An Assessment of the 2013-2014 MS4 Annual Report for Lee County and its Nexus to the TMDL/BMAP for TN in the Caloosahatchee Estuary

Permittee Name: Lee County

B. Permit Name: Lee County Municipal Separate Storm Sewer System

C. Permit Number: FLS000035-003 (Cycle 3)

D. Annual Report Year: Year 1 Year 2 X Year 3 Year 4 Year 5 Other, specify Year:


MS4 REFERENCE INFORMATION

An overview of the MS4 program administered by USEPA:

http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Basic-Information.cfm

The Florida Phase I MS4 Permitting Resource Manual:


The following comments on this annual permit report are made in the context of state and Federal requirements for Adopted TMDL and associated BMAP requirements as they apply to MS4 compliance. In this case the TMDL and BMAP referred to is for the Caloosahatchee Estuary.

BACKGROUND

1. The geographic scope of the Lee County MS4 permit covers a portion of the Caloosahatchee Estuary (CE) TMDL and additional areas primarily of unincorporated Lee County. Other co-permittees discharging at major MS4 outfalls to the Caloosahatchee Estuary include the municipalities of Fort Myers and Cape Coral. Seven of the 10 major outfalls of Lee County’s MS4 discharge to the CE (Billy Creek, Deep Lagoon, Hancock/Yellow Fever, Marsh Point, Olga Creek, Powell Creek and Whiskey Creek). This assessment is only for Lee County’s MS4 Permit. Lee County’s website does not currently list it’s MS4 overview as it had previously. This may be a temporary occurrence.


3. NPDES MS4 permits must be consistent with the requirements of adopted TMDLs in accordance with Section 403.067, F.S. When a BMAP or an implementation plan for a TMDL for a water
body into which the permitted MS4 discharges the pollutant of concern, the MS4 operator must comply with the adopted provisions of the BMAP or implementation plan that specify activities to be undertaken by the permittee during the permit cycle.

4. Increasing trends in TN concentrations have been documented in previous MS4 reports and after adoption of the TMDL. The monitoring report in the Lee County 2010-2011 MS4 Annual Report documents increasing TN trends from January 2002 to February 2011 at both South and North Tidal Caloosahatchee major watersheds. A steeper TN trend increase was reported from Tidal Caloosahatchee North Watershed.

5. An independent assessment of TN trends at most CE sub-basin monitoring stations (Lee County Surface Water Quality Monitoring Program) by the Southwest Florida Watershed Council indicated similar results with most stations within the CE WBIDS showing increasing trends (linear regression) since the early 1990s. Lee County’s 2012-2013 MS4 Annual Report also documents this long term increasing trend with TN concentrations and attributes the increasing trend to the organic nitrogen fraction and speculated it was not a result of artificial changes to the watershed.

6. This MS4 report (2013-2014) also documents an increasing trend in TN from 2009-2012 (post CE TMDL adoption) on page 9 of 27. However, Lee County concludes that the only major MS4 outfall of the 10 with an increasing level of TN for the 2013-2014 period was Ten Mile Canal (page 10). Also note that in this MS4 report, previous TN trend increases were speculated to have occurred from a shift in the air shed producing more N in rainfall. Other potential sources such as increased development were apparently not considered.

SPECIFIC COMMENTS ON THE 2013-2014 LEE COUNTY MS4 ANNUAL REPORT

1. Of primary concern is the “Loading Protocol” and subsequent conclusions derived from it (page 27 of 27). The protocol used an extrapolated flow per square mile for the entire county to generate flow and ultimately the TN loading to each of the 10 major outfalls including the seven that discharge to the CE. This approach suffers from assumptions associated with the extrapolation that may lead to significant errors in load calculations and ultimately to conclusions about TN loading trends.

Furthermore the protocol estimates loads only for the years 2001, 2007 and 2014 as required by the MS4 permit criteria and reporting cycle.

Problems with the protocol stem from an assumption that streamflow data from USGS gauging stations in Lee County represent accurate and appropriate extrapolations of runoff from the entire county where runoff was determined as simply CFS per square mile. Of the 10 USGS Streamflow Gauging Stations in Lee County, only one (Whiskey Creek) was from a stream discharging to the CE and TMDL/BMAP jurisdiction. Four of the seven major outfall sub-basins occur in the north tidal Caloosahatchee Watershed where TN concentrations had the steepest upward trend. None of these outfalls had USGS gauging stations in their sub-watersheds.
In the event that Event Mean Concentration (EMC) data are not available to generate loading estimates, MS4 permittees must normalize the average annual loading estimates to reflect variations in annual rainfall for developing loading estimates that more accurately estimate stormwater pollutant loadings discharged from the MS4. The protocol used, overly homogenizes the estimated runoff data, potentially minimizing differences in rainfall between years and changing land use through time.

