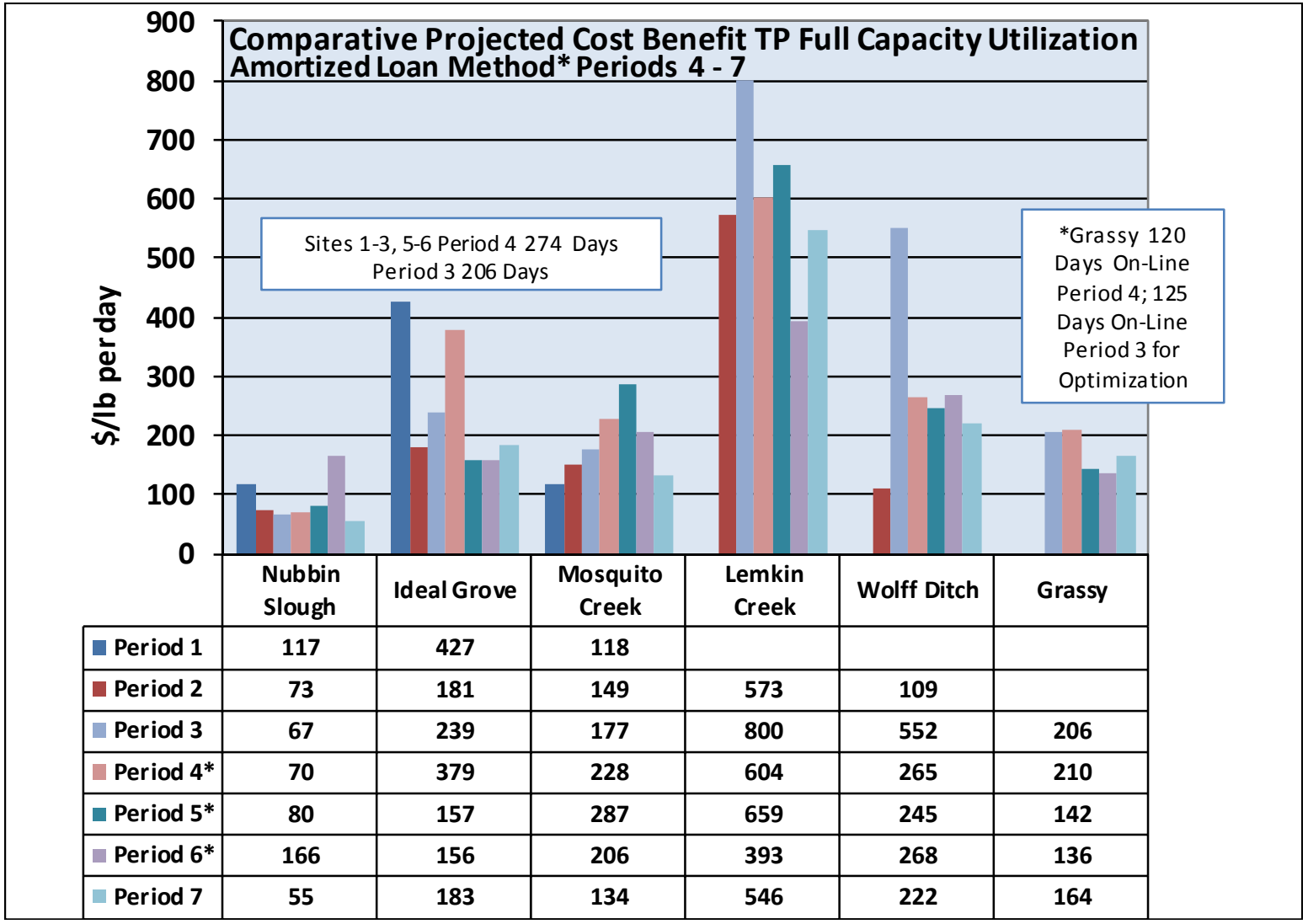
	Nubbin Slough	Ideal Grove	Mosquito Creek	Lemkin Creek	Wolff Ditch	Grassy Island
Period 1	51	191	54			
Period 2	33	85	69	261	51	
Period 3*	30	108	80	359	252	91
Period 4*	30	163	98	259	114	90
Period 5	34	67	123	283	105	61
Period 6	72	67	88	169	115	59
Period 7	24	79	58	234	95	71

Figure 75. Comparative Projected Cost Benefit Full Capacity Present Value.



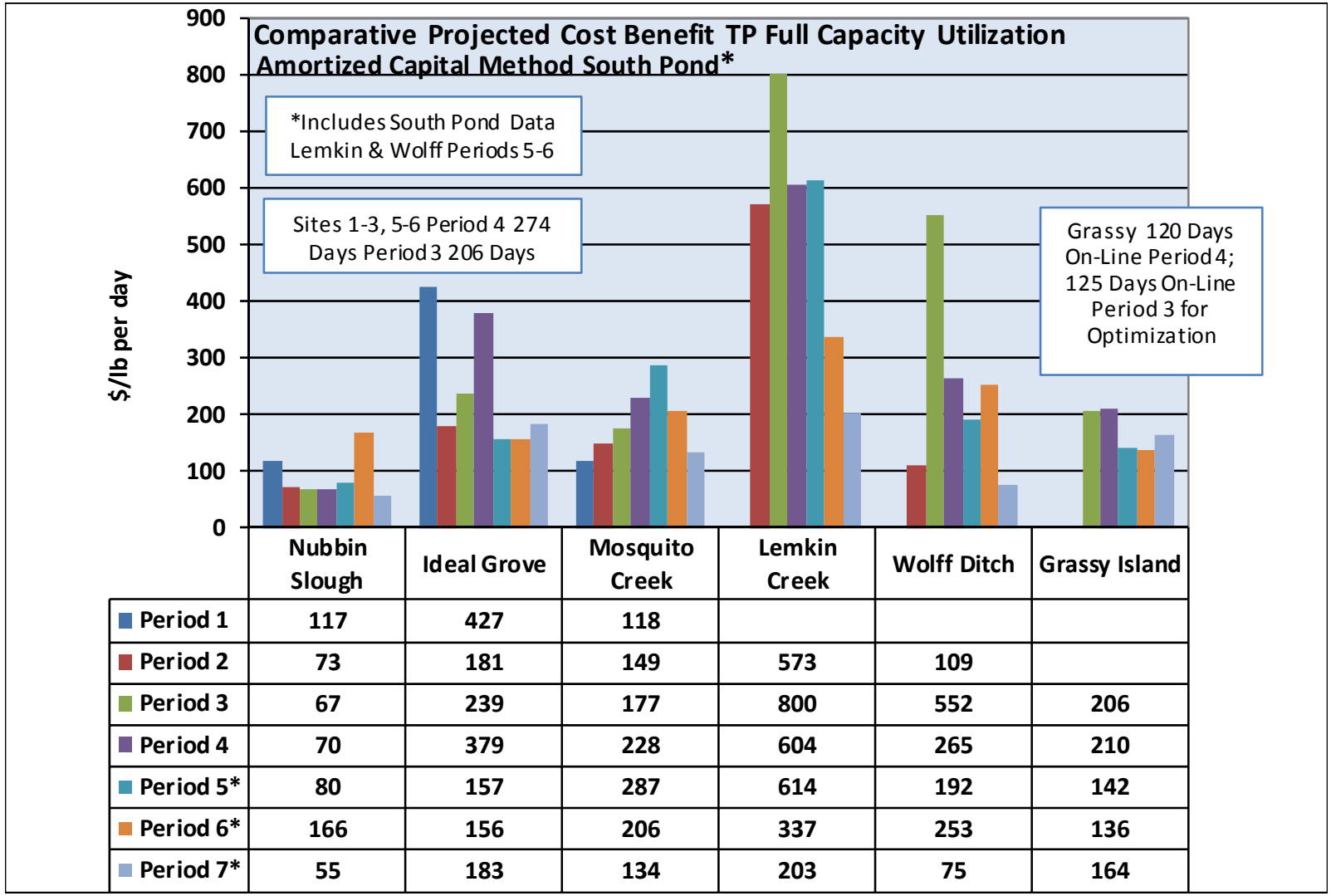
	Nubbin Slough	Ideal Grove	Mosquito Creek	Lemkin Creek	Wolff Ditch	Grassy Island
Period 1	51	191	54			
Period 2	33	85	69	261	51	
Period 3	30	108	80	359	252	91
Period 4	30	163	98	259	114	90
Period 5*	34	67	123	264	82	61
Period 6*	72	67	88	145	109	59
Period 7*	24	79	58	203	75	71

Figure 76. Comparative Projected Cost Benefit Full Capacity Present Value South Pond.



	Nubbin Slough	Ideal Grove	Mosquito Creek	Lemkin Creek	Wolff Ditch	Grassy
Period 1	117	427	118			
Period 2	73	181	149	573	109	
Period 3	67	239	177	800	552	206
Period 4*	70	379	228	604	265	210
Period 5*	80	157	287	659	245	142
Period 6*	166	156	206	393	268	136
Period 7	55	183	134	546	222	164

Figure 77. Comparative Projected Cost Benefit Full Capacity Amortized Loan.



	Nubbin Slough	Ideal Grove	Mosquito Creek	Lemkin Creek	Wolff Ditch	Grassy Island
Period 1	117	427	118			
Period 2	73	181	149	573	109	
Period 3	67	239	177	800	552	206
Period 4	70	379	228	604	265	210
Period 5*	80	157	287	614	192	142
Period 6*	166	156	206	337	253	136
Period 7*	55	183	134	203	75	164

Figure 78. Comparative Projected Cost Benefit Full Capacity Amortized Loan South Pond.

Examples of the significance of key parameters and comparisons to Cost/Benefit values are demonstrated in Figure 79 and Figure 80. The data indicates that elevated levels of TP are generally inversely related to Cost/Benefit values. Additionally, as more P is available to treat, the per unit fixed costs decrease resulting in a lower Cost/Benefit, all other factors remaining constant.

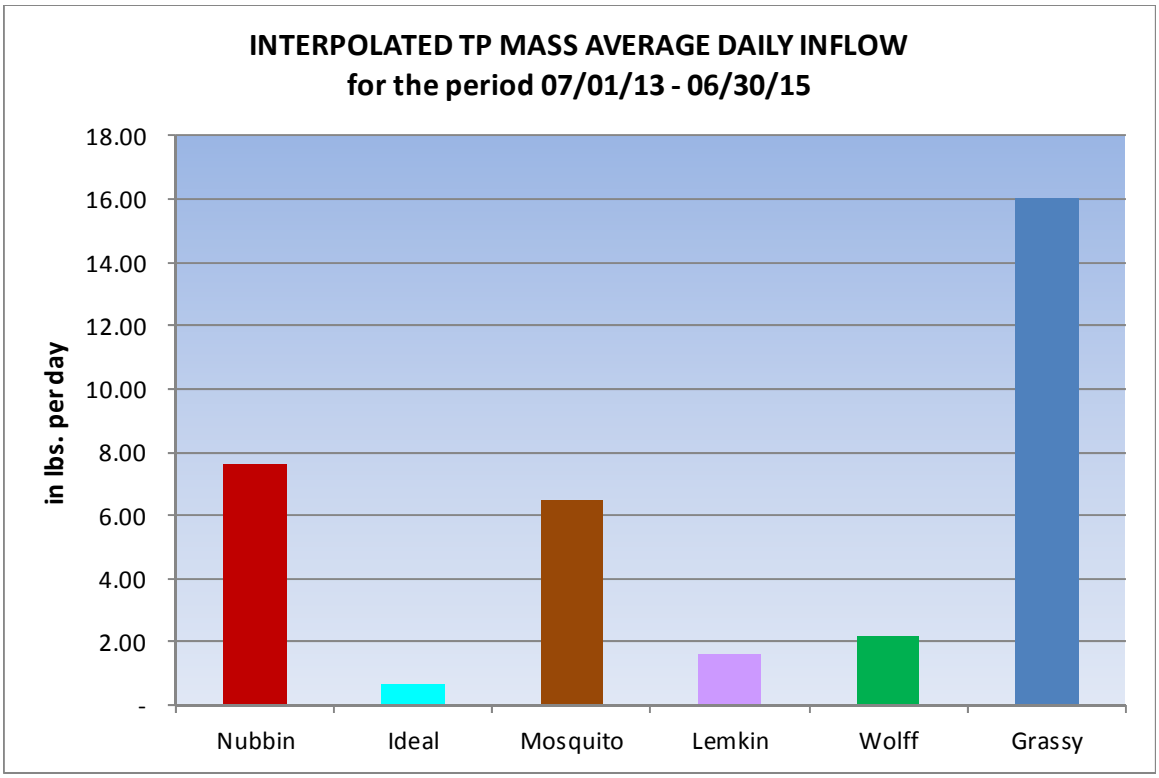


Figure 79. Average Daily TP Mass Inflow Levels by Site.

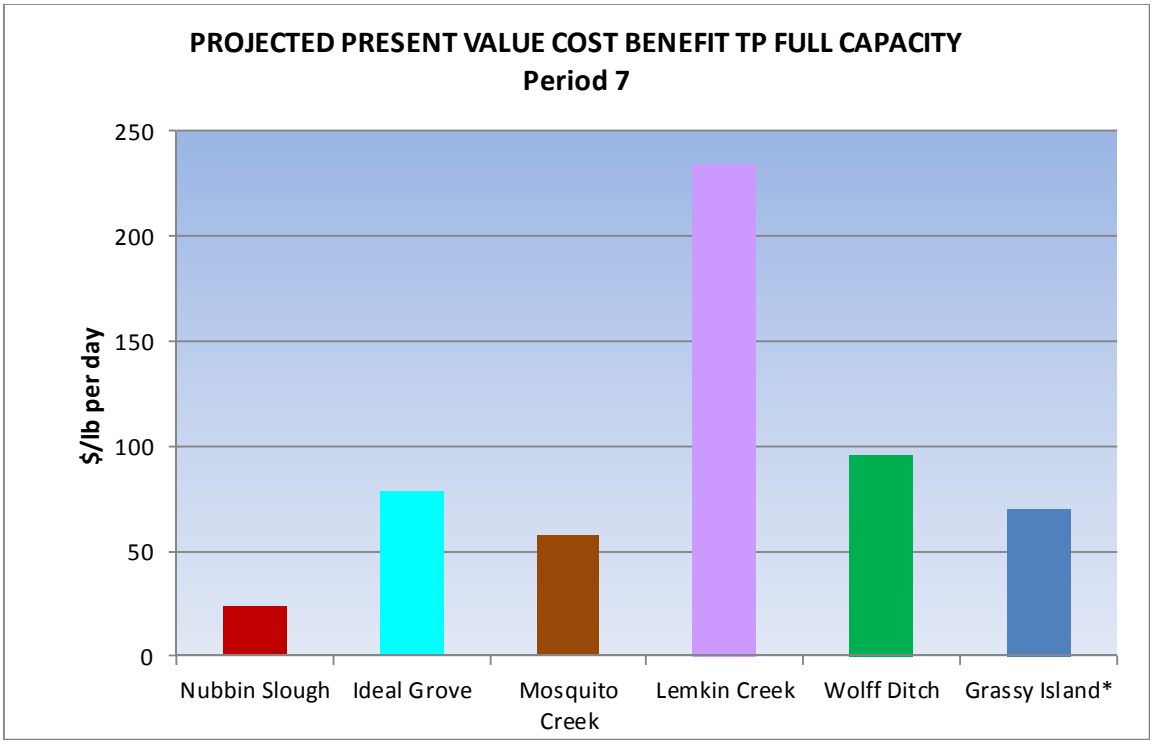


Figure 80. Projected Cost/Benefit by Site PV based on Full Capacity Utilization.

Comparisons - St. Lucie and Martin Counties

In a report prepared by Hazen and Sawyer (Hazen and Sawyer, 2014), Cost/Benefit values were presented for water remediation projects in St. Lucie and Martin Counties for TP, TN, and TP and TN combined. Values for the HWTT systems are considerably lower for all measurements, which include median and high and low calculations. The HWTT metric used for comparisons with the Hazen and Sawyer Report is the Partial Capacity Amortized Loan methodology. (Note that the Wetland, chemical treatment category in the referenced Hazen and Sawyer report included one entry, which was Ideal Grove; therefore, this category was not used for comparison purposes.)

The median cost per lb. of TP removed across all types of systems in the Hazen and Sawyer Report was $952, compared to a median cost for the HWTT projects (Sites 1-3, 5-7) of $535. For wet detention with alum injection projects, the cost per lb. of TP ranged from a high of $2,950 to a low of $488, compared to a range of $899 to $160 for all HWTT sites (Figure 81).

The median cost per lb. of TN removed across all types of systems in the Hazen and Sawyer Report was $327, compared to a median cost for the HWTT Grassy Island (only site with Cost/Benefit calculation) of $97. For wet detention with alum injection projects, the cost per lb. of TN ranged from a high of $1,217 to a low of $187, compared to $97 for the HWTT Grassy Island (Figure 82).

The median cost per lb. of TP and TN removed across all types of systems in the Hazen and Sawyer Report was $240, compared to a median cost for the HWTT Grassy Island (only site with Cost/Benefit calculation) of $75. For wet detention with alum injection projects, the cost per lb. of TN ranged from a high of $862 to a low of $126, compared to $75 for the HWTT Grassy Island (Figure 83).

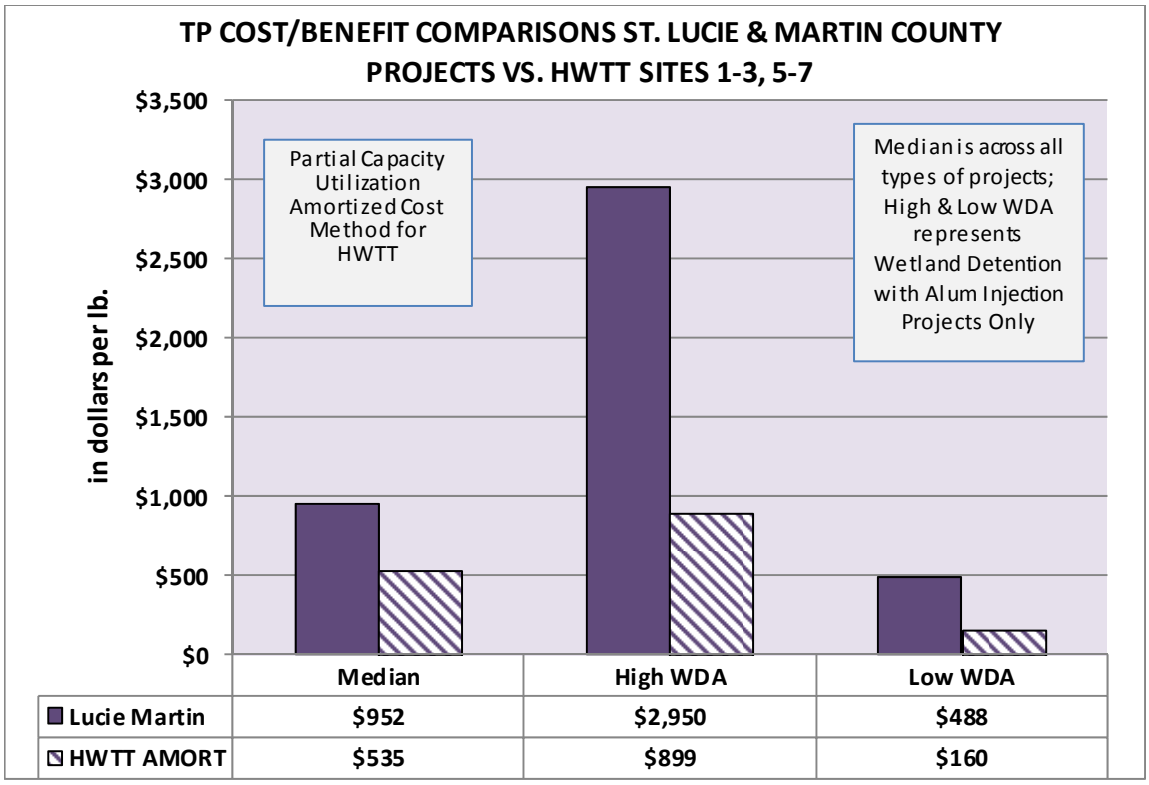


Figure 81. TP Cost/Benefit St. Lucie & Martin County Projects vs. HWTT Facilities.

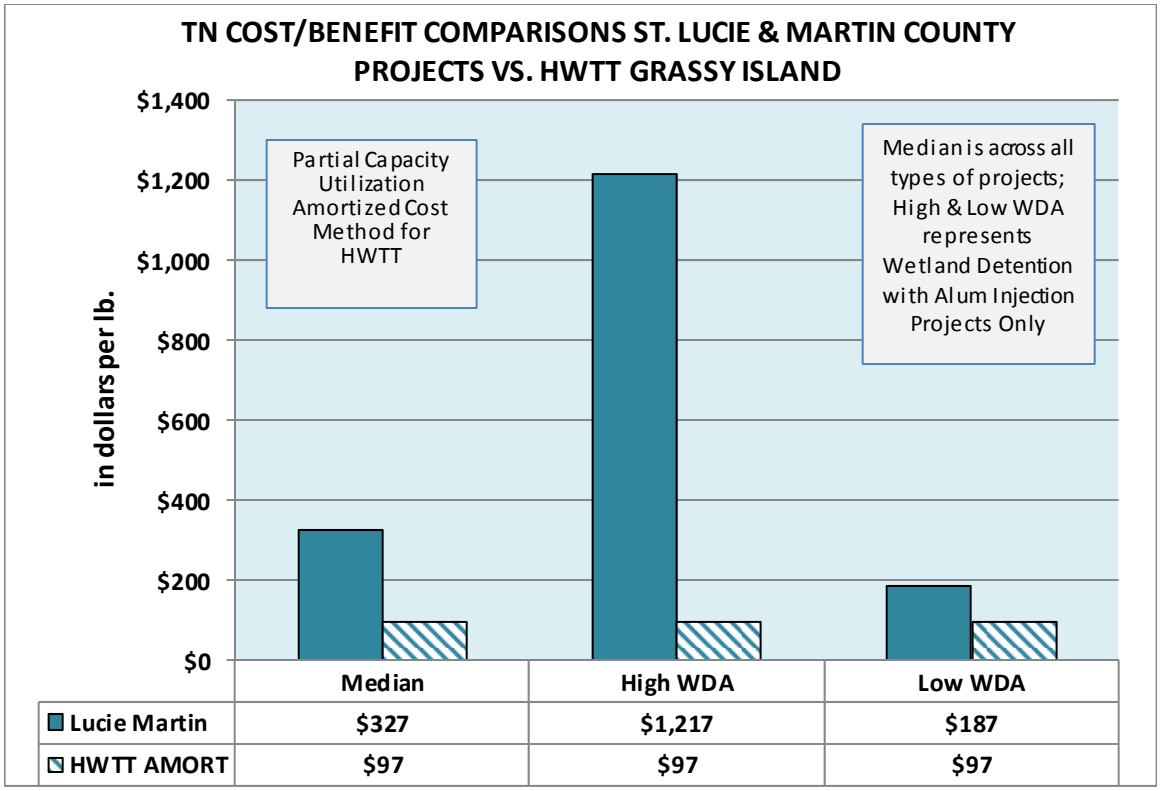


Figure 82. TN Cost/Benefit St. Lucie & Martin County Projects vs. HWTT Grassy Island.

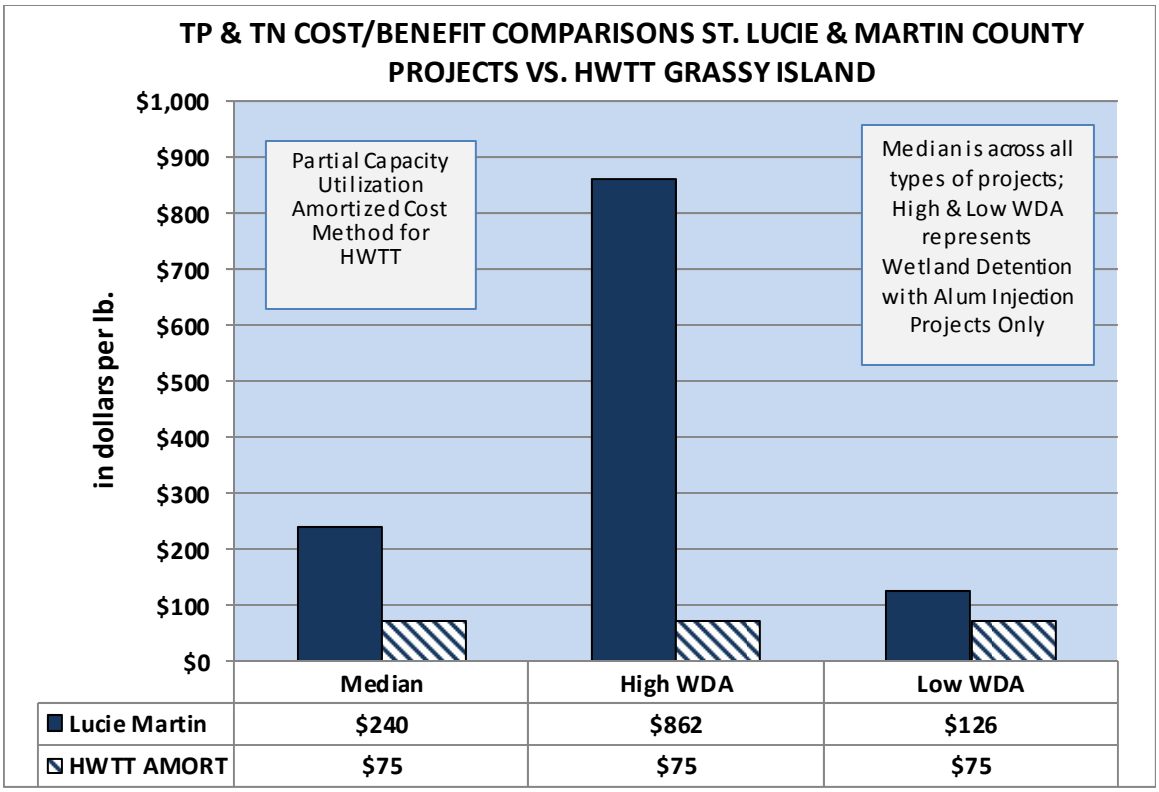


Figure 83. TP & TN Cost/Benefit St. Lucie & Martin County Projects vs. HWTT Grassy Island.

Cost Avoidance Lemkin Creek & Wolff Ditch

The Lemkin Creek and Wolff Ditch site locations were chosen primarily to hydrate approximately 33 acres of wetlands situated downstream of the facilities. The TP levels at both Lemkin and Wolff are significantly below the other sites, and flows are not available as anticipated (see discussion above). The combination of these factors produces higher Cost/Benefit values as there are fewer "benefit units", i.e., lbs. of TP, over which to allocate fixed costs.

To recognize the economic value of providing needed water to the downstream wetlands, the cost avoidance of restoring the subject wetlands has been estimated, and the Cost/Benefit values have been recalculated accordingly. While the appropriateness of inclusion of cost avoidance, cost savings, and opportunity costs within Cost/Benefit calculations is well recognized (Carter-Finn, et al, 2006), it is more difficult to determine a valuation. The economic savings attributed to the wetland hydration has been valued using the cost per acre of purchasing one mitigation credit times the number of acres within the wetland, the total then allocated to Lemkin Creek and Wolff Ditch based on the respective capacities. The mitigation credit is based upon the quoted Bluefield Ranch Mitigation price of $95,000 as of November 20, 2014 and 33 acres (per SFWMD) for a total of $3,135,000. All other costs associated with attaining the credit and associated compliance issues have been excluded. The resulting value was capitalized as a cost avoidance (i.e., cost savings), thereby reducing the investment in the facility, and amortized over the life of the project. The revised Cost/Benefit values for Lemkin Creek and Wolff Ditch with and without the cost avoidance (both sets using South Pond outflow) are shown in Figure 84; the Cost/Benefit comparisons for all sites reflecting the updated values are presented in Figure 85; and the detailed calculation schedules are provided in Table 17 and Table 18. The Cost/Benefit valuations before and after the cost savings were: Present Value method - $203 versus $191 for Lemkin Creek and $75 versus $65 for Wolff Ditch; and Amortized Cost method - $473 versus $445 for Lemkin Creek and $175 versus $150 for Wolff Ditch.

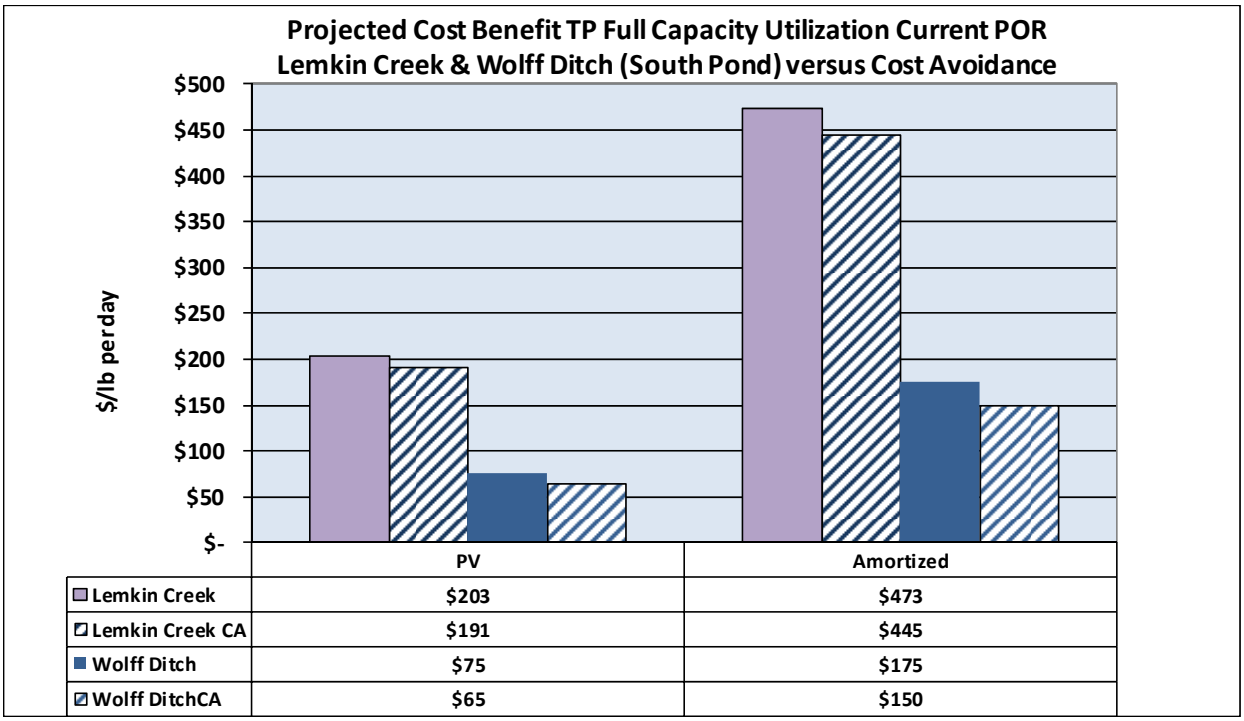


Figure 84. Projected Cost/Benefit of TP Full Capacity Present Value & Amortized Loan South Pond Data – Lemkin & Wolff Facilities versus Cost Avoidance.

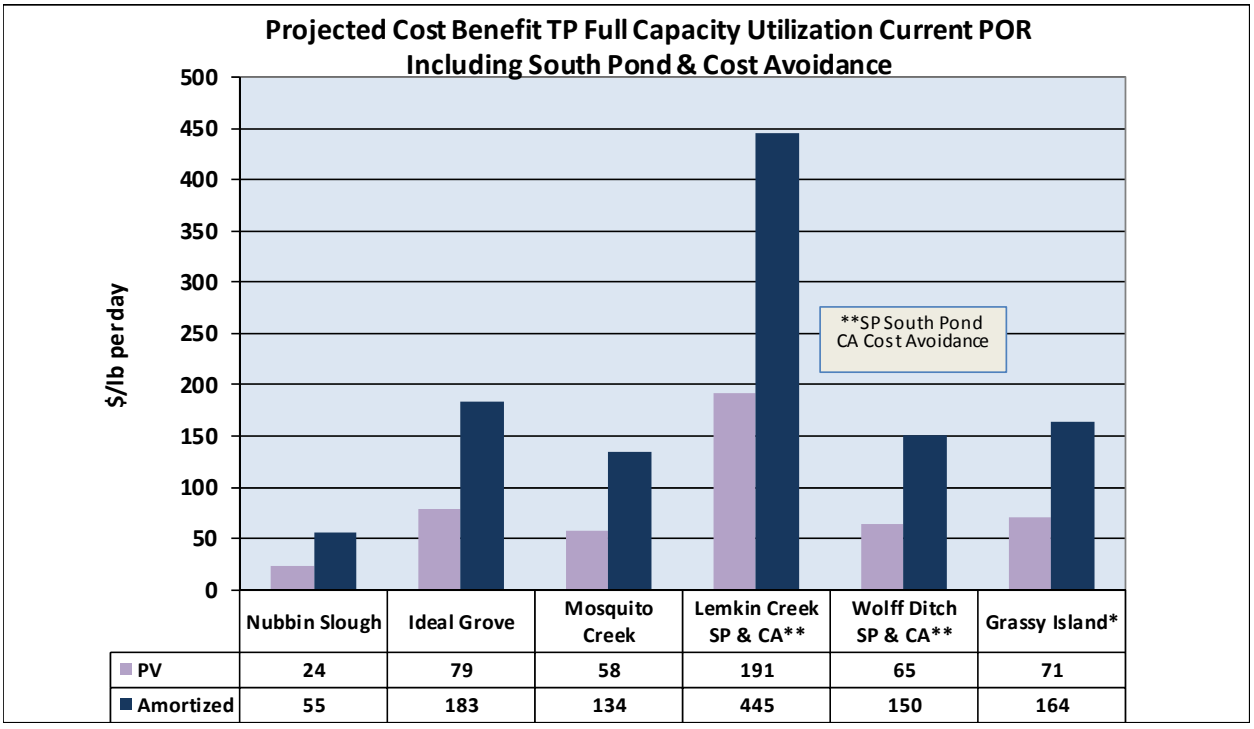


Figure 85. Projected Cost/Benefit of TP Full Capacity Present Value & Amortized Loan South Pond Data – Lemkin & Wolff Facilities including Cost Avoidance.

Table 17. TP Cost Benefit Analysis Lemkin Actual & Projected South Pond & Cost Avoidance.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Lemkin Creek Site 5 South Pond & Cost Avoidance						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs		**All Costs**	
			Based on Design Flow		**Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		1003.5				
Design Capacity gpm		2244.4				
% of Design Capacity		45%				
Infrastructure (Note 7)						
Infrastructure Period 1		$ 635,973				
Optimization & Monitoring (Note 1)		59,939				
Total Allocated Capital Period 1		$ 695,911	$ 695,911	$ 695,911	$ 695,911	$ 695,911
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		59,939				
Total Period 1		$ 755,850				
Estimated Life			50	50	50	50
Amortized Capital Period 1			32,395		32,395	
Cost Avoidance Period 7		$ (627,000)	-627,000	-627,000	-627,000	-627,000
Estimated Life			50	50	50	50
Amortized Cost Avoidance Period 7			-29,187		-29,187	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			3,208		3,208	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 52,142	$ 52,142	$ 52,142	$ 116,621	$ 116,621
O&M Fixed Costs Actual & Projected		330,136	330,136	330,136	344,778	344,778
Total Operations & Maintenance (Note 3)		$ 382,278	$ 382,278	$ 382,278	$ 461,399	$ 461,399
Present Worth O&M (Notes 4,10 & 11)				$ 8,212,173		$ 9,911,858
Annual Costs & Present Value Actual & Projected			$ 385,486	$ 8,281,084	$ 464,607	$ 9,980,769
Cost per Day (Notes 5 & 8)			$ 1,056	$ 454	$ 1,273	$ 547
P Removal lb/day Total (Per Data Schedule)			1.28	1.28	2.86	2.86
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 825**	**$ 355**	**$ 445**	**$ 191**

Table 18. TP Cost Benefit Analysis Wolff Actual & Projected South Pond & Cost Avoidance.
(See Notes & Assumptions)

WATERSHED TECHNOLOGIES, LLC.						
Projected Cost Benefit Analysis (Note 8) Wolff Ditch Site 6 South Pond & Cost Avoidance						
O&M Costs Period:	**7/1/2014**	**through**	**6/30/2015**			
TP Data Period	**7/1/2014**	**through**	**6/30/2015**			
			Partial Capacity Utilization		**Full Capacity Utilization**	
			Actual P Removal & Costs		**Projectd P Removal & Variable/Semi Fixed Costs**	
			Capacity & Fixed Costs Based on Design Flow		**All Costs Based on Design Flow**	
		Total	**Amortized Loan**	**Projected Present Value**	**Projected Amortized Loan**	**Projected Present Value**
Capacity Utilization:						
Actual Average gpm		1148.7				
Design Capacity gpm		8977.6				
% of Design Capacity		13%				
Infrastructure (Note 7)						
Infrastructure Period 1		$ 1,036,070				
Optimization & Monitoring (Note 1)		80,360				
Total Allocated Capital Period 1		$ 1,116,430	$ 1,116,430	$ 1,116,430	$ 1,116,430	$ 1,116,430
Unallocated Costs Period 1: Optimization & Monitoring (Note 1)		80,360				
Total Period 1		$ 1,196,790				
Estimated Life			50	50	50	50
Amortized Capital Period 1			51,970		51,970	
Cost Avoidance Period 7		$ (2,508,000)	-2,508,000	-2,508,000	-2,508,000	-2,508,000
Estimated Life			50	50	50	50
Amortized Cost Avoidance Period 7			-116,748		-116,748	
% Expense Days Current Period (Note 11)			100%	100%	100%	100%
Amortized Capital Current Period			-64,778		-64,778	
Operations & Maintenance Current Period						
O&M Variable Costs Actual & Projected (Note 2)		$ 45,452	$ 45,452	$ 45,452	$ 355,231	$ 355,231
O&M Fixed Costs Actual & Projected		350,517	350,517	350,517	420,862	420,862
Total Operations & Maintenance (Note 3)		$ 395,968	$ 395,968	$ 395,968	$ 776,093	$ 776,093
Present Worth O&M (Notes 4,10 & 11)				$ 8,506,267		$ 16,672,173
Annual Costs & Present Value Actual & Projected			$ 331,191	$ 7,114,697	$ 711,315	$ 15,280,603
Cost per Day (Notes 5 & 8)			$ 907	$ 390	$ 1,949	$ 837
P Removal lb/day Total (Per Data Schedule)			1.66	1.66	12.97	12.97
Cost/Benefit $/lb. (System On-Line Flow > 0) (Note 6)			**$ 547**	**$ 235**	**$ 150**	**$ 65**

Environmental and Ancillary Benefits

As stated, this Report provides a limited quantification of environmental and other benefits in calculating Cost/Benefit values; however, the effectiveness of HWTT on qualitative factors is discussed below. Additionally, as HWTT projects require a significantly smaller land area as compared to traditional wetland treatment or systems with large detention/reservoir areas, positive savings will accrue through a reduction in land costs. HWTT projects are also well suited for implementation on either existing SFWMD properties and/or private property with associated cost benefits.

Flora and Fauna

As well as removal of P, the HWTT systems provide environmental benefits through wetland and wildlife habitat restoration and creation. Wetlands provide a valuable environment for a wide range of plant and animal species. The intrinsically high habitat value of wetlands is due in large part to their water and nutrient storage functions, which support high levels of primary productivity. The HWTT systems provide many of the same ancillary benefits to wildlife as the native marshes of South Florida, for example, water supply, food source, and refuge.

The Lemkin Creek/Wolff Ditch site provides flow to a restored downstream wetland. The Nubbin Slough site was retrofitted from a traditional chemical treatment system that was not actively removing P to a partial HWTT system, providing additional desirable habitat. Ideal Grove is a converted wetland treatment system that was not effective in nutrient removal; the new facility provides added wildlife surroundings. The HWTT Mosquito Creek facility likewise affords new wetland and wildlife habitat. Informal field observations have confirmed utilization of the HWTT wetland sites by a variety of wildlife. Photographs of various flora and fauna at the sites or downstream wetlands are shown in Figure 86 through Figure 92.

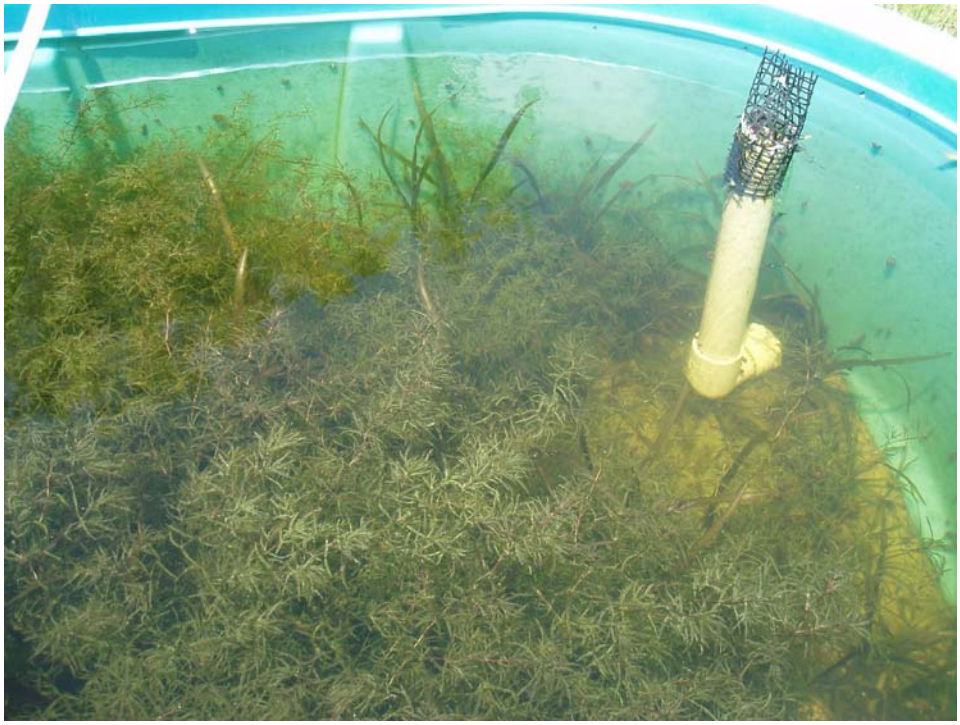


Figure 86. Southern naiad (*Najas*) and *Vallisneria*, Mesocosm.



Figure 87. Otters, HWTT Treatment Facility.



Figure 88. Roseate Spoonbills, Grassy Island limerock beds.



Figure 89. Baby alligator, Wolff Ditch Treatment Facility.



Figure 90. Everglades Rat snake, Nubbin Slough Treatment Facility.



Figure 91. Lotus Flower, HWTT Treatment Facility.



Figure 92. Gallinule, Ideal Grove Treatment Facility.

Further Minimization of Coagulant Use

The HWTT affords several mechanisms for minimizing coagulant use and economizing on the cost per mass of TP removed. HWTT design and operational factors that can be adjusted include: relative size and configuration of the wetland (floating and/or submerged vegetation) unit processes; type and dose of coagulants; coagulant aids and buffers; and amendment dosing cycles. For some Northern Everglades locations, depending on the size and configuration of the associated wetland unit processes, it is possible to implement extremely low frequency coagulant dosing and still achieve desired outflow TP concentrations and mass TP reductions.

Another mechanism for minimizing coagulant use in an HWTT system is the reuse of spent floc (see discussion below). At HWTT facilities such as the Nubbin and Grassy Island sites, where floc tilling is not performed, the floc drying beds will accumulate increasingly large amounts of dried floc over time. One potential use for this dried floc will be to recycle the material back into the HWTT flow train. For example, the dried floc may be introduced into the inflow region, or broadcast over the shallow zone of the FAV pond.

Efficient Floc Management Alternatives

Prior to the initiation of the HWTT project, no floc management activities had been performed in any of the chemical dosing facilities in the Northern Everglades. HWTT systems cycle wet floc internally to enhance contaminant removal per unit area. This concept was clearly illustrated by simple jar test re-use studies presented in previous reports. At an operational scale (presently at Nubbin Slough, Mosquito Creek, and Grassy Island), wet floc is pumped to adjacent drying beds and subjected to passive, solar drying; the resultant dried material will be subsequently reintroduced into the system to achieve additional TP removal. The first use will be to broadcast throughout the water hyacinth zones to stabilize P in the underlying sediments. The dry material is stable and low-volume, thus it can be incorporated into the relatively large footprint HWTT system on a sustainable basis.

Further, in HWTT facilities several options are available with respect to final use of floc materials. The systems can capitalize on dry season periods by drawing down water levels in shallow zones and tilling the dried floc and vegetation into the soil using conventional farm machinery. Deep zones incorporated into the system keep vegetation viable during the drydown and tilling operations. Because both the vegetation and floc exhibit a dramatic volume (~90%) reduction upon drying, this patented tilling technique can be repeated numerous times without creating a substantial change in the shallow zone ground elevation. Moreover, in laboratory trials, shallow zone soil cores collected post-tilling (of vegetation and floc) revealed no release of P to the water following reflooding with low P (rain) waters.

Suitability for Treating Northern Everglades Runoff

HWTT systems offer a cost-effective technology for treating runoff P in the Northern Everglades watersheds. The technology is compatible with the distinct wet season/dry season rainfall regime and is capable of achieving high TP mass load reductions and low outflow TP concentrations. HWTT systems combine the benefits of treatment wetlands and conventional chemical treatment systems, while eliminating the major drawbacks, for example, the large footprint and year-round water requirements of wetland systems and the high operations cost of chemical systems.

Operational Flexibility

HWTT provides operational flexibility primarily through utilization of several varying components to maximize treatment while minimizing costs. Each component can be implemented based on very specific site-conditions, which can be invaluable in managing a diverse set of circumstances and water quality parameters.

The hybrid process can also be constructed in areas with limited land availability as compared to traditional wetland treatment systems. As the technology relies in part on chemical amendments, it is less vulnerable to natural disasters/disturbances and would recover faster than systems that rely solely on vegetation (hurricane wind damage, natural predation, and drought effects).

Scale-up issues and costs are also relatively minor as compared to wetland treatment. Where land is not available, the technology can be deployed directly within the water body (DeBusk et al., 2005).

Enhanced System Evaluation Techniques

Watershed Technologies has designed, constructed, and fully implemented a "Mesocosm" facility (Figure 93) for rapid assessment of comparisons between traditional chemical treatment and HWTT and for the investigation of optimal operational parameters necessary for full-scale design and optimization. The system is a mobile unit, which can be assembled and utilized at current sites as well as off-site locations, providing invaluable performance data in real time and consequently reducing personnel and other operating costs.



Figure 93. Photograph of Mesocosm assembled at the Grassy Island Site during Phase I construction.

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Appendices

Appendix I. Comparative Summary of Operating Performance Statistics for the HWTT Systems for Periods 1- 7.
(Click to Open Linked Excel File.)

Site	Parameter	Pd 1	Pd 2	Pd 3	Pd 4	Pd 5	Pd 6	Pd 7
Nubbin	# Days in Period			365	206	274	365	365	365
Nubbin	# Days On-line			265	199	234	359	350	332
Nubbin	# Days On-line Flow > 0			241	125	194	355	348	332
Nubbin	# Days in *Period* Flow >0.0000 Less Non-Controllable Down Time			283	125	208	355	361	347
Nubbin	% Days On-Line vs. Available Days*			85%	100%	93%	100%	96%	96%
Nubbin	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.							
Ideal	# Days in Period			365	206	274	365	365	365
Ideal	# Days On-line			358	197	262	361	362	313
Ideal	# Days On-line Flow > 0			253	148	261	341	362	313
Ideal	# Days in Period Flow >0.0000 Less Non-Controllable Down Time			257	148	267	341	364	313
Ideal	% Days On-Line vs. Available Days*			98%	100%	98%	100%	99%	100%
Ideal	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.							
Mosquito	# Days in Period			365	206	274	365	365	365
Mosquito	# Days On-line			324	193	254	337	310	332
Mosquito	# Days On-line Flow > 0			312	131	229	335	302	332
Mosquito	# Days in Period Flow >0.0000 Less Non-Controllable Down Time			312	132	235	346	344	332
Mosquito	% Days On-Line vs. Available Days*			100%	99%	97%	97%	88%	100%
Mosquito	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.							
Lemkin	# Days in Period			365	206	274	365	365	365
Lemkin	# Days On-line			338	201	267	361	358	343
Lemkin	# Days On-line Flow > 0			338	129	267	361	358	343
Lemkin	# Days in Period Flow >0.0000 Less Non-Controllable Down Time			338	129	267	361	358	343
Lemkin	% Days On-Line vs. Available Days*			100%	100%	100%	100%	100%	100%
Lemkin	Facility Purpose	Remove P & N in cost-effective; environmentally sound; provide flow downstream wetlands.							
Wolff	# Days in Period			365	206	274	365	365	365
Wolff	# Days On-line			350	203	262	357	364	356
Wolff	# Days On-line Flow > 0			350	155	262	357	364	356
Wolff	# Days in Period Flow >0.0000 Less Non-Controllable Down Time			356	155	262	357	364	356
Wolff	% Days On-Line vs. Available Days*			98%	100%	100%	100%	100%	100%
Wolff	Facility Purpose	Remove P & N in cost-effective; environmentally sound; provide flow downstream wetlands.							
Grassy	# Days in Period				206	231	365	365	365
Grassy	# Days On-line					120	321	362	360
Grassy	# Days On-line Flow > 0				125	120	314	362	360
Grassy	# Days in Period Flow >0.0000 Less Non-Controllable Down Time					120	316	362	360
Grassy	% Days On-Line vs. Available Days*					100%	99%	100%	100%
Grassy	Facility Purpose	Remove P & N in cost-effective; environmentally sound; provide flow downstream wetlands.							

