

Florida Department of Environmental Protection



Upper Wakulla River and Wakulla Springs Draft BMAP and Review Schedule

September 19, 2013

Steve Cioccia





Review of Draft BMAP Sections



Acknowledgements

Responsible Stakeholders	Responsible Agencies	Other Interested Stakeholders
Agricultural Producers	Florida Department of Agriculture and Consumer Services	Center for Earth Jurisprudence
Leon County	Florida Department of Environmental Protection, including Wakulla Springs State Park	Citizens
Wakulla County	Florida Department of Health	Florida Department of Economic Opportunity
City of Tallahassee	Leon County Health Department	Friends of Wakulla Springs
Florida Department of Transportation District 3	Northwest Florida Water Management District	Wakulla Springs Alliance
Gadsden County	Wakulla County Health Department	-
Jefferson County	-	-
City of Gretna	-	-
City of Midway	-	-
City of Quincy	-	-
Town of Havana	-	-
Federal Correctional Institution, Tallahassee	-	-
Florida Agricultural and Mechanical University	-	-
Florida State University	-	-
Tallahassee Community College	-	-
Talquin Electric Cooperative	-	-



Summary

- Summarizes report information on:
 - Upper Wakulla River and Wakulla Springs Basin.
 - Total maximum daily loads (TMDLs).
 - Upper Wakulla River and Wakulla Springs BMAP.
 - Key elements of the BMAP.
 - Anticipated outcomes of BMAP implementation.
 - BMAP cost.
 - BMAP follow-up and commitment to plan implementation.



Chapter 1: Context, Purpose, and Scope of the Plan



Background

- The BMAP represents the joint efforts of multiple stakeholders to prepare strategies for water quality restoration for the Upper Wakulla River and Wakulla Springs to work towards achieving the adopted TMDL.
- The BMAP includes management strategies to reduce nitrate concentrations in the Upper Wakulla River, targeted at restoring the natural aquatic biological community, along with a monitoring plan to guide effective long-term restoration efforts.



Plan Purpose and Scope

- The purpose of this BMAP is to implement nitrate reductions to achieve the Upper Wakulla River TMDL.
- This plan outlines management strategies that have provided or will provide nitrate reductions and a schedule for implementation for the first five-year BMAP implementation.
- The BMAP also details a monitoring approach to measure progress towards the nitrate target concentration and improvement in the river's biological community.



BMAP Basin

- Approximately 848,445 acres.
- Includes two Priority Focus Areas (PFAs), which represent the areas where the aquifer is most vulnerable and there is a known connectivity with Wakulla Springs.





Stakeholder Involvement

- Technical meetings were held regularly throughout the BMAP development process, starting in January 2013.
- All technical meetings were open to the public and noticed in the *Florida Administrative Register*.
- The Department also met with stakeholders in one-on-one meetings to discuss items such as management strategies.
- A public workshop will be held on **October 17, 2013**.



BMAP Approach

- The BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, Florida Statutes (F.S.).
- The phased approach allows for the implementation of management strategies designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics in the basin.
- The total reductions to achieve the Upper Wakulla River TMDL will be addressed in five-year increments.



BMAP Approach, continued

- The largest source of loading during the TMDL period of record, the City of Tallahassee's wastewater treatment facility (WWTF) and Southeast Spray Field (SESF), have been upgraded to reduce nitrate concentrations applied to the land's surface by about 75%.
- Further reductions in nitrate concentrations are expected in the river and springs due to the completed actions.
- Given the progress in load reductions made to date and the need for further monitoring to determine to what extent additional reductions are needed, a sufficiency of effort evaluation rather than detailed allocations was used in the first five-year implementation.



BMAP Approach, continued

- The stakeholders within the PFAs were asked to submit management strategies to reduce nitrate loading from the sources they are responsible for managing.
- The Department compared the strategies to the sources within each PFA to evaluate whether:
 - Each of the existing sources were sufficiently addressed for the first BMAP phase, and
 - Strategies were in place or would be put into place to reduce future nitrate sources.
- Where needed, the Department requested additional details and strategies from the responsible stakeholders to ensure sufficiency for the first BMAP implementation.



BMAP Approach, Continued

- Collectively, the management strategies included in the BMAP are sufficient to address nitrate loading in the PFAs to the Upper Wakulla River and Wakulla Springs Basin over the next five years.
- After year four of BMAP implementation, the Department will evaluate available water quality and biological data to determine progress towards the TMDL targets.
- Discussions will then be held with the responsible stakeholders to identify additional strategies for the next BMAP phase, as needed.