Furthermore, it is unlikely that the gauge station flows, used as a proxy for rainfall, enable valid between year comparisons because they do not account for changes in upstream withdrawals and diversions from development which complicates the simulation of rainfall and resulting runoff through time. This problem is compounded when years compared are 6 or 7 years apart.

Other loading protocols should be considered that include differences in land use between subbasins with major outfalls. Such differences in impervious cover between years for example may generate large inter-basin differences in runoff per inch of rainfall. Utilization of the county's extensive and more uniformly distributed rainfall monitoring network in combination with land use considerations as more typical of “spreadsheet” loading models should produce more accurate loading estimates for the three years in question.

Utilization of streamflow data from USGS gauging stations (listed below) started in 2007 that were more pertinent to the CE would have been more appropriate for estimating flows associated with MS4 Major Outfalls to the CE. The TMDL TAC recommended the monitoring of these stations for flows in the context of TMDL loading estimates.

<table>
<thead>
<tr>
<th>Station Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Data to be Measured</th>
<th>Data to be Processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telegraph Creek</td>
<td>26°43'47.8&quot;N</td>
<td>81°42'06.7&quot;W</td>
<td>1. Water level;</td>
<td>Discharge, including discharge at Punta</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Water velocity;</td>
<td>Blanca and Shell Point Canal</td>
</tr>
<tr>
<td>Orange River</td>
<td>26°41'31&quot;N</td>
<td>81°45'34&quot;W</td>
<td>3. Periodic discharge</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>measurements using an</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Acoustic Doppler</td>
<td></td>
</tr>
<tr>
<td>Popash Creek</td>
<td>26°42'56.58&quot;N</td>
<td>81°48'31.2&quot;W</td>
<td>Current Profiler</td>
<td></td>
</tr>
<tr>
<td>Billy's Creek</td>
<td>26°39'14&quot;N</td>
<td>81°50'26&quot;W</td>
<td>(ADCP).</td>
<td></td>
</tr>
<tr>
<td>Hancock Creek</td>
<td>26°40'06&quot;N</td>
<td>81°53'44&quot;W</td>
<td></td>
<td></td>
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<tr>
<td>MARKER#52</td>
<td>26°38'29&quot;N</td>
<td>81°52'58&quot;W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell Point</td>
<td>26°31'26&quot;N</td>
<td>82°00'16&quot;W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unfortunately monitoring flows at these stations was stopped by FDEP in 2011 just before the BMAP was adopted. The SFWMD continued the monitoring for a short duration until April of 2013 after which the monitoring stopped.

2. The MS4 permit criteria allows FDEP to require additional reporting in the annual report for discharges to impaired waters, especially those with an adopted TMDL or BMAP in accordance with Part VIII.B of the permit. It’s recommended that the additional reporting include a refined loading estimate as a revised form of this report.
3. Part V of Phase I MS4 permits related to monitoring requirements state that “If the total annual pollutant loadings have not decreased over the past two permit cycles, each permittee shall re-evaluate its Stormwater Management Plan (SWMP) and identify and submit revisions to its SWMP, as appropriate, to reduce pollutant loadings, especially to impaired waters, in the Year 4 annual report”. Lee County concludes that average TN loading from the 10 major outfalls increased in 2014 over the estimate from 2007 and as such should comply with this requirement of the permit and to be consistent with “Background item 3” above for TMDL/BMAP compliance. However, it appears that Lee County does not similarly interpret this requirement related to TN load changes during the past two permit cycles and concludes a decreasing trend since 2001 (p. 22) where TN loads for 2001 were relatively high driving the trend downward when compared to 2007 and 2014. This interpretation of a downward trend in TN loading is the opposite trend of TN concentrations since 2001 for the majority of basins discharging to the CE as documented earlier in this assessment.

Some year to year loading variation is expected from differences in rainfall but as TN concentrations continue to trend up, an apparent, long term decreasing TN loading trend conclusion from the MS4 report is questionable considering the uncertainty about flow derived from the loading protocol. The uncertainty about the TN loading trend grows when in the context of three individual years at intervals of seven years. It is also apparent that there is no recognition of a specific TN reduction goal in this MS4 report or as part of the MS4 SWMP stemming from the TMDL. In this case the TMDL requires a 23% annual reduction in TN minus background loading as required (note Background item 3 above), which applies to Lee County’s MS4 stormwater permits (see page 77 of CE TMDL 2009).

A specific TN reduction goal for the MS4 in coordination with the BMAP similar to what is proposed for load allocations should be integrated and enforced through the MS4 SWMP planning. There appears to be little coordination between the BMAP and at least the Lee County MS4 permittee (and possibly other MS4 co-permitees) resulting in an apparent lack of compliance.