Appendix II. Comparative Summary of TMDL Performance Statistics for the HWTT Systems Periods 1- 7.
(Click to Open Linked Excel File.)

Site	Parameter	Pd 1***	Pd 2	Pd 3	Pd 4	Pd 5	Pd 6	Pd 7
Nubbin	On-line Flow Days >0 (184 Day Period)						348	332
Nubbin	FWM Inflow Conc. in µg/L						799	1,011
Nubbin	FWM Outflow Conc. in µg/L		73	109	231	169	247	179
Nubbin	Tributary TMDL* Met FWM Outflow		YES	YES	NO	NO	NO	NO
Nubbin	Lake TMDL** Met FWM Outflow Conc.		NO	NO	NO	NO	NO	NO
Nubbin	% Samples Inflow Meeting Tributary	0%	0%	0%	0%	0%	0%	0%
Nubbin	% Samples Outflow Meeting Tributary	52%	90%	81%	45%	53%	49%	43%
Nubbin	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.						
Ideal	On-line Flow Days >0 (184 Day Period)						362	313
Ideal	FWM Inflow Conc. in µg/L						862	814
Ideal	FWM Outflow Conc. in µg/L		16	50	19	24	48	56
Ideal	Tributary TMDL* Met for FWM Outflow		YES	YES	YES	YES	YES	YES
Ideal	Lake TMDL** Met for FWM Outflow Conc.		YES	NO	YES	YES	NO	NO
Ideal	% Samples Inflow Meeting Tributary		39%	30%	17%	9%	6%	8%
Ideal	% Samples Outflow Meeting Tributary		92%	89%	100%	91%	87%	86%
Ideal	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.						
Mosquito	On-line Flow Days >0 (184 Day Period)						302	332
Mosquito	FWM Inflow Conc. in µg/L						640	621
Mosquito	FWM Outflow Conc. in µg/L		61	149	84.6	118	150	142
Mosquito	Tributary TMDL* Met for FWM Outflow		YES	NO	YES	NO	NO	NO
Mosquito	Lake TMDL** Met for FWM Outflow Conc.		NO	NO	NO	NO	NO	NO
Mosquito	% Samples Inflow Meeting Tributary		7%	0%	2%	4%	6%	6%
Mosquito	% Samples Outflow Meeting Tributary		80%	51%	72%	65%	46%	52%
Mosquito	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.						
Lemkin	On-line Flow Days >0 (184 Day Period)						358	343
Lemkin	FWM Inflow Conc. in µg/L						101	132
Lemkin	FWM Outflow Conc. in µg/L		30	22	31	24	29	42
Lemkin	Tributary TMDL* Met for FWM Outflow		YES	YES	YES	YES	YES	YES
Lemkin	Lake TMDL** Met for FWM Outflow Conc.		YES	YES	YES	YES	YES	NO
Lemkin	% Samples Inflow Meeting Tributary		85%	91%	83%	81%	73%	48%
Lemkin	% Samples Outflow Meeting Tributary		94%	100%	100%	94%	94%	93%
Lemkin	Facility Purpose	Remove P in cost-effective environmentally sound manner; provide flow downstream wetlands.						
Wolff	On-line Flow Days >0 (184 Day Period)						364	356
Wolff	FWM Inflow Conc. in µg/L						146	156
Wolff	FWM Outflow Conc. in µg/L		28	23	35.1	52	24	62
Wolff	Tributary TMDL* Met for FWM Outflow		YES	YES	YES	YES	YES	YES
Wolff	Lake TMDL** Met for FWM Outflow Conc.		YES	YES	YES	NO	YES	NO
Wolff	% Samples Inflow Meeting Tributary		63%	100%	74%	72%	56%	42%
Wolff	% Samples Outflow Meeting Tributary		94%	100%	100%	92%	94%	86%
Wolff	Facility Purpose	Remove P in cost-effective environmentally sound manner; provide flow downstream wetlands.						
Grassy	On-line Flow Days >0 (184 Day Period)						362	360
Grassy	FWM Inflow Conc. in µg/L						490	411
Grassy	FWM Outflow Conc. in µg/L				27	50	93	40
Grassy	Tributary TMDL* Met for FWM Outflow				YES	YES	YES	YES
Grassy	Lake TMDL** Met for FWM Outflow Conc.				YES	NO	NO	YES
Grassy	% Samples Inflow Meeting Tributary				4%	2%	1%	3%
Grassy	% Samples Outflow Meeting Tributary				100%	89%	82%	93%
Grassy	Facility Purpose	Remove P in cost-effective environmentally sound manner; provide lower input conc. downstream waters.						

Appendix III. Nubbin Slough TP Reduction & Operations Report.
(Click to Open Linked File.)

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
7/1/2014					Off-Line	pump malfunction
7/2/2014	1.9153	0.5288	1.3865	228.0		sampling date
7/3/2014					Off-Line	pump malfunction
7/4/2014					Off-Line	pump malfunction
7/5/2014					Off-Line	pump malfunction
7/6/2014					Off-Line	pump malfunction
7/7/2014	6.6353	2.3290	4.3063	577.0		
7/8/2014	7.6837	2.7767	4.9069	634.0		
7/9/2014	10.1786	3.7738	6.4048	799.0		sampling date
7/10/2014	10.4678	3.6781	6.7897	831.0		
7/11/2014	10.9223	3.6212	7.3011	877.0		
7/12/2014	10.9697	3.4144	7.5553	891.0		
7/13/2014	11.4390	3.3229	8.1161	940.0		
7/14/2014	11.3652	3.0599	8.3053	945.0		
7/15/2014	10.1966	2.5234	7.6732	858.0		
7/16/2014	10.7671	2.4245	8.3426	917.0		sampling date
7/17/2014	10.9409	2.4902	8.4508	958.0		
7/18/2014	10.5002	2.4167	8.0834	946.0		
7/19/2014	10.1210	2.3569	7.7641	939.0		
7/20/2014	9.7777	2.3052	7.4725	935.0		
7/21/2014	9.4674	2.2610	7.2064	934.0		
7/22/2014	9.1577	2.2169	6.9408	933.0		
7/23/2014	7.9087	1.9421	5.9666	833.0		sampling date
7/24/2014	6.2492	1.4716	4.7776	644.0		
7/25/2014	4.6295	1.0455	3.5839	467.0		
7/26/2014	4.4236	0.9581	3.4655	437.0		
7/27/2014	9.7019	2.0152	7.6867	939.0		
7/28/2014	8.5703	1.7071	6.8632	813.0		
7/29/2014	8.7191	1.6653	7.0538	811.0		
7/30/2014	9.0095	1.6498	7.3598	822.0		sampling date
7/31/2014	10.3171	2.0491	8.2680	945.0		
8/1/2014	10.3527	2.2180	8.1347	952.0		
8/2/2014	10.2576	2.3591	7.8985	947.0		
8/3/2014	10.2278	2.5146	7.7132	948.0		
8/4/2014	8.8976	2.3299	6.5676	828.0		
8/5/2014	10.1999	2.8355	7.3644	953.0		
8/6/2014	8.8372	2.6003	6.2368	829.0		sample jar cracked
8/7/2014	10.0650	2.9248	7.1402	948.0		
8/8/2014	9.8234	2.8183	7.0051	929.0		
8/9/2014	10.0784	2.8540	7.2245	957.0		
8/10/2014	10.2996	2.8779	7.4216	982.0		
8/11/2014	7.4685	2.0586	5.4099	715.0		
8/12/2014	9.9344	2.7004	7.2340	955.0		
8/13/2014	10.3492	2.7734	7.5758	999.0		sampling date
8/14/2014	10.7070	2.8349	7.8721	1032.0		
8/15/2014	9.2683	2.4243	6.8440	892.0		

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Appendix IV. Ideal Grove TP Reduction & Operations Report.
(Click to Open Linked File)

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	313	# Days On-Line Flow > 0.0000	313	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	313	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	210.0198	14.9769	195.0428	gpm On-Line Flow > 0		
PER DAY	0.6710	0.0478	0.6231	69.23	Operational/ Flow Status	Comments
7/1/2014	0.2502	0.0237	0.2265	47.0		
7/2/2014	0.4738	0.0449	0.4289	89.0		sampling event
7/3/2014	0.6171	0.0524	0.5647	107.0		
7/4/2014	0.6645	0.0507	0.6138	107.0		
7/5/2014	0.7052	0.0486	0.6566	106.0		
7/6/2014	0.7522	0.0470	0.7052	106.0		
7/7/2014	0.7916	0.0449	0.7467	105.0		
7/8/2014	0.8221	0.0424	0.7797	103.0		
7/9/2014	0.8593	0.0405	0.8189	102.0		sampling event
7/10/2014	0.9239	0.0429	0.8810	102.0		
7/11/2014	0.9789	0.0449	0.9340	101.0		
7/12/2014	1.0325	0.0469	0.9857	100.0		Flow sensor failure, flow estimated
7/13/2014	1.0959	0.0493	1.0466	100.0		Flow sensor failure, flow estimated
7/14/2014	1.1592	0.0517	1.1076	100.0		Flow sensor failure, flow estimated
7/15/2014	1.2226	0.0541	1.1685	100.0		Flow sensor failure, flow estimated
7/16/2014	1.2859	0.0565	1.2294	100.0		Flow sensor failure, flow estimated; sampling event
7/17/2014	1.2911	0.0601	1.2310	100.0		Flow sensor failure, flow estimated
7/18/2014	1.3999	0.0688	1.3311	108.0		
7/19/2014	1.4576	0.0754	1.3822	112.0		
7/20/2014	1.4503	0.0787	1.3715	111.0		
7/21/2014	1.4166	0.0805	1.3361	108.0		
7/22/2014	1.3958	0.0828	1.3130	106.0		
7/23/2014	1.3749	0.0850	1.2899	104.0		sampling event
7/24/2014	1.3378	0.0790	1.2587	103.0		
7/25/2014	1.2756	0.0718	1.2039	100.0		
7/26/2014	1.2274	0.0655	1.1620	98.0		
7/27/2014	1.2293	0.0618	1.1675	100.0		
7/28/2014	1.2061	0.0568	1.1493	100.0		
7/29/2014	1.2776	0.0560	1.2216	108.0		
7/30/2014	1.2061	0.0487	1.1574	104.0		sampling event
7/31/2014	1.1442	0.0561	1.0881	99.0		
8/1/2014	1.1403	0.0658	1.0746	99.0		
8/2/2014	1.1249	0.0747	1.0502	98.0		
8/3/2014	1.1439	0.0860	1.0579	100.0		Flow sensor failure, flow estimated
8/4/2014	1.1400	0.0958	1.0442	100.0		Flow sensor failure, flow estimated
8/5/2014	1.1361	0.1056	1.0305	100.0		Flow sensor failure, flow estimated
8/6/2014	1.1321	0.1154	1.0167	100.0		Flow sensor failure, flow estimated; sampling event
8/7/2014	1.0509	0.1173	0.9336	100.0		Flow sensor failure, flow estimated
8/8/2014	0.9697	0.1192	0.8505	100.0		Flow sensor failure, flow estimated
8/9/2014	0.8885	0.1210	0.7674	100.0		Flow sensor failure, flow estimated
8/10/2014	0.8073	0.1229	0.6843	100.0		Flow sensor failure, flow estimated
8/11/2014	0.7987	0.1373	0.6614	110.0		
8/12/2014	0.7093	0.1394	0.5700	110.0		
8/13/2014	0.4904	0.1119	0.3785	87.0		sampling event
8/14/2014	0.4815	0.1031	0.3784	86.0		

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Appendix V. Mosquito Creek TP Reduction & Operations Report.
(Click to Open Linked File)

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
7/1/2014					Off-Line	instrument failure-lightning strike
7/2/2014	2.6712	0.3580	2.3131	392.0		sampling date
7/3/2014	6.0155	0.8334	5.1820	881.0		
7/4/2014	6.0276	0.8622	5.1654	881.0		
7/5/2014	6.0397	0.8909	5.1488	881.0		
7/6/2014	6.0518	0.9196	5.1321	881.0		
7/7/2014	5.9468	0.9301	5.0168	864.0		
7/8/2014	6.8967	1.1091	5.7876	1000.0		
7/9/2014	6.9104	1.1417	5.7687	1000.0		sampling date
7/10/2014	7.6143	1.1761	6.4383	1000.0		
7/11/2014	8.3182	1.2104	7.1078	1000.0		
7/12/2014	8.9861	1.2398	7.7463	996.0		
7/13/2014	9.6872	1.2740	8.4132	996.0		
7/14/2014	9.6582	1.2162	8.4419	926.0		
7/15/2014	10.2098	1.2359	8.9739	917.0		
7/16/2014	12.3587	1.4429	10.9158	1044.0		sampling date
7/17/2014	12.2171	1.5085	10.7086	1115.0		
7/18/2014	11.1444	1.4640	9.6804	1106.0		
7/19/2014	10.0323	1.4123	8.6200	1091.0		
7/20/2014	8.9550	1.3628	7.5923	1077.0		
7/21/2014	8.0139	1.3326	6.6813	1078.0		
7/22/2014	6.9661	1.2830	5.6831	1063.0		
7/23/2014	5.9505	1.2355	4.7150	1049.0		sampling date
7/24/2014	6.3390	1.2932	5.0458	1073.0		
7/25/2014	6.4992	1.3042	5.1950	1058.0		
7/26/2014	6.6907	1.3219	5.3688	1049.0		
7/27/2014	6.6663	1.2980	5.3683	1008.0		
7/28/2014	7.1773	1.3782	5.7991	1048.0		
7/29/2014	7.3105	1.3856	5.9249	1032.0		
7/30/2014	7.6264	1.4276	6.1988	1042.0		sampling date
7/31/2014	7.5155	1.4831	6.0324	1042.0		
8/1/2014	7.3904	1.5356	5.8548	1040.0		
8/2/2014	7.4267	1.6230	5.8036	1061.0		
8/3/2014	7.1896	1.6510	5.5386	1043.0		
8/4/2014	6.8886	1.6607	5.2279	1015.0		
8/5/2014	6.8473	1.7316	5.1157	1025.0		
8/6/2014	7.0209	1.8611	5.1598	1068.0		sampling date
8/7/2014	7.1643	2.0398	5.1246	1085.0		
8/8/2014	6.4598	1.9649	4.4950	974.0		
8/9/2014	6.8746	2.2236	4.6510	1032.0		
8/10/2014	7.1724	2.4570	4.7153	1072.0		
8/11/2014	7.2776	2.6310	4.6466	1083.0		
8/12/2014	7.4104	2.8183	4.5922	1098.0		
8/13/2014	7.3815	2.9447	4.4367	1089.0		sampling date
8/14/2014	7.6476	2.9434	4.7042	1083.0		
8/15/2014	7.9984	2.9746	5.0238	1089.0		
8/16/2014	8.4137	3.0280	5.3857	1103.0		

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Appendix VI. Lemkin Creek TP Reduction & Operations Report.
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WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	177.4588	380.2907	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.5174	1.1087	1,003.48	Flow Status	Comments
7/1/2014	3.7818	0.8874	2.8943	1136.0		
7/2/2014	3.7585	0.8819	2.8765	1129.0		sampling date
7/3/2014	3.5696	0.8517	2.7179	1143.0		
7/4/2014	3.0570	0.7431	2.3139	1048.0		
7/5/2014	3.1284	0.7767	2.3518	1154.0		
7/6/2014	2.8907	0.7350	2.1556	1154.0		
7/7/2014	2.6529	0.6934	1.9595	1154.0		
7/8/2014	2.6370	0.7117	1.9253	1260.0		
7/9/2014	2.3755	0.6658	1.7098	1259.0		sampling date
7/10/2014	2.4494	0.7532	1.6963	1257.0		
7/11/2014	2.4708	0.8229	1.6479	1229.0		
7/12/2014	2.5447	0.9087	1.6361	1228.0		
7/13/2014	2.5737	0.9773	1.5964	1206.0		
7/14/2014	2.7668	1.1097	1.6571	1260.0		
7/15/2014	2.8831	1.2146	1.6684	1277.0		
7/16/2014	2.9573	1.3025	1.6549	1275.0		sampling date
7/17/2014	3.2238	1.3769	1.8468	1267.0		
7/18/2014	3.5281	1.4677	2.0604	1274.0		
7/19/2014	3.8805	1.5776	2.3029	1296.0		
7/20/2014	4.1688	1.6608	2.5079	1295.0		
7/21/2014	3.4062	1.3329	2.0732	989.0		
7/22/2014	2.8288	1.0894	1.7393	771.0		
7/23/2014	2.9399	1.1161	1.8238	755.0		sampling date
7/24/2014	2.6932	0.9991	1.6941	732.0		
7/25/2014	2.5327	0.9149	1.6177	731.0		
7/26/2014	2.4278	0.8503	1.5775	747.0		
7/27/2014	2.2735	0.7677	1.5058	749.0		
7/28/2014	2.1269	0.6874	1.4395	754.0		
7/29/2014	1.9468	0.5964	1.3505	747.0		
7/30/2014	1.7793	0.5097	1.2697	744.0		sampling date
7/31/2014	1.8368	0.5029	1.3338	755.0		
8/1/2014	1.8901	0.4945	1.3956	764.0		
8/2/2014	1.8688	0.4669	1.4019	743.0		
8/3/2014	1.8815	0.4486	1.4329	736.0		
8/4/2014	1.9274	0.4382	1.4892	742.0		
8/5/2014	1.9686	0.4265	1.5421	746.0		
8/6/2014	2.0475	0.4224	1.6252	764.0		sampling date
8/7/2014	2.1344	0.4349	1.6995	777.0		
8/8/2014	2.1808	0.4391	1.7417	775.0		
8/9/2014	2.2068	0.4393	1.7675	766.0		
8/10/2014	2.2404	0.4410	1.7993	760.0		
8/11/2014	2.3425	0.4562	1.8863	777.0		
8/12/2014	2.4315	0.4687	1.9628	789.0		
8/13/2014	2.4245	0.4627	1.9618	770.0		sampling date
8/14/2014	2.6465	0.4897	2.1569	775.0		
8/15/2014	2.9300	0.5275	2.4025	796.0		
8/16/2014	3.2011	0.5625	2.6386	811.0		

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Appendix VII. Wolff Ditch TP Reduction & Operations Report.
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WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE DAILY FLOW	On-Line Unless Otherwise Noted	
	INFLOW	OUTFLOW	REMOVAL	gpm On-Line Flow > 0	Operational/ Flow Status	Comments
TOTAL	770.0271	304.4620	465.5651			
PER DAY	2.1630	0.8552	1.3078	1148.7		
7/1/2014	8.6088	3.4187	5.1902	2586.0		
7/2/2014	8.5722	3.4041	5.1681	2575.0		sampling date
7/3/2014	8.0951	3.3856	4.7095	2605.0		
7/4/2014	7.3394	3.2572	4.1022	2550.0		
7/5/2014	6.5495	3.0849	3.4647	2458.0		
7/6/2014	5.8121	2.9326	2.8795	2379.0		
7/7/2014	5.2430	2.8565	2.3865	2360.0		
7/8/2014	4.6524	2.7635	1.8889	2326.0		
7/9/2014	4.5000	2.9494	1.5507	2530.0		sampling date
7/10/2014	6.0887	3.5466	2.5421	2747.0		
7/11/2014	7.1931	3.8385	3.3546	2710.0		
7/12/2014	7.7920	3.8852	3.9068	2520.0		
7/13/2014	8.0940	3.8226	4.2714	2293.0		
7/14/2014	8.1933	3.7013	4.4919	2065.0		
7/15/2014	12.0666	5.2527	6.8139	2739.0		
7/16/2014	13.4401	5.6695	7.7706	2775.0		sampling date
7/17/2014	12.6459	5.7332	6.9126	2726.0		
7/18/2014	12.0579	5.8819	6.1760	2719.0		
7/19/2014	11.1512	5.8607	5.2905	2636.0		
7/20/2014	10.3067	5.8456	4.4611	2560.0		
7/21/2014	9.6193	5.8987	3.7207	2517.0		
7/22/2014	9.3511	6.2133	3.1377	2585.0		
7/23/2014	9.2530	6.6791	2.5739	2711.0		sampling date
7/24/2014	8.3922	6.0602	2.3319	2658.0		
7/25/2014	7.2131	5.2114	2.0018	2486.0		
7/26/2014	6.5931	4.7662	1.8269	2492.0		
7/27/2014	5.8074	4.2012	1.6062	2430.0		
7/28/2014	5.2349	3.7903	1.4445	2453.0		
7/29/2014	4.8102	3.4867	1.3235	2561.0		
7/30/2014	4.2411	3.0787	1.1624	2614.0		sampling date
7/31/2014	3.9332	2.7816	1.1516	2466.0		
8/1/2014	3.8655	2.6588	1.2066	2466.0		
8/2/2014	3.5713	2.3849	1.1865	2319.0		
8/3/2014	3.4834	2.2538	1.2297	2303.0		
8/4/2014	3.4692	2.1697	1.2994	2336.0		
8/5/2014	3.2490	1.9594	1.2897	2229.0		
8/6/2014	2.3326	1.3525	0.9801	1631.0		sampling date
8/7/2014					Off-Line	power failure
8/8/2014	1.9639	1.1766	0.7872	1226.0		
8/9/2014	4.3205	2.6239	1.6965	2560.0		
8/10/2014	4.5544	2.7997	1.7547	2568.0		
8/11/2014	4.8790	3.0319	1.8471	2624.0		
8/12/2014	5.1295	3.2190	1.9106	2637.0		
8/13/2014	5.2239	3.3074	1.9165	2572.0		sampling date
8/14/2014	5.6411	3.7445	1.8966	2575.0		
8/15/2014	6.1275	4.2297	1.8978	2607.0		
8/16/2014	6.6943	4.7758	1.9186	2667.0		

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Appendix VIII. Grassy Island TP Reduction & Operations Report.
(Click to Open Linked File)

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
7/1/2014	19.7676	4.9195	14.8481	2275.0		
7/2/2014	19.4201	4.4340	14.9861	2235.0		sampling date
7/3/2014	34.7247	3.8501	30.8746	4063.0		
7/4/2014	44.0710	11.3032	32.7678	5244.0		
7/5/2014	36.2683	9.3859	26.8824	4390.0		
7/6/2014	34.7577	9.0906	25.6672	4281.0		
7/7/2014	33.6691	8.8362	24.8329	4221.0		
7/8/2014	34.2506	5.8651	28.3854	4372.0		
7/9/2014	34.8351	9.9823	24.8528	4529.0		sampling date
7/10/2014	16.5793	4.9426	11.6367	2052.0		
7/11/2014	24.5137	6.3926	18.1211	2895.0		
7/12/2014	17.8175	5.3907	12.4268	2012.0		
7/13/2014		2.2226			Off-Line	power failure
7/14/2014	27.5465	1.1908	26.3557	2860.0		
7/15/2014	46.6014	6.4341	40.1672	4651.0		
7/16/2014	47.1363	6.1982	40.9381	4529.0		sampling date
7/17/2014	47.6288	6.9655	40.6633	4788.0		
7/18/2014	44.0026	7.4186	36.5840	4638.0		
7/19/2014	41.5526	8.0052	33.5474	4603.0		
7/20/2014	39.5032	9.0216	30.4816	4611.0		
7/21/2014	36.7655	9.6613	27.1042	4535.0		
7/22/2014	34.5488	10.4160	24.1328	4518.0		
7/23/2014	33.5265	11.1072	22.4193	4665.0		sampling date
7/24/2014	31.9053	10.4035	21.5019	4557.0		
7/25/2014	29.5540	9.3039	20.2501	4336.0		
7/26/2014	30.3480	8.4769	21.8711	4577.0		
7/27/2014	28.8290	7.7673	21.0617	4473.0		
7/28/2014	27.6992	7.0012	20.6980	4425.0		
7/29/2014	26.1133	6.6498	19.4636	4299.0		
7/30/2014	27.0711	6.0766	20.9944	4597.0		sampling date
7/31/2014	26.4428	5.5132	20.9296	4550.0		
8/1/2014	25.9766	4.9325	21.0440	4530.0		
8/2/2014	25.4625	4.4375	21.0250	4501.0		
8/3/2014	25.1148	3.9307	21.1841	4501.0		
8/4/2014	35.7447	4.5146	31.2300	6496.0		
8/5/2014	39.3063	4.9270	34.3793	7245.0		
8/6/2014	38.5755	4.0227	34.5527	7213.0		sampling date
8/7/2014	39.5393	3.9380	35.6013	7233.0		
8/8/2014	40.2956	4.0186	36.2770	7215.0		
8/9/2014	26.7434	3.4779	23.2655	4689.0		
8/10/2014	16.6856	1.0534	15.6322	2866.0		
8/11/2014	36.1649	3.2642	32.9008	6088.0		
8/12/2014	43.2237	3.5123	39.7113	7134.0		

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Appendix IX. Bessey Creek TP Reduction & Operations Report.
(Click to Open Linked File)

WATERSHED TECHNOLOGIES						
Bessey Creek TP Reduction						
Period	3/8/2015	through	6/30/2015	115	days in period	
# of Days On-Line:	115	# Days On-Line Flow > 0.0000	115	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	115	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	15.1450	1.4191	13.7259	gpm On-Line Flow > 0	Operational/	
PER DAY	0.1317	0.0123	0.1194	51.41	Flow Status	Comments
3/8/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/9/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/10/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/11/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/12/2015	0.0398	0.0038	0.0361	15.0		Periodic flow measurements
3/13/2015	0.0401	0.0132	0.0269	15.0		Periodic flow measurements
3/14/2015	0.0404	0.0227	0.0177	15.0		Periodic flow measurements
3/15/2015	0.0407	0.0322	0.0085	15.0		Periodic flow measurements
3/16/2015	0.0409	0.0416	-0.0007	15.0		Periodic flow measurements
3/17/2015	0.0399	0.0324	0.0076	15.0		Periodic flow measurements
3/18/2015	0.0389	0.0231	0.0159	15.0		Periodic flow measurements
3/19/2015	0.0379	0.0138	0.0242	15.0		Periodic flow measurements
3/20/2015	0.0370	0.0045	0.0324	15.0		Periodic flow measurements
3/21/2015	0.0455	0.0056	0.0399	15.0		Periodic flow measurements
3/22/2015	0.0541	0.0068	0.0474	15.0		Periodic flow measurements
3/23/2015	0.0627	0.0079	0.0548	15.0		Periodic flow measurements
3/24/2015	0.0600	0.0139	0.0461	15.0		Periodic flow measurements
3/25/2015	0.0613	0.0133	0.0480	15.0		Periodic flow measurements
3/26/2015	0.0626	0.0128	0.0498	15.0		Periodic flow measurements
3/27/2015	0.0638	0.0122	0.0516	15.0		Periodic flow measurements
3/28/2015	0.0651	0.0116	0.0535	15.0		Periodic flow measurements
3/29/2015	0.0663	0.0111	0.0553	15.0		Periodic flow measurements
3/30/2015	0.0676	0.0105	0.0571	15.0		Periodic flow measurements
3/31/2015	0.0689	0.0099	0.0589	15.0		Periodic flow measurements
4/1/2015	0.0327	0.0044	0.0284	7.0		Periodic flow measurements
4/2/2015	0.0311	0.0039	0.0271	7.0		Periodic flow measurements
4/3/2015	0.0295	0.0035	0.0259	7.0		Periodic flow measurements
4/4/2015	0.0278	0.0031	0.0247	7.0		Periodic flow measurements
4/5/2015	0.0262	0.0027	0.0235	7.0		Periodic flow measurements
4/6/2015	0.0245	0.0022	0.0223	7.0		Periodic flow measurements
4/7/2015	0.0229	0.0018	0.0211	7.0		Periodic flow measurements
4/8/2015	0.0213	0.0014	0.0199	7.0		Periodic flow measurements
4/9/2015	0.0196	0.0009	0.0187	7.0		Periodic flow measurements
4/10/2015	0.0180	0.0005	0.0175	7.0		Periodic flow measurements
4/11/2015	0.0178	0.0015	0.0163	7.0		Periodic flow measurements
4/12/2015	0.0176	0.0025	0.0152	7.0		Periodic flow measurements
4/13/2015	0.0174	0.0034	0.0140	7.0		Periodic flow measurements
4/14/2015	0.0173	0.0044	0.0129	7.0		Periodic flow measurements
4/15/2015	0.0171	0.0054	0.0117	7.0		Periodic flow measurements
4/16/2015	0.0170	0.0047	0.0123	7.0		Periodic flow measurements
4/17/2015	0.0169	0.0039	0.0130	7.0		Periodic flow measurements
4/18/2015	0.0168	0.0032	0.0136	7.0		Periodic flow measurements
4/19/2015	0.0167	0.0025	0.0142	7.0		Periodic flow measurements
4/20/2015	0.0166	0.0017	0.0148	7.0		Periodic flow measurements
4/21/2015	0.0165	0.0010	0.0155	7.0		Periodic flow measurements
4/22/2015	0.0163	0.0010	0.0153	7.0		Periodic flow measurements
4/23/2015	0.0161	0.0010	0.0151	7.0		Periodic flow measurements

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Appendix X. Grassy Island TN Reduction.
(Click to Open Linked File)

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
7/1/2014	80.6563	31.8903	48.7660	2275.0		
7/2/2014	79.2382	28.7432	50.4950	2235.0		sampling date
7/3/2014	144.0469	24.9759	119.0711	4063.0		
7/4/2014	185.9173	73.3772	112.5401	5244.0		
7/5/2014	155.6401	60.9746	94.6656	4390.0		
7/6/2014	151.7757	59.0987	92.6771	4281.0		
7/7/2014	149.6485	57.4863	92.1622	4221.0		
7/8/2014	155.0020	38.1847	116.8173	4372.0		
7/9/2014	160.5682	65.0364	95.5317	4529.0		
7/10/2014	72.7502	34.2003	38.5499	2052.0		
7/11/2014	102.6374	47.1611	55.4763	2895.0		
7/12/2014	71.3321	42.5876	28.7445	2012.0		
7/13/2014		18.8986			Off-Line	power failure
7/14/2014	101.3965	10.9608	90.4357	2860.0		
7/15/2014	164.8935	64.5558	100.3376	4651.0		
7/16/2014	160.5682	68.3386	92.2295	4529.0		sampling date
7/17/2014	170.3671	69.4345	100.9326	4788.0		
7/18/2014	165.6270	67.5967	98.0303	4638.0		
7/19/2014	164.9698	67.2742	97.6956	4603.0		
7/20/2014	165.8503	70.4483	95.4020	4611.0		
7/21/2014	163.7006	70.5444	93.1562	4535.0		
7/22/2014	163.6687	71.5007	92.1680	4518.0		
7/23/2014	169.5946	72.0142	97.5804	4665.0		
7/24/2014	166.2551	72.3571	93.8980	4557.0		
7/25/2014	158.7506	69.6838	89.0668	4336.0		
7/26/2014	168.1635	68.6723	99.4912	4577.0		
7/27/2014	164.9184	68.4054	96.5130	4473.0		
7/28/2014	163.7184	67.4272	96.2912	4425.0		
7/29/2014	159.6102	70.5233	89.0869	4299.0		
7/30/2014	171.2661	71.5585	99.7075	4597.0		sampling date
7/31/2014	168.9682	70.0959	98.8723	4550.0		
8/1/2014	167.6811	68.2674	99.4137	4530.0		
8/2/2014	166.0667	67.5246	98.5421	4501.0		
8/3/2014	165.5257	66.5787	98.9471	4501.0		
8/4/2014	238.1118	86.4658	151.6460	6496.0		
8/5/2014	264.6958	108.9190	155.7768	7245.0		
8/6/2014	262.6598	105.5776	157.0822	7213.0		
8/7/2014	262.5189	104.4896	158.0292	7233.0		
8/8/2014	260.9984	107.8407	153.1578	7215.0		
8/9/2014	169.0583	94.4300	74.6284	4689.0		
8/10/2014	102.9870	28.9492	74.0378	2866.0		
8/11/2014	218.0349	90.8425	127.1924	6088.0		
8/12/2014	254.6388	99.0319	155.6069	7134.0		

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Appendix XI. Lemkin Creek TP Reduction & Operations Report South Pond.
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WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
7/1/2014	3.7818	0.6553	3.1264	1136.0		
7/2/2014	3.7585	0.6513	3.1072	1129.0		sampling date
7/3/2014	3.5696	0.6574	2.9122	1143.0		
7/4/2014	3.0570	0.6010	2.4560	1048.0		
7/5/2014	3.1284	0.6598	2.4687	1154.0		
7/6/2014	2.8907	0.6578	2.2329	1154.0		
7/7/2014	2.6529	0.6558	1.9971	1154.0		
7/8/2014	2.6370	0.7139	1.9231	1260.0		
7/9/2014	2.3755	0.7111	1.6644	1259.0		sampling date
7/10/2014	2.4494	0.7359	1.7135	1257.0		
7/11/2014	2.4708	0.7448	1.7260	1229.0		
7/12/2014	2.5447	0.7695	1.7752	1228.0		
7/13/2014	2.5737	0.7806	1.7931	1206.0		
7/14/2014	2.7668	0.8415	1.9253	1260.0		
7/15/2014	2.8831	0.8792	2.0039	1277.0		
7/16/2014	2.9573	0.9041	2.0533	1275.0		sampling date
7/17/2014	3.2238	0.9810	2.2427	1267.0		
7/18/2014	3.5281	1.0696	2.4585	1274.0		
7/19/2014	3.8805	1.1726	2.7079	1296.0		
7/20/2014	4.1688	1.2562	2.9126	1295.0		
7/21/2014	3.4062	1.0239	2.3823	989.0		
7/22/2014	2.8288	0.8485	1.9803	771.0		
7/23/2014	2.9399	0.8801	2.0597	755.0		sampling date
7/24/2014	2.6932	0.8244	1.8688	732.0		
7/25/2014	2.5327	0.7944	1.7382	731.0		
7/26/2014	2.4278	0.7823	1.6454	747.0		
7/27/2014	2.2735	0.7548	1.5187	749.0		
7/28/2014	2.1269	0.7301	1.3968	754.0		
7/29/2014	1.9468	0.6938	1.2530	747.0		
7/30/2014	1.7793	0.6617	1.1177	744.0		sampling date
7/31/2014	1.8368	0.6365	1.2003	755.0		
8/1/2014	1.8901	0.6086	1.2815	764.0		
8/2/2014	1.8688	0.5575	1.3114	743.0		
8/3/2014	1.8815	0.5181	1.3634	736.0		
8/4/2014	1.9274	0.4879	1.4395	742.0		
8/5/2014	1.9686	0.4560	1.5126	746.0		
8/6/2014	2.0475	0.4315	1.6160	764.0		sampling date
8/7/2014	2.1344	0.4562	1.6782	777.0		
8/8/2014	2.1808	0.4724	1.7085	775.0		
8/9/2014	2.2068	0.4840	1.7228	766.0		
8/10/2014	2.2404	0.4971	1.7432	760.0		
8/11/2014	2.3425	0.5256	1.8169	777.0		
8/12/2014	2.4315	0.5513	1.8802	789.0		
8/13/2014	2.4245	0.5552	1.8693	770.0		sampling date
8/14/2014	2.6465	0.5522	2.0943	775.0		
8/15/2014	2.9300	0.5603	2.3697	796.0		
8/16/2014	3.2011	0.5639	2.6372	811.0		

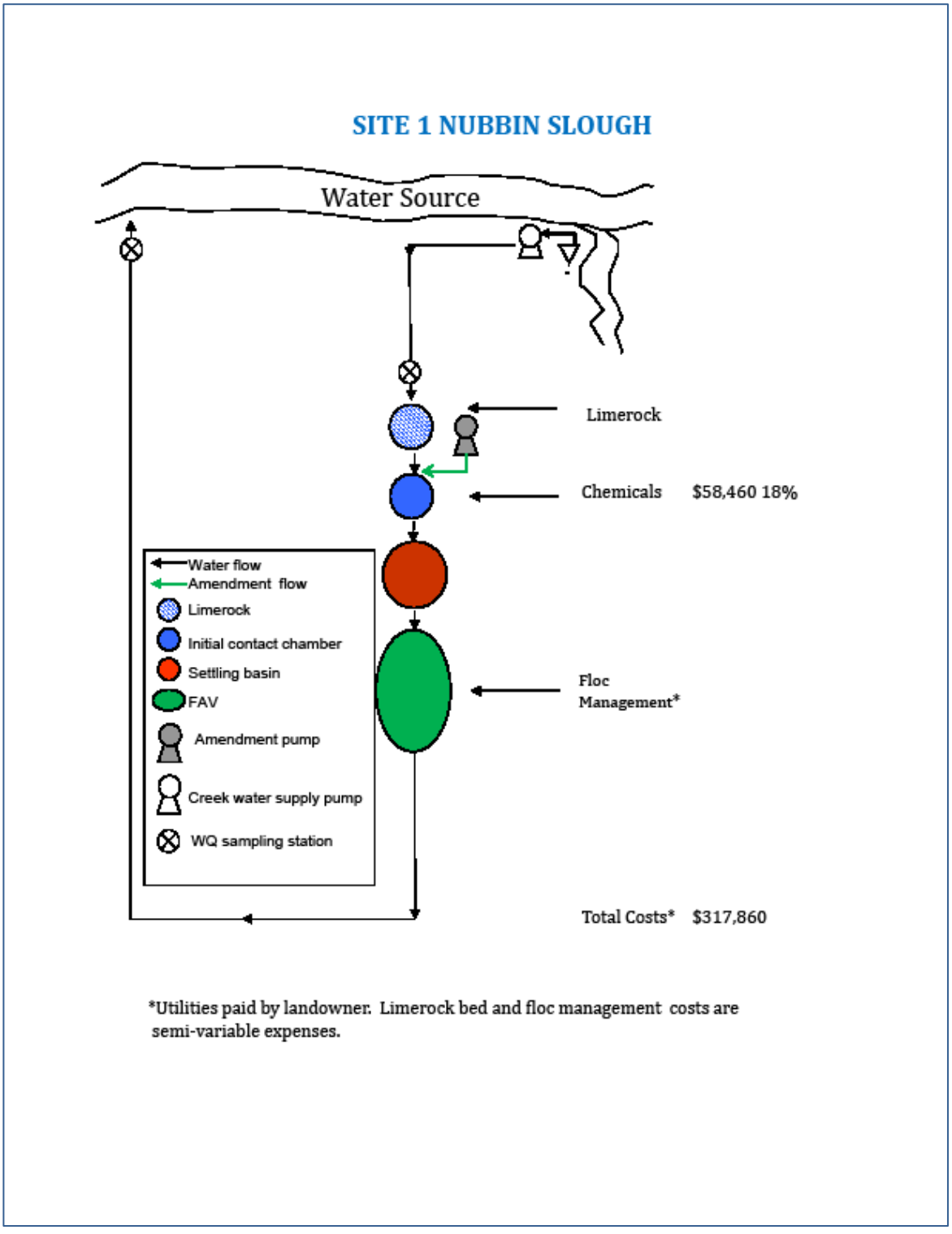
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Appendix XII. Wolff Ditch TP Reduction & Operations Report South Pond.
(Click to Open Linked File)

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0		
PER DAY	2.1630	0.5030	1.6600	1148.7	Operational/ Flow Status	Comments
7/1/2014	8.6088	1.4918	7.1170	2586.0		
7/2/2014	8.5722	1.4854	7.0868	2575.0		sampling date
7/3/2014	8.0951	1.4983	6.5969	2605.0		
7/4/2014	7.3594	1.4623	5.8972	2550.0		
7/5/2014	6.5495	1.4053	5.1443	2458.0		
7/6/2014	5.8121	1.3560	4.4561	2379.0		
7/7/2014	5.2430	1.3411	3.9019	2360.0		
7/8/2014	4.6324	1.3178	3.3345	2326.0		
7/9/2014	4.5000	1.4291	3.0710	2530.0		sampling date
7/10/2014	6.0887	1.6082	4.4804	2747.0		
7/11/2014	7.1931	1.6424	5.5507	2710.0		
7/12/2014	7.7920	1.5792	6.2129	2520.0		
7/13/2014	8.0940	1.4842	6.6099	2293.0		
7/14/2014	8.1933	1.3791	6.8141	2065.0		
7/15/2014	12.0666	1.8857	10.1809	2739.0		
7/16/2014	13.4401	1.9677	11.4725	2775.0		sampling date
7/17/2014	12.6459	2.1108	10.5351	2726.0		
7/18/2014	12.0579	2.2827	9.7751	2719.0		
7/19/2014	11.1512	2.3850	8.7662	2636.0		
7/20/2014	10.3067	2.4833	7.8234	2560.0		
7/21/2014	9.6193	2.6058	7.0136	2517.0		
7/22/2014	9.3511	2.8448	6.5063	2585.0		
7/23/2014	9.2330	3.1604	6.0926	2711.0		sampling date
7/24/2014	8.3922	2.9936	5.3985	2658.0		
7/25/2014	7.2131	2.7017	4.5114	2486.0		
7/26/2014	6.5931	2.6098	3.9832	2492.0		
7/27/2014	5.8074	2.4490	3.3585	2430.0		
7/28/2014	5.2349	2.3753	2.8596	2453.0		
7/29/2014	4.8102	2.3787	2.4315	2561.0		
7/30/2014	4.2411	2.3247	1.9163	2614.0		sampling date
7/31/2014	3.9332	2.0788	1.8544	2466.0		
8/1/2014	3.8655	1.9645	1.9010	2466.0		
8/2/2014	3.5713	1.7399	1.8315	2319.0		
8/3/2014	3.4834	1.6211	1.8623	2303.0		
8/4/2014	3.4692	1.5361	1.9331	2336.0		
8/5/2014	3.2490	1.3624	1.8867	2229.0		
8/6/2014	2.3326	0.9213	1.4113	1631.0		sampling date
8/7/2014					Off-Line	power failure
8/8/2014	1.9639	0.7472	1.2166	1226.0		
8/9/2014	4.3205	1.6174	2.7030	2560.0		
8/10/2014	4.5544	1.6798	2.8746	2568.0		
8/11/2014	4.8790	1.7750	3.1040	2624.0		
8/12/2014	5.1295	1.8426	3.2869	2637.0		
8/13/2014	5.2239	1.8546	3.3692	2572.0		sampling date
8/14/2014	5.6411	1.8347	3.8064	2575.0		
8/15/2014	6.1275	1.8351	4.2924	2607.0		
8/16/2014	6.6943	1.8544	4.8399	2667.0		

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Appendix XIII. Variable and Total Cost Detail by Site.
(Click to Open Linked File)



Appendix XIV. Estimated Rough Order of Magnitude Replacement Costs Sites 1-3, 5-7, Discounted Future Values & Discount Rate Sensitivity Analyses.
(Click to Open Linked File.)

HWTT
Estimated Replacement Costs Order of Magnitude Excluding Labor & Overhead
in 2010 - 2013 dollars (See Note)
System Life in Years 50
Net Discount Rate Compounded Annually
(6% ROR less 2% inflation) 4%
RC = Replacement Cost

Item	Average Estimated Life	Estimated RC* in 2010 - 2013 Dollars	PV* in 2010 - 2013 Dollars	Year 2020	Year 2030	Year 2040	Year 2050	# of Replace-ments
Site 1 Nubbin Slough								
Pumps	10	$ 14,000	$ 23,100	$ 9,500	$ 6,400	$ 4,300	$ 2,900	4
Limerock (projected life 5-10 years)	10	34,110	56,200	23,000	15,600	10,500	7,100	4
Monitoring & Control Equipment	10	20,000	33,000	13,500	9,100	6,200	4,200	4
Total Replacement Cost		$ 68,110	$ 112,300	$ 46,000	$ 31,100	$ 21,000	$ 14,200	
Site 2 Ideal Grove								
Pumps	10	$ 4,000	$ 6,500	$ 2,700	$ 1,800	$ 1,200	$ 800	4
Limerock (projected life 5-10 years)	10	-	-	-	-	-	-	4
Monitoring & Control Equipment	10	8,000	13,300	5,400	3,700	2,500	1,700	4
Total Replacement Cost		$ 12,000	$ 19,800	$ 8,100	$ 5,500	$ 3,700	$ 2,500	
Site 3 Mosquito Creek								
Pumps	10	$ 16,000	$ 26,300	$ 10,800	$ 7,300	$ 4,900	$ 3,300	4
Limerock (projected life 5-10 years)	10	35,000	57,700	23,600	16,000	10,800	7,300	4
Monitoring & Control Equipment	10	13,000	21,400	8,800	5,900	4,000	2,700	4
Total Replacement Cost		$ 64,000	$ 105,400	$ 43,200	$ 29,200	$ 19,700	$ 13,300	
Site 5 Lemkin Creek								
Pumps	10	$ 32,000	$ 52,800	$ 21,600	$ 14,600	$ 9,900	$ 6,700	4
Limerock (projected life 5-10 years)	10	8,750	14,400	5,900	4,000	2,700	1,800	4
Monitoring & Control Equipment	10	16,000	26,300	10,800	7,300	4,900	3,300	4
Total Replacement Cost		$ 56,750	$ 93,500	$ 38,300	$ 25,900	$ 17,500	$ 11,800	
Site 6 Wolff Ditch								
Pumps	10	$ 59,000	$ 97,300	$ 39,900	$ 26,900	$ 18,200	$ 12,300	4
Limerock (projected life 5-10 years)	10	8,750	14,400	5,900	4,000	2,700	1,800	4
Monitoring & Control Equipment	10	18,000	29,600	12,200	8,200	5,500	3,700	4
Total Replacement Cost		$ 85,750	$ 141,300	$ 58,000	$ 39,100	$ 26,400	$ 17,800	
Site 7 Grassy Island through Phase III								
Pumps	10	212,450	$ 350,300	$ 143,500	$ 97,000	$ 65,500	$ 44,300	4
Limerock (projected life 5-10 years)	10	77,050	127,100	52,100	35,200	23,800	16,000	4
Monitoring & Control Equipment	10	81,450	134,300	55,000	37,200	25,100	17,000	4
Total Replacement Cost		$ 370,950	$ 611,700	$ 250,600	$ 169,400	$ 114,400	$ 77,300	
Total Replacement Costs		$ 657,560	$ 1,084,000					

Note: The information contained herein is based upon a set of assumptions including estimated current year costs, life & discount rates.