OSTDS Initiative

- The details of the initiative were discussed earlier in the meeting.
- The OSTDS Initiative is described in detail in the BMAP in Section 1.3.4.
- The Initiative will address present and future nitrogen contributions, evaluate and prioritize management strategies and develop needed reduction commitments implemented through BMAP implementation.



Allocations Implemented by the BMAP

- Section 403.067, F.S., states that the BMAP must equitably allocate pollutant reductions to individual basins, as a whole to all basins, or to each identified point source or category of nonpoint sources, as appropriate.
- The adopted TMDL sets the allocations, as a percent reduction, to the nonpoint source category in order to achieve the target concentration of 0.35 mg/L of nitrate + nitrite in the Upper Wakulla River.
- This BMAP implements the TMDL allocations for the nonpoint sources.



TMDL

- The Department adopted the TMDL for the Upper Wakulla River (WBID 1006) in March 2012.
- The Upper Wakulla River is impaired by nitrate based on stream condition index (SCI) surveys that indicated healthy biological community conditions in only 7 of 27 sampling events.
- The biological community in the river is affected by excessive algal mats that were linked to elevated nitrate concentrations from anthropogenic sources.

WBID	Parameter	TMDL (mg/L)	TMDL % Reduction	WLA for Wastewater	WLA for NPDES Stormwater	LA (% Reduction)
1006	Nitrate, as monthly average	0.35	56.2%	N/A	N/A	56.2%



Assumptions

- The following assumptions were used in the BMAP process:
 - Reductions in nitrate concentrations in the Upper Wakulla River and Wakulla Springs will result in improved biological communities, including a reduction in the amount of algae present in the river.
 - The greatest source of nitrate loading to the Upper Wakulla River is through Wakulla Springs. Therefore, management strategies that reduce nitrate loading to the ground water were the priority for this BMAP phase.
 - The scope of the TMDL did not include the adjacent Wakulla Springs vent area (WBID1006X) and, therefore, these waters are not applicable for determining achievement of the restoration targets. The BMAP incorporates Wakulla Springs and its contributing springshed within the BMAP area.
 - This BMAP focuses on reductions and management strategies within two PFAs. The PFAs were identified using best available information on the most vulnerable aquifer areas and ground water pathways to determine where management strategies would be most beneficial to improving the water quality of the Upper Wakulla River and Wakulla Springs. In future BMAP phases, the PFAs may be refined using the latest data.



Considerations

- During the BMAP process, several items were identified that could be addressed in future cycles to ensure that future BMAP phases use the most accurate information:
 - **Water Quality Standards** – Since the Department adopted the Upper Wakulla River TMDL, numeric nutrient criteria were established for both streams and springs. For future evaluations to determine whether the Upper Wakulla River and Wakulla Springs Basin is meeting water quality standards, the Department will use these numeric nutrient criteria. The BMAP monitoring plan was designed to collect the data necessary for these new evaluations.
 - **Basin Boundary** – The BMAP boundary was determined using information from studies in the basin that delineated boundaries based on potentiometric surface data, water level measurements, and dye trace studies. The available boundaries were compiled by the Department, and the BMAP boundary was identified with input from the stakeholders. In future phases of the BMAP, the basin extent may be modified based on new evidence and better science.



Considerations, continued

- **Georgia Sources** – The BMAP focuses on the Upper Wakulla River and Wakulla Springs Basin within Florida, as the Department only has authority to address nutrient loading within the state. However, a portion of the Wakulla Springs springshed extends into Georgia. Available data indicate that the greatest nutrient loading sources are in Florida. If significant nutrient loading sources to the springshed within Georgia are identified, addressing these sources should be considered in the next BMAP phase. Leon County has already begun efforts to address some of the nutrient loading from Georgia, as summarized in Table 4.
- **OSTDS** – Based on evaluations of loading in the basin, OSTDS are now the largest contributor of nitrate in the Upper Wakulla River and Wakulla Springs Basin. However, the management strategies that can be implemented at this time to reduce OSTDS loadings are limited. FDOH is currently conducting a multi-year study to determine the best systems to attenuate nitrate loading. Scheduled to be completed in January 2015, the study results will then be brought to the Legislature for consideration. The results of this study will help to identify OSTDS nitrogen reduction mechanisms. In the meantime, the Department will work with the responsible local stakeholders and FDOH in the OSTDS Initiative to identify appropriate management strategies, funding sources and implementation responsibilities to address OSTDS loading.