Part of the apparent inequity of estimated versus actual TN trends is the conclusion by FDEP that 90% of the targeted load reduction for the first cycle of the BMAP (2012-2017) has been largely achieved as stated in the final BMAP adoption document in 2012. This conclusion was enabled by FDEP crediting projects dating back to 2001. However, this estimate is undermined and more recent load reductions are exaggerated when FDEP compares recent load reductions to the starting load determined from 2005 land use coverage which was 4 years before the TMDL was adopted and 7 years before the BMAP was implemented in 2012. It is more certain to assume that cumulative pollutant loads increase as the watershed is developed through time. This necessitates the need for a comprehensive loading and water quality analysis as part of the TMDL/BMAP progress assessment before TN load reductions can be accurately evaluated based on more recent land use models. SFWMD has more recent land use data through 2012 for calculating relevant loading yet this exercise has not been conducted.
A refined loading estimate should, as recommended above, clarify this issue and provide better coordination with the BMAP since FDEP or SFWMD has been reluctant to provide a comprehensive water quality and loading analysis for the CE since the TMDL was adopted in 2009.

Interestingly, if the TN loading estimates in the current MS4 report for 2001, 2007 and 2014 were adjusted for total rainfall occurring during those years, (for example lbs. of TN/inch of rainfall) then the conclusion would have been a successively increased loading rate for 2001, 2007 and 2014 and consistent with the documented upward TN concentration trends discussed above for the same time period.

4. Page 18 of the report “TMDL Implementation Status Report” provides an implementation schedule for the other 5 TMDLs established within the CE watershed. In 2012 Lee County provided a NPDES MS4 Permit TMDL Prioritization Report (March 2012 letter correspondence) to FDEP stating that the Implementation Phase for the Daughtrey Creek TMDL would begin in September 2014 and for the Billy Creek TMDL in September of 2015. This current MS4 annual report (p. 18 of 27) states that the implementation phase for these two TMDLs will be reassessed, prioritized and appropriately addressed in future cycles. Considering the apparent growing inequity between estimated TN load reduction and actual conditions we are disappointed the TMDL implementation phase for the Daughtry Creek and Billy Creek TMDLs have been delayed to some undetermined date in the future. In this case the requirement for timely and effective implementation is driven by the permittee rather than the regulating agency.

5. It was reported that the Ten Mile Canal outfall was the only one to have increasing TN loading (assumed for 2014 and compared to 2013?). However, this conclusion should be evaluated in the context of 2014 annual rainfall as 18% below the annual average for Lee County and compared to 2013 which was about 8% above normal. This demonstrates the problem of comparing loading estimates between points in time that do not account for variations in rainfall.
RECOMMENDATIONS

1. FDEP with assistance from SFWMD should conduct a comprehensive TN loading analysis for this TMDL by **September 2016**. The need for this update was also identified in the BMAP Final Adoption Report in 2012. The analysis should be based on the most current land use available (2012) and would enable:
   a. Selection of an appropriate loading model.
   b. Incorporation of a valid and current TN load reduction target for both the MS4 SWMP and BMAP.
   c. Accurate assessment of BMAP load reduction projects and ultimate compliance with the TMDL and MS4 permit. It would also enable better project coordination and meaningful BMAP Progress Reports.
   d. Recalculation if necessary of TN load reduction allocations to BMAP partners and MS4 co-permittees.

2. Resume flow monitoring at the seven stations identified in “Specific Comments.... Item 1” above. This flow information is critical to load estimation and monitoring should be reinstated. Flow monitoring at Shell Point is especially important since estimation of TN loads can be accomplished by subtracting loads at S-79 from those at Shell Point to determine the majority of the tidal basin contribution.

3. Lee County should redraft its TN loading assessment for its 2013-2014 MS4 report with consideration of the comments provided above.

4. Evaluate the MS4 annual reports for Fort Myers and Cape Coral in the same context as this assessment for Lee County. Again the need for a specific annual TN load reduction target for these municipalities is necessary for TMDL/BMAP and MS4 compliance. Both Fort Myers and Cape Coral discharge directly to the Caloosahatchee Estuary (TMDL).

5. Determine TMDL implementation dates for both Daughtry Creek and Billy Creek.

6. Ask SFWMD to require post construction TN monitoring for new developments in the Caloosahatchee Estuary watershed as part of the Impaired Waters ERP application process. The Impaired Waters ERP Rule allows SFWMD discretion on this provision but considering the fact that TN concentrations have been increasing in many of the CE TMDL basins since the TN impairment was determined some 6-8 years ago, it should be routinely required.

7. Conduct a BMAP meeting twice per year or in coordination with new developments relating to science, policy or management and to better assess stakeholder concerns and load reduction verification.