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WATERSHED TECHNOLOGIES						
Bessey Creek TP Reduction						
Period	3/8/2015	through	6/30/2015	115	days in period	

# of Days On-Line:	115	# Days On-Line Flow > 0.0000	115	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	115	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	15.1450	1.4191	13.7259	gpm On-Line Flow > 0	Operational/	
PER DAY	0.1317	0.0123	0.1194	51.41	Flow Status	Comments
3/8/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/9/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/10/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/11/2015	0.0436	0.0022	0.0415	15.0		Periodic flow measurements
3/12/2015	0.0398	0.0038	0.0361	15.0		Periodic flow measurements
3/13/2015	0.0401	0.0132	0.0269	15.0		Periodic flow measurements
3/14/2015	0.0404	0.0227	0.0177	15.0		Periodic flow measurements
3/15/2015	0.0407	0.0322	0.0085	15.0		Periodic flow measurements
3/16/2015	0.0409	0.0416	-0.0007	15.0		Periodic flow measurements
3/17/2015	0.0399	0.0324	0.0076	15.0		Periodic flow measurements
3/18/2015	0.0389	0.0231	0.0159	15.0		Periodic flow measurements
3/19/2015	0.0379	0.0138	0.0242	15.0		Periodic flow measurements
3/20/2015	0.0370	0.0045	0.0324	15.0		Periodic flow measurements
3/21/2015	0.0455	0.0056	0.0399	15.0		Periodic flow measurements
3/22/2015	0.0541	0.0068	0.0474	15.0		Periodic flow measurements
3/23/2015	0.0627	0.0079	0.0548	15.0		Periodic flow measurements
3/24/2015	0.0600	0.0139	0.0461	15.0		Periodic flow measurements
3/25/2015	0.0613	0.0133	0.0480	15.0		Periodic flow measurements
3/26/2015	0.0626	0.0128	0.0498	15.0		Periodic flow measurements
3/27/2015	0.0638	0.0122	0.0516	15.0		Periodic flow measurements
3/28/2015	0.0651	0.0116	0.0535	15.0		Periodic flow measurements
3/29/2015	0.0663	0.0111	0.0553	15.0		Periodic flow measurements
3/30/2015	0.0676	0.0105	0.0571	15.0		Periodic flow measurements
3/31/2015	0.0689	0.0099	0.0589	15.0		Periodic flow measurements
4/1/2015	0.0327	0.0044	0.0284	7.0		Periodic flow measurements
4/2/2015	0.0311	0.0039	0.0271	7.0		Periodic flow measurements
4/3/2015	0.0295	0.0035	0.0259	7.0		Periodic flow measurements
4/4/2015	0.0278	0.0031	0.0247	7.0		Periodic flow measurements
4/5/2015	0.0262	0.0027	0.0235	7.0		Periodic flow measurements
4/6/2015	0.0245	0.0022	0.0223	7.0		Periodic flow measurements
4/7/2015	0.0229	0.0018	0.0211	7.0		Periodic flow measurements
4/8/2015	0.0213	0.0014	0.0199	7.0		Periodic flow measurements
4/9/2015	0.0196	0.0009	0.0187	7.0		Periodic flow measurements
4/10/2015	0.0180	0.0005	0.0175	7.0		Periodic flow measurements
4/11/2015	0.0178	0.0015	0.0163	7.0		Periodic flow measurements
4/12/2015	0.0176	0.0025	0.0152	7.0		Periodic flow measurements
4/13/2015	0.0174	0.0034	0.0140	7.0		Periodic flow measurements
4/14/2015	0.0173	0.0044	0.0129	7.0		Periodic flow measurements
4/15/2015	0.0171	0.0054	0.0117	7.0		Periodic flow measurements
4/16/2015	0.0170	0.0047	0.0123	7.0		Periodic flow measurements
4/17/2015	0.0169	0.0039	0.0130	7.0		Periodic flow measurements
4/18/2015	0.0168	0.0032	0.0136	7.0		Periodic flow measurements
4/19/2015	0.0167	0.0025	0.0142	7.0		Periodic flow measurements
4/20/2015	0.0166	0.0017	0.0148	7.0		Periodic flow measurements
4/21/2015	0.0165	0.0010	0.0155	7.0		Periodic flow measurements
4/22/2015	0.0163	0.0010	0.0153	7.0		Periodic flow measurements
4/23/2015	0.0161	0.0010	0.0151	7.0		Periodic flow measurements

WATERSHED TECHNOLOGIES						
Bessey Creek TP Reduction						
Period	3/8/2015	through	6/30/2015	115	days in period	

# of Days On-Line:	115	# Days On-Line Flow > 0.0000	115	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	115	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	15.1450	1.4191	13.7259	gpm On-Line Flow > 0	Operational/	
PER DAY	0.1317	0.0123	0.1194	51.41	Flow Status	Comments
4/24/2015	0.1976	0.0121	0.1855	87.0		Periodic flow measurements
4/25/2015	0.1952	0.0119	0.1832	87.0		Periodic flow measurements
4/26/2015	0.1927	0.0118	0.1809	87.0		Periodic flow measurements
4/27/2015	0.1903	0.0117	0.1786	87.0		Periodic flow measurements
4/28/2015	0.1879	0.0115	0.1764	87.0		Periodic flow measurements
4/29/2015	0.1854	0.0114	0.1741	87.0		Periodic flow measurements
4/30/2015	0.1830	0.0112	0.1718	87.0		Periodic flow measurements
5/1/2015	0.1581	0.0097	0.1485	76.0		Periodic flow measurements
5/2/2015	0.1564	0.0095	0.1469	76.0		Periodic flow measurements
5/3/2015	0.1548	0.0094	0.1454	76.0		Periodic flow measurements
5/4/2015	0.1531	0.0093	0.1438	76.0		Periodic flow measurements
5/5/2015	0.1514	0.0091	0.1422	76.0		Periodic flow measurements
5/6/2015	0.1497	0.0219	0.1277	76.0		Periodic flow measurements
5/7/2015	0.1480	0.0347	0.1133	76.0		Periodic flow measurements
5/8/2015	0.1595	0.0323	0.1272	76.0		Periodic flow measurements
5/9/2015	0.1710	0.0299	0.1411	76.0		Periodic flow measurements
5/10/2015	0.1826	0.0275	0.1550	76.0		Periodic flow measurements
5/11/2015	0.1941	0.0251	0.1690	76.0		Periodic flow measurements
5/12/2015	0.2056	0.0227	0.1829	76.0		Periodic flow measurements
5/13/2015	0.2343	0.0219	0.2124	82.0		Periodic flow measurements
5/14/2015	0.2467	0.0193	0.2274	82.0		Periodic flow measurements
5/15/2015	0.2592	0.0168	0.2424	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/16/2015	0.2446	0.0150	0.2296	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/17/2015	0.2301	0.0133	0.2168	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/18/2015	0.2156	0.0116	0.2040	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/19/2015	0.2010	0.0099	0.1912	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/20/2015	0.2013	0.0118	0.1895	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/21/2015	0.2016	0.0138	0.1878	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/22/2015	0.2019	0.0158	0.1861	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/23/2015	0.2022	0.0177	0.1844	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/24/2015	0.2024	0.0197	0.1827	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/25/2015	0.2027	0.0217	0.1810	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/26/2015	0.2030	0.0237	0.1794	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/27/2015	0.1998	0.0234	0.1765	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/28/2015	0.1967	0.0231	0.1736	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/29/2015	0.1935	0.0228	0.1707	82.0		Periodic flow measurements; not dosed, pond/plants filling in

WATERSHED TECHNOLOGIES						
Bessey Creek TP Reduction						
Period	3/8/2015	through	6/30/2015	115	days in period	

# of Days On-Line:	115	# Days On-Line Flow > 0.0000	115	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	115	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	15.1450	1.4191	13.7259	gpm On-Line Flow > 0	Operational/	
PER DAY	0.1317	0.0123	0.1194	51.41	Flow Status	Comments
5/30/2015	0.1903	0.0225	0.1678	82.0		Periodic flow measurements; not dosed, pond/plants filling in
5/31/2015	0.1872	0.0222	0.1649	82.0		Periodic flow measurements; not dosed, pond/plants filling in
6/1/2015	0.1503	0.0179	0.1324	67.0		
6/2/2015	0.1478	0.0177	0.1300	67.0		
6/3/2015	0.0390	0.0047	0.0343	18.0		
6/4/2015	0.0660	0.0080	0.0580	31.0		
6/5/2015	0.1275	0.0155	0.1120	61.0		
6/6/2015	0.1764	0.0216	0.1548	86.0		
6/7/2015	0.1147	0.0141	0.1006	57.0		
6/8/2015	0.1204	0.0149	0.1055	61.0		
6/9/2015	0.1354	0.0168	0.1186	70.0		
6/10/2015	0.1668	0.0184	0.1484	79.0		
6/11/2015	0.2036	0.0200	0.1836	89.0		
6/12/2015	0.2414	0.0212	0.2202	98.0		
6/13/2015	0.2713	0.0203	0.2510	107.0		
6/14/2015	0.3025	0.0190	0.2836	116.0		
6/15/2015	0.3377	0.0173	0.3204	126.0		
6/16/2015	0.3220	0.0129	0.3091	117.0		
6/17/2015	0.3078	0.0092	0.2987	109.0		
6/18/2015	0.2388	0.0076	0.2312	83.0		
6/19/2015	0.2315	0.0078	0.2237	79.0		
6/20/2015	0.2207	0.0078	0.2129	74.0		
6/21/2015	0.2064	0.0077	0.1988	68.0		
6/22/2015	0.1915	0.0075	0.1840	62.0		
6/23/2015	0.2625	0.0102	0.2523	85.0		
6/24/2015	0.2533	0.0099	0.2434	82.0		
6/25/2015	0.2316	0.0090	0.2226	75.0		
6/26/2015	0.2594	0.0101	0.2494	84.0		
6/27/2015	0.2625	0.0102	0.2523	85.0		
6/28/2015	0.2039	0.0079	0.1959	66.0		
6/29/2015	0.1575	0.0061	0.1514	51.0		
6/30/2015	0.1822	0.0071	0.1751	59.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
7/1/2014	80.6563	31.8903	48.7660	2275.0		
7/2/2014	79.2382	28.7432	50.4950	2235.0		sampling date
7/3/2014	144.0469	24.9759	119.0711	4063.0		
7/4/2014	185.9173	73.3772	112.5401	5244.0		
7/5/2014	155.6401	60.9746	94.6656	4390.0		
7/6/2014	151.7757	59.0987	92.6771	4281.0		
7/7/2014	149.6485	57.4863	92.1622	4221.0		
7/8/2014	155.0020	38.1847	116.8173	4372.0		
7/9/2014	160.5682	65.0364	95.5317	4529.0		
7/10/2014	72.7502	34.2003	38.5499	2052.0		
7/11/2014	102.6374	47.1611	55.4763	2895.0		
7/12/2014	71.3321	42.5876	28.7445	2012.0		
7/13/2014		18.8986			Off-Line	power failure
7/14/2014	101.3965	10.9608	90.4357	2860.0		
7/15/2014	164.8935	64.5558	100.3376	4651.0		
7/16/2014	160.5682	68.3386	92.2295	4529.0		sampling date
7/17/2014	170.3671	69.4345	100.9326	4788.0		
7/18/2014	165.6270	67.5967	98.0303	4638.0		
7/19/2014	164.9698	67.2742	97.6956	4603.0		
7/20/2014	165.8503	70.4483	95.4020	4611.0		
7/21/2014	163.7006	70.5444	93.1562	4535.0		
7/22/2014	163.6687	71.5007	92.1680	4518.0		
7/23/2014	169.5946	72.0142	97.5804	4665.0		
7/24/2014	166.2551	72.3571	93.8980	4557.0		
7/25/2014	158.7506	69.6838	89.0668	4336.0		
7/26/2014	168.1635	68.6723	99.4912	4577.0		
7/27/2014	164.9184	68.4054	96.5130	4473.0		
7/28/2014	163.7184	67.4272	96.2912	4425.0		
7/29/2014	159.6102	70.5233	89.0869	4299.0		
7/30/2014	171.2661	71.5585	99.7075	4597.0		sampling date
7/31/2014	168.9682	70.0959	98.8723	4550.0		
8/1/2014	167.6811	68.2674	99.4137	4530.0		
8/2/2014	166.0667	67.5246	98.5421	4501.0		
8/3/2014	165.5257	66.5787	98.9471	4501.0		
8/4/2014	238.1118	86.4658	151.6460	6496.0		
8/5/2014	264.6958	108.9190	155.7768	7245.0		
8/6/2014	262.6598	105.5776	157.0822	7213.0		
8/7/2014	262.5189	104.4896	158.0292	7233.0		
8/8/2014	260.9984	107.8407	153.1578	7215.0		
8/9/2014	169.0583	94.4300	74.6284	4689.0		
8/10/2014	102.9870	28.9492	74.0378	2866.0		
8/11/2014	218.0349	90.8425	127.1924	6088.0		
8/12/2014	254.6388	99.0319	155.6069	7134.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
8/13/2014	269.8251	109.7638	160.0613	7585.0		sampling date
8/14/2014	268.5590	106.4238	162.1352	7575.0		
8/15/2014	146.2086	90.3151	55.8934	4138.0		
8/16/2014	84.0182	18.0963	65.9219	2386.0		
8/17/2014	284.9184	92.0469	192.8715	8119.0		
8/18/2014	250.0542	106.9626	143.0916	7150.0		
8/19/2014	126.2007	80.4460	45.7546	3621.0		
8/20/2014	59.1490	16.7635	42.3856	1703.0		
8/21/2014	191.4394	66.1921	125.2472	5531.0		
8/22/2014	178.6680	75.7414	102.9266	5180.0		
8/23/2014	205.4741	81.6355	123.8386	5978.0		
8/24/2014	198.5561	86.1274	112.4287	5797.0		
8/25/2014	147.9935	70.4812	77.5123	4336.0		
8/26/2014	184.7487	69.7092	115.0394	5432.0		
8/27/2014	192.3991	75.2721	117.1270	5677.0		sampling date
8/28/2014	204.1646	79.3667	124.7978	6061.0		
8/29/2014	206.8329	75.0736	131.7593	6178.0		
8/30/2014	206.3253	80.8907	125.4346	6201.0		
8/31/2014	200.2861	77.3363	122.9498	6057.0		
9/1/2014	135.0253	76.4566	58.5687	4109.0		
9/2/2014	221.8896	74.4500	147.4397	6795.0		
9/3/2014	189.8256	71.7307	118.0949	5850.0		
9/4/2014	187.9110	71.7047	116.2063	5828.0		
9/5/2014	187.7995	71.5006	116.2989	5862.0		
9/6/2014	187.8332	70.2423	117.5909	5901.0		
9/7/2014	187.4397	68.9622	118.4775	5927.0		
9/8/2014	186.9098	65.6191	121.2907	5949.0		
9/9/2014	149.1029	65.2221	83.8808	4777.0		
9/10/2014	60.9281	44.1250	16.8031	1965.0		sampling date
9/11/2014	105.2305	35.1677	70.0629	3332.0		
9/12/2014	136.2168	43.0331	93.1837	4236.0		
9/13/2014	145.8542	34.0847	111.7695	4456.0		
9/14/2014	145.5194	50.3446	95.1747	4369.0		
9/15/2014	148.0322	50.7534	97.2788	4369.0		
9/16/2014	150.5106	51.6118	98.8988	4368.0		
9/17/2014	153.4432	52.4003	101.0429	4380.0		
9/18/2014	154.4669	52.7415	101.7254	4338.0		
9/19/2014	105.1478	54.7673	50.3805	2906.0		
9/20/2014		34.7658			Off-Line	power failure
9/21/2014	97.2533	10.2757	86.9776	2605.0		
9/22/2014	273.8886	48.8097	225.0789	7225.0		
9/23/2014	303.9051	104.0161	199.8889	7897.0		
9/24/2014	289.7379	99.1329	190.6049	7418.0		sampling date

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
9/25/2014	266.5483	94.5977	171.9506	6962.0		
9/26/2014	274.7119	84.4799	190.2320	7323.0		
9/27/2014	285.2938	115.2166	170.0771	7765.0		
9/28/2014	276.9567	125.7455	151.2112	7700.0		
9/29/2014	256.0847	125.9784	130.1063	7276.0		
9/30/2014	259.8953	119.6152	140.2800	7550.0		
10/1/2014	266.3110	151.7106	114.6004	7914.0		
10/2/2014	264.5367	231.3984	33.1383	8046.0		
10/3/2014	262.2051	194.3227	67.8824	8167.0		
10/4/2014	244.0202	199.7936	44.2267	7788.0		
10/5/2014	235.5890	204.8299	30.7592	7709.0		
10/6/2014	232.8204	207.3752	25.4452	7816.0		
10/7/2014	230.4378	231.7225	-1.2847	7942.0		
10/8/2014	221.6470	232.7034	-11.0564	7848.0		sampling date
10/9/2014	215.6212	242.1378	-26.5166	7630.0		
10/10/2014	216.2329	216.0178	0.2151	7647.0		
10/11/2014	224.0884	226.3963	-2.3079	7920.0		
10/12/2014	224.1112	211.1195	12.9917	7916.0		
10/13/2014	213.7089	191.5746	22.1343	7544.0		
10/14/2014	198.9571	166.1554	32.8016	7019.0		
10/15/2014	137.6157	111.6224	25.9932	4852.0		
10/16/2014	235.7513	165.4986	70.2527	8307.0		
10/17/2014	235.9507	192.8836	43.0671	8309.0		
10/18/2014	232.4564	208.2283	24.2281	8181.0		
10/19/2014	222.3615	195.8787	26.4829	7821.0		
10/20/2014	237.2037	197.8103	39.3934	8338.0		
10/21/2014	225.6759	167.3909	58.2850	7928.0		
10/22/2014	222.5080	109.3434	113.1646	7812.0		sampling date
10/23/2014	223.0524	107.3686	115.6838	8082.0		
10/24/2014	217.6161	113.0680	104.5481	8146.0		
10/25/2014	209.9227	112.3796	97.5431	8127.0		
10/26/2014	205.4561	112.5714	92.8846	8236.0		
10/27/2014	126.0844	96.8460	29.2385	5240.0		
10/28/2014	44.2463	30.5259	13.7204	1909.0		
10/29/2014	112.3371	34.6382	77.6989	5039.0		
10/30/2014	129.8263	86.2999	43.5264	6064.0		
10/31/2014	92.3838	58.9240	33.4597	4501.0		
11/1/2014	87.6380	56.6751	30.9629	4462.0		
11/2/2014	83.6553	55.5172	28.1381	4460.0		
11/3/2014	60.8026	50.9506	9.8519	3402.0		
11/4/2014	49.0625	30.3429	18.7197	2888.0		
11/5/2014	50.2291	39.3794	10.8497	3119.0		sampling date
11/6/2014	34.7592	28.4236	6.3356	2068.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
11/7/2014	45.7240	25.0717	20.6523	2611.0		
11/8/2014	65.0675	39.4973	25.5702	3572.0		
11/9/2014	68.1305	43.1569	24.9736	3601.0		
11/10/2014	69.6841	42.0072	27.6769	3551.0		
11/11/2014	71.4723	37.6071	33.8651	3516.0		
11/12/2014	73.3794	39.4242	33.9552	3489.0		
11/13/2014	75.1616	41.3975	33.7640	3458.0		
11/14/2014	58.1407	39.3401	18.8006	2591.0		
11/15/2014		11.7742			Off-Line	power failure
11/16/2014		2.1037			Off-Line	power failure
11/17/2014	28.5776	5.9517	22.6260	1164.0		
11/18/2014	86.7766	31.4004	55.3762	3436.0		
11/19/2014	88.2867	38.0522	50.2345	3401.0		sampling date
11/20/2014	83.7021	39.9158	43.7863	3199.0		
11/21/2014	85.1523	40.7638	44.3885	3229.0		
11/22/2014	88.3955	41.9494	46.4461	3326.0		
11/23/2014	85.0633	43.8733	41.1900	3176.0		
11/24/2014	82.1820	42.5300	39.6520	3045.0		
11/25/2014	75.8202	48.2531	27.5671	2788.0		
11/26/2014	69.1333	59.1529	9.9804	2523.0		
11/27/2014		18.1396			Off-Line	power failure
11/28/2014	32.1243	5.4327	26.6916	1155.0		
11/29/2014	74.3632	31.5463	42.8169	2654.0		
11/30/2014	75.3616	39.3740	35.9876	2670.0		
12/1/2014	72.4715	40.2048	32.2667	2549.0		
12/2/2014	73.6267	40.3473	33.2794	2571.0		
12/3/2014	72.3681	39.9025	32.4656	2509.0		sampling date
12/4/2014	71.0970	37.8468	33.2502	2462.0		
12/5/2014	75.8074	41.8380	33.9695	2622.0		
12/6/2014	74.3344	39.4807	34.8536	2568.0		
12/7/2014	72.4519	39.0473	33.4046	2500.0		
12/8/2014	71.3481	37.9536	33.3945	2459.0		
12/9/2014	72.4783	37.9381	34.5402	2495.0		
12/10/2014	75.5596	31.3401	44.2195	2598.0		
12/11/2014	76.9009	39.0503	37.8506	2641.0		
12/12/2014	78.5366	40.4731	38.0636	2694.0		
12/13/2014	81.6062	42.2488	39.3574	2796.0		
12/14/2014	80.7379	41.9398	38.7982	2763.0		
12/15/2014	82.6174	42.1566	40.4608	2824.0		
12/16/2014	80.8398	41.2872	39.5525	2760.0		
12/17/2014	81.1105	41.1614	39.9491	2766.0		sampling date
12/18/2014	79.7795	40.4453	39.3342	2729.0		
12/19/2014	78.7467	39.5713	39.1753	2702.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
12/20/2014	77.6315	38.6423	38.9892	2672.0		
12/21/2014	76.8404	38.0574	38.7829	2653.0		
12/22/2014	76.8900	37.5372	39.3528	2663.0		
12/23/2014	75.4410	36.7858	38.6553	2621.0		
12/24/2014	72.4216	34.9291	37.4925	2524.0		
12/25/2014	69.3051	33.7708	35.5343	2423.0		
12/26/2014	72.1091	32.0538	40.0553	2529.0		
12/27/2014	77.7647	35.7164	42.0483	2736.0		
12/28/2014	76.7247	35.1156	41.6091	2708.0		
12/29/2014	77.2997	34.3472	42.9525	2737.0		sampling date
12/30/2014	79.6398	35.6490	43.9909	2739.0		
12/31/2014	76.5098	34.6845	41.8253	2558.0		
1/1/2015	83.4078	34.8329	48.5749	2713.0		
1/2/2015	87.2171	36.9346	50.2825	2762.0		
1/3/2015	89.6820	37.6379	52.0440	2767.0		
1/4/2015	89.7615	37.5473	52.2142	2700.0		
1/5/2015	78.5175	43.2197	35.2977	2304.0		
1/6/2015	83.8250	35.8379	47.9871	2401.0		
1/7/2015	91.3675	33.6067	57.7608	2556.0		
1/8/2015	94.1204	32.9097	61.2107	2573.0		
1/9/2015	95.0310	33.9859	61.0451	2540.0		
1/10/2015	96.8810	34.2003	62.6807	2533.0		
1/11/2015	98.6021	35.2484	63.3537	2523.0		
1/12/2015	107.8105	41.0457	66.7649	2701.0		
1/13/2015	106.6804	41.4070	65.2734	2618.0		
1/14/2015	109.7779	32.6136	77.1644	2640.0		sampling date
1/15/2015	113.8604	39.1714	74.6890	2776.0		
1/16/2015	115.4831	42.7055	72.7776	2855.0		
1/17/2015	112.6292	42.0142	70.6150	2824.0		
1/18/2015	111.1078	41.1282	69.9796	2826.0		
1/19/2015	110.2817	39.9439	70.3378	2846.0		
1/20/2015	108.6311	39.3949	69.2362	2845.0		
1/21/2015	106.4926	39.0460	67.4465	2831.0		
1/22/2015	104.3699	38.5500	65.8199	2817.0		
1/23/2015	101.2416	38.0645	63.1771	2775.0		
1/24/2015	96.9038	37.2475	59.6562	2698.0		
1/25/2015	95.5166	34.9641	60.5525	2702.0		
1/26/2015	97.4989	36.0474	61.4515	2803.0		
1/27/2015	95.3291	34.6080	60.7211	2786.0		
1/28/2015	82.9824	32.7138	50.2686	2466.0		sampling date
1/29/2015	72.9171	27.1507	45.7664	2178.0		
1/30/2015	72.6098	26.7322	45.8776	2180.0		
1/31/2015	70.9764	26.2357	44.7407	2142.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
2/1/2015	69.4549	25.6763	43.7786	2107.0		
2/2/2015	65.4204	24.9353	40.4851	1995.0		
2/3/2015	65.0779	23.5130	41.5649	1995.0		
2/4/2015	63.5348	24.2272	39.3076	1958.0		
2/5/2015	64.0378	26.8232	37.2146	1984.0		
2/6/2015	60.8719	21.2853	39.5866	1896.0		
2/7/2015	59.1094	18.6838	40.4256	1851.0		
2/8/2015	60.0621	18.4701	41.5920	1891.0		
2/9/2015	60.4324	18.9427	41.4897	1913.0		
2/10/2015	59.7898	19.1921	40.5977	1903.0		
2/11/2015	42.4959	7.6618	34.8342	1360.0		sampling date
2/12/2015	61.4684	16.4092	45.0593	2008.0		
2/13/2015	60.4926	18.7877	41.7049	2018.0		
2/14/2015	59.8562	18.6620	41.1942	2040.0		
2/15/2015	57.8427	18.4254	39.4173	2015.0		
2/16/2015	57.0960	18.0482	39.0478	2034.0		
2/17/2015	54.9809	18.1510	36.8299	2004.0		
2/18/2015	48.3210	16.7988	31.5222	1803.0		
2/19/2015	52.3563	16.0204	36.3359	2001.0		
2/20/2015	49.3747	15.5399	33.8348	1934.0		
2/21/2015	48.4200	15.2257	33.1943	1945.0		
2/22/2015	48.3731	15.6634	32.7098	1994.0		
2/23/2015	47.5553	16.0242	31.5312	2013.0		
2/24/2015	45.0812	15.6581	29.4231	1961.0		
2/25/2015	42.8519	14.9498	27.9021	1917.0		sampling date
2/26/2015	43.2200	14.9731	28.2469	1918.0		
2/27/2015	45.2239	15.3279	29.8960	1991.0		
2/28/2015	43.8429	14.2005	29.6423	1915.0		
3/1/2015	42.7574	15.9295	26.8280	1853.0		
3/2/2015	43.3705	10.1614	33.2092	1865.0		
3/3/2015	49.2140	14.0994	35.1147	2100.0		
3/4/2015	50.6081	18.3649	32.2431	2143.0		
3/5/2015	50.3519	18.3112	32.0407	2116.0		
3/6/2015	51.1649	18.1909	32.9740	2134.0		
3/7/2015	53.5305	18.4009	35.1296	2216.0		
3/8/2015	52.1777	18.4487	33.7290	2144.0		
3/9/2015	49.5486	20.0179	29.5307	2021.0		
3/10/2015	47.5173	15.1096	32.4077	1924.0		
3/11/2015	45.3018	13.4666	31.8352	1821.0		
3/12/2015	41.8714	12.5752	29.2962	1671.0		
3/13/2015	42.7531	11.5173	31.2359	1694.0		sampling date
3/14/2015	43.0413	12.3536	30.6877	1752.0		
3/15/2015	42.6065	12.9392	29.6673	1783.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
3/16/2015	40.4811	12.5451	27.9360	1743.0		
3/17/2015	39.2438	11.9318	27.3121	1740.0		
3/18/2015	38.1638	11.1773	26.9865	1744.0		
3/19/2015	39.9208	12.4255	27.4953	1882.0		
3/20/2015	37.8569	11.9988	25.8581	1843.0		
3/21/2015	36.4414	12.0364	24.4050	1834.0		
3/22/2015	33.7516	11.3843	22.3673	1758.0		
3/23/2015	32.7943	11.1343	21.6600	1770.0		
3/24/2015	32.0531	11.1356	20.9174	1795.0		
3/25/2015	30.4877	10.6259	19.8618	1774.0		sampling date
3/26/2015	29.4780	10.4061	19.0719	1774.0		
3/27/2015	29.8324	7.5627	22.2697	1859.0		
3/28/2015	28.0160	9.3720	18.6439	1810.0		
3/29/2015	26.5683	9.8121	16.7562	1782.0		
3/30/2015	25.5541	8.5973	16.9568	1782.0		
3/31/2015	24.6776	9.2915	15.3862	1792.0		
4/1/2015	23.3673	9.5560	13.8113	1770.0		
4/2/2015	22.7642	10.1156	12.6485	1802.0		
4/3/2015	18.5176	7.6856	10.8320	1535.0		
4/4/2015	17.5290	7.0845	10.4445	1525.0		
4/5/2015	16.3879	6.9582	9.4297	1500.0		
4/6/2015	15.3271	6.9004	8.4267	1480.0		
4/7/2015	14.1716	6.6556	7.5159	1448.0		
4/8/2015	13.4765	6.7637	6.7128	1462.0		sampling date
4/9/2015	14.5708	6.8415	7.7293	1481.0		
4/10/2015	15.6260	7.1087	8.5173	1494.0		
4/11/2015	16.4646	7.5359	8.9287	1486.0		
4/12/2015	17.1880	7.3769	9.8111	1469.0		
4/13/2015	18.2722	7.6013	10.6709	1483.0		
4/14/2015	19.0503	7.8887	11.1616	1472.0		
4/15/2015	19.9096	7.2688	12.6408	1468.0		
4/16/2015	19.8705	7.3371	12.5334	1401.0		
4/17/2015	22.1019	5.4081	16.6938	1493.0		
4/18/2015	23.5684	0.5610	23.0074	1528.0		
4/19/2015	23.5220	8.0536	15.4684	1466.0		
4/20/2015	27.4483	15.2513	12.1970	1647.0		
4/21/2015	26.9666	13.4334	13.5332	1560.0		
4/22/2015	35.2050	13.2287	21.9763	1966.0		sampling date
4/23/2015	41.5702	17.8739	23.6964	2281.0		
4/24/2015	40.7928	17.8535	22.9393	2200.0		
4/25/2015	39.6999	16.8563	22.8436	2105.0		
4/26/2015	39.7548	16.5993	23.1555	2073.0		
4/27/2015	41.5439	18.3508	23.1932	2131.0		

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
4/28/2015	43.5284	22.8569	20.6715	2197.0		
4/29/2015	42.4950	18.2157	24.2793	2111.0		
4/30/2015	43.0224	17.8058	25.2166	2104.0		
5/1/2015	44.2306	17.6964	26.5342	2130.0		
5/2/2015	44.8439	18.2600	26.5839	2127.0		
5/3/2015	45.9046	18.3284	27.5763	2145.0		
5/4/2015	46.3036	18.4246	27.8790	2132.0		
5/5/2015	47.2232	18.8176	28.4056	2143.0		
5/6/2015	44.2378	20.4108	23.8270	1979.0		sampling date
5/7/2015	42.4576	15.6850	26.7727	1945.0		
5/8/2015	41.0114	14.5113	26.5001	1925.0		
5/9/2015	40.7706	14.2138	26.5568	1962.0		
5/10/2015	38.9718	14.1626	24.8092	1924.0		
5/11/2015	37.6272	13.7140	23.9133	1907.0		
5/12/2015	38.9510	15.3985	23.5525	2028.0		
5/13/2015	36.5982	14.0507	22.5476	1959.0		
5/14/2015	35.4800	13.2983	22.1817	1954.0		
5/15/2015	34.4903	12.9788	21.5115	1956.0		
5/16/2015	32.7972	12.5972	20.2000	1917.0		
5/17/2015	31.9907	11.8851	20.1056	1929.0		
5/18/2015	25.1975	10.9555	14.2420	1569.0		
5/19/2015	12.9718	4.8803	8.0915	835.0		
5/20/2015	14.4852	3.7737	10.7115	965.0		sampling date
5/21/2015	16.7152	5.5267	11.1885	1119.0		
5/22/2015	18.0457	5.5498	12.4959	1214.0		
5/23/2015	23.6075	8.4122	15.1953	1596.0		
5/24/2015	23.5352	9.3007	14.2345	1599.0		
5/25/2015	21.5439	9.2075	12.3364	1471.0		
5/26/2015	16.4818	5.6437	10.8381	1131.0		
5/27/2015	16.1963	4.9874	11.2089	1117.0		
5/28/2015	15.9705	6.1475	9.8230	1107.0		outflow meter out; value estimated
5/29/2015	15.6027	6.1135	9.4892	1087.0		outflow meter out; value estimated
5/30/2015	15.8375	6.3159	9.5217	1109.0		outflow meter out; value estimated
5/31/2015	15.5151	6.2965	9.2186	1092.0		outflow meter out; value estimated
6/1/2015	13.2445	5.4692	7.7753	937.0		outflow meter out; value estimated
6/2/2015	9.4778	3.9818	5.4960	674.0		outflow meter out; value estimated
6/3/2015	9.9462	4.2508	5.6954	711.0		outflow meter out; value estimated; sampling date
6/4/2015	10.1088	4.3209	5.7878	778.0		outflow meter out; value estimated
6/5/2015	9.7779	4.1802	5.5977	815.0		outflow meter out; value estimated
6/6/2015	9.0324	3.8623	5.1701	821.0		outflow meter out; value estimated
6/7/2015	7.7146	3.2995	4.4150	771.0		outflow meter out; value estimated
6/8/2015	7.0369	3.0106	4.0263	781.0		outflow meter out; value estimated
6/9/2015	6.5157	2.7886	3.7271	813.0		outflow meter out; value estimated

WATERSHED TECHNOLOGIES						
Grassy Island N Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TN MASS (lbs.)		TN (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	34220	16351	17954	gpm On-Line Flow > 0	Operational/	
PER DAY	95.1	45.4	49.9	3244.5	Flow Status	Comments
6/10/2015	6.3939	2.6547	3.7392	911.0		
6/11/2015	5.0591	2.3077	2.7515	840.0		
6/12/2015	4.2629	1.7428	2.5201	848.0		
6/13/2015	3.4709	1.4484	2.0225	861.0		
6/14/2015	2.6408	1.1795	1.4613	870.0		
6/15/2015	1.7072	0.7932	0.9140	837.0		
6/16/2015	0.8372	0.3869	0.4502	802.0		
6/17/2015	0.0390	0.0273	0.0117	811.0		sampling date
6/18/2015	0.0368	0.0230	0.0138	766.0		
6/19/2015	0.0359	0.0206	0.0153	746.0		
6/20/2015	0.0380	0.0238	0.0142	790.0		
6/21/2015	0.0362	0.0241	0.0121	753.0		
6/22/2015	0.0421	0.0208	0.0213	875.0		
6/23/2015	0.0434	0.0036	0.0398	902.0		
6/24/2015	0.0394	0.0018	0.0376	820.0		
6/25/2015	0.0395	0.0198	0.0197	822.0		
6/26/2015	0.0336	0.0541	-0.0206	698.0		
6/27/2015	0.0480	0.0372	0.0108	998.0		
6/28/2015	0.0505	0.0487	0.0018	1051.0		
6/29/2015	0.0517	0.0470	0.0047	1076.0		
6/30/2015	0.0531	0.0508	0.0023	1105.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
7/1/2014	19.7676	4.9195	14.8481	2275.0		
7/2/2014	19.4201	4.4340	14.9861	2235.0		sampling date
7/3/2014	34.7247	3.8501	30.8746	4063.0		
7/4/2014	44.0710	11.3032	32.7678	5244.0		
7/5/2014	36.2683	9.3859	26.8824	4390.0		
7/6/2014	34.7577	9.0906	25.6672	4281.0		
7/7/2014	33.6691	8.8362	24.8329	4221.0		
7/8/2014	34.2506	5.8651	28.3854	4372.0		
7/9/2014	34.8351	9.9823	24.8528	4529.0		sampling date
7/10/2014	16.5793	4.9426	11.6367	2052.0		
7/11/2014	24.5137	6.3926	18.1211	2895.0		
7/12/2014	17.8175	5.3907	12.4268	2012.0		
7/13/2014		2.2226			Off-Line	power failure
7/14/2014	27.5465	1.1908	26.3557	2860.0		
7/15/2014	46.6014	6.4341	40.1672	4651.0		
7/16/2014	47.1363	6.1982	40.9381	4529.0		sampling date
7/17/2014	47.6288	6.9655	40.6633	4788.0		
7/18/2014	44.0026	7.4186	36.5840	4638.0		
7/19/2014	41.5526	8.0052	33.5474	4603.0		
7/20/2014	39.5032	9.0216	30.4816	4611.0		
7/21/2014	36.7655	9.6613	27.1042	4535.0		
7/22/2014	34.5488	10.4160	24.1328	4518.0		
7/23/2014	33.5265	11.1072	22.4193	4665.0		sampling date
7/24/2014	31.9053	10.4035	21.5019	4557.0		
7/25/2014	29.5540	9.3039	20.2501	4336.0		
7/26/2014	30.3480	8.4769	21.8711	4577.0		
7/27/2014	28.8290	7.7673	21.0617	4473.0		
7/28/2014	27.6992	7.0012	20.6980	4425.0		
7/29/2014	26.1133	6.6498	19.4636	4299.0		
7/30/2014	27.0711	6.0766	20.9944	4597.0		sampling date
7/31/2014	26.4428	5.5132	20.9296	4550.0		
8/1/2014	25.9766	4.9325	21.0440	4530.0		
8/2/2014	25.4625	4.4375	21.0250	4501.0		
8/3/2014	25.1148	3.9307	21.1841	4501.0		
8/4/2014	35.7447	4.5146	31.2300	6496.0		
8/5/2014	39.3063	4.9270	34.3793	7245.0		
8/6/2014	38.5755	4.0227	34.5527	7213.0		sampling date
8/7/2014	39.5393	3.9380	35.6013	7233.0		
8/8/2014	40.2956	4.0186	36.2770	7215.0		
8/9/2014	26.7434	3.4779	23.2655	4689.0		
8/10/2014	16.6856	1.0534	15.6322	2866.0		
8/11/2014	36.1649	3.2642	32.9008	6088.0		
8/12/2014	43.2237	3.5123	39.7113	7134.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
8/13/2014	46.8548	3.8406	43.0141	7585.0		sampling date
8/14/2014	47.2872	3.9453	43.3419	7575.0		
8/15/2014	26.1016	3.5365	22.5650	4138.0		
8/16/2014	15.2060	0.7464	14.4596	2386.0		
8/17/2014	52.2722	3.9895	48.2827	8119.0		
8/18/2014	46.5000	4.8604	41.6396	7150.0		
8/19/2014	23.7854	3.8246	19.9608	3621.0		
8/20/2014	11.2977	0.8323	10.4654	1703.0		sampling date
8/21/2014	36.1133	3.1305	32.9828	5531.0		
8/22/2014	33.2790	3.4034	29.8756	5180.0		
8/23/2014	37.7797	3.4752	34.3045	5978.0		
8/24/2014	36.0287	3.4624	32.5663	5797.0		
8/25/2014	26.4944	2.6661	23.8283	4336.0		
8/26/2014	32.6225	2.4711	30.1514	5432.0		
8/27/2014	33.4993	2.4888	31.0104	5677.0		sampling date
8/28/2014	34.4957	2.4948	32.0008	6061.0		
8/29/2014	33.8676	2.2340	31.6336	6178.0		
8/30/2014	32.6948	2.2674	30.4274	6201.0		
8/31/2014	30.6669	2.0302	28.6367	6057.0		
9/1/2014	19.9434	1.8670	18.0764	4109.0		
9/2/2014	31.5569	1.6773	29.8795	6795.0		
9/3/2014	25.9428	1.4763	24.4665	5850.0		sampling date
9/4/2014	25.8253	1.4807	24.3446	5828.0		
9/5/2014	25.9558	1.4814	24.4743	5862.0		
9/6/2014	26.1082	1.4604	24.6478	5901.0		
9/7/2014	26.2029	1.4390	24.7639	5927.0		
9/8/2014	26.2797	1.3743	24.9055	5949.0		
9/9/2014	21.0860	1.3712	19.7148	4777.0		
9/10/2014	8.6669	0.9313	7.7356	1965.0		sampling date
9/11/2014	15.1253	0.7081	14.4172	3332.0		
9/12/2014	19.7743	0.8262	18.9482	4236.0		
9/13/2014	21.3751	0.6237	20.7514	4456.0		
9/14/2014	21.5204	0.8776	20.6428	4369.0		
9/15/2014	22.0829	0.8423	21.2406	4369.0		
9/16/2014	22.6403	0.8149	21.8254	4368.0		
9/17/2014	23.2665	0.7866	22.4799	4380.0		sampling date
9/18/2014	23.6169	0.7586	22.8583	4338.0		
9/19/2014	16.2050	0.7545	15.4505	2906.0		
9/20/2014		0.4585			Off-Line	power failure
9/21/2014	15.2152	0.1297	15.0856	2605.0		
9/22/2014	43.1548	0.5892	42.5656	7225.0		
9/23/2014	48.2126	1.2003	47.0123	7897.0		
9/24/2014	46.2689	1.0928	45.1761	7418.0		sampling date

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
9/25/2014	43.7115	1.0997	42.6118	6962.0		
9/26/2014	46.2798	1.0288	45.2511	7323.0		
9/27/2014	49.3931	1.4616	47.9315	7765.0		
9/28/2014	49.2970	1.6542	47.6427	7700.0		
9/29/2014	46.8822	1.7121	45.1701	7276.0		
9/30/2014	48.9588	1.6740	47.2848	7550.0		
10/1/2014	51.6453	2.1803	49.4650	7914.0		sampling date
10/2/2014	48.5145	3.7897	44.7249	8046.0		
10/3/2014	45.1918	3.5473	41.6445	8167.0		
10/4/2014	39.2304	3.9990	35.2315	7788.0		
10/5/2014	35.0075	4.4388	30.5687	7709.0		
10/6/2014	31.6153	4.8170	26.7982	7816.0		
10/7/2014	28.1843	5.7232	22.4611	7942.0		
10/8/2014	23.9567	6.0705	17.8862	7848.0		sampling date
10/9/2014	27.8238	5.8924	21.9314	7630.0		
10/10/2014	32.4284	4.8565	27.5719	7647.0		
10/11/2014	38.2908	4.6453	33.6455	7920.0		
10/12/2014	42.9739	3.8921	39.0818	7916.0		
10/13/2014	45.4358	3.1074	42.3284	7544.0		
10/14/2014	46.4434	2.3031	44.1403	7019.0		
10/15/2014	34.9870	1.2662	33.7209	4852.0		sampling date
10/16/2014	56.1353	1.9427	54.1926	8307.0		
10/17/2014	52.3828	2.3460	50.0368	8309.0		
10/18/2014	47.8678	2.6275	45.2402	8181.0		
10/19/2014	42.2165	2.5680	39.6485	7821.0		
10/20/2014	41.2279	2.6983	38.5296	8338.0		
10/21/2014	35.6072	2.3798	33.2275	7928.0		
10/22/2014	31.5454	1.6231	29.9224	7812.0		sampling date
10/23/2014	31.8864	1.5158	30.3706	8082.0		
10/24/2014	31.3837	1.5135	29.8702	8146.0		
10/25/2014	30.5570	1.4214	29.1356	8127.0		
10/26/2014	30.2033	1.3401	28.8632	8236.0		
10/27/2014	18.7305	1.0804	17.6501	5240.0		
10/28/2014	6.6468	0.3175	6.3293	1909.0		
10/29/2014	17.0777	0.3339	16.7438	5039.0		sampling date
10/30/2014	18.0945	0.7954	17.2991	6064.0		
10/31/2014	11.6069	0.5180	11.0889	4501.0		
11/1/2014	9.6984	0.4739	9.2245	4462.0		
11/2/2014	7.8870	0.4403	7.4467	4460.0		
11/3/2014	4.6376	0.3818	4.2558	3402.0		
11/4/2014	2.7667	0.2141	2.5527	2888.0		
11/5/2014	1.7243	0.2604	1.4639	3119.0		sampling date
11/6/2014	2.1480	0.1908	1.9572	2068.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
11/7/2014	3.9807	0.1709	3.8098	2611.0		
11/8/2014	7.1813	0.2732	6.9081	3572.0		
11/9/2014	8.9893	0.3029	8.6864	3601.0		
11/10/2014	10.5898	0.2990	10.2908	3551.0		
11/11/2014	12.1937	0.2714	11.9223	3516.0		
11/12/2014	13.7953	0.2885	13.5069	3489.0		sampling date
11/13/2014	12.9306	0.3022	12.6284	3458.0		
11/14/2014	9.1326	0.2865	8.8461	2591.0		
11/15/2014		0.0856			Off-Line	power failure
11/16/2014		0.0153			Off-Line	power failure
11/17/2014	3.3534	0.0430	3.3103	1164.0		
11/18/2014	9.1614	0.2266	8.9348	3436.0		
11/19/2014	8.3382	0.2740	8.0642	3401.0		sampling date
11/20/2014	8.6229	0.3140	8.3088	3199.0		
11/21/2014	9.4909	0.3470	9.1439	3229.0		
11/22/2014	10.5869	0.3833	10.2036	3326.0		
11/23/2014	10.8837	0.4275	10.4563	3176.0		
11/24/2014	11.1772	0.4393	10.7379	3045.0		
11/25/2014	10.9135	0.5259	10.3877	2788.0		
11/26/2014	10.4913	0.6772	9.8140	2523.0		sampling date
11/27/2014		0.2411			Off-Line	power failure
11/28/2014	4.6402	0.0819	4.5582	1155.0		
11/29/2014	10.4756	0.5307	9.9449	2654.0		
11/30/2014	10.3508	0.7288	9.6219	2670.0		
12/1/2014	9.7023	0.8102	8.8920	2549.0		
12/2/2014	9.6050	0.8775	8.7275	2571.0		
12/3/2014	9.1968	0.9298	8.2670	2509.0		sampling date
12/4/2014	9.3077	0.7895	8.5182	2462.0		
12/5/2014	10.2142	0.7693	9.4449	2622.0		
12/6/2014	10.2992	0.6268	9.6725	2568.0		
12/7/2014	10.3141	0.5204	9.7937	2500.0		
12/8/2014	10.4278	0.4077	10.0201	2459.0		
12/9/2014	10.8675	0.3079	10.5596	2495.0		
12/10/2014	11.6149	0.1708	11.4441	2598.0		sampling date
12/11/2014	11.3674	0.2528	11.1146	2641.0		
12/12/2014	11.1468	0.3040	10.8428	2694.0		
12/13/2014	11.1032	0.3619	10.7414	2796.0		
12/14/2014	10.5121	0.4041	10.1079	2763.0		
12/15/2014	10.2738	0.4521	9.8218	2824.0		
12/16/2014	9.5814	0.4883	9.0930	2760.0		
12/17/2014	9.1416	0.5330	8.6085	2766.0		sampling date
12/18/2014	9.0783	0.5186	8.5597	2729.0		
12/19/2014	9.0469	0.5023	8.5446	2702.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
12/20/2014	9.0043	0.4854	8.5189	2672.0		
12/21/2014	8.9977	0.4728	8.5248	2653.0		
12/22/2014	9.0892	0.4611	8.6281	2663.0		sampling date
12/23/2014	9.3463	0.4417	8.9046	2621.0		
12/24/2014	9.3861	0.4094	8.9767	2524.0		
12/25/2014	9.3807	0.3860	8.9948	2423.0		
12/26/2014	10.1776	0.3567	9.8209	2529.0		
12/27/2014	11.4287	0.3864	11.0423	2736.0		
12/28/2014	11.7255	0.3686	11.3568	2708.0		
12/29/2014	12.2693	0.3493	11.9200	2737.0		sampling date
12/30/2014	12.3258	0.3939	11.9319	2739.0		
12/31/2014	11.5557	0.4130	11.1427	2558.0		
1/1/2015	12.3030	0.4438	11.8592	2713.0		
1/2/2015	12.5731	0.5005	12.0726	2762.0		
1/3/2015	12.6439	0.5398	12.1041	2767.0		
1/4/2015	12.3846	0.5674	11.8172	2700.0		
1/5/2015	10.6082	0.6855	9.9227	2304.0		
1/6/2015	11.0965	0.5946	10.5019	2401.0		
1/7/2015	11.8572	0.5816	11.2757	2556.0		sampling date
1/8/2015	12.8019	0.5380	12.2639	2573.0		
1/9/2015	13.4925	0.5239	12.9685	2540.0		
1/10/2015	14.3076	0.4961	13.8115	2533.0		
1/11/2015	15.1002	0.4800	14.6202	2523.0		
1/12/2015	17.0744	0.5233	16.5511	2701.0		
1/13/2015	17.4307	0.4928	16.9379	2618.0		
1/14/2015	18.4655	0.3611	18.1044	2640.0		sampling date
1/15/2015	18.3873	0.4284	17.9590	2776.0		
1/16/2015	17.8518	0.4610	17.3909	2855.0		
1/17/2015	16.6107	0.4474	16.1633	2824.0		
1/18/2015	15.5745	0.4318	15.1427	2826.0		
1/19/2015	14.6293	0.4132	14.2161	2846.0		
1/20/2015	13.5691	0.4012	13.1679	2845.0		
1/21/2015	12.4525	0.3912	12.0613	2831.0		sampling date
1/22/2015	12.3038	0.3840	11.9199	2817.0		
1/23/2015	12.0346	0.3769	11.6578	2775.0		
1/24/2015	11.6173	0.3664	11.2509	2698.0		
1/25/2015	11.5511	0.3417	11.2093	2702.0		
1/26/2015	11.8962	0.3499	11.5463	2803.0		
1/27/2015	11.7380	0.3335	11.4044	2786.0		
1/28/2015	10.3135	0.3129	10.0006	2466.0		sampling date
1/29/2015	8.5033	0.2615	8.2418	2178.0		
1/30/2015	7.9047	0.2592	7.6455	2180.0		
1/31/2015	7.1712	0.2562	6.9150	2142.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
2/1/2015	6.4680	0.2525	6.2155	2107.0		
2/2/2015	5.5693	0.2469	5.3224	1995.0		
2/3/2015	5.0144	0.2345	4.7799	1995.0		
2/4/2015	4.3768	0.2434	4.1335	1958.0		sampling date
2/5/2015	4.9016	0.2926	4.6091	1984.0		
2/6/2015	5.1302	0.2507	4.8794	1896.0		
2/7/2015	5.4438	0.2367	5.2071	1851.0		
2/8/2015	6.0062	0.2506	5.7556	1891.0		
2/9/2015	6.5260	0.2743	6.2518	1913.0		
2/10/2015	6.9395	0.2957	6.6439	1903.0		
2/11/2015	5.2793	0.1252	5.1541	1360.0		sampling date
2/12/2015	7.6120	0.2609	7.3511	2008.0		
2/13/2015	7.4663	0.2901	7.1762	2018.0		
2/14/2015	7.3621	0.2793	7.0828	2040.0		
2/15/2015	7.0885	0.2667	6.8218	2015.0		
2/16/2015	6.9703	0.2521	6.7182	2034.0		
2/17/2015	6.6851	0.2440	6.4411	2004.0		
2/18/2015	5.8505	0.2168	5.6338	1803.0		sampling date
2/19/2015	6.2731	0.2103	6.0629	2001.0		
2/20/2015	5.8506	0.2075	5.6431	1934.0		
2/21/2015	5.6701	0.2070	5.4632	1945.0		
2/22/2015	5.5939	0.2168	5.3771	1994.0		
2/23/2015	5.4260	0.2258	5.2002	2013.0		
2/24/2015	5.0704	0.2248	4.8455	1961.0		
2/25/2015	4.7460	0.2188	4.5272	1917.0		sampling date
2/26/2015	5.5142	0.2486	5.2656	1918.0		
2/27/2015	6.5190	0.2849	6.2341	1991.0		
2/28/2015	7.0348	0.2924	6.7424	1915.0		
3/1/2015	7.5469	0.3602	7.1866	1853.0		
3/2/2015	8.3404	0.2505	8.0899	1865.0		
3/3/2015	10.2298	0.3766	9.8532	2100.0		
3/4/2015	11.2949	0.5287	10.7662	2143.0		
3/5/2015	11.9974	0.5655	11.4319	2116.0		
3/6/2015	12.9515	0.6003	12.3513	2134.0		sampling date
3/7/2015	13.0497	0.6166	12.4331	2216.0		
3/8/2015	12.2392	0.6278	11.6114	2144.0		
3/9/2015	11.1727	0.6917	10.4810	2021.0		
3/10/2015	10.2896	0.5301	9.7596	1924.0		
3/11/2015	9.4105	0.4796	8.9309	1821.0		
3/12/2015	8.3341	0.4546	7.8795	1671.0		
3/13/2015	8.1435	0.4227	7.7208	1694.0		sampling date
3/14/2015	8.5528	0.4104	8.1424	1752.0		
3/15/2015	8.8370	0.3836	8.4534	1783.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
3/16/2015	8.7686	0.3258	8.4428	1743.0		
3/17/2015	8.8832	0.2648	8.6184	1740.0		
3/18/2015	9.0336	0.2045	8.8290	1744.0		sampling date
3/19/2015	9.5383	0.2181	9.3203	1882.0		
3/20/2015	9.1350	0.2014	8.9336	1843.0		
3/21/2015	8.8857	0.1925	8.6933	1834.0		
3/22/2015	8.3213	0.1727	8.1486	1758.0		
3/23/2015	8.1806	0.1595	8.0211	1770.0		
3/24/2015	8.0958	0.1499	7.9460	1795.0		
3/25/2015	7.8031	0.1334	7.6697	1774.0		sampling date
3/26/2015	7.2884	0.1296	7.1588	1774.0		
3/27/2015	7.0982	0.0935	7.0048	1859.0		
3/28/2015	6.3860	0.1148	6.2711	1810.0		
3/29/2015	5.7701	0.1192	5.6510	1782.0		
3/30/2015	5.2531	0.1035	5.1496	1782.0		
3/31/2015	4.7626	0.1108	4.6518	1792.0		
4/1/2015	4.1906	0.1129	4.0777	1770.0		sampling date
4/2/2015	3.9013	0.1257	3.7755	1802.0		
4/3/2015	3.0123	0.1004	2.9119	1535.0		
4/4/2015	2.6837	0.0971	2.5866	1525.0		
4/5/2015	2.3358	0.0999	2.2359	1500.0		
4/6/2015	2.0048	0.1037	1.9011	1480.0		
4/7/2015	1.6681	0.1046	1.5635	1448.0		
4/8/2015	1.3881	0.1111	1.2770	1462.0		sampling date
4/9/2015	1.5180	0.1080	1.4099	1481.0		
4/10/2015	1.6442	0.1080	1.5362	1494.0		
4/11/2015	1.7476	0.1101	1.6375	1486.0		
4/12/2015	1.8386	0.1037	1.7349	1469.0		
4/13/2015	1.9681	0.1029	1.8653	1483.0		
4/14/2015	2.0647	0.1028	1.9620	1472.0		
4/15/2015	2.1700	0.0911	2.0789	1468.0		sampling date
4/16/2015	2.3933	0.1031	2.2902	1401.0		
4/17/2015	2.8939	0.0838	2.8101	1493.0		
4/18/2015	3.3133	0.0095	3.3038	1528.0		
4/19/2015	3.5162	0.1469	3.3693	1466.0		
4/20/2015	4.3292	0.2978	4.0314	1647.0		
4/21/2015	4.4594	0.2791	4.1803	1560.0		
4/22/2015	6.0723	0.2907	5.7815	1966.0		sampling date
4/23/2015	7.6209	0.3760	7.2448	2281.0		
4/24/2015	7.9055	0.3591	7.5464	2200.0		
4/25/2015	8.0954	0.3236	7.7717	2105.0		
4/26/2015	8.4955	0.3038	8.1917	2073.0		
4/27/2015	9.2710	0.3195	8.9515	2131.0		