Considerations, continued

- **Lake Swallets** – There are several lakes within the basin that have known sinkholes that drain to ground water. In the next BMAP phase, if data are available, the nitrate loads from these lakes could be considered and management strategies to address the loading identified, as needed.



Future Growth

- Section 403.067(7)(a)(2), F.S., requires BMAPs to:
“...identify the mechanisms by which potential future increases in pollutant loading will be addressed.”
- The BMAP does not include an allocation for new development in this first phase.
- Instead, it relies on strategies from the stakeholders that help to minimize loading from future sources
- Leon County, Wakulla County, and City of Tallahassee have multiple measures in place to help control loading from future growth.



Comments and Questions on Chapter 1





Chapter 2: Upper Wakulla River and Wakulla Springs Basin Setting



Land Uses

- Land cover categories were aggregated using the simplified Level 1 codes:
- 2009 land cover:
 - Natural lands (84.1%).
 - Urban and built-up (9.1%).
 - Agriculture (6.7%).

Level 1 Land Cover Code	Land Cover Description	Acres	% Total
1000	Urban and Built-Up	66,045.6	7.8%
2000	Agriculture	57,104.6	6.7%
3000	Upland Nonforested	51,268.7	6.0%
4000	Upland Forests	449,514.1	53.0%
5000	Water	19,838.4	2.3%
6000	Wetlands	193,611.3	22.8%
7000	Barren Land	806.5	0.1%
8000	Transportation, Communication, and Utilities	10,255.3	1.2%
Total	Total	848,444.5	100.0%



Hydrology

- Within the Wakulla River watershed, the Cody Scarp generally separates the semi-confined and unconfined geologic areas.
- Moving southward, breaches are present in the confining layer, mainly sinkholes and sinking streams, which provide pathways for recharge and the introduction of contaminants.
- The karst sub-surface is characterized by expansive areas of extremely porous formations, which results in a large and extensive cave system and tunnel/conduit network that provides direct pathways and allows short travel times of surface runoff through ground water to the spring vent at the headwaters of the Wakulla River.
- Wakulla Springs provide the majority of the flow in the River.



Water Quality Trends

- When comparing the data from the TMDL verified period (2000-2007) to more recent data (2008-2012), the nitrate concentrations at the vent are declining. Attributed mainly to TN reduction achieved by the City of Tallahassee-T.P. Smith WWTF upgrade to AWT treatment level.
- Nitrate concentrations appear to be higher in the B- and C-Tunnels than in the Main Tunnel to the spring. K-Tunnel (from the south) has lower nitrate levels and may be diluting flows from the other tunnels.
- The B-, C-, D-, and K-Tunnels continue to show mean nitrate + nitrite concentrations above the target concentration of 0.35 mg/L, with the highest mean nitrate concentration in B-Tunnel.
- There are declining nitrate concentrations in the B-, C-, and D-Tunnels. The K-Tunnel nitrate concentrations are unchanged, but are lower overall than the other tunnels.



Biological Community Trends

- The SCI evaluation that occurred in 2004 in the Upper Wakulla River had score that was categorized as “very poor.” In 2007, the SCI score was categorized as “poor.”
 - While there seems to be a slight improving trend in biological conditions, the overall quality is still poor.
- In April 2012, a rapid periphyton survey (RPS) was conducted in the Upper Wakulla River. Found that 75% of the points assessed had a rank of greater than four for algal coverage, which indicates visible filamentous algae.



Comments and Questions on Chapter 2





Chapter 3: Pollutant Sources and Anticipated Outcomes



Sources in the TMDL

- WWTFs.
- OSTDS.
- Fertilizer (both residential and agricultural).
- Livestock.
- Atmospheric deposition.
 - Considered a background, uncontrollable source; therefore, the TMDL did not require reductions from this source
- Sinking streams.
 - These contributions were minimal and thought to be temporary in response to large rainfall events
- Stormwater (both MS4s and nonpoint sources).



WWTFs

- The City of Tallahassee's T.P. Smith Water Reclamation Facility and spray field were upgraded in November 2012 to meet advanced waste treatment (AWT) standards.
- The Department reviewed the permits for four, smaller domestic wastewater facilities within the PFAs. Of these, Winco Utilities is the largest (495,000 gallons per day).
 - The need to address WWTF nitrogen contributions resulted in the requirement in 4.1.1. for subject WWTFs in PFA1 to meet a TN effluent limit of 3.0 mg/L. This will serve to reduce existing and prevent future additional detrimental nitrogen loading from this source category.
- The WWTF BMAP requirements are enforceable through each facility's permit.



OSTDS

- In karst areas, such as the PFAs, the combined nitrate contribution from concentrations of numerous OSTDS to ground water can be significant.
- Based on the most recent FDOH coverage of OSTDS, there are approximately 7,484 septic tanks in PFA1 and 4,092 septic tanks in PFA2.
- With the reduction in loading from the City of Tallahassee WWTF, OSTDS are now the largest source of nitrates to the ground water.
 - Significant on-site treatment system contributions will be addressed through the OSTDS Initiative.



Fertilizer and Livestock

- It is estimated that residential fertilizer contributes about 7% of the nitrate loading in the basin. Leon County, Wakulla County, and City of Tallahassee have fertilizer ordinances and education programs to help address this source.
- Based on the 2009 land cover, agriculture makes up about 4% of the acreage within the PFAs, which is mostly pasture and rangeland, followed by hay fields and field crops. There are also smaller amounts of horse farms, row crops, other grove types, nurseries and vineyards, ornamentals, and tree nurseries.
- Agricultural producers must implement appropriate best management practices (BMPs) or water quality monitoring to show they are not having an impact.



Stormwater – MS4s

- The Phase I MS4s are:
 - Leon County.
 - Florida Department of Transportation District 3.
 - City of Tallahassee.
- The Phase II MS4s (all outside the PFAs) are:
 - Florida State University.
 - Florida Agricultural and Mechanical University.
 - Federal Correctional Institution, Tallahassee.
- Both Phase I and II permits include self-implementing clause for BMAP responsibilities.



Stormwater – Nonpoint Sources

- The stormwater nonpoint sources (all outside the PFAs) are:
 - Gadsden County.
 - Jefferson County.
 - Wakulla County.
 - City of Gretna.
 - City of Midway.
 - City of Quincy.
 - Town of Havana.
- The strategies for nonpoint sources are enforceable through the BMAP itself.



Anticipated Outcomes of BMAP Implementation

- Improvements in water quality trends in the Upper Wakulla River and Wakulla Springs.
- Decreased loading of the target pollutant (nitrate).
- Increased coordination, such as through the OSTDS Initiative and annual meetings, among state and local governments and within divisions of local governments in problem solving for water quality restoration.
- Determination of effective management strategies through the stakeholder decision-making and priority-setting processes.
- Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions.
- Enhanced understanding of basin hydrology, water quality, and pollutant sources.



Comments and Questions on Chapter 3





Chapter 4: Management Strategies within the PFAs



Sufficiency of Effort Evaluation

- Stakeholders in the PFAs provided management strategies that had been implemented since January 1, 2004 and that were planned to occur during the first five-year implementation period.
- WWTF sufficiency:
 - For the first BMAP phase, the largest source of loading has been addressed and the responsible entities have plans to improve the sewer collection systems.
 - Requirement in 4.1.1. for WWTFs in PFA1 subject to the requirements shall meet a TN effluent limit of 3.0 mg/L, this will serve to reduce existing and prevent future additional detrimental nitrogen loading from this source category.



Sufficiency, continued

- WWTF sufficiency (cont.):
 - The TN=3 mg/L requirement will apply to new facilities contributing nitrogen and existing WWTF permits which can not demonstrate reasonable assurance not to contribute to the Wakulla River impairment with capacities of 100,000 gpd or greater.
 - With the above, the Department determined that these strategies sufficiently address nitrate loading from the WWTFs within the PFAs.
- OSTDS sufficiency:
 - With the continuation of adopted measures and implementation of the OSTDS Initiative, OSTDS sources will be sufficiently addressed in the first and second BMAP phases. Depending on water quality trends, substantial additional efforts may be needed in future BMAP phases to address OSTDS sources.