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
4/28/2015	10.1126	0.3780	9.7346	2197.0		
4/29/2015	10.2495	0.2855	9.9640	2111.0		sampling date
4/30/2015	10.0675	0.3267	9.7408	2104.0		
5/1/2015	10.0419	0.3713	9.6706	2130.0		
5/2/2015	9.8781	0.4305	9.4475	2127.0		
5/3/2015	9.8107	0.4791	9.3315	2145.0		
5/4/2015	9.6011	0.5282	9.0729	2132.0		
5/5/2015	9.4998	0.5864	8.9134	2143.0		
5/6/2015	8.6335	0.6863	7.9472	1979.0		sampling date
5/7/2015	7.9743	0.4875	7.4867	1945.0		
5/8/2015	7.3866	0.4130	6.9736	1925.0		
5/9/2015	7.0132	0.3661	6.6472	1962.0		
5/10/2015	6.3720	0.3251	6.0469	1924.0		
5/11/2015	5.8147	0.2752	5.5396	1907.0		
5/12/2015	5.6510	0.2629	5.3881	2028.0		
5/13/2015	4.9441	0.1964	4.7477	1959.0		sampling date
5/14/2015	5.1160	0.1973	4.9187	1954.0		
5/15/2015	5.3059	0.2041	5.1019	1956.0		
5/16/2015	5.3812	0.2097	5.1715	1917.0		
5/17/2015	5.5970	0.2092	5.3878	1929.0		
5/18/2015	4.7006	0.2037	4.4969	1569.0		
5/19/2015	2.5805	0.0958	2.4847	835.0		
5/20/2015	3.0733	0.0781	2.9952	965.0		sampling date
5/21/2015	3.5004	0.1103	3.3901	1119.0		
5/22/2015	3.7288	0.1068	3.6220	1214.0		
5/23/2015	4.8117	0.1560	4.6557	1596.0		
5/24/2015	4.7301	0.1662	4.5639	1599.0		
5/25/2015	4.2681	0.1584	4.1097	1471.0		
5/26/2015	3.2175	0.0935	3.1241	1131.0		
5/27/2015	3.1144	0.0795	3.0350	1117.0		sampling date
5/28/2015	2.9953	0.0967	2.8986	1107.0		outflow meter out; value estimated
5/29/2015	2.8516	0.0949	2.7567	1087.0		outflow meter out; value estimated
5/30/2015	2.8179	0.0969	2.7211	1109.0		outflow meter out; value estimated
5/31/2015	2.6847	0.0954	2.5894	1092.0		outflow meter out; value estimated
6/1/2015	2.2264	0.0818	2.1446	937.0		outflow meter out; value estimated
6/2/2015	1.5460	0.0589	1.4871	674.0		outflow meter out; value estimated
6/3/2015	1.5723	0.0621	1.5102	711.0		outflow meter out; value estimated; sampling date
6/4/2015	1.7498	0.0671	1.6827	778.0		outflow meter out; value estimated
6/5/2015	1.8638	0.0693	1.7945	815.0		outflow meter out; value estimated
6/6/2015	1.9085	0.0689	1.8396	821.0		outflow meter out; value estimated
6/7/2015	1.8214	0.0638	1.7576	771.0		outflow meter out; value estimated
6/8/2015	1.8745	0.0638	1.8108	781.0		outflow meter out; value estimated
6/9/2015	1.9821	0.0655	1.9166	813.0		outflow meter out; value estimated

WATERSHED TECHNOLOGIES						
Grassy Island TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	360	# Days On-Line Flow > 0.0000	360	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	360	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Noted Otherwise	# Days Outflow >0
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		365
TOTAL	5763.4630	518.8877	5247.5984	gpm On-Line Flow > 0	Operational/	
PER DAY	16.0096	1.4414	14.5767	3244.5	Flow Status	Comments
6/10/2015	2.2554	0.0701	2.1852	911.0		sampling date
6/11/2015	2.5728	0.0761	2.4968	840.0		
6/12/2015	3.0953	0.0734	3.0219	848.0		
6/13/2015	3.6483	0.0807	3.5676	861.0		
6/14/2015	4.1972	0.0922	4.1050	870.0		
6/15/2015	4.5295	0.0970	4.4325	837.0		
6/16/2015	4.8110	0.0961	4.7149	802.0		
6/17/2015	5.3412	0.1025	5.2387	811.0		sampling date
6/18/2015	5.0317	0.1167	4.9149	766.0		
6/19/2015	4.8875	0.1315	4.7559	746.0		
6/20/2015	5.1622	0.1834	4.9788	790.0		
6/21/2015	4.9075	0.2177	4.6898	753.0		
6/22/2015	5.6876	0.2149	5.4726	875.0		
6/23/2015	5.8476	0.0417	5.8059	902.0		
6/24/2015	5.3019	0.0230	5.2789	820.0		sampling date
6/25/2015	5.3148	0.2576	5.0572	822.0		
6/26/2015	4.5131	0.7037	3.8094	698.0		
6/27/2015	6.4528	0.4835	5.9693	998.0		
6/28/2015	6.7955	0.6332	6.1623	1051.0		
6/29/2015	6.9571	0.6116	6.3456	1076.0		
6/30/2015	7.1446	0.6603	6.4844	1105.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line	**313**	**# Days On-Line Flow > 0.0000**	**313**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**313**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**210.0198**	**14.9769**	**195.0428**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**0.6710**	**0.0478**	**0.6231**	**69.23**	**Flow Status**	**Comments**
7/1/2014	0.2502	0.0237	0.2265	47.0		
7/2/2014	0.4738	0.0449	0.4289	89.0		sampling event
7/3/2014	0.6171	0.0524	0.5647	107.0		
7/4/2014	0.6645	0.0507	0.6138	107.0		
7/5/2014	0.7052	0.0486	0.6566	106.0		
7/6/2014	0.7522	0.0470	0.7052	106.0		
7/7/2014	0.7916	0.0449	0.7467	105.0		
7/8/2014	0.8221	0.0424	0.7797	103.0		
7/9/2014	0.8593	0.0405	0.8189	102.0		sampling event
7/10/2014	0.9239	0.0429	0.8810	102.0		
7/11/2014	0.9789	0.0449	0.9340	101.0		
7/12/2014	1.0325	0.0469	0.9857	100.0		Flow sensor failure, flow estimated
7/13/2014	1.0959	0.0493	1.0466	100.0		Flow sensor failure, flow estimated
7/14/2014	1.1592	0.0517	1.1076	100.0		Flow sensor failure, flow estimated
7/15/2014	1.2226	0.0541	1.1685	100.0		Flow sensor failure, flow estimated
7/16/2014	1.2859	0.0565	1.2294	100.0		Flow sensor failure, flow estimated; sampling event
7/17/2014	1.2911	0.0601	1.2310	100.0		Flow sensor failure, flow estimated
7/18/2014	1.3999	0.0688	1.3311	108.0		
7/19/2014	1.4576	0.0754	1.3822	112.0		
7/20/2014	1.4503	0.0787	1.3715	111.0		
7/21/2014	1.4166	0.0805	1.3361	108.0		
7/22/2014	1.3958	0.0828	1.3130	106.0		
7/23/2014	1.3749	0.0850	1.2899	104.0		sampling event
7/24/2014	1.3378	0.0790	1.2587	103.0		
7/25/2014	1.2756	0.0718	1.2039	100.0		
7/26/2014	1.2274	0.0655	1.1620	98.0		
7/27/2014	1.2293	0.0618	1.1675	100.0		
7/28/2014	1.2061	0.0568	1.1493	100.0		
7/29/2014	1.2776	0.0560	1.2216	108.0		
7/30/2014	1.2061	0.0487	1.1574	104.0		sampling event
7/31/2014	1.1442	0.0561	1.0881	99.0		
8/1/2014	1.1403	0.0658	1.0746	99.0		
8/2/2014	1.1249	0.0747	1.0502	98.0		
8/3/2014	1.1439	0.0860	1.0579	100.0		Flow sensor failure, flow estimated
8/4/2014	1.1400	0.0958	1.0442	100.0		Flow sensor failure, flow estimated
8/5/2014	1.1361	0.1056	1.0305	100.0		Flow sensor failure, flow estimated
8/6/2014	1.1321	0.1154	1.0167	100.0		Flow sensor failure, flow estimated; sampling event
8/7/2014	1.0509	0.1173	0.9336	100.0		Flow sensor failure, flow estimated
8/8/2014	0.9697	0.1192	0.8505	100.0		Flow sensor failure, flow estimated
8/9/2014	0.8885	0.1210	0.7674	100.0		Flow sensor failure, flow estimated
8/10/2014	0.8073	0.1229	0.6843	100.0		Flow sensor failure, flow estimated
8/11/2014	0.7987	0.1373	0.6614	110.0		
8/12/2014	0.7093	0.1394	0.5700	110.0		
8/13/2014	0.4904	0.1119	0.3785	87.0		sampling event
8/14/2014	0.4815	0.1031	0.3784	86.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line	**313**	**# Days On-Line Flow > 0.0000**	**313**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**313**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	**210.0198**	**14.9769**	**195.0428**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**0.6710**	**0.0478**	**0.6231**	**69.23**	**Flow Status**	**Comments**
8/15/2014	0.4949	0.0989	0.3961	89.0		
8/16/2014	0.6020	0.1115	0.4905	109.0		
8/17/2014	0.4992	0.0851	0.4140	91.0		
8/18/2014	0.5448	0.0848	0.4599	100.0		
8/19/2014	0.6221	0.0875	0.5347	115.0		
8/20/2014	0.5963	0.0747	0.5216	111.0		sampling event
8/21/2014	0.5852	0.0691	0.5161	109.0		
8/22/2014	0.5633	0.0624	0.5010	105.0		
8/23/2014	0.5308	0.0549	0.4759	99.0		
8/24/2014	0.1125	0.0108	0.1017	21.0		
8/25/2014					Off-Line	pump malfunction
8/26/2014					Off-Line	pump malfunction
8/27/2014					Off-Line	pump malfunction; sampling event
8/28/2014					Off-Line	pump malfunction
8/29/2014	0.0097	0.0102	-0.0005	74.0		
8/30/2014	0.0270	0.0284	-0.0014	138.0		
8/31/2014	0.0358	0.0376	-0.0019	137.0		
9/1/2014	0.0437	0.0460	-0.0023	134.0		
9/2/2014	0.0431	0.0453	-0.0023	110.0		
9/3/2014	0.0489	0.0514	-0.0026	107.0		sampling event
9/4/2014	0.9951	0.0965	0.8987	106.0		
9/5/2014	1.9235	0.1406	1.7829	105.0		
9/6/2014	2.8613	0.1857	2.6756	105.0		
9/7/2014	3.7990	0.2307	3.5683	105.0		
9/8/2014	4.6917	0.2732	4.4185	104.0		
9/9/2014	5.6205	0.3178	5.3027	104.0		
9/10/2014	6.3604	0.3520	6.0084	101.0		sampling event
9/11/2014	5.8322	0.3896	5.4426	100.0		
9/12/2014	6.0646	0.4866	5.5781	113.0		
9/13/2014	5.4899	0.5282	4.9616	112.0		
9/14/2014	4.8800	0.5639	4.3161	110.0		
9/15/2014	3.3357	0.4651	2.8706	84.0		
9/16/2014	2.4190	0.4104	2.0087	69.0		
9/17/2014	1.3074	0.2734	1.0341	43.0		sampling event
9/18/2014	1.2425	0.2475	0.9950	43.0		
9/19/2014	1.6430	0.3091	1.3339	60.0		
9/20/2014	1.5783	0.2775	1.3007	61.0		
9/21/2014	1.4861	0.2408	1.2453	61.0		
9/22/2014	1.3939	0.2040	1.1899	61.0		
9/23/2014	1.2591	0.1618	1.0973	59.0		
9/24/2014	1.0708	0.1155	0.9553	54.0		sampling event
9/25/2014	1.1934	0.1130	1.0805	51.0		
9/26/2014	1.4025	0.1191	1.2834	52.0		
9/27/2014	1.5272	0.1183	1.4089	50.0		
9/28/2014	1.6716	0.1196	1.5520	49.0		
9/29/2014	1.9973	0.1334	1.8639	53.0		
9/30/2014	2.1866	0.1374	2.0492	53.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line	**313**	**# Days On-Line Flow > 0.0000**	**313**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**313**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**210.0198**	**14.9769**	**195.0428**	**gpm On-Line Flow > 0**		
PER DAY	**0.6710**	**0.0478**	**0.6231**	**69.23**	**Operational/ Flow Status**	**Comments**
10/1/2014	2.2862	0.1361	2.1501	51.0		sampling event
10/2/2014	2.1366	0.1215	2.0152	50.0		
10/3/2014	1.5849	0.0854	1.4995	39.0		
10/4/2014					Off-Line	pump malfunction
10/5/2014					Off-Line	pump malfunction
10/6/2014					Off-Line	pump malfunction
10/7/2014					Off-Line	pump malfunction
10/8/2014					Off-Line	pump malfunction; sampling event
10/9/2014					Off-Line	pump malfunction
10/10/2014					Off-Line	pump malfunction
10/11/2014					Off-Line	pump malfunction
10/12/2014					Off-Line	pump malfunction
10/13/2014					Off-Line	pump malfunction
10/14/2014					Off-Line	pump malfunction
10/15/2014					Off-Line	pump malfunction; sampling event
10/16/2014					Off-Line	pump malfunction
10/17/2014					Off-Line	pump malfunction
10/18/2014					Off-Line	pump malfunction
10/19/2014					Off-Line	pump malfunction
10/20/2014					Off-Line	pump malfunction
10/21/2014					Off-Line	pump malfunction
10/22/2014					Off-Line	pump malfunction; sampling event
10/23/2014					Off-Line	pump malfunction
10/24/2014					Off-Line	pump malfunction
10/25/2014					Off-Line	pump malfunction
10/26/2014					Off-Line	pump malfunction
10/27/2014					Off-Line	pump malfunction
10/28/2014					Off-Line	pump malfunction
10/29/2014					Off-Line	pump malfunction; sampling event
10/30/2014					Off-Line	pump malfunction
10/31/2014					Off-Line	pump malfunction
11/1/2014					Off-Line	pump malfunction
11/2/2014					Off-Line	pump malfunction
11/3/2014					Off-Line	pump malfunction
11/4/2014					Off-Line	pump malfunction
11/5/2014	0.2847	0.0243	0.2605	43.0		sampling event
11/6/2014	0.8004	0.0559	0.7445	103.0		
11/7/2014	0.6511	0.0380	0.6131	73.0		
11/8/2014	0.9363	0.0463	0.8900	93.0		
11/9/2014	0.9758	0.0414	0.9344	87.0		
11/10/2014	1.0757	0.0394	1.0363	87.0		
11/11/2014	1.1892	0.0379	1.1513	88.0		
11/12/2014	1.2756	0.0355	1.2400	87.0		sampling event
11/13/2014	1.2572	0.0318	1.2254	82.0		
11/14/2014	1.0081	0.0231	0.9849	63.0		
11/15/2014	1.4504	0.0302	1.4202	87.0		
11/16/2014	1.4046	0.0264	1.3781	81.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line	**313**	**# Days On-Line Flow > 0.0000**	**313**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**313**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**210.0198**	**14.9769**	**195.0428**	**gpm On-Line Flow > 0**		
PER DAY	**0.6710**	**0.0478**	**0.6231**	**69.23**	**Operational/ Flow Status**	**Comments**
11/17/2014	1.3147	0.0223	1.2924	73.0		
11/18/2014	1.3076	0.0200	1.2876	70.0		
11/19/2014	1.3544	0.0185	1.3359	70.0		sampling event
11/20/2014	0.7237	0.0115	0.7121	42.0		
11/21/2014					Off-Line	GFI outlet burned out
11/22/2014					Off-Line	GFI outlet burned out
11/23/2014					Off-Line	GFI outlet burned out
11/24/2014	0.4028	0.0145	0.3882	46.0		
11/25/2014	0.5044	0.0248	0.4797	76.0		
11/26/2014	0.3344	0.0249	0.3095	74.0		sampling event
11/27/2014	0.4164	0.0233	0.3931	71.0		
11/28/2014	0.4975	0.0220	0.4755	69.0		
11/29/2014	0.5648	0.0205	0.5442	66.0		
11/30/2014	0.4852	0.0148	0.4704	49.0		
12/1/2014	0.4162	0.0109	0.4053	37.0		
12/2/2014	0.1385	0.0031	0.1354	11.0		
12/3/2014					Off-Line	intake cleaned; sampling event
12/4/2014					Off-Line	intake cleaned
12/5/2014	0.2154	0.0050	0.2103	49.0		
12/6/2014	0.5340	0.0125	0.5215	81.0		
12/7/2014	0.6593	0.0155	0.6438	75.0		
12/8/2014	0.7692	0.0180	0.7511	70.0		
12/9/2014	0.8834	0.0207	0.8627	67.0		
12/10/2014	0.9845	0.0231	0.9614	64.0		sampling event
12/11/2014	0.9081	0.0219	0.8862	61.0		
12/12/2014	0.9642	0.0239	0.9403	67.0		
12/13/2014	1.0004	0.0256	0.9748	72.0		
12/14/2014	0.9513	0.0251	0.9262	71.0		
12/15/2014	0.9032	0.0246	0.8785	70.0		
12/16/2014	0.8560	0.0242	0.8319	69.0		
12/17/2014	0.7980	0.0234	0.7746	67.0		sampling event
12/18/2014	0.7413	0.0220	0.7193	64.0		
12/19/2014	0.6866	0.0207	0.6660	61.0		
12/20/2014	0.6339	0.0194	0.6145	58.0		
12/21/2014	0.5831	0.0181	0.5650	55.0		
12/22/2014	0.5446	0.0172	0.5274	53.0		sampling event
12/23/2014	0.4658	0.0162	0.4496	51.0		
12/24/2014	0.3916	0.0152	0.3764	49.0		
12/25/2014	0.3494	0.0155	0.3339	51.0		
12/26/2014	0.2968	0.0154	0.2814	52.0		
12/27/2014	0.2375	0.0151	0.2224	52.0		
12/28/2014	0.1884	0.0156	0.1728	55.0		
12/29/2014	0.1347	0.0163	0.1184	59.0		sampling event
12/30/2014	0.1487	0.0165	0.1323	61.0		
12/31/2014	0.1608	0.0163	0.1445	62.0		
1/1/2015	0.1704	0.0159	0.1545	62.0		
1/2/2015	0.1829	0.0157	0.1672	63.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	313	# Days On-Line Flow > 0.0000	313	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	313	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless Otherwise Noted	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW		
TOTAL	210.0198	14.9769	195.0428	gpm On-Line Flow > 0	Operational/	
PER DAY	0.6710	0.0478	0.6231	69.23	Flow Status	Comments
1/3/2015	0.1865	0.0148	0.1717	61.0		
1/4/2015	0.1960	0.0144	0.1816	61.0		
1/5/2015	0.2122	0.0145	0.1977	63.0		
1/6/2015	0.2219	0.0140	0.2079	63.0		
1/7/2015	0.2317	0.0136	0.2181	63.0		sampling event
1/8/2015	0.2191	0.0128	0.2063	61.0		
1/9/2015	0.2104	0.0122	0.1982	60.0		
1/10/2015	0.2018	0.0115	0.1902	59.0		
1/11/2015	0.1967	0.0111	0.1856	59.0		
1/12/2015	0.2144	0.0120	0.2024	66.0		
1/13/2015	0.2245	0.0124	0.2121	71.0		
1/14/2015	0.2123	0.0116	0.2007	69.0		sampling event
1/15/2015	0.2002	0.0110	0.1892	68.0		
1/16/2015	0.1912	0.0105	0.1807	68.0		
1/17/2015	0.1796	0.0099	0.1697	67.0		
1/18/2015	0.1682	0.0093	0.1589	66.0		
1/19/2015	0.1570	0.0087	0.1483	65.0		
1/20/2015	0.1439	0.0080	0.1359	63.0		
1/21/2015	0.1312	0.0073	0.1239	61.0		sampling event
1/22/2015	0.1233	0.0074	0.1158	61.0		
1/23/2015	0.1115	0.0073	0.1042	59.0		
1/24/2015	0.1021	0.0073	0.0948	58.0		
1/25/2015	0.0929	0.0072	0.0856	57.0		
1/26/2015	0.0869	0.0075	0.0795	58.0		
1/27/2015	0.0794	0.0076	0.0718	58.0		
1/28/2015	0.0718	0.0077	0.0641	58.0		sampling event
1/29/2015	0.0768	0.0077	0.0691	58.0		
1/30/2015	0.0803	0.0075	0.0728	57.0		
1/31/2015	0.0852	0.0075	0.0777	57.0		
2/1/2015	0.0901	0.0075	0.0826	57.0		
2/2/2015	0.0950	0.0075	0.0875	57.0		
2/3/2015	0.0999	0.0075	0.0924	57.0		
2/4/2015	0.0405	0.0029	0.0375	22.0		sampling event
2/5/2015					Off-Line	pump failure
2/6/2015					Off-Line	pump failure
2/7/2015					Off-Line	pump failure
2/8/2015					Off-Line	pump failure
2/9/2015	0.1196	0.0090	0.1106	60.0		
2/10/2015	0.1215	0.0092	0.1123	60.0		
2/11/2015	0.1233	0.0094	0.1139	60.0		sampling event
2/12/2015	0.1262	0.0097	0.1165	60.0		
2/13/2015	0.1721	0.0133	0.1588	80.0		
2/14/2015	0.1803	0.0141	0.1663	82.0		
2/15/2015	0.1843	0.0145	0.1698	82.0		
2/16/2015	0.1882	0.0149	0.1733	82.0		
2/17/2015	0.1898	0.0152	0.1747	81.0		
2/18/2015	0.1961	0.0158	0.1803	82.0		sampling event

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line	**313**	**# Days On-Line Flow > 0.0000**	**313**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**313**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**210.0198**	**14.9769**	**195.0428**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**0.6710**	**0.0478**	**0.6231**	**69.23**	**Flow Status**	**Comments**
2/19/2015	0.2155	0.0156	0.1999	82.0		
2/20/2015	0.2350	0.0155	0.2195	82.0		
2/21/2015	0.2513	0.0152	0.2361	81.0		
2/22/2015	0.2705	0.0150	0.2555	81.0		
2/23/2015	0.2897	0.0149	0.2748	81.0		
2/24/2015	0.3012	0.0144	0.2869	79.0		
2/25/2015	0.3119	0.0139	0.2980	77.0		sampling event
2/26/2015	0.3126	0.0140	0.2986	75.0		
2/27/2015	0.3087	0.0140	0.2947	72.0		
2/28/2015	0.3128	0.0143	0.2985	71.0		
3/1/2015	0.3122	0.0143	0.2978	69.0		
3/2/2015	0.3110	0.0144	0.2967	67.0		
3/3/2015	0.3095	0.0144	0.2951	65.0		
3/4/2015	0.3025	0.0142	0.2884	62.0		sampling event
3/5/2015	0.3314	0.0135	0.3179	61.0		
3/6/2015	0.3471	0.0124	0.3347	58.0		
3/7/2015	0.3596	0.0114	0.3482	55.0		
3/8/2015	0.3758	0.0106	0.3652	53.0		
3/9/2015	0.3975	0.0101	0.3874	52.0		
3/10/2015	0.2541	0.0058	0.2483	31.0		
3/11/2015	0.3500	0.0072	0.3428	40.0		sampling event
3/12/2015	0.4818	0.0116	0.4701	60.0		
3/13/2015	0.4094	0.0116	0.3978	56.0		
3/14/2015	0.3427	0.0115	0.3312	52.0		
3/15/2015	0.2760	0.0111	0.2649	47.0		
3/16/2015	0.4276	0.0207	0.4070	83.0		
3/17/2015	0.4477	0.0265	0.4212	101.0		
3/18/2015	0.3676	0.0274	0.3403	99.0		sampling event
3/19/2015	0.2656	0.0213	0.2443	78.0		
3/20/2015	0.2538	0.0221	0.2317	82.0		
3/21/2015	0.1978	0.0189	0.1789	71.0		
3/22/2015	0.1685	0.0179	0.1506	68.0		
3/23/2015	0.1453	0.0174	0.1279	67.0		
3/24/2015	0.1227	0.0169	0.1058	66.0		
3/25/2015	0.1008	0.0164	0.0844	65.0		sampling event
3/26/2015	0.1007	0.0142	0.0865	60.0		
3/27/2015	0.1085	0.0133	0.0952	60.0		
3/28/2015	0.1143	0.0122	0.1021	59.0		
3/29/2015	0.1198	0.0111	0.1087	58.0		
3/30/2015	0.1404	0.0112	0.1292	64.0		
3/31/2015	0.1580	0.0109	0.1471	68.0		
4/1/2015	0.1618	0.0095	0.1523	66.0		sampling event
4/2/2015	0.1903	0.0101	0.1802	66.0		
4/3/2015	0.2154	0.0105	0.2049	65.0		
4/4/2015	0.2359	0.0107	0.2252	63.0		
4/5/2015	0.2589	0.0111	0.2478	62.0		
4/6/2015	0.2764	0.0112	0.2652	60.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	313	# Days On-Line Flow > 0.0000	313	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	313	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	210.0198	14.9769	195.0428	gpm On-Line Flow > 0	Operational/	
PER DAY	0.6710	0.0478	0.6231	69.23	Flow Status	Comments
4/7/2015	0.2871	0.0112	0.2760	57.0		
4/8/2015	0.3226	0.0121	0.3106	59.0		sampling event
4/9/2015	0.3247	0.0134	0.3113	61.0		
4/10/2015	0.3106	0.0141	0.2965	60.0		
4/11/2015	0.2918	0.0145	0.2772	58.0		
4/12/2015	0.2638	0.0144	0.2494	54.0		
4/13/2015	0.2891	0.0172	0.2719	61.0		
4/14/2015	0.2893	0.0187	0.2706	63.0		
4/15/2015	0.2624	0.0184	0.2439	59.0		sampling event
4/16/2015	0.2835	0.0168	0.2667	54.0		
4/17/2015	0.2906	0.0148	0.2757	48.0		
4/18/2015	0.2949	0.0132	0.2816	43.0		
4/19/2015	0.2834	0.0113	0.2721	37.0		
4/20/2015	0.4232	0.0152	0.4080	50.0		
4/21/2015	0.5375	0.0175	0.5200	58.0		
4/22/2015	0.5237	0.0156	0.5081	52.0		sampling event
4/23/2015	0.4754	0.0144	0.4610	47.0		
4/24/2015	0.5078	0.0155	0.4923	50.0		
4/25/2015	0.6528	0.0202	0.6326	64.0		
4/26/2015	0.2663	0.0083	0.2580	26.0		
4/27/2015	0.4217	0.0134	0.4083	41.0		
4/28/2015	0.0516	0.0017	0.0500	5.0		
4/29/2015	0.4356	0.0141	0.4215	42.0		sampling event
4/30/2015	0.6200	0.0205	0.5995	65.0		
5/1/2015	0.5311	0.0180	0.5131	61.0		
5/2/2015	0.4409	0.0154	0.4255	56.0		
5/3/2015	0.3732	0.0135	0.3597	53.0		
5/4/2015	0.3104	0.0117	0.2987	50.0		
5/5/2015	0.2580	0.0102	0.2478	48.0		
5/6/2015	0.2998	0.0127	0.2871	66.0		sampling event
5/7/2015	0.4541	0.0161	0.4380	79.0		
5/8/2015	0.3894	0.0121	0.3773	56.0		
5/9/2015	0.3753	0.0105	0.3648	46.0		
5/10/2015	0.2903	0.0075	0.2828	31.0		
5/11/2015					Off-Line	pump failure
5/12/2015					Off-Line	pump failure
5/13/2015	0.4543	0.0097	0.4446	35.0		sampling event
5/14/2015	0.5621	0.0134	0.5488	48.0		
5/15/2015	0.4699	0.0126	0.4573	45.0		
5/16/2015	0.3944	0.0121	0.3823	43.0		
5/17/2015	0.3241	0.0116	0.3125	41.0		
5/18/2015	0.3583	0.0154	0.3429	54.0		
5/19/2015	0.3059	0.0163	0.2896	57.0		
5/20/2015	0.2090	0.0147	0.1943	51.0		sampling event
5/21/2015	0.1923	0.0142	0.1781	48.0		
5/22/2015	0.1839	0.0142	0.1697	47.0		
5/23/2015	0.1643	0.0133	0.1510	43.0		