Sufficiency, continued

- Residential fertilizer sufficiency:
 - The responsible stakeholders have strategies in place to reduce/remove fertilizer use; therefore, these strategies are collectively sufficient to address sources of residential fertilizer during the first BMAP phase.
- Agricultural fertilizer and livestock sufficiency:
 - Agricultural fertilizer use has been reduced in the basin, and the Florida Department of Agriculture and Consumer Services (FDACS) plans to implement BMPs on 90% of the agricultural acres in the PFAs during the first phase. These actions are sufficient for the first BMAP implementation.



Sufficiency, continued

- Stormwater sufficiency
 - The completed and planned strategies together will sufficiently address stormwater nitrate loading for the first BMAP phase.
- Other strategies:
 - The stakeholders also provided studies, protection measures, and source control efforts that will help improve water quality.
- The BMAP includes management strategies tables for each entity in the PFAs. These strategies were reviewed in a previous meeting.



Comments and Questions on Chapter 4





Chapter 5: Management Strategies Outside of the PFAs



Strategies Outside the PFAs

- Strategies are also being implemented or are planned for outside of the PFAs. These strategies will help to reduce the nitrate loading to the Upper Wakulla River and Wakulla Springs.
- The BMAP includes management strategies tables for each entity outside of the PFAs. These strategies were reviewed during the last meeting.



Comments and Questions on Chapter 5





Chapter 6: Assessing Progress and Making Changes



Tracking Implementation

- The Department will work with the stakeholders to organize the monitoring data and track project implementation.
- This information will be organized through annual progress reports.
- In addition to activities for the OSTDS Initiative, the stakeholders will meet at least annually to review progress and plan implementation.