WATERSHED TECHNOLOGIES						
Ideal Grove TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	313	# Days On-Line Flow > 0.0000	313	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	313	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	210.0198	14.9769	195.0428	gpm On-Line Flow > 0	Operational/	
PER DAY	0.6710	0.0478	0.6231	69.23	Flow Status	Comments
5/24/2015	0.1491	0.0126	0.1365	40.0		
5/25/2015	0.1817	0.0161	0.1656	50.0		
5/26/2015	0.1877	0.0175	0.1702	53.0		
5/27/2015	0.1863	0.0182	0.1681	54.0		sampling event
5/28/2015	0.1904	0.0184	0.1720	54.0		
5/29/2015	0.1946	0.0187	0.1759	54.0		
5/30/2015	0.1951	0.0187	0.1764	53.0		
5/31/2015	0.1917	0.0182	0.1735	51.0		
6/1/2015	0.0844	0.0080	0.0764	22.0		
6/2/2015					Off-Line	equipment failure
6/3/2015	0.1556	0.0145	0.1411	39.0		sampling event
6/4/2015	0.2291	0.0209	0.2082	60.0		
6/5/2015	0.2042	0.0182	0.1860	56.0		
6/6/2015	0.1842	0.0159	0.1682	53.0		
6/7/2015	0.1619	0.0135	0.1483	49.0		
6/8/2015	0.1754	0.0141	0.1612	56.0		
6/9/2015	0.1717	0.0132	0.1584	58.0		
6/10/2015	0.1506	0.0110	0.1395	54.0		sampling event
6/11/2015	0.1424	0.0106	0.1318	51.0		
6/12/2015	0.1370	0.0103	0.1266	49.0		
6/13/2015	0.1315	0.0101	0.1214	47.0		
6/14/2015	0.1289	0.0100	0.1189	46.0		
6/15/2015	0.1431	0.0113	0.1318	51.0		
6/16/2015	0.1517	0.0121	0.1395	54.0		
6/17/2015	0.1519	0.0123	0.1395	54.0		sampling event
6/18/2015	0.1392	0.0125	0.1268	53.0		
6/19/2015	0.1294	0.0128	0.1166	53.0		
6/20/2015	0.1128	0.0124	0.1004	50.0		
6/21/2015	0.1015	0.0125	0.0889	49.0		
6/22/2015	0.0980	0.0137	0.0844	52.0		
6/23/2015	0.0918	0.0146	0.0772	54.0		
6/24/2015	0.0591	0.0108	0.0483	39.0		sampling event
6/25/2015					Off-Line	equipment failure
6/26/2015					Off-Line	equipment failure
6/27/2015					Off-Line	equipment failure
6/28/2015					Off-Line	equipment failure
6/29/2015	0.0439	0.0080	0.0359	29.0		
6/30/2015	0.0787	0.0144	0.0644	52.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
7/1/2014	3.7818	0.6553	3.1264	1136.0		
7/2/2014	3.7585	0.6513	3.1072	1129.0		sampling date
7/3/2014	3.5696	0.6574	2.9122	1143.0		
7/4/2014	3.0570	0.6010	2.4560	1048.0		
7/5/2014	3.1284	0.6598	2.4687	1154.0		
7/6/2014	2.8907	0.6578	2.2329	1154.0		
7/7/2014	2.6529	0.6558	1.9971	1154.0		
7/8/2014	2.6370	0.7139	1.9231	1260.0		
7/9/2014	2.3755	0.7111	1.6644	1259.0		sampling date
7/10/2014	2.4494	0.7359	1.7135	1257.0		
7/11/2014	2.4708	0.7448	1.7260	1229.0		
7/12/2014	2.5447	0.7695	1.7752	1228.0		
7/13/2014	2.5737	0.7806	1.7931	1206.0		
7/14/2014	2.7668	0.8415	1.9253	1260.0		
7/15/2014	2.8831	0.8792	2.0039	1277.0		
7/16/2014	2.9573	0.9041	2.0533	1275.0		sampling date
7/17/2014	3.2238	0.9810	2.2427	1267.0		
7/18/2014	3.5281	1.0696	2.4585	1274.0		
7/19/2014	3.8805	1.1726	2.7079	1296.0		
7/20/2014	4.1688	1.2562	2.9126	1295.0		
7/21/2014	3.4062	1.0239	2.3823	989.0		
7/22/2014	2.8288	0.8485	1.9803	771.0		
7/23/2014	2.9399	0.8801	2.0597	755.0		sampling date
7/24/2014	2.6932	0.8244	1.8688	732.0		
7/25/2014	2.5327	0.7944	1.7382	731.0		
7/26/2014	2.4278	0.7823	1.6454	747.0		
7/27/2014	2.2735	0.7548	1.5187	749.0		
7/28/2014	2.1269	0.7301	1.3968	754.0		
7/29/2014	1.9468	0.6938	1.2530	747.0		
7/30/2014	1.7793	0.6617	1.1177	744.0		sampling date
7/31/2014	1.8368	0.6365	1.2003	755.0		
8/1/2014	1.8901	0.6086	1.2815	764.0		
8/2/2014	1.8688	0.5575	1.3114	743.0		
8/3/2014	1.8815	0.5181	1.3634	736.0		
8/4/2014	1.9274	0.4879	1.4395	742.0		
8/5/2014	1.9686	0.4560	1.5126	746.0		
8/6/2014	2.0475	0.4315	1.6160	764.0		sampling date
8/7/2014	2.1344	0.4562	1.6782	777.0		
8/8/2014	2.1808	0.4724	1.7085	775.0		
8/9/2014	2.2068	0.4840	1.7228	766.0		
8/10/2014	2.2404	0.4971	1.7432	760.0		
8/11/2014	2.3425	0.5256	1.8169	777.0		
8/12/2014	2.4315	0.5513	1.8802	789.0		
8/13/2014	2.4245	0.5552	1.8693	770.0		sampling date
8/14/2014	2.6465	0.5522	2.0943	775.0		
8/15/2014	2.9300	0.5603	2.3697	796.0		
8/16/2014	3.2011	0.5639	2.6372	811.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
8/17/2014	3.4169	0.5570	2.8599	811.0		
8/18/2014	3.6148	0.5473	3.0675	807.0		
8/19/2014	3.8153	0.5383	3.2770	804.0		
8/20/2014	4.0293	0.5314	3.4978	804.0		sampling date
8/21/2014	3.7761	0.5225	3.2536	803.0		
8/22/2014	3.5455	0.5168	3.0287	807.0		
8/23/2014	3.3166	0.5116	2.8049	812.0		
8/24/2014	3.0694	0.5039	2.5655	813.0		
8/25/2014	2.8424	0.4998	2.3426	820.0		
8/26/2014	2.5827	0.4901	2.0926	818.0		
8/27/2014	2.3043	0.4764	1.8279	809.0		sampling date
8/28/2014	2.2180	0.4524	1.7657	796.0		
8/29/2014	2.0026	0.4025	1.6001	735.0		
8/30/2014	2.0983	0.4153	1.6830	788.0		
8/31/2014	2.0496	0.3991	1.6505	788.0		
9/1/2014	2.0009	0.3829	1.6181	788.0		
9/2/2014	1.9522	0.3666	1.5856	788.0		
9/3/2014	2.1934	0.4038	1.7896	908.0		sampling date
9/4/2014	2.7192	0.5134	2.2058	1168.0		
9/5/2014	2.6147	0.5069	2.1078	1167.0		
9/6/2014	2.5426	0.5069	2.0357	1181.0		
9/7/2014	2.3008	0.4724	1.8284	1114.0		
9/8/2014	2.0985	0.4445	1.6540	1061.0		
9/9/2014	1.9602	0.4291	1.5311	1037.0		
9/10/2014	1.9794	0.4487	1.5307	1098.0		sampling date
9/11/2014	2.0404	0.4616	1.5788	1164.0		
9/12/2014	2.0148	0.4550	1.5599	1183.0		
9/13/2014	1.9774	0.4456	1.5318	1196.0		
9/14/2014	1.8874	0.4244	1.4630	1177.0		
9/15/2014	1.8754	0.4207	1.4547	1207.0		
9/16/2014	1.7431	0.3900	1.3531	1159.0		
9/17/2014	1.6127	0.3599	1.2528	1109.0		sampling date
9/18/2014	1.9388	0.3548	1.5841	1117.0		
9/19/2014	2.3361	0.3599	1.9762	1158.0		
9/20/2014	2.8345	0.3747	2.4598	1233.0		
9/21/2014	3.2256	0.3713	2.8543	1250.0		
9/22/2014	3.5174	0.3566	3.1608	1229.0		
9/23/2014	3.8195	0.3442	3.4753	1215.0		
9/24/2014	4.1205	0.3325	3.7879	1203.0		sampling date
9/25/2014	3.9153	0.3183	3.5970	1181.0		
9/26/2014	3.5740	0.2929	3.2811	1115.0		
9/27/2014	3.5165	0.2906	3.2259	1136.0		
9/28/2014	3.5529	0.2962	3.2567	1190.0		
9/29/2014	3.3474	0.2818	3.0656	1164.0		
9/30/2014	3.0480	0.2592	2.7888	1102.0		
10/1/2014	3.0305	0.2605	2.7700	1141.0		sampling date
10/2/2014	2.8371	0.2608	2.5763	1142.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
10/3/2014	2.6688	0.2635	2.4053	1154.0		
10/4/2014	2.4449	0.2608	2.1842	1142.0		
10/5/2014	2.2193	0.2573	1.9620	1127.0		
10/6/2014	2.0942	0.2660	1.8281	1165.0		
10/7/2014	1.9332	0.2715	1.6617	1189.0		
10/8/2014	1.7072	0.2681	1.4391	1174.0		sampling date
10/9/2014	1.8181	0.2807	1.5374	1202.0		
10/10/2014	1.8364	0.2790	1.5574	1169.0		
10/11/2014	1.8656	0.2791	1.5864	1145.0		
10/12/2014	1.3181	0.1944	1.1237	781.0		
10/13/2014	1.2921	0.1880	1.1040	740.0		
10/14/2014	1.3371	0.1921	1.1450	741.0		
10/15/2014	1.4120	0.2004	1.2116	758.0		sampling date
10/16/2014	1.4827	0.1967	1.2859	749.0		
10/17/2014	1.5785	0.1965	1.3820	753.0		
10/18/2014	1.7040	0.1996	1.5044	770.0		
10/19/2014	1.7869	0.1975	1.5894	767.0		
10/20/2014	1.8618	0.1947	1.6671	761.0		
10/21/2014	1.9814	0.1964	1.7850	773.0		
10/22/2014	2.1226	0.1999	1.9227	792.0		sampling date
10/23/2014	2.1146	0.2065	1.9081	786.0		
10/24/2014	2.0525	0.2075	1.8450	760.0		
10/25/2014	2.0034	0.2093	1.7940	739.0		
10/26/2014	2.0300	0.2190	1.8110	746.0		
10/27/2014	2.0514	0.2282	1.8232	751.0		
10/28/2014	2.0975	0.2404	1.8572	765.0		
10/29/2014	2.0476	0.2414	1.8062	744.0		sampling date
10/30/2014	1.8534	0.2401	1.6133	744.0		
10/31/2014	1.6303	0.2347	1.3956	731.0		
11/1/2014	1.4435	0.2341	1.2094	733.0		
11/2/2014	1.2846	0.2389	1.0458	752.0		
11/3/2014	1.0927	0.2385	0.8542	755.0		
11/4/2014	0.9016	0.2388	0.6628	760.0		
11/5/2014	0.7051	0.2381	0.4670	762.0		sampling date
11/6/2014	0.7019	0.2175	0.4843	700.0		
11/7/2014	0.7689	0.2200	0.5489	712.0		
11/8/2014	0.8609	0.2286	0.6323	744.0		
11/9/2014	0.9382	0.2323	0.7059	760.0		
11/10/2014	1.0271	0.2379	0.7891	783.0		
11/11/2014	1.1334	0.2466	0.8868	816.0		
11/12/2014	1.1862	0.2431	0.9431	809.0		sampling date
11/13/2014	1.1217	0.2355	0.8862	775.0		
11/14/2014	1.0642	0.2290	0.8352	745.0		
11/15/2014	1.0388	0.2290	0.8098	737.0		
11/16/2014	0.9957	0.2250	0.7708	716.0		
11/17/2014	1.3361	0.3094	1.0267	974.0		
11/18/2014	1.5788	0.3747	1.2042	1167.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
11/19/2014	1.5555	0.3784	1.1771	1166.0		sampling date
11/20/2014	1.8181	0.3900	1.4281	1202.0		
11/21/2014	2.0682	0.3968	1.6714	1223.0		
11/22/2014	2.2586	0.3920	1.8666	1208.0		
11/23/2014	2.5173	0.3988	2.1185	1229.0		
11/24/2014	2.7167	0.3959	2.3208	1220.0		
11/25/2014	2.9513	0.3981	2.5532	1227.0		
11/26/2014	3.1291	0.3930	2.7361	1211.0		sampling date
11/27/2014	2.8695	0.3754	2.4941	1182.0		
11/28/2014	2.5940	0.3549	2.2391	1142.0		
11/29/2014	2.4917	0.3580	2.1337	1178.0		
11/30/2014	2.3390	0.3546	1.9843	1194.0		
12/1/2014	2.1560	0.3470	1.8090	1196.0		
12/2/2014	1.9873	0.3419	1.6454	1207.0		
12/3/2014	1.9403	0.3599	1.5804	1302.0		sampling date
12/4/2014	1.9615	0.3594	1.6021	1261.0		
12/5/2014	2.0437	0.3702	1.6735	1261.0		
12/6/2014	2.1260	0.3810	1.7450	1261.0		
12/7/2014	2.2083	0.3919	1.8164	1261.0		
12/8/2014	2.2905	0.4027	1.8879	1261.0		
12/9/2014	2.3728	0.4135	1.9593	1261.0		
12/10/2014	2.4551	0.4243	2.0307	1261.0		sampling date
12/11/2014	2.2364	0.4157	1.8207	1261.0		
12/12/2014	2.0178	0.4070	1.6107	1261.0		
12/13/2014	1.7991	0.3984	1.4007	1261.0		
12/14/2014	1.5804	0.3897	1.1907	1261.0		
12/15/2014	1.3823	0.3868	0.9955	1280.0		
12/16/2014	0.9881	0.3219	0.6662	1090.0		
12/17/2014	0.8049	0.3167	0.4882	1098.0		sampling date
12/18/2014	0.9032	0.3205	0.5827	1102.0		
12/19/2014	0.9913	0.3208	0.6705	1094.0		
12/20/2014	1.0870	0.3237	0.7633	1095.0		
12/21/2014	1.1893	0.3284	0.8609	1102.0		
12/22/2014	1.2625	0.3254	0.9371	1083.0		sampling date
12/23/2014	1.4220	0.3514	1.0706	1190.0		
12/24/2014	1.4408	0.3415	1.0993	1177.0		
12/25/2014	1.4626	0.3326	1.1300	1167.0		
12/26/2014	1.4774	0.3224	1.1551	1152.0		
12/27/2014	1.5347	0.3214	1.2133	1170.0		
12/28/2014	1.5688	0.3154	1.2535	1170.0		
12/29/2014	1.6030	0.3093	1.2936	1170.0		sampling date
12/30/2014	1.5581	0.3202	1.2379	1187.0		
12/31/2014	1.4887	0.3262	1.1624	1186.0		
1/1/2015	1.4278	0.3343	1.0935	1192.0		
1/2/2015	1.3571	0.3401	1.0170	1190.0		
1/3/2015	1.2833	0.3450	0.9384	1185.0		
1/4/2015	1.2050	0.3483	0.8567	1175.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
1/5/2015	1.1375	0.3546	0.7829	1175.0		
1/6/2015	1.0673	0.3600	0.7074	1172.0		
1/7/2015	1.0146	0.3715	0.6430	1189.0		sampling date
1/8/2015	1.3021	0.3560	0.9460	1185.0		
1/9/2015	1.5917	0.3415	1.2502	1184.0		
1/10/2015	1.8617	0.3237	1.5380	1171.0		
1/11/2015	2.1584	0.3109	1.8474	1176.0		
1/12/2015	2.4221	0.2938	2.1283	1164.0		
1/13/2015	2.7288	0.2819	2.4469	1173.0		
1/14/2015	3.0322	0.2692	2.7630	1179.0		sampling date
1/15/2015	2.6114	0.2509	2.3605	1107.0		
1/16/2015	2.3929	0.2508	2.1421	1115.0		
1/17/2015	2.1729	0.2509	1.9220	1124.0		
1/18/2015	1.9439	0.2503	1.6937	1130.0		
1/19/2015	1.7365	0.2532	1.4834	1152.0		
1/20/2015	1.5819	0.2664	1.3155	1222.0		
1/21/2015	1.3012	0.2602	1.0410	1203.0		sampling date
1/22/2015	1.2644	0.2643	1.0001	1184.0		
1/23/2015	1.2639	0.2758	0.9881	1199.0		
1/24/2015	1.2433	0.2831	0.9602	1195.0		
1/25/2015	1.2043	0.2860	0.9183	1173.0		
1/26/2015	1.1740	0.2905	0.8835	1159.0		
1/27/2015	1.1521	0.2969	0.8552	1153.0		
1/28/2015	1.1412	0.3062	0.8350	1158.0		sampling date
1/29/2015	1.0907	0.3093	0.7814	1170.0		
1/30/2015	1.0329	0.3107	0.7222	1175.0		
1/31/2015	0.8919	0.2855	0.6063	1080.0		
2/1/2015	0.9070	0.3104	0.5966	1174.0		
2/2/2015	0.8532	0.3136	0.5396	1186.0		
2/3/2015	0.7887	0.3130	0.4757	1184.0		
2/4/2015	0.7306	0.3152	0.4154	1192.0		sampling date
2/5/2015	0.7416	0.3152	0.4264	1177.0		
2/6/2015	0.7560	0.3168	0.4392	1168.0		
2/7/2015	0.7780	0.3217	0.4564	1171.0		
2/8/2015	0.8036	0.3279	0.4757	1179.0		
2/9/2015	0.8204	0.3306	0.4898	1174.0		
2/10/2015	0.8448	0.3363	0.5085	1180.0		
2/11/2015	0.8695	0.3421	0.5274	1186.0		sampling date
2/12/2015	0.9101	0.3340	0.5760	1165.0		
2/13/2015	0.9487	0.3260	0.6226	1144.0		
2/14/2015	0.9993	0.3227	0.6766	1139.0		
2/15/2015	1.0670	0.3246	0.7423	1153.0		
2/16/2015	1.1390	0.3274	0.8115	1170.0		
2/17/2015	1.1819	0.3218	0.8601	1157.0		
2/18/2015	1.2183	0.3148	0.9034	1139.0		sampling date
2/19/2015	1.1689	0.3091	0.8599	1154.0		
2/20/2015	1.0883	0.2950	0.7932	1138.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line:	**343**	**# Days On-Line Flow > 0.0000:**	**343**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**343**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**557.7494**	**118.8341**	**438.9153**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**1.6261**	**0.3465**	**1.2796**	**1,003.48**	**Flow Status**	**Comments**
2/21/2015	1.0571	0.2945	0.7625	1175.0		
2/22/2015	1.0031	0.2881	0.7151	1190.0		
2/23/2015	0.9397	0.2790	0.6606	1195.0		
2/24/2015	0.8851	0.2728	0.6123	1213.0		
2/25/2015	0.8143	0.2618	0.5526	1210.0		sampling date
2/26/2015	0.9772	0.2605	0.7168	1176.0		
2/27/2015	1.1481	0.2631	0.8850	1161.0		
2/28/2015	1.3499	0.2728	1.0771	1177.0		
3/1/2015	1.5488	0.2812	1.2676	1187.0		
3/2/2015	1.7495	0.2895	1.4599	1196.0		
3/3/2015	1.9254	0.2937	1.6317	1188.0		
3/4/2015	2.1060	0.2988	1.8071	1184.0		sampling date
3/5/2015	1.9318	0.3003	1.6315	1166.0		
3/6/2015					Off-Line	mechnical, electrical problems
3/7/2015					Off-Line	mechnical, electrical problems
3/8/2015					Off-Line	mechnical, electrical problems
3/9/2015					Off-Line	mechnical, electrical problems
3/10/2015					Off-Line	mechnical, electrical problems
3/11/2015					Off-Line	mechnical, electrical problems; sampling date
3/12/2015					Off-Line	mechnical, electrical problems
3/13/2015					Off-Line	mechnical, electrical problems
3/14/2015					Off-Line	mechnical, electrical problems
3/15/2015					Off-Line	mechnical, electrical problems
3/16/2015					Off-Line	mechnical, electrical problems
3/17/2015					Off-Line	mechnical, electrical problems
3/18/2015					Off-Line	mechnical, electrical problems; sampling date
3/19/2015					Off-Line	mechnical, electrical problems
3/20/2015					Off-Line	mechnical, electrical problems
3/21/2015					Off-Line	mechnical, electrical problems
3/22/2015					Off-Line	mechnical, electrical problems
3/23/2015					Off-Line	mechnical, electrical problems
3/24/2015					Off-Line	mechnical, electrical problems
3/25/2015	0.0897	0.0241	0.0656	91.0		sampling date
3/26/2015	0.8483	0.2349	0.6134	900.0		
3/27/2015	0.7836	0.2243	0.5593	871.0		
3/28/2015	0.7462	0.2213	0.5249	871.0		
3/29/2015	0.7088	0.2183	0.4905	871.0		
3/30/2015	0.6445	0.2067	0.4378	836.0		
3/31/2015	0.6078	0.2036	0.4043	835.0		
4/1/2015	0.5734	0.2012	0.3722	837.0		sampling date
4/2/2015	0.5754	0.2077	0.3678	840.0		
4/3/2015	0.5734	0.2127	0.3607	837.0		
4/4/2015	0.5816	0.2216	0.3600	849.0		
4/5/2015	0.5727	0.2239	0.3488	836.0		
4/6/2015	0.5836	0.2340	0.3496	852.0		
4/7/2015	0.4953	0.2036	0.2917	723.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line:	**343**	**# Days On-Line Flow > 0.0000:**	**343**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**343**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**557.7494**	**118.8341**	**438.9153**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**1.6261**	**0.3465**	**1.2796**	**1,003.48**	**Flow Status**	**Comments**
4/8/2015	0.5549	0.2336	0.3212	810.0		sampling date
4/9/2015	0.5570	0.2286	0.3284	807.0		
4/10/2015	0.5674	0.2270	0.3404	816.0		
4/11/2015	0.5618	0.2189	0.3429	802.0		
4/12/2015	0.5603	0.2127	0.3476	794.0		
4/13/2015	0.5921	0.2188	0.3733	833.0		
4/14/2015	0.6042	0.2174	0.3869	844.0		
4/15/2015	0.6043	0.2115	0.3928	838.0		sampling date
4/16/2015	0.5864	0.2074	0.3790	833.0		
4/17/2015	0.5645	0.2018	0.3627	822.0		
4/18/2015	0.5142	0.1859	0.3283	768.0		
4/19/2015	0.4495	0.1644	0.2851	689.0		
4/20/2015	0.2528	0.0936	0.1592	398.0		
4/21/2015					Off-Line	pump failure
4/22/2015					Off-Line	pump failure
4/23/2015	0.1346	0.0186	0.1160	493.0		
4/24/2015	0.4532	0.0627	0.3905	830.0		
4/25/2015	0.7182	0.0994	0.6188	877.0		
4/26/2015	0.9260	0.1281	0.7978	848.0		
4/27/2015	1.1957	0.1654	1.0302	876.0		
4/28/2015	1.4594	0.2019	1.2574	891.0		
4/29/2015	1.6644	0.2303	1.4341	871.0		sampling date
4/30/2015	1.5353	0.2299	1.3054	864.0		
5/1/2015	1.4114	0.2301	1.1813	859.0		
5/2/2015	1.2435	0.2221	1.0214	824.0		
5/3/2015	1.1015	0.2173	0.8843	801.0		
5/4/2015	1.3046	0.2869	1.0177	1051.0		
5/5/2015	1.3499	0.3349	1.0150	1219.0		
5/6/2015	1.1964	0.3397	0.8567	1229.0		sampling date
5/7/2015	1.1439	0.3307	0.8131	1227.0		
5/8/2015	1.0978	0.3236	0.7742	1232.0		
5/9/2015	1.0504	0.3162	0.7342	1236.0		
5/10/2015	0.9938	0.3060	0.6879	1229.0		
5/11/2015	0.9324	0.2941	0.6383	1215.0		
5/12/2015	0.8679	0.2811	0.5868	1195.0		
5/13/2015	0.8056	0.2685	0.5371	1176.0		sampling date
5/14/2015	0.7860	0.2633	0.5227	1162.0		
5/15/2015	0.5670	0.1909	0.3761	849.0		
5/16/2015	0.8043	0.2723	0.5320	1220.0		
5/17/2015	0.7782	0.2649	0.5133	1196.0		
5/18/2015	0.7609	0.2604	0.5005	1185.0		
5/19/2015	0.6950	0.2392	0.4558	1097.0		
5/20/2015	0.6706	0.2321	0.4384	1073.0		sampling date
5/21/2015	0.6069	0.2348	0.3721	1052.0		
5/22/2015	0.5706	0.2482	0.3223	1079.0		
5/23/2015	0.5346	0.2635	0.2711	1112.0		
5/24/2015	0.4863	0.2740	0.2123	1124.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	118.8341	438.9153	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.3465	1.2796	1,003.48	Flow Status	Comments
5/25/2015	0.3930	0.2562	0.1369	1022.0		
5/26/2015	0.3382	0.2588	0.0794	1005.0		
5/27/2015	0.2844	0.2607	0.0237	986.0		sampling date
5/28/2015	0.3734	0.2664	0.1069	1021.0		
5/29/2015	0.4855	0.2823	0.2032	1096.0		
5/30/2015	0.6024	0.2942	0.3082	1158.0		
5/31/2015	0.6429	0.2697	0.3732	1076.0		
6/1/2015	0.7105	0.2603	0.4502	1053.0		
6/2/2015	0.7467	0.2421	0.5046	993.0		
6/3/2015	0.8384	0.2430	0.5954	1011.0		sampling date
6/4/2015	0.8483	0.2521	0.5961	1049.0		
6/5/2015	0.8093	0.2469	0.5625	1027.0		
6/6/2015	0.8281	0.2594	0.5687	1079.0		
6/7/2015	0.8006	0.2577	0.5429	1072.0		
6/8/2015	0.4575	0.1514	0.3061	630.0		
6/9/2015	0.3175	0.1082	0.2094	450.0		
6/10/2015	0.5302	0.1860	0.3442	774.0		sampling date
6/11/2015	0.5627	0.1849	0.3778	786.0		
6/12/2015					Off-Line	power failure
6/13/2015	0.5086	0.1471	0.3616	654.0		
6/14/2015	0.5491	0.1492	0.3999	679.0		
6/15/2015	0.5961	0.1524	0.4437	710.0		
6/16/2015	0.6476	0.1558	0.4918	744.0		
6/17/2015	0.7130	0.1616	0.5514	791.0		sampling date
6/18/2015	0.6805	0.1637	0.5168	788.0		
6/19/2015	0.6507	0.1664	0.4843	788.0		
6/20/2015	0.5768	0.1571	0.4198	732.0		
6/21/2015	0.5229	0.1520	0.3710	697.0		
6/22/2015	0.5187	0.1612	0.3575	728.0		
6/23/2015	0.4831	0.1610	0.3221	716.0		
6/24/2015	0.4745	0.1701	0.3044	745.0		sampling date
6/25/2015	0.5223	0.1872	0.3351	820.0		
6/26/2015	0.4847	0.1738	0.3110	761.0		
6/27/2015	0.4650	0.1667	0.2983	730.0		
6/28/2015	0.4713	0.1690	0.3024	740.0		
6/29/2015	0.3446	0.1235	0.2211	541.0		
6/30/2015	0.5350	0.1918	0.3432	840.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	177.4588	380.2907	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.5174	1.1087	1,003.48	Flow Status	Comments
7/1/2014	3.7818	0.8874	2.8943	1136.0		
7/2/2014	3.7585	0.8819	2.8765	1129.0		sampling date
7/3/2014	3.5696	0.8517	2.7179	1143.0		
7/4/2014	3.0570	0.7431	2.3139	1048.0		
7/5/2014	3.1284	0.7767	2.3518	1154.0		
7/6/2014	2.8907	0.7350	2.1556	1154.0		
7/7/2014	2.6529	0.6934	1.9595	1154.0		
7/8/2014	2.6370	0.7117	1.9253	1260.0		
7/9/2014	2.3755	0.6658	1.7098	1259.0		sampling date
7/10/2014	2.4494	0.7532	1.6963	1257.0		
7/11/2014	2.4708	0.8229	1.6479	1229.0		
7/12/2014	2.5447	0.9087	1.6361	1228.0		
7/13/2014	2.5737	0.9773	1.5964	1206.0		
7/14/2014	2.7668	1.1097	1.6571	1260.0		
7/15/2014	2.8831	1.2146	1.6684	1277.0		
7/16/2014	2.9573	1.3025	1.6549	1275.0		sampling date
7/17/2014	3.2238	1.3769	1.8468	1267.0		
7/18/2014	3.5281	1.4677	2.0604	1274.0		
7/19/2014	3.8805	1.5776	2.3029	1296.0		
7/20/2014	4.1688	1.6608	2.5079	1295.0		
7/21/2014	3.4062	1.3329	2.0732	989.0		
7/22/2014	2.8288	1.0894	1.7393	771.0		
7/23/2014	2.9399	1.1161	1.8238	755.0		sampling date
7/24/2014	2.6932	0.9991	1.6941	732.0		
7/25/2014	2.5327	0.9149	1.6177	731.0		
7/26/2014	2.4278	0.8503	1.5775	747.0		
7/27/2014	2.2735	0.7677	1.5058	749.0		
7/28/2014	2.1269	0.6874	1.4395	754.0		
7/29/2014	1.9468	0.5964	1.3505	747.0		
7/30/2014	1.7793	0.5097	1.2697	744.0		sampling date
7/31/2014	1.8368	0.5029	1.3338	755.0		
8/1/2014	1.8901	0.4945	1.3956	764.0		
8/2/2014	1.8688	0.4669	1.4019	743.0		
8/3/2014	1.8815	0.4486	1.4329	736.0		
8/4/2014	1.9274	0.4382	1.4892	742.0		
8/5/2014	1.9686	0.4265	1.5421	746.0		
8/6/2014	2.0475	0.4224	1.6252	764.0		sampling date
8/7/2014	2.1344	0.4349	1.6995	777.0		
8/8/2014	2.1808	0.4391	1.7417	775.0		
8/9/2014	2.2068	0.4393	1.7675	766.0		
8/10/2014	2.2404	0.4410	1.7993	760.0		
8/11/2014	2.3425	0.4562	1.8863	777.0		
8/12/2014	2.4315	0.4687	1.9628	789.0		
8/13/2014	2.4245	0.4627	1.9618	770.0		sampling date
8/14/2014	2.6465	0.4897	2.1569	775.0		
8/15/2014	2.9300	0.5275	2.4025	796.0		
8/16/2014	3.2011	0.5625	2.6386	811.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	177.4588	380.2907	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.5174	1.1087	1,003.48	Flow Status	Comments
8/17/2014	3.4169	0.5876	2.8293	811.0		
8/18/2014	3.6148	0.6096	3.0052	807.0		
8/19/2014	3.8153	0.6322	3.1831	804.0		
8/20/2014	4.0293	0.6571	3.3722	804.0		sampling date
8/21/2014	3.7761	0.6176	3.1585	803.0		
8/22/2014	3.5455	0.5819	2.9636	807.0		
8/23/2014	3.3166	0.5465	2.7701	812.0		
8/24/2014	3.0694	0.5081	2.5613	813.0		
8/25/2014	2.8424	0.4730	2.3694	820.0		
8/26/2014	2.5827	0.4326	2.1501	818.0		
8/27/2014	2.3043	0.3889	1.9154	809.0		sampling date
8/28/2014	2.2180	0.3977	1.8203	796.0		
8/29/2014	2.0026	0.3811	1.6215	735.0		
8/30/2014	2.0983	0.4235	1.6749	788.0		
8/31/2014	2.0496	0.4383	1.6113	788.0		
9/1/2014	2.0009	0.4532	1.5477	788.0		
9/2/2014	1.9522	0.4681	1.4841	788.0		
9/3/2014	2.1934	0.5565	1.6369	908.0		sampling date
9/4/2014	2.7192	0.6838	2.0354	1168.0		
9/5/2014	2.6147	0.6512	1.9635	1167.0		
9/6/2014	2.5426	0.6265	1.9161	1181.0		
9/7/2014	2.3008	0.5604	1.7405	1114.0		
9/8/2014	2.0985	0.5046	1.5939	1061.0		
9/9/2014	1.9602	0.4647	1.4955	1037.0		
9/10/2014	1.9794	0.4619	1.5175	1098.0		sampling date
9/11/2014	2.0404	0.4916	1.5488	1164.0		
9/12/2014	2.0148	0.5017	1.5131	1183.0		
9/13/2014	1.9774	0.5092	1.4682	1196.0		
9/14/2014	1.8874	0.5032	1.3842	1177.0		
9/15/2014	1.8754	0.5181	1.3573	1207.0		
9/16/2014	1.7431	0.4995	1.2437	1159.0		
9/17/2014	1.6127	0.4798	1.1329	1109.0		sampling date
9/18/2014	1.9388	0.5024	1.4364	1117.0		
9/19/2014	2.3361	0.5408	1.7953	1158.0		
9/20/2014	2.8345	0.5970	2.2376	1233.0		
9/21/2014	3.2256	0.6267	2.5989	1250.0		
9/22/2014	3.5174	0.6372	2.8802	1229.0		
9/23/2014	3.8195	0.6508	3.1686	1215.0		
9/24/2014	4.1205	0.6651	3.4554	1203.0		sampling date
9/25/2014	3.9153	0.6529	3.2624	1181.0		
9/26/2014	3.5740	0.6164	2.9576	1115.0		
9/27/2014	3.5165	0.6280	2.8885	1136.0		
9/28/2014	3.5529	0.6579	2.8950	1190.0		
9/29/2014	3.3474	0.6435	2.7039	1164.0		
9/30/2014	3.0480	0.6092	2.4388	1102.0		
10/1/2014	3.0305	0.6308	2.3997	1141.0		sampling date
10/2/2014	2.8371	0.6000	2.2371	1142.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	177.4588	380.2907	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.5174	1.1087	1,003.48	Flow Status	Comments
10/3/2014	2.6688	0.5746	2.0942	1154.0		
10/4/2014	2.4449	0.5372	1.9077	1142.0		
10/5/2014	2.2193	0.4992	1.7201	1127.0		
10/6/2014	2.0942	0.4840	1.6101	1165.0		
10/7/2014	1.9332	0.4613	1.4718	1189.0		
10/8/2014	1.7072	0.4233	1.2839	1174.0		sampling date
10/9/2014	1.8181	0.4396	1.3785	1202.0		
10/10/2014	1.8364	0.4335	1.4029	1169.0		
10/11/2014	1.8656	0.4305	1.4350	1145.0		
10/12/2014	1.3181	0.2977	1.0204	781.0		
10/13/2014	1.2921	0.2859	1.0062	740.0		
10/14/2014	1.3371	0.2901	1.0470	741.0		
10/15/2014	1.4120	0.3006	1.1114	758.0		sampling date
10/16/2014	1.4827	0.3176	1.1651	749.0		
10/17/2014	1.5785	0.3400	1.2385	753.0		
10/18/2014	1.7040	0.3688	1.3352	770.0		
10/19/2014	1.7869	0.3885	1.3985	767.0		
10/20/2014	1.8618	0.4063	1.4555	761.0		
10/21/2014	1.9814	0.4340	1.5474	773.0		
10/22/2014	2.1226	0.4664	1.6562	792.0		sampling date
10/23/2014	2.1146	0.4818	1.6328	786.0		
10/24/2014	2.0525	0.4841	1.5684	760.0		
10/25/2014	2.0034	0.4885	1.5149	739.0		
10/26/2014	2.0300	0.5110	1.5190	746.0		
10/27/2014	2.0514	0.5325	1.5189	751.0		
10/28/2014	2.0975	0.5608	1.5367	765.0		
10/29/2014	2.0476	0.5633	1.4843	744.0		sampling date
10/30/2014	1.8534	0.5199	1.3336	744.0		
10/31/2014	1.6303	0.4681	1.1622	731.0		
11/1/2014	1.4435	0.4266	1.0168	733.0		
11/2/2014	1.2846	0.3938	0.8908	752.0		
11/3/2014	1.0927	0.3513	0.7414	755.0		
11/4/2014	0.9016	0.3092	0.5924	760.0		
11/5/2014	0.7051	0.2656	0.4396	762.0		sampling date
11/6/2014	0.7019	0.2452	0.4567	700.0		
11/7/2014	0.7689	0.2506	0.5183	712.0		
11/8/2014	0.8609	0.2631	0.5978	744.0		
11/9/2014	0.9382	0.2701	0.6681	760.0		
11/10/2014	1.0271	0.2796	0.7474	783.0		
11/11/2014	1.1334	0.2928	0.8406	816.0		
11/12/2014	1.1862	0.2917	0.8945	809.0		sampling date
11/13/2014	1.1217	0.3060	0.8156	775.0		
11/14/2014	1.0642	0.3198	0.7444	745.0		
11/15/2014	1.0388	0.3416	0.6972	737.0		
11/16/2014	0.9957	0.3565	0.6392	716.0		
11/17/2014	1.3361	0.5184	0.8177	974.0		
11/18/2014	1.5788	0.6612	0.9176	1167.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	177.4588	380.2907	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.5174	1.1087	1,003.48	Flow Status	Comments
11/19/2014	1.5555	0.7007	0.8548	1166.0		sampling date
11/20/2014	1.8181	0.7718	1.0463	1202.0		
11/21/2014	2.0682	0.8357	1.2325	1223.0		
11/22/2014	2.2586	0.8752	1.3833	1208.0		
11/23/2014	2.5173	0.9411	1.5762	1229.0		
11/24/2014	2.7167	0.9845	1.7322	1220.0		
11/25/2014	2.9513	1.0407	1.9107	1227.0		
11/26/2014	3.1291	1.0770	2.0521	1211.0		sampling date
11/27/2014	2.8695	1.0126	1.8568	1182.0		
11/28/2014	2.5940	0.9411	1.6528	1142.0		
11/29/2014	2.4917	0.9324	1.5593	1178.0		
11/30/2014	2.3390	0.9061	1.4329	1194.0		
12/1/2014	2.1560	0.8686	1.2875	1196.0		
12/2/2014	1.9873	0.8372	1.1501	1207.0		
12/3/2014	1.9403	0.8606	1.0797	1302.0		sampling date
12/4/2014	1.9615	0.8595	1.1020	1261.0		
12/5/2014	2.0437	0.8855	1.1583	1261.0		
12/6/2014	2.1260	0.9115	1.2145	1261.0		
12/7/2014	2.2083	0.9374	1.2708	1261.0		
12/8/2014	2.2905	0.9634	1.3271	1261.0		
12/9/2014	2.3728	0.9894	1.3834	1261.0		
12/10/2014	2.4551	1.0154	1.4397	1261.0		sampling date
12/11/2014	2.2364	0.9548	1.2817	1261.0		
12/12/2014	2.0178	0.8941	1.1236	1261.0		
12/13/2014	1.7991	0.8335	0.9656	1261.0		
12/14/2014	1.5804	0.7729	0.8075	1261.0		
12/15/2014	1.3823	0.7230	0.6593	1280.0		
12/16/2014	0.9881	0.5633	0.4248	1090.0		
12/17/2014	0.8049	0.5146	0.2903	1098.0		sampling date
12/18/2014	0.9032	0.5351	0.3682	1102.0		
12/19/2014	0.9913	0.5496	0.4418	1094.0		
12/20/2014	1.0870	0.5685	0.5185	1095.0		
12/21/2014	1.1893	0.5907	0.5986	1102.0		
12/22/2014	1.2625	0.5987	0.6638	1083.0		sampling date
12/23/2014	1.4220	0.7396	0.6824	1190.0		
12/24/2014	1.4408	0.8123	0.6285	1177.0		
12/25/2014	1.4626	0.8856	0.5770	1167.0		
12/26/2014	1.4774	0.9533	0.5241	1152.0		
12/27/2014	1.5347	1.0486	0.4861	1170.0		
12/28/2014	1.5688	1.1289	0.4399	1170.0		
12/29/2014	1.6030	1.2093	0.3937	1170.0		sampling date
12/30/2014	1.5581	1.1397	0.4185	1187.0		
12/31/2014	1.4887	1.0516	0.4371	1186.0		
1/1/2015	1.4278	0.9694	0.4584	1192.0		
1/2/2015	1.3571	0.8803	0.4767	1190.0		
1/3/2015	1.2833	0.7896	0.4937	1185.0		
1/4/2015	1.2050	0.6966	0.5084	1175.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	343	# Days On-Line Flow > 0.0000:	343	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	343	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	557.7494	177.4588	380.2907	gpm On-Line Flow > 0	Operational/	
PER DAY	1.6261	0.5174	1.1087	1,003.48	Flow Status	Comments
1/5/2015	1.1375	0.6104	0.5272	1175.0		
1/6/2015	1.0673	0.5227	0.5446	1172.0		
1/7/2015	1.0146	0.4430	0.5716	1189.0		sampling date
1/8/2015	1.3021	0.4720	0.8301	1185.0		
1/9/2015	1.5917	0.5021	1.0896	1184.0		
1/10/2015	1.8617	0.5267	1.3349	1171.0		
1/11/2015	2.1584	0.5593	1.5991	1176.0		
1/12/2015	2.4221	0.5835	1.8386	1164.0		
1/13/2015	2.7288	0.6183	2.1106	1173.0		
1/14/2015	3.0322	0.6518	2.3804	1179.0		sampling date
1/15/2015	2.6114	0.5930	2.0184	1107.0		
1/16/2015	2.3929	0.5781	1.8148	1115.0		
1/17/2015	2.1729	0.5635	1.6094	1124.0		
1/18/2015	1.9439	0.5471	1.3968	1130.0		
1/19/2015	1.7365	0.5380	1.1986	1152.0		
1/20/2015	1.5819	0.5497	1.0322	1222.0		
1/21/2015	1.3012	0.5205	0.7807	1203.0		sampling date
1/22/2015	1.2644	0.5123	0.7521	1184.0		
1/23/2015	1.2639	0.5187	0.7452	1199.0		
1/24/2015	1.2433	0.5170	0.7263	1195.0		
1/25/2015	1.2043	0.5075	0.6968	1173.0		
1/26/2015	1.1740	0.5014	0.6726	1159.0		
1/27/2015	1.1521	0.4988	0.6533	1153.0		
1/28/2015	1.1412	0.5010	0.6402	1158.0		sampling date
1/29/2015	1.0907	0.4841	0.6066	1170.0		
1/30/2015	1.0329	0.4640	0.5689	1175.0		
1/31/2015	0.8919	0.4061	0.4858	1080.0		
2/1/2015	0.9070	0.4192	0.4878	1174.0		
2/2/2015	0.8532	0.4011	0.4520	1186.0		
2/3/2015	0.7887	0.3781	0.4106	1184.0		
2/4/2015	0.7306	0.3581	0.3725	1192.0		sampling date
2/5/2015	0.7416	0.3557	0.3860	1177.0		
2/6/2015	0.7560	0.3549	0.4011	1168.0		
2/7/2015	0.7780	0.3579	0.4202	1171.0		
2/8/2015	0.8036	0.3623	0.4413	1179.0		
2/9/2015	0.8204	0.3628	0.4575	1174.0		
2/10/2015	0.8448	0.3667	0.4781	1180.0		
2/11/2015	0.8695	0.3706	0.4989	1186.0		sampling date
2/12/2015	0.9101	0.3660	0.5440	1165.0		
2/13/2015	0.9487	0.3614	0.5873	1144.0		
2/14/2015	0.9993	0.3618	0.6375	1139.0		
2/15/2015	1.0670	0.3682	0.6988	1153.0		
2/16/2015	1.1390	0.3756	0.7633	1170.0		
2/17/2015	1.1819	0.3734	0.8085	1157.0		
2/18/2015	1.2183	0.3696	0.8487	1139.0		sampling date
2/19/2015	1.1689	0.3883	0.7806	1154.0		
2/20/2015	1.0883	0.3966	0.6916	1138.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line:	**343**	**# Days On-Line Flow > 0.0000:**	**343**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**343**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**557.7494**	**177.4588**	**380.2907**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**1.6261**	**0.5174**	**1.1087**	**1,003.48**	**Flow Status**	**Comments**
2/21/2015	1.0571	0.4236	0.6334	1175.0		
2/22/2015	1.0031	0.4433	0.5598	1190.0		
2/23/2015	0.9397	0.4596	0.4801	1195.0		
2/24/2015	0.8851	0.4811	0.4040	1213.0		
2/25/2015	0.8143	0.4944	0.3199	1210.0		sampling date
2/26/2015	0.9772	0.4704	0.5068	1176.0		
2/27/2015	1.1481	0.4545	0.6937	1161.0		
2/28/2015	1.3499	0.4506	0.8992	1177.0		
3/1/2015	1.5488	0.4443	1.1046	1187.0		
3/2/2015	1.7495	0.4374	1.3121	1196.0		
3/3/2015	1.9254	0.4242	1.5012	1188.0		
3/4/2015	2.1060	0.4127	1.6933	1184.0		sampling date
3/5/2015	1.9318	0.3884	1.5434	1166.0		
3/6/2015					Off-Line	mechnical, electrical problems
3/7/2015					Off-Line	mechnical, electrical problems
3/8/2015					Off-Line	mechnical, electrical problems
3/9/2015					Off-Line	mechnical, electrical problems
3/10/2015					Off-Line	mechnical, electrical problems
3/11/2015					Off-Line	mechnical, electrical problems; sampling date
3/12/2015					Off-Line	mechnical, electrical problems
3/13/2015					Off-Line	mechnical, electrical problems
3/14/2015					Off-Line	mechnical, electrical problems
3/15/2015					Off-Line	mechnical, electrical problems
3/16/2015					Off-Line	mechnical, electrical problems
3/17/2015					Off-Line	mechnical, electrical problems
3/18/2015					Off-Line	mechnical, electrical problems; sampling date
3/19/2015					Off-Line	mechnical, electrical problems
3/20/2015					Off-Line	mechnical, electrical problems
3/21/2015					Off-Line	mechnical, electrical problems
3/22/2015					Off-Line	mechnical, electrical problems
3/23/2015					Off-Line	mechnical, electrical problems
3/24/2015					Off-Line	mechnical, electrical problems
3/25/2015	0.0897	0.0350	0.0547	91.0		sampling date
3/26/2015	0.8483	0.3322	0.5161	900.0		
3/27/2015	0.7836	0.3081	0.4755	871.0		
3/28/2015	0.7462	0.2946	0.4516	871.0		
3/29/2015	0.7088	0.2811	0.4277	871.0		
3/30/2015	0.6445	0.2569	0.3875	836.0		
3/31/2015	0.6078	0.2437	0.3641	835.0		
4/1/2015	0.5734	0.2314	0.3420	837.0		sampling date
4/2/2015	0.5754	0.2293	0.3461	840.0		
4/3/2015	0.5734	0.2256	0.3478	837.0		
4/4/2015	0.5816	0.2259	0.3557	849.0		
4/5/2015	0.5727	0.2196	0.3531	836.0		
4/6/2015	0.5836	0.2209	0.3628	852.0		
4/7/2015	0.4953	0.1850	0.3103	723.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line:	**343**	**# Days On-Line Flow > 0.0000:**	**343**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**343**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**557.7494**	**177.4588**	**380.2907**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**1.6261**	**0.5174**	**1.1087**	**1,003.48**	**Flow Status**	**Comments**
4/8/2015	0.5549	0.2044	0.3504	810.0		sampling date
4/9/2015	0.5570	0.2064	0.3505	807.0		
4/10/2015	0.5674	0.2115	0.3558	816.0		
4/11/2015	0.5618	0.2107	0.3511	802.0		
4/12/2015	0.5603	0.2113	0.3490	794.0		
4/13/2015	0.5921	0.2245	0.3675	833.0		
4/14/2015	0.6042	0.2304	0.3739	844.0		
4/15/2015	0.6043	0.2316	0.3726	838.0		sampling date
4/16/2015	0.5864	0.2303	0.3561	833.0		
4/17/2015	0.5645	0.2272	0.3373	822.0		
4/18/2015	0.5142	0.2123	0.3019	768.0		
4/19/2015	0.4495	0.1905	0.2591	689.0		
4/20/2015	0.2528	0.1100	0.1428	398.0		
4/21/2015					Off-Line	pump failure
4/22/2015					Off-Line	pump failure
4/23/2015	0.1346	0.0245	0.1100	493.0		
4/24/2015	0.4532	0.0827	0.3705	830.0		
4/25/2015	0.7182	0.1310	0.5872	877.0		
4/26/2015	0.9260	0.1689	0.7571	848.0		
4/27/2015	1.1957	0.2181	0.9776	876.0		
4/28/2015	1.4594	0.2662	1.1932	891.0		
4/29/2015	1.6644	0.3036	1.3608	871.0		sampling date
4/30/2015	1.5353	0.3041	1.2312	864.0		
5/1/2015	1.4114	0.3053	1.1061	859.0		
5/2/2015	1.2435	0.2957	0.9478	824.0		
5/3/2015	1.1015	0.2902	0.8114	801.0		
5/4/2015	1.3046	0.3843	0.9203	1051.0		
5/5/2015	1.3499	0.4500	0.8999	1219.0		
5/6/2015	1.1964	0.4579	0.7385	1229.0		sampling date
5/7/2015	1.1439	0.4403	0.7036	1227.0		
5/8/2015	1.0978	0.4252	0.6726	1232.0		
5/9/2015	1.0504	0.4096	0.6409	1236.0		
5/10/2015	0.9938	0.3904	0.6035	1229.0		
5/11/2015	0.9324	0.3692	0.5632	1215.0		
5/12/2015	0.8679	0.3467	0.5211	1195.0		
5/13/2015	0.8056	0.3251	0.4805	1176.0		sampling date
5/14/2015	0.7860	0.3212	0.4648	1162.0		
5/15/2015	0.5670	0.2347	0.3323	849.0		
5/16/2015	0.8043	0.3372	0.4671	1220.0		
5/17/2015	0.7782	0.3306	0.4476	1196.0		
5/18/2015	0.7609	0.3276	0.4333	1185.0		
5/19/2015	0.6950	0.3032	0.3917	1097.0		
5/20/2015	0.6706	0.2966	0.3740	1073.0		sampling date
5/21/2015	0.6069	0.3468	0.2601	1052.0		
5/22/2015	0.5706	0.4131	0.1575	1079.0		
5/23/2015	0.5346	0.4849	0.0496	1112.0		
5/24/2015	0.4863	0.5500	-0.0637	1124.0		

WATERSHED TECHNOLOGIES						
Lemkin Creek TP Reduction & Operations Report						
Period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	
# of Days On-Line:	**343**	**# Days On-Line Flow > 0.0000:**	**343**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**343**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:** **100%**
	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**557.7494**	**177.4588**	**380.2907**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**1.6261**	**0.5174**	**1.1087**	**1,003.48**	**Flow Status**	**Comments**
5/25/2015	0.3930	0.5545	-0.1614	1022.0		
5/26/2015	0.3382	0.5987	-0.2605	1005.0		
5/27/2015	0.2844	0.6399	-0.3555	986.0		sampling date
5/28/2015	0.3734	0.6083	-0.2349	1021.0		
5/29/2015	0.4855	0.5946	-0.1091	1096.0		
5/30/2015	0.6024	0.5666	0.0358	1158.0		
5/31/2015	0.6429	0.4692	0.1737	1076.0		
6/1/2015	0.7105	0.4032	0.3073	1053.0		
6/2/2015	0.7467	0.3273	0.4194	993.0		
6/3/2015	0.8384	0.2795	0.5589	1011.0		sampling date
6/4/2015	0.8483	0.2954	0.5529	1049.0		
6/5/2015	0.8093	0.2945	0.5149	1027.0		
6/6/2015	0.8281	0.3149	0.5131	1079.0		
6/7/2015	0.8006	0.3184	0.4822	1072.0		
6/8/2015	0.4575	0.1904	0.2672	630.0		
6/9/2015	0.3175	0.1383	0.1792	450.0		
6/10/2015	0.5302	0.2419	0.2884	774.0		sampling date
6/11/2015	0.5627	0.2470	0.3158	786.0		
6/12/2015					Off-Line	power failure
6/13/2015	0.5086	0.2077	0.3009	654.0		
6/14/2015	0.5491	0.2168	0.3322	679.0		
6/15/2015	0.5961	0.2279	0.3681	710.0		
6/16/2015	0.6476	0.2401	0.4075	744.0		
6/17/2015	0.7130	0.2567	0.4563	791.0		sampling date
6/18/2015	0.6805	0.2557	0.4248	788.0		
6/19/2015	0.6507	0.2557	0.3950	788.0		
6/20/2015	0.5768	0.2375	0.3393	732.0		
6/21/2015	0.5229	0.2262	0.2968	697.0		
6/22/2015	0.5187	0.2362	0.2825	728.0		
6/23/2015	0.4831	0.2323	0.2508	716.0		
6/24/2015	0.4745	0.2417	0.2328	745.0		sampling date
6/25/2015	0.5223	0.2661	0.2562	820.0		
6/26/2015	0.4847	0.2469	0.2378	761.0		
6/27/2015	0.4650	0.2369	0.2281	730.0		
6/28/2015	0.4713	0.2401	0.2312	740.0		
6/29/2015	0.3446	0.1755	0.1690	541.0		
6/30/2015	0.5350	0.2726	0.2625	840.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
7/1/2014					Off-Line	instrument failure-lightning strike
7/2/2014	2.6712	0.3580	2.3131	392.0		sampling date
7/3/2014	6.0155	0.8334	5.1820	881.0		
7/4/2014	6.0276	0.8622	5.1654	881.0		
7/5/2014	6.0397	0.8909	5.1488	881.0		
7/6/2014	6.0518	0.9196	5.1321	881.0		
7/7/2014	5.9468	0.9301	5.0168	864.0		
7/8/2014	6.8967	1.1091	5.7876	1000.0		
7/9/2014	6.9104	1.1417	5.7687	1000.0		sampling date
7/10/2014	7.6143	1.1761	6.4383	1000.0		
7/11/2014	8.3182	1.2104	7.1078	1000.0		
7/12/2014	8.9861	1.2398	7.7463	996.0		
7/13/2014	9.6872	1.2740	8.4132	996.0		
7/14/2014	9.6582	1.2162	8.4419	926.0		
7/15/2014	10.2098	1.2359	8.9739	917.0		
7/16/2014	12.3587	1.4429	10.9158	1044.0		sampling date
7/17/2014	12.2171	1.5085	10.7086	1115.0		
7/18/2014	11.1444	1.4640	9.6804	1106.0		
7/19/2014	10.0323	1.4123	8.6200	1091.0		
7/20/2014	8.9550	1.3628	7.5923	1077.0		
7/21/2014	8.0139	1.3326	6.6813	1078.0		
7/22/2014	6.9661	1.2830	5.6831	1063.0		
7/23/2014	5.9505	1.2355	4.7150	1049.0		sampling date
7/24/2014	6.3390	1.2932	5.0458	1073.0		
7/25/2014	6.4992	1.3042	5.1950	1058.0		
7/26/2014	6.6907	1.3219	5.3688	1049.0		
7/27/2014	6.6663	1.2980	5.3683	1008.0		
7/28/2014	7.1773	1.3782	5.7991	1048.0		
7/29/2014	7.3105	1.3856	5.9249	1032.0		
7/30/2014	7.6264	1.4276	6.1988	1042.0		sampling date
7/31/2014	7.5155	1.4831	6.0324	1042.0		
8/1/2014	7.3904	1.5356	5.8548	1040.0		
8/2/2014	7.4267	1.6230	5.8036	1061.0		
8/3/2014	7.1896	1.6510	5.5386	1043.0		
8/4/2014	6.8886	1.6607	5.2279	1015.0		
8/5/2014	6.8473	1.7316	5.1157	1025.0		
8/6/2014	7.0209	1.8611	5.1598	1068.0		sampling date
8/7/2014	7.1643	2.0398	5.1246	1085.0		
8/8/2014	6.4598	1.9649	4.4950	974.0		
8/9/2014	6.8746	2.2236	4.6510	1032.0		
8/10/2014	7.1724	2.4570	4.7153	1072.0		
8/11/2014	7.2776	2.6310	4.6466	1083.0		
8/12/2014	7.4104	2.8183	4.5922	1098.0		
8/13/2014	7.3815	2.9447	4.4367	1089.0		sampling date
8/14/2014	7.6476	2.9434	4.7042	1083.0		
8/15/2014	7.9984	2.9746	5.0238	1089.0		
8/16/2014	8.4137	3.0280	5.3857	1103.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
8/17/2014	8.6946	3.0321	5.6624	1099.0		
8/18/2014	8.9895	3.0417	5.9478	1097.0		
8/19/2014	9.2663	3.0456	6.2207	1093.0		
8/20/2014	9.5409	3.0494	6.4915	1089.0		sampling date
8/21/2014	8.7420	2.9248	5.8172	1049.0		
8/22/2014	8.2541	2.8983	5.3557	1044.0		
8/23/2014	7.7853	2.8775	4.9078	1041.0		
8/24/2014	7.2698	2.8375	4.4323	1031.0		
8/25/2014	6.6965	2.7703	3.9263	1011.0		
8/26/2014	6.1838	2.7226	3.4611	998.0		
8/27/2014	5.8725	2.7650	3.1075	1018.0		sampling date
8/28/2014	6.5927	2.7819	3.8109	1021.0		
8/29/2014	7.1813	2.7469	4.4344	1005.0		
8/30/2014	8.0064	2.8022	5.2043	1022.0		
8/31/2014	8.6930	2.8054	5.8876	1020.0		
9/1/2014	9.3676	2.8059	6.5617	1017.0		
9/2/2014	9.8500	2.7538	7.0962	995.0		
9/3/2014	10.2703	2.6929	7.5774	970.0		sampling date
9/4/2014	11.7704	2.6227	9.1477	973.0		
9/5/2014	13.4973	2.5939	10.9035	992.0		
9/6/2014	15.1455	2.5392	12.6064	1002.0		
9/7/2014	16.8904	2.4927	14.3978	1016.0		
9/8/2014	18.2968	2.3941	15.9027	1009.0		
9/9/2014	19.5445	2.2806	17.2639	995.0		
9/10/2014	20.0519	2.0963	17.9556	948.0		sampling date
9/11/2014	18.2149	1.9332	16.2817	951.0		
9/12/2014	17.0006	1.8375	15.1630	991.0		
9/13/2014	14.8079	1.6371	13.1708	977.0		
9/14/2014	12.7633	1.4522	11.3111	970.0		
9/15/2014	10.8472	1.2816	9.5655	972.0		
9/16/2014	8.8681	1.1035	7.7645	968.0		
9/17/2014	6.7975	0.9124	5.8851	949.0		sampling date
9/18/2014	7.0614	1.1764	5.8851	949.0		
9/19/2014	7.2945	1.4342	5.8603	945.0		
9/20/2014	7.4454	1.6719	5.7734	931.0		
9/21/2014	7.7457	1.9412	5.8044	936.0		
9/22/2014	8.1087	2.2298	5.8789	948.0		
9/23/2014	8.3282	2.4803	5.8479	943.0		
9/24/2014	8.8000	2.8095	5.9905	966.0		sampling date
9/25/2014	9.0672	2.9647	6.1026	989.0		
9/26/2014	9.3925	3.1425	6.2500	1018.0		
9/27/2014	9.4334	3.2270	6.2064	1016.0		
9/28/2014	9.3899	3.2818	6.1081	1005.0		
9/29/2014	9.2700	3.3078	5.9622	986.0		
9/30/2014	9.2802	3.3786	5.9016	981.0		
10/1/2014	9.3280	3.4626	5.8653	980.0		sampling date
10/2/2014	8.8639	3.2005	5.6634	990.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
10/3/2014	8.4473	2.9529	5.4944	1007.0		
10/4/2014	7.9333	2.6688	5.2645	1014.0		
10/5/2014	7.0847	2.2756	4.8092	976.0		
10/6/2014	6.3192	1.9173	4.4019	944.0		
10/7/2014	5.9270	1.6735	4.2535	967.0		
10/8/2014	5.4086	1.3901	4.0185	972.0		sampling date
10/9/2014	7.3453	2.1125	5.2328	975.0		
10/10/2014	8.6761	2.6506	6.0255	913.0		
10/11/2014	10.1069	3.2066	6.9003	881.0		
10/12/2014	12.2720	3.9956	8.2764	913.0		
10/13/2014	15.7805	5.2355	10.5449	1024.0		
10/14/2014	19.0831	6.4226	12.6605	1098.0		
10/15/2014	20.8196	7.0864	13.7332	1076.0		sampling date
10/16/2014	20.5732	6.9020	13.6711	1122.0		
10/17/2014	19.6792	6.4947	13.1845	1136.0		
10/18/2014	18.4143	5.9643	12.4500	1129.0		
10/19/2014	17.1024	5.4206	11.6818	1118.0		
10/20/2014	15.9985	4.9438	11.0547	1120.0		
10/21/2014	14.8905	4.4652	10.4253	1122.0		
10/22/2014	13.2514	3.8325	9.4189	1081.0		sampling date
10/23/2014	12.6733	3.7280	8.9453	1128.0		
10/24/2014	11.3352	3.4017	7.9335	1110.0		
10/25/2014	9.9605	3.0615	6.8990	1084.0		
10/26/2014	8.8350	2.7958	6.0392	1082.0		
10/27/2014	7.6136	2.4982	5.1154	1066.0		
10/28/2014	6.2597	2.1515	4.1081	1023.0		
10/29/2014	4.8307	1.7659	3.0648	948.0		sampling date
10/30/2014	8.1135	2.1150	5.9985	952.0		
10/31/2014	11.5551	2.4953	9.0598	967.0		
11/1/2014	15.0687	2.8805	12.1883	980.0		
11/2/2014	17.1109	3.0013	14.1096	910.0		
11/3/2014	20.9629	3.4485	17.5144	943.0		
11/4/2014	24.3997	3.8190	20.5807	951.0		
11/5/2014	27.9495	4.2040	23.7455	961.0		sampling date
11/6/2014	25.0403	3.8299	21.2104	972.0		
11/7/2014	21.4970	3.3586	18.1384	958.0		
11/8/2014	18.2571	2.9333	15.3238	955.0		
11/9/2014	15.3687	2.5659	12.8028	973.0		
11/10/2014	12.0490	2.1278	9.9211	966.0		
11/11/2014	8.8032	1.7012	7.1020	962.0		
11/12/2014	5.6189	1.2860	4.3330	964.0		sampling date
11/13/2014	5.5635	1.3843	4.1792	961.0		
11/14/2014	5.5256	1.4866	4.0390	961.0		
11/15/2014	5.4648	1.5823	3.8825	957.0		
11/16/2014	5.3646	1.6648	3.6998	946.0		
11/17/2014	5.4905	1.8196	3.6710	975.0		
11/18/2014	5.4073	1.9076	3.4997	967.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
11/19/2014	5.4524	2.0417	3.4107	982.0		sampling date
11/20/2014	5.5320	1.9810	3.5510	977.0		
11/21/2014	5.5816	1.9109	3.6707	967.0		
11/22/2014	5.6173	1.8380	3.7793	955.0		
11/23/2014	5.7222	1.7888	3.9334	955.0		
11/24/2014	6.2055	1.8526	4.3529	1017.0		
11/25/2014	6.3545	1.8108	4.5437	1023.0		
11/26/2014	6.2457	1.6980	4.5477	988.0		sampling date
11/27/2014	6.9102	1.7484	5.1617	1036.0		
11/28/2014	7.4186	1.7512	5.6674	1057.0		
11/29/2014	7.7796	1.7169	6.0627	1056.0		
11/30/2014	8.1400	1.6827	6.4573	1055.0		
12/1/2014	8.4593	1.6407	6.8186	1049.0		
12/2/2014	8.7828	1.6006	7.1822	1044.0		
12/3/2014	9.1291	1.5654	7.5638	1042.0		sampling date
12/4/2014	8.3976	1.4931	6.9044	1028.0		
12/5/2014	7.9023	1.4630	6.4393	1043.0		
12/6/2014	7.2915	1.4124	5.8791	1044.0		
12/7/2014	6.6731	1.3604	5.3127	1044.0		
12/8/2014	6.0606	1.3097	4.7509	1045.0		
12/9/2014	5.4364	1.2565	4.1799	1044.0		
12/10/2014	4.7534	1.1883	3.5650	1030.0		sampling date
12/11/2014	4.6961	1.1807	3.5154	1031.0		
12/12/2014	4.6116	1.1661	3.4455	1026.0		
12/13/2014	4.5455	1.1562	3.3894	1025.0		
12/14/2014	4.5146	1.1552	3.3593	1032.0		
12/15/2014	4.4612	1.1486	3.3126	1034.0		
12/16/2014	4.4203	1.1452	3.2751	1039.0		
12/17/2014	4.3495	1.1341	3.2154	1037.0		sampling date
12/18/2014	4.6706	1.0778	3.5927	1038.0		
12/19/2014	5.0259	1.0283	3.9975	1046.0		
12/20/2014	5.3247	0.9668	4.3579	1042.0		
12/21/2014	5.5995	0.9022	4.6973	1034.0		
12/22/2014	5.8865	0.8409	5.0456	1029.0		sampling date
12/23/2014	5.9612	0.8697	5.0915	1038.0		
12/24/2014	5.9151	0.8808	5.0344	1026.0		
12/25/2014	5.9670	0.9063	5.0607	1031.0		
12/26/2014	5.9958	0.9284	5.0674	1032.0		
12/27/2014	6.0655	0.9571	5.1084	1040.0		
12/28/2014	6.1180	0.9832	5.1348	1045.0		
12/29/2014	6.1354	1.0038	5.1317	1044.0		sampling date
12/30/2014	6.0501	0.9969	5.0532	1050.0		
12/31/2014	5.8900	0.9777	4.9123	1043.0		
1/1/2015	5.7370	0.9596	4.7774	1037.0		
1/2/2015	5.6017	0.9444	4.6572	1034.0		
1/3/2015	5.4352	0.9239	4.5113	1025.0		
1/4/2015	5.2137	0.8938	4.3200	1005.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
1/5/2015	5.1186	0.8852	4.2334	1009.0		
1/6/2015	5.0672	0.8843	4.1829	1022.0		
1/7/2015	4.9644	0.8746	4.0898	1025.0		sampling date
1/8/2015	5.4805	1.1013	4.3792	1015.0		
1/9/2015	5.9916	1.3247	4.6668	1006.0		
1/10/2015	6.0237	1.4325	4.5912	925.0		
1/11/2015	6.6089	1.6647	4.9442	935.0		
1/12/2015	7.7237	2.0383	5.6854	1013.0		
1/13/2015	8.5654	2.3494	6.2160	1047.0		
1/14/2015	9.2002	2.6069	6.5933	1053.0		sampling date
1/15/2015	8.4996	2.5045	5.9951	1054.0		
1/16/2015	7.7311	2.3813	5.3498	1046.0		
1/17/2015	6.9532	2.2532	4.7001	1035.0		
1/18/2015	6.3232	2.1730	4.1502	1046.0		
1/19/2015	5.5708	2.0510	3.5198	1037.0		
1/20/2015	4.8447	1.9365	2.9083	1031.0		
1/21/2015	4.1066	1.8142	2.2923	1020.0		sampling date
1/22/2015	4.0312	1.6955	2.3357	1016.0		
1/23/2015	3.9679	1.5823	2.3856	1015.0		
1/24/2015	3.8509	1.4490	2.4019	1000.0		
1/25/2015	3.7812	1.3351	2.4460	997.0		
1/26/2015	3.7080	1.2207	2.4874	993.0		
1/27/2015	3.6280	1.1048	2.5232	987.0		
1/28/2015	3.5668	0.9954	2.5714	986.0		sampling date
1/29/2015	3.6283	0.8905	2.7378	988.0		
1/30/2015	3.6789	0.7829	2.8960	987.0		
1/31/2015	3.8163	0.6912	3.1251	1009.0		
2/1/2015	3.2232	0.4846	2.7387	840.0		
2/2/2015	1.5413	0.1856	1.3557	396.0		
2/3/2015	4.0063	0.3660	3.6403	1015.0		
2/4/2015	4.0540	0.2557	3.7984	1013.0		sampling date
2/5/2015	4.1747	0.3116	3.8631	1014.0		
2/6/2015	4.3294	0.3706	3.9588	1023.0		
2/7/2015	4.4514	0.4272	4.0242	1024.0		
2/8/2015	4.5648	0.4830	4.0818	1023.0		
2/9/2015	4.6687	0.5376	4.1311	1020.0		
2/10/2015	4.7860	0.5937	4.1924	1020.0		
2/11/2015	4.8986	0.6491	4.2495	1019.0		sampling date
2/12/2015	4.7004	0.6810	4.0194	1017.0		
2/13/2015	4.5118	0.7141	3.7977	1017.0		
2/14/2015	4.2977	0.7429	3.5548	1011.0		
2/15/2015	4.0777	0.7697	3.3080	1003.0		
2/16/2015	3.9577	0.8161	3.1417	1020.0		
2/17/2015	3.7464	0.8443	2.9021	1014.0		
2/18/2015	3.2742	0.8073	2.4668	933.0		sampling date
2/19/2015	3.5900	0.8684	2.7216	984.0		
2/20/2015	3.8669	0.9185	2.9484	1021.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
2/21/2015	4.0011	0.9342	3.0669	1019.0		
2/22/2015	4.1347	0.9499	3.1848	1017.0		
2/23/2015	4.2467	0.9607	3.2860	1010.0		
2/24/2015	4.2698	0.9519	3.3180	983.0		
2/25/2015	4.3841	0.9638	3.4203	978.0		sampling date
2/26/2015	4.2612	0.9224	3.3388	968.0		
2/27/2015	4.1442	0.8825	3.2617	959.0		
2/28/2015	4.0626	0.8503	3.2122	958.0		
3/1/2015	4.0019	0.8225	3.1794	962.0		
3/2/2015	3.9936	0.8051	3.1885	979.0		
3/3/2015	3.9386	0.7779	3.1607	985.0		
3/4/2015	4.0198	0.7768	3.2429	1026.0		sampling date
3/5/2015	4.0880	0.7989	3.2891	1048.0		
3/6/2015	4.0739	0.8050	3.2688	1049.0		
3/7/2015	3.9785	0.7950	3.1835	1029.0		
3/8/2015	3.9031	0.7886	3.1145	1014.0		
3/9/2015	3.8627	0.7892	3.0736	1008.0		
3/10/2015	3.8721	0.7999	3.0722	1015.0		
3/11/2015	3.8433	0.8027	3.0406	1012.0		sampling date
3/12/2015	3.7342	0.7411	2.9932	990.0		
3/13/2015	3.7200	0.6990	3.0210	993.0		
3/14/2015	3.6646	0.6494	3.0153	985.0		
3/15/2015	3.6245	0.6030	3.0215	981.0		
3/16/2015	3.6286	0.5637	3.0649	989.0		
3/17/2015	3.6104	0.5206	3.0898	991.0		
3/18/2015	3.4257	0.4552	2.9705	947.0		sampling date
3/19/2015	3.1274	0.4629	2.6646	800.0		
3/20/2015	3.1845	0.5127	2.6717	758.0		
3/21/2015	3.2575	0.5614	2.6961	725.0		
3/22/2015	2.9427	0.5364	2.4063	615.0		
3/23/2015	2.2541	0.4307	1.8234	444.0		
3/24/2015	2.0025	0.3983	1.6042	373.0		
3/25/2015	2.1906	0.4511	1.7395	387.0		sampling date
3/26/2015	2.2993	0.4430	1.8563	423.0		
3/27/2015	2.2458	0.4003	1.8455	431.0		
3/28/2015	2.1389	0.3476	1.7913	429.0		
3/29/2015	1.8567	0.2698	1.5869	390.0		
3/30/2015	1.7917	0.2265	1.5652	395.0		
3/31/2015	1.8624	0.1965	1.6658	432.0		
4/1/2015	1.7611	0.1450	1.6161	431.0		sampling date
4/2/2015	1.7049	0.1799	1.5249	426.0		
4/3/2015	1.5241	0.1977	1.3264	389.0		
4/4/2015	1.5143	0.2346	1.2797	395.0		
4/5/2015	1.5973	0.2896	1.3077	426.0		
4/6/2015	1.5505	0.3239	1.2266	423.0		
4/7/2015	1.5006	0.3568	1.1438	419.0		
4/8/2015	1.2975	0.3478	0.9497	371.0		sampling date

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
4/9/2015	1.5366	0.3310	1.2056	359.0		
4/10/2015	1.8936	0.3390	1.5545	374.0		
4/11/2015	1.4147	0.2156	1.1991	242.0		
4/12/2015	1.4318	0.1891	1.2427	216.0		
4/13/2015	1.0006	0.1161	0.8845	135.0		
4/14/2015	0.8031	0.0828	0.7203	98.0		
4/15/2015	0.8708	0.0804	0.7904	97.0		sampling date
4/16/2015	0.8579	0.0752	0.7827	90.0		
4/17/2015					Off-Line	floc removal and improvements
4/18/2015					Off-Line	floc removal and improvements
4/19/2015					Off-Line	floc removal and improvements
4/20/2015					Off-Line	floc removal and improvements
4/21/2015					Off-Line	floc removal and improvements
4/22/2015					Off-Line	floc removal and improvements, sampling date
4/23/2015					Off-Line	floc removal and improvements
4/24/2015					Off-Line	floc removal and improvements
4/25/2015					Off-Line	floc removal and improvements
4/26/2015					Off-Line	floc removal and improvements
4/27/2015					Off-Line	floc removal and improvements
4/28/2015					Off-Line	floc removal and improvements
4/29/2015					Off-Line	floc removal and improvements, sampling date
4/30/2015					Off-Line	floc removal and improvements
5/1/2015					Off-Line	floc removal and improvements
5/2/2015					Off-Line	floc removal and improvements
5/3/2015					Off-Line	floc removal and improvements
5/4/2015					Off-Line	floc removal and improvements
5/5/2015					Off-Line	floc removal and improvements
5/6/2015					Off-Line	floc removal and improvements, sampling date
5/7/2015					Off-Line	floc removal and improvements
5/8/2015					Off-Line	floc removal and improvements
5/9/2015					Off-Line	floc removal and improvements
5/10/2015					Off-Line	floc removal and improvements
5/11/2015					Off-Line	floc removal and improvements
5/12/2015					Off-Line	floc removal and improvements
5/13/2015					Off-Line	floc removal and improvements, sampling date
5/14/2015					Off-Line	floc removal and improvements
5/15/2015					Off-Line	floc removal and improvements
5/16/2015					Off-Line	floc removal and improvements
5/17/2015					Off-Line	floc removal and improvements
5/18/2015	1.4122	0.5191	0.8930	497.0		
5/19/2015	3.1778	0.9796	2.1982	932.0		
5/20/2015	4.0536	1.0777	2.9759	1019.0		sampling date
5/21/2015	3.8853	0.9700	2.9152	1000.0		
5/22/2015	3.7281	0.8675	2.8606	983.0		

WATERSHED TECHNOLOGIES						
Mosquito Large Pond TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line:	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	332	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	2151.4548	497.9566	1653.4982	gpm On-Line Flow > 0	Operational/	
PER DAY	6.4803	1.4999	4.9804	863.89	Flow Status	Comments
5/23/2015	3.4113	0.7329	2.6784	922.0		
5/24/2015	2.9037	0.5694	2.3343	805.0		
5/25/2015	1.5710	0.2770	1.2939	447.0		
5/26/2015	0.4414	0.0687	0.3727	129.0		
5/27/2015	0.7224	0.0965	0.6259	217.0		sampling date
5/28/2015	0.7764	0.1025	0.6739	208.0		
5/29/2015	0.7445	0.0973	0.6471	180.0		
5/30/2015	0.9760	0.1266	0.8494	215.0		
5/31/2015	1.0479	0.1350	0.9129	212.0		
6/1/2015	1.1495	0.1473	1.0022	215.0		
6/2/2015	1.1960	0.1525	1.0435	208.0		
6/3/2015	1.1014	0.1398	0.9616	179.0		sampling date
6/4/2015	1.3087	0.1687	1.1400	216.0		
6/5/2015	1.2823	0.1680	1.1144	215.0		
6/6/2015	1.2386	0.1648	1.0737	211.0		
6/7/2015	1.1782	0.1594	1.0189	204.0		
6/8/2015	0.9828	0.1351	0.8477	173.0		
6/9/2015	1.0335	0.1445	0.8890	185.0		
6/10/2015	1.1204	0.1594	0.9611	204.0		sampling date
6/11/2015	1.2898	0.1921	1.0977	216.0		
6/12/2015	2.2382	0.3461	1.8921	347.0		
6/13/2015	0.8592	0.1371	0.7221	124.0		
6/14/2015					Off-Line	equipment failure
6/15/2015	1.0253	0.1719	0.8535	130.0		
6/16/2015	1.7737	0.3032	1.4705	212.0		
6/17/2015	1.8752	0.3261	1.5491	212.0		sampling date
6/18/2015	1.9350	0.3155	1.6195	218.0		
6/19/2015	1.8616	0.2835	1.5781	209.0		
6/20/2015	1.6178	0.2290	1.3888	181.0		
6/21/2015	1.9104	0.2501	1.6602	213.0		
6/22/2015	1.8810	0.2264	1.6545	209.0		
6/23/2015	1.8965	0.2084	1.6881	210.0		
6/24/2015	1.8395	0.1830	1.6565	203.0		sampling date
6/25/2015	1.6039	0.1595	1.4444	177.0		
6/26/2015	1.8486	0.1839	1.6647	204.0		
6/27/2015	1.9392	0.1929	1.7463	214.0		
6/28/2015	1.9211	0.1911	1.7300	212.0		
6/29/2015	1.8486	0.1839	1.6647	204.0		
6/30/2015	1.9029	0.1893	1.7137	210.0		

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	96%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
7/1/2014					Off-Line	pump malfunction
7/2/2014	1.9153	0.5288	1.3865	228.0		sampling date
7/3/2014					Off-Line	pump malfunction
7/4/2014					Off-Line	pump malfunction
7/5/2014					Off-Line	pump malfunction
7/6/2014					Off-Line	pump malfunction
7/7/2014	6.6353	2.3290	4.3063	577.0		
7/8/2014	7.6837	2.7767	4.9069	634.0		
7/9/2014	10.1786	3.7738	6.4048	799.0		sampling date
7/10/2014	10.4678	3.6781	6.7897	831.0		
7/11/2014	10.9223	3.6212	7.3011	877.0		
7/12/2014	10.9697	3.4144	7.5553	891.0		
7/13/2014	11.4390	3.3229	8.1161	940.0		
7/14/2014	11.3652	3.0599	8.3053	945.0		
7/15/2014	10.1966	2.5234	7.6732	858.0		
7/16/2014	10.7671	2.4245	8.3426	917.0		sampling date
7/17/2014	10.9409	2.4902	8.4508	958.0		
7/18/2014	10.5002	2.4167	8.0834	946.0		
7/19/2014	10.1210	2.3569	7.7641	939.0		
7/20/2014	9.7777	2.3052	7.4725	935.0		
7/21/2014	9.4674	2.2610	7.2064	934.0		
7/22/2014	9.1577	2.2169	6.9408	933.0		
7/23/2014	7.9087	1.9421	5.9666	833.0		sampling date
7/24/2014	6.2492	1.4716	4.7776	644.0		
7/25/2014	4.6295	1.0455	3.5839	467.0		
7/26/2014	4.4236	0.9581	3.4655	437.0		
7/27/2014	9.7019	2.0152	7.6867	939.0		
7/28/2014	8.5703	1.7071	6.8632	813.0		
7/29/2014	8.7191	1.6653	7.0538	811.0		
7/30/2014	9.0095	1.6498	7.3598	822.0		sampling date
7/31/2014	10.3171	2.0491	8.2680	945.0		
8/1/2014	10.3527	2.2180	8.1347	952.0		
8/2/2014	10.2576	2.3591	7.8985	947.0		
8/3/2014	10.2278	2.5146	7.7132	948.0		
8/4/2014	8.8976	2.3299	6.5676	828.0		
8/5/2014	10.1999	2.8355	7.3644	953.0		
8/6/2014	8.8372	2.6003	6.2368	829.0		sample jar cracked
8/7/2014	10.0650	2.9248	7.1402	948.0		
8/8/2014	9.8234	2.8183	7.0051	929.0		
8/9/2014	10.0784	2.8540	7.2245	957.0		
8/10/2014	10.2996	2.8779	7.4216	982.0		
8/11/2014	7.4685	2.0586	5.4099	715.0		
8/12/2014	9.9344	2.7004	7.2340	955.0		
8/13/2014	10.3492	2.7734	7.5758	999.0		sampling date
8/14/2014	10.7070	2.8349	7.8721	1032.0		
8/15/2014	9.2683	2.4243	6.8440	892.0		

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
8/16/2014	11.1240	2.8741	8.2498	1069.0		
8/17/2014	10.7132	2.7339	7.9793	1028.0		
8/18/2014	9.9150	2.4987	7.4163	950.0		
8/19/2014	10.5673	2.6297	7.9376	1011.0		
8/20/2014	10.2689	2.5230	7.7459	981.0		sampling date
8/21/2014					Off-Line	new flow meter installed
8/22/2014					Off-Line	new flow meter installed
8/23/2014					Off-Line	new flow meter installed
8/24/2014					Off-Line	new flow meter installed
8/25/2014	1.9007	0.4010	1.4997	163.0		
8/26/2014	5.2120	1.0678	4.1442	438.0		
8/27/2014	5.3166	1.0580	4.2585	438.0		sampling date
8/28/2014	3.4519	0.6702	2.7817	298.0		
8/29/2014	3.2867	0.6206	2.6661	298.0		
8/30/2014	5.4677	1.0002	4.4676	522.0		
8/31/2014	9.3645	1.6515	7.7130	944.0		
9/1/2014	8.7942	1.4864	7.3078	939.0		
9/2/2014	8.2647	1.3286	6.9361	938.0		
9/3/2014	7.6702	1.1611	6.5091	929.0		sampling date
9/4/2014	3.4464	0.5159	2.9305	415.0		
9/5/2014	3.6083	0.5340	3.0743	432.0		
9/6/2014	7.9302	1.1604	6.7698	944.0		
9/7/2014	7.9671	1.1527	6.8144	943.0		
9/8/2014	6.2451	0.8934	5.3517	735.0		
9/9/2014	8.0236	1.1349	6.8887	939.0		
9/10/2014	8.1461	1.1393	7.0068	948.0		sampling date
9/11/2014	6.2976	0.8584	5.4392	732.0		
9/12/2014	7.8555	1.0428	6.8127	912.0		
9/13/2014	6.6921	0.8647	5.8274	776.0		
9/14/2014	8.2283	1.0341	7.1943	953.0		
9/15/2014	6.3796	0.7792	5.6004	738.0		
9/16/2014	3.8946	0.4620	3.4326	450.0		
9/17/2014	4.1679	0.4798	3.6881	481.0		sampling date
9/18/2014	3.8240	0.3854	3.4386	422.0		
9/19/2014	4.7386	0.4155	4.3231	501.0		
9/20/2014	11.0177	0.8330	10.1846	1118.0		
9/21/2014	11.3176	0.7297	10.5878	1104.0		
9/22/2014	11.5850	0.6276	10.9574	1088.0		
9/23/2014	11.8619	0.5292	11.3327	1074.0		
9/24/2014	12.2764	0.4384	11.8380	1073.0		sampling date
9/25/2014	12.0990	0.7609	11.3381	1097.0		
9/26/2014	10.4048	0.9590	9.4457	980.0		
9/27/2014	11.5215	1.4266	10.0949	1129.0		
9/28/2014	11.0563	1.7484	9.3079	1129.0		
9/29/2014	10.5817	2.0683	8.5134	1128.0		

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
9/30/2014	10.1169	2.3898	7.7271	1128.0		
10/1/2014	9.7463	2.7377	7.0086	1139.0		sampling date
10/2/2014	9.5671	2.8479	6.7192	1144.0		
10/3/2014	9.3125	2.9358	6.3767	1140.0		
10/4/2014	9.0754	3.0284	6.0470	1138.0		
10/5/2014	1.7740	0.6263	1.1477	228.0		
10/6/2014					Off-Line	electrical problems
10/7/2014					Off-Line	electrical problems
10/8/2014					Off-Line	electrical problems; sampling date
10/9/2014					Off-Line	electrical problems
10/10/2014					Off-Line	electrical problems
10/11/2014					Off-Line	electrical problems
10/12/2014					Off-Line	electrical problems
10/13/2014	6.1636	0.5763	5.5873	359.0		
10/14/2014	8.6118	0.8052	7.8066	418.0		
10/15/2014	22.2094	2.0766	20.1328	924.0		sampling date
10/16/2014	26.4666	2.5536	23.9130	1153.0		
10/17/2014	23.9508	2.3894	21.5614	1095.0		
10/18/2014	18.5042	1.9131	16.5912	890.0		
10/19/2014	21.9566	2.3582	19.5983	1114.0		
10/20/2014	21.1428	2.3657	18.7772	1135.0		
10/21/2014	20.8100	2.4333	18.3768	1186.0		
10/22/2014	19.1815	2.3522	16.8293	1165.0		sampling date
10/23/2014	17.9846	2.3832	15.6014	1151.0		
10/24/2014	16.5008	2.3682	14.1326	1116.0		
10/25/2014	15.7033	2.4474	13.2559	1126.0		
10/26/2014	14.5876	2.4765	12.1111	1113.0		
10/27/2014	13.2116	2.4519	10.7597	1077.0		
10/28/2014	11.7589	2.3956	9.3633	1029.0		
10/29/2014	11.3608	2.5533	8.8076	1073.0		sampling date
10/30/2014	11.2709	2.5023	8.7686	1100.0		
10/31/2014	10.9149	2.3915	8.5234	1102.0		
11/1/2014	10.4236	2.2513	8.1723	1090.0		
11/2/2014	10.0236	2.1312	7.8923	1087.0		
11/3/2014	5.6208	1.1748	4.4460	633.0		
11/4/2014	2.9541	0.6059	2.3482	346.0		
11/5/2014	4.6145	0.9270	3.6876	563.0		sampling date
11/6/2014	5.4613	1.0307	4.4306	659.0		
11/7/2014	4.6667	0.8253	3.8414	557.0		
11/8/2014	4.7174	0.7794	3.9380	557.0		
11/9/2014	5.9323	0.9126	5.0197	693.0		
11/10/2014	9.5856	1.3677	8.2179	1108.0		
11/11/2014	9.6690	1.2741	8.3948	1106.0		
11/12/2014	9.7255	1.1776	8.5478	1101.0		sampling date
11/13/2014	7.2200	0.9131	6.3069	822.0		

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
11/14/2014	5.2490	0.6924	4.5566	601.0		
11/15/2014	0.1650	0.0227	0.1423	19.0		
11/16/2014	0.1554	0.0222	0.1332	18.0		
11/17/2014	2.6011	0.3865	2.2145	303.0		
11/18/2014	3.7040	0.5715	3.1325	434.0		
11/19/2014	3.9794	0.6369	3.3424	469.0		sampling date
11/20/2014	3.6530	0.5310	3.1220	408.0		
11/21/2014	3.5522	0.4693	3.0829	377.0		
11/22/2014	3.6893	0.4432	3.2461	373.0		
11/23/2014	3.3151	0.3621	2.9530	320.0		
11/24/2014	4.2555	0.4224	3.8331	393.0		
11/25/2014	4.0217	0.3624	3.6593	356.0		
11/26/2014	10.3891	0.8490	9.5402	883.0		sampling date
11/27/2014	12.4746	1.1769	11.2978	1133.0		
11/28/2014	7.0964	0.7722	6.3241	692.0		
11/29/2014					Off-Line	equipment failure
11/30/2014					Off-Line	equipment failure
12/1/2014	5.9036	0.9960	4.9076	739.0		
12/2/2014	5.5551	1.0944	4.4607	768.0		
12/3/2014	4.4761	1.0381	3.4381	691.0		sampling date
12/4/2014	3.7585	0.8528	2.9057	583.0		
12/5/2014	6.3903	1.4176	4.9727	996.0		
12/6/2014	7.2726	1.5761	5.6964	1139.0		
12/7/2014	7.0340	1.4881	5.5459	1107.0		
12/8/2014	6.4434	1.3296	5.1138	1019.0		
12/9/2014	5.3233	1.0705	4.2528	846.0		
12/10/2014	4.7148	0.9231	3.7918	753.0		sampling date
12/11/2014	3.6214	0.6974	2.9240	593.0		
12/12/2014	3.5298	0.6679	2.8619	593.0		
12/13/2014	3.2236	0.5985	2.6251	556.0		
12/14/2014	2.8725	0.5226	2.3499	509.0		
12/15/2014	2.8267	0.5031	2.3236	515.0		
12/16/2014	2.4698	0.4293	2.0405	463.0		
12/17/2014	2.2480	0.3808	1.8673	434.0		sampling date
12/18/2014	2.4002	0.3745	2.0257	449.0		
12/19/2014	1.9841	0.2847	1.6995	360.0		
12/20/2014	2.0552	0.2706	1.7846	362.0		
12/21/2014	2.2029	0.2655	1.9374	377.0		
12/22/2014	2.2354	0.2459	1.9895	372.0		sampling date
12/23/2014	3.4422	0.4952	2.9470	379.0		
12/24/2014	4.6069	0.7398	3.8671	379.0		
12/25/2014	15.4114	2.6288	12.7826	1012.0		
12/26/2014	21.0288	3.7264	17.3024	1149.0		
12/27/2014	24.5813	4.4720	20.1093	1150.0		
12/28/2014	28.0421	5.2008	22.8413	1147.0		

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
12/29/2014	31.2368	5.8791	25.3577	1135.0		sampling date
12/30/2014	30.4521	6.2979	24.1542	1134.0		
12/31/2014	27.6525	6.2595	21.3930	1056.0		
1/1/2015	29.0654	7.1774	21.8881	1139.0		
1/2/2015	28.2553	7.5899	20.6654	1137.0		
1/3/2015	27.4236	7.9939	19.4297	1134.0		
1/4/2015	24.1503	7.6236	16.5267	1027.0		
1/5/2015	18.6209	6.3546	12.2663	815.0		
1/6/2015	17.2339	6.3488	10.8851	777.0		
1/7/2015	15.3383	6.0925	9.2458	713.0		sampling date
1/8/2015	14.1122	5.1011	9.0111	671.0		
1/9/2015	12.2483	3.9692	8.2791	596.0		
1/10/2015	8.8710	2.5270	6.3440	442.0		
1/11/2015	6.8955	1.6807	5.2148	352.0		
1/12/2015	13.0131	2.6096	10.4034	681.0		
1/13/2015	19.6153	3.0426	16.5727	1053.0		
1/14/2015	18.0384	1.9352	16.1032	994.0		sampling date
1/15/2015	19.4251	2.1414	17.2837	1137.0		
1/16/2015	15.9417	1.8108	14.1309	995.0		
1/17/2015	16.9786	1.9935	14.9851	1135.0		
1/18/2015	15.7168	1.9146	13.8022	1131.0		
1/19/2015	14.4635	1.8362	12.6272	1127.0		
1/20/2015	13.2775	1.7662	11.5113	1128.0		
1/21/2015	12.0466	1.6900	10.3566	1125.0		sampling date
1/22/2015	11.8874	1.6547	10.2326	1122.0		
1/23/2015	11.7497	1.6224	10.1273	1121.0		
1/24/2015	9.6631	1.3233	8.3398	932.0		
1/25/2015	8.6243	1.1710	7.4533	841.0		
1/26/2015	8.0625	1.0851	6.9774	795.0		
1/27/2015	8.4337	1.1248	7.3090	841.0		
1/28/2015	7.0396	0.9301	6.1095	710.0		sampling date
1/29/2015	5.4428	0.6680	4.7748	548.0		
1/30/2015	4.9547	0.5617	4.3930	498.0		
1/31/2015	4.5646	0.4749	4.0897	458.0		
2/1/2015	4.3528	0.4125	3.9404	436.0		
2/2/2015	4.0703	0.3480	3.7223	407.0		
2/3/2015	3.9270	0.2995	3.6275	392.0		
2/4/2015	3.9037	0.2618	3.6419	389.0		sampling date
2/5/2015	7.5311	0.5648	6.9663	765.0		
2/6/2015	11.0731	0.9216	10.1515	1147.0		
2/7/2015	10.8261	0.9938	9.8323	1144.0		
2/8/2015	9.6530	0.9723	8.6807	1041.0		
2/9/2015	8.5373	0.9393	7.5980	940.0		
2/10/2015	10.2521	1.2273	9.0248	1153.0		
2/11/2015	10.0063	1.2992	8.7071	1150.0		sampling date

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	96%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
2/12/2015	9.8239	1.3851	8.4387	1146.0		
2/13/2015	9.6510	1.4718	8.1792	1143.0		
2/14/2015	9.4539	1.5539	7.9001	1137.0		
2/15/2015	8.0878	1.4283	6.6595	988.0		
2/16/2015	6.6795	1.2639	5.4156	829.0		
2/17/2015	5.6530	1.1433	4.5097	713.0		
2/18/2015	4.8826	1.0533	3.8294	626.0		sampling date
2/19/2015	4.3373	0.8347	3.5026	539.0		
2/20/2015	4.2300	0.7215	3.5085	510.0		
2/21/2015	3.6386	0.5456	3.0930	426.0		
2/22/2015	3.6912	0.4817	3.2095	420.0		
2/23/2015	3.6595	0.4102	3.2493	405.0		
2/24/2015	3.6668	0.3472	3.3196	395.0		
2/25/2015	3.6120	0.2824	3.3296	379.0		sampling date
2/26/2015	3.5842	0.3141	3.2701	363.0		
2/27/2015	4.1686	0.4021	3.7665	408.0		
2/28/2015	4.2559	0.4456	3.8103	403.0		
3/1/2015	8.3523	0.9390	7.4133	766.0		
3/2/2015	11.2360	1.3447	9.8913	999.0		
3/3/2015	10.5011	1.3284	9.1727	906.0		
3/4/2015	8.1270	1.0803	7.0467	681.0		sampling date
3/5/2015	9.8098	1.5294	8.2804	753.0		
3/6/2015	10.1391	1.7776	8.3615	718.0		
3/7/2015	8.9311	1.7143	7.2169	587.0		
3/8/2015	9.1654	1.8912	7.2742	562.0		
3/9/2015	7.6570	1.6763	5.9807	440.0		
3/10/2015	7.8977	1.8166	6.0811	427.0		
3/11/2015	7.6007	1.8232	5.7775	388.0		sampling date
3/12/2015	6.8187	1.4668	5.3519	349.0		
3/13/2015	6.4500	1.2269	5.2231	331.0		
3/14/2015	5.2863	0.8733	4.4130	272.0		
3/15/2015	4.5163	0.6324	3.8839	233.0		
3/16/2015	5.2196	0.5989	4.6207	270.0		
3/17/2015	3.3355	0.2979	3.0376	173.0		
3/18/2015	3.3266	0.2121	3.1145	173.0		sampling date
3/19/2015	3.2178	0.2060	3.0118	169.0		
3/20/2015	3.1859	0.2048	2.9810	169.0		
3/21/2015	2.1275	0.1374	1.9901	114.0		
3/22/2015	2.1060	0.1366	1.9694	114.0		
3/23/2015	2.0845	0.1358	1.9486	114.0		
3/24/2015	0.4162	0.0272	0.3890	23.0		
3/25/2015	3.8500	0.2532	3.5968	215.0		sampling date
3/26/2015	3.7074	0.2387	3.4687	221.0		
3/27/2015	3.7546	0.2357	3.5189	240.0		
3/28/2015	4.7311	0.2882	4.4429	326.0		

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
3/29/2015	3.7869	0.2225	3.5644	283.0		
3/30/2015	2.5112	0.1411	2.3701	205.0		
3/31/2015	2.9575	0.1571	2.8004	266.0		
4/1/2015	1.6379	0.0808	1.5571	164.0		sampling date
4/2/2015	2.1664	0.0958	2.0706	203.0		
4/3/2015	1.6013	0.0637	1.5377	141.0		
4/4/2015	1.4691	0.0526	1.4166	122.0		
4/5/2015	1.1836	0.0382	1.1455	93.0		
4/6/2015	1.5558	0.0452	1.5106	116.0		
4/7/2015	1.6776	0.0439	1.6336	119.0		
4/8/2015	1.0052	0.0237	0.9815	68.0		sampling date
4/9/2015	0.9279	0.0224	0.9055	59.0		
4/10/2015	1.7171	0.0423	1.6748	103.0		
4/11/2015	0.8279	0.0207	0.8072	47.0		
4/12/2015	0.9094	0.0231	0.8863	49.0		
4/13/2015	1.0922	0.0282	1.0640	56.0		
4/14/2015	1.2882	0.0336	1.2546	63.0		
4/15/2015	1.4119	0.0373	1.3746	66.0		sampling date
4/16/2015	1.0606	0.0308	1.0298	54.0		
4/17/2015	1.8426	0.0592	1.7834	103.0		
4/18/2015	1.5977	0.0574	1.5403	99.0		
4/19/2015	1.0359	0.0422	0.9937	72.0		
4/20/2015	0.1769	0.0083	0.1686	14.0		
4/21/2015	5.8452	0.3199	5.5253	537.0		
4/22/2015	5.3158	0.3497	4.9661	582.0		sampling date
4/23/2015	7.7039	0.7175	6.9864	790.0		
4/24/2015	11.9565	1.4015	10.5550	1153.0		
4/25/2015	12.6362	1.7513	10.8849	1150.0		
4/26/2015	11.6525	1.8375	9.8150	1004.0		
4/27/2015	9.2414	1.6160	7.6255	756.0		
4/28/2015	13.6512	2.5988	11.0524	1063.0		
4/29/2015	11.1451	2.2788	8.8663	828.0		sampling date
4/30/2015					Off-Line	floc removal
5/1/2015					Off-Line	floc removal
5/2/2015					Off-Line	floc removal
5/3/2015					Off-Line	floc removal
5/4/2015					Off-Line	floc removal
5/5/2015					Off-Line	floc removal
5/6/2015					Off-Line	floc removal, sampling date
5/7/2015					Off-Line	floc removal
5/8/2015					Off-Line	floc removal
5/9/2015					Off-Line	floc removal
5/10/2015					Off-Line	floc removal
5/11/2015					Off-Line	floc removal
5/12/2015					Off-Line	floc removal

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	96%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
5/13/2015					Off-Line	floc removal, sampling date
5/14/2015					Off-Line	floc removal
5/15/2015	0.6954	0.0000	0.6954	129.0		refilling pond; no outflow
5/16/2015	1.3990	0.0000	1.3990	173.0		refilling pond; no outflow
5/17/2015	2.0162	0.0000	2.0162	187.0		refilling pond; no outflow
5/18/2015	1.4017	0.0000	1.4017	104.0		refilling pond; no outflow
5/19/2015	1.9569	0.0000	1.9569	121.0		refilling pond; no outflow
5/20/2015	1.6415	0.0000	1.6415	87.0		refilling pond; no outflow, sample date
5/21/2015	1.4026	0.0000	1.4026	74.0		refilling pond; no outflow
5/22/2015	1.7898	0.0000	1.7898	94.0		refilling pond; no outflow
5/23/2015	1.3771	0.0000	1.3771	72.0		refilling pond; no outflow
5/24/2015	0.8837	0.0000	0.8837	46.0		refilling pond; no outflow
5/25/2015	0.8684	0.0000	0.8684	45.0		refilling pond; no outflow
5/26/2015	0.8335	0.0000	0.8335	43.0		refilling pond; no outflow
5/27/2015	0.5646	0.0000	0.5646	29.0		refilling pond; no outflow, sample date
5/28/2015	0.5136	0.0000	0.5136	27.0		refilling pond; no outflow
5/29/2015	0.4273	0.0000	0.4273	23.0		refilling pond; no outflow
5/30/2015	0.3989	0.0000	0.3989	22.0		refilling pond; no outflow
5/31/2015	0.3360	0.0000	0.3360	19.0		refilling pond; no outflow
6/1/2015	0.3447	0.0000	0.3447	20.0		refilling pond; no outflow
6/2/2015	0.3190	0.0000	0.3190	19.0		refilling pond; no outflow
6/3/2015	0.4740	0.0000	0.4740	29.0		refilling pond; no outflow, sample date
6/4/2015	0.6180	0.0443	0.5738	39.0		
6/5/2015	0.4912	0.0349	0.4563	32.0		
6/6/2015	0.4010	0.0282	0.3728	27.0		
6/7/2015	0.3445	0.0240	0.3205	24.0		
6/8/2015	0.3849	0.0265	0.3583	27.8		
6/9/2015	0.2504	0.0171	0.2334	18.7		
6/10/2015	0.2411	0.0162	0.2249	18.7		sampling date
6/11/2015	1.6756	0.1097	1.5659	122.9		
6/12/2015	1.7706	0.1131	1.6574	122.9		
6/13/2015	3.9629	0.2475	3.7155	261.1		
6/14/2015	4.1646	0.2546	3.9100	261.1		
6/15/2015	4.3664	0.2618	4.1046	261.1		
6/16/2015	1.3821	0.0814	1.3007	79.0		
6/17/2015	1.3335	0.0772	1.2563	73.0		sampling date
6/18/2015	1.6489	0.0889	1.5599	70.0		
6/19/2015	1.9902	0.1024	1.8878	69.0		
6/20/2015	2.2527	0.1120	2.1407	66.0		
6/21/2015	4.0602	0.1966	3.8635	103.0		
6/22/2015	22.5772	1.0716	21.5055	505.0		
6/23/2015	8.2992	0.3876	7.9116	166.0		
6/24/2015	4.9755	0.2293	4.7462	90.0		sampling date

WATERSHED TECHNOLOGIES						
Nubbin Slough TP Reduction						
Period	7/1/2014	through	6/30/2015	365	days in period	
# of Days On-Line	332	# Days On-Line Flow > 0.0000	332	# Days in Period Flow > 0.0000 Less Uncontrollable Downtime:	347	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime: 96%
	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Noted Otherwise	
TOTAL	2525.9080	437.6181	2088.2898	gpm On-Line Flow > 0	Operational/	
PER DAY	7.6082	1.3181	6.2900	619.24	Flow Status	Comments
6/25/2015	7.3527	0.3389	7.0138	133.0		
6/26/2015	6.7445	0.3108	6.4337	122.0		
6/27/2015	4.8096	0.2217	4.5880	87.0		
6/28/2015	4.4779	0.2064	4.2716	81.0		
6/29/2015	6.4128	0.2955	6.1173	116.0		
6/30/2015	5.6942	0.2624	5.4317	103.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
7/1/2014	8.6088	1.4918	7.1170	2586.0		
7/2/2014	8.5722	1.4854	7.0868	2575.0		sampling date
7/3/2014	8.0951	1.4983	6.5969	2605.0		
7/4/2014	7.3594	1.4623	5.8972	2550.0		
7/5/2014	6.5495	1.4053	5.1443	2458.0		
7/6/2014	5.8121	1.3560	4.4561	2379.0		
7/7/2014	5.2430	1.3411	3.9019	2360.0		
7/8/2014	4.6524	1.3178	3.3345	2326.0		
7/9/2014	4.5000	1.4291	3.0710	2530.0		sampling date
7/10/2014	6.0887	1.6082	4.4804	2747.0		
7/11/2014	7.1931	1.6424	5.5507	2710.0		
7/12/2014	7.7920	1.5792	6.2129	2520.0		
7/13/2014	8.0940	1.4842	6.6099	2293.0		
7/14/2014	8.1933	1.3791	6.8141	2065.0		
7/15/2014	12.0666	1.8857	10.1809	2739.0		
7/16/2014	13.4401	1.9677	11.4725	2775.0		sampling date
7/17/2014	12.6459	2.1108	10.5351	2726.0		
7/18/2014	12.0579	2.2827	9.7751	2719.0		
7/19/2014	11.1512	2.3850	8.7662	2636.0		
7/20/2014	10.3067	2.4833	7.8234	2560.0		
7/21/2014	9.6193	2.6058	7.0136	2517.0		
7/22/2014	9.3511	2.8448	6.5063	2585.0		
7/23/2014	9.2530	3.1604	6.0926	2711.0		sampling date
7/24/2014	8.3922	2.9936	5.3985	2658.0		
7/25/2014	7.2131	2.7017	4.5114	2486.0		
7/26/2014	6.5931	2.6098	3.9832	2492.0		
7/27/2014	5.8074	2.4490	3.3585	2430.0		
7/28/2014	5.2349	2.3753	2.8596	2453.0		
7/29/2014	4.8102	2.3787	2.4315	2561.0		
7/30/2014	4.2411	2.3247	1.9163	2614.0		sampling date
7/31/2014	3.9332	2.0788	1.8544	2466.0		
8/1/2014	3.8655	1.9645	1.9010	2466.0		
8/2/2014	3.5713	1.7399	1.8315	2319.0		
8/3/2014	3.4834	1.6211	1.8623	2303.0		
8/4/2014	3.4692	1.5361	1.9331	2336.0		
8/5/2014	3.2490	1.3624	1.8867	2229.0		
8/6/2014	2.3326	0.9213	1.4113	1631.0		sampling date
8/7/2014					Off-Line	power failure
8/8/2014	1.9639	0.7472	1.2166	1226.0		
8/9/2014	4.3205	1.6174	2.7030	2560.0		
8/10/2014	4.5544	1.6798	2.8746	2568.0		
8/11/2014	4.8790	1.7750	3.1040	2624.0		
8/12/2014	5.1295	1.8426	3.2869	2637.0		
8/13/2014	5.2239	1.8546	3.3692	2572.0		sampling date
8/14/2014	5.6411	1.8347	3.8064	2575.0		
8/15/2014	6.1275	1.8351	4.2924	2607.0		
8/16/2014	6.6943	1.8544	4.8399	2667.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
8/17/2014	7.1495	1.8391	5.3104	2678.0		
8/18/2014	7.3961	1.7727	5.6233	2614.0		
8/19/2014	7.6490	1.7135	5.9356	2559.0		
8/20/2014	7.9789	1.6750	6.3039	2534.0		sampling date
8/21/2014	7.1391	1.6339	5.5052	2511.0		
8/22/2014	6.3286	1.5971	4.7315	2494.0		
8/23/2014	5.4861	1.5488	3.9373	2458.0		
8/24/2014	4.5692	1.4701	3.0991	2372.0		
8/25/2014	3.7455	1.4085	2.3370	2311.0		
8/26/2014	3.0419	1.3859	1.6560	2313.0		
8/27/2014	2.3007	1.3421	0.9586	2279.0		sampling date
8/28/2014	2.2941	1.2656	1.0285	2227.0		
8/29/2014	1.9291	1.0055	0.9236	1836.0		
8/30/2014	1.5363	0.7558	0.7805	1434.0		
8/31/2014	1.6379	0.7597	0.8782	1500.0		
9/1/2014	1.7355	0.7580	0.9776	1560.0		
9/2/2014	1.7677	0.7258	1.0419	1560.0		
9/3/2014	1.4733	0.5678	0.9055	1277.0		sampling date
9/4/2014	1.1588	0.4202	0.7386	956.0		
9/5/2014	1.1943	0.4083	0.7859	940.0		
9/6/2014	1.0737	0.3468	0.7269	808.0		
9/7/2014	0.9586	0.2930	0.6655	691.0		
9/8/2014	1.2837	0.3720	0.9117	888.0		
9/9/2014	1.3130	0.3612	0.9518	873.0		
9/10/2014	1.4171	0.3706	1.0464	907.0		sampling date
9/11/2014	1.3472	0.3442	1.0029	868.0		
9/12/2014	1.3737	0.3427	1.0310	891.0		
9/13/2014	1.4242	0.3465	1.0778	930.0		
9/14/2014	1.4238	0.3375	1.0863	936.0		
9/15/2014	1.4232	0.3283	1.0949	942.0		
9/16/2014	1.4240	0.3193	1.1047	949.0		
9/17/2014	1.4262	0.3105	1.1156	957.0		sampling date
9/18/2014	1.6566	0.3005	1.3562	946.0		
9/19/2014	1.8914	0.2921	1.5993	940.0		
9/20/2014	2.0617	0.2756	1.7861	907.0		
9/21/2014	2.1869	0.2563	1.9306	863.0		
9/22/2014	2.3926	0.2484	2.1442	856.0		
9/23/2014	2.6282	0.2436	2.3846	860.0		
9/24/2014	2.7730	0.2311	2.5419	836.0		sampling date
9/25/2014	2.5041	0.2148	2.2892	797.0		
9/26/2014	2.2963	0.2033	2.0929	774.0		
9/27/2014	1.9262	0.1765	1.7497	690.0		
9/28/2014	2.0566	0.1957	1.8609	786.0		
9/29/2014	1.8530	0.1837	1.6693	759.0		
9/30/2014	1.5977	0.1658	1.4319	705.0		
10/1/2014	1.6520	0.1804	1.4716	790.0		sampling date
10/2/2014	1.6043	0.1761	1.4283	771.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
10/3/2014	1.6689	0.1840	1.4848	806.0		
10/4/2014	1.7491	0.1939	1.5553	849.0		
10/5/2014	1.7793	0.1982	1.5811	868.0		
10/6/2014	1.7398	0.1948	1.5450	853.0		
10/7/2014	1.7554	0.1975	1.5579	865.0		
10/8/2014	1.8030	0.2039	1.5991	893.0		sampling date
10/9/2014	1.8195	0.2200	1.5995	942.0		
10/10/2014	1.7333	0.2243	1.5090	940.0		
10/11/2014	1.6387	0.2275	1.4112	933.0		
10/12/2014	1.5503	0.2313	1.3190	929.0		
10/13/2014	1.4563	0.2340	1.2223	921.0		
10/14/2014	1.3563	0.2354	1.1209	908.0		
10/15/2014	1.3288	0.2499	1.0789	945.0		sampling date
10/16/2014	1.6008	0.2383	1.3625	907.0		
10/17/2014	1.8540	0.2278	1.6262	873.0		
10/18/2014	2.0531	0.2144	1.8387	827.0		
10/19/2014	2.2419	0.2032	2.0387	789.0		
10/20/2014	2.7202	0.2174	2.5028	850.0		
10/21/2014	2.9113	0.2079	2.7035	818.0		
10/22/2014	3.3420	0.2153	3.1267	853.0		sampling date
10/23/2014	3.4407	0.2380	3.2027	906.0		
10/24/2014	3.3318	0.2473	3.0845	906.0		
10/25/2014	3.2194	0.2564	2.9630	905.0		
10/26/2014	3.1038	0.2651	2.8387	903.0		
10/27/2014	2.9886	0.2738	2.7148	901.0		
10/28/2014	2.8707	0.2821	2.5886	898.0		
10/29/2014	2.7597	0.2911	2.4687	897.0		sampling date
10/30/2014	2.6712	0.2857	2.3855	885.0		
10/31/2014	2.6106	0.2832	2.3274	882.0		
11/1/2014	2.5243	0.2778	2.2465	870.0		
11/2/2014	2.4252	0.2709	2.1543	853.0		
11/3/2014	2.4395	0.2767	2.1627	876.0		
11/4/2014	2.4483	0.2821	2.1662	898.0		
11/5/2014	2.3612	0.2765	2.0847	885.0		sampling date
11/6/2014	2.3469	0.2682	2.0788	863.0		
11/7/2014	2.3859	0.2661	2.1198	861.0		
11/8/2014	2.3907	0.2603	2.1304	847.0		
11/9/2014	2.3969	0.2549	2.1421	834.0		
11/10/2014	2.0801	0.2161	1.8640	711.0		
11/11/2014	1.8577	0.1886	1.6691	624.0		
11/12/2014	1.9050	0.1890	1.7160	629.0		sampling date
11/13/2014	1.8934	0.1921	1.7014	632.0		
11/14/2014	2.2373	0.2320	2.0053	755.0		
11/15/2014	2.6054	0.2763	2.3291	889.0		
11/16/2014	2.6083	0.2828	2.3255	900.0		
11/17/2014	2.5904	0.2871	2.3032	904.0		
11/18/2014	2.5099	0.2845	2.2254	886.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
11/19/2014	2.4138	0.2797	2.1341	862.0		sampling date
11/20/2014	2.3186	0.2784	2.0402	858.0		
11/21/2014	2.2998	0.2865	2.0132	883.0		
11/22/2014	2.3612	0.3057	2.0556	942.0		
11/23/2014	1.1466	0.1545	0.9921	476.0		
11/24/2014					Off-Line	power failure
11/25/2014					Off-Line	power failure
11/26/2014	1.0449	0.1603	0.8846	494.0		sampling date
11/27/2014	1.9448	0.2906	1.6542	915.0		
11/28/2014	1.9585	0.2850	1.6736	917.0		
11/29/2014	1.9830	0.2808	1.7022	924.0		
11/30/2014	2.0098	0.2768	1.7329	932.0		
12/1/2014	2.0367	0.2727	1.7639	940.0		
12/2/2014	2.0224	0.2632	1.7593	929.0		
12/3/2014	2.0036	0.2532	1.7504	916.0		sampling date
12/4/2014	1.9624	0.2519	1.7105	884.0		
12/5/2014	1.9867	0.2589	1.7278	882.0		
12/6/2014	2.0132	0.2662	1.7470	881.0		
12/7/2014	2.0350	0.2728	1.7622	878.0		
12/8/2014	2.0871	0.2836	1.8036	888.0		
12/9/2014	2.1471	0.2955	1.8516	901.0		
12/10/2014	2.1620	0.3012	1.8608	895.0		sampling date
12/11/2014	2.0339	0.2878	1.7461	873.0		
12/12/2014	1.9702	0.2834	1.6868	878.0		
12/13/2014	1.9229	0.2815	1.6414	891.0		
12/14/2014	1.8443	0.2750	1.5693	890.0		
12/15/2014	1.7540	0.2668	1.4872	883.0		
12/16/2014	1.6820	0.2613	1.4207	885.0		
12/17/2014	1.6206	0.2576	1.3630	893.0		sampling date
12/18/2014	1.5227	0.2591	1.2636	891.0		
12/19/2014	1.4204	0.2598	1.1606	886.0		
12/20/2014	1.3282	0.2622	1.0660	887.0		
12/21/2014	1.2289	0.2632	0.9657	883.0		
12/22/2014	1.1612	0.2713	0.8899	903.0		sampling date
12/23/2014	1.1902	0.2708	0.9194	917.0		
12/24/2014	1.2117	0.2684	0.9433	925.0		
12/25/2014	1.2057	0.2599	0.9457	912.0		
12/26/2014	1.2046	0.2527	0.9519	903.0		
12/27/2014	1.2087	0.2467	0.9621	898.0		
12/28/2014	1.2046	0.2391	0.9655	887.0		
12/29/2014	1.2166	0.2348	0.9818	888.0		sampling date
12/30/2014	1.2443	0.2401	1.0042	890.0		
12/31/2014	1.2579	0.2426	1.0152	882.0		
1/1/2015	1.2753	0.2459	1.0294	877.0		
1/2/2015	1.3607	0.2623	1.0984	918.0		
1/3/2015	1.4257	0.2748	1.1509	944.0		
1/4/2015	1.4568	0.2807	1.1760	947.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
1/5/2015	1.4865	0.2864	1.2001	949.0		
1/6/2015	1.4908	0.2872	1.2036	935.0		
1/7/2015	1.4310	0.2756	1.1554	882.0		sampling date
1/8/2015	1.4457	0.2611	1.1846	869.0		
1/9/2015	1.4934	0.2527	1.2408	876.0		
1/10/2015	1.5383	0.2435	1.2948	881.0		
1/11/2015	1.5764	0.2332	1.3432	882.0		
1/12/2015	1.6200	0.2236	1.3964	886.0		
1/13/2015	1.6378	0.2106	1.4273	876.0		
1/14/2015	1.6586	0.1982	1.4604	868.0		sampling date
1/15/2015	1.6664	0.1954	1.4711	862.0		
1/16/2015	1.6896	0.1943	1.4952	864.0		
1/17/2015	1.7088	0.1928	1.5160	864.0		
1/18/2015	1.7341	0.1920	1.5421	867.0		
1/19/2015	1.6827	0.1828	1.4999	832.0		
1/20/2015	1.8403	0.1962	1.6441	900.0		
1/21/2015	0.9302	0.0973	0.8329	450.0		sampling date
1/22/2015					Off-Line	pump failure
1/23/2015	0.9147	0.1035	0.8112	450.0		
1/24/2015	1.8140	0.2132	1.6008	900.0		
1/25/2015	1.7986	0.2194	1.5792	900.0		
1/26/2015	1.7950	0.2271	1.5679	906.0		
1/27/2015	1.7775	0.2331	1.5444	905.0		
1/28/2015	1.7581	0.2388	1.5193	903.0		sampling date
1/29/2015	1.7059	0.2380	1.4679	900.0		
1/30/2015	1.6540	0.2372	1.4168	897.0		
1/31/2015	1.6096	0.2374	1.3722	898.0		
2/1/2015	1.5651	0.2377	1.3274	899.0		
2/2/2015	1.5255	0.2388	1.2868	903.0		
2/3/2015	1.4807	0.2390	1.2416	904.0		
2/4/2015	1.4420	0.2403	1.2017	909.0		sampling date
2/5/2015	1.4193	0.2376	1.1817	887.0		
2/6/2015	1.4186	0.2384	1.1801	879.0		
2/7/2015	1.4355	0.2423	1.1933	882.0		
2/8/2015	1.4509	0.2459	1.2051	884.0		
2/9/2015	1.4598	0.2483	1.2114	882.0		
2/10/2015	1.4502	0.2477	1.2025	869.0		
2/11/2015	1.4789	0.2535	1.2254	879.0		sampling date
2/12/2015	1.4492	0.2572	1.1920	897.0		
2/13/2015	1.3721	0.2525	1.1196	886.0		
2/14/2015	1.2639	0.2416	1.0222	853.0		
2/15/2015	1.2124	0.2413	0.9711	857.0		
2/16/2015	1.1254	0.2337	0.8917	835.0		
2/17/2015	1.1168	0.2425	0.8743	872.0		
2/18/2015	1.0572	0.2408	0.8165	871.0		sampling date
2/19/2015	1.0096	0.2306	0.7790	861.0		
2/20/2015	0.9628	0.2206	0.7422	851.0		