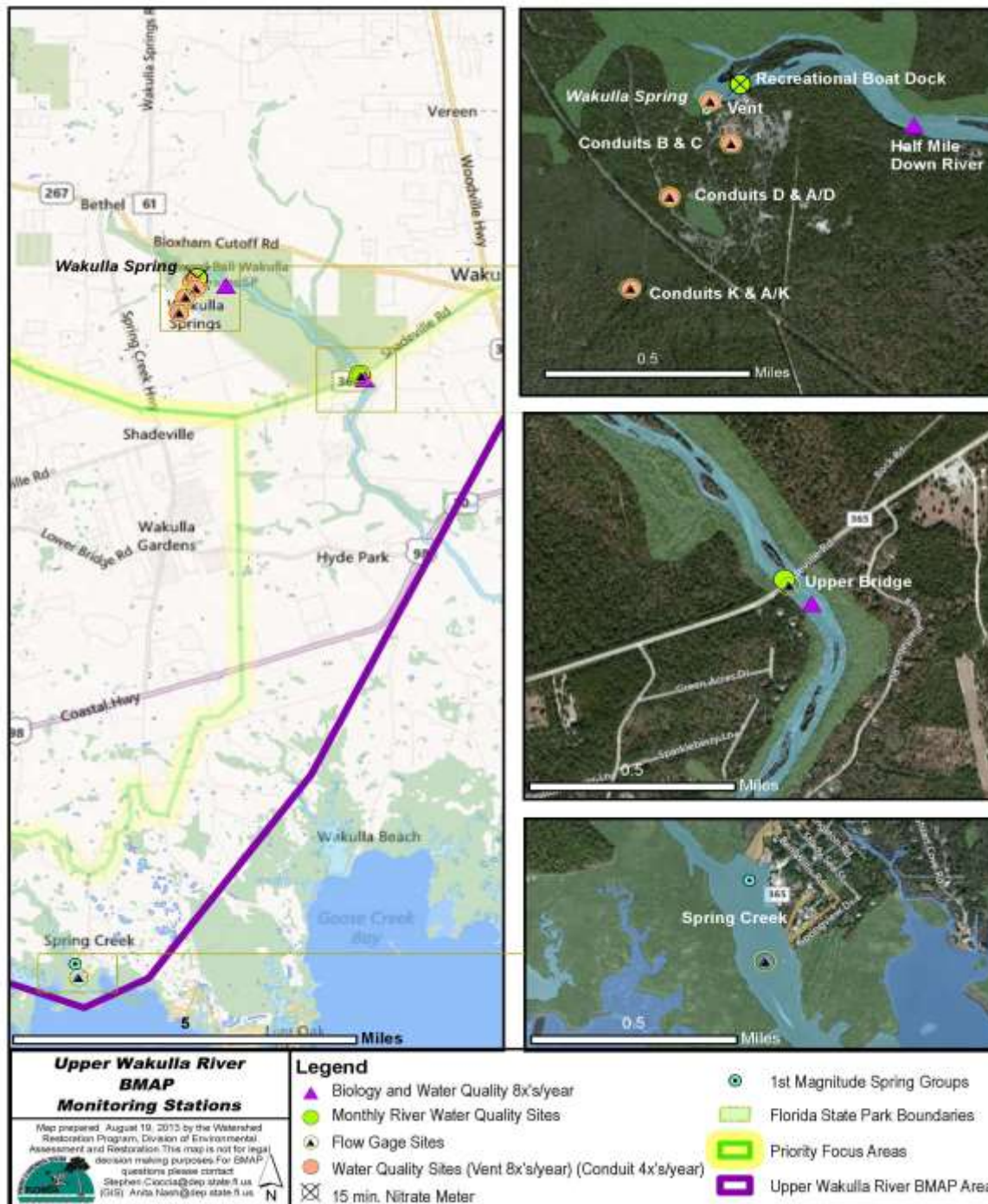
Water Quality Monitoring

- Primary objectives:
 - Track trends in nitrate concentrations and loads in the Upper Wakulla River and Wakulla Springs.
 - Track trends in the biological communities in the Upper Wakulla River.
- For the first objective, water quality data will be collected at the spring vent, major conduits (B-, C-, D-, AD-, K-, and AK-tunnels), recreation area boat dock, and upper bridge areas.
- Flow data will also be collected at the major conduits and Spring Creek.



Water Quality Monitoring, continued

- For the second objective, biological data will be collected at two locations using the following assessments:
 - Rapid periphyton survey (RPS).
 - Linear vegetation survey (LVS)
 - Stream condition index (SCI).
 - Habitat assessment (HA).





Research Studies

- During the BMAP process, the stakeholders identified several research items they would like to pursue, if funding becomes available.
- These research items were reviewed at a previous meeting and updated based on feedback from the stakeholders.



Commitment to Plan Implementation

- While the BMAP is linked by statute to permitting and other enforcement processes, successful implementation requires that local stakeholders willingly and consistently work together to attain adopted TMDLs.
- This collaboration fosters the sharing of ideas, information, and resources.
- The stakeholders have demonstrated their willingness to confer with and support each other in their efforts.



Comments and Questions on Chapter 6





Appendices



Appendices

- Appendix A: TMDL Basin Rotation Schedule
 - Explains the Department's watershed assessment cycle.
- Appendix B: Summary of Statutory Provisions Guiding BMAP Development and Implementation
 - Includes excerpts from Sections 403.067(6) and (7) in Florida Statutes.
- Appendix C: Rule 62-304(2), F.A.C., the Upper Wakulla River TMDL
 - Identifies the TMDL targets for the BMAP.
 - Rule language for the Upper Wakulla River TMDL.



Appendices, continued

- Appendix D: City of Tallahassee Stormwater Treatment Projects in the Upper Wakulla River and Wakulla Spring Basin
 - Table and map of the city's stormwater treatment projects in the basin.
- Appendix E: Glossary of Terms
- Appendix F: Bibliography of Key References and Websites



Comments and Questions on the Appendices





BMAP Review Schedule



BMAP Review Process

Action	Involved Parties	Date
Draft BMAP to stakeholders for review	Department and Technical Stakeholders	Sent - September 12, 2013
Technical meeting to discuss Draft BMAP	Department and Technical Stakeholders	Today - September 19, 2013
<i>Comments on Draft BMAP due to the Department</i>	<i>Technical Stakeholders</i>	<i>October 3, 2013</i>
Revised Draft BMAP for stakeholder and public review	Department	October 10, 2013
Public workshop on the BMAP	Department and Public	October 17, 2013
Public comment period closes (30 days from BMAP sent to stakeholders and public)	Department	November 8, 2013



Department Adoption Process

Action	Date
Brief Department management on BMAP	Mid-November 2013
Brief Department Deputy Secretary on BMAP	Mid-November 2013
Brief Department Secretary on BMAP and obtain Secretarial approval	End-November 2013
Notify interested parties and place Florida Administrative Register (FAR) notice	End-November 2013
End of challenge period (21-days after notice)	End-December 2013
BMAP adopted and enforceable (if there are no challenges)	End-December 2013



Questions on the Review Schedule