WATERSHED TECHNOLOGIES						
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for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
2/21/2015	0.2638	0.0607	0.2032	242.0		
2/22/2015					Off-Line	equipment failure
2/23/2015	0.4031	0.0934	0.3097	400.0		
2/24/2015	0.8313	0.1934	0.6379	860.0		
2/25/2015	0.7894	0.1845	0.6048	853.0		sampling date
2/26/2015	0.8186	0.1896	0.6290	856.0		
2/27/2015	0.8737	0.2006	0.6731	885.0		
2/28/2015	1.0191	0.2320	0.7871	1001.0		
3/1/2015	1.0773	0.2433	0.8340	1027.0		
3/2/2015	1.0400	0.2331	0.8068	963.0		
3/3/2015	1.0342	0.2302	0.8040	931.0		
3/4/2015	1.0173	0.2249	0.7924	891.0		sampling date
3/5/2015	1.0084	0.2302	0.7782	894.0		
3/6/2015	1.0017	0.2362	0.7656	899.0		
3/7/2015	0.9938	0.2419	0.7519	903.0		
3/8/2015	1.0118	0.2541	0.7576	931.0		
3/9/2015	1.0108	0.2620	0.7488	942.0		
3/10/2015	1.0053	0.2688	0.7364	949.0		
3/11/2015	0.7068	0.1950	0.5118	676.0		sampling date
3/12/2015					Off-Line	pump failure
3/13/2015	0.0968	0.0248	0.0719	85.0		
3/14/2015					Off-Line	pump failure
3/15/2015					Off-Line	pump failure
3/16/2015	0.7447	0.1732	0.5715	583.0		
3/17/2015	1.2112	0.2733	0.9378	915.0		
3/18/2015	1.2865	0.2821	1.0044	939.0		sampling date
3/19/2015	1.2689	0.2805	0.9884	950.0		
3/20/2015	1.2207	0.2722	0.9485	938.0		
3/21/2015	0.7602	0.1710	0.5892	600.0		
3/22/2015					Off-Line	power failure
3/23/2015	0.5249	0.1203	0.4046	438.0		
3/24/2015	1.0779	0.2496	0.8283	926.0		
3/25/2015	1.0743	0.2514	0.8229	951.0		sampling date
3/26/2015	1.0596	0.2544	0.8052	975.0		
3/27/2015	1.0011	0.2470	0.7541	959.0		
3/28/2015	0.9319	0.2366	0.6953	931.0		
3/29/2015	0.8641	0.2261	0.6380	902.0		
3/30/2015	0.8071	0.2181	0.5891	882.0		
3/31/2015	0.7675	0.2145	0.5530	880.0		
4/1/2015	0.7397	0.2144	0.5253	892.0		sampling date
4/2/2015	0.7344	0.2208	0.5136	893.0		
4/3/2015	0.7234	0.2254	0.4980	887.0		
4/4/2015	0.7237	0.2336	0.4902	895.0		
4/5/2015	0.7136	0.2384	0.4752	890.0		
4/6/2015	0.7099	0.2453	0.4645	893.0		
4/7/2015	0.6998	0.2500	0.4498	888.0		
4/8/2015	0.6937	0.2561	0.4376	888.0		sampling date

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
4/9/2015	0.7091	0.2527	0.4564	892.0		
4/10/2015	0.7084	0.2436	0.4647	876.0		
4/11/2015	0.6990	0.2320	0.4670	850.0		
4/12/2015	0.4640	0.1486	0.3154	555.0		
4/13/2015	0.5286	0.1634	0.3652	622.0		
4/14/2015	0.8541	0.2547	0.5994	989.0		
4/15/2015	0.8615	0.2478	0.6137	982.0		sampling date
4/16/2015	0.8540	0.2400	0.6140	964.0		
4/17/2015	0.8426	0.2313	0.6113	942.0		
4/18/2015	0.8579	0.2300	0.6279	950.0		
4/19/2015	0.8624	0.2258	0.6367	946.0		
4/20/2015	0.8429	0.2155	0.6275	916.0		
4/21/2015	0.8480	0.2116	0.6364	913.0		
4/22/2015	0.8540	0.2080	0.6460	911.0		sampling date
4/23/2015	0.8207	0.2134	0.6073	914.0		
4/24/2015	0.7949	0.2210	0.5739	926.0		
4/25/2015	0.7731	0.2301	0.5429	944.0		
4/26/2015	0.7413	0.2367	0.5045	951.0		
4/27/2015	0.7193	0.2470	0.4723	972.0		
4/28/2015	0.6465	0.2393	0.4073	923.0		
4/29/2015	0.5896	0.2358	0.3538	892.0		sampling date
4/30/2015	0.2368	0.0931	0.1436	350.0		
5/1/2015	0.3466	0.1342	0.2125	501.0		
5/2/2015	0.6826	0.2601	0.4225	965.0		
5/3/2015	0.6997	0.2626	0.4371	968.0		
5/4/2015	0.7235	0.2675	0.4560	980.0		
5/5/2015	0.7356	0.2681	0.4675	976.0		
5/6/2015	0.7376	0.2651	0.4725	959.0		sampling date
5/7/2015	0.6996	0.2590	0.4405	961.0		
5/8/2015	0.6600	0.2524	0.4075	961.0		
5/9/2015	0.6204	0.2458	0.3745	961.0		
5/10/2015	0.5904	0.2432	0.3472	977.0		
5/11/2015	0.5513	0.2370	0.3143	979.0		
5/12/2015	0.4995	0.2251	0.2744	957.0		
5/13/2015	0.4581	0.2176	0.2405	953.0		sampling date
5/14/2015	0.4808	0.2196	0.2612	969.0		
5/15/2015	0.4953	0.2177	0.2775	968.0		
5/16/2015	0.5060	0.2143	0.2917	960.0		
5/17/2015	0.5073	0.2071	0.3002	935.0		
5/18/2015	0.5133	0.2022	0.3112	920.0		
5/19/2015	0.5224	0.1986	0.3238	911.0		
5/20/2015	0.5388	0.1979	0.3409	915.0		sampling date
5/21/2015	0.5347	0.1998	0.3350	895.0		
5/22/2015	0.5612	0.2130	0.3482	926.0		
5/23/2015	0.5716	0.2203	0.3513	930.0		
5/24/2015	0.5908	0.2311	0.3597	948.0		
5/25/2015	0.6034	0.2394	0.3640	955.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	179.0771	590.9500	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.5030	1.6600	1148.7	Flow Status	Comments
5/26/2015	0.6084	0.2447	0.3637	950.0		
5/27/2015	0.6068	0.2472	0.3596	935.0		sampling date
5/28/2015	0.5882	0.2417	0.3466	926.0		
5/29/2015	0.5805	0.2405	0.3400	934.0		
5/30/2015	0.5591	0.2338	0.3254	920.0		
5/31/2015	0.5406	0.2281	0.3125	910.0		
6/1/2015	0.5292	0.2255	0.3038	912.0		
6/2/2015	0.5309	0.2284	0.3024	937.0		
6/3/2015	0.5081	0.2209	0.2872	919.0		sampling date
6/4/2015	0.5114	0.2223	0.2890	925.0		
6/5/2015	0.5114	0.2223	0.2890	925.0		
6/6/2015	0.5235	0.2276	0.2959	947.0		
6/7/2015	0.5213	0.2267	0.2947	943.0		
6/8/2015	0.5158	0.2243	0.2915	933.0		
6/9/2015	0.5191	0.2257	0.2934	939.0		
6/10/2015	0.5003	0.2175	0.2828	905.0		sampling date
6/11/2015	0.5034	0.2129	0.2906	905.0		
6/12/2015	0.5306	0.2181	0.3125	948.0		
6/13/2015	0.5569	0.2224	0.3345	989.0		
6/14/2015	0.5535	0.2147	0.3388	977.0		
6/15/2015	0.5495	0.2069	0.3426	964.0		
6/16/2015	0.5505	0.2011	0.3494	960.0		
6/17/2015	0.5549	0.1965	0.3584	962.0		sampling date
6/18/2015	0.5627	0.2003	0.3625	964.0		
6/19/2015	0.5782	0.2067	0.3715	979.0		
6/20/2015	0.5957	0.2140	0.3817	997.0		
6/21/2015	0.5983	0.2159	0.3824	990.0		
6/22/2015	0.5941	0.2153	0.3788	972.0		
6/23/2015	0.5921	0.2155	0.3767	958.0		
6/24/2015	0.5912	0.2160	0.3752	946.0		sampling date
6/25/2015	0.6068	0.2217	0.3851	971.0		
6/26/2015	0.6087	0.2224	0.3863	974.0		
6/27/2015	0.6056	0.2213	0.3843	969.0		
6/28/2015	0.5968	0.2181	0.3787	955.0		
6/29/2015	0.5812	0.2124	0.3688	930.0		
6/30/2015	0.5762	0.2105	0.3657	922.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
7/1/2014	8.6088	3.4187	5.1902	2586.0		
7/2/2014	8.5722	3.4041	5.1681	2575.0		sampling date
7/3/2014	8.0951	3.3856	4.7095	2605.0		
7/4/2014	7.3594	3.2572	4.1022	2550.0		
7/5/2014	6.5495	3.0849	3.4647	2458.0		
7/6/2014	5.8121	2.9326	2.8795	2379.0		
7/7/2014	5.2430	2.8565	2.3865	2360.0		
7/8/2014	4.6524	2.7635	1.8889	2326.0		
7/9/2014	4.5000	2.9494	1.5507	2530.0		sampling date
7/10/2014	6.0887	3.5466	2.5421	2747.0		
7/11/2014	7.1931	3.8385	3.3546	2710.0		
7/12/2014	7.7920	3.8852	3.9068	2520.0		
7/13/2014	8.0940	3.8226	4.2714	2293.0		
7/14/2014	8.1933	3.7013	4.4919	2065.0		
7/15/2014	12.0666	5.2527	6.8139	2739.0		
7/16/2014	13.4401	5.6695	7.7706	2775.0		sampling date
7/17/2014	12.6459	5.7332	6.9126	2726.0		
7/18/2014	12.0579	5.8819	6.1760	2719.0		
7/19/2014	11.1512	5.8607	5.2905	2636.0		
7/20/2014	10.3067	5.8456	4.4611	2560.0		
7/21/2014	9.6193	5.8987	3.7207	2517.0		
7/22/2014	9.3511	6.2133	3.1377	2585.0		
7/23/2014	9.2530	6.6791	2.5739	2711.0		sampling date
7/24/2014	8.3922	6.0602	2.3319	2658.0		
7/25/2014	7.2131	5.2114	2.0018	2486.0		
7/26/2014	6.5931	4.7662	1.8269	2492.0		
7/27/2014	5.8074	4.2012	1.6062	2430.0		
7/28/2014	5.2349	3.7903	1.4445	2453.0		
7/29/2014	4.8102	3.4867	1.3235	2561.0		
7/30/2014	4.2411	3.0787	1.1624	2614.0		sampling date
7/31/2014	3.9332	2.7816	1.1516	2466.0		
8/1/2014	3.8655	2.6588	1.2066	2466.0		
8/2/2014	3.5713	2.3849	1.1865	2319.0		
8/3/2014	3.4834	2.2538	1.2297	2303.0		
8/4/2014	3.4692	2.1697	1.2994	2336.0		
8/5/2014	3.2490	1.9594	1.2897	2229.0		
8/6/2014	2.3326	1.3525	0.9801	1631.0		sampling date
8/7/2014					Off-Line	power failure
8/8/2014	1.9639	1.1766	0.7872	1226.0		
8/9/2014	4.3205	2.6239	1.6965	2560.0		
8/10/2014	4.5544	2.7997	1.7547	2568.0		
8/11/2014	4.8790	3.0319	1.8471	2624.0		
8/12/2014	5.1295	3.2190	1.9106	2637.0		
8/13/2014	5.2239	3.3074	1.9165	2572.0		sampling date
8/14/2014	5.6411	3.7445	1.8966	2575.0		
8/15/2014	6.1275	4.2297	1.8978	2607.0		
8/16/2014	6.6943	4.7758	1.9186	2667.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
8/17/2014	7.1495	5.2461	1.9035	2678.0		
8/18/2014	7.3961	5.5605	1.8355	2614.0		
8/19/2014	7.6490	5.8741	1.7750	2559.0		
8/20/2014	7.9789	6.2430	1.7359	2534.0		sampling date
8/21/2014	7.1391	5.5914	1.5477	2511.0		
8/22/2014	6.3286	4.9627	1.3659	2494.0		
8/23/2014	5.4861	4.3087	1.1774	2458.0		
8/24/2014	4.5692	3.5959	0.9733	2372.0		
8/25/2014	3.7455	2.9559	0.7896	2311.0		
8/26/2014	3.0419	2.4105	0.6314	2313.0		
8/27/2014	2.3007	1.8351	0.4656	2279.0		sampling date
8/28/2014	2.2941	1.7014	0.5926	2227.0		
8/29/2014	1.9291	1.3271	0.6021	1836.0		
8/30/2014	1.5363	0.9774	0.5589	1434.0		
8/31/2014	1.6379	0.9606	0.6773	1500.0		
9/1/2014	1.7355	0.9347	0.8008	1560.0		
9/2/2014	1.7677	0.8705	0.8972	1560.0		
9/3/2014	1.4733	0.6599	0.8134	1277.0		sampling date
9/4/2014	1.1588	0.4678	0.6910	956.0		
9/5/2014	1.1943	0.4341	0.7601	940.0		
9/6/2014	1.0737	0.3510	0.7227	808.0		
9/7/2014	0.9586	0.2812	0.6774	691.0		
9/8/2014	1.2837	0.3369	0.9468	888.0		
9/9/2014	1.3130	0.3073	1.0057	873.0		
9/10/2014	1.4171	0.2943	1.1227	907.0		sampling date
9/11/2014	1.3472	0.2891	1.0581	868.0		
9/12/2014	1.3737	0.3044	1.0693	891.0		
9/13/2014	1.4242	0.3257	1.0985	930.0		
9/14/2014	1.4238	0.3359	1.0879	936.0		
9/15/2014	1.4232	0.3461	1.0771	942.0		
9/16/2014	1.4240	0.3568	1.0672	949.0		
9/17/2014	1.4262	0.3680	1.0581	957.0		sampling date
9/18/2014	1.6566	0.3557	1.3010	946.0		
9/19/2014	1.8914	0.3454	1.5461	940.0		
9/20/2014	2.0617	0.3255	1.7363	907.0		
9/21/2014	2.1869	0.3023	1.8847	863.0		
9/22/2014	2.3926	0.2925	2.1001	856.0		
9/23/2014	2.6282	0.2864	2.3417	860.0		
9/24/2014	2.7730	0.2713	2.5017	836.0		sampling date
9/25/2014	2.5041	0.2572	2.2468	797.0		
9/26/2014	2.2963	0.2485	2.0478	774.0		
9/27/2014	1.9262	0.2203	1.7059	690.0		
9/28/2014	2.0566	0.2496	1.8069	786.0		
9/29/2014	1.8530	0.2398	1.6132	759.0		
9/30/2014	1.5977	0.2215	1.3762	705.0		
10/1/2014	1.6520	0.2469	1.4052	790.0		sampling date
10/2/2014	1.6043	0.2396	1.3647	771.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	**7/1/2014**	**through**	**6/30/2015**	**365**	**days in period**	

# of Days On-Line:	**356**	**# Days On-Line Flow > 0.0000**	**356**	**# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:**	**356**	**% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:**	**100%**

	TP MASS (lbs.)		**TP (lbs.)**	**AVERAGE**	**On-Line Unless**	
	INFLOW	**OUTFLOW**	**REMOVAL**	**DAILY FLOW**	**Otherwise Noted**	
TOTAL	**770.0271**	**304.4620**	**465.5651**	**gpm On-Line Flow > 0**	**Operational/**	
PER DAY	**2.1630**	**0.8552**	**1.3078**	**1148.7**	**Flow Status**	**Comments**
10/3/2014	1.6689	0.2491	1.4198	806.0		
10/4/2014	1.7491	0.2609	1.4882	849.0		
10/5/2014	1.7793	0.2653	1.5141	868.0		
10/6/2014	1.7398	0.2592	1.4806	853.0		
10/7/2014	1.7554	0.2614	1.4940	865.0		
10/8/2014	1.8030	0.2683	1.5347	893.0		sampling date
10/9/2014	1.8195	0.2927	1.5267	942.0		
10/10/2014	1.7333	0.3018	1.4315	940.0		
10/11/2014	1.6387	0.3092	1.3295	933.0		
10/12/2014	1.5503	0.3174	1.2329	929.0		
10/13/2014	1.4563	0.3242	1.1322	921.0		
10/14/2014	1.3563	0.3289	1.0273	908.0		
10/15/2014	1.3288	0.3521	0.9767	945.0		sampling date
10/16/2014	1.6008	0.3395	1.2613	907.0		
10/17/2014	1.8540	0.3282	1.5258	873.0		
10/18/2014	2.0531	0.3124	1.7407	827.0		
10/19/2014	2.2419	0.2994	1.9425	789.0		
10/20/2014	2.7202	0.3240	2.3962	850.0		
10/21/2014	2.9113	0.3132	2.5981	818.0		
10/22/2014	3.3420	0.3280	3.0139	853.0		sampling date
10/23/2014	3.4407	0.3531	3.0876	906.0		
10/24/2014	3.3318	0.3578	2.9741	906.0		
10/25/2014	3.2194	0.3620	2.8574	905.0		
10/26/2014	3.1038	0.3659	2.7379	903.0		
10/27/2014	2.9886	0.3697	2.6189	901.0		
10/28/2014	2.8707	0.3731	2.4976	898.0		
10/29/2014	2.7597	0.3773	2.3824	897.0		sampling date
10/30/2014	2.6712	0.3677	2.3035	885.0		
10/31/2014	2.6106	0.3619	2.2487	882.0		
11/1/2014	2.5243	0.3525	2.1718	870.0		
11/2/2014	2.4252	0.3412	2.0840	853.0		
11/3/2014	2.4395	0.3459	2.0935	876.0		
11/4/2014	2.4483	0.3500	2.0983	898.0		
11/5/2014	2.3612	0.3404	2.0208	885.0		sampling date
11/6/2014	2.3469	0.3260	2.0210	863.0		
11/7/2014	2.3859	0.3193	2.0666	861.0		
11/8/2014	2.3907	0.3083	2.0824	847.0		
11/9/2014	2.3969	0.2978	2.0991	834.0		
11/10/2014	2.0801	0.2490	1.8310	711.0		
11/11/2014	1.8577	0.2143	1.6434	624.0		
11/12/2014	1.9050	0.2117	1.6933	629.0		sampling date
11/13/2014	1.8934	0.2094	1.6840	632.0		
11/14/2014	2.2373	0.2463	1.9910	755.0		
11/15/2014	2.6054	0.2854	2.3200	889.0		
11/16/2014	2.6083	0.2843	2.3240	900.0		
11/17/2014	2.5904	0.2809	2.3094	904.0		
11/18/2014	2.5099	0.2708	2.2391	886.0		

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Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
11/19/2014	2.4138	0.2590	2.1548	862.0		sampling date
11/20/2014	2.3186	0.2666	2.0520	858.0		
11/21/2014	2.2998	0.2835	2.0163	883.0		
11/22/2014	2.3612	0.3121	2.0491	942.0		
11/23/2014	1.1466	0.1626	0.9839	476.0		
11/24/2014					Off-Line	power failure
11/25/2014					Off-Line	power failure
11/26/2014	1.0449	0.1840	0.8609	494.0		sampling date
11/27/2014	1.9448	0.3425	1.6024	915.0		
11/28/2014	1.9585	0.3448	1.6137	917.0		
11/29/2014	1.9830	0.3490	1.6340	924.0		
11/30/2014	2.0098	0.3536	1.6561	932.0		
12/1/2014	2.0367	0.3583	1.6784	940.0		
12/2/2014	2.0224	0.3557	1.6667	929.0		
12/3/2014	2.0036	0.3523	1.6513	916.0		sampling date
12/4/2014	1.9624	0.3263	1.6361	884.0		
12/5/2014	1.9867	0.3119	1.6748	882.0		
12/6/2014	2.0132	0.2980	1.7152	881.0		
12/7/2014	2.0350	0.2834	1.7516	878.0		
12/8/2014	2.0871	0.2729	1.8142	888.0		
12/9/2014	2.1471	0.2630	1.8841	901.0		
12/10/2014	2.1620	0.2474	1.9146	895.0		sampling date
12/11/2014	2.0339	0.2443	1.7896	873.0		
12/12/2014	1.9702	0.2487	1.7215	878.0		
12/13/2014	1.9229	0.2555	1.6674	891.0		
12/14/2014	1.8443	0.2582	1.5861	890.0		
12/15/2014	1.7540	0.2592	1.4948	883.0		
12/16/2014	1.6820	0.2629	1.4191	885.0		
12/17/2014	1.6206	0.2683	1.3523	893.0		sampling date
12/18/2014	1.5227	0.2698	1.2528	891.0		
12/19/2014	1.4204	0.2705	1.1500	886.0		
12/20/2014	1.3282	0.2729	1.0553	887.0		
12/21/2014	1.2289	0.2738	0.9551	883.0		
12/22/2014	1.1612	0.2822	0.8790	903.0		sampling date
12/23/2014	1.1902	0.2818	0.9084	917.0		
12/24/2014	1.2117	0.2795	0.9322	925.0		
12/25/2014	1.2057	0.2709	0.9348	912.0		
12/26/2014	1.2046	0.2636	0.9411	903.0		
12/27/2014	1.2087	0.2575	0.9513	898.0		
12/28/2014	1.2046	0.2497	0.9548	887.0		
12/29/2014	1.2166	0.2455	0.9712	888.0		sampling date
12/30/2014	1.2443	0.2460	0.9983	890.0		
12/31/2014	1.2579	0.2438	1.0141	882.0		
1/1/2015	1.2753	0.2424	1.0329	877.0		
1/2/2015	1.3607	0.2537	1.1069	918.0		
1/3/2015	1.4257	0.2609	1.1648	944.0		
1/4/2015	1.4568	0.2618	1.1950	947.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
1/5/2015	1.4865	0.2623	1.2242	949.0		
1/6/2015	1.4908	0.2584	1.2323	935.0		
1/7/2015	1.4310	0.2438	1.1872	882.0		sampling date
1/8/2015	1.4457	0.2387	1.2070	869.0		
1/9/2015	1.4934	0.2391	1.2543	876.0		
1/10/2015	1.5383	0.2390	1.2993	881.0		
1/11/2015	1.5764	0.2377	1.3386	882.0		
1/12/2015	1.6200	0.2373	1.3827	886.0		
1/13/2015	1.6378	0.2331	1.4047	876.0		
1/14/2015	1.6586	0.2295	1.4291	868.0		sampling date
1/15/2015	1.6664	0.2309	1.4355	862.0		
1/16/2015	1.6896	0.2344	1.4552	864.0		
1/17/2015	1.7088	0.2373	1.4715	864.0		
1/18/2015	1.7341	0.2411	1.4930	867.0		
1/19/2015	1.6827	0.2343	1.4484	832.0		
1/20/2015	1.8403	0.2565	1.5838	900.0		
1/21/2015	0.9302	0.1298	0.8004	450.0		sampling date
1/22/2015					Off-Line	pump failure
1/23/2015	0.9147	0.1252	0.7896	450.0		
1/24/2015	1.8140	0.2457	1.5684	900.0		
1/25/2015	1.7986	0.2410	1.5575	900.0		
1/26/2015	1.7950	0.2380	1.5570	906.0		
1/27/2015	1.7775	0.2331	1.5444	905.0		
1/28/2015	1.7581	0.2279	1.5302	903.0		sampling date
1/29/2015	1.7059	0.2287	1.4772	900.0		
1/30/2015	1.6540	0.2295	1.4245	897.0		
1/31/2015	1.6096	0.2313	1.3783	898.0		
2/1/2015	1.5651	0.2331	1.3320	899.0		
2/2/2015	1.5255	0.2357	1.2899	903.0		
2/3/2015	1.4807	0.2375	1.2432	904.0		
2/4/2015	1.4420	0.2403	1.2017	909.0		sampling date
2/5/2015	1.4193	0.2269	1.1924	887.0		
2/6/2015	1.4186	0.2173	1.2013	879.0		
2/7/2015	1.4355	0.2105	1.2251	882.0		
2/8/2015	1.4509	0.2034	1.2476	884.0		
2/9/2015	1.4598	0.1953	1.2644	882.0		
2/10/2015	1.4502	0.1850	1.2652	869.0		
2/11/2015	1.4789	0.1796	1.2994	879.0		sampling date
2/12/2015	1.4492	0.1894	1.2597	897.0		
2/13/2015	1.3721	0.1932	1.1789	886.0		
2/14/2015	1.2639	0.1918	1.0720	853.0		
2/15/2015	1.2124	0.1986	1.0138	857.0		
2/16/2015	1.1254	0.1993	0.9261	835.0		
2/17/2015	1.1168	0.2141	0.9028	872.0		
2/18/2015	1.0572	0.2198	0.8374	871.0		sampling date
2/19/2015	1.0096	0.2173	0.7923	861.0		
2/20/2015	0.9628	0.2148	0.7481	851.0		

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
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	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
2/21/2015	0.2638	0.0611	0.2028	242.0		
2/22/2015					Off-Line	equipment failure
2/23/2015	0.4031	0.1010	0.3022	400.0		
2/24/2015	0.8313	0.2170	0.6142	860.0		
2/25/2015	0.7894	0.2153	0.5741	853.0		sampling date
2/26/2015	0.8186	0.2146	0.6040	856.0		
2/27/2015	0.8737	0.2203	0.6534	885.0		
2/28/2015	1.0191	0.2475	0.7716	1001.0		
3/1/2015	1.0773	0.2521	0.8252	1027.0		
3/2/2015	1.0400	0.2348	0.8052	963.0		
3/3/2015	1.0342	0.2254	0.8088	931.0		
3/4/2015	1.0173	0.2142	0.8031	891.0		sampling date
3/5/2015	1.0084	0.2164	0.7920	894.0		
3/6/2015	1.0017	0.2192	0.7825	899.0		
3/7/2015	0.9938	0.2217	0.7721	903.0		
3/8/2015	1.0118	0.2302	0.7816	931.0		
3/9/2015	1.0108	0.2345	0.7763	942.0		
3/10/2015	1.0053	0.2379	0.7674	949.0		
3/11/2015	0.7068	0.1706	0.5362	676.0		sampling date
3/12/2015					Off-Line	pump failure
3/13/2015	0.0968	0.0220	0.0747	85.0		
3/14/2015					Off-Line	pump failure
3/15/2015					Off-Line	pump failure
3/16/2015	0.7447	0.1571	0.5875	583.0		
3/17/2015	1.2112	0.2498	0.9614	915.0		
3/18/2015	1.2865	0.2596	1.0269	939.0		sampling date
3/19/2015	1.2689	0.2610	1.0080	950.0		
3/20/2015	1.2207	0.2561	0.9646	938.0		
3/21/2015	0.7602	0.1628	0.5975	600.0		
3/22/2015					Off-Line	power failure
3/23/2015	0.5249	0.1173	0.4076	438.0		
3/24/2015	1.0779	0.2464	0.8315	926.0		
3/25/2015	1.0743	0.2514	0.8229	951.0		sampling date
3/26/2015	1.0596	0.2695	0.7901	975.0		
3/27/2015	1.0011	0.2766	0.7244	959.0		
3/28/2015	0.9319	0.2797	0.6521	931.0		
3/29/2015	0.8641	0.2818	0.5823	902.0		
3/30/2015	0.8071	0.2862	0.5209	882.0		
3/31/2015	0.7675	0.2961	0.4714	880.0		
4/1/2015	0.7397	0.3109	0.4288	892.0		sampling date
4/2/2015	0.7344	0.2990	0.4354	893.0		
4/3/2015	0.7234	0.2848	0.4386	887.0		
4/4/2015	0.7237	0.2751	0.4487	895.0		
4/5/2015	0.7136	0.2613	0.4523	890.0		
4/6/2015	0.7099	0.2499	0.4599	893.0		
4/7/2015	0.6998	0.2363	0.4635	888.0		
4/8/2015	0.6937	0.2241	0.4696	888.0		sampling date

WATERSHED TECHNOLOGIES						
Wolff Ditch TP Reduction & Operations Report						
for the period	7/1/2014	through	6/30/2015	365	days in period	

# of Days On-Line:	356	# Days On-Line Flow > 0.0000	356	# Days in Period Flow > 0.0000 Less Non-Controllable Down Time:	356	% Time On-Line vs. Available Days Excl. Uncontrollable Downtime:	100%

	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
4/9/2015	0.7091	0.2282	0.4809	892.0		
4/10/2015	0.7084	0.2271	0.4813	876.0		
4/11/2015	0.6990	0.2233	0.4757	850.0		
4/12/2015	0.4640	0.1477	0.3164	555.0		
4/13/2015	0.5286	0.1677	0.3609	622.0		
4/14/2015	0.8541	0.2700	0.5841	989.0		
4/15/2015	0.8615	0.2714	0.5901	982.0		sampling date
4/16/2015	0.8540	0.2632	0.5909	964.0		
4/17/2015	0.8426	0.2539	0.5887	942.0		
4/18/2015	0.8579	0.2528	0.6051	950.0		
4/19/2015	0.8624	0.2485	0.6139	946.0		
4/20/2015	0.8429	0.2375	0.6055	916.0		
4/21/2015	0.8480	0.2336	0.6145	913.0		
4/22/2015	0.8540	0.2299	0.6241	911.0		sampling date
4/23/2015	0.8207	0.2322	0.5885	914.0		
4/24/2015	0.7949	0.2369	0.5580	926.0		
4/25/2015	0.7731	0.2431	0.5300	944.0		
4/26/2015	0.7413	0.2465	0.4947	951.0		
4/27/2015	0.7193	0.2537	0.4656	972.0		
4/28/2015	0.6465	0.2425	0.4041	923.0		
4/29/2015	0.5896	0.2358	0.3538	892.0		sampling date
4/30/2015	0.2368	0.0931	0.1436	350.0		
5/1/2015	0.3466	0.1342	0.2125	501.0		
5/2/2015	0.6826	0.2601	0.4225	965.0		
5/3/2015	0.6997	0.2626	0.4371	968.0		
5/4/2015	0.7235	0.2675	0.4560	980.0		
5/5/2015	0.7356	0.2681	0.4675	976.0		
5/6/2015	0.7376	0.2651	0.4725	959.0		sampling date
5/7/2015	0.6996	0.2574	0.4422	961.0		
5/8/2015	0.6600	0.2491	0.4108	961.0		
5/9/2015	0.6204	0.2409	0.3795	961.0		
5/10/2015	0.5904	0.2365	0.3539	977.0		
5/11/2015	0.5513	0.2286	0.3227	979.0		
5/12/2015	0.4995	0.2152	0.2842	957.0		
5/13/2015	0.4581	0.2062	0.2520	953.0		sampling date
5/14/2015	0.4808	0.2063	0.2745	969.0		
5/15/2015	0.4953	0.2028	0.2925	968.0		
5/16/2015	0.5060	0.1978	0.3082	960.0		
5/17/2015	0.5073	0.1894	0.3178	935.0		
5/18/2015	0.5133	0.1832	0.3301	920.0		
5/19/2015	0.5224	0.1783	0.3441	911.0		
5/20/2015	0.5388	0.1759	0.3629	915.0		sampling date
5/21/2015	0.5347	0.1782	0.3565	895.0		
5/22/2015	0.5612	0.1908	0.3704	926.0		
5/23/2015	0.5716	0.1980	0.3736	930.0		
5/24/2015	0.5908	0.2083	0.3825	948.0		
5/25/2015	0.6034	0.2164	0.3869	955.0		

WATERSHED TECHNOLOGIES						
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	TP MASS (lbs.)		TP (lbs.)	AVERAGE	On-Line Unless	
	INFLOW	OUTFLOW	REMOVAL	DAILY FLOW	Otherwise Noted	
TOTAL	770.0271	304.4620	465.5651	gpm On-Line Flow > 0	Operational/	
PER DAY	2.1630	0.8552	1.3078	1148.7	Flow Status	Comments
5/26/2015	0.6084	0.2218	0.3866	950.0		
5/27/2015	0.6068	0.2247	0.3821	935.0		sampling date
5/28/2015	0.5882	0.2178	0.3704	926.0		
5/29/2015	0.5805	0.2149	0.3656	934.0		
5/30/2015	0.5591	0.2069	0.3522	920.0		
5/31/2015	0.5406	0.2000	0.3406	910.0		
6/1/2015	0.5292	0.1957	0.3335	912.0		
6/2/2015	0.5309	0.1963	0.3346	937.0		
6/3/2015	0.5081	0.1878	0.3203	919.0		sampling date
6/4/2015	0.5114	0.1906	0.3208	925.0		
6/5/2015	0.5114	0.1922	0.3192	925.0		
6/6/2015	0.5235	0.1984	0.3252	947.0		
6/7/2015	0.5213	0.1991	0.3222	943.0		
6/8/2015	0.5158	0.1986	0.3172	933.0		
6/9/2015	0.5191	0.2015	0.3176	939.0		
6/10/2015	0.5003	0.1958	0.3045	905.0		sampling date
6/11/2015	0.5034	0.1958	0.3076	905.0		
6/12/2015	0.5306	0.2051	0.3255	948.0		
6/13/2015	0.5569	0.2139	0.3430	989.0		
6/14/2015	0.5535	0.2113	0.3422	977.0		
6/15/2015	0.5495	0.2085	0.3409	964.0		
6/16/2015	0.5505	0.2077	0.3428	960.0		
6/17/2015	0.5549	0.2081	0.3468	962.0		sampling date
6/18/2015	0.5627	0.2085	0.3542	964.0		
6/19/2015	0.5782	0.2118	0.3664	979.0		
6/20/2015	0.5957	0.2157	0.3800	997.0		
6/21/2015	0.5983	0.2142	0.3841	990.0		
6/22/2015	0.5941	0.2103	0.3838	972.0		
6/23/2015	0.5921	0.2072	0.3849	958.0		
6/24/2015	0.5912	0.2046	0.3865	946.0		sampling date
6/25/2015	0.6068	0.2101	0.3968	971.0		
6/26/2015	0.6087	0.2107	0.3980	974.0		
6/27/2015	0.6056	0.2096	0.3959	969.0		
6/28/2015	0.5968	0.2066	0.3902	955.0		
6/29/2015	0.5812	0.2012	0.3800	930.0		
6/30/2015	0.5762	0.1995	0.3767	922.0		

Key Parameters Sites 1-3, 5-7
Periods 1-7 (See Notes & Assumptions)
***Projected Full Capacity Utilization**

Site	Parameter	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Nubbin Slough	Cost per Day*	$1,294	$895	$818	$ 720	$ 818	$ 1,592	$ 801
Nubbin Slough	P Removal per Day	25.34	27.52	27.18	23.81	23.93	22.26	33.74
Nubbin Slough	Cost/Benefit $/lb. PV*	$51	$33	$30	$ 30	$ 34	$ 72	$ 24
Nubbin Slough	Cost/Benefit $/lb. Amortized Loan*	N/A	N/A	N/A	$ 70	$ 80	$ 166	$ 55
Nubbin Slough	# Days in Period	365	365	206	274	365	365	365
Nubbin Slough	On-line Days Flow>0	319	241	125	194	355	348	332
Nubbin Slough	Flow Average per day in cfs	1.2	0.5	1.9	1.5	1.1	1.0	1.4
Nubbin Slough	Capacity per day in cfs	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Nubbin Slough	% Capacity Utilization	16%	7%	26%	20%	15%	14%	19%
Nubbin Slough	Total Flow in millions of gallons	245.1	81.0	154.7	183.5	255.8	235.7	296.0
Nubbin Slough	FWM TP Conc. In µg/L	905	794	792	819	775	799	1,011
Nubbin Slough	FWM TP Conc. Out µg/L	274	73	109	231	169	247	179
Nubbin Slough	% Change TP Conc. In vs. Out	70%	91%	86%	72%	78%	69%	82%
Nubbin Slough	Total P Removal in lbs.	1,299	466	879	914	1,280	1,097	2,088
Nubbin Slough	Comments	Trials	Limerock				Limerock	Improvements
Ideal Grove	Cost per Day*	$284	$144	$227	$ 454	$ 284	$ 383	$ 414
Ideal Grove	P Removal per Day	1.49	1.71	2.10	2.79	4.21	5.71	5.25
Ideal Grove	Cost/Benefit $/lb. PV*	$191	$85	$108	$ 163	$ 67	$ 67	$ 79
Ideal Grove	Cost/Benefit $/lb. Amortized Loan*	N/A	N/A	N/A	$ 379	$ 157	$ 156	$ 183
Ideal Grove	# Days in Period	365	365	206	274	365	365	365
Ideal Grove	On-line Days Flow>0	N/A	253	148	261	341	362	313
Ideal Grove	Flow Average per day in cfs	0.3	0.3	0.2	0.1	0.1	0.1	0.2
Ideal Grove	Capacity per day in cfs	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Ideal Grove	% Capacity Utilization	24%	19%	14%	10%	8%	9%	12%
Ideal Grove	Total Flow in millions of gallons	18	18	18	21	23	27	31
Ideal Grove	FWM TP Conc. In µg/L	N/A	258	347	421	623	862	814
Ideal Grove	FWM TP Conc. Out µg/L	N/A	16	50	19	24	48	56
Ideal Grove	% Change TP Conc. In vs. Out	N/A	94%	86%	96%	96%	94%	93%
Ideal Grove	Total P Removal in lbs.	83	84	45	71	117	183	195
Ideal Grove	Comments	Trials						
Mosquito Creek	Cost per Day*	$746	$609	$927	$ 1,112	$ 1,684	$ 1,408	$ 894
Mosquito Creek	P Removal per Day	13.89	8.78	11.56	11.38	13.68	15.93	15.53
Mosquito Creek	Cost/Benefit $/lb. PV*	$54	$69	$80	$ 98	$ 123	$ 88	$ 58
Mosquito Creek	Cost/Benefit $/lb. Amortized Loan*	N/A	N/A	N/A	$ 228	$ 287	$ 206	$ 134
Mosquito Creek	# Days in Period	365	365	206	274	365	365	365
Mosquito Creek	On-line Days Flow>0	N/A	312	131	229	335	302	332
Mosquito Creek	Flow Average per day in cfs	1.2	1.5	2.3	1.5	1.6	1.7	1.9
Mosquito Creek	Capacity per day in cfs	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Mosquito Creek	% Capacity Utilization	20%	24%	39%	26%	27%	28%	32%

Key Parameters Sites 1-3, 5-7
Periods 1-7 (See Notes & Assumptions)
***Projected Full Capacity Utilization**

Site	Parameter	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Mosquito Creek	Total Flow in millions of gallons	103.6	293.1	198.3	228.0	344.3	330.4	413.0
Mosquito Creek	FWM TP Conc. In µg/L	N/A	345	506	435	541	640	621
Mosquito Creek	FWM TP Conc. Out µg/L	N/A	61	149	85	118	150	142
Mosquito Creek	% Change TP Conc. In vs. Out	N/A	82%	70%	81%	78%	77%	77%
Mosquito Creek	Total P Removal in lbs.	373	664	591	669	1,214	1,357	1,653
Mosquito Creek	Comments	Trials	Limerock					Improvements
Lemkin Creek	Cost per Day*		$382	$527	$ 391	$ 460	$ 333	$ 581
Lemkin Creek	P Removal per Day		1.46	1.47	1.51	1.62	1.97	2.48
Lemkin Creek	P Removal per Day So. Pond					1.74	2.30	2.86
Lemkin Creek	Cost/Benefit $/lb. PV* at Site		$261	$359	$ 259	$ 283	$ 169	$ 234
Lemkin Creek	Cost/Benefit $/lb. Amortized Loan*		N/A	N/A	$ 604	$ 659	$ 393	$ 546
Lemkin Creek	Cost/Benefit $/lb. PV So. Pond*					$ 264	$ 145	$ 203
Lemkin Creek	Cost/Benefit $/lb. Amortized Loan So. Pond*					$ 614	$ 337	$ 473
Lemkin Creek	Cost/Benefit $/lb. PV So. Pond Cost Avoidance*							$ 191
Lemkin Creek	Cost/Benefit $/lb. Amortized Loan So. Pond*							$ 445
Lemkin Creek	# Days in Period		365	206	274	365	$ 365	$ 365
Lemkin Creek	On-line Days Flow>0		338	129	267	361	$ 358	$ 343
Lemkin Creek	Flow Average per day in cfs		1.6	1.3	1.8	1.9	$ 2	$ 2
Lemkin Creek	Capacity per day in cfs		5.0	5.0	5.0	5.0	$ 5	$ 5
Lemkin Creek	% Capacity Utilization		31%	26%	37%	38%	36%	45%
Lemkin Creek	Total Flow in millions of gallons		342.9	109.9	318.9	444.6	$ 416	$ 496
Lemkin Creek	FWM TP Conc. In µg/L		85	76	87	85	101	132
Lemkin Creek	FWM TP Conc. Out µg/L at Site		30	22	31	24	$ 29	$ 42
Lemkin Creek	% Change TP Conc. In vs. Out at Site		64%	71%	64%	71%	71%	68%
Lemkin Creek	FWM TP Conc. Out µg/L So. Pond					20	$ 17	$ 28
Lemkin Creek	% Change TP In vs. Out So. Pond					76%	83%	79%
Lemkin Creek	Total P Removal in lbs.		155	50	149	223	$ 254	$ 380
Lemkin Creek	Comments			Low Flows				Improvements
Wolff Ditch	Cost per Day*		$469	$577	$ 742	$ 1,188	$ 1,507	$ 975
Wolff Ditch	P Removal per Day		9.24	2.29	6.52	11.29	13.11	10.22
Wolff Ditch	P Removal per Day So. Pond					14.42	$ 14	$ 13
Wolff Ditch	Cost/Benefit $/lb. PV* at Site		$51	$252	$ 114	$ 105	$ 115	$ 95
Wolff Ditch	Cost/Benefit $/lb. Amortized Loan*		N/A	N/A	$ 265	$ 245	$ 268	$ 222
Wolff Ditch	Cost/Benefit $/lb. PV So. Pond*					$ 82	$ 109	$ 75
Wolff Ditch	Cost/Benefit $/lb. Amortized Loan So. Pond*					$ 192	$ 253	$ 175
Wolff Ditch	Cost/Benefit $/lb. PV So. Pond Cost Avoidance*							$ 65
Wolff Ditch	Cost/Benefit $/lb. Amortized Loan So. Pond*							$ 150
Wolff Ditch	# Days in Period		365	206	274	365	$ 365	$ 365
Wolff Ditch	On-line Days Flow>0		350	155	262	357	$ 364	$ 356

Key Parameters Sites 1-3, 5-7
Periods 1-7 (See Notes & Assumptions)
***Projected Full Capacity Utilization**

Site	Parameter	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Wolff Ditch	Flow Average per day in cfs		2.4	3.2	3.3	2.3	$ 2	$ 3
Wolff Ditch	Capacity per day in cfs		20.0	20.0	20.0	20.0	$ 20	$ 20
Wolff Ditch	% Capacity Utilization		12%	16%	17%	12%	8%	13%
Wolff Ditch	Total Flow in millions of gallons		550.8	323.2	565.0	540.1	$ 400	$ 589
Wolff Ditch	FWM TP Conc. In µg/L		114	44	95	156	146	156
Wolff Ditch	FWM TP Conc. Out µg/L at Site		28	23	35	52	$ 24	$ 62
Wolff Ditch	% Change TP Conc. In vs. Out at Site		75%	48%	63%	66%	83%	61%
Wolff Ditch	FWM TP Conc. Out µg/L So. Pond					23	$ 17	$ 36
Wolff Ditch	% Change TP In vs. Out So. Pond					85%	88%	77%
Wolff Ditch	Total P Removal in lbs.		393	57	285	472	$ 405	$ 466
Wolff Ditch	Comments			Low Flows				Improvements
Grassy Island	Cost per Day*			$2,017	$ 1,457	$ 3,858	$ 3,763	$ 4,274
Grassy Island	P Removal per Day			22.12	16.17	63.43	64.26	60.50
Grassy Island	Cost/Benefit $/lb. PV*			$91	$ 90	$ 61	$ 59	$ 71
Grassy Island	Cost/Benefit $/lb. Amortized Loan*			N/A	$ 210	$ 142	$ 136	$ 164
Grassy Island	# Days in Period			206	231	365	365	365
Grassy Island	On-line Days Flow>0			125	120	314	362	360
Grassy Island	Flow Average per day in cfs			6.9	5.0	6.8	8.6	7.2
Grassy Island	Capacity per day in cfs			10.0	10.0	15.8	20.0	25.8
Grassy Island	% Capacity Utilization			69%	50%	62%	43%	28%
Grassy Island	Total Flow in millions of gallons			554.2	388.3	1,373.6	2,012.8	1,681.9
Grassy Island	FWM TP Conc. In µg/L			575	327	442	490	411
Grassy Island	FWM TP Conc. Out µg/L			165	27	50	93	40
Grassy Island	% Change TP Conc. In vs. Out			71%	92%	89%	81%	90%
Grassy Island	Total P Removal in lbs.			1,897	971	4,493	6,670	5,248
Grassy Island	N Removal per Day*							207.0
Grassy Island	Cost/Benefit $/lb. PV* N							$ 21
Grassy Island	Cost/Benefit $/lb. Amortized Loan* N							$ 48

TREATMENT DAYS SITES 1-3, 5-7
ALL PERIODS

Site	Parameter	Pd 1	Pd 2	Pd 3	Pd 4	Pd 5	Pd 6	Pd 7
Nubbin	# Days in Period		365	206	274	365	365	365
Nubbin	# Days On-line		265	199	234	359	350	332
Nubbin	# Days On-line Flow > 0		241	125	194	355	348	332
Nubbin	# Days in *Period* Flow >0.0000 Less Non-Controllable Down Time		283	125	208	355	361	347
Nubbin	% Days On-Line vs. Available Days*		85%	100%	93%	100%	96%	96%
Nubbin	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.						
Ideal	# Days in Period		365	206	274	365	365	365
Ideal	# Days On-line		358	197	262	361	362	313
Ideal	# Days On-line Flow > 0		253	148	261	341	362	313
Ideal	# Days in Period Flow >0.0000 Less Non-Controllable Down Time		257	148	267	341	364	313
Ideal	% Days On-Line vs. Available Days*		98%	100%	98%	100%	99%	100%
Ideal	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.						
Mosquito	# Days in Period		365	206	274	365	365	365
Mosquito	# Days On-line		324	193	254	337	310	332
Mosquito	# Days On-line Flow > 0		312	131	229	335	302	332
Mosquito	# Days in Period Flow >0.0000 Less Non-Controllable Down Time		312	132	235	346	344	332
Mosquito	% Days On-Line vs. Available Days*		100%	99%	97%	97%	88%	100%
Mosquito	Facility Purpose	Remove P & N in cost-effective & environmentally sound manner.						
Lemkin	# Days in Period		365	206	274	365	365	365
Lemkin	# Days On-line		338	201	267	361	358	343
Lemkin	# Days On-line Flow > 0		338	129	267	361	358	343
Lemkin	# Days in Period Flow >0.0000 Less Non-Controllable Down Time		338	129	267	361	358	343
Lemkin	% Days On-Line vs. Available Days*		100%	100%	100%	100%	100%	100%
Lemkin	Facility Purpose	Remove P & N in cost-effective; environmentally sound; provide flow downstream wetlands.						
Wolff	# Days in Period		365	206	274	365	365	365
Wolff	# Days On-line		350	203	262	357	364	356
Wolff	# Days On-line Flow > 0		350	155	262	357	364	356

TREATMENT DAYS SITES 1-3, 5-7
ALL PERIODS

Site	Parameter	Pd 1	Pd 2	Pd 3	Pd 4	Pd 5	Pd 6	Pd 7
Wolff	# Days in Period Flow >0.0000 Less Non-Controllable Down Time		356	155	262	357	364	356
Wolff	% Days On-Line vs. Available Days*		98%	100%	100%	100%	100%	100%
Wolff	Facility Purpose	Remove P & N in cost-effective; environmentally sound; provide flow downstream wetlands.						
Grassy	# Days in Period			206	231	365	365	365
Grassy	# Days On-line				120	321	362	360
Grassy	# Days On-line Flow > 0			125	120	314	362	360
Grassy	# Days in Period Flow >0.0000 Less Non-Controllable Down Time				120	316	362	360
Grassy	% Days On-Line vs. Available Days*				100%	99%	100%	100%
Grassy	Facility Purpose	Remove P & N in cost-effective; environmentally sound; provide flow downstream wetlands.						

Site	Parameter	Pd 1***	Pd 2	Pd 3	Pd 4	
Nubbin	On-line Flow Days >0 (184 Day Period)					
Nubbin	FWM Inflow Conc. in µg/L					
Nubbin	FWM Outflow Conc. in µg/L			73	109	231
Nubbin	Tributary TMDL* Met FWM Outflow Conc.			YES	YES	NO
Nubbin	Lake TMDL** Met FWM Outflow Conc.			NO	NO	NO
Nubbin	% Samples Inflow Meeting Tributary	0%		0%	0%	0%
Nubbin	% Samples Outflow Meeting Tributary	52%		90%	81%	45%
Nubbin	Facility Purpose	Remove P & N in cost-effective & environmentally sour				
Ideal	On-line Flow Days >0 (184 Day Period)					
Ideal	FWM Inflow Conc. in µg/L					
Ideal	FWM Outflow Conc. in µg/L			16	50	19
Ideal	Conc.			YES	YES	YES
Ideal	Lake TMDL** Met for FWM Outflow Conc.			YES	NO	YES
Ideal	% Samples Inflow Meeting Tributary			39%	30%	17%
Ideal	% Samples Outflow Meeting Tributary			92%	89%	100%
Ideal	Facility Purpose	Remove P & N in cost-effective & environmentally sour				
Mosquito	On-line Flow Days >0 (184 Day Period)					
Mosquito	FWM Inflow Conc. in µg/L					
Mosquito	FWM Outflow Conc. in µg/L			61	149	84.6
Mosquito	Conc.			YES	NO	YES
Mosquito	Lake TMDL** Met for FWM Outflow Conc.			NO	NO	NO
Mosquito	% Samples Inflow Meeting Tributary			7%	0%	2%
Mosquito	% Samples Outflow Meeting Tributary			80%	51%	72%
Mosquito	Facility Purpose	Remove P & N in cost-effective & environmentally sour				
Lemkin	On-line Flow Days >0 (184 Day Period)					
Lemkin	FWM Inflow Conc. in µg/L					
Lemkin	FWM Outflow Conc. in µg/L			30	22	31
Lemkin	Conc.			YES	YES	YES
Lemkin	Lake TMDL** Met for FWM Outflow Conc.			YES	YES	YES
Lemkin	% Samples Inflow Meeting Tributary			85%	91%	83%
Lemkin	% Samples Outflow Meeting Tributary			94%	100%	100%
Lemkin	Facility Purpose	Remove P in cost-effective environmentally sound manner;				
Wolff	On-line Flow Days >0 (184 Day Period)					
Wolff	FWM Inflow Conc. in µg/L					
Wolff	FWM Outflow Conc. in µg/L			28	23	35.1
Wolff	Conc.			YES	YES	YES
Wolff	Lake TMDL** Met for FWM Outflow Conc.			YES	YES	YES
Wolff	% Samples Inflow Meeting Tributary			63%	100%	74%
Wolff	% Samples Outflow Meeting Tributary			94%	100%	100%
Wolff	Facility Purpose	Remove P in cost-effective environmentally sound manner;				
Grassy	On-line Flow Days >0 (184 Day Period)					
Grassy	FWM Inflow Conc. in µg/L					
Grassy	FWM Outflow Conc. in µg/L					27
Grassy	Conc.					YES
Grassy	Lake TMDL** Met for FWM Outflow Conc.					YES
Grassy	% Samples Inflow Meeting Tributary					4%
Grassy	% Samples Outflow Meeting Tributary					100%

Grassy	Facility Purpose	Remove P in cost-effective environmentally sound manner; pro

Pd 5	Pd 6	Pd 7	
		348	332
		799	1,011
	169	247	179
	NO	NO	NO
	NO	NO	NO
	0%	0%	0%
	53%	49%	43%
ıd manner.			
		362	313
		862	814
	24	48	56
	YES	YES	YES
	YES	NO	NO
	9%	6%	8%
	91%	87%	86%
ıd manner.			
		302	332
		640	621
	118	150	142
	NO	NO	NO
	NO	NO	NO
	4%	6%	6%
	65%	46%	52%
ıd manner.			
		358	343
		101	132
	24	29	42
	YES	YES	YES
	YES	YES	NO
	81%	73%	48%
	94%	94%	93%
provide flow downstream wetlands.			
		364	356
		146	156
	52	24	62
	YES	YES	YES
	NO	YES	NO
	72%	56%	42%
	92%	94%	86%
provide flow downstream wetlands.			
		362	360
		490	411
	50	93	40
	YES	YES	YES
	NO	NO	YES
	2%	1%	3%
	89%	82%	93%

ovide lower input conc. downstream waters.

HWTT

Estimated Replacement Costs Order of Magnitude Excluding Labor & Overhead
in 2010 - 2013 dollars (See Note)

System Life in Years 50

Net Discount Rate Compounded Annually
(6% ROR less 2% inflation) 4%

RC = Replacement Cost

Item	Average Estimated Life	Estimated RC* in 2010 - 2013 Dollars	PV* in 2010 - 2013 Dollars	Year 2020	Year 2030	Year 2040	Year 2050	# of Replace-ments
Site 1 Nubbin Slough								
Pumps	10	$ 14,000	$ 23,100	$ 9,500	$ 6,400	$ 4,300	$ 2,900	4
Limerock (projected life 5-10 years)	10	34,110	56,200	23,000	15,600	10,500	7,100	4
Monitoring & Control Equipment	10	20,000	33,000	13,500	9,100	6,200	4,200	4
Total Replacement Cost		$ 68,110	$ 112,300	$ 46,000	$ 31,100	$ 21,000	$ 14,200	
Site 2 Ideal Grove								
Pumps	10	$ 4,000	$ 6,500	$ 2,700	$ 1,800	$ 1,200	$ 800	4
Limerock (projected life 5-10 years)	10	-	-	-	-	-	-	4
Monitoring & Control Equipment	10	8,000	13,300	5,400	3,700	2,500	1,700	4
Total Replacement Cost		$ 12,000	$ 19,800	$ 8,100	$ 5,500	$ 3,700	$ 2,500	
Site 3 Mosquito Creek								
Pumps	10	$ 16,000	$ 26,300	$ 10,800	$ 7,300	$ 4,900	$ 3,300	4
Limerock (projected life 5-10 years)	10	35,000	57,700	23,600	16,000	10,800	7,300	4
Monitoring & Control Equipment	10	13,000	21,400	8,800	5,900	4,000	2,700	4
Total Replacement Cost		$ 64,000	$ 105,400	$ 43,200	$ 29,200	$ 19,700	$ 13,300	
Site 5 Lemkin Creek								
Pumps	10	$ 32,000	$ 52,800	$ 21,600	$ 14,600	$ 9,900	$ 6,700	4
Limerock (projected life 5-10 years)	10	8,750	14,400	5,900	4,000	2,700	1,800	4
Monitoring & Control Equipment	10	16,000	26,300	10,800	7,300	4,900	3,300	4
Total Replacement Cost		$ 56,750	$ 93,500	$ 38,300	$ 25,900	$ 17,500	$ 11,800	
Site 6 Wolff Ditch								
Pumps	10	$ 59,000	$ 97,300	$ 39,900	$ 26,900	$ 18,200	$ 12,300	4
Limerock (projected life 5-10 years)	10	8,750	14,400	5,900	4,000	2,700	1,800	4
Monitoring & Control Equipment	10	18,000	29,600	12,200	8,200	5,500	3,700	4
Total Replacement Cost		$ 85,750	$ 141,300	$ 58,000	$ 39,100	$ 26,400	$ 17,800	
Site 7 Grassy Island through Phase III								
Pumps	10	212,450	$ 350,300	$ 143,500	$ 97,000	$ 65,500	$ 44,300	4
Limerock (projected life 5-10 years)	10	77,050	127,100	52,100	35,200	23,800	16,000	4
Monitoring & Control Equipment	10	81,450	134,300	55,000	37,200	25,100	17,000	4
Total Replacement Cost		$ 370,950	$ 611,700	$ 250,600	$ 169,400	$ 114,400	$ 77,300	
Total Replacement Costs		$ 657,560	$ 1,084,000					

Note: The information contained herein is based upon a set of assumptions including estimated current year costs, life & discount rates.

HWTT

Estimated Replacement Costs Order of Magnitude Excluding Labor & Overhead

Determination of Future Value & Present Value in 2010 - 2013 dollars (See Note)

ROR	Inflation
6.0%	2.0%

2020		2030		2040		2050		50 years	
Future Value	Present Value	Future Value	Present Value	Future Value	Present Value	Future Value	Present Value	Total Present Value	Difference Net vs. 2 Step Calc.
$ 17,066	$ 9,500	$ 20,803	$ 6,500	$ 25,359	$ 4,400	$ 30,913	$ 3,000	$ 23,400	
41,580	23,200	50,686	15,800	61,786	10,800	75,316	7,300	57,100	
24,380	13,600	29,719	9,300	36,227	6,300	44,161	4,300	33,500	
$ 83,026	$ 46,300	$ 101,208	$ 31,600	$ 123,372	$ 21,500	$ 150,390	$ 14,600	$ 114,000	$ (1,700)
$ 4,876	$ 2,700	$ 5,944	$ 1,900	$ 7,245	$ 1,300	$ 8,832	$ 900	$ 6,800	
-	-	-	-	-	-	-	-	-	
9,752	5,400	11,888	3,700	14,491	2,500	17,664	1,700	13,300	
$ 14,628	$ 8,100	$ 17,831	$ 5,600	$ 21,736	$ 3,800	$ 26,496	$ 2,600	$ 20,100	$ (300)
$ 19,504	$ 10,900	$ 23,775	$ 7,400	$ 28,982	$ 5,000	$ 35,329	$ 3,400	$ 26,700	
42,665	23,800	52,008	16,200	63,398	11,000	77,281	7,500	58,500	
15,847	8,800	19,317	6,000	23,548	4,100	28,705	2,800	21,700	
$ 78,016	$ 43,500	$ 95,101	$ 29,600	$ 115,927	$ 20,100	$ 141,315	$ 13,700	$ 106,900	$ (1,500)
$ 39,008	$ 21,800	$ 47,550	$ 14,800	$ 57,964	$ 10,100	$ 70,657	$ 6,900	$ 53,600	
10,666	6,000	13,002	4,100	15,849	2,800	19,320	1,900	14,800	
19,504	10,900	23,775	7,400	28,982	5,000	35,329	3,400	26,700	
$ 69,178	$ 38,700	$ 84,328	$ 26,300	$ 102,795	$ 17,900	$ 125,306	$ 12,200	$ 95,100	$ (1,600)
$ 71,921	$ 40,200	$ 87,671	$ 27,300	$ 106,870	$ 18,600	$ 130,274	$ 12,700	$ 98,800	
10,666	6,000	13,002	4,100	15,849	2,800	19,320	1,900	14,800	
21,942	12,300	26,747	8,300	32,605	5,700	39,745	3,900	30,200	
$ 104,529	$ 58,500	$ 127,420	$ 39,700	$ 155,324	$ 27,100	$ 189,339	$ 18,500	$ 143,800	$ (2,500)
$ 258,975	$ 144,600	$ 315,690	$ 98,400	$ 384,824	$ 67,000	$ 469,098	$ 45,600	$ 355,600	
93,924	52,400	114,492	35,700	139,565	24,300	170,129	16,500	128,900	
99,287	55,400	121,030	37,700	147,535	25,700	179,845	17,500	136,300	
$ 452,186	$ 252,400	$ 551,212	$ 171,800	$ 671,925	$ 117,000	$ 819,072	$ 79,600	$ 620,800	$ (9,100)
								$ 1,100,700	$ (16,700)

Note: The information contained herein is based upon a set of assumptions including estimated current year costs, life & discount rates

HWTT
Estimated Replacement Costs Order of Magnitude Excluding Labor & Overhead
in 2010 - 2013 dollars (See Note)
System Life in Years 50
Net Discount Rate Compounded Annually
(7% ROR less 2% inflation) 3%
RC = Replacement Cost

Item	Average Estimated Life in Years	Estimated RC* in 2010 - 2013 Dollars	Present Value* in 2010 - 2013 Dollars	Year 2020	Year 2030	Year 2040	Year 2050	# of Replace-ments
Site 1 Nubbin Slough								
Pumps	10	$ 14,000	$ 28,300	$ 10,400	$ 7,800	$ 5,800	$ 4,300	4
Limerock (projected life 5-10 years)	10	34,110	68,900	25,400	18,900	14,100	10,500	4
Monitoring & Control Equipment	10	20,000	40,300	14,900	11,100	8,200	6,100	4
Total Replacement Cost		$ 68,110	$ 137,500	$ 50,700	$ 37,800	$ 28,100	$ 20,900	
Site 2 Ideal Grove								
Pumps	10	$ 4,000	$ 8,000	$ 3,000	$ 2,200	$ 1,600	$ 1,200	4
Limerock (projected life 5-10 years)	10	-	-	-	-	-	-	4
Monitoring & Control Equipment	10	8,000	16,200	6,000	4,400	3,300	2,500	4
Total Replacement Cost		$ 12,000	$ 24,200	$ 9,000	$ 6,600	$ 4,900	$ 3,700	
Site 3 Mosquito Creek								
Pumps	10	$ 16,000	$ 32,300	$ 11,900	$ 8,900	$ 6,600	$ 4,900	4
Limerock (projected life 5-10 years)	10	35,000	70,500	26,000	19,400	14,400	10,700	4
Monitoring & Control Equipment	10	13,000	26,300	9,700	7,200	5,400	4,000	4
Total Replacement Cost		$ 64,000	$ 129,100	$ 47,600	$ 35,500	$ 26,400	$ 19,600	
Site 5 Lemkin Creek								
Pumps	10	$ 32,000	$ 64,500	$ 23,800	$ 17,700	$ 13,200	$ 9,800	4
Limerock (projected life 5-10 years)	10	8,750	17,600	6,500	4,800	3,600	2,700	4
Monitoring & Control Equipment	10	16,000	32,300	11,900	8,900	6,600	4,900	4
Total Replacement Cost		$ 56,750	$ 114,400	$ 42,200	$ 31,400	$ 23,400	$ 17,400	
Site 6 Wolff Ditch								
Pumps	10	$ 59,000	$ 119,000	$ 43,900	$ 32,700	$ 24,300	$ 18,100	4
Limerock (projected life 5-10 years)	10	8,750	17,600	6,500	4,800	3,600	2,700	4
Monitoring & Control Equipment	10	18,000	36,300	13,400	10,000	7,400	5,500	4
Total Replacement Cost		$ 85,750	$ 172,900	$ 63,800	$ 47,500	$ 35,300	$ 26,300	
Site 7 Grassy Island								
Pumps	10	$ 140,000	$ 282,300	$ 104,200	$ 77,500	$ 57,700	$ 42,900	4
Limerock (projected life 5-10 years)	10	77,050	155,300	57,300	42,700	31,700	23,600	4
Monitoring & Control Equipment	10	43,050	86,700	32,000	23,800	17,700	13,200	4
Total Replacement Cost		$ 260,100	$ 524,300	$ 193,500	$ 144,000	$ 107,100	$ 79,700	
Total Replacement Costs		$ 546,710	$ 1,102,400					

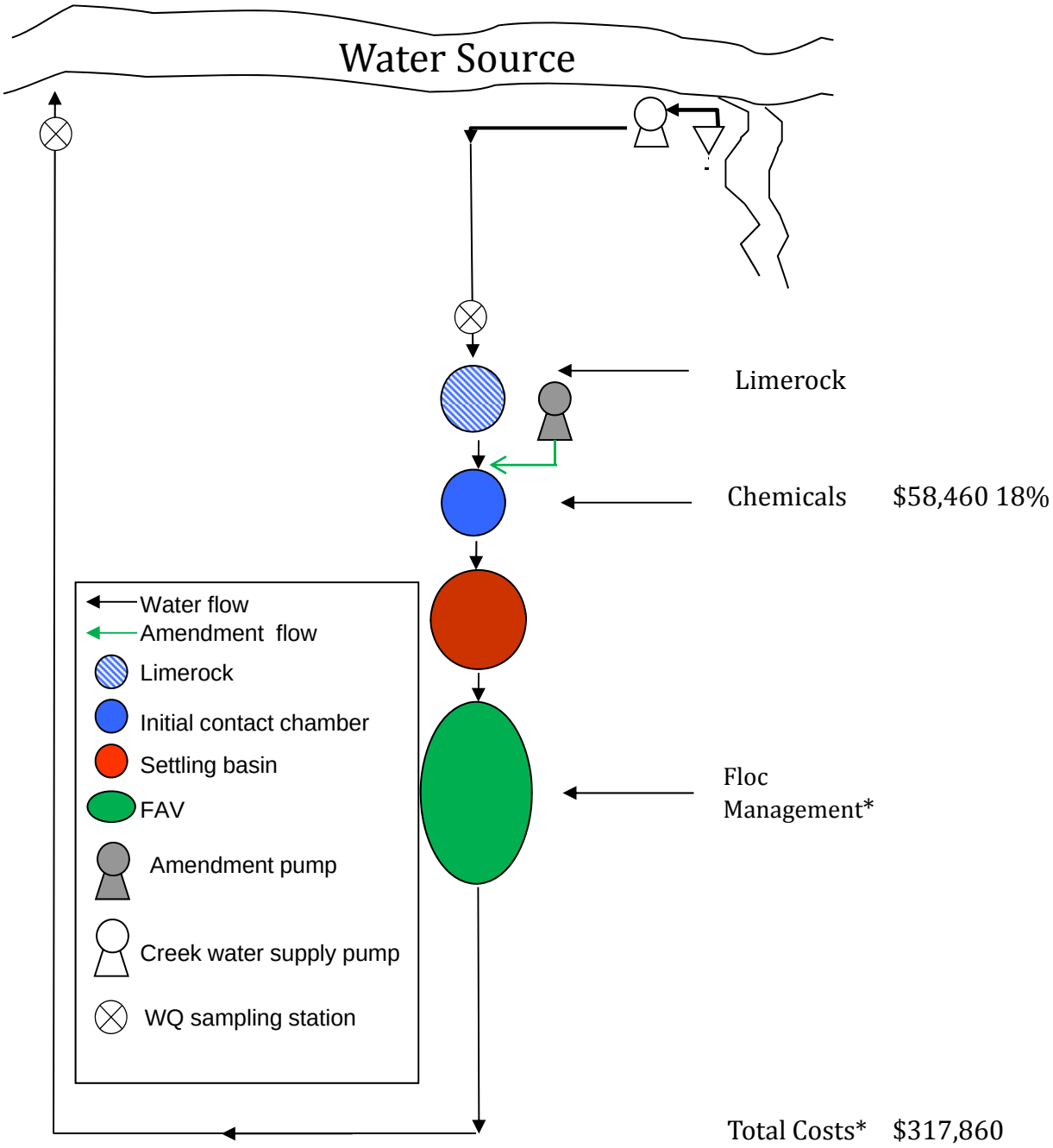
Note: The information contained herein is based upon a set of assumptions including estimated current year costs, life & discount rates

HWTT
Estimated Replacement Costs Order of Magnitude Excluding Labor & Overhead
in 2010 - 2013 dollars (See Note)
System Life in Years 50
Net Discount Rate Compounded Annually
(7% ROR less 2% inflation) 5%
RC = Replacement Cost

Item	Average Estimated Life in Years	Estimated RC* in 2010 - 2013 Dollars	Present Value* in 2010 - 2013 Dollars	Year 2020	Year 2030	Year 2040	Year 2050	# of Replace-ments
Site 1 Nubbin Slough								
Pumps	10	$ 14,000	$ 19,100	$ 8,600	$ 5,300	$ 3,200	$ 2,000	4
Limerock (projected life 5-10 years)	10	34,110	46,500	20,900	12,900	7,900	4,800	4
Monitoring & Control Equipment	10	20,000	27,200	12,300	7,500	4,600	2,800	4
Total Replacement Cost		$ 68,110	$ 92,800	$ 41,800	$ 25,700	$ 15,700	$ 9,600	
Site 2 Ideal Grove								
Pumps	10	$ 4,000	$ 5,500	$ 2,500	$ 1,500	$ 900	$ 600	4
Limerock (projected life 5-10 years)	10	-	-	-	-	-	-	4
Monitoring & Control Equipment	10	8,000	10,900	4,900	3,000	1,900	1,100	4
Total Replacement Cost		$ 12,000	$ 16,400	$ 7,400	$ 4,500	$ 2,800	$ 1,700	
Site 3 Mosquito Creek								
Pumps	10	$ 16,000	$ 21,800	$ 9,800	$ 6,000	$ 3,700	$ 2,300	4
Limerock (projected life 5-10 years)	10	35,000	47,800	21,500	13,200	8,100	5,000	4
Monitoring & Control Equipment	10	13,000	17,700	8,000	4,900	3,000	1,800	4
Total Replacement Cost		$ 64,000	$ 87,300	$ 39,300	$ 24,100	$ 14,800	$ 9,100	
Site 5 Lemkin Creek								
Pumps	10	$ 32,000	$ 43,600	$ 19,600	$ 12,100	$ 7,400	$ 4,500	4
Limerock (projected life 5-10 years)	10	8,750	11,900	5,400	3,300	2,000	1,200	4
Monitoring & Control Equipment	10	16,000	21,800	9,800	6,000	3,700	2,300	4
Total Replacement Cost		$ 56,750	$ 77,300	$ 34,800	$ 21,400	$ 13,100	$ 8,000	
Site 6 Wolff Ditch								
Pumps	10	$ 59,000	$ 80,500	$ 36,200	$ 22,200	$ 13,700	$ 8,400	4
Limerock (projected life 5-10 years)	10	8,750	11,900	5,400	3,300	2,000	1,200	4
Monitoring & Control Equipment	10	18,000	24,700	11,100	6,800	4,200	2,600	4
Total Replacement Cost		$ 85,750	$ 117,100	$ 52,700	$ 32,300	$ 19,900	$ 12,200	
Site 7 Grassy Island								
Pumps	10	$ 140,000	$ 191,000	$ 85,900	$ 52,800	$ 32,400	$ 19,900	4
Limerock (projected life 5-10 years)	10	77,050	105,000	47,300	29,000	17,800	10,900	4
Monitoring & Control Equipment	10	43,050	58,700	26,400	16,200	10,000	6,100	4
Total Replacement Cost		$ 260,100	$ 354,700	$ 159,600	$ 98,000	$ 60,200	$ 36,900	
Total Replacement Costs		$ 546,710	$ 745,600					

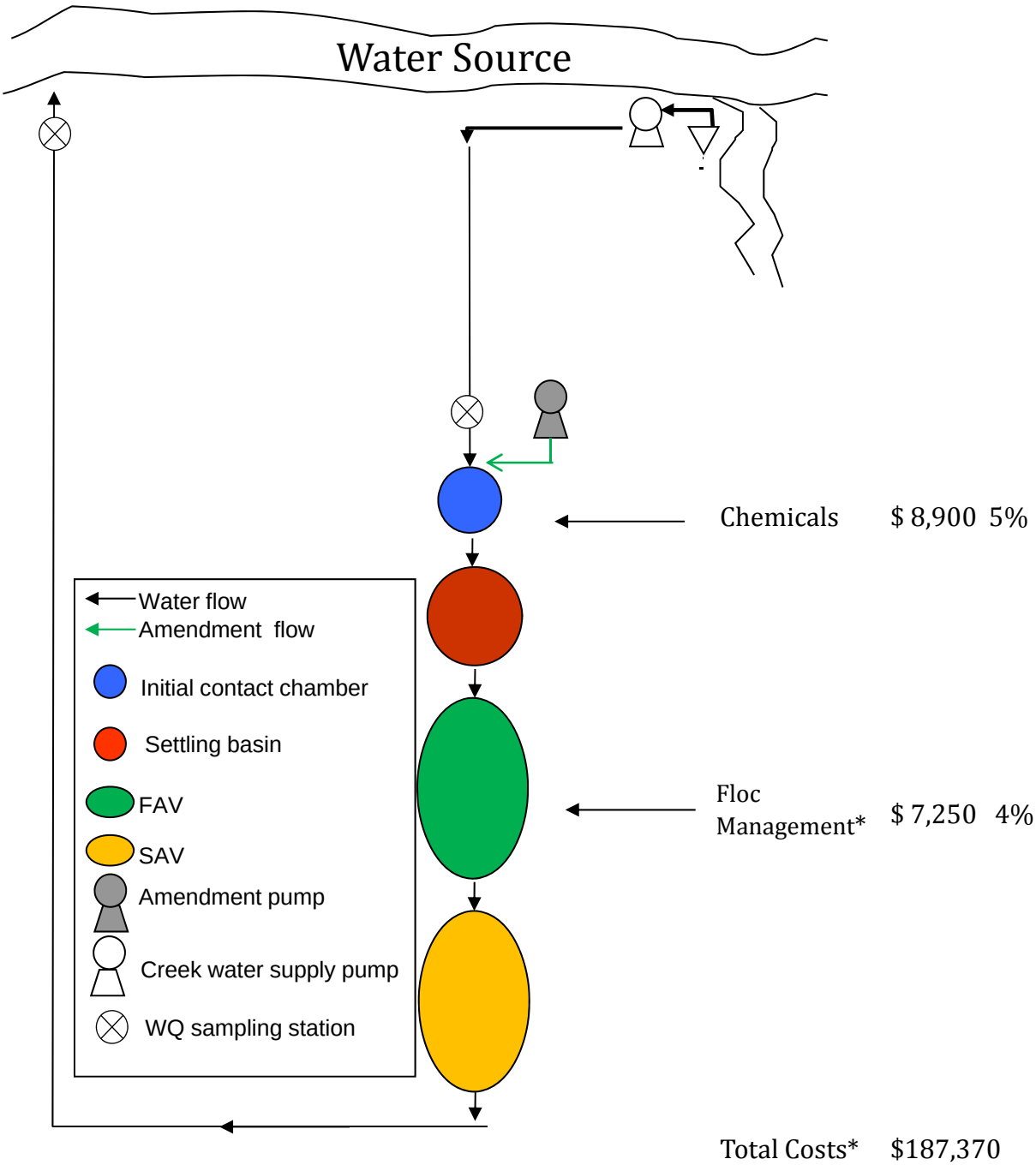
Note: The information contained herein is based upon a set of assumptions including estimated current year costs, life & discount rates

SITE 1 NUBBIN SLOUGH



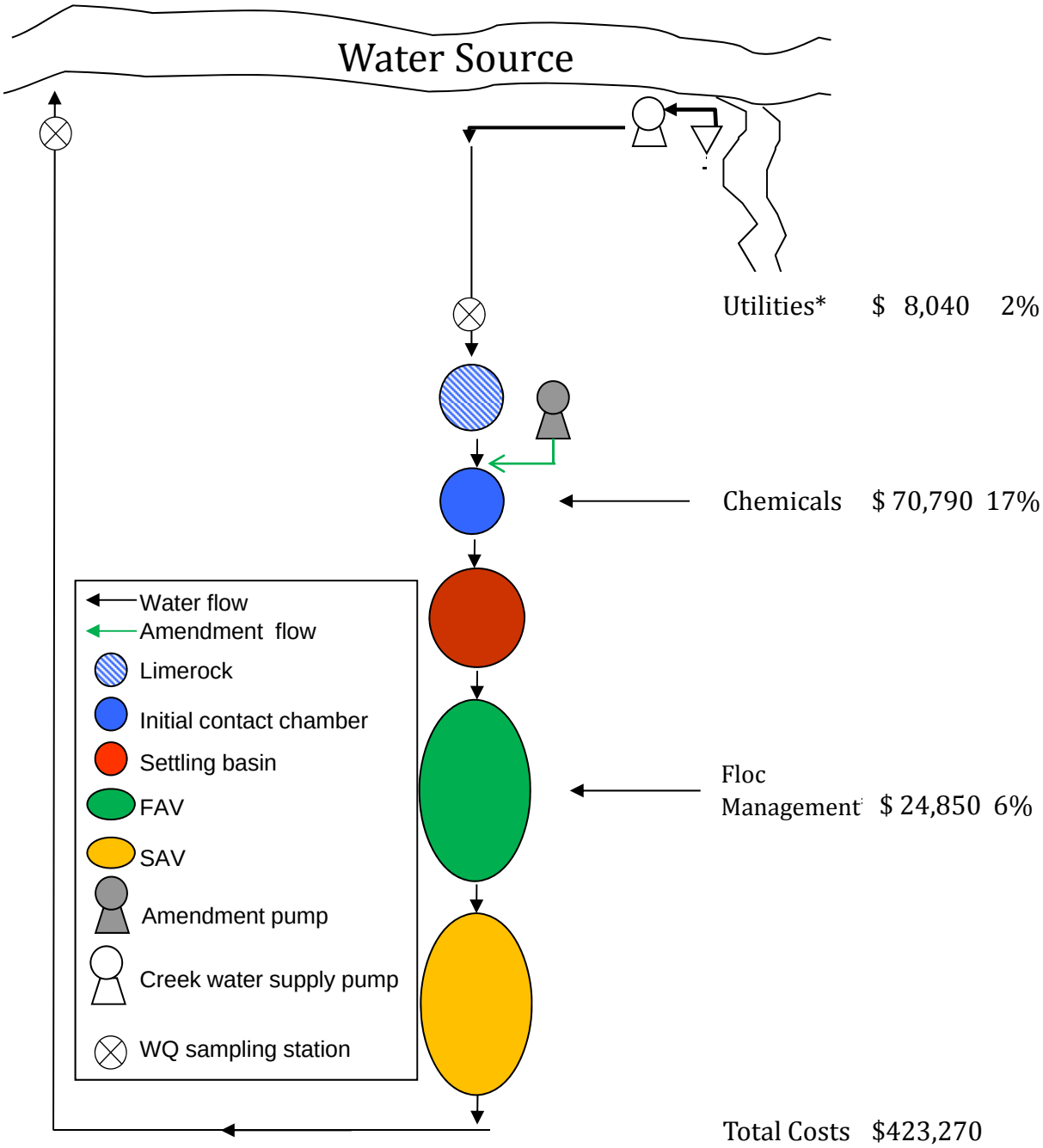
*Utilities paid by landowner. Limerock bed and floc management costs are semi-variable expenses.

SITE 2 IDEAL GROVE



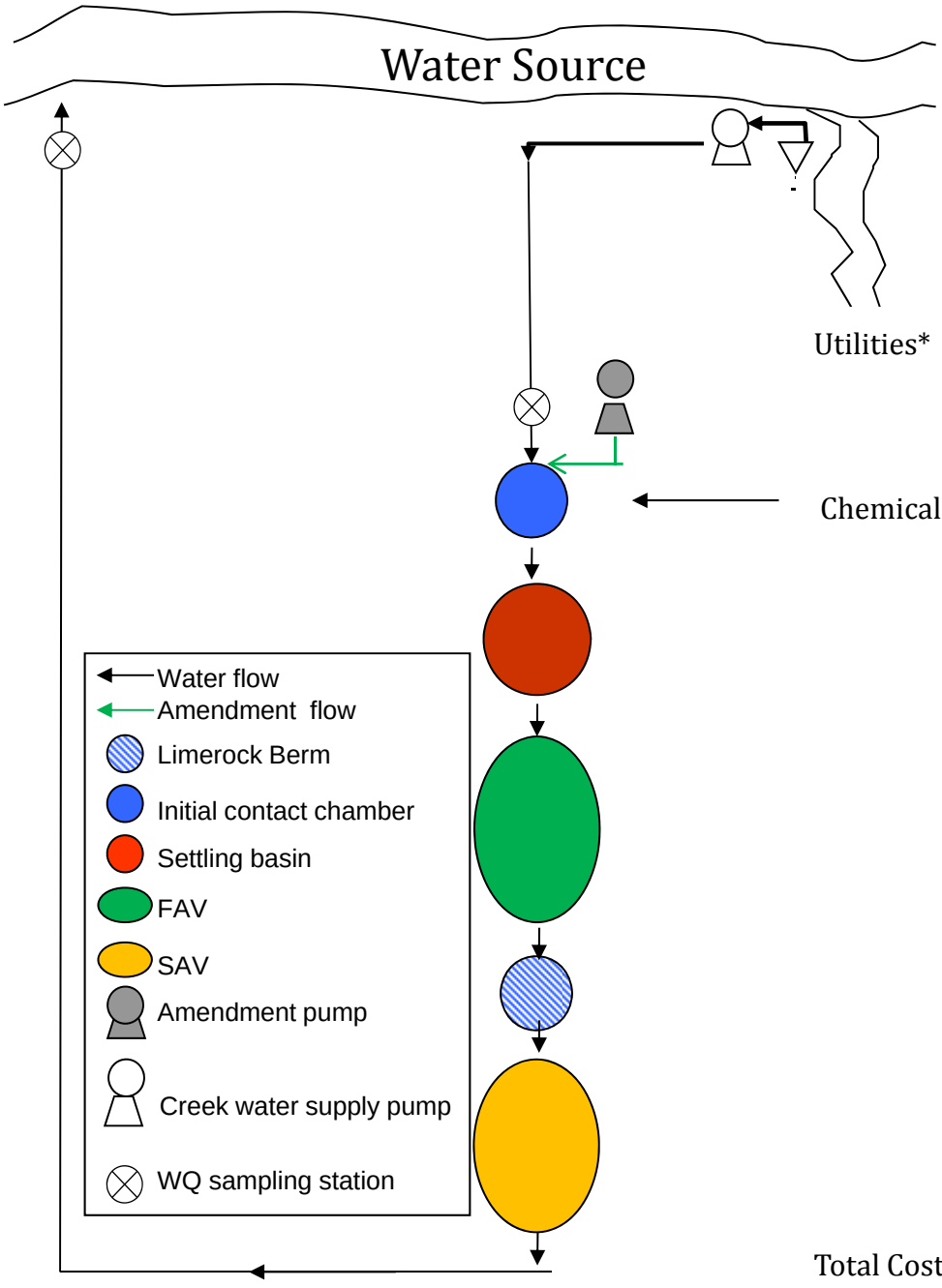
*Utilities paid by landowner. Floc management is a semi-variable expense.

SITE 3 MOSQUITO CREEK



*Utilities primarily associated with pump station, amendment injection & monitoring equipment. Floc management is a semi-variable expense.

SITE 5 LEMKIN CREEK



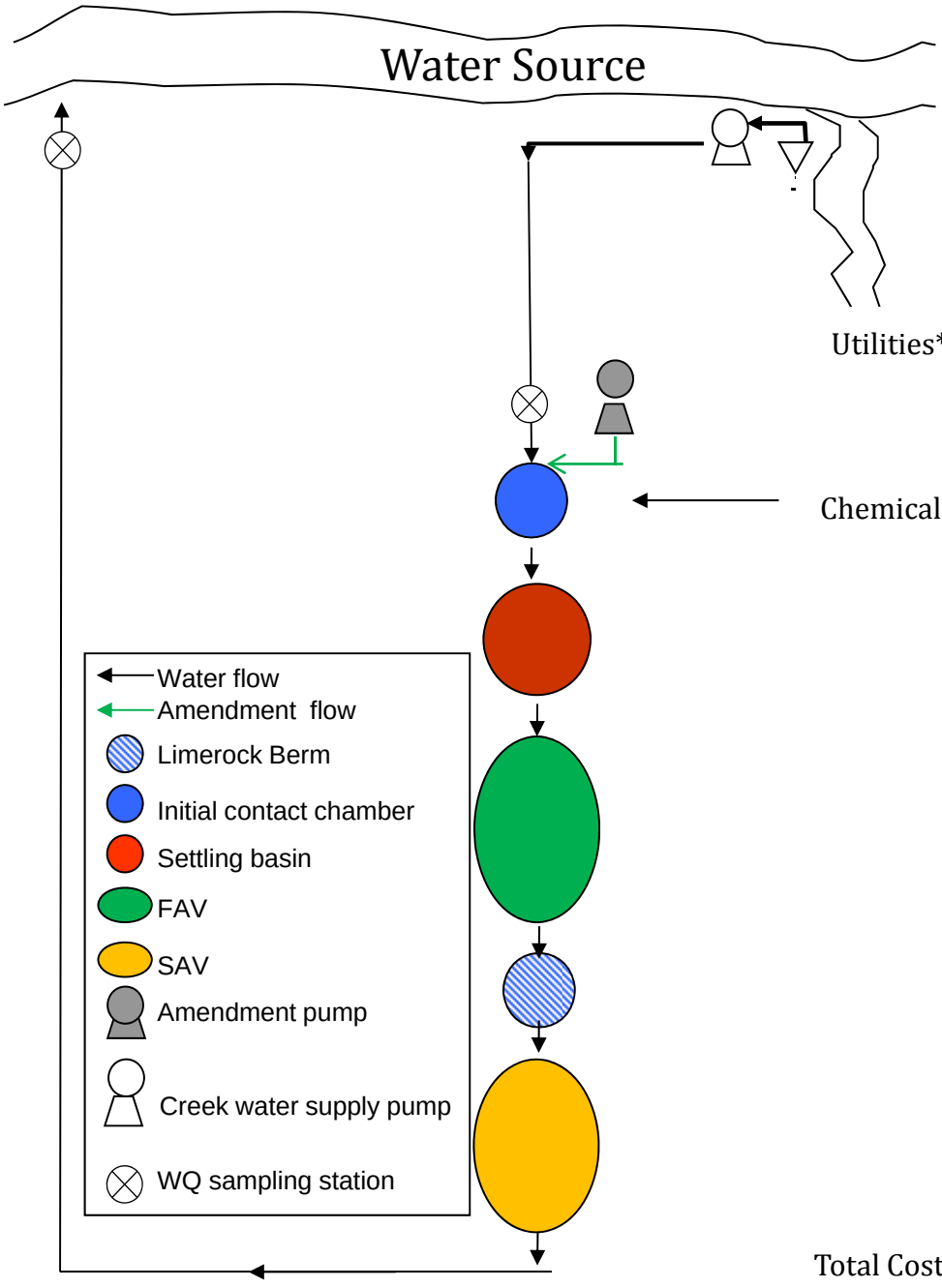
Utilities* $ 8,620 2%

Chemicals $43,520 11%

Total Costs $382,280

*Utilities primarily associated with pump station, amendment injection & monitoring equipment. Floc management costs have not been separately identified to date.

SITE 6 WOLFF DITCH



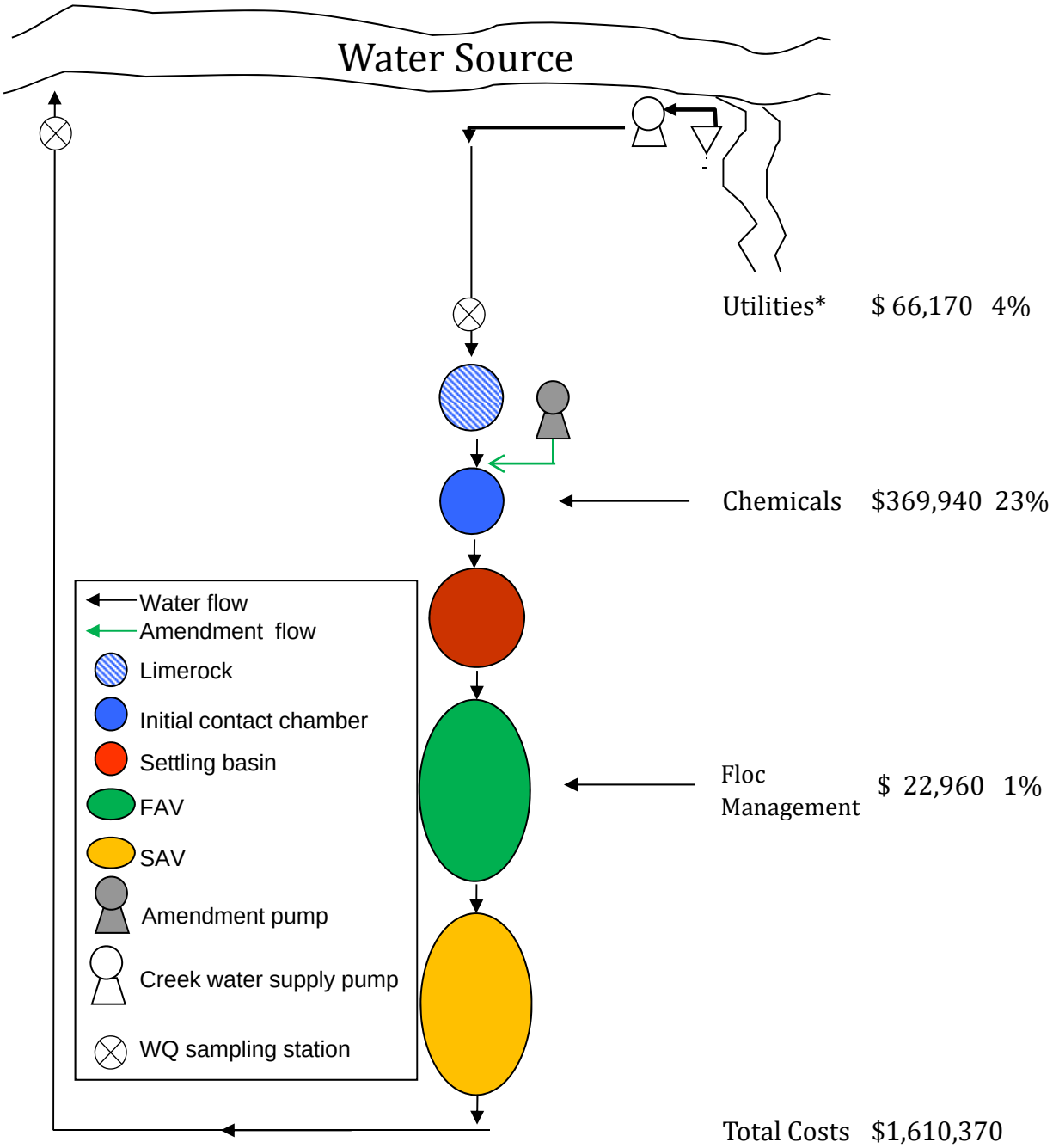
Utilities* $ 10,610 3%

Chemicals $ 34,840 9%

Total Costs $395,970

*Utilities primarily associated with pump station, amendment injection & monitoring equipment. Floc management costs have not been separately identified to date.

SITE 7 GRASSY ISLAND



*Utilities primarily associated with pump station, amendment injection & monitoring equipment. Floc management is a semi-variable expense